CONRAD YELVINGTON

DISTRIBUTORS, INC.

RECEIVED
OCT 02 2000
BUREAU OF AIR REGULATION

RECEIVED
OCT 02 2000
DIVISION OF AIR RESOURCES MANAGEMENT

September 28, 2000

Mr. Bill Leffler, PE
FDEP Air Resources Mgmt.
2600 Blair Stone Road MS 5500
Tallahassee, FL 32399-2400

FEDERAL EXPRESS #821960254061

Re: Transmittal of Conrad Yelvington Dist., Inc. (CYDI) Portable Power Screen Permit modification to allow spent abrasives

Dear Mr. Leffler:

Enclosed please find a letter from Ms. Stephanie Brooks, PE of Brooks & Associates, Inc., which attaches application pages that have been changed to include spent abrasives as a material. Please review this application for modification. If it meets with your approval, please process same.

Should you have any questions please contact either Ms. Stephanie Brooks at 954.796.1987 or myself at 904.547.5107.

With Best Wishes,

I am
Sincerely,

William C. Thomas III
Vice President of Industrial Development & Operations

WCT/krk

cc: Ms. Stephanie Brooks, PE, Brooks & Associates, Inc.
Mr. Gary Yelvington, President, CYDI
Mr. Frank Milton, Manager of Business Development, CYDI

Brooks & Associates, Inc.
Engineering and Environmental Consulting

Mr. Bill Leffler, PE
FDEP Air Resources Mgmt
2600 Blair Stone RD MS 5500
Tallahassee FL 32399-2400

RE: Conrad Yelvington Distributors Inc. Portable Power Screen Permit
Modification to allow spent abrasives

Dear Mr. Leffler,

Please find enclosed the application pages that have been changed to include spent abrasives as a material. The emissions calculations are based on processing 550 tons per hour of spent abrasives 24 hours per day, 365 days per year. The emissions were also based on information provided by the TCLP test results of samples of the material. I used the most restrictive number in the cases where the tests failed to detect any of the pollutant being tested for, and I averaged the three results for Barium. Barium and Silver are included in my calculations even though they are not listed as hazardous air pollutants. The emission calculations treat all of the emissions as particulate matter emissions and have already been accounted for in the general particulate matter emission calculations previously submitted.

Based on the calculations and Conrad Yelvington Distributors Inc. continuing in the practice of not accepting any spent abrasive materials that fail the TCLP, the emission unit will comply with all applicable rules and regulations.

Should you have any questions please call me at (954) 796-1987.

Sincerely,

Stephanie S Brooks, PE

Stephanie S. Brooks PE

Cc: Mr. Bill Thomas, CYDI

5068 NW 85th Rd. Coral Springs, FL 33067
Phone: (954) 796-1987 Fax: (954) 796-1984

	ppm	lb/hr	tpy
Arsenic	0.040	0.044	0.19
Barium	0.599	0.659	2.89
Cadmium	0.025	0.028	0.12
Chromium	0.050	0.055	0.24
Lead	0.050	0.055	0.24
Selenium	0.050	0.055	0.24
silver	0.020	0.022	0.10
Mercury	0.002	0.002	0.01

STEPHANIE S. BROOKS
NO. 42489

Stephanie S Brooks PE
9-22-00

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Advanced Environmental Laboratories, Inc.

Aanlytical Report

Client:	Gulf Marine Repair.	**Report No.:**	J001042
Project No.:	32937	**Date Sampled:**	Unknown
Matrix:	TCLP Extract	**Date Submitted:**	5/9/00
		Date Reported:	5/11/00
		Page No.:	2 of 2

[redacted]

Units: mg/L

					J001042-1	J001108-1-mb
Aanlyte	**Method**	**MRL**	**TCLP Limits**	**Lab Code: Date Aanlyzed**	**Sand Blast**	**Method Blank**
Arsenic	6010B	0.050	5.0	5/10/00	U	U
Barium	6010B	0.25	100	5/10/00	**0.568**	U
Cadmium	6010B	0.025	1.0	5/10/00	U	U
Chromium	6010B	0.05	5.0	5/10/00	U	U
Lead	6010B	0.050	5.0	5/10/00	U	U
Selenium	6010B	0.05	1.0	5/10/00	U	U
Silver	6010B	0.05	5.0	5/10/00	U	U
Mercury	7470A	0.0020	0.20	5/10/00	U	U

GALE
EUSTACE

Not detected above the MRL

RL Method Reporting Limit

DHRS # 82315

**Southeastern Environmental
Laboratories, Inc.
80 Industrial Loop North, Building 5
Orange Park, FL 32073
(904) 269-6176**

DHRS E-82179

CQAP # 880633G

Conrad Yelvington
460 Bay Point Way N.
Jacksonville, Florida 32259

Sampled By: Client
Client Job/PO No.: H/S – TITUSVILLE
Project Name: Sandblasting Abrasive
Submission Number: 9900160
Reported Date: 11/17/99

Description **Sample ID**

Sandblasting Abrasive

Sample Date: 11/10/99

Parameter	**Result**	**Units**	**Method**	**Analyst Initials**	**Date/Time**
Arsenic	U 0.25	mg/l	1311/6010	VP	11/17/99
Barium	0.13	mg/l	1311/6010	VP	11/17/99
Cadmium	U 0.10	mg/l	1311/6010	VP	11/17/99
Chromium	U 0.10	mg/l	1311/6010	VP	11/17/99
Lead	U 0.10	mg/l	1311/6010	VP	11/17/99
Mercury	U 0.005	mg/l	1311/7471	VP	11/17/99
Selenium	U 0.25	mg/l	1311/6010	VP	11/17/99
Silver	U 0.20	mg/l	1311/272.1	VP	11/17/99

5 Day Turn Around

Approved By: ______________________

SCHNEIDER LABORATORIES

INCORPORATED
2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • (FAX) 804-353-6928
Excellence in Service and Technology
AIHA 8938, ELLAP 8836, NVLAP 1150, NYELAP 11413, CAELAP 2078

LABORATORY ANALYSIS REPORT

EPA SW846 Method 1311 (Toxicity Characteristic Leachate Procedure)

ACCOUNT:	1999-09-23	**DATE COLLECTED:**	7/27/99
CLIENT:	Worth Contracting	**DATE RECEIVED:**	7/29/99
ADDRESS:	2112 Jernigan Rd Jacksonville, Fl. 32207	**DATE ANALYZED:**	8/2/99
		DATE REPORTED:	8/2/99
P.O.#:			
PROJECT NAME:	Washington Terrace	**SAMPLE TYPE:**	TCLP
PROJECT NO.:	230		
JOB LOCATION:	St. Pete, Fl.		
CLIENT SAMPLE NO.:	23010		
SLI SAMPLE NO.:	1999319		

METAL NAME:	ACTUAL CONC.	UNITS	ANALYSIS METHOD	REGULATORY LIMIT(ppm)
Arsenic (As)	<0.04	ppm	EPA 6010	5.0
Barium (Ba)	1.19	ppm	EPA 6010	100.0
Cadmium (Cd)	<0.02	ppm	EPA 6010	1.0
Chromium (Cr)	0.06	ppm	EPA 6010	5.0
Lead (Pb)	<0.20	ppm	EPA 7420	5.0
Mercury (Hg)	<0.005	ppm	EPA 7470	0.2
Selenium (Se)	<0.06	ppm	EPA 6010	1.0
Silver (Ag)	<0.02	ppm	EPA 6010	5.0

SAMPLE TYPE: Blast Waste
SAMPLE pH: 8.35
ANALYST: CAROLYN C. RING

Matthew D. Asbury
REVIEWED BY Matthew D. Asbury, Analyst

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*Quality Control Data available upon request. *For true values, assume 2 significant figures. Sample concentrations below the Minimum Reporting Limit are indicated with a "less than" (<) sign. Note on measurement units: mg/L = ppm (parts per million). All testing is done in strict accordance with Schneider Laboratories, Inc. protocol.*

C. FACILITY POLLUTANTS

Facility Pollutant Information

1. Pollutant Emitted	2. Pollutant Classification
PM	B
H114	
H015	
H027	
H046	
PB	
H162	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 1

1. Pollutant Emitted : **H027**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 0.0280000 lb/hour 0.1200000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units ppm Reference : Source Test
7. Emissions Method Code : 1
8. Calculations of Emissions : 0.025 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.028 lb/hr 0.028 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.12 tpy
9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 2

1. Pollutant Emitted : **H114**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : 0.0020000 lb/hour	0.0100000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor 0 Units ppm Reference : Source Testing	
7. Emissions Method Code : 1	
8. Calculations of Emissions : 0.002 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.002 lb/hr 0.002 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.01 tpy	
9. Pollutant Potential/Estimated Emissions Comment :	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 3

1. Pollutant Emitted : **H015**

2. Total Percent Efficiency of Control : %

3. Potential Emissions :
0.0440000 lb/hour 0.1900000 tons/year

4. Synthetically Limited?
[ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
to tons/year

6. Emissions Factor 0 Units ppm
Reference : Source Test

7. Emissions Method Code : 1

8. Calculations of Emissions :

0.04 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.044 lb/hr
0.044 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.19 tpy

9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 4

1. Pollutant Emitted : **H046**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : 0.0550000 lb/hour	0.2400000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor 0 Units ppm Reference : Source Test	
7. Emissions Method Code : 1	
8. Calculations of Emissions : 0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr 0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy	
9. Pollutant Potential/Estimated Emissions Comment : The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION

(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 5

1. Pollutant Emitted : **PB**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 0.0550000 lb/hour 0.2400000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units ppm Reference : Source Test
7. Emissions Method Code : 1
8. Calculations of Emissions : 0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr 0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy
9. Pollutant Potential/Estimated Emissions Comment : The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 6

1. Pollutant Emitted : **H162**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 0.0550000 lb/hour 0.2400000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units ppm Reference : Test Report
7. Emissions Method Code : 1
8. Calculations of Emissions : 0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr 0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy
9. Pollutant Potential/Estimated Emissions Comment : The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

	ppm	lb/hr	tpy
Arsenic	0.040	0.044	0.19
Barium	0.599	0.659	2.89
Cadmium	0.025	0.028	0.12
Chromium	0.050	0.055	0.24
Lead	0.050	0.055	0.24
Selenium	0.050	0.055	0.24
silver	0.020	0.022	0.10
Mercury	0.002	0.002	0.01

Stephanie S. Brooks PE

4-22-00

STEPHANIE S. BROOKS
NO. 42489

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Advanced Environmental Laboratories, Inc.

Aanlytical Report

Client:	Gulf Marine Repair.	**Report No.:**	J001042
Project No.:	32937	**Date Sampled:**	Unknown
Matrix:	TCLP Extract	**Date Submitted:**	5/9/00
		Date Reported:	5/11/00
		Page No.:	2 of 2

[redacted]

Units: mg/L

				Lab Code:	J001042-1	J001108-1-mb
Aanlyte	**Method**	**MRL**	**TCLP Limits**	**Date Aanlyzed**	**Sand Blast**	**Method Blank**
Arsenic	6010B	0.050	5.0	5/10/00	U	U
Barium	6010B	0.25	100	5/10/00	0.568	U
Cadmium	6010B	0.025	1.0	5/10/00	U	U
Chromium	6010B	0.05	5.0	5/10/00	U	U
Lead	6010B	0.050	5.0	5/10/00	U	U
Selenium	6010B	0.05	1.0	5/10/00	U	U
Silver	6010B	0.05	5.0	5/10/00	U	U
Mercury	7470A	0.0020	0.20	5/10/00	U	U

GALE EUSTACE

Not detected above the MRL
RL Method Reporting Limit

DHRS # 82315

Southeastern Environmental
Laboratories, Inc.
80 Industrial Loop North, Building 5
Orange Park, FL 32073
(904) 269-6176

DHRS E-82179

CQAP # 880633G

Conrad Yelvington
460 Bay Point Way N.
Jacksonville, Florida 32259

Sampled By: Client
Client Job/PO No.: H/S – [illegible]
Project Name: Sandblasting Abrasive
Submission Number: 9900160
Reported Date: 11/17/99

Description **Sample ID**

Sandblasting Abrasive

Sample Date: 11/10/99

Parameter	**Result**	**Units**	**Method**	**Analyst Initials**	**Date/Time**
Arsenic	U 0.25	mg/l	1311/6010	VP	11/17/99
Barium	0.13	mg/l	1311/6010	VP	11/17/99
Cadmium	U 0.10	mg/l	1311/6010	VP	11/17/99
Chromium	U 0.10	mg/l	1311/6010	VP	11/17/99
Lead	U 0.10	mg/l	1311/6010	VP	11/17/99
Mercury	U 0.005	mg/l	1311/7471	VP	11/17/99
Selenium	U 0.25	mg/l	1311/6010	VP	11/17/99
Silver	U 0.20	mg/l	1311/272.1	VP	11/17/99

5 Day Turn Around

Approved By: Bradford Murphy

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SCHNEIDER LABORATORIES

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LABORATORY ANALYSIS REPORT

EPA SW846 Method 1311 (Toxicity Characteristic Leachate Procedure)

ACCOUNT: 1069-99-23
CLIENT: Worth Contracting
ADDRESS: 2112 Jernigan Rd
Jacksonville, Fl. 32207
P.O.#:
PROJECT NAME: Washington Terrace
PROJECT NO.: 239
JOB LOCATION: St. Pete, Fl.
CLIENT SAMPLE NO.: 23010
SLI SAMPLE NO.: 1996319

DATE COLLECTED: 7/27/99
DATE RECEIVED: 7/29/99
DATE ANALYZED: 8/2/99
DATE REPORTED: 8/2/99

SAMPLE TYPE: TCLP

METAL NAME:	ACTUAL CONC.	UNITS	ANALYSIS METHOD	REGULATORY LIMIT(ppm)
Arsenic (As)	<0.04	ppm	EPA 6010	5.0
Barium (Ba)	1.19	ppm	EPA 6010	100.0
Cadmium (Cd)	<0.02	ppm	EPA 6010	1.0
Chromium (Cr)	0.05	ppm	EPA 6010	5.0
Lead (Pb)	<0.20	ppm	EPA 7420	5.0
Mercury (Hg)	<0.005	ppm	EPA 7470	0.2
Selenium (Se)	<0.05	ppm	EPA 6010	1.0
Silver (Ag)	<0.02	ppm	EPA 6010	5.0

SAMPLE TYPE: Blast Waste
SAMPLE pH: 9.35
ANALYST: CAROLYN C. RING

REVIEWED BY Matthew D. [illegible], Analyst

*Quality Control Data available upon request. *For true values, assume 2 significant figures. Sample concentrations below the Minimum Reporting Limit are indicated with a "less than" (<) sign. Note on measurement units: mg/L = ppm (parts per million). All testing is done in strict accordance with Schneider Laboratories, Inc. protocol.*

C. FACILITY POLLUTANTS

Facility Pollutant Information

1. Pollutant Emitted	2. Pollutant Classification
PM	B
H114	
H015	
H027	
H046	
PB	
H162	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 1

1. Pollutant Emitted : **H027**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : 0.0280000 lb/hour	0.1200000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor 0 Units ppm Reference : Source Test	
7. Emissions Method Code : 1	
8. Calculations of Emissions : 0.025 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.028 lb/hr 0.028 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.12 tpy	
9. Pollutant Potential/Estimated Emissions Comment :	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 2

1. Pollutant Emitted : **H114**

2. Total Percent Efficiency of Control : %

3. Potential Emissions :
0.0020000 lb/hour 0.0100000 tons/year

4. Synthetically Limited?
[ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
to tons/year

6. Emissions Factor 0 Units ppm
Reference : Source Testing

7. Emissions Method Code : 1

8. Calculations of Emissions :

0.002 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.002 lb/hr
0.002 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.01 tpy

9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 3

1. Pollutant Emitted : **H015**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 0.0440000 lb/hour 0.1900000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units ppm Reference : Source Test
7. Emissions Method Code : 1
8. Calculations of Emissions : 0.04 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.044 lb/hr 0.044 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.19 tpy
9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 4

1. Pollutant Emitted : **H046**

2. Total Percent Efficiency of Control : %

3. Potential Emissions :
0.0550000 lb/hour 0.2400000 tons/year

4. Synthetically Limited?
[ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
to tons/year

6. Emissions Factor 0 Units ppm
Reference : Source Test

7. Emissions Method Code : 1

8. Calculations of Emissions :

0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr
0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy

9. Pollutant Potential/Estimated Emissions Comment :

The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 5

1. Pollutant Emitted : **PB**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 0.0550000 lb/hour 0.2400000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units ppm Reference : Source Test
7. Emissions Method Code : 1
8. Calculations of Emissions : 0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr 0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy
9. Pollutant Potential/Estimated Emissions Comment : The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 6

1. Pollutant Emitted : **H162**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 0.0550000 lb/hour 0.2400000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units ppm Reference : Test Report
7. Emissions Method Code : 1
8. Calculations of Emissions : 0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr 0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy
9. Pollutant Potential/Estimated Emissions Comment : The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

	ppm	lb/hr	tpy
Arsenic	0.040	0.044	0.19
Barium	0.599	0.659	2.89
Cadmium	0.025	0.028	0.12
Chromium	0.050	0.055	0.24
Lead	0.050	0.055	0.24
Selenium	0.050	0.055	0.24
silver	0.020	0.022	0.10
Mercury	0.002	0.002	0.01

Stephanie S Brooks PE

9-22-00

STEPHANIE S. BROOKS

NO. 42489

Advanced Environmental Laboratories, Inc.

Aanlytical Report

Client:	Gulf Marine Repair.		**Report No.:**	J001042
Project No.:	32937		**Date Sampled:**	Unknown
Matrix:	TCLP Extract		**Date Submitted:**	5/9/00
			Date Reported:	5/11/00
			Page No.:	2 of 2

[redacted]

Units: mg/L

				Lab Code:	J001042-1	J001108-1-mb
Aanlyte	**Method**	**MRL**	**TCLP Limits**	**Date Aanlyzed**	**Sand Blast**	**Method Blank**
Arsenic	6010B	0.050	5.0	5/10/00	U	U
Barium	6010B	0.25	100	5/10/00	**0.568**	U
Cadmium	6010B	0.025	1.0	5/10/00	U	U
Chromium	6010B	0.05	5.0	5/10/00	U	U
Lead	6010B	0.050	5.0	5/10/00	U	U
Selenium	6010B	0.05	1.0	5/10/00	U	U
Silver	6010B	0.05	5.0	5/10/00	U	U
Mercury	7470A	0.0020	0.20	5/10/00	U	U

GALE
EUSTACE

Not detected above the MRL

RL. Method Reporting Limit

DHRS # 82315

Southeastern Environmental Laboratories, Inc.
80 Industrial Loop North, Building 5
Orange Park, FL 32073
(904) 269-6176

DHRS E-82179

CQAP # 880633G

Conrad Yelvington
460 Bay Point Way N.
Jacksonville, Florida 32259

Sampled By:	Client
Client Job/PO No.:	H/S - [illegible]
Project Name:	Sandblasting Abrasive
Submission Number:	9900160
Reported Date:	11/17/99

Description **Sample ID**

Sandblasting Abrasive

Sample Date: 11/10/99

Parameter	Result	Units	Method	Analyst Initials	Date/Time
Arsenic	U 0.25	mg/l	1311/6010	VP	11/17/99
Barium	0.13	mg/l	1311/6010	VP	11/17/99
Cadmium	U 0.10	mg/l	1311/6010	VP	11/17/99
Chromium	U 0.10	mg/l	1311/6010	VP	11/17/99
Lead	U 0.10	mg/l	1311/6010	VP	11/17/99
Mercury	U 0.005	mg/l	1311/7471	VP	11/17/99
Selenium	U 0.25	mg/l	1311/6010	VP	11/17/99
Silver	U 0.20	mg/l	1311/272.1	VP	11/17/99

5 Day Turn Around

Approved By:

SCHNEIDER LABORATORIES

INCORPORATED

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • (FAX) 804-353-6928
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AIHA 8936, ELLAP 8836, NVLAP 1150, NYELAP 11413, CAELAP 2075

LABORATORY ANALYSIS REPORT

EPA SW846 Method 1311 (Toxicity Characteristic Leachate Procedure)

ACCOUNT:	1669-99-23	**DATE COLLECTED:**	7/27/99
CLIENT:	Worth Contracting	**DATE RECEIVED:**	7/29/99
ADDRESS:	2112 Jernigan Rd Jacksonville, Fl. 32207	**DATE ANALYZED:**	8/2/99
		DATE REPORTED:	8/2/99
P.O.#:			
PROJECT NAME:	Washington Terrace	**SAMPLE TYPE:**	TCLP
PROJECT NO.:	239		
JOB LOCATION:	St. Pete, Fl.		
CLIENT SAMPLE NO.:	23610		
SLI SAMPLE NO.:	1990319		

METAL NAME:	ACTUAL CONC.	UNITS	ANALYSIS METHOD	REGULATORY LIMIT(ppm)
Arsenic (As)	<0.04	ppm	EPA 6010	5.0
Barium (Ba)	1.19	ppm	EPA 6010	100.0
Cadmium (Cd)	<0.02	ppm	EPA 6010	1.0
Chromium (Cr)	0.05	ppm	EPA 6010	5.0
Lead (Pb)	<0.20	ppm	EPA 7420	5.0
Mercury (Hg)	<0.005	ppm	EPA 7470	0.2
Selenium (Se)	<0.06	ppm	EPA 6010	1.0
Silver (Ag)	<0.02	ppm	EPA 6010	5.0

SAMPLE TYPE: Blast Waste
SAMPLE pH: 8.38
ANALYST: CAROLYN C. RING

Matthew D. Asbury
REVIEWED BY Matthew D. Asbury, Analyst

---

*Quality Control Data available upon request. *For true values, assume 2 significant figures. Sample concentrations below the Minimum Reporting Limit are indicated with a "less than (<)" sign. Note on measurement units: mg/L = ppm (parts per million). All testing is done in strict accordance with Schneider Laboratories, Inc. protocol.*

C. FACILITY POLLUTANTS

Facility Pollutant Information

1. Pollutant Emitted	2. Pollutant Classification
PM	B
H114	
H015	
H027	
H046	
PB	
H162	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION

(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 1

1. Pollutant Emitted : **H027**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 0.0280000 lb/hour 0.1200000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units ppm Reference : Source Test
7. Emissions Method Code : 1
8. Calculations of Emissions : 0.025 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.028 lb/hr 0.028 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.12 tpy
9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 2

1. Pollutant Emitted : **H114**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 0.0020000 lb/hour 0.0100000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units ppm Reference : Source Testing
7. Emissions Method Code : 1
8. Calculations of Emissions : 0.002 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.002 lb/hr 0.002 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.01 tpy
9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 3

1. Pollutant Emitted : **H015**		
2. Total Percent Efficiency of Control : %		
3. Potential Emissions :	0.0440000 lb/hour	0.1900000 tons/year
4. Synthetically Limited? [ ] Yes [X] No		
5. Range of Estimated Fugitive/Other Emissions:	to	tons/year
6. Emissions Factor 0 Reference : Source Test	Units ppm	
7. Emissions Method Code : 1		
8. Calculations of Emissions : 0.04 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.044 lb/hr 0.044 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.19 tpy		
9. Pollutant Potential/Estimated Emissions Comment :		

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 4

1. Pollutant Emitted : **H046**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : 0.0550000 lb/hour	0.2400000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor 0 Reference : Source Test	Units ppm
7. Emissions Method Code : 1	
8. Calculations of Emissions : 0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr 0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy	
9. Pollutant Potential/Estimated Emissions Comment : The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 5

1. Pollutant Emitted : **PB**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : 0.0550000 lb/hour	0.2400000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor 0 Reference : Source Test	Units ppm
7. Emissions Method Code : 1	
8. Calculations of Emissions : 0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr 0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy	
9. Pollutant Potential/Estimated Emissions Comment : The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION

(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 6

1. Pollutant Emitted : **H162**	
2. Total Percent Efficiency of Control :	%
3. Potential Emissions : 0.0550000 lb/hour	0.2400000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor 0 Reference : Test Report	Units ppm
7. Emissions Method Code : 1	
8. Calculations of Emissions : 0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr 0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy	
9. Pollutant Potential/Estimated Emissions Comment : The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION

(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

	ppm	lb/hr	tpy
Arsenic	0.040	0.044	0.19
Barium	0.599	0.659	2.89
Cadmium	0.025	0.028	0.12
Chromium	0.050	0.055	0.24
Lead	0.050	0.055	0.24
Selenium	0.050	0.055	0.24
silver	0.020	0.022	0.10
Mercury	0.002	0.002	0.01

STEPHANIE S. BROOKS

Stephanie S. Brooks P.E.

Advanced Environmental Laboratories, Inc.

Aanlytical Report

Client:	Gulf Marine Repair.		**Report No.:**	J001042
Project No.:	32937		**Date Sampled:**	Unknown
Matrix:	TCLP Extract		**Date Submitted:**	5/9/00
			Date Reported:	5/11/00
			Page No.:	2 of 2

[redacted]

Units: mg/L

				Lab Code:	J001042-1	J001108-1-mb
Aanlyte	**Method**	**MRL**	**TCLP Limits**	**Date Aanlyzed**	**Sand Blast**	**Method Blank**
Arsenic	6010B	0.050	5.0	5/10/00	U	U
Barium	6010B	0.25	100	5/10/00	**0.568**	U
Cadmium	6010B	0.025	1.0	5/10/00	U	U
Chromium	6010B	0.05	5.0	5/10/00	U	U
Lead	6010B	0.050	5.0	5/10/00	U	U
Selenium	6010B	0.05	1.0	5/10/00	U	U
Silver	6010B	0.05	5.0	5/10/00	U	U
Mercury	7470A	0.0020	0.20	5/10/00	U	U

GALE EUSTACE

Not detected above the MRL

RL. Method Reporting Limit

DHRS # 82315

Southeastern Environmental
Laboratories, Inc.
80 Industrial Loop North, Building 5
Orange Park, FL 32073
(904) 269-6176

DHRS E-82179

CQAP # 880633G

Conrad Yelvington
460 Bay Point Way N.
Jacksonville, Florida 32259

Sampled By: Client
Client Job/PO No.: H/S - TTMVUICCE
Project Name: Sandblasting Abrasive
Submission Number: 9900160
Reported Date: 11/17/99

Description	**Sample ID**
Sandblasting Abrasive	

Sample Date: 11/10/99

Parameter	**Result**	**Units**	**Method**	**Analyst Initials**	**Date/Time**
Arsenic	U 0.25	mg/l	1311/6010	VP	11/17/99
Barium	0.13	mg/l	1311/6010	VP	11/17/99
Cadmium	U 0.10	mg/l	1311/6010	VP	11/17/99
Chromium	U 0.10	mg/l	1311/6010	VP	11/17/99
Lead	U 0.10	mg/l	1311/6010	VP	11/17/99
Mercury	U 0.005	mg/l	1311/7471	VP	11/17/99
Selenium	U 0.25	mg/l	1311/6010	VP	11/17/99
Silver	U 0.20	mg/l	1311/272.1	VP	11/17/99

5 Day Turn Around

Approved By: Bradford B Murphy

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LABORATORY ANALYSIS REPORT

EPA SW846 Method 1311 (Toxicity Characteristic Leachate Procedure)

ACCOUNT: 1669-99-23
CLIENT: Worth Contracting
ADDRESS: 2112 Jernigan Rd
Jacksonville, Fl. 32207
P.O.#:
PROJECT NAME: Washington Terrace
PROJECT NO.: 239
JOB LOCATION: St. Pete, Fl.
CLIENT SAMPLE NO.: 23810
SLI SAMPLE NO.: 1998319

DATE COLLECTED: 7/27/99
DATE RECEIVED: 7/29/99
DATE ANALYZED: 8/2/99
DATE REPORTED: 8/2/99
SAMPLE TYPE: TCLP

METAL NAME:	ACTUAL CONC.	UNITS	ANALYSIS METHOD	REGULATORY LIMIT(ppm)
Arsenic (As)	<0.04	ppm	EPA 6010	5.0
Barium (Ba)	1.19	ppm	EPA 6010	100.0
Cadmium (Cd)	<0.02	ppm	EPA 6010	1.0
Chromium (Cr)	0.05	ppm	EPA 6010	5.0
Lead (Pb)	<0.20	ppm	EPA 7420	5.0
Mercury (Hg)	<0.005	ppm	EPA 7470	0.2
Selenium (Se)	<0.05	ppm	EPA 6010	1.0
Silver (Ag)	<0.02	ppm	EPA 6010	5.0

SAMPLE TYPE: Blast Waste
SAMPLE pH: 9.35
ANALYST: CAROLYN C. RING

Matthew D.
REVIEWED BY Matthew D. Asbury, Analyst

*Quality Control Data available upon request. *For true values, assume 2 significant figures. Sample concentrations below the Minimum Reporting Limit are indicated with a "less than" (<) sign. Note on measurement units: mg/L = ppm (parts per million). Air testing is done in strict accordance with Schneider Laboratories, Inc. protocol.*

C. FACILITY POLLUTANTS

Facility Pollutant Information

1. Pollutant Emitted	2. Pollutant Classification
PM	B
H114	
H015	
H027	
H046	
PB	
H162	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 1

1. Pollutant Emitted : **H027**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : 0.0280000 lb/hour	0.1200000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor 0 Reference : Source Test	Units ppm
7. Emissions Method Code : 1	
8. Calculations of Emissions : 0.025 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.028 lb/hr 0.028 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.12 tpy	
9. Pollutant Potential/Estimated Emissions Comment :	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION

(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 2

1. Pollutant Emitted : **H114**

2. Total Percent Efficiency of Control : %

3. Potential Emissions :
0.0020000 lb/hour 0.0100000 tons/year

4. Synthetically Limited?
[ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
to tons/year

6. Emissions Factor 0 Units ppm
Reference : Source Testing

7. Emissions Method Code : 1

8. Calculations of Emissions :

0.002 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.002 lb/hr
0.002 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.01 tpy

9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 3

1. Pollutant Emitted : **H015**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : 0.0440000 lb/hour	0.1900000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor 0 Reference : Source Test	Units ppm
7. Emissions Method Code : 1	
8. Calculations of Emissions : 0.04 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.044 lb/hr 0.044 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.19 tpy	
9. Pollutant Potential/Estimated Emissions Comment :	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 4

1. Pollutant Emitted : **H046**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : 0.0550000 lb/hour	0.2400000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor 0 Reference : Source Test	Units ppm
7. Emissions Method Code : 1	
8. Calculations of Emissions : 0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr 0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy	
9. Pollutant Potential/Estimated Emissions Comment : The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 5

1. Pollutant Emitted : **PB**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : 0.0550000 lb/hour	0.2400000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor 0 Reference : Source Test	Units ppm
7. Emissions Method Code : 1	
8. Calculations of Emissions : 0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr 0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy	
9. Pollutant Potential/Estimated Emissions Comment : The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Pollutant Potential/Estimated Emissions : Pollutant 6

1. Pollutant Emitted : **H162**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 0.0550000 lb/hour 0.2400000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units ppm Reference : Test Report
7. Emissions Method Code : 1
8. Calculations of Emissions : 0.05 ppm * 550 tph* (2000lb/ton)*(1lb/1000000lb) = 0.055 lb/hr 0.055 lb/hr * 8760 hr/yr / 2000 lb/ton = 0.24 tpy
9. Pollutant Potential/Estimated Emissions Comment : The 0.05 ppm is a detection limit from the lab. The tests show that the TCLP limits are being met and that the material being tested is under detection limits.

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

federal register

Tuesday
May 26, 1998

Part II

Environmental Protection Agency

40 CFR Parts 148, 261, 266, 268, and 271

Land Disposal Restrictions Phase IV: Final Rule Promulgating Treatment Standards for Metal Wastes and Mineral Processing Wastes; Mineral Processing Secondary Materials and Bevill Exclusion Issues; Treatment Standards for Hazardous Soils, and Exclusion of Recycled Wood Preserving Wastewaters; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 148, 261, 266, 268, and 271

[EPA–F–98–2P4F–FFFFF; FRL–6010–5]

RIN 2050 AE05

Land Disposal Restrictions Phase IV: Final Rule Promulgating Treatment Standards for Metal Wastes and Mineral Processing Wastes; Mineral Processing Secondary Materials and Bevill Exclusion Issues; Treatment Standards for Hazardous Soils, and Exclusion of Recycled Wood Preserving Wastewaters

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This rule promulgates Land Disposal Restrictions treatment standards for metal-bearing wastes, including toxicity characteristic metal wastes, and hazardous wastes from mineral processing. The set of standards being applied to these wastes is the universal treatment standards. These standards are based upon the performance of the Best Demonstrated Available technologies for treating these, or similar, wastes. This rule also revises the universal treatment standards for twelve metal constituents, which means that listed and characteristic wastes containing one or more of these constituents may have to meet different standards than they currently do.

In a related section regarding wastes and secondary materials from mineral processing, EPA is amending the rules to define which secondary materials from mineral processing are considered to be wastes and potentially subject to Land Disposal Restrictions. The intended effect is to encourage safe recycling of mineral processing secondary materials by reducing regulatory obstacles to recycling, while ensuring that hazardous wastes are properly treated and disposed. EPA also is finalizing decisions on a set of mineral processing issues wastes which courts have been remanded to EPA. These include retaining the Toxicity Characteristic Leaching Procedure as the test for identifying the toxicity characteristic for mineral processing wastes, and readdressing the regulatory status of a number of miscellaneous mineral processing wastes.

This rule also amends the LDR treatment standards for soil contaminated with hazardous waste. The purpose of this revision is to create standards which are more technically and environmentally appropriate to contaminated soils than those which currently apply.

Finally, this rule excludes from the definition of solid waste certain shredded circuit boards in recycling operations, as well as certain materials reused in wood preserving operations.

EFFECTIVE DATES: This final rule is effective on August 24, 1998.

Compliance dates:

—For prohibition on underground injection of certain wastes at 40 CFR 148.18: May 26, 2000;
—For definition of solid waste provisions at 40 CFR 261.2, 261.4(a)(15), and 261.4(b): November 27, 1998;
—For exclusion of recycled wood preserving wastewaters at 40 CFR 261.4(a)(9): May 26, 1998;
—For prohibition on land disposal of wastes from elemental phosphorus processing and on mixed radioactive wastes at 40 CFR 268.34(b): May 26, 2000; and
—For land Disposal Restrictions treatment standards at 40 CFR 268.49 for soil contaminated with previously prohibited wastes: May 26, 1998.

ADDRESSES: Supporting materials are available for viewing in the RCRA Information Center (RIC), located at Crystal Gateway I, First Floor, 1235 Jefferson Davis Highway, Arlington, Virginia. The docket information number is F–98–2P4F–FFFFF. The RIC is open from 9 a.m. to 4 p.m., Monday through Friday, excluding federal holidays. To review docket materials, it is recommended that the public make an appointment by calling (703) 603–9230. The public may copy a maximum of 100 pages from any regulatory docket at no charge. Additional copies cost $0.15/page. The index and some supporting materials are available electronically. See the "Supplementary Information" section for information on accessing them.

FOR FURTHER INFORMATION CONTACT: For general information, contact the RCRA Hotline at (800) 424–9346 or TDD (800) 553–7672 (hearing impaired). In the Washington, D.C. metropolitan area, call (703) 412–9810 or TDD (703) 412–3323.

For more detailed information on specific aspects of this rulemaking, contact the Waste Treatment Branch (5302W), Office of Solid Waste (OSW), U.S. Environmental Protection Agency, 401 M Street S.W., Washington, D.C. 20460; phone (703) 308–8434. For information on the issue of treatment standards for metal-bearing wastes, contact Elaine Eby (703) 308–8449 or Anita Cummings at (703) 308–8303. For questions on land disposal restrictions (LDR) treatment standards for mineral processing wastes, radioactive mixed wastes, and grab versus composite sampling methods, contact Anita Cummings at (703) 308–8303. For information on treatment standards for manufactured gas plant wastes, contact Rita Chow at (703) 308–6158. Contact Rhonda Minnick at (703) 308–8771 for information on improvements and corrections to the Land Disposal Restrictions. For information on secondary mineral processing materials and Bevill issues, call Ashley Allen at 703–308–8419 or Stephen Hoffman of the Industrial and Extractive Wastes Branch at (703) 308–8413. For questions on treatment standards for hazardous soil, contact Elizabeth McManus of the Permits and State Programs Division at (703) 308–8657. Contact Stephen Bergman of the Hazardous Waste Identification Division at (703) 308–7262 for questions on the exclusion for wood preserving wastewaters. For information on the capacity analyses, contact Bill Kline at (703) 308–8440 or C. Pan Lee at (703) 308–8478. For questions on the regulatory impact analyses, contact Paul Borst at (703) 308–0481. For other questions, call Sue Slotnick at (703) 308–8462.

SUPPLEMENTARY INFORMATION:

Availability of Rule on the Internet: Please follow these instructions to access the rule: From the World Wide Web (WWW), type http://www.epa.gov/rules and regulations. In addition, several technical background documents contained in the docket supporting this rule will be available on the Internet at http://www.epa.gov/offices and regions/oswer.

Table of Contents

I. Introduction to the Phase IV Rule

In the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA), Congress specified that land disposal of hazardous waste is prohibited unless the waste first meets treatment standards established by EPA or is disposed in units from which there will be no migration of hazardous constituents for as long as the waste remains hazardous. The HSWA amendments require that treatment standards must substantially diminish the toxicity or mobility of hazardous waste, so that short- and long-term threats to human health and the environment are minimized.

Today's Phase IV final rule is the latest in a series of LDR rules that establish treatment standards for wastes identified or listed as hazardous after the date of the 1984 amendments. (See RCRA § 3004(g)(4)). EPA proposed the Phase IV rule in four **Federal Register** notices, and issued three NODAs setting out additional data relevant to this proceeding. In two **Federal Register** notices prior to today's, EPA promulgated various rules proposed in the Phase IV proposals: treatment standards for wood preserving wastes, paperwork reduction, and clarification of treatability variances. Today's final rule promulgates regulations addressing most of the remaining issues discussed in Phase IV proposals and NODAs. The table at the end of this introduction lists references for all the Phase IV Notices, plus others cited frequently in the preamble.

This final Phase IV preamble contains five major, interrelated sections. The first section explains the new land disposal restrictions treatment standards for wastes identified as hazardous because they exhibit the toxicity characteristic for metals (referred to as "TC metal wastes"). The section also revises the universal treatment standards (UTS) for 12 metal constituents in all hazardous wastes. The TC metal wastes will now be required to meet the universal treatment standards as do most other hazardous wastes. The second major preamble section establishes the prohibition on land disposal plus treatment standards for a particular type of newly identified hazardous waste: mineral processing waste that exhibits a characteristic of hazardous waste. The third section addresses additional issues affecting both TC metal wastes and characteristic mineral processing wastes. The fourth section amends the rules defining when secondary materials being recycled are solid wastes. It states that secondary materials from mineral processing which are generated and reclaimed within that industry are not solid wastes unless they are managed in land disposal units before being reclaimed. Such materials are not subject to regulation as hazardous wastes. That part of the preamble also addresses other issues related to mineral processing. The final major preamble section promulgates amended treatment standards for soil that contains hazardous waste or which exhibits a characteristic of hazardous waste.

Today's rule also includes two brief sections on hazardous waste issues unrelated to the major sections. One clarifies that a previously-promulgated exclusion from hazardous waste regulation for recycled shredded circuit boards also applies to whole circuit boards under certain conditions. The other section promulgates an exclusion from RCRA jurisdiction for certain wood preserving wastewaters and spent wood preserving solutions when recycled.

TABLE OF SELECTED LDR FEDERAL REGISTER NOTICES

Common name	Title of rule in FEDERAL REGISTER	Date	Citation
Third Third LDR Final Rule	Land Disposal Restrictions for Third Third Scheduled Wastes; Rule.	June 1, 1990	55 FR 22520.
Phase II LDR Proposal	Land Disposal Restrictions for Newly Identified and Listed hazardous Waste and hazardous soil; Proposed Rule.	September 14, 1993	58 FR 48092.
Phase III LDR Proposal	Land Disposal Restrictions Phase III: Decharacterized Wastewaters, Carbamate and Organobromine Wastes, and Spent Potliners; Proposed Rule.	March 2, 1995	60 FR 11702.
Phase IV Original Proposal	Land Disposal Restrictions—Phase IV: Issues Associated With Clean Water Act Treatment Equivalency, and Treatment Standards for Wood Preserving Wastes and Toxicity Characteristic Metal Wastes; Proposed Rule.	August 22, 1995	60 FR 43654.
Phase IV First Supplemental Proposal.	Land Disposal Restrictions—Clarification of Bevill Exclusion for Mining Wastes, to the Definition of Solid Waste for Mineral Processing Wastes, Treatment Standards for Characteristic Mineral Processing Wastes, and Associated Issues.	January 25, 1996	61 FR 2338.
HWIR Media Proposal	Requirements for Management of Hazardous Contaminated Media.	April 29, 1996	61 FR 11804.
Phase IV NODA #1	Land Disposal Restrictions Phase IV Proposed Rule—Issues Associated With Clean Water Act Treatment Equivalency, and Treatment Standards for Wood Preserving Wastes and Toxicity Characteristic Metal Wastes; Notice of Data Availability.	May 10, 1996	61 FR 21417.
Phase IV NODA #2	Land Disposal Restrictions—Phase IV: Treatment Standards for Characteristic Metal Wastes; Notice of Data Availability.	March 5, 1997	FR 62 10004.
Phase IV LDR Wood Preserving Final Rule.	Land Disposal Restrictions Phase IV: Treatment Standards for Wood Preserving Waste, Paperwork Reduction and Streamlining, Exemptions from RCRA for Certain Processed Materials; and Miscellaneous Hazardous Waste Provisions; Final Rule.	May 12, 1997	62 FR 25998.
Phase IV Second Supplemental Proposal.	Land Disposal Restrictions Phase IV: Second Supplemental Proposal on Treatment Standards for Metal Wastes and Mineral Processing Wastes, Mineral Processing and Bevill Exclusion Issues, and the Use of Hazardous Waste as Fill.	May 12, 1997	62 FR 26041.

TABLE OF SELECTED LDR FEDERAL REGISTER NOTICES—Continued

Common name	Title of rule in FEDERAL REGISTER	Date	Citation
Phase IV NODA #3	Land Disposal Restrictions Phase IV: Second Supplemental Proposal on Treatment Standards for Metal Wastes and Mineral Processing Wastes, Mineral Processing and Bevill Exclusion Issues, and the Use of Hazardous Waste as Fill; Notice of Data Availability.	November 10, 1997	62 FR 60465.
Treatability Variance Final Rule	Clarification of Standards for Hazardous Waste Land Disposal Restriction Treatment Variances.	December 5, 1997	62 FR 64504.

II. Potentially Regulated Entities

Entities potentially regulated by this final rule vary according to the section of the rule. The following table shows the industry categories that may be regulated according to each major section of the rule. The table is not intended to be exhaustive or definitive with respect to every case-specific circumstance. Rather, it is a general guide for readers regarding entities that EPA is now aware could potentially be regulated by this action. Other types of entities not listed in the table could also be regulated, and failure to mention them in the table should not be taken as any type of regulatory determination on the part of the Agency.

TABLE OF ENTITIES POTENTIALLY AFFECTED BY THE PHASE IV FINAL RULE

Section of the rule	Category	Examples of entities potentially affected
LDR treatment standards for TC metal hazardous wastes, characteristic mineral processing wastes, and other metal-bearing wastes.	Generators of Toxicity Characteristic (TC) metal hazardous wastes (D004—D011), characteristic mineral processing waste, or any hazardous waste required to meet the LDR treatment standard for antimony, barium, beryllium, cadmium, chromium, lead, nickel, selenium, silver, thallium, vanadium, or zinc.	Facilities in the following industries: primary mineral processing, chemical manufacturers, pharmaceutical producers, paint producers, manufacturers of motor vehicle parts, blast furnaces and steel mills, metal plating and polishing, and aircraft parts and equipment.
	Facilities that treat and/or dispose of TC metal hazardous wastes, characteristic mineral processing wastes, and other metal-bearing hazardous wastes.	Hazardous waste treatment and disposal facilities.
LDR treatment standards for hazardous soil.	Entities managing hazardous soil	Private or public parties remediating sites containing hazardous soil
Mineral Processing Secondary Materials	Facilities that generate, store, and/or recycle secondary materials from primary mineral processing.	Copper smelters, gold refiners, and other primary metals producers that return wastestreams to units for additional recovery
Exclusion for Recycled Wood Preserving Process Wastewaters.	Wood Preserving Facilities	Facilities that generate and reclaim drippage and wastewaters on-site from the wood processing industry.

III. Revised Land Disposal Restrictions (i.e., Universal Treatment Standards) for Metal Constituents in all Hazardous Wastes, Including Toxic Characteristic Metals

Summary

There are two purposes to today's new treatment standards for metal-containing wastes. First, EPA is revising the numerical standards because new data are available on which to base more accurate standards. Second, EPA is including a new set of wastes in the current treatment standard regime, continuing EPA's efforts to apply the same LDR treatment standards when technically and legally possible. (In a subsequent section of this rule, EPA is expanding the treatment standard regime to include yet another set of wastes. These are characteristic mineral processing wastes that are not currently subject to land disposal restrictions.)

The numerical standards that EPA is revising are the universal treatment standards (UTS) for 12 metal constituents. The new UTS will apply to nonwastewater forms of any listed or characteristic hazardous waste that is already required to meet the UTS for those constituents in the waste. The revised UTS are less stringent for 7 constituents, and more stringent for 5. The rule does not affect the UTS for wastewater forms of these wastes, and does not change the UTS for any other constituents, including any of the organics.

The new set of wastes that EPA is bringing into the current LDR regime is the group of 8 wastes known as TC metal wastes—wastes identified as hazardous because they exhibit the toxicity characteristic due to the presence of the metals enumerated in 261.24 (Waste codes D004–D011). These are wastes that exhibit the toxicity characteristic because of high toxic metal content. By today's rule, that key metal must be treated to the UTS for that metal. Furthermore, any underlying hazardous constituents (UHCs) must be treated to UTS levels as well, whether these UHCs are organics or metals. Both wastewater and nonwastewater forms of the TC metal wastes are affected by today's rule, except for arsenic, for which only the wastewater forms are affected.

Hazardous wastes that exhibit both the TC for metals and the predecessor characteristic based on the Extraction Procedure (EP) are presently only required to be treated to reduce metal levels to below the characteristic level. Today's rule, for the most part, will require additional treatment of these metal constituents before land disposal can occur.

The Agency also finds that the treatment standards established in today's rule are not established below levels at which threats to human health and the environment are minimized. See *Hazardous Waste Treatment Council v. EPA*, 886 F.2d 355, 362 (D.C. Cir. 1990). That case held that the statute can be read to allow either technology-based or risk-based LDR treatment standards, and further held that technology-based standards are permissible so long as they are not established "beyond the point at which there is no 'threat' to human health or the environment." *Id.* at 362. EPA's finding that today's standards are not below a "minimize threat" level is based on the Agency's inability at the present time to establish concentration levels for hazardous constituents which represent levels at which threats to human health and the environment are minimized. As the Agency has explained a number of times, determining these levels on a national basis—which requires determination of relevant exposure pathways and potential receptors for all hazardous constituents in hazardous wastes, with all the attendant uncertainties involved in such a national determination—has not yet proven possible. See, *e.g.*, 55 FR at 6642 (February 26, 1990). Thus, the Agency continues to find that technology-based standards remain the best approach for the national treatment standards since such standards eliminate as much of the inherent uncertainty of hazardous waste land disposal and so fulfill the Congressional intent in promulgating the land disposal restrictions provisions. *Id.* However, the Agency believes that it may be possible to make valid determinations that threats to human health and the environment are minimized on an individualized basis in the context of certain site-specific remediations, and accordingly has provided in this rule a variance from technology-based treatment requirements for contaminated soils generated in certain remediations. See section VII below.

A. History of Metal Treatment Standards

Land disposal of hazardous wastes is largely prohibited by statute, unless the wastes meet the applicable treatment standards established by EPA prior to land disposal. See RCRA sections 3004(d)–(g), (m); (the exception for no-migration units is not relevant to today's rule). Until today's rule, metals that were characteristic because they failed the Toxicity Characteristic Leaching Procedure (TCLP) and also failed the Extraction Procedure (EP)—which preceded the use of the TCLP as a means of identifying whether a waste exhibited a characteristic of hazardous waste—were subject to treatment standards at levels equal to the TC levels (55 FR 22520, June 1, 1990). (Note that wastes that were characteristic according to the TCLP but did not fail the EP were considered, until promulgation of today's rule, to be newly identified wastes, and were not subject to the LDR requirements. Today's rule makes these wastes subject to LDR). However, the TC levels are typically higher than those treatment levels for which threats posed by land disposal of the wastes are minimized. (*Waste Management v. EPA*, 976 F.2d 2, 13–14, 26–27, 32 (D.C. Cir. 1992). Consequently, treatment to levels lower than the characteristic levels normally is required. *Id.*

In an effort to make treatment standards as uniform as possible while adhering to the fundamental requirement that the standards must minimize threats to human health and the environment, EPA developed the UTS. Under the UTS, whenever technically and legally possible, the Agency adopts the same technology-based numerical limit for a hazardous constituent regardless of the type of hazardous waste in which the constituent is present (see 40 CFR 268.40; and 59 FR 47982, September 19, 1994). In the original Phase IV proposal, EPA proposed to apply the metal UTS, as measured by the TCLP (60 FR 43582, August 22, 1995; see 40 CFR 261.24), to all TC metal wastes. The TCLP measures the possibility that a waste may leach toxic metals above a designated concentration level under certain assumed disposal conditions, and so is a measure of the potential mobility of toxic metals in a waste.

Commenters in response to the original proposal took issue with the Agency's use of data previously used to establish metal UTS as a basis for establishing the treatment standards for characteristic metal wastes. The commenters raised three basic issues with regard to the data transfer. First, they said that characteristic metal wastes are extremely variable and the data used to calculate the treatment standards were not representative of the diversity of TC metal wastes. Second, the commenters said that although two treatment technologies—high temperature metals recovery (HTMR) and stabilization—were determined to be Best Demonstrated Available Technology (BDAT), the current metals UTS were based solely on HTMR, a technology not commercially available for many TC metal wastes. Finally, commenters asserted that individual metal UTS values were not uniformly achievable when waste streams with multiple toxic metals were being treated. In light of these concerns, the commenters urged the Agency to obtain additional data that would demonstrate the effectiveness of stabilization on TC metal waste streams and more fully characterize the diversity of treatment of these nonwastewaters. The following commenters provided the Agency with stabilization performance data: Battery Council International, American Foundrymen's Association, Chemical Waste Management, and the Environmental Treatment Council. While extensive, the data unfortunately was based on composite samples and could not be used as the basis for treatment standards (see USEPA, Final Best Demonstrated Available Technology (BDAT) Background Document for Quality Assurance/Quality Control Procedures and Methodology, Office of Solid Waste, October 23, 1991 and 62 FR 26041 for a discussion of grab and composite sampling).

The Agency, however, was convinced that additional data were needed to further assess the treatment of TC metal nonwastewaters. During September 1996, EPA conducted site visits at three hazardous waste treatment facilities and collected additional treatment performance data. One facility was a large commercial TSDF that employed conventional stabilization techniques to treat a wide array of inorganic metal wastes. Another was an on-site treatment facility that focused on the stabilization of inorganic metal slag. A third facility was commercial and focused on stabilization of inorganic materials using non-conventional stabilization techniques. During these site visits, the Agency either gathered performance data from company records or requested the collection of actual treatment performance data through sampling and analysis.

Treatment data were collected for the following types of hazardous waste: mineral processing waste, baghouse dust, battery slag, soils, pot solids, recycling by-products, and sludge. See the memorandum, Final Revised Calculation of Treatment Standards Using Data Obtained From Rollins Environmental's Highway 36 Commercial Waste Treatment Facility and GNB's Frisco, Texas Waste Treatment Facility, March 10, 1997 and the memorandum, Transferability of UTS to Mineral Processing Wastes, January 28, 1997 for a complete description of the waste constituents and concentrations. Most of the wastes contained multiple metals in various concentrations while some had significant concentrations of typically two metal combinations, including lead and cadmium, barium and lead, and chromium and antimony. In addition, between October 1994 and December 1995, the Agency obtained performance data from one HTMR facility; (other HTMR data became available very late in 1997). The assessment of the new data sets began with the calculation of treatment standards for each of the two data sets representing stabilization and HTMR. The same methodology, sometimes called "C 99," and used in past LDR rulemakings, was used to calculate the treatment levels (see 56 FR 41164, August 18, 1991, and the BDAT Background Document for K061, dated August, 1991). Next, the Agency compared the treatment levels for stabilization verses HTMR. Based on this comparison, the Agency selected the highest level for each metal as the proposed UTS to allow for waste and process variability and detection limit difficulties. This approach is consistent with the legislative goal of providing substantial treatment through standards that are achievable by an array of well-performing, available treatment technologies. See 130 Cong. Rec. S 9184 (Daily ed., July 25, 1984) (statement of Senator Chafee).

As a result, the Agency issued a Second Supplemental Proposal on May 12, 1997 (62 FR 26041). In it, EPA proposed to change the numerical limits for all nonwastewater wastes containing the following metal constituents: antimony, barium, beryllium, cadmium, chromium, lead, nickel, selenium, silver, and thallium. (62 FR at 26047, May 12, 1997). The Agency also reproposed to change the numerical limits for vanadium in P119 and P120 nonwastewaters, and for zinc in K061 nonwastewaters. (62 FR at 26047, May 12, 1997). EPA also proposed these same UTS treatment standards for TC metal wastes identified as hazardous due to concentrations of barium, cadmium, chromium, lead, selenium and silver.

The Agency would like to correct in today's rule a prior error that was discovered in calculating the metals treatment levels using the HTMR treatment data. As previously stated, in the Second Supplemental and in today's preamble, in determining the treatment levels for each metal constituent, the Agency compared the treatment standards calculated with data from HTMR and stabilization. Based on this comparison, the highest level for each metal was chosen as the treatment standard. In reviewing the calculations from the HTMR data set, the Agency discovered an error in the calculations. When applying the methodology presented in USEPA, "Final Best Demonstrated Technology (BDAT) Background Document for Quality Assurance/Quality Control Procedures and Methodology," dated October 23, 1991, it was discovered that the Agency failed to conduct a "Z-score test" to remove any outliers—data that is either so high or so low that it is not considered to be representative of the population from which the data are drawn. EPA uses this statistical method to confirm that certain data do not represent treatment by a well-operated system, or reflect anomalously low levels which are not typically achievable. This error was found to have occurred only in the calculation of the treatment standards based on the performance of HTMR; the treatment standards based on the performance of stabilization were properly calculated. The proposed treatment standards for cadmium, chromium, nickel, and silver were affected. The application of the Z-score outlier test resulted in 2 data points out of 40 being eliminated as outliers for both cadmium and chromium. For nickel, 5 out of 122 data points were identified as outliers.

For silver, 3 out of 114 data points were identified as outliers. Three of the resulting, calculated treatment standards changed slightly and are slightly more stringent than the proposed standards: cadmium from proposed 0.20 to corrected 0.11 mg/L TCLP; chromium from proposed 0.85 to corrected 0.60 mg/L TCLP; and nickel from proposed 13.6 to corrected 11 mg/L TCLP. Silver, on the other hand, changed from the proposed 0.11 mg/L TCLP to a corrected, slightly less stringent 0.14 mg/L TCLP. (Note: In re-calculating this standard, the Agency added an additional 74 data points which were submitted by the INMETCO Company (a high temperature metal reclaimer) in their comments to the May 12 supplemental proposal.) The Agency believes that these re-calculations are not significant because these four revised standards are each still achievable. See Memorandum, "Calculation of Universal Treatment Standard (UTS) for HTMR Residues Using Data Submitted by Horsehead Research Development (HRD) Co., Inc. And INMETCO," December 17, 1997.

B. Applicability of Metal Treatment Standards

As noted earlier, today's rule finalizes LDR treatment standards in two ways. First, it revises the UTS levels for 10 metal constituents in nonwastewater forms of hazardous wastes. The 10 include antimony, barium, beryllium, cadmium, chromium, lead, nickel, selenium, silver, and thallium. These treatment standards will replace the existing UTS values. In addition, EPA is applying UTS for the first time to 8 TC metal wastes: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. The UTS apply to both wastewater and nonwastewater forms of the wastes (except for TC arsenic wastes, for which the UTS apply to wastewater forms only), and to both organic and metal underlying hazardous constituents in them. No TC metal wastes have had to meet standards for underlying hazardous constituents before today, and wastes exhibiting only the TC and not the EP were not yet prohibited. (Note, some subcategories of mercury and arsenic TC metal wastes have treatment methods requiring use of a specified technology, and are not affected by today's rule.) The Agency is also adjusting the treatment standards for vanadium in P019 and P020 nonwastewaters as well as zinc in K061 nonwastewaters.

The metal treatment standards being promulgated today have broad applicability. They apply to the following metal-containing hazardous wastes: (1) characteristic metal wastes, including both the newly identified wastes that, heretofore, were not prohibited from land disposal; and metal wastes that were identified as hazardous under the predecessor leaching protocol, the Extraction Procedure (EP), which remain hazardous because they also exhibit the TC by the TCLP; (2) mineral processing wastes which exhibit the toxicity characteristic for metal (this is actually a subset of wastes in (1) above); (3) listed hazardous wastes which have metal constituents; (4) underlying hazardous constituents (UHCs) that are metals in any characteristic hazardous waste (including mineral processing waste which exhibit a characteristic) that is disposed in other than a Clean Water Act (CWA) or CWA-equivalent wastewater treatment system (see 40 CFR 268.2(i); 59 FR 47982, September 19, 1994); and (5) radioactive wastes mixed with the wastes mentioned in (1)–(4) above.

C. Development of New Treatment Standards for Hazardous Wastes Containing Metals

1. Measuring Compliance by Grab or Composite Sampling

As explained in the May 12, 1997 Second Supplemental Phase IV proposal, EPA establishes treatment standards using data obtained by grab sampling, not composite sampling, and likewise assesses compliance with these standards using grab sampling. 62 FR at 26047. This approach was sustained by the D.C. Circuit Court of Appeals in *Chemical Waste Management v. EPA*, 976 F. 2d at 34, and EPA did not and is not reopening the issue in this proceeding. The Agency has now obtained requisite grab sampling data. As a result, the treatment standards promulgated in this rule are all based upon treatment performance that was measured through the use of grab sampling. All compliance likewise will be based on grab sampling.

2. Development of Treatment Standards for Metal Wastes

All of the metals described below are on the UTS list and some are also TC metals. This section discusses development of both the TC and UTS treatment standard levels. The Agency is presenting the metal treatment standards alphabetically by constituent. Depending on the constituent, one or more treatment standards is discussed. For example in the section entitled, "Treatment Standards for Barium Waste," the Agency discusses the promulgation of three treatment standards: (1) 21 mg/L TCLP for nonwastewater forms of D005 waste (based on the UTS); (2) 1.2 mg/L for wastewater forms of D005 waste (also based on the UTS); and (3) a revised UTS of 21 mg/L TCLP for barium nonwastewaters. If a metal constituent is not one of the TC metals, its presence cannot be the basis for determining if a waste exhibits the toxicity characteristic—but it could be an underlying hazardous constituent in the waste, in which case that constituent would need to meet the standard for that metal in today's rule before the waste could be land disposed.

a. Final Universal Treatment Standard for Nonwastewater Forms of Antimony. The Agency proposed in the Second Supplemental (62 FR 26041, May 12, 1997), to change the UTS for nonwastewaters containing antimony from 2.1 mg/L TCLP to 0.07 mg/L TCLP. This proposed change was a result of new data collection efforts conducted by the Agency to gather performance data that was representative of the diversity of metal-containing wastes.

In response, the Agency received several comments. Two commenters supported the proposed change; however the remaining commenters argued against the proposed level for antimony of 0.07 mg/L TCLP for a number of reasons. One commercial waste management facility stated that very few of the waste streams they treat using conventional stabilization techniques, including furnace ash, incinerator ash, scrubber brine sludge, furnace baghouse dust, and stripper rinse waters, would meet the proposed standard. The commenter submitted 48 data points supporting its claim. A third commenter stated that meeting the standard would significantly increase their compliance costs. Another stated that commercial stabilization techniques were not capable of meeting the proposed UTS for antimony. In general, these commenters suggested a higher UTS for antimony in the range of 1.3 mg/L TCLP to 2.98 mg/L TCLP.

In response to the commenters' concerns regarding the difficulty in treating antimony wastes, the Agency has conducted a thorough review of its BDAT data set and has determined that while it represents a diverse collection of waste streams containing metals, the concentration of antimony in the 9 data points used to calculate the proposed standard may not be representative of the most difficult to treat antimony waste. The data used by the Agency to calculate the proposed UTS of 0.07 mg/L TCLP, showed a range of antimony concentrations in the untreated waste of between 0.2440 mg/L TCLP and 16.1 mg/L TCLP. While the Agency, at the time, believed that these data were sufficient to establish a treatment standard, new data submitted by a commercial hazardous waste treatment facility provide a compelling argument to amend this standard. The new data consist of 48 additional data points representing various multiple metal waste streams, including incinerator or furnace ash, scrubber brine sludge, lab pack waste, stripper rinse water and baghouse dust. These wastes have all been treated with conventional stabilization techniques and meet the proposed UTS values for all metal constituents except for antimony. The Agency has reviewed the data, the treatment technology, and the QA/QC information submitted by the commenter and believes that the data should be incorporated into the existing BDAT data set. After doing so, the Agency recalculated the treatment standard for antimony nonwastewaters and is today promulgating a revised standard of 1.15 mg/L TCLP. All data available to the Agency indicate that the revised treatment standard for antimony nonwastewaters can be achieved by either stabilization or HTMR processes and addresses the commenter's concerns.

b. Treatment Standard for Wastewater Forms of Arsenic Waste. The Agency proposed in the original Phase IV proposal (60 FR 43683, August 22, 1995), to change the treatment standard for wastewater forms of toxicity characteristic arsenic (D004) waste from the characteristic level of 5.0 mg/L established in the Third Third rule (55 FR 22520 June 1, 1990) to the previously promulgated UTS for arsenic wastewaters of 1.4 mg/L. The Agency did not propose to change the treatment standard for nonwastewater forms of toxicity characteristic arsenic (D004) waste in that the UTS of 5.0 mg/L TCLP was the same as the TC level. The Agency received no comment on the proposed change to D004 wastewaters. Therefore, the Agency is today promulgating as proposed the UTS standard of 1.4 mg/L for D004 wastewaters.

c. Treatment Standards for Barium Waste. (i) Treatment standards for TC Barium (D005) Waste. In 60 FR 43684 (August 22, 1995), EPA proposed to change the treatment standards for wastewater forms of TC metal barium waste (D005) from the characteristic level of 100 mg/L (established in the Third Third rule, 55 FR 22520, June 1, 1990) to the previously promulgated UTS for barium of 1.2 mg/L. Likewise, EPA proposed for D005 nonwastewaters a change from the characteristic level of 100 mg/L TCLP (55 FR 22520, June 1, 1990) to the previously promulgated UTS of 7.6 mg/L TCLP. In support of these revised treatment standards, the Agency had performed a comprehensive re-evaluation of the available treatment performance data from wastes containing significant concentrations of barium.

For D005 wastewaters, the Agency determined that the existing UTS level for barium (1.2 mg/L) was appropriate, based on the performance of lime conditioning followed by sedimentation and filtration as BDAT. For D005 nonwastewaters, the Agency determined that the existing UTS level of 7.6 mg/L TCLP, based on treatment of barium in K061 (electric arc furnace dust) using HTMR was also appropriate. The Agency believed that these treatment standards could be routinely met by industry. Additionally, the Agency reviewed stabilization data and determined that the treatment standards for barium could be achieved by stabilization for a wide variety of waste matrices. (See Proposed Best Demonstrated Available Technology (BDAT) Background Document for Toxicity Characteristic Metal Wastes D004–D011, July 26, 1995.)

The Agency received no significant comment on the proposed change to the wastewater standard for D005. However, as previously discussed in Section III.A of today's rule, new data collection efforts and new analysis of BDAT data for nonwastewaters resulted in a reproposal of the barium treatment standard in the Phase IV Second Supplement (62 FR 26047) . In this notice, the Agency proposed to revise the treatment standard for barium nonwastewaters to 21 mg/L TCLP based on stabilization. The Agency received no comments in response to the reproposal. Therefore, the Agency today is promulgating a nonwastewater treatment standard of 21 mg/L TCLP as proposed in 62 FR 26041. In addition, the treatment standard of 1.2 mg/L for wastewater forms of D005 is promulgated as proposed in 60 FR 43654.

(ii) Universal Treatment Standard (UTS) for Barium Nonwastewaters. (Please refer to the discussion above about the development of the treatment standard for D005 for additional information on the development of the barium UTS levels.) The Agency proposed to change the UTS for barium nonwastewaters from 7.6 mg/L to 21 mg/L TCLP (see 62 FR 26041). It was proposed that such a treatment standard would better reflect the diversity of metal-containing waste streams and their treatment.

The Agency received no significant comment in response to the reproposal. Therefore, the Agency is today promulgating a nonwastewater UTS of 21 mg/L TCLP, as proposed.

d. Final Universal Treatment Standard for Nonwastewater Forms of Beryllium Waste. The Agency proposed in the original Phase IV proposal (60 FR 43683, August 22, 1995), to revise the UTS for nonwastewaters containing beryllium from 0.014 mg/L TCLP to 0.04 mg/L TCLP. As previously discussed, new data collection efforts and new analysis of BDAT data resulted in a reproposal of the beryllium treatment standard to 0.02 mg/L TCLP in the Phase IV Second Supplemental (62 FR 26041, May 12, 1997).

The Agency received numerous comments on the proposed revision. One commenter supported the proposed treatment level for beryllium, but stated that current stabilization technologies could achieve lower treatment levels. Several other commenters stated that while the proposed standard for beryllium was consistent with the data considered by the Agency, the stabilization data for beryllium were quite limited and reflected the treatment of wastes having very low beryllium content. Commenters further questioned whether the proposed standard of 0.02 mg/L TCLP could be met by conventional stabilization techniques if higher concentrations of beryllium were treated. Other commenters stated that they could not support the treatment standards because EPA has not demonstrated that existing commercial technologies were capable of achieving the proposed standards or that technologies were otherwise available.

In light of the comments received, the Agency conducted a review of the data set used to calculate the proposed standard. The review indicated that, consistent with the commenter's concerns, the data used by the Agency to calculate the standard were based on wastes containing low concentrations of beryllium (between 0.0050 and 0.5 mg/L TCLP). These concentration levels and the subsequent treatment standard developed from them does not appear to adequately account for the difficulty in treating wastes containing higher concentrations of beryllium. Data generated and submitted by Brush Wellman, Inc., consisting of seven data points, showed characteristic wastes (D008) with concentrations of beryllium ranging from 32 to 95 mg/L TCLP. When treated with conventional stabilization techniques, treatment resulted in beryllium levels ranging from 0.05 mg/L to 0.31 mg/L TCLP. As a result of these data, the proposed UTS for beryllium must be revised to reflect a more difficult-to-treat or high-concentration beryllium waste. Accordingly, the Agency is today promulgating a revised UTS for beryllium nonwastewaters of 1.22 mg/L based on this newly acquired data. All treatment performance data available to the Agency indicates that this revised treatment standard can be met, thereby addressing concerns raised by the commenters to the proposal. It should be noted that the UTS for beryllium wastewaters remains unchanged at 0.82 mg/L.

e. Treatment Standards for Cadmium Wastes. (i) Treatment standards for TC Cadmium (D006) Waste. The Agency proposed to change the treatment standards for wastewater forms of TC cadmium (D006) waste from the characteristic level of 1.0 mg/L (established in the Third Third rule (55 FR 22520. June 1, 1990) to the previously promulgated UTS for cadmium wastewaters of 0.69 mg/L. EPA also proposed to change the treatment standard for D006 nonwastewaters from the characteristic level of 1.0 mg/L TCLP (55 FR 22520 (June 1,1990)) to the previously promulgated UTS for cadmium nonwastewaters of 0.19 mg/L TCLP. In support of these revised treatment standards, the Agency had performed a comprehensive re-evaluation of the available treatment performance data from wastes containing significant concentrations of cadmium.

For D006 wastewaters, the Agency determined that the existing UTS for cadmium (0.69 mg/L) based on a BDAT of lime conditioning followed by sedimentation was appropriate. The treatment standard for nonwastewater forms of D006 wastes was based on a transfer from the UTS for cadmium of 0.19 mg/L TCLP based on the K061–HTMR treatment standard data. The Agency chose to use these data because they represented performance of an HTMR treatment unit. The UTS based on K061–HTMR could be routinely met by industry. Additionally the Agency reviewed stabilization performance data and determined that the UTS for cadmium could be achieved by stabilization for a wide variety of waste matrices. See Proposed Best Demonstrated Available Technology (BDAT) Background Document for Toxicity Characteristic Metal Waste D004–D011 (July 26, 1995).

The Agency received no comments on the proposed change to the wastewater standard for D006. However, for reasons previously discussed in Section III.A of today's preamble, the Agency in the Phase IV Second Supplemental proposed to revise the treatment standard for cadmium nonwastewaters to 0.20 mg/L TCLP based on HTMR.

All comments received in response to the revised standard for cadmium supported the change. However, as discussed earlier in Section III.A of today's preamble, the Agency discovered an error in the calculation of the treatment standard. In applying the LDR methodology for calculating a treatment standard, the Agency failed to conduct a "Z-score" outlier test. With the application of this test, 2 out of the 40 data points were determined to be outliers, resulting in a revised treatment standard for cadmium nonwastewaters of 0.11 mg/L TCLP. (The proposed treatment standard of 0.20 mg/L TCLP was based on all 40 data points.) The Agency has reviewed the comments in light of this amended treatment standard and believes that it can be achieved by both HTMR and stabilization treatment. Data submitted by commenters in support of this rule does clearly indicate that the standard can be achieved. See supporting information contained in docket for this rule. Therefore, the Agency is today promulgating a nonwastewater treatment standard of 0.11 mg/L TCLP for D006. In addition, the treatment standard of 0.69 mg/L for wastewater forms of D006 waste is being promulgated as proposed in 60 FR 43654.

(ii) Universal Treatment Standard (UTS) for Nonwastewaters Containing Cadmium. The reader is referred to the above discussion about the development of the treatment standard for D006 nonwastewaters for additional information of the development of the UTS level for cadmium nonwastewaters. EPA is promulgating an UTS of 0.11 mg/L TCLP for nonwastewaters containing cadmium. No change was proposed for the cadmium wastewater UTS; therefore it remains at 0.69 mg/L.

f. Treatment Standards for Chromium Wastes. (i) Treatment Standards for TC Chromium Wastes (D007). In 60 FR 43654 (August 22, 1995), the Agency proposed to change the treatment standards for wastewater forms of toxicity characteristic chromium (D007) waste from the characteristic level of 5.0 mg/L (established in the Third Third rule (55 FR 22520, June 1, 1990) to the previously promulgated UTS for chromium (total) wastewaters of 2.77 mg/L. EPA also proposed to change the treatment standards for D007 nonwastewaters from the characteristic level of 5.0 mg/L TCLP (55 FR 22520, June 1,1990) (a standard remanded by the D.C. Circuit as insufficiently stringent in *Chemical Waste Management v. EPA*, 976 F. 2d at 32) to the previously promulgated UTS for nonwastewater forms of chromium (total) of 0.86 mg/L TCLP. In support of these revised standards, the Agency had performed a comprehensive re-evaluation of the available treatment performance data from wastes containing significant concentrations of chromium.

For D007 wastewaters, the Agency determined that the existing UTS (2.77 mg/L) based on a BDAT of lime conditioning followed by sedimentation was appropriate. The treatment standard for D007 nonwastewaters was based on a transfer from the UTS for chromium (total) of 0.86 mg/L TCLP based on the K061–HTMR treatment standard data. In addition, the Agency reviewed stabilization performance data and determined that the UTS for chromium (total) could be achieved by stabilization for a wide variety of waste matrices. See Proposed Best Demonstrated Available Technology (BDAT) Background Document for Toxicity Characteristic Wastes D004–D011, July 26, 1995.

The Agency received no comments on the proposed change to the wastewater standard for D007. However, as previously discussed in Section III.A of today's preamble, new data collection efforts and further analysis of BDAT data, resulted in a proposed revision to the treatment standard for nonwastewater containing chromium to 0.85 mg/L TCLP based on a BDAT of stabilization (62 FR 26041).

In response to the reproposal, the Agency received no significant comments. However, as discussed earlier in Section III.A of today's preamble, the Agency discovered an error in the calculation of the treatment standard. In applying the LDR methodology for calculating a treatment standard, the Agency failed to conduct a "Z-score" outlier test. With the application of this test, 2 out of the 40 data points, originally used to calculate the standard, were determined to be outliers, resulting in a revised treatment standard for chromium nonwastewaters of 0.60 mg/L TCLP. The Agency has reviewed the comments in light of this amended standard and believes that it can be achieved by both HTMR and stabilization technologies. Data submitted by commenters in response to this proposal also support this conclusion. See supporting information contained in the docket for this rule. Therefore, the Agency is today promulgating an amended nonwastewater treatment standard of 0.60 mg/L TCLP. In addition, EPA is also promulgating a treatment standard of 2.77 mg/L for wastewater forms of D007 as proposed in 60 FR 43654.

(ii) Universal Treatment Standard (UTS) for Chromium Nonwastewaters. (Please refer to the discussion above about the development of the treatment standard for D007 for additional information on the development of the chromium UTS levels.) The Agency proposed to change the UTS for chromium (total) nonwastewaters to 0.85 mg/L TCLP to better reflect the diversity of metal-containing waste streams and their treatment (see 62 FR 26041). No change was proposed for the chromium wastewater UTS.

The Agency received no significant comments on the reproposal. However, as a result of an error in the calculation of the proposed treatment standard, as previously discussed, the Agency is today promulgating a revised chromium nonwastewater UTS of 0.60 mg/L TCLP. The chromium wastewater UTS remains unchanged at 2.77 mg/L.

g. Final Treatment Standards for Lead Wastes. (i) Treatment standards for TC Lead Wastes (D008). In 60 FR 43654 (August 22, 1995), the Agency proposed to change the treatment standards for wastewater forms of toxicity characteristic lead (D008) waste from the characteristic level of 5.0 mg/L established in the Third Third rule (55 FR 22520, June 1, 1990) to the previously promulgated UTS for lead wastewaters of 0.69 mg/L. EPA also proposed to change the treatment standard for D008 nonwastewaters from the characteristic level of 5.0 mg/L TCLP (55 FR 22520, June 1, 1990) (a standard remanded by the D.C. Circuit as insufficiently stringent in *Chemical Waste Management v. EPA*, 976 F. 2d at 27) to the previously promulgated UTS for lead nonwastewaters of 0.37 mg/L TCLP. In support of these revised treatment standards, the Agency had performed a comprehensive re-evaluation of the available treatment performance data from wastes containing significant concentrations of lead.

For D008 wastewaters, the Agency determined that the existing UTS for lead (0.69 mg/L) based on a BDAT of lime conditioning followed by sedimentation was appropriate. The treatment standard for nonwastewater forms of D008 waste was based on a transfer from the UTS for lead of 0.37 mg/L TCLP, which in turn, was based on K061–HTMR treatment standard data. The Agency believed that the UTS could be routinely met by industry using HTMR. Additionally, the Agency reviewed stabilization performance data and determined that the UTS for lead could also be achieved by stabilization for a wide variety of waste matrices. See Proposed Best Demonstrated Available Technology (BDAT) Background Document for Toxicity Characteristic Metal Wastes D004–D011, July 26, 1995.

The Agency did not receive any comments on the proposed change for D008 wastewaters. However as previously discussed in today's preamble, numerous comments on the proposed nonwastewater treatment standard were submitted. As a result, the Agency in the Phase IV Second Supplemental proposed to change the D008 nonwastewater standard to 0.75 mg/L TCLP based on new BDAT stabilization data (62 FR 26047) collected by the Agency. The Agency felt that these data better reflected the diversity of lead-containing waste streams and their treatment.

Numerous commenters concurred with the Agency's reproposal. However, other commenters, specifically those representing various sectors of the secondary lead industry, argued that EPA's proposed treatment standard for lead was not achievable. In particular, comments from Battery Council International (BCI) and the Association of Battery Recyclers (ABR) argued that new data developed by their association members showed that no facility in the secondary lead industry could meet EPA's proposed treatment standard for lead. Instead, they supported setting a treatment standard of 8.39 mg/L TCLP for D008 nonwastewaters based on stabilization. The commenters argued that smelter slag has chemical and physical characteristics distinctly different from the wastes used to develop the treatment standard and that because of its physical variability, treatment of secondary smelter slag through stabilization was much less effective than other types of D008 wastes. The commenter further questioned EPA's decision to ignore data submitted by BCI, ABR and others in response to the original Phase IV proposal, stating that these data were much more comprehensive and representative. The commenter stated that these data contained 276 composite data points for lead from secondary smelter slag, with a 99th percentile confidence interval for stabilized slag of 2.97 mg/L TCLP. Another commenter, which uses a chemical fixation process on the generated blast furnace slag, argued that they could only meet a 2.0 mg/L TCLP for lead, based on composite rather than grab sampling.

In response to the commenters' concerns, the Agency would first like to respond to the commenters' statement that data previously submitted to the Agency was ignored. The Agency is careful to review and analyze all data that are submitted in support or response to its rulemakings. In fact, the referenced data were analyzed extensively, but were found to be so seriously lacking in form and quality assurance/quality control prerequisites that it was impossible to use them for BDAT development. (In the docket for this rule see the documents, "Draft—Overview of Five Data Sets Submitted in Response to the Land Disposal Restrictions Phase IV Proposed Rule: Treatment of Metals," November 1996; and correspondence from Michael Petruska, USEPA to David B. Weinberg, Battery Council International Re: Request for Additional Data in Support of the Previous Submitted Data in Response to the Land Disposal Restriction Phase IV," July 22, 1996). Specifically, the data submitted to the Agency were (1) based on composite samples rather than grab samples, the latter being the only type used to develop treatment standards; (2) lacking in any quality assurance/quality control (QA/QC) documentation; and (3) not accompanied with specific treatment information, or any indication that performance of the treatment process was in fact optimized. As such, the Agency was unable to utilize these data.

Other additional data were subsequently submitted by the commenter in response to the "Second Supplemental" and analyzed by the Agency. These data were based on grab sampling, but there were no specifics on the type of stabilization treatment conducted on the waste. The data does indicate that secondary smelter slags can be treated to meet today's treatment standards for all metals except lead and thallium. With respect to lead, approximately 24 out of 83 samples have treated lead values greater than 0.75 mg/L TCLP, but less than the characteristic level of 5.0 mg/L TCLP. No information was provided for the majority of the thallium data sets. Based on these data, the commenter proposed a treatment standard of 8.39 mg/L TCLP for lead nonwastewaters and 0.79 mg/L TCLP for thallium nonwastewaters. However, these data failed to show effective treatment of the thallium and lead constituents. (In the docket for this rule, see memorandum to Nick Vizzone, USEPA from Howard Finkel of ICF, "Calculation of Universal Treatment Standard (UTS) for Stabilized Secondary Lead Slag Using Data Submitted by the Battery Council International and Association of Battery Recyclers," December 5, 1997).

Commenters have failed to provide reliable and convincing data or information to persuade the Agency that stabilization can not meet the proposed treatment standard of 0.75 mg/L TCLP for lead slags. While the physical variability of the slag may indeed affect treatment performance, the Agency is unconvinced that the commenter's data were the result of optimized treatment conditions and, therefore, are not indicative of true treatment difficulties. EPA's own performance data from treatment of D008 battery slags (which were used in part for the calculation of the treatment standard) clearly support the view that slags from secondary battery recyclers can be treated to meet the nonwastewater standard of 0.75 mg/L TCLP. These data indicate that slags with lead concentrations ranging from 5 to 846 mg/L TCLP (a range similar to that associated with the data submitted in response to the May 12 Second Supplemental proposal and which are discussed above) can be treated with stabilization techniques to levels less than 0.01 mg/L to 0.3 mg/L TCLP. Furthermore, data and information available to the Agency suggest that with optimized treatment these standards should be achievable regardless of the waste matrix. (See "Treatment Technology Background Document", January 1991, for a discussion of Waste Characteristics Affecting Performance (WCAPS and other pertinent material). As such, the Agency is unpersuaded by the commenter's arguments and is today promulgating as proposed a treatment standard of 0.75 mg/L TCLP for D008 nonwastewaters and a standard of 0.69 mg/L for D008 wastewaters. The Agency notes that if a particular waste is unique or possesses properties making it unusually difficult to treat by the treatment technologies whose performance was used to develop the treatment standard, the affected party may petition the Agency, on a case-by-case basis, for a treatment variance as provided in 40 CFR 268.44.

(ii) Final Universal Treatment Standard (UTS) for Nonwastewaters Containing Lead. (Please refer to the discussion above about the development of the treatment standard for D008 for additional information on the development of the lead UTS levels.) The Agency proposed to change the UTS for lead nonwastewaters from 0.37 mg/L TCLP to 0.75 mg/L TCLP to better reflect the diversity of metal-containing waste streams and their treatment (see 62 FR 26041). In response to the proposed revision, the Agency did receive a number of comments on the nonwastewater level, discussed above. For reasons also discussed above, the Agency is today promulgating a lead nonwastewater UTS of 0.75 mg/L TCLP as proposed.

(iii) Secondary Smelter Battery Slag—Additional Issue. EPA published a Notice of Data Availability (NODA) on May 10, 1996 (61 FR 21419) that discussed, among other things, an issue regarding application of the LDR standards to slags resulting from the smelting of lead acid batteries. The LDR treatment standard, established in the Third Third Rule in 1990, for lead acid batteries is RLEAD (see 40 CFR 268.40 and 268.42, Table 1), which means recovery of lead. The NODA stated that "[o]nce the batteries are smelted, the LDR requirements have been satisfied, and, therefore, the slag resulting from this smelting need not be treated further. The standards proposed under Phase IV (i.e., compliance with UTS) would not apply to this slag, even if the slag exhibits a characteristic of hazardous waste (i.e., contains lead in amounts greater than 5.0 mg/L)." This position was based on EPA's usual interpretation that "when EPA specifies a treatment method as the treatment standard, residues resulting from the required treatment method are no longer prohibited from land disposal *unless EPA should otherwise specify.*" (emphasis added) 55 FR at 22538 (June 1, 1990).

After the publication of the May 10, 1996 NODA, EPA realized that it had, in fact, "otherwise specified" that lead slags resulting from the smelting of lead acid batteries would be a separate treatability group in the Third Third rule, and they would indeed require further treatment if the slags exceeded the TC for lead (5.0 mg/L) as generated. See 55 FR at 22568 (June 1, 1990). The Third Third rule states that "The residuals from the recovery process are a new treatability group (i.e., the residues are not lead acid batteries) and, therefore, their status as prohibited or nonprohibited is determined at the point the residues are generated. Such residues would thus only be prohibited and therefore require further treatment if they exhibit a characteristic." This point was clarified both in person and in a letter, dated July 31, 1996, sent to representatives of Battery Council International. The letter explained that the Agency had mischaracterized the status of lead slags in the May 10, 1996 NODA and requested comment on the appropriate treatment standard for these lead slags.

EPA published the Phase IV Second Supplemental Proposed Rule on May 12, 1997, and among other things, used new data from the treatment of lead slags in revising the treatment standards for lead. In response to this issue, one commenter stated that EPA was prohibited under RCRA 3004(m) from requiring further treatment for residuals that resulted from a treatment process that was determined to be BDAT (such as RLEAD). The commenter believes RCRA 3004(m) states that once threats are minimized, EPA cannot require further treatment of the residuals after the specified BDAT treatment has been performed on the waste, or the BDAT numerical level has been achieved. Because the Agency's data on lead slag residuals show concentrations of 283 mg/L TCLP lead are not uncommon, potential threats from treated lead slag (using RLEAD only) are clearly not minimized. In fact, the concentrations of lead in these residuals resulting from RLEAD of lead acid batteries are among the most concentrated TC lead wastes for which the Agency has data. The Agency only is requiring further treatment of slag residuals which exhibit the characteristic for lead (i.e., contain lead in amounts greater than the TC level of 5.0 mg/l). Those residuals, by definition, are still hazardous and potential threats posed by their land disposal have not been minimized.

Another commenter raised the issue of whether there had been adequate notice and comment given regarding the status of lead slag residuals. The Agency believes that adequate notice and opportunity to comment were given in light of the facts recited. We note also that all comments received on the Phase IV second supplemental rule regarding lead slag residuals took issue with the treatment standard for lead and the data used to develop the standard, but did not question that the slags could be required to be treated further. Commenters appeared to clearly understand that slags are covered by the Phase IV rule establishing standards for TC lead wastes.

Therefore, lead slag residuals resulting from the smelting of lead acid batteries are included under today's rulemaking. If such residuals exhibit a lead toxicity characteristic (i.e., have lead levels exceeding 5.0 mg/L) after RLEAD is employed, they would have to be treated again for lead and any other underlying hazardous constituents present in waste until the treatment standards are achieved. For a discussion on the development of these numerical standards being promulgated today; see the discussion in section (i) above.

(iv) Addition of Iron Filings to Stabilize Lead-Containing Wastes. Today, the Agency is codifying the principle that the addition of iron metal, in the form of fines, filings, or dust, for the purpose of ostensibly achieving a treatment standard for lead is "impermissible dilution" under 40 CFR 268.3. The Agency has determined that this waste management practice does not minimize threats posed by land disposal of lead-containing hazardous waste because the practice essentially "blinds" the analytic method but would not in fact prevent lead from leaching under actual disposal conditions. Affected wastes include: toxic characteristic lead wastes (D008), any characteristic waste containing lead as an underlying hazardous constituent, and listed wastes for which lead is regulated.

On March 2, 1995, EPA published the LDR Phase III proposal (60 FR 11702). Among other things EPA proposed that the addition of iron dust to stabilize lead in characteristic hazardous waste constituted impermissible dilution, rather than treatment legitimately meeting the LDR treatment standards (60 FR 11731). In the proposal, the Agency stated that certain industries were adding iron dust or iron fines to some characteristic hazardous waste (nonwastewaters) as an ostensible form of treatment for lead. As an example, the Agency noted that foundries were known to mix iron dust or filings with the D008 sand generated from their spent casting molds, viewing this practice as a form of stabilization. In the proposal, the Agency stated that such stabilization practices were inadequate to minimize threats posed by land disposal of metal-containing hazardous waste, and proposed to clarify that waste management practice as "impermissible dilution" under 40 CFR 268.3.

In response to the proposal, the Agency received numerous comments. Commenters in support of the "impermissible dilution" designation agreed with EPA's discussion in the preamble that no chemical or pozzolanic reaction was possible from iron dust or filings and that standard chemistry showed that metals such as lead were not bound in a non-leachable matrix when using iron dust or filings as a stabilizing agent. One commenter further mentioned many instances where generators have avoided treatment costs by adding iron to their metal and cyanide-bearing waste streams, thus providing the short-term ability to, as the commenter stated, "fool" the test for both amenable cyanide and leachable metals. The commenter pointed out that EPA's adoption of a total cyanide treatment standard had essentially solved the issue of ineffective treatment of cyanide using iron, but the issue of metals treatment still remained. The commenter concluded that the prohibition on the use of iron dust and filings would promote more treatment of toxic metal-bearing wastes.

Other commenters discussed analytical concerns with the TCLP test when used on iron-treated wastes. One commenter stated that the addition of iron to D008 waste sand may mask the presence of lead in two ways: first, iron is more easily oxidized than lead so that under the conditions of the TCLP test, iron may be preferentially leached out into solution, leaving the lead in an insoluble, undetectable state. A second problem with the presence of iron in the TCLP test is spectral interference with the analysis of lead, which could result in positive interference and a raised detection limit for lead.

Numerous commenters representing the foundry industry, however, argued extensively against the "impermissible dilution" designation for iron treatment of characteristic metal wastes. The commenters stated that EPA's position was neither justified nor supported by any technical documentation. The commenters further stated that: (1) iron added to lead bearing waste foundry sand effectively immobilizes the lead and yields a treatment residue that consistently passes the TCLP; (2) TCLP tests, run on foundry sand that was treated with iron and landfilled 8–10 years ago, yielded lead results below the 5 ppm level; (3) analytical results for total iron from landfill samples clearly show the iron has not oxidized after several years; and (4) iron treatment has long-term stability. The commenters further stated that no evidence either from leaching tests or from real-world experience showed that iron treatment is not a successful long-term treatment for brass foundry sand when the treatment is conducted in an appropriate manner. On March 5, 1997, the Agency addressed the issue and industry arguments in Land Disposal Restriction—Phase IV Treatment Standards for Characteristic Metal Wastes; Notice of Data Availability (NODA) (62 FR 10004). In this NODA, new studies and data were presented on the issue of the treatment adequacy of adding iron to characteristic metal wastes as a method of treatment. As explained in the Phase III proposed rule (60 FR 11702), and again in the NODA of March 5, 1997, the addition of iron seems to temporarily retard the leachability of lead in spent foundry sand, thus allowing the waste to pass the TCLP test, but not to be permanently treated. At the time of the Phase III final rule, EPA decided not to finalize a determination that the practice was a form of impermissible dilution in the Phase III final rule without studying the issue further. See 61 FR 15569, April 8, 1996. In the March 5, 1997 NODA, two studies were noticed that had recently been completed.

One study was developed by Dr. John Drexler of the University of Colorado and the other by Dr. Douglas Kendall of the National Enforcement Investigation Center (NEIC). The results of these studies indicated that the addition of iron filings or iron dust to spent foundry sands (D008) did not constitute adequate treatment of the waste because high concentrations of lead remained available to the environment and indeed have been shown to leach in actual field testing of units receiving the spent foundry wastes. (The reader is referred to 62 FR 10004, March 5, 1997 for a full discussion of the studies).

Specifically, Dr. Drexler's study concluded: (1) the spent foundry wastes placed in Nacodoches Municipal Landfill remained hazardous; (2) the addition of iron filings to spent foundry sand does not cause chemical reduction (i.e., the hazardous lead remains oxidized); (3) the addition of iron filings to the spent foundry sand promoted a physicochemical dilution of the sample during the TCLP by producing significant increases in surface area sorption sites; (4) the addition of iron filings to the waste artificially altered the environmental character of the TCLP test by increasing pH and lowering Eh (redox potential) and DO (dissolved oxygen); and (5) in-vitro testing shows that these "treated" wastes maintain a high bioavailability of lead.

Dr. Kendall's study concluded that the addition of iron is not a permanent way to treat lead-contaminated waste. Specifically, he concluded that: (1) no reaction occurs when metallic iron is mixed with lead-contaminated foundry sand (D008); (2) during the TCLP process, lead begins to leach into the solution and if metallic iron is present, the lead concentration in solution will decrease by an oxidation/reduction reaction to levels below the lead characteristic; (3) only if fresh metallic iron is regularly introduced into the mixture, can soluble lead be kept at low levels; and (4) upon placement of the waste in a landfill and left alone, the iron will oxidize, losing its ability to reduce lead ions.

Peer review of the studies concurred with the findings that the addition of iron filings to spent foundry sand is not treatment of hazardous waste and that the scientific data presented in the studies were based on sound scientific research and support the conclusions made. (See "Peer Review Report, September 3, 1996, submitted by A.T. Kearney, Inc., Dallas, Texas to Rena McClurg, Regional Project Officer, USEPA, Dallas, Texas.)

The Agency received several comments in response to the NODA. One State agency commented that based on the evidence gathered by the EPA, the addition of iron fines as treatment of lead containing wastes appears to be unacceptable under most disposal criteria. Furthermore, it was the commenter's contention that the method in question should be rejected where disposal of wastes so treated may be subjected to acid leaching and chemical oxidation, in particular disposing of wastes in a municipal solid waste landfill. The commenter did note however that data exist to support the contention that the treatment may be acceptable for brass foundries under specified monofill disposal criteria. Another commenter requested clarification as to whether iron-bearing lead waste products, i.e., from the steel bridge blast cleaning and painting industry, would be impacted. The commenter recommended that all waste debris from any lead abatement project be deemed hazardous and treated appropriately regardless of the type of abrasive blast media used.

Two commenters argued that the conclusions drawn from the studies conducted by Drs. Kendall and Drexler were erroneous or misplaced from a regulatory standpoint. In particular the commenters argued, among other things, that given the biased sampling, i.e., sampling of only "hot spots" in the landfill and disregard for SW–846 statistical analysis, EPA should reconsider its view on the treatment of foundry sands with iron filings. (The reader is referred to the "Comment Response Document" for this final rule for a more complete discussion of the comments received on this issue.)

EPA has evaluated all the comments on the subject studies and on the issue of iron filings as a treatment method for lead nonwastewaters. The regulatory issue at hand—and the focus of the studies—is whether or not adding iron metal is adequate treatment for LDR purposes. Several commenters have elected to take issue with points that are not the central focus of the two studies. While a statistical evaluation is used to determine if a waste is hazardous, all parts of the waste must be treated to meet the applicable standards, not just a representative sample. Thus, if results show that "hot spots" remain, this is presumptive evidence that treatment was not effective and there is noncompliance with the LDR treatment requirements. In the preceding determination of whether a waste is hazardous, the Agency guidance in SW–846 provides basic sampling strategies for simple and stratified random sampling of the waste as a whole. However, in application of the land disposal treatment standards, all portions of the waste must meet the applicable treatment standards, i.e., no portion may exceed the regulatory limit. See 40 CFR 268.40. Hence, commenters that focused on the SW–846 sampling issue largely misconstrued the central findings of the studies.

In response to comments pointing to the disposal of a waste in a monofill, while data may suggest that disposal of iron treated waste in this type of controlled environment may be protective in some scenarios, RCRA section 3004(m)(1) requires treatment to substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from the waste so that short-term and long-term threats to human health and the environment are minimized. This statutory requirement has not been met with iron addition plus placement in a monofill since ultimate placement of the waste in a monofill is not germane to the key issue at hand—is the treatment prior to land placement effective.

With respect to this key issue, the Agency's determination that the addition of elemental iron in the form of fines, filings, etc., constitutes impermissible dilution is predicated on the fact that the adsorption of soluble lead on to the iron surface is a reversible reaction and once the iron surfaces oxidize (which naturally occurs when the treated waste is exposed to air), the ability of the additive (iron) to scavenge soluble metals is diminished. Therefore, the treatment is not permanent. In addition, adsorption alone is not a reliable method of permanently immobilizing lead which both studies conclude. The authors have also concluded, and the Agency agrees, that the prohibition should apply to any lead-containing waste. As stated by Dr. Kendall in his response to comments, "Lead-contaminated foundry sand is no different from any other waste which fails the TCLP test because of excessive amount of extractable lead. The addition of iron metal (zero valence iron) is not a permanent treatment because iron oxidizes. Since iron addition is not a permanent treatment, it should not be allowed for hazardous wastes which are to be land disposed, regardless of their origin." (See memorandum from Samuel Coleman, USEPA to James R. Berlow, USEPA Re: "Reply to Comments Concerning Prohibition of Land Disposal of Iron Treated Lead Contaminated Wastes". November 17, 1997.)

As indicated above, the addition of iron metal is not a permanent treatment because the iron inevitably oxidizes and loses its adsorptivity for soluble lead ions. After oxidation of the iron surfaces, surface adsorption of lead ions ceases and the lead-bearing waste returns to its original state; all pretext of treatment is lost. Since iron addition is not effective, it cannot be allowed for hazardous lead-containing hazardous wastes that are to be land disposed, regardless of their origin (i.e., all lead-bearing wastes, not just foundry sands).

The Agency concludes that addition of iron metal, in the form of fines, filings, or dust, fails to provide long-term treatment for lead-containing hazardous wastes. EPA is codifying this determination by calling the practice impermissible dilution, and so invalidating it as a means of treating lead in lead-containing hazardous wastes. It can also be simply viewed as a type of treatment that fails to minimize the threats to human health and the environment posed by disposal of lead-containing hazardous wastes, because lead mobility is not substantially reduced when the waste is disposed.

In response to comments whether use of iron-containing abrasives to remove lead-based paint, for example from the steel bridge blast cleaning and painting industry, may be a type of impermissible dilution, the Agency notes that the dilution prohibition does not apply to processes which generate a waste, only to processes that treat a waste which already has been generated. See S. Rep. No. 284, 98th Cong. 2d Sess. 17 (1984). As such, it would not appear that abrasive blasting is impermissible dilution since it is part of the process generating the waste, i.e., the removed paint. If generators added iron filings/dust or discarded, off specification steel shots to lead-based paint waste (similar to the current foundry practices), it is analogous to impermissible dilution and this rule bans such practice. However, addition of iron filing/dust to a hazardous waste (before the hazardous waste determination) is a lot different from using steel pellets/shots, silica-containing products, and other abrasive materials for paint removal.

The Agency has been pursuing several specific efforts to evaluate the environmental hazards caused by disposal of lead-containing wastes, including evaluation of damage case information included in the 1996 Hazardous Waste Characteristic Scoping Study, re-examination of the risk modeling used for the 1995-proposed Hazardous Waste Identification rule, and evaluation of fate and transport in other environmental media from industrial nonhazardous solid waste disposal facilities. Upon completion of these activities, the Agency will be in a better position to decide whether disposal of lead-containing waste is a health and environmental concern warranting listing or whether revising the TC regulatory limit would be more appropriate.

In addition, the Agency notes that a determination that a waste is not hazardous (here because addition of iron during a generating process results in a determination that paint waste does not exhibit a characteristic) may not be a shield against future liability, if the disposal results in environmental damage. Note that under CERCLA, not just generators are liable for any environmental damage caused by the release of hazardous material into the environment. CERCLA liability is independent of any hazardous waste determination that previously may have been made. EPA believes that in light of CERCLA liability and the available environmental contamination data, it would be prudent for generators to examine their waste generation and management practices with an eye toward segregation of lead-based paint waste and iron dust/flakes or steel shots, and potential re-smelting of the lead-bearing residuals.

As a final matter, it has been argued to the Agency that the proposed (and now final) action regarding addition of iron filings is analogous to treatment of fluoride in a process for treating aluminum spent potliner waste (K088) operated by Reynolds Metals Company. See generally Docket P33F–S0069 p. 6 (July 7, 1997) and 62 FR 37694, 37697 (July 14, 1997) (responding to comment and establishing October 8, 1997 as the date prohibition of land disposal of K088 wastes takes effect). The argument goes that in the Reynolds treatment process, reagents are added to the process that only allow the fluoride to meet the LDR treatment standard by blinding the analytical method (the TCLP), but do not result in permanent reduction of fluoride mobility in the treated wastes. See 62 FR at 37695, noting that levels of fluoride in the leachate from actual disposal are well in excess of the levels established in the treatment standard (as measured by the TCLP). Hence, it is asserted, this process must be an example of impermissible dilution.

The Agency disagrees. First, EPA calculated that the process did reduce fluoride mobility on the order of 28%. Docket P33F–S0064. This estimate may in fact understate the extent of treatment. The maximum amount of fluoride detected in actual leachate from the disposed treatment residue is 2228 mg/L. 62 FR 37695. However, untreated potliners leached fluoride at concentrations ranging from 7730–8860 mg/L when exposed to the same type of leaching medium (simulated monofill leaching medium). Docket P33F–S0049 data set J. Thus, EPA finds that the process is resulting in non-dilutive treatment of fluoride. In addition, the reagent used for fluoride treatment serves another legitimate function in the process—as a fluxing agent to prevent agglomeration of material in the rotary kiln. 62 FR at 37695. Dilution which is a necessary part of a treatment process is normally permissible. 51 FR at 40592 (November 7, 1986); 62 FR at 37697. Consequently, EPA does not regard the treatment of fluoride in the Reynolds K088 treatment process to be a form of impermissible dilution.

h. Treatment Standards for Wastewater and Nonwastewater Forms of Mercury Waste. The Agency, in the original Phase IV rule, proposed to change the treatment standard for one subcategory of TC mercury wastewaters (D009—All Others) from the characteristic level of 0.20 mg/L (established in the Third Third rule (55 FR 22520, June 1, 1990) to the previously promulgated UTS for mercury wastewaters (Mercury—All

Others) of 0.15 mg/L. (60 FR 43654, August 22, 1995.) The Agency received no comments on this proposed change. As such, the Agency is promulgating a treatment standard of 0.15 mg/L for wastewater forms of D009—All Others.

The Agency also proposed to revise the treatment standard for TC mercury nonwastewaters (D009—All Others) from the characteristic level of 0.20 mg/L TCLP to 0.025 mg/L TCLP. The nonwastewater UTS for mercury is based on the mercury standard developed from K071 waste treatment data. The only comments received on the achievability of this proposed change were regarding the application of this treatment standard to TC mercury soil. TC soils are subject to specific treatment standards being finalized elsewhere in today's rule. More detail can be found on the mercury soil comments in the Response to Comments Background Document. Therefore, the Agency is promulgating a treatment standard of 0.025 mg/L TCLP for nonwastewater forms of D009—All Others in today's rule.

With respect to the broader issue of mercury treatment, the Agency plans to conduct an intensive review of traditional and innovative technologies over the next year or so. Outreach to various industry, academic, and other groups is also being investigated as to its feasibility. Key information, when available, on this effort can be obtained from the RCRA Hotline, and notices of significant public events will be placed in the **Federal Register** and on EPA's Internet home page.

i. Final Universal Treatment Standard for Nonwastewater Forms of Nickel. The Agency proposed in the Phase IV Second Supplemental to change the UTS for nonwastewaters containing nickel from 5.0 mg/L TCLP to 13.6 mg/L TCLP. This revision to the UTS was based on new performance data obtained by the Agency and presented in that notice. The Agency did not receive any significant comments on this issue. However, as discussed in an earlier section of today's preamble, the Agency discovered an error in the calculation of the treatment standard. In applying the LDR methodology for calculation of a treatment standard, the Agency failed to conduct a "Z-score" outlier test. With the application of this test, 5 out of the 122 data points originally used in the calculation of the standard, were determined to be outliers. This error resulted in a revised treatment standard for nickel nonwastewaters of 11.0 mg/L TCLP. In light of this amended standard, the Agency has reviewed all of the comments and data submittals, and has determined that all the treatment data for nickel is below 11.0 mg/L TCLP. Accordingly, the Agency is today promulgating a final UTS for nickel nonwastewaters of 11.0 mg/L TCLP. No change was proposed for nickel wastewater; therefore, the UTS remains at 3.98 mg/L for these wastes.

j. Final Treatment Standards for Selenium Wastes. (i) Treatment standards for TC Selenium Wastes (D010). The majority of commenters supported the Agency proposal to maintain the 5.7 mg/L TCLP level for D010 nonwastewaters. They strongly agreed with the Agency's reasoning, and urged EPA to adopt the proposed treatment standard.

One commenter, however, maintains that the Agency should establish a "High Selenium Greater Than 200 ppm" subcategory for nonwastewaters, with a corresponding treatment standard of 10 mg/L TCLP. The commenter has cited technical problems in achieving the proposed treatment standard level for highly contaminated selenium wastes. The commenter states that, since 1995, they have consistently experienced problems treating waste streams from glass manufacturing companies with wastes that contain high concentrations of selenium. The commenter provided treatability testing data from a selenium waste stream, containing 80 mg/L TCLP, which showed that 16 different treatment recipes were tested prior to finding one that would treat a selenium waste to below 5.7 mg/L TCLP. The other data, from three different generators of selenium waste, suggest TCLP values of untreated waste of between 465–1064 ppm TCLP, with treated wastes achieving between 2.5 and 45.6 mg/L TCLP.

The Agency has reviewed all the treatment data and, for the most part, waste streams containing selenium exist either in relatively low concentrations (0.1–0.13 mg/L TCLP) or in extremely high concentrations (greater than 450 mg/L TCLP). Because of the highly divergent nature of these wastes and the difficulty in treating selenium with multiple metals at almost any concentration, it seems unreasonable to mandate that one treatment standard could be applicable to both. Calculations of a revised treatment standard, based only on the newly submitted treatment data for the high selenium concentration wastes, would yield a standard of 77.0 mg/L TCLP for selenium nonwastewaters. If a calculation is done after pooling all selenium data (including low concentration selenium data), a standard of 261 mg/L TCLP would result. The Agency is reluctant to establish a treatment standard for selenium nonwastewaters of either 77.0 mg/L or 261 mg/L TCLP on a national level. Earlier data suggest and commenters concur that for the majority of selenium wastes the proposed standard of 5.7 mg/L TCLP for selenium nonwastewaters is appropriate. Furthermore, only three high selenium concentration waste streams that could apparently not be treated to this level. Therefore, there is little reason to pool all treatment data or to engage in bifurcation of the selenium standard.

Accordingly, the Agency is promulgating a treatment standard of 5.7 mg/L TCLP for nonwastewaters containing selenium. The Agency, however, is convinced that the high-level selenium waste streams for which data were submitted to EPA will be unable to be treated to achieve the 5.7 mg/L TCLP standard. Therefore, in a **Federal Register** notice that will be published shortly, the Agency will be requesting comment on a proposal to grant a site-specific treatment variance for Waste Management, Inc. for the treatment of some D010 wastes containing high concentrations of selenium.

The Agency also is promulgating as proposed a wastewater treatment standard of 0.82 mg/L for D010 wastewaters. No comments were received on this issue.

(ii) Universal Treatment Standard (UTS) for Selenium. As noted above, in the May 12, 1997 reproposal of the Phase IV rule, the Agency proposed to change the UTS for selenium nonwastewaters from 0.16 mg/L to 5.7 mg/L TCLP. For the reasons discussed above for D010 nonwastewaters, 5.7 mg/L TCLP is a better reflection of treatability of difficult-to-treat selenium waste streams than 0.16 mg/L TCLP. This is the level being promulgated today for the selenium nonwastewater UTS. (It should be noted that because the UTS is above the TC level for selenium, selenium is not considered an "underlying hazardous constituent" (UHC) in characteristic waste, according to the definition at 268.2(i)). The wastewater UTS for selenium remains unchanged at 0.82 mg/L.

k. Final Treatment Standards for Silver Wastes. (i) Treatment standards for TC Silver Wastes (D011). In today's final rule, EPA is promulgating a nonwastewater treatment standard of 0.14 mg/L TCLP for characteristic silver (D011). For wastewaters, EPA is promulgating a treatment standard of 0.43 mg/L as proposed in the original Phase IV proposal on August 22, 1995 (60 FR 43684). EPA is in the process of determining whether silver should remain on the TC list at 40 CFR 261.24(b) Table 1 or whether the current TC level should be altered. If EPA alters the status of silver on that TC list, EPA will revisit the treatment standards for silver.

(ii) Proposals, Comments, and Responses. Until today's notice, the treatment standards for wastewater and nonwastewater forms of D011 have both been 5.0 mg/L TCLP, which is the TC level. In 1995, EPA proposed a treatment standard of 0.43 for wastewaters and 0.30 mg/L for nonwastewater, based on the best treatment data in EPA's possession at that time (60 FR 43684). EPA received comments urging the Agency to refrain from setting a treatment standard lower than the TC level and instead suggesting that EPA remove silver from the TC list altogether due to new information on the low risk of silver to human health.

In a 1996 Notice of Data Availability (NODA), EPA presented the option of retaining the 5.0 mg/L treatment standard for D011 wastes (61 FR 21420, May 10, 1996). Comments were divided in two groups: those which supported the option, and those which stated that EPA had no firm basis for such a decision, given the potential toxicity of silver to aquatic life.

Since receipt of the comments on the NODA, EPA acquired more recent treatment data on TC metals, including silver. Based on these data, EPA learned that D011 nonwastewaters could be successfully treated to a level of 0.11 mg/L using HTMR, and EPA proposed revising the UTS for silver in its Phase IV Second Supplemental proposal. The grab data used to establish this treatment standard was submitted to the Agency by an HTMR facility (62 FR 26041) (Background Documents from Second Supplemental proposal). Commenters on the Second Supplemental reiterated that silver should not be on the TC list. However, the commenters continued, if silver remains on the list for now, EPA should not set a more stringent standard than the current one of 5.0 mg/L, but rather it should choose a risk-based standard. Commenters explained further that little D011 is disposed, because silver is generally recovered from silver wastes.

In response to the reproposal, the Agency received no significant comment on the technical aspects of achieving the proposed treatment standard; however the Agency did receive from International Metals Company (INMETCO) an additional 74 grab data points on the treatment of silver using HTMR. (See memorandum from Howard Finkel, ICF, Inc., to Nick Vizzone, USEPA Re: "Calculation of Universal Treatment Standards (UTS) for HTMR Residues Using Data Submitted by Horsehead Research Development Company, Inc. and INMETCO," December 17, 1997.) The Agency used INMETCO data for the calculation of the proposed treatment standard and determined that this additional data should be included in the data pool. As previously discussed in Section III.A. of today's preamble, the Agency discovered an error in the calculation of the treatment standard. In applying the LDR methodology for calculating a treatment standard, the Agency failed to conduct a "Z-score" outlier test. With the application of this test and the inclusion of the 74 additional data points, 3 out of the 114 data points, were determined to be outliers, resulting in a revised treatment standard for silver nonwastewaters of 0.14 mg/L TCLP. The Agency has reviewed the comments in light of this amended standard and believes that it can be achieved by both HTMR and stabilization technologies. Data submitted by commenters in response to this proposal also support this conclusion. See supporting information contained in the docket for this rule.

The Agency does not have an adequate basis for taking the actions recommended by some commenters, i.e. to remove silver from the TC list, or regulate it at a less stringent level than the proposed technology-based treatment standard. EPA is in the process of determining whether silver should remain on the TC list at 40 CFR 261.24(b) Table 1, or whether the current TC level should be altered. In addition, EPA continues its work on the Hazardous Waste Identification Rule (HWIR) to establish risk-based exit levels for hazardous wastes. The Agency is not yet able to establish a nationally-applicable risk-based level for silver that fulfills the statutory charge of minimizing threats of hazardous waste to human health and the environment.

The process of establishing such a level is technically complex; EPA is currently modeling the ecological and human health effects of exposure to silver through numerous pathways. Several issues remain unresolved concerning human health and environmental risk. EPA is continuing to investigate these issues. The Agency recently acquired studies indicating that silver may be connected to central nervous system and other non-cancer effects in humans. The draft Reference Dose for these effects have not been finalized by the Agency for use in risk assessments. (A Reference Dose is a benchmark level for chronic toxicity that is protective of human health.) In addition to potential adverse human health effects, uncertainties and concerns also remain for potential adverse environmental effects. Although EPA removed the Maximum Contaminant Level (MCL) for silver in drinking water, the Ambient Water Quality Criteria remain in effect due to potential aquatic toxicity. Further areas of uncertainty are how silver speciates after release (i.e. which valence state of silver would be present). The issue could be important since potential toxic effects differ depending on the species of silver present. In short, EPA's work on understanding risks from disposal of silver-containing hazardous wastes is ongoing, and it would be premature to establish a treatment standard based on risk at this time.

In the absence of such "minimize threat" levels for hazardous constituents, the Agency establishes standards based on Best Demonstrated Available Technology (BDAT). (See full explanation in the preamble of the Phase II Final LDR rule at 59 FR 47986, September 19, 1994.) The fact that the UTS for nonwastewater forms of silver is being lowered (made more stringent) from the existing level of 0.30mg/L to 0.14 mg/L is due to new data on what treatment technology achieves. As explained in the summary of this preamble section (Section III: Revised Land Disposal Restrictions for Metal Constituents in All Hazardous Wastes, Including Toxic Characteristic Metals), technology-based standards are the best assurance that threat is minimized, given the uncertainty as to the level at which threats of hazardous waste disposal are minimized.

EPA expects that the new treatment standard for silver wastes will have little, if any impact on the regulated community. As stated by commenters, high-silver wastes are generally recycled due to their economic value and are covered by the special streamlined standards for recyclable materials utilized for precious metal recovery at 40 CFR Part 266.70 Subpart F. Moreover, the Regulatory Impact Analysis for this rule estimated that the new, more stringent UTS levels for metal constituents, including silver, will not increase compliance costs. This is because the current treatment methods already achieve the new standard of 0.14 mg/L in silver nonwastewaters. (Achievability of the UTS for TC silver wastewaters is not an issue; EPA received no comments nor data on its proposal to apply the existing UTS of 0.43 mg/L.)

Thus, the Agency is promulgating the wastewater standard of 0.43 mg/L as proposed and the nonwastewater standard of 0.14 mg/L. If EPA changes the status of silver on the TC list, EPA will revisit the treatment standards for silver wastes.

(iii) Universal Treatment Standard (UTS) for Silver Nonwastewaters. (Please refer to the discussion above about the development of the treatment standard for characteristic silver for information on the development of the UTS levels.) In today's final rule, EPA is promulgating a nonwastewater UTS of 0.14 mg/L TCLP for silver.

l. Final Universal Treatment Standard for Nonwastewater Forms of Thallium. The Agency proposed in the Second Supplemental Proposed Rule to change the UTS for thallium-containing nonwastewaters from 0.078 mg/L TCLP to 0.20 mg/L. (The original standard was based on composite sampling from an HTMR facility). This proposal was based on new data obtained by the Agency and presented in that notice. Several commenters supported the change. However, two commenters argued that EPA had not demonstrated that existing commercial technologies were capable of achieving the proposed standards *or* that technologies were otherwise available. The Agency remains unconvinced by the arguments of the commenters and notes that they supplied no treatment data in support of their contentions. Accordingly, the Agency is today promulgating as proposed a revised UTS for nonwastewaters containing thallium of 0.20 mg/L TCLP. No change was proposed for wastewater containing thallium; therefore the UTS remains 1.4 mg/L.

m. Final Treatment Standard for Nonwastewater Forms of Vanadium in P119 and P120 Wastes. The Agency proposed in the Second Supplemental Proposed rule to change the UTS for nonwastewaters containing vanadium in P119 and P120 wastes from 0.23 mg/L TCLP to 1.6 mg/L TCLP. This proposal was based on new data obtained by the Agency and presented in that notice. Commenters were supportive of the change. The treatment standard of 1.6 mg/L TCLP is being promulgated as proposed. No change was proposed for wastewater containing vanadium in P119 and P120 wastes, therefore, the UTS remains 4.3 mg/L. The Agency would like to point out that vanadium is not an "underlying hazardous constituent" in characteristic waste, according to the definition at 268.2(i).

n. Final Treatment Standard for Nonwastewater Forms of Zinc in K061 Waste. The Agency proposed in the Second Supplemental Proposed rule to change the treatment standard for zinc nonwastewaters in K061 waste from 5.3 mg/L to 4.3 mg/L . This proposal was based on new data obtained by the Agency and presented in that notice. One commenter was supportive of the change, while two other commenters were concerned with zinc being identified as an UHC. Still another commenter, a major HTMR facility, submitted data (152 data points) showing 100% compliance with the standard after 6 high statistical outliers were removed. Indeed, the great majority of these data showed zinc at levels an order of magnitude below the promulgated standards. EPA believes these data confirm the achievability of today's standard. Therefore, the Agency is today promulgating a revised nonwastewater treatment standard of 4.3 mg/L TCLP for K061 waste. No change was proposed for wastewater containing zinc in K061; therefore the UTS remains 2.61 mg/L. In response to the comments regarding zinc as an UHC, the Agency would like to point out that zinc is only regulated in K061 waste; it is not defined as an "underlying hazardous constituent" in characteristic waste, according to the definition at 268.(i).

UNIVERSAL TREATMENT STANDARDS FOR TWELVE METAL CONSTITUENTS

[Affecting Nonwastewater TC Metal Wastes and Nonwastewater Metal Constituents in All Wastes]

Waste code	Constituent	TC level (mg/L)	Existing UTS level (mg/L TCLP)	2nd supplemental proposed UTS level (mg/L TCLP)	Final UTS level (mg/L TCLP)
D005	Barium	100	7.6	21.0	21.0
D006	Cadmium	1.0	0.19	0.20	0.11
D007	Chromium	5.0	0.86	0.85	0.60
D008	Lead	5.0	0.37	0.75	0.75
D009- all others	Mercury	0.2	0.025	0.025	0.025
D010	Selenium	1.0	0.16	5.7	5.7
D011	Silver	5.0	0.30	0.11	0.14
	Antimony		2.1	*0.07	1.15
	Beryllium		0.014	*0.02	1.22
	Nickel		5.0	13.6	11.0
	Thallium		0.078	0.20	0.20
	Vanadium **		0.23	1.6	1.6
	Zinc **		5.3	4.3	4.3

*The proposed UTS levels for antimony and beryllium were rounded up to the nearest 0.01 mg/L TCLP.

**Vanadium and zinc are not underlying hazardous constituents.

Note: Treatment standards for TC metal wastewaters have also been revised in today's rule, but are not reflected in this table.

D. Use of TCLP to Evaluate Performance of Treatment Technology for Treating Hazardous Metal Constituents

Commenters did not question the appropriateness of using the TCLP as a means of evaluating the performance of the treatment technology used to treat metal hazardous constituents in hazardous wastes. EPA is addressing the issue *sua sponte* to set out why the recent opinion of the D.C. Circuit in *Columbia Falls Aluminum Co.* v. *EPA* (No. 96-1234, April 3, 1998) does not affect use of the TCLP for this purpose.

Columbia Falls presented an unusual set of facts. EPA had established treatment standards for spent aluminum liners (waste K088), which standards used the TCLP to measure performance of the treatment technology for several hazardous constituents, including arsenic and fluoride. All of the commercial treatment capacity for this waste was provided by a single facility, and all of the treatment residue from this single process was disposed at a single location. Slip op. at p. 6; 62 FR at 1993 (Jan. 14, 1997). Notwithstanding that the treatment process was able to achieve the treatment standards for arsenic and fluoride as measured by the TCLP (i.e., the treatment residue, when tested with the TCLP, never exceeded the regulatory levels), actual *leachate* from the disposal site contained significantly higher levels of these constituents. *Id.* EPA also had not offered any substantive explanation for continued use of the TCLP to measure performance of the treatment process for these constituents after the extreme disparities in actual performance in the field became known. *Id.* p. 18. Under these circumstances, the court held that it was arbitrary and capricious to continue to use the TCLP because it bore no rational relationship to what was actually occurring. *Id.* p. 19.

None of these circumstances are present here. The TCLP has not been shown here to be underpredictive of performance of treatment technology for key hazardous constituents for any wastes, much less, as in *Columbia Falls*, to be drastically underpredictive (for two constituents) for 100 % of the wastes to which the test applied. Moreover, the wastes affected by the standard in today's rule will not uniformly be going to a single disposal environment where actual leaching of key constituents is shown to be higher than the regulatory level. Rather, the wastes will be decharacterized and so can be disposed in any landfill: municipal, subtitle D or subtitle C. Given the enormous diversity of characteristic wastes and the diversity of likely disposal environments, the TCLP will not pervasively underpredict as was the case with spent potliners. Unlike the situation in *Columbia Falls*, therefore, there is no argument that application of the TCLP to measure treatment performance will fail to minimize threats posed by these wastes' land disposal.[1]

EPA also emphasizes that the LDR treatment standards are technology-based, not risk-based. A key role of the TCLP in the treatment standard is to measure whether the best demonstrated treatment technology has been properly applied to the waste. Thus, unlike the situation when the test is used as a means of identifying whether or not wastes are hazardous, the TCLP is not principally serving a predictive function when it is used as a component of an LDR treatment standard. The test is normally a good measure of evaluating the performance of treatment technology both because it is a widely-available test for metal mobility, and also because it is typically somewhat aggressive (*Edison Electric*, 2 F.3d at 445). Thus, it is a useful tool for measuring whether metal mobility has been substantially reduced in order that threats posed by land disposal be minimized (as required by section 3004 (m)). In the Agency's view, therefore, questions as to the validity of the TCLP as a component of LDR treatment standards are raised only under the extreme circumstances present in *Columbia Falls*, where, for all wastes and all disposal scenarios affected by the standard, large disparities between actual environmental field results and the treatment standard raise significant questions as to whether treatment is minimizing threats. These questions are not present for the metal-containing wastes here.

IV. Application of Land Disposal Restrictions to Characteristic Mineral Processing Wastes

Summary

EPA is today finalizing its proposal to apply the Universal Treatment Standards (UTS), as revised in part today, to the newly identified characteristic mineral processing wastes. In earlier rules and a Report to Congress, EPA has determined which mineral processing wastes are not excluded in the Bevill Amendment and are thus considered "newly identified" wastes subject to RCRA regulations. (See 54 FR 36592, September 1, 1989; 55 FR 2322, January 23, 1990; and Report to Congress on Special Wastes from Mineral Processing, USEPA, July 31, 1990.) The treatment standards being promulgated today are located in the table "Treatment Standards for Hazardous Wastes" at 268.40 in the regulatory language for today's rule. The wastes are identified by characteristic waste code (e.g. D002 corrosive waste, or D008 TC lead waste); there is no separate section in that table for characteristic mineral processing wastes.

A. Proposal, Comments, and Responses

In the original Phase IV, EPA proposed to apply the metal UTS, as measured by the TCLP (60 FR 43582, August 22, 1995) to all TC metal wastes. On January 25, 1996, EPA further proposed to apply the existing UTS to the newly identified mineral processing wastes, i.e., mineral processing wastes that exhibit a characteristic and do not have Bevill status and are not excluded from being a solid wastes due to recycling. The Agency stated in this proposal that existing data showed that these "newly identified" mineral processing wastes were similar to those wastes for which the UTS was achievable, and consequently the UTS fairly reflected the performance of Best Demonstrated Available Technology (BDAT) for these wastes. (See 61 FR 2338 for a complete discussion of the Agency's rationale for extending the UTS to both wastewater and nonwastewater forms of "newly identified" mineral processing wastes.)

Many commenters in response to this proposal took issue with the Agency's conclusions that the existing data demonstrated that the UTS was achievable for the newly identified mineral processing wastes and stated that the record for the rulemaking reflected no such showing. The commenters further argued that to develop representative treatment standards for mineral processing wastes, the Agency must: (1) Collect and analyze a representative mineral processing waste characterization and treatability data set; (2) analyze that data using well-reasoned and documented methods for determining the treatability of the subject wastes; (3) make a determination as to whether the UTS or some other LDR treatment standards are appropriately applied to mineral processing wastes; and (4) provide notice and an opportunity to comment on that determination prior to imposing any LDR treatment standards on such wastes. Several other commenters took issue with the Agency's use of only HTMR data to develop the treatment standards.

As a result of these comments and others received in response to the original Phase IV rule, the Agency decided to further assess the treatment of TC metal wastes and mineral processing wastes. As previously discussed in today's preamble, the Agency collected actual stabilization performance data during three site visits conducted in September 1997. In particular, treatment data were collected for the following primary mineral processing wastes: cadmium sponge residue, cupel and crucibles from fire assay laboratories, slag from fire assay laboratory, soil and debris contaminated with sulfuric acid, blast furnace slag, baghouse dust, lead/bromide residue, and gold ore leach tailings. In addition, treatment data from the following secondary mineral processing wastes

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[1] Nor is there a legitimate argument that the TCLP is impermissibly overpredictive. Indeed, since the TCLP has already been upheld as a means of identifying many of these metal-containing wastes as hazardous, *Edison Electric Inst. v. EPA*, 2 F.3d 438, 444–45 (D.C. Cir. 1993), and since the 'minimize threat' requirement in section 3004(m) is a more stringent test, *HWTC III*, 886 F.2d at 363, *a fortiorari* it is reasonable to use the TCLP as part of the process of assuring that threats posed by land disposal of these wastes are minimized.

were also collected: lead slag waste, lead-bearing assay laboratory wastes, lead contaminated wastes, cupels, and debris; blast furnace slag, lead recycling by-products, lead contaminated soils, and lead battery recycling slag waste. Many of these wastes were particularly difficult to treat due to high total and leachable levels of metals, extreme Ph, and presence of multiple hazardous metal constituents.

As previously discussed in an earlier section of today's preamble, the Agency assessed two data sets representing performance of stabilization and HTMR for the treatment of metal-containing waste streams. This assessment began with the calculation of treatment standards for each of the two data sets. Next, the Agency compared the treatment levels for stabilization versus HTMR. Based on this comparison, the Agency selected the highest level for each metal as the proposed UTS to allow for process variability and detection limit difficulties. As noted earlier, this approach is consistent with the legislative goal of providing substantial treatment through standards that are achievable by an array of well-performing available treatment technologies.

On May 12, 1997, the Agency issued a Second Supplemental Proposal (62 FR 26041). In it, EPA proposed to change the numerical limits for all nonwastewater wastes containing the following metal constituents: antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc. EPA also proposed these same UTS treatment standards for TC metal wastes identified as hazardous due to the concentration of barium, cadmium, chromium, lead, selenium, or silver. Based on the data collection efforts, the methodology used to develop these revised standards, and the preponderance of mineral processing treatment data used to calculate the standards, the Agency was convinced that the transferability of the universal treatment standards to mineral processing wastes was well supported.

In response to these revised treatment standards and their application to mineral processing wastes, the Agency received few comments. Several commenters supported the Agency's decision to apply the LDR treatment standards to mineral processing wastes. A limited few, however, continued to argue that EPA's application of the LDR program to mineral processing wastes was not supported by the record. The commenters' position is unsubstantiated, relying entirely upon assertions that the standards are not achievable. No data was submitted to support the commenters' position. Conversely, the data in hand (some of which reflect successful treatment of hard-to-treat mineral processing wastes) show that the treatment standards are achievable using either stabilization or HTMR for mineral processing wastes. As a result, the Agency is today finalizing the applicability of the existing UTS to the newly identified mineral processing wastes.

The reader is referred to an earlier section of today's preamble for a complete discussion of treatment standards for metal wastes being promulgated today.

B. Clarification That Universal Treatment Standards Apply to Ignitable, Corrosive, and Reactive Characteristic Mineral Processing Wastes

As discussed above, the treatment standards promulgated in this rule will apply to all the newly identified characteristic wastes from mineral processing operations. This includes not only the mineral processing wastes exhibiting the toxicity characteristic (TC), but also wastes that exhibit the characteristic of ignitability (D001); corrosivity (D002); or reactivity (D003). (See definitions of these characteristics at 40 CFR 261.20 through 261.23.) The treatment standards found in 40 CFR 268.40 require removal of the characteristic as well as meeting the treatment standards for all underlying hazardous constituents (UHCs) reasonably expected to be present at levels above the UTS. The Agency received no comment on this issue at proposal (see 61 FR 2338, January 25, 1996). Therefore, the Agency has no reason to believe that the UTS are not achievable for mineral processing wastes also exhibiting the characteristic of ignitability, corrosivity and/or reactivity. As such, the Agency is today promulgating the application of UTS to D001, D002, and D003 mineral processing wastes.

C. Use of TCLP to Evaluate Performance of Treatment Technology for Treating Hazardous Metal Constituents in Mineral Processing Wastes

Part of this rulemaking involves consideration of what the appropriate regulatory test is to determine if mineral processing wastes exhibit the toxicity characteristic. The Agency addresses this issue in detail later in this preamble when discussing retention of the TCLP for this purpose. Here, we confirm that the Agency will also continue to use the TCLP as part of the LDR treatment standard for these wastes. Although commenters did not raise this issue, the Agency feels that addressing it is appropriate in light of the D.C. Circuit's recent decision in *Columbia Falls Aluminum Co.* v. *EPA* (No. 96-1234, April 3, 1998).

The critical component in making waste identification determinations (i.e., to determine whether a waste should be regulated) is ascertaining a plausible mismanagement scenario for the waste if unregulated, and finding a predictive model that can reasonably evaluate whether the waste is capable of posing substantial present or potential harm to human health and the environment under those conditions. *Edison Electric Inst.*, 2 F. 3d at 444. This issue simply does not arise in the LDR context since the wastes subject to LDR are regulated hazardous wastes, and the issue of where and how they would have been managed absent Subtitle C regulation is irrelevant.

In the LDR context, all land disposal (except that occurring in no-migration units) is defined as being unprotective (see, e.g. RCRA section 3004(d)(1)), largely due to the "long-term uncertainties associated with land disposal" (*id.*). For this reason, treatment standards reflecting performance of Best Demonstrated Available Technology provide an objective means of removing as much of this inherent "long-term uncertainty" as possible, and so permissibly achieve the ultimate requirement of minimizing threats posed by land disposal of hazardous wastes. *HWTC III*, 886 F. 2d at 362-65; 55 FR at 6642 (Feb. 26, 1990). The principal role of the TCLP in these treatment standards is assuring the performance levels achievable from use of these best treatment technologies, not predicting environmental fate in the disposal environment.

As discussed earlier, the TCLP is historically accepted as being well-suited for evaluating performance of treatment technology for metals given its availability and general aggressiveness for mobilizing metals. Also, we note that since the TCLP serves a different purpose in the LDR treatment standards than it serves for identifying wastes as hazardous, and since it is well-suited for that purpose, there would be no contradiction in using it as part of the LDR standard even if a different test were to be used (presumably in the future) for waste identification.

Nor does the *Columbia Falls* opinion undercut use of the TCLP as a component of treatment standards for mineral processing wastes. As noted earlier with respect to other toxic metal-containing wastes, EPA does not view *Columbia Falls* as requiring a change in use of the TCLP as part of the LDR treatment standards. The TCLP has not been shown generally to be underpredictive of performance of treatment technology for key hazardous constituents for any wastes, much less, as in *Columbia Falls*, to be drastically underpredictive (for two constituents) for 100% of the wastes to which the test applied. For all mineral processing wastes to which it was applied, the TCLP test has not been shown to be underpredictive either, and so would be part of the mechanism for assuring that treatment minimizes threats posed by land disposal of these wastes. Moreover, it should be noted that mineral processing wastes can be and are treated commercially, and the treatment residues are then disposed along with other wastes in different types of disposal units. See, e.g. the document entitled, "Background Documents Supporting the Phase IV Final Rule: Metal Treatment Standards" in the RCRA Docket (commercial treatment company treating mineral processing wastes along with other metal-containing wastes and disposing of commingled treatment residues). These units certainly can generate mildly acidic leachate. 51 FR at 40594 (Nov. 7, 1986). Given these circumstances, the TCLP is an appropriate part of a standard which minimizes threats posed by land disposal of these wastes.

V. Other LDR Issues That May Affect Both Toxic Characteristic Metal Wastes and Characteristic Mineral Processing Wastes

A. Treatment Standards for Soil Contaminated With TC Metal Wastes or Characteristic Mineral Processing Wastes

1. Summary

EPA has decided that the LDR treatment standards (i.e., UTS) for toxicity characteristic metals (D004–D011) and newly identified mineral processing wastes being promulgated in today's rulemaking will not apply to soils contaminated with these hazardous wastes. Instead, these contaminated soils will be subject to the treatment standards for soil originally proposed in a separate rulemaking entitled the Hazardous Waste Identification Rule for Contaminated Media ("HWIR-Media") (61 FR 11804, April 29, 1996). These treatment standards are being finalized in a separate section of today's rule. However, because of their impacts on TC metal and mineral processing wastes, a brief introductory discussion is warranted at this point.

2. Discussion of Today's Approach

In the Phase IV proposed rule (60 FR 43682, August 22, 1995), the Agency did not specifically exempt soil contaminated with TC metal wastes from the newly proposed LDR standards; thus, the UTS standards for metals would have applied to TC metal soils. In the Phase IV First Supplemental Proposal (61 FR 2338, January 25, 1996), the Agency proposed applying existing universal treatment standards to newly identified mineral processing wastes, i.e., to mineral processing wastes that exhibit a characteristic, do not have Bevill status, and are not excluded from being solid wastes due to recycling. As a consequence, soils contaminated with these newly identified mineral processing wastes would also have been subject to UTS.

In today's rule, the Agency is finalizing alternative treatment standards for contaminated soil reproposed in the HWIR-Media rulemaking. (See the section of this preamble on treatment standards for contaminated soil.) These treatment standards for hazardous contaminated soils are being finalized for all hazardous wastes, including TC metal and newly identified mineral processing wastes.

B. LDR Treatment Standards for Manufactured Gas Plant Waste (MGP)

1. Summary

Today, the Agency is promulgating treatment standards for hazardous MGP wastes and soils, i.e., wastes and contaminated soils that resulted from processing coal to produce gas and that exhibit a characteristic of hazardous waste. Typically these operations were conducted at manufactured gas plants until the 1950s, and wastes remain at those closed MGP sites. MGP wastes are among the mineral processing wastes which the Agency determined in 1989 and 1990 to be subject to RCRA jurisdiction because they are not excluded from RCRA by the Bevill Amendment. See 54 FR 36592 (September 1, 1989). Hence, they are a subset of the newly identified mineral processing wastes covered by the prohibitions and treatment standards promulgated in this rule.

On January 25, 1996, EPA proposed to apply LDR treatment standards to MGP wastes (61 FR 2360). MGP wastes are no longer being produced, since manufactured gas plants are no longer in operation. The Agency notes that the LDRs only apply at closed MGP sites that are excavated and managed in a way that constitutes placement in a land disposal unit (See 61 FR 18805, April 29, 1996.) The LDRs would require that actively managed MGP wastes be treated to eliminate any characteristics and to achieve the UTS for any underlying hazardous constituents prior to land disposal. Today's rule finalizes the UTS for MGP wastes that exhibit the toxicity characteristic. However, for soils contaminated with MGP wastes, EPA is today promulgating treatment standards specifically for hazardous soil. These soil standards, generally, require treatment to achieve 90 percent reduction of hazardous constituent levels, or 10 times the UTS levels. See Section VII of this preamble.

Today's rule does not alter the Agency's 1993 memorandum that interpreted existing rules to say that the ash that results from burning MGP remediation wastes along with coal in utility boilers remains covered by the Bevill amendment and hence is not regulated under Subtitle C rules. (See memorandum, dated April 26, 1993, entitled "Remediation of Historic Manufactured Gas Plant Sites", from Sylvia K. Lowrance, Director of the Office of Solid Waste, to EPA Regional Waste Management Division Directors. The memorandum is located in the RCRA docket for the Phase IV Supplemental Proposal dated January 25, 1996; 61 FR 2338.) Such residuals are considered to be covered by the Bevill amendment because they result primarily from the combustion of coal (assuming, if the MGP remediation wastes that are co-burned are hazardous, the residues are not significantly affected by burning the MGP wastes, within the meaning of 40 CFR section 266.112).

2. Background

Manufactured gas plants were designed to generate gas from coal. The coal tar residuals generated from the process remain at these historic MGP sites. Many of these sites have soils contaminated with these coal tar residuals. The majority of these contaminated soils will come from the cleanup of historic MGP sites. A significant portion of the soil is nonhazardous, but approximately 15 percent of the soils fail the toxicity characteristic leaching procedure test for benzene. These toxicity characteristic (TC) soils also typically contain PAHs, heavy metals, inorganics, volatile aromatics, and phenolics. At certain closed MGP sites, there can be non-soil hazardous wastes, e.g., coal tars in tar holders, which may need to be treated to UTS levels if they are actively managed and land disposed.

3. Public Comments and EPA Responses

Commenters expressed several major concerns about the Phase IV proposal to apply UTS to MGP wastes. First, they urged the Agency to delay implementing the soil standards until the final HWIR-media rule becomes effective. In addition, commenters requested that EPA re-affirm the Agency's 1993 co-burning memorandum for MGP wastes. Finally, commenters urged the Agency to establish specified treatment methods for those MGP wastes that will not be managed according to the Agency's 1993 co-burning memorandum, rather than making the wastes subject to the UTS concentration levels as proposed. One commenter identified several methods of management that could be specified: "recycling technologies including the use of coal tar residuals to manufacture asphalt, bricks, and cement; and combustion technologies that include utility boiler co-burning, incineration and thermal desorption." The commenter stated that specified methods would preserve flexibility for managing MGP site remediations and remove regulatory barriers to expeditious site cleanups.

Regarding the commenter's concern about the coordination of Phase IV standards and the HWIR-media rule, the Agency is finalizing treatment standards for hazardous contaminated soils in a separate section of today's rule. Also, although the Agency did not reopen the issue, the Agency confirms that the 1993 co-burning interpretation remains in effect.

The Agency has studied carefully the comment urging the Agency to specify incorporation of MGP waste into asphalt, bricks, or concrete as a designated method of treatment, which would have the effect of making wastes so treated not subject to meeting numerical treatment standards for hazardous constituents. The recycling of hazardous waste-contaminated soil in asphalt, brick, or cement manufacturing produces products that potentially could be applied or placed on the land. These recycling practices incorporate the contaminated soils into the products, and, thus, are considered to be a "use constituting disposal" (see section 261.2 (c) (1)). The use constituting disposal practice (assuming legitimate recycling is occurring) is regulated per the provisions of 40 CFR sections 266.20 through 266.23. This issue is discussed in more detail in section VII of the preamble.

At this time, the Agency does not have adequate information on asphalt, brick, or cement produced from MGP hazardous waste to determine whether these waste-derived products minimize threats posed by land disposal of MGP wastes. (See also response to USWAG comment #00035 in "Phase IV Response to Comments" in the docket to this rule.) Until the Agency can further study the issue, it is not designating production of these materials from MGP soils as a specified method of treatment. Existing 266.23 (a) continues to apply. And, as noted earlier, for MGP sites in particular, the Bevill exclusion still applies for MGP wastes co-burned in coal-fired utility boilers.

EPA is aware that the regulated community has requested various types of flexibility from LDR treatment standards in managing their site-specific cleanup, remediation, and/or removal activities of these wastes and contaminated soils. With the possible exception of use consituting disposal scenarios, the Agency continues to believe that more complete relief for remediation wastes is needed, particularly with respect to the land disposal restrictions and is best provided by targeted statutory change. Thus, the Agency will continue to participate in discussion of potential legislative solutions on this important issue.

Please refer to the Phase IV response to comments document that is available at the RCRA docket for responses to other issues raised by commenters.

C. Treatment Standards for Debris Contaminated With Phase IV wastes

The Agency is clarifying that debris contaminated with TC metal or characteristic mineral processing wastes can be disposed if it meets the treatment standards established in this rule, but also can be disposed if it meets the standards for debris set out at 40 CFR 268.45.

D. Treatment Standards for Radioactive Mixed Waste

1. Background

Radioactive mixed wastes are wastes which satisfy the definition of radioactive waste subject to the Atomic Energy Act (AEA) 10 CFR Part 61 and also contain waste that is either listed as a hazardous waste in Subpart D of 40 CFR Part 261, or that exhibits any of the hazardous characteristics identified in Subpart C of 40 CFR Part 261. Since the hazardous portions of the mixed waste are subject to RCRA, the land disposal restrictions apply to the mixed waste. Today's rule promulgates revised treatment standards for radioactive wastes that are mixed with metal characteristic wastes and do not currently have a method of treatment (i.e. HLVIT) specified as BDAT.

Treatment standards for radioactive waste mixed with metal-bearing waste were first promulgated in the Third Third rule at 55 FR 22626 (June 1, 1990). That rule established a subcategory of mixed wastes for a specific high level wastestream at the Savannah River site, for which a specified method of treatment is currently required. This method is HLVIT (vitrification of high-level radioactive waste) for radioactive high-level wastes generated during the reprocessing of fuel rods mixed with characteristic metal wastes. This was done because of the human health hazards associated with sampling that would be required if numerical standards were applied. The Third Third rule stated that all the promulgated treatment standards in that rule for RCRA listed and characteristic wastes apply to the RCRA hazardous portion of mixed radioactive (high-level, TRU, and low-level) wastes, unless EPA has specifically established a separate treatability group for a specific category of mixed waste. Thus, that rule required that radioactive waste mixed with metal characteristic waste would have to comply with the LDR treatment standard for the metal characteristic waste, as well as any requirements set forth by the NRC for the radioactive component of the mixed waste.

Because today's rule revises the treatment standards for metal characteristic wastes (i.e., revising certain metal numeric treatment standards, and applying UTS levels to underlying hazardous constituents in the characteristic waste), the treatment standards for radioactive waste mixed with metal characteristic waste that were not specifically subcategorized in the Third Third rule are also affected. Today's rule also revises treatment standards for twelve metal constituents in all wastes, including radioactive mixed wastes. In conclusion, unless specifically noted in Section 268, the treatment standards promulgated today apply to all mixed wastes.

2. Proposal and Issues Discussed by Comments

In addition to revising metal characteristic treatment standards that apply to mixed waste, the Phase IV proposal also discussed mixed radioactive and characteristic metal wastes which have been previously stabilized to meet the LDR requirements, and are now being stored until disposal capacity becomes available. The rule proposed to allow this particular category of stabilized characteristic metal mixed wastes to comply with the LDR metal standards that were in effect at the time the waste was stabilized. More simply, they would require no further treatment to comply with the newly promulgated TC metal standards. The proposal stated that mixed radioactive/characteristic metal wastes that are stabilized after the effective date of Phase IV would be subject to the metal treatment standards promulgated in the Phase IV rulemaking.

The majority of commenters agreed with this approach. The Agency believes that requiring facilities to re-treat the wastes could pose significant threats to human health and the environment (worker exposure, environmental releases). Essentially, requiring these wastes to meet the newly promulgated treatment standards could necessitate treaters opening sealed drums of stabilized mixed waste, grinding the stabilized material, and re-treating to comply with the treatment standards for the few constituents for which EPA is lowering the standards. One commenter wanted the exemption to be broadened to include wastes that were treated by methods other than stabilization. Because the exposure concerns of re-treating the previously stabilized waste primarily center around the idea of first grinding up the stabilized material to retreat it and the potential added radiological exposures attendant thereto, the broadening of this exemption without more specific information is not warranted at this point. Of course, if any wastes already meet the applicable treatment standards, for example macroencapsulation, then there is no need to initiate further treatment. It is important to emphasize that the Agency does not want any more handling of this material than is necessary, and we will entertain site-specific treatment variances to ensure that the appropriate balance is struck to ensure minimization of threats.

As noted, the majority of commenters agreed that hazards from added worker radiation exposure associated with re-treatment (i.e., opening drums, grinding already treated masses of mixed waste) would probably offset any gain in protection of human health and the environment resulting from compliance with the new metal treatment standards proposed in Phase IV. It was pointed out by one commenter that this is consistent with the Storage Prohibition (40 CFR 268.50(e)), where wastes that have met the applicable treatment standards are excluded from the storage prohibition. In addition, one commenter stated that these wastes have been treated to meet the LDR standards in place at the time of treatment, and the only reason they have not already been land disposed is that capacity has not been available. The one commenter who disagreed with the proposal stated that neither retreatment nor an exemption from the new standards are reasonable options, but prefers retreatment. The commenter did not provide support, and the Agency is not persuaded that retreatment is environmentally preferable. Thus, the Agency is promulgating the exemption as proposed. In response to comments, EPA is also indicating that the same principle applies with regard to listed wastes stabilized to meet a previous treatment standard, which standard is affected by this rule because the metal UTS have changed. Again, retreating these wastes would likely create new threats, not minimize them.

One DOE facility requested that the Agency clarify whether a waste required to be treated by a specific technology (i.e., HLVIT) would be required to be further treated for any UHCs present in the waste above UTS levels. The Agency is not imposing additional treatment requirements on those wastes for which a method of treatment (HLVIT) is specified.

Four facilities are concerned that uranium mills tailings will not remain exempt under RCRA. These wastes are by-product materials from uranium mining (i.e., waste acids from solvent extractions, barren lixiviants, slimes from solvent extraction and waste solvents generated in the beneficiation process during the extraction of uranium ore) and, therefore, are excluded from the treatment standards being promulgated today for TC metal wastes. With respect to the radioactive mineral processing wastes, RCRA Section 1004 (27) as codified in 40 CFR 261.4(a)(4) states that "...source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954 as amended, 42 U.S.C. 2100 *et seq.*.." are not solid wastes. Therefore, such excluded materials are not subject to this rule. However, all other wastes not excluded under 40 CFR 261.4 are subject to today's rulemaking (assuming the waste is otherwise subject to today's rule).

Therefore, the Agency is today finalizing as proposed numerical treatment standards for radioactive waste mixed with metal-bearing characteristic waste for which no method of treatment has been established as the treatment standard.

E. Underlying Hazardous Constituents in TC Metal Wastes and Characteristic Mineral Processing Wastes

Summary: As with other characteristic wastes, TC metal wastes (D004—D011) and newly identified mineral processing wastes cannot be land disposed until the characteristic is removed and any underlying hazardous constituents (UHCs) are below universal treatment standards.

1. Background

In 1993, EPA began requiring that, in addition to removing the characteristic in the characteristic wastes, treatment must ensure that UHCs are below their UTS levels. (58 FR 29860; see also 59 FR 47982. See also *Chemical Waste Management* v. *EPA*, 976 F. 2d at 13–14, 16–18 (treatment standards may be lower than the level at which waste is identified as hazardous, and underlying hazardous constituents must be treated to minimize threats posed by land disposal)). UHCs are any constituents in 40 CFR 268.48 that are reasonably expected to be present at levels above the UTS at the point of generation of the characteristic waste. See 40 CFR 268.2(i). EPA's review of the treatment data on TC metal and mineral processing wastes shows that these wastes often contain underlying hazardous constituents, and that UTS are achievable for the UHCs.

2. Discussion of Today's Approach

In the August 22, 1995 Phase IV proposed rule, EPA proposed to apply treatment standards to all TC metal wastes, and on January 25, 1996, EPA further proposed the same for characteristic mineral processing wastes. See 60 FR 43654 and 61 FR 2338. Furthermore, EPA proposed that when the new treatment standards were promulgated, all of those newly identified wastes would have to be treated not only to meet the proposed treatment standards, but also to meet treatment standards for any UHCs reasonably expected to be present (at levels above UTS) in those wastes at the wastes' point of generation. See 60 FR 43654.

One commenter disagreed with the Agency's proposal, stating that the TC metal wastes that also contain organic UHCs would have to be treated by combustion technologies to achieve the organic UTS levels. The Agency disagrees. The organic UTS levels were based on the performance of combustion as well as other removal and destruction technologies. These other removal and destruction technologies can be used to treat organic UHCs to UTS levels in TC metal wastes. Thus, pretreatment of the waste can be used to achieve the organic UTS levels. In addition, the commenter believed there would be difficulties in stabilizing incinerator ash to meet the finalized UTS levels for the metals. The Agency does not agree. In determining the UTS numbers for each metal, the wastes with the most difficult to treat metal constituents were treated by HTMR and stabilization technologies. The higher value between the two technologies was selected as the treatment standard. Thus, treatment using either HTMR or stabilization is expected to achieve the final metal UTS levels. It should be noted that selenium is not being regarded as a UHC since its treatment standard is above its characteristic level. Thus, a selenium characteristic waste will always be hazardous unless the selenium concentration is below the characteristic level of 1 mg/L TCLP. Fluoride, vanadium, and zinc are other metals not considered UHCs in characteristic wastes because these three metals are not on the Hazardous Constituents Table, 40 CFR 261 Appendix VIII (i.e., they are not "hazardous constituents"). (See Background Document for Phase IV Second Supplemental Proposed Rule.)

VI. Issues Relating to Newly-Identified Mineral Processing Wastes

As explained above, EPA considers mineral processing hazardous wastes to be newly identified or listed for purposes of determining when LDR prohibitions apply, since their status as hazardous wastes was not established until after 1984. Today's rule establishes prohibitions and treatment standards for these wastes, pursuant to RCRA section 3004(g)(4).

However, there are a series of important threshold issues in determining what these prohibitions and treatment standards apply to, generally involving the issues of whether primary mineral processing secondary materials are solid and hazardous wastes. There are three main issues. A fundamental first issue is whether, if a mineral processing secondary material (which would otherwise be a hazardous waste) is recycled within the mineral processing industry sector, it is a solid waste. Of particular importance in assessing applicability of the LDR program, is a second issue: whether there is land placement of the mineral processing secondary material before recycling, or during the recycling process. If the material is a waste, a third issue is relevant: is the waste a beneficiation/extraction waste or one of 20 mineral processing wastes that are excluded from subtitle C regulation under the Bevill exclusion (see RCRA 3001 (b)(3)(A)(ii)).

In this rulemaking, EPA also is addressing certain sub-issues that are related to determining whether a particular mining waste is subject to the Bevill exclusion, including whether a waste is "uniquely associated" with mining, how the introduction of non-exempt, mineral processing feedstocks into a Bevill process may affect the Bevill status of the waste generated from the process, and how the mixture of Bevill wastes with other hazardous wastes affects the Bevill status of the resulting wastes when disposed.

As stated in the January 1996 proposal, EPA is not reopening in any respect the Bevill determinations previously made by the Agency, including the Agency's articulation in 1989 of the functional distinctions between beneficiation and mineral processing. *See* 61 Fed. Reg. 2354. Some commenters misinterpreted EPA's statements in the proposal generally describing the beneficiation/processing distinction as somehow reinterpreting the scope of the Bevill amendment. That discussion was intended, however, merely to restate principles articulated by EPA in 1989 (see 54 Fed. Reg. 36619), not to reopen in any way the distinctions as articulated previously by the Agency. Whether a particular waste is from beneficiation or mineral processing will continue to be determined based on 40 CFR 261.4(b)(7) and criteria articulated by EPA in the 1989 preamble.

The following sections of the preamble discuss these threshold issues.

A. Introduction

In July of 1988, the U.S. Court of Appeals, for the D.C. Circuit in *Environmental Defense Fund* v. *EPA (EDF II)*, 852 F.2d 1316 (D.C. Cir. 1988), *cert. denied*, 489 U.S. 1011(1989), ordered EPA to restrict the scope of the Bevill mining waste exclusion, as it applied to mineral processing wastes, to include only "large volume, low hazard" wastes. In response, the Agency promulgated several rules that delineated the scope of the Bevill exemption for extraction/beneficiation and mineral processing wastes. In these rulemakings, the Agency applied high-volume/low toxicity criteria for determining whether a particular waste was subject to the Bevill exemption. The Agency also described the general characteristics that would distinguish extraction/beneficiation wastes from mineral processing wastes. The rules also evaluated which specific mineral processing wastes were in conformance with these high volume/low toxicity criteria and thus were eligible for the exclusion provided by RCRA 3001(b)(3)(A)(ii) (the "Bevill exclusion").

These rules were promulgated on September 1, 1989 (54 FR 36592) and on January 23, 1990 (55 FR 2322). EPA was required to prepare a *Report to Congress* which further studied mineral processing wastes identified in the 1990 rule to determine their regulatory status under the Bevill exclusion. This report was issued on July 31, 1990 (*Report to Congress on Wastes from Mineral Processing*). EPA fully considered information from, and comments on, the *Report to Congress* in a regulatory determination published on June 13, 1991(56 FR 27300). The list of Bevill exempt activities and wastes is set out at 40 CFR 261.4(b)(7).

Many mineral processing wastes that EPA determined did not fall within the Bevill exclusion as a result of the 1991 rule appear to exhibit the toxicity characteristic due to metal content (D004–D011), and also exhibit corrosivity (D002), and/or reactivity (D003). For purposes of LDR applicability, these wastes are "newly identified" because they were brought into the RCRA Subtitle C system after the date of enactment of the Hazardous and Solid Waste Act Amendments on November 8, 1984. (See 55 FR at 22667 (June 1, 1990). Hence, their land disposal has not been prohibited until today's rule.

The Agency is currently required by a court approved consent decree (*EDF* v. *Browner*, No. 89–0598 (D.D.C.)) to promulgate LDR restrictions for characteristic and listed mineral processing wastes, and metal wastes hazardous under the revised toxicity characteristic, by April 15, 1998. On April 14, 1998, EPA filed an unopposed motion requesting the Court to extend the deadline to April 30, 1998 to establish Land Disposal Restrictions for newly identified mineral processing wastes by April, 1998. The legal obligation to establish prohibitions on land disposal and treatment standards for newly identified mineral processing wastes is established by statute. RCRA section 3004(g)(4).

B. Overview of Today's Rule

1. Issues Related to Which Mineral Processing Secondary Materials are Subject to LDRs

As noted above, a threshold question when considering whether wastes are prohibited from land disposal is whether the mineral processing secondary materials are "solid wastes" under RCRA. The issue is of importance with respect to land disposal prohibitions for the mineral processing industry because this industry recycles mineral processing secondary materials that exhibit hazardous waste characteristics, and sometimes uses land-based units—piles and impoundments—to store these materials before recycling. Thus, there is an issue as to whether such materials are solid wastes subject to the land disposal prohibition (as well as to the rest of Subtitle C). The Agency issued two proposals (61 FR 2338, January 25, 1996, and 62 FR 26041, May 12, 1997) which discussed potential RCRA jurisdiction over secondary materials from mineral processing that are reclaimed within the industry sector and sought comment on a proposed conditional exclusion from the definition of solid waste.

We now further summarize how today's rule deals with issues raised by whether and when mineral processing secondary materials, when placed in land-based storage units, are subject to the LDR standards and other Subtitle C controls. The rationale for the Agency's decisions are described below.

To be a hazardous waste, a material must first be a solid waste. RCRA section 1004 (5). To be a "solid waste" a material must in some sense be "discarded." RCRA section 1004 (27). A material is not "discarded" if it is "destined for immediate reuse in another phase of the industry's ongoing production process and [has] not yet become part of the waste disposal problem." *American Mining Congress* v. *EPA*, 907 F. 2d 1179, 1186 (D.C. Cir. 1990).

This rule amends the current RCRA rules (existing 40 CFR 261.2(c)(3)) defining which "secondary materials"—sludges, by-products and spent materials—being generated by and reclaimed by mineral processing or beneficiation facilities are solid wastes. The rule does so by creating a conditional exclusion to the regulatory definition of solid waste, so that:

(a) Mineral processing secondary materials may not be stored on the land before they are reclaimed. The rule provides a partial exception to this principle: if the pile is placed on a pad which has been approved as protective by an EPA Region or a State with an authorized program, the pile would not be considered to be storing solid or hazardous waste, and so would be outside RCRA jurisdiction. Thus, if storage is used prior to reentry into a mineral processing reclamation process, to be excluded, all mineral processing secondary materials must be placed in tanks, containers, buildings, or approved piles resting on pads;

(b) Mineral processing secondary materials must be legitimately recycled to recover metal, acid, cyanide, water, or other values:

(c) Mineral processing secondary materials cannot be accumulated speculatively; and

(d) Facilities utilizing this conditional exclusion must submit a one-time notification of their recycling activities to EPA or the authorized State describing: the materials being recycled and the processes into which they are recycled; where storage units are located and their design. Facilities must update the notification if their recycling activities change.

EPA is thus essentially disclaiming authority over mineral processing secondary materials that are reclaimed within the mineral processing or mining/beneficiation industry sector, so long as there is no land-based storage preceding reclamation. Further, potential jurisdiction affects only *storage*. EPA is not asserting authority over any mineral processing production unit, even if the unit is land-based.

2. Issues Related to Whether Materials are Within the Scope of the Bevill Exclusion

a. Use of Non-Bevill Materials as Feedstocks to Operations Whose Waste is Bevill Exempt. Today's rule also allows secondary materials from mineral processing to be co-processed with normal raw materials in beneficiation operations which generate Bevill exempt wastes, without changing the exempt status of the resulting Bevill waste, provided that legitimate recovery of the mineral processing secondary material is occurring, and provided that primary ores and minerals account for at least 50 percent of the feedstock. The Agency voiced concern at proposal that the addition of mineral processing secondary materials into a Bevill exempt extraction/beneficiation process could have the potential to increase the risk of the resulting wastes. The Agency proposed adding a condition—the use of a significantly affected test (similar to the existing test used in the Burning in Industrial Furnaces (BIF) Rule (see 40 CFR 266.112))—as a means of assuring that resultant Bevill wastes were not adversely impacted by co-processing. EPA also considered simply limiting eligibility for Bevill status to situations where Bevill raw materials comprised the sole feedstock to the process.

After considering public comments, the Agency has decided to adopt the general approach proposed in January 1996, with one change. The Agency now does not believe that the use of the "significantly affected" test would appreciably reduce risks posed by the resulting wastes, and the Agency is concerned that it would severely disrupt legitimate recycling practices within beneficiation and mineral processing industries. Even in situations where a constituent may increase due to recycling, the increase may not be environmentally significant, may be balanced by the lowering of other constituents, or may be off-set by having to dispose of the material and utilize additional raw material feedstocks.

b. Uniquely Associated. The Bevill exclusion for the primary metal sector is limited to extraction/beneficiation wastes and 20 mineral processing wastes. Under Section 3001(b)(3)(A)(ii) of RCRA, the Bevill exclusion is available for "solid waste from the extraction, beneficiation and processing of ores and minerals." Under the Agency's longstanding interpretation, a waste must be "uniquely associated" with mining and processing of ores and minerals to be subject to the Bevill exclusion. The Agency currently uses a qualitative approach (see 45 FR 76619 and 54 FR 36623) to determine if a waste is uniquely associated. Because of public interest in how the Agency makes these determinations, the Agency sought comment on alternative approaches for making "uniquely associated" determinations.

The Agency is retaining and clarifying in this rule its use of its qualitative approach. The Agency recognizes that determining whether a particular waste is uniquely associated with extraction, beneficiation, and processing involves an evaluation of the specific facts of each case. While the Agency discussed, in the May 1997 proposal, several options that would establish a bright line for making this determination, the Agency is concerned that any of these tests could potentially be either over- or under-inclusive of the wastes that, in EPA's view, are best viewed as uniquely associated.

In the Agency's view the following qualitative criteria should be used to make such determinations on a case-by-case basis:

(1) Any waste from ancillary operations are not "uniquely associated" because they are not properly viewed as being "from" mining or mineral processing.

(2) In evaluating wastes from non-ancillary operations, one must consider the extent to which the waste originates or derives from processes that serve to remove mineral values from the ground, concentrate or otherwise enhance their characteristics to remove impurities,

and the extent to which the mineral recovery process imparts its chemical characteristics to the waste.

c. Bevill Mixtures. EPA first addressed mixing of hazardous wastes with Bevill wastes in 1989 (see 54 FR 36622–23). That rule provided that mixtures of Bevill wastes and listed wastes would be considered a hazardous waste unless and until the mixture was delisted. A mixture of Bevill waste and non-excluded characteristic hazardous waste, however, would be considered hazardous if it exhibited a characteristic of the non-excluded waste, but not if it exhibited a characteristic imparted to it by the Bevill waste. As explained in the proposal, this Bevill mixture rule was remanded to the Agency in *Solite Corp* v. *EPA*, 952 F.2d 472, 493–94 (D.C. Cir. 1991), and an emergency reinstatement of that rule was vacated on procedural grounds in *Mobil Oil* v. *EPA*, 35 F.3d 579 (D.C. Cir. 1994). Today EPA is reinstating the 1989 Bevill mixture rule. Under this 1989 rule, a mixture of a Bevill-exempt waste and a characteristic hazardous waste (or a waste listed solely because it exhibits a hazardous characteristic) is a hazardous waste if it continues to exhibit the characteristic of the non-excluded waste. Mixtures of Bevill wastes and other listed wastes are hazardous wastes unless and until delisted. In addition, the act of mixing Bevill and non-Bevill wastes is subject to all normal Subtitle C consequences (i.e., requires a permit if it constitutes treatment, storage of disposal of hazardous wastes). EPA is adopting this approach because it preserves the Bevill exclusion for mixtures that are characteristically hazardous due to Bevill wastes, but nonetheless ensures that the Bevill Amendment is not used to allow Bevill wastes to shield/immunize non-Bevill hazardous wastes from regulatory controls that would otherwise apply to those wastes.

d. Response to Court Remands Dealing with Other Issues Relating to Mineral Processing and to Scope of Bevill Exclusion. (i) Toxicity Characteristic Leaching Procedure (TCLP) The applicability of the TCLP test to mineral processing wastes was challenged in *Edison Electric Institute* v. *EPA*, 2 F.3d 438 (D.C. Cir. 1993). In that case the Court held that the Agency must provide at least some factual support that the mismanagement scenario assumed in developing the TCLP is plausible when applied to mineral processing wastes or, alternatively, that mining wastes are exposed to conditions similar to those simulated by the TCLP, namely "contact with some form of acidic leaching media". 2 F. 3d at 447. EPA prepared a technical background document in support of the January, 1996 proposal, which presented data on this issue. This report concluded that mineral processing wastes had in the past been co-disposed with municipal wastes, and due to the location of mineral processing plants near large urban areas, it was plausible that these wastes could be mismanaged with municipal wastes. EPA also solicited information from the public that would help the Agency evaluate industry comments that the Synthetic Precipitation Leaching Procedure (SPLP) would provide a more accurate measure of how mineral processing wastes behave in the environment. EPA received extremely limited data from the public on this issue.

EPA has concluded, based on the information available to the Agency and review of public comments, that co-disposal of mineral processing wastes with municipal wastes is a plausible mismanagement scenario and that, therefore, application of the TCLP to these wastes continues to be appropriate. Moreover, comments from industry during the rulemaking stated that certain facilities co-manage mineral processing wastes with extraction and beneficiation wastes. Given the well-documented, acidic nature of some extraction and beneficiation wastes, mineral processing wastes disposed of in this manner may be subject to the kinds of low pH conditions that are reflected in the TCLP. For this additional reason, EPA finds that, under the plausible mismanagement standard articulated in *Edison Electric*, application of the TCLP to mineral processing wastes is appropriate in light of the information at the Agency's disposal. While the Agency has received comments seeking to compare the TCLP and the SPLP, the Agency has concluded, for reasons discussed later in this preamble, that this information is not sufficient to support adopting the SPLP as the appropriate test for mineral processing wastes at this time.

The Agency recognizes that the methodology underlying the TCLP may not reflect the variety of conditions under which some types of mineral processing wastes are disposed. As a result, the Agency will undertake, and within three to five years, conclude a review of the appropriateness of using the TCLP and other leaching protocols in this and other contexts.

(ii) Listed Hazardous Wastes. In *American Mining Congress* v. *EPA*, 907 F.2d 1179 (D.C. Cir. 1990), the Court found that the Agency's record regarding the listings of five waste streams (K064, K065, K066, K090, K091) did not adequately address certain issues raised in comments. EPA indicated its intent not to list these five waste streams in the January, 1996 proposal and placed a technical background document in the docket enumerating the reasons for those decisions. Many of these wastes are either no longer generated, or managed in a fashion not warranting listing. EPA did not receive any comments challenging those proposed decisions. Therefore, in this rule, EPA is not listing these five smelting wastes as hazardous wastes. Instead, EPA will rely on the RCRA hazardous waste characteristics to identify those portions of the wastes requiring management as hazardous wastes.

(iii) Titanium Tetrachloride. In 1989, EPA determined that wastes from the production of titanium tetrachloride were mineral processing wastes. DuPont challenged this decision, and the Court remanded EPA's decision for further consideration on grounds that the Agency's decision was unclear (see *Solite Corporation* v. *EPA*, 952 F.2d at 494–95 (D.C. Cir. 1991)). EPA reevaluated data on wastes from the production of titanium tetrachloride, and placed results of this reevaluation in the docket in support of the January 1996 proposal. EPA also has met with representatives of DuPont to discuss their process further. Based on the Agency's reevaluation of this issue, EPA, in this rule, concludes that iron chloride waste acid generated from the chloride-ilmenite process of titanium tetrachloride production should be classified as a mineral processing waste. The Agency has reached this decision because this process significantly affects the physical/chemical structure of the raw feedstock through chlorination and this reaction creates new chemicals (iron chloride and titanium tetrachloride gases). This meets the definition of mineral processing rather than beneficiation.

(iv) Air Pollution Control Dust and Sludges Generated From Lightweight Aggregate Production. Finally, since 1995, the Agency has conducted reviews of air pollution control dust and sludges generated from lightweight aggregate production, and has met with representatives of this industry sector. The Agency also has issued a Report *to Congress* and a regulatory determination on Cement Kiln Dust (CKD) (59 FR at 709, January 6, 1994 and 60 FR at 7366, February 7, 1995). EPA has found that some aggregate kilns and cement kilns use hazardous waste fuels to fire their units. Both types of facilities generate dusts which may be either reintroduced into the kiln or blended into the final product. While these dusts rarely exhibit any of the RCRA hazardous waste characteristics, the resultant product could be classified as hazardous waste due to the "derived from" rule if listed hazardous wastes are combusted. The Agency is seeking a way to encourage the legitimate and environmentally sound reuse of dusts, from both cement and lightweight aggregate manufacture. In an effort to develop a consistent regulatory approach, EPA, therefore, has decided to defer any decision on the Bevill status of air pollution control dust and sludges generated from lightweight aggregate production until evaluation of issues related to CKD and lightweight aggregate dust handling, use, and disposal can be completed.

e. Reexamination of Bevill Exempt Wastes. The May 12 proposal sought general comment on whether a reexamination of some Bevill waste is warranted given that additional risk assessment techniques and additional information are available since making the 1986 Bevill regulatory determination (51 FR at 24496, July 3, 1986) on mining and the 1991 Bevill regulatory determination on mineral processing (56 FR 27300, June 13, 1991). EPA presented information from Superfund sites and other sources which indicate that some Bevill wastes continue to cause environmental damage (see environmental damage and risk technical background documents placed in the January 1996, and April, 1997 dockets). The Agency also posed the question of whether some waste streams require additional study or regulatory controls. Today's rule is not making any changes to the status of Bevill exempt extraction and beneficiation wastes or the 20 exempt mineral processing wastes.

C. Analysis of and Response to Public Comments

1. Jurisdiction

a. EPA Authority to Regulate Mineral Processing Secondary Materials Reclaimed Within the Industry. Many industry commenters maintained that EPA lacks jurisdiction over mineral processing secondary materials reclaimed within the industry because such materials cannot be "solid wastes." The argument is straight-forward: a solid waste regulated under RCRA must be a "discarded material," RCRA section 1004 (27), and these materials are not discarded. The comments suggest that, under the case law, (in particular *American Mining Congress* v. *EPA*, 824 F. 2d 1177 (D.C. Cir. 1987) ("*AMC I*")), these materials are part of an on-going production process within the generating industry, and so cannot be "discarded."

EPA disagrees that there is an absolute jurisdictional barrier to regulating any management of mineral processing secondary materials which are reclaimed within the industry. Although the *AMC I* court found that, in some respects EPA's 1985 rules exceeded the statutory grant of authority, subsequent judicial opinions have sharply limited the scope of *AMC I*. The only absolute bar on the Agency's authority to define recycled mineral processing secondary materials as solid wastes is for "materials that are 'destined for *immediate reuse* in another phase of the industry's ongoing production process' and that 'have not yet become part of the waste disposal problem.'" *American Mining Congress* v. *EPA*, 907 F. 2d 1179, 1186 (D.C. Cir. 1990) ("*AMC II*") quoting *AMC I*, 824 F. 2d at 1186.[2]) The case law likewise makes clear that "discarded" is an ambiguous term, within EPA's discretion to interpret, consistent with RCRA's overall goals and purposes. *AMC II*, 907 F.2d at 1179; *American Petroleum Inst.* v. *EPA*, 906 F.2d 726, 741(D.C. Cir. 1990).

Applying this test, today's rule states that any mineral processing secondary materials which are being reclaimed immediately within the mineral processing industry (or within beneficiation) are not a solid waste. However, as explained below, EPA does not view mineral processing secondary materials which have been removed from a production process for storage as being "immediately reused," and so such materials are not automatically excluded from jurisdiction. EPA reiterates that there is a jurisdictional bar against regulating the actual production process (see *Steel Manufacturers Association* v. *EPA*, 27 F.3d 642, 647 (D.C. Cir. 1994); EPA also interprets the holding of *AMC I* to mandate this result), so today's rule does not assert authority over mineral processing production units. However, if production units are also used to dispose of hazardous wastes, those units are subject to RCRA Subtitle C.

With respect to mineral processing secondary materials which are stored before being reclaimed at mineral processing or beneficiation facilities—i.e. that are not being immediately reused—the Agency has established a conditional exclusion from the definition of solid waste, the conditions being designed to assure that management of these materials are not "part of the waste disposal problem." The main condition is that mineral processing secondary materials not be stored on the land (except for storage on approved pads) and not be stored in disposal units.

In considering the question of scope of jurisdiction, it is useful to remember that this rule applies to a continuum of potential recovery practices. At the one end of the continuum, where EPA's authority is most certain, would be the situation where mineral processing company A sends its secondary materials to unrelated mineral processing company B processing a different metal than company A. The case law indicates that EPA retains discretion to classify the material as a solid waste. *API*, 906 F.2d at 741 (transfer of steel industry dust to a metal reclaimer processing exclusively steel industry secondary materials can involve a RCRA solid waste). It should be remembered that EPA views "mineral processing" broadly in this rule to include all primary mineral processing sectors (see, e.g., the Agency's 1996 *Identification and Description of Mineral Processing Sectors and Waste Streams*). This document identified 41 different sectors involved in primary mineral processing. Primary mineral processing involves changing the physical and chemical structure of ores and minerals. For example, mineral processing includes the production of steel and the production of gold. These sectors generate very different types of wastes and recycle them under different conditions. Thus, the *API* principle of no absolute jurisdictional bar applies.

Points further in on the continuum would be if companies A and B process the same metal but are unrelated companies (also potentially within the *API* framework), and where companies A and B are under common ownership but not at the same site. The point on the continuum closest to on-going production is where secondary materials are reclaimed at the generating site, but where the process is non-continuous due to storage of materials. Immediate recovery on-site without storage would then mark the other end of the continuum, and would illustrate when materials are immediately reused within a continuous process, and so

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[2] The other cases which have similarly stressed this narrow reading of *AMC I* are *American Petroleum Inst.* v. *EPA*, 906 F. 2d 726, 741 (D.C. Cir. 1990); *Shell Oil* v. *EPA*, 950 F. 2d 741, 755–56 (D.C. Cir. 1991); *Chemical Waste Management* v. *EPA*, 976 F. 2d 2, 14 (D.C. Cir. 1992); *United States* v. *Ilco, Inc.*, 996 F. 2d 1126, 1131 (5th Cir. 1993); and *Owen Electric Steel Co.* v. *Browner*, 37 F. 3d 146, 149–50 (4th Cir. 1994).

absolutely outside Subtitle C jurisdiction.[3]

EPA believes that it has discretion to consider whether any of these situations short of immediate reuse involve solid wastes, this discretion being limited by the second part of the Court's articulated test: is the non-continuous management of the mineral processing secondary materials part of the waste disposal problem. Thus, EPA in today's rule has focused on the storage of these materials. The leading authority for this approach is *AMC II,* where the Court found that secondary materials generated and reclaimed on-site could be classified as solid wastes because they were stored in surface impoundments. 907 F. 2d at 1186. The case involved a single plant which stored its secondary materials —sludges—in an impoundment before reclaiming all of the accumulated sludges in its own smelting process. 50 FR at 40292, 40296 (October 1985). Several comenters argued that *AMC II* involved only specutlative accumulation. This is not the case. The wastes generated in the impoundment were actually recycled 100 percent, not stored with expectation of recycling. 50 FR at 40292, 40296; Brief of Petitioner Amercian Mining Congress in *AMC II* (filed March 30, 1990) pp. 18, 29. The Court nonetheless held that the sludges were discarded, stressing the special sensitivity in RCRA to land-based units such as surface impoundments, and explaining how storage of secondary materials in such units can be part of the waste disposal problem (907 F. 2d at 1186–87). Thus, EPA believes that mineral processing secondary materials stored on the land are discarded.

Land-based storage of mineral processing sludges, spent materials, and by-products can be viewed by EPA as being part of the waste disposal problem. There is no dispute that a considerable amount of mineral processing secondary materials contain hazardous constituents that can threaten human health and the environment (see U.S. EPA, Office of Solid Waste, *Human Health and Environmental Damages from Mining and Mineral Processing Wastes,* 1995, and *Damage Cases and Environmental Releases,* 1997). Land-based units, and impoundments in particular, have certain inherent indicia of discard due to their inability to prevent releases of contained materials. RCRA section 1002(b)(7); *AMC II,* 907 F.2d at 1187; 53 FR at 521, 525 (Jan. 8, 1988). Surface impoundments pose essentially inherent risks of groundwater contamination due to the hydraulic pressure created by the contained liquids. *Chemical Waste Management* v. *EPA,* 919 F. 2d 158, 166 (D.C. Cir. 1992). There are many damage incidents which involve storage of mineral processing wastes in piles and surface impoundments, some of which involve mineral processing secondary materials stored in land-based units before eventual reclamation. These damage incidents confirm that this potential harm is not hypothetical.

It should be noted that there is Agency precedent for the limitation on land based storage as part of within-industry recycling practices. The Agency established the principle of encouraging recycling without allowing land-based storage at 40 CFR 261.4(a)(10). Any wastes from coke by-product production are not solid wastes if recycled to coke ovens conditioned on there being no land disposal from the point of generation to the point of recycling. The Agency also has promulgated a rule where recovered oil generated by any facet of petroleum exploration, production, and retailing is not a solid waste conditioned on no management of these materials in land-based units (see 59 FR 58936, July 28, 1994). The Agency has also proposed to extend this principle to a wider range of oil-bearing secondary materials (see 60 FR 57747, 57753, November 20, 1995). The condition likewise appears in current rules at 40 CFR 261.2(e)(iii) where it qualifies the exclusion for materials returned for reclamation in the process from which they are generated. The application of a no land placement condition in today's rule is, therefore, building on an established policy of encouraging recycling conditioned on no land placement.

Putting this together, the Agency reads the statute as creating an absolute jurisdictional bar in two situations: where mineral processing or beneficiation is occurring, and where reclamation is continuous in the sense that there is no interdiction in time—i.e. materials moving from one step of a recovery process to another without a break in the process, as for storage. As one moves back along the continuum, EPA has discretion to interpret whether secondary materials may be considered discarded. The Agency is exercising that discretion here by putting its focus on whether the reclamation, or more precisely, the storage which precedes reclamation, is part of the waste disposal problem because it involves storage which can be and has been part of that problem.

b. Are There Limits on Jurisdiction? (Response to Public Interest Group Position). In contrast, representatives of public interest groups argued that the Agency's authority was essentially unlimited. They believe that the authority should be extended, at a minimum, to all land-based units because such units are a type of disposal unit. With respect to mineral processing secondary materials that are managed in tanks, containers, or buildings (i.e. in other than land-based units), EPA sees no principle that compels the materials to be designated as solid wastes. As explained above, case law indicates that EPA has discretion to interpret which materials are "discarded" consistent with the overall statutory objective, *API,* 906 F.2d at 742. These objectives include not only assuring safe management of hazardous wastes, but also "encouraging . . . materials recovery, [and] properly conducted recycling and reuse . . . ." RCRA section 1003(a)(6). EPA's construction in today's rule, which rests largely on the distinction between land-based storage and more environmentally protective storage of secondary materials, is consistent with this object by encouraging "properly conducted recycling. . . ." In addition, EPA reads the case law as allowing the Agency to make reasonable distinctions among secondary material handling practices in determining when a particular recycling practice may be considered to be "part of the waste disposal problem." Finally, as EPA explained at proposal, there are potential jurisdictional constraints given that the mineral processing industry exists to recover mineral values from an initial raw material, and some aspects of recovery of mineral values from secondary materials can be like sequential processing of an initial raw material. 61 FR at 2342. Where there is no obvious element of discard present, such as land-based storage, the Agency does not believe that it should exercise its interpretive discretion to assert authority.

With respect to intra-industry reclamation practices involving land-based units, EPA largely is asserting authority. EPA proposed a series of conditions that would have allowed land-based storage units on the idea that there were certain unique necessities within this industry compelling use of such units. 61 FR at 2341. However, as the rulemaking progressed, it became

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[3] The Agency indicated in its January 1996 proposal that some lower value mineral processing secondary materials are from ancillary production operations and that those materials were often placed in land-based storage units. 61 FR at 2340. Industry comments challenged this discussion as over broad and misplaced. Upon review, the Agency acknowledges that mineral processing facilities generate a wide range of secondary materials, which also have a wide range of values to the facility owner.

apparent that there are no such production-related necessities. Agency reevaluation of mineral processing secondary material volumes indicated that, in addition to volumes being lower than EPA initially believed, comparison to volumes of other industrial hazardous wastes indicated that these wastes were often higher in volume than mineral processing secondary materials and were being stored off the land. Consequently, the Agency is claiming authority over most land-based storage units.

The Agency is not, however, asserting authority over piles resting on pads determined by a state or EPA to be protective. The reasoning is similar to that for not claiming authority over within-industry secondary materials stored in tanks, containers or buildings. Such materials need not be viewed as "part of the waste disposal problem," and so, given the intra-industry recycling, need not be considered "discarded." The practice also can be viewed as a type of "properly conducted recycling" which should be encouraged. Again, EPA views this determination to be within its interpretive discretion.

EPA also disagrees that it is compelled to assert control over land-based units that are actual production units, i.e. that actually recover product. The Agency is aware of only two land-based units which recover metals: gold heap leach piles and copper dump leach piles. Under prior rulemakings (54 FR 36592 and 55 FR 2322), the Agency has defined these land-based units as extraction/beneficiation activities. The Agency is unaware of any other land based process units which actually recover metals. The Agency believes that regulating such units could pose the possibility of interdicting actual production steps which was the particular focus of the *AMC I* court. EPA notes, however, that storage units which also make secondary materials more suitable for actual recovery, such as equalization basins, can remain within Subtitle C jurisdiction. These units, in the Agency's view, are not the part of the process which actually produces an end product (such as the smelter at a smelting facility). At most, they facilitate eventual recovery. The Agency does not read the case law to say that such storage units are in all cases outside the authority of Subtitle C.

EPA also is not asserting authority over mineral processing secondary materials once they are removed from approved storage for reclamation. Thus, should a mineral processing plant reclaim mineral processing secondary materials after those materials are stored in land-based units (i.e. the materials defined as hazardous wastes in today's rule), they would no longer be solid and hazardous wastes. EPA believes it would be counterproductive to retain the hazardous waste status for mineral processing secondary materials entering reclamation. If the materials remain hazardous wastes, for example, the smelting process itself could be subject to Subtitle C regulation. EPA believes that it retains discretion to classify the removed materials as no longer being solid and hazardous wastes.

The Agency believes it has discretion to adopt this classification notwithstanding the court's decision in *American Petroleum Institute*. v. *EPA*, 906 F.2d 726 (D.C. Cir. 1990). In that case, the Court held that EPA had adopted the so-called indigenous principle, whereby secondary materials stopped being wastes at the point they were utilized as feedstock in a production process related to the one that generated it, without sufficient justification. 906 F.2d at 741–42. However, in that case, EPA had made no attempt to determine which materials were part of the waste disposal problem, and which were not. Here, the Agency is making clear that storage on the land of mineral processing secondary materials is the environmental concern, and that reclaiming mineral processing secondary materials within the industry is ordinarily a form of proper recycling which may permissibly be encouraged. RCRA section 1003(a)(6).

EPA also notes that it is possible that no mineral processing secondary materials will be placed in impoundments or in unapproved piles. Under today's rule, if a facility wishes to use a pile for storage (assuming the pile has not been adjudicated to be protective), the wastes would first have to be treated to meet Land Disposal Restrictions standards, probably rendering them unrecoverable. If an impoundment is utilized, wastes need not be pretreated, but the impoundment would have to meet minimum technology design standards and be dredged annually (RCRA section 3005(j)(11) and 40 CFR section 268.5) and, of course, ultimately obtain a RCRA permit. The Agency anticipates that facilities will use a non land-based form of storage instead.

c. Immediate Reuse.[4] In the May 1997 proposal, EPA suggested a different way of defining absolute jurisdictional limits, namely to say that secondary minerals generated by and "immediately reused" within the mineral processing industry, were not solid wastes. The reference to "immediate" was suggested as a means of interpreting the "immediate reuse in another phase of the industry's ongoing process" standard articulated in the case law. *AMC I*, at 824 F. 2d at 1185. The Agency proposed that secondary materials that were legitimately recycled within 48 hours would be outside RCRA jurisdiction, regardless of whether they were stored between process steps (including storage in land-based units). See 62 FR at 26051.

Industry and public interest groups both opposed the use of the 48-hour time limit included in the January 1996 proposal to define immediate reuse. Industry renewed its categorical objections based on *AMC I*, and noted that many secondary materials are legitimately reclaimed long after they are generated and the time period between generation and reclamation in no way affected their value. For example, commenters stated that the gold industry generates retort slags which contain gold values. Comments stated that these slags are stored off the ground for periods up to six months after which they are reintroduced into their recovery process.[5]

Public interest groups objected to the 48-hour limit on the basis that an absolute waiver of RCRA jurisdiction based on time does not translate to any reduction of environmental risk. Public interest groups also noted that the Court in *AMC II* granted jurisdiction to units holding secondary materials with the propensity to leak, and that the Court's opinion would extend to all land placement, since the continuous placement of materials on piles or other land-based units would result in the same "discard" underlying the Court's opinion.

Although the Agency necessarily accepts that materials immediately reused in another phase of the industry's ongoing production process are beyond EPA's jurisdiction, *AMC I*, 824 F.2d at 1185, the Agency is not adopting in today's rule the proposed 48-hour approach to define immediate reuse. The Agency is defining "immediate reuse" as the continuous recirculation of secondary materials

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[4] It should be noted that EPA is not using "reuse" as a term of art in this section of the preamble (i.e. is not using the term as defined in 40 CFR 261.1(a)(5)), but rather is referring to immediate reclamation of materials (i.e. material recovery) at a mineral processing facility. The key concept here is actually "immediate," which EPA is using to interpret the phrase "continuous process" used in the case law.

[5] It should be noted that since no land-based storage is involved, these gold slags are not solid wastes under the final rule in any case (assuming that the recovery is legitimate and that the other conditions in the rule are satisfied).

back into recovery processes without prior storage. The plain reading of the words "continuous," 824 F.2d at 1193, and "immediate" preclude storage. Storage by its very nature means that processes are not continuous; rather, storage means that materials are generated which must be held apart for some period of time prior to reentry into a process. Storage, therefore, breaks the continuous and immediate nature of production and reentry. In addition, land-based storage units have inherent elements of discard. *AMC II,* 907 F. 2d at 1186–87.

The definition of "immediate reuse" in today's rule does not bar storage prior to recycling. Mineral processing industries will be able to store and recycle their mineral processing secondary materials outside RCRA Subtitle C requirements if they do so while meeting the conditions of the exclusion from the definition of solid waste contained in today's rule.

In the May 1997 proposal, the Agency discussed the possibility that some molten metals that spill onto the ground could be classified as materials undergoing immediate reuse (see 62 FR at 26051). The Agency noted that copper reverts (refined copper material) can be spilled in the process of being transferred from one part of the smelting process to another. Such reverts are picked up as soon as they can be safely handled and are placed directly back into the smelting process. The Agency has reviewed smelting processes in other metal sectors and finds that spillage from ladles is common and that these materials are routinely picked up within a short time and placed back into the process. The Agency thus concludes that molten metal spilled onto smelter floors is not a solid waste if it is picked up as practical (given heat and worker safety factors) and is then placed back into the smelting process. Such a material is not a secondary material (i.e. sludge, by-product, or spent material), but rather remains in process. This interpretation parallels existing rules, which say that a spilled commercial chemical product is not a solid waste if it is recycled within a reasonable amount of time (see 40 CFR 261.33 and 55 FR at 22671).

Industry commenters stated that spent smelter brick was similar to reverts since they are often returned back into recovery processes. If such spent bricks are stored before being recycled, they are not being immediately reused (nor are they still in process, since they are spent and physically removed). As noted in the Agency's May 1997 proposal, copper flue dusts, also are stored sometimes and not immediately recycled. Flue dusts not meeting the immediate reuse definition are defined as mineral processing secondary materials (usually a sludge, since these dusts are usually air pollution control residue) and would be eligible for the conditional exclusion to the definition of solid waste.

d. Relation to the Current Regulatory Definition of Solid Waste. (i) Distinctions among Sludges, By-products, and Spent Materials. The existing regulatory definition of solid waste classifies metal recovery operations as a type of reclamation activity, and then states that certain secondary materials being reclaimed are, or are not, solid wastes depending on the type of material being reclaimed. Spent materials being reclaimed are solid wastes, while characteristic sludges and by-products being reclaimed are not solid wastes. See, generally, 40 CFR 261.2(c)(3) and 50 FR at 633–34, 639–41 (January 4, 1985).

As EPA noted at proposal, these distinctions among types of secondary materials being reclaimed are not needed because they are not directly based on environmental distinctions. 61 FR at 2342. In this industry, at least, the distinctions do not relate to which of these materials may be part of the waste disposal problem.[6] The more environmentally meaningful distinction, and the one adopted here, is between land-based storage and storage in tanks, containers, and buildings.

In this rule, the Agency is, therefore, eliminating the regulatory distinctions between by-products, sludges and spent materials from mineral processing when these materials are reclaimed. Thus, under the amended rule, if any secondary material—sludge, by-product, or spent material—is legitimately reclaimed within the mineral processing industry, it is not a solid waste as long as all other conditions to the exclusion to the definition of solid waste are satisfied. EPA believes that this principle not only should encourage properly conducted recycling within the industry, but also fulfills an Agency objective of reducing some of the complexity in the existing regulatory definition of solid waste.[7]

(ii) Other existing regulatory exclusions. The existing regulatory definition of solid waste also contains a series of exclusions in 40 CFR 261.2(e), two of which could apply to the mineral processing industry. Section 261.2(e)(1)(ii) excludes from the definition of solid waste sludges, by-products and spent materials (i.e. secondary materials) which are "used or reused as effective substitutes for commercial products." An example could be mineral processing acid plant blowdown substituting for commercial acid in another process (either mineral processing or a process in a different industrial category).[8] Commenters from industry questioned whether this provision is affected by the amendments relating to mineral processing secondary materials being reclaimed. The answer is that the provision remains as an independent basis for excluding secondary materials from Subtitle C. EPA did not propose to change it, and the issues involved, in any case, would be broader than the present proceeding since the basis for the exclusion does not rest on the notion of a continued process within an industry, but on comparability of secondary and virgin materials (see 50 FR at 619–20 and 637–41 (Jan. 4, 1985)).

The second existing exclusion, found at 261.2(e)(1)(iii), does overlap with the present rule. The exclusion is for secondary materials "returned [as a substitute for feedstock materials] to the original process from which they are generated, without first being reclaimed or land disposed." An example could be an emission control dust from primary smelting which is returned directly to the smelter for metal recovery without any interim land disposal.

This provision is essentially consistent with, but also subsumed by, today's final rule (with respect to the mineral processing industry). It is subsumed because the activity involved, return as a feedstock to a smelter, is a type of reclamation activity (see 50 FR at 639–40), the subject of this final rule.[9] The existing rule also contains a "no

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[6] Put another way, the fact that a mineral processing secondary material is a sludge, rather than a spent material or by-product, does not convey any meaningful information as to the types of risks the material might pose if reclaimed.

[7] EPA does note the potential anomaly that non-mineral processing secondary materials, at least for the moment, will be regulated in some cases stringently than those generated and reclaimed within the mineral processing industry. This could come about because non-mineral processing industry sludges and by-products would still not be solid wastes if reclaimed, and so could be stored in land-based units before reclamation without being solid wastes. EPA has chosen, however, to address the broader issues regarding the regulatory definition of solid waste in a different rulemaking effort, which is proceeding on a different schedule from this rule. EPA believes that if may legitimately proceed one step at a time on these issues, and so is not precluded from making needed changes to the regulatory definition that affect only discrete industry segments, in this case, the mineral processing industry.

[8] This example assumes that legitimate recycling is occurring.

[9] The exclusion for return of secondary materials as feedstock was in fact adopted largely in order to exclude certain direct reclamation practices in the mineral processing industry. 50 FR at 639–40.

land disposal" condition similar to the conditions in this final rule (although today's rule excludes storage in piles in some circumstances, and so is more flexible than the current 261.2(e)(1)(iii) in this respect).

In light of this overlap, EPA is adding language to 261.2(e)(1)(iii) to indicate that there are special provisions relating to reclamation within the mineral processing industry (namely those adopted in today's final rule), and that these provisions define the scope of the exclusion for mineral processing secondary materials generated and reclaimed within the industry, including those which are returned to a mineral processing operation from which they are generated without first being reclaimed.

Today's rule also does not alter the regulatory status of recyclable materials that are reclaimed to recover economically significant amounts of gold, silver, platinum, iridium, osmium, rhodium, ruthenium, or any combination of them. 40 CFR 266.70. This rule was established to encourage recycling of precious metals. Commenters from the gold industry questioned whether this provision is affected by the amendments relating to mineral processing secondary materials being reclaimed. The answer is that today's rule redefines which secondary materials generated and reclaimed within the mineral processing industry are wastes, and so could exclude certain materials reclaimed within the precious metal industry which are now defined as solid wastes. However, to the extent any precious metal recovery operations remain subject to regulation after today's rule, the tailored regulatory provisions in 266.70 continue to apply.

e. Otherwise Excluded Mineral Processing Units Which Serve as Disposal Units. As the Agency noted in the original proposal, land-based units in the mineral processing industry not only can be related to a recovery process but also can serve as repositories of conventional wastes. 61 FR at 2340, 2342, 2347. That is, unusable solids settle in surface impoundments or are left in piles and in many cases these units become the ultimate repositories for these wastes. *Id.*

Under current rules, when an operating product storage unit that is a tank also contains a hazardous waste, the waste is not subject to regulation until it exits the unit. 40 CFR section 261.4 (c). An example would be a listed distillation column bottom remaining within the distillation column.

Section 261.4(c) does not apply to hazardous wastes which accumulate in land-based units. Thus, if wastes accumulate in piles or impoundments, if those wastes are hazardous (i.e. are listed or exhibit a characteristic of hazardous waste), and the wastes are not legitimately recycled, then the units are Subtitle C regulated units because they are being used to store or dispose of hazardous waste. The Agency is not altering this long-standing principle in the present rule (particularly given the central statutory finding that land-based units, and especially surface impoundments, "should be the least favored method for managing hazardous wastes'; RCRA section 1002(b)(7)). Consequently, any process impoundment that holds un-recycled hazardous accumulated solids, the impoundment is a regulated unit (i.e. subject to Subtitle C) because it is disposing of a hazardous waste. In addition, the same principle would apply to storage or process piles, which likewise are ineligible for the 261.4(c) exemption.

2. Scope of This Rule

This section of the preamble addresses the issue of which secondary materials come from "mineral processing" operations, and so are potentially within the scope of the conditional exclusion for mineral processing wastes being reclaimed within the mineral processing industry sector or in extraction/beneficiation operations. Newly identified wastes from mineral processing also are subject to the LDR prohibitions and treatment standards adopted today, and so this preamble section also clarifies the applicability of these LDR provisions.

a. Mineral Processing Wastes Covered by This Rule. The Agency's 1989 rule (see 54 FR 36592) applied the high volume/low toxicity criteria to determine which primary mineral processing wastes would retain the Bevill exclusion. This rule also clarified the Bevill status of beneficiation operations. Those mineral processing waste streams not meeting the high volume/low toxicity criteria are no longer Bevill exempt wastes and are subject to regulation under Subtitle C (except 20 mineral processing waste streams noted at 40 CFR 261.4). Non-exempt Bevill mineral processing wastes are "newly identified," and are now subject to the Land Disposal Restrictions, when land disposed. Therefore, only "newly identified" characteristic hazardous mineral processing wastes are potentially eligible for the conditional exclusion from the definition of solid waste.

EPA established in the 1989 rulemaking the factors it would use to determine whether a waste is generated from extraction/beneficiation versus mineral processing (see 54 FR 36592, 36616–20). The Agency has not and is not reopening this standard. However, EPA prepared and noticed a report—*Identification and Description of Mineral Processing Sectors and Waste Streams*—which tentatively applied this existing test on a waste-by-waste basis to wastes from 41 mineral sectors (62 FR at 2354).

There are two principal issues raised by this report: its legal status and its accuracy. First, the Agency has decided that the *Identification and Description of Mineral Processing Sectors and Waste Streams* report should be a guidance document. Thus, the Report is not a rule, and it, therefore, cannot be invoked as a definitive determination as to whether or not a particular waste is to be classified as being from mineral processing or from extraction/beneficiation. In addition, this report should not be viewed as an exclusive list of mineral processing and associated waste streams: other mineral processing waste streams may exist. Mineral processing facilities are obligated to determine the Bevill status of their wastes by utilizing applicable regulatory provisions, as clarified by the criteria articulated in 1989 in the **Federal Register** preamble cited above. Thus, because the document is guidance, no party could rely upon that document as the definitive basis for a regulatory determination.

The Agency has fully evaluated comments suggesting that the report contains factual inaccuracies, and believes that the Report, as now revised after review of public comments, is accurate and should therefore, provide useful guidance to the public. EPA disagrees with comments contenting that the Agency adopted new criteria in reaching the tentative conclusions set out in the Report. This is not the case—the same general approach used in 1989 was applied in the Report, and would have to be applied in making any actual regulatory determination.

One commenter argued that considering these determinations to be advisory would violate EPA's duty under section 3001(b)(3) of RCRA, as construed by the Court in *EDF V. EPA*, 852 F.2d 1316, 1331 (D.C. CIR 1988) to have made final determinations as to which mining wastes are subject to the Bevill exclusion. According to this commenter, reaching one conclusion at headquarters and a potentially different conclusion at EPA regions or States would undermine the intent of the Court's order in *EDF*. This commenter also asserted that such an approach would effectively allow States to regulate less stringently than EPA, in violation of sections 3006 and 3009 of RCRA.

EPA believes that these comments are erroneous. EPA fulfilled some time ago its obligations under section 3001(b)(3) generally, and under the *EDF* decision in particular, to define the scope of the Bevill exclusion as it applied to mining wastes. See 51 Fed. Reg. 24496 (July 3, 1986); 54 Fed. Reg. 36592 (Sept. 1, 1989); 55 Fed. Reg. 2322 (Jan. 23, 1990); 56 Fed. Reg. 27300 (June 13, 1991). As discussed in those notices and rules, EPA's regulatory determination did not obviate the need to evaluate whether a particular waste was from mineral processing which, unless one of the 20 identified special mineral processing wastes, would not be exempt from Subtitle C under Bevill. Indeed, the Agency has extensively discussed the distinctions between beneficiation and mineral processing precisely to assist industry, EPA and the States in making such case-specific determinations. See 54 Fed. Reg. 36618–36619 (Sept. 1, 1989). Issuance of the Identification document in the record for this rulemaking is simply intended to aid the industry and regulators in making these decisions.

EPA acknowledges that the potential for inconsistent determinations exist; for this reason, EPA headquarters has assisted regional offices and States in making these determinations over the past decade. Section 3001(b)(3) does not, however, require the Agency to use rulemaking to make each and every decision. Those decisions that are very fact-specific may need to be made on a case-by-case basis using general criteria articulated nationally by EPA. It is precisely because of the fact-specific nature of such inquiries that EPA believes adopting the guidance document as "binding" would not be appropriate. Finally, nothing in EPA's approach is inconsistent with the RCRA requirement that authorized State programs be at least equivalent to and no less stringent than the federal program (see RCRA 3006 (b)).

b. Wastewater Treatment Surface Impoundments. EPA indicated at proposal that wastes managed in wastewater treatment surface impoundments would never be eligible for a conditional exclusion from the definition of solid waste. 62 FR at 2348. (A wastewater treatment surface impoundment is one whose ultimate discharge is regulated by the Clean Water Act, and can include zero discharge facilities.) This remains EPA's position, although the issue is no longer directly relevant to the final rule because no impoundments are eligible for exclusion. As the Agency noted at proposal, the essential purpose of these units is waste management rather than production. 62 FR at 2348. See also *AMC II*, where the D.C. Circuit held that wastewater treatment surface impoundments can be classified as waste management units, notwithstanding that all of the entrained solids in the unit were eventually recycled as feedstock at the generating plant. 907 F. 2d at 1186–87.18[10]

c. Materials Outside the Scope. This rule limits the use of the conditional exclusion to the definition of solid waste to only those secondary mineral processing materials generated within primary mineral processing. The Agency identified over 40 mineral sectors which potentially generate mineral processing secondary materials subject to this rule. The scope of this rule is therefore quite broad. The Agency did not receive comments opposed to the Agency including them in this rule.

This rule also restricts the use of the conditional exclusion from the definition of solid waste to characteristically hazardous mineral processing materials. Thus, no listed hazardous wastes can qualify for the conditional exclusion.

The National Mining Association (NMA) and the Metals Industry Recycling Coalition submitted comments urging the Agency to broaden the scope of the rule to include metal-bearing wastes generated outside of primary mineral processing as well as allowing the reprocessing of listed hazardous wastes. The Agency is not extending the exclusion contained in this rule because the Agency did not propose addressing wastes generated outside of primary mineral processing, since at the time of proposal the Agency indicated that these wastes would be addressed under a different rulemaking. While metal-bearing wastes generated outside of primary mineral processing, and listed hazardous wastes are not within the scope of this rule, the Agency will continue to assess how best to encourage their legitimate recycling.

Commenters indicated they were unsure how this rule would affect the application of 40 CFR 261.2 to secondary materials generated from outside the mineral processing industry sector. As discussed earlier in the preamble, today's rule does not amend § 261.2 for any secondary materials other than those generated within the mineral processing sector. Thus, when fully implemented, a mineral processing facility can use the conditional exclusion to the definition of solid wastes and can utilize § 261.2 to recycle other wastes.

3. Mineral Processing Secondary Material Volumes and Environmental Damages

a. Volume of Secondary Materials and Large Volume Exemption. In the Agency's May 1997 proposal, land placement of secondary mineral processing materials would be prohibited except for materials exceeding the high volume criteria (45,000 tons per facility waste stream per year for solid wastes and one million tons per facility per waste stream per year for liquids). The May 1997 proposal would have allowed high volume secondary materials to be placed in land-based units if those units meet the integrity standards noted in the January proposal and meet other proposed conditions. In today's rule, the Agency is adopting a no land placement condition for mineral processing secondary materials without any volume exemption.

As noted in the May 1997 proposal (see 62 FR at 26049), the Agency reevaluated the volumes of mineral processing secondary materials as a result of comments submitted by public interest groups which asserted that volumes of these materials were considerably less than EPA originally believed (see *Characterization of Mineral Processing Wastes and Materials*, U.S. EPA, 1998). Based on this reevaluation, the Agency finds that mineral processing wastes are not generated in the high volumes that we previously believed to be the case. EPA found that of the 119 hazardous wastes streams it studied, 117 were generated in volumes lower than the proposed high volume cutoff. Further, comments from public interest groups on the Agency's May 1997 proposal indicate that two remaining waste streams that

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[10] Waters in these impoundments are often recycled back into processes for their value as water. Recycling of wastewaters may be currently allowed under the effective substitute clause in the regulatory definition of solid waste (see 40 CFR 261.2(e)(1)(ii)), a provision unaffected by today's amendments. However, EPA reads *AMC II* and its regulations to state that impoundments where some wastewaters are returned to a process as an effective substitute for a commercial product, but which also function as wastewater treatment impoundments, would be regulated units (assuming there are hazardous wastes in the unit). This is because the unit would necessarily be functioning at least partially as a disposal unit (since wastewaters are ultimately discharged). In addition, the product storage regulatory exemption at 40 CFR 261.4(c) does not apply to surface impoundments. Notwithstanding industry comments that recycling of wastewater should be encouraged, the Agency notes the stronger policy in RCRA to assure that surface impoundments managing hazardous waste are managed so as to operate protectively. *AMC II*, 907 F.2d at 1187 and sources there cited.

the Agency had classified as high volume may not in fact meet the high volume cutoff. The Agency reassessed how it estimated the volumes of these waste streams and acknowledges that it used very conservative approaches to estimate these volumes. It is, therefore, possible that none of the 119 waste streams studied meet the high volume cutoff. The Agency proposed using the high volume cutoff as an indicator that land storage may be an economic necessity because when volumes are high, alternatives to land placement are costly and not practical. In fact, the Agency now finds that mineral processing secondary materials are generated at volumes where there is no reason that they cannot be managed in non-land based units (except for solids placed on approved pads).

Industry comments maintained that it is impractical to place mineral processing secondary materials in tanks, containers, and buildings. Based on the storage of similar volumes and types of hazardous wastes generated in other industries, the Agency does not agree. The Agency presented its analyses of volumes in its report entitled, *Characterization of Mineral Processing Wastes and Materials*, 1997. This report noted that listed hazardous wastes, such as spent potliners, and electric arc furnace dusts, are generated at volumes which generally exceed that of mineral processing secondary materials yet are stored in tanks and buildings. Further, this report noted that the volumes generated by other industries that use tanks, containers, and buildings to store hazardous wastes are not substantially different than volumes generated by the mineral processing industry.

b. Reliability of Damage and Environmental Release Reports. Industry commenters to the May 12, 1997 proposal sought to refute or minimize the degree of contamination caused by the land storage of mineral processing secondary materials. Despite these objections, the Agency still finds that land-based storage and management practices of mineral processing secondary materials and wastes can or may create or exacerbate soil and ground water contamination.

The Agency issued two separate reports in 1995 and 1997 (Office of Solid Waste, U.S. EPA, *Human Health and Environmental Damages from Mining and Mineral Processing Wastes* (1995), and Office of Solid Waste, U.S. EPA, *Damage Cases and Environmental Releases* (1997)) which presented information on damage cases and environmental releases of mineral processing and mining wastes. The data tended to fall into two general classes: (1) information that illustrates that environmental damages have occurred, and (2) information that discusses the types and magnitude of mineral processing materials that have been released into the environment. In some cases, a combination of feedstock, in-process materials, secondary materials, and wastes contribute to ground water, surface water, or soil contamination. Also, in some cases, contamination occurred through episodic or continuing mismanagement of hazardous and other solid wastes (e.g., commercial chemical spills). Industry commenters objected to the use of these damage cases contending that they reflect historic practices and not current operations.

The Agency disagrees that storage of mineral processing wastes, and in some cases secondary materials, on the ground, which was reflected in these reports, no longer occurs. After careful reevaluation, the Agency finds that the record and, in particular, these reports, clearly indicate that the storage on the ground of mineral processing wastes and secondary materials continues as a management practice and has caused environmental damage or has the potential to do so. These reports identify cases where mineral processing wastes and secondary materials were eroded by rain, were carried by wind, or, in the case of surface impoundments, migrated to contaminate ground water. The vast majority of newly identified mineral processing wastes are liquids and their placement in impoundments presents actual or potential threats to the environment. The Agency concludes that placement of secondary mineral processing materials in impoundments may contribute to the waste management problem.[11]

EPA is also not impressed by comments stating that most of the damage incidents involved wastes no longer utilized within a process, not secondary materials awaiting reclamation, and therefore are irrelevant to this rule. The damage incidents certainly show that when hazardous mining and mineral processing wastes and mineral processing secondary materials are stored in piles or in surface impoundments, hazardous constituent releases and consequent damage has occurred in this industry. Piles and impoundments do not automatically become safer if the materials stored in them are secondary materials awaiting recycling rather than wastes. Rather, the risk comes from the nature of the storage unit.

The Agency compared the toxic and hazardous properties of newly identified mineral processing wastes with a limited number of RCRA listed hazardous wastes in the 1997 technical background document, *Characterization of Mineral Processing Wastes and Materials*. This report was used to support the May 1997 proposal. In order to easily compare the listed waste leachate concentrations with the leachate concentrations of the newly identified mineral processing wastes, a combined mean and maximum range of chromium, cadmium, and lead concentrations for the seven listed wastes were calculated. The mean leachate concentrations for chromium, cadmium, and lead range from 6.03 mg/l to 273.23 mg/l, <0.01 mg/l to 117.5 mg/l, and 1.47 mg/l to 259.83 mg/l, respectively. Likewise, the maximum leachate concentrations for chromium, cadmium, and lead range from 12 mg/l to 4250 mg/l, <0.01 mg/l to 268 mg/l, and 2.10 mg/l to 1550 mg/l, respectively. The report then compared the ranges in constituent concentrations exhibited by the listed wastes and the newly identified mineral processing wastes. The report states that 15 of the 23 mineral processing wastes exhibit leachate concentrations of chromium, cadmium, and lead at levels that are equal to or greater than those levels exhibited by the seven listed wastes. Therefore, the Agency has concluded that some mineral processing secondary materials exhibit hazardous properties similar to listed hazardous wastes, and have the same or greater potential of leaching metals into the environment when they are improperly placed on the land.

In addition, mineral processing secondary materials often contain metal compounds and other constituents which, due to processing steps, become more mobile in the environment (see 54 FR 36614–36619, September 1, 1989). By the very nature of mineral processing, heavy metals are continuously concentrated and waste streams tend to contain higher metal loadings than those found in raw ore. Since the resultant wastes have higher concentrations of metals, they likewise have a higher potential to leach higher concentrations of metals into the environment if they are not adequately stored. Finally, the record also shows that a wide range of mineral processing secondary materials are released into the environment. Such releases do not necessarily mean that environmental

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[11] Of course, those mineral processing facilities that have in fact improved their storage practices for mineral processing secondary materials being reclaimed by using tanks, containers, or buildings instead of impoundments to store secondary materials would be essentially unaffected by this rule, since such units would be excluded from regulations.

damage has occurred; however, the Agency believes it must take appropriate steps to minimize such releases to reduce the potential for damage to occur, just as the Agency does with other hazardous wastes. RCRA is a preventive statute, designed to assure safe management of hazardous waste from cradle to grave to prevent the need for remediating releases. Based on the information noted above, the Agency therefore has finalized in today's rule a "no land placement" condition for the storage of mineral processing secondary materials.

Comments from public interest groups pointed out that a considerable amount of information shows that releases result from fugitive dusts and that control of dusts was not adequately addressed in the proposals. The Agency agrees that the release of fugitive dust should be addressed and believes that placement in tanks, containers or buildings will adequately address this concern. Mineral processing secondary materials stored in tanks or containers must be stored in a manner which effectively manages fugitive emissions. Moreover, as at proposal, if the site-specific pile approval process is utilized, the possibility of harm via an air exposure must be considered, and, if necessary, controlled. See 62 FR at 2372 (proposed 261.4(a)(15)(iv)(A)(3)).

4. Conditions to the Exclusion

In the January 1996 and May 1997 proposals, the Agency sought comment on how to establish a conditional exclusion to the definition of solid waste which would encourage recycling of mineral processing secondary materials and be protective. In today's rule the Agency is establishing a conditional exclusion to the definition of solid waste. The conditions relate to legitimacy of recycling, land placement, speculative accumulation, and notification, and are discussed below.

a. Legitimacy. It goes virtually without saying that only mineral processing secondary materials which are reclaimed legitimately would be excluded under today's rule. This is because sham recycling is simply waste treatment or disposal conducted under the guise of recycling. *See U.S. v. Self*, 2 F. 3d 1071, 1079 (10th Cir. 1993).

The Agency currently uses a qualitative approach for determining whether a material is being legitimately recycled. Factors the Agency considers typically relevant in making such determinations are found at 50 FR 638 (Jan. 4, 1985); 53 FR 522(Jan. 8, 1988); 56 FR 7145, 7185 (Feb. 21. 1991). Use of these factors to assess whether a particular activity is to be viewed as recycling rather than treatment or disposal was emphatically sustained by the Court in *Marine Shale Processors v. EPA*, 81 F. 3d 1371, 1381–83 (5th Cir. 1996) and *United States v. Marine Shale Processors*, 81 F. 3d 1361, 1366(5th Cir. 1996).

The main issue in this rulemaking was whether the Agency should develop quantified criteria for use in assessing legitimacy of reclamation activities within the mineral processing industry. The Agency proposed quantitative criteria including the potential use of an ore grade cut-off, normal operating range, efficiency standard, and an economic test. 62 FR at 2342–44. In addition to metal values, the Agency also solicited comment on legitimate recycling of acid, water, and other values.

The mineral processing industry noted in their comments that their products must meet international quality standards and they would not risk affecting product quality by introducing materials which would adversely affect that quality, and therefore that legitimacy can be assumed in essentially all cases. They also opposed the proposed quantified criteria.

While the Agency agrees that market forces generally may limit the introduction of materials which could adversely affect product quality, mineral processing facilities by their nature process large volumes of materials, EPA is concerned that small volumes of wastes could be placed into processes without contributing mineral values in order to treat or dispose of them. Obviously, this is not recycling, as noted by the Court in *U.S. v. Marine Shale Processors*, 81 F. 3d at 1366. The Agency, therefore, does not agree that there is no need to apply some type of reasonable legitimacy criteria.

Industry commenters also noted that application of quantitative criteria would be burdensome, are not necessary, and could not be effectively implemented. The Agency agrees that implementation of the proposed quantitative tests would have required significant testing of materials (and resultant costs) and that due to uncertainty in evaluating test results, companies may decide not to recycle any materials to protect the Bevill status of their resultant wastes. Application of an ore grade cutoff criteria could restrict the gold industry's ability to recover gold values from secondary materials that contain gold at levels below those found in ore. Such recovery could nevertheless be cost effective. Industry commenters stated that the application of a normal operating range test would be difficult to implement since operating parameters at large mineral processing facilities change often related to differences in feed. There also was little support from industry for the proposed efficiency test because such facilities may be recovering a specific metal at one recovery rate while they are recovering other metals at a different rates. Industry commenters also rejected the proposed use of an economic test because recycling need not be profitable to be legitimate. They specifically pointed out the cases where recycling was economical only relative to disposal, and yet, the company was legitimately reusing the recycled materials.

For these reasons the Agency has declined to adopt any of the proposed quantitative tests. In today's rule, the Agency is not adopting quantitative criteria and will continue to use the qualitative approach for evaluating whether an activity is legitimate recycling. In addition, the Agency believes that legitimate recycling may occur for reasons other than to recover metal values— recovery of acids, cyanide, or water, for example. With no quantitative tests for such recycling, the Agency believes the qualitative criteria best cover the broad array of situations being addressed. Situations most likely to be deemed sham recycling would, thus, be those involving low amounts of recoverable material plus the presence of non-contributing hazardous constituents in the waste (particularly hazardous constituents not otherwise present in the normal feedstock of the process). See generally, 53 FR at 522(January 8, 1988).

b. Design and Construction Standards. In the January 1996 proposal, the Agency assumed that land-based storage of mineral processing secondary materials was a necessity within the mineral processing sector, and proposed three different types of conditional mechanisms whereby these land-based units could be deemed "process units" that would be excluded from Subtitle C jurisdiction. 62 FR at 2345–48. More specifically, these alternative conditions were an environmental performance standard, a design and operating standard, or an ad hoc, site-specific standard developed by an EPA Region or authorized State. The environmental performance standard would have used a ground water protection standard as a determinant of whether a land-based unit was involved in discard. If ground water monitoring determined that there was an exceedance of the MCL (background levels if background exceeded the MCL) at a designated point of compliance, then the unit would be required to implement unit-specific corrective action. 62 FR at 2345–46.

The Agency also proposed, in lieu of compliance with the ground water standard, design and construction standards. EPA proposed that surface impoundments be constructed with a transmissivity equivalent to a 40 mil geomembrane liner placed on top of 12 inches of a material with a 10–5 hydraulic conductivity. Piles could be constructed on concrete, asphalt, or soil any of which would have to have the equivalent transmissivity of three feet of clay with 10–7 cm/sec hydraulic conductivity. *Id.* at 2346.

The final alternative allowed for an authorized State or EPA Region to make a site-specific determination that the unit can be operated in a manner that is protective. The Agency proposed this option to allow for flexibility because there are a range of site-specific characteristics, such as depth to groundwater and rainfall, which can affect the design of a unit and affect the risks posed by such units. *Id.* at 2347.

EPA finds now, however, that the premise of volumetric necessity was mistaken (see the earlier section of this preamble). As such, the Agency is adopting its traditional jurisdictional demarcation point of not allowing exclusions for land-based storage units. As discussed earlier, land-based storage units are so fraught with indicia of discard—including elements of outright disposal via both air and groundwater exposure pathways (borne out by damage cases as well), plus no longer being part of the actual production operation—that EPA views this demarcation as strongly justified once it is clear that there is no necessity to use such units. The sole exception in the final rule which allows for conditional exclusion for a land-based storage unit is for piles resting on pads which are approved by an authorized State or EPA Region, as discussed in the section below.

c. Units Eligible for Conditional Exclusion and Conditions Attached to Such Units. (i) Tanks, Containers and Buildings. Today's rule states that mineral processing secondary materials reclaimed within the industry can be excluded if they are stored in any of the following: tanks, containers, buildings, or piles resting on pads when such piles are evaluated and approved on a site-specific basis by an authorized State or EPA Region. (As noted in the May 12, 1997 proposal, this is conceptually the same as the rule EPA proposed for the oil-bearing secondary materials generated by and recycled within the petroleum industry. See 62 FR at 26048 (May 12, 1997) and 60 FR 57753 (November 20, 1995)). Tanks, containers, building, and approved pads do not have to meet the design and operating standards for units storing RCRA Subtitle C wastes.

EPA also is adopting certain minimal conditions on these units' design to assure basic unit integrity and so assure that tanks, containers, and buildings do not serve as conduits for massive material release (i.e. disposal units). An acceptable tank must be free standing and not be a surface impoundment, and be manufactured of a material suitable for containment of its contents. An acceptable container must be free standing and be manufactured of a material suitable for containment of its contents. An acceptable building must be a man-made structure and have floors constructed from non-earthen materials, have walls, and have a roof suitable for diverting rainwater away from the foundation. A building may also have doors or removable sections to enable trucks or machines access. The Agency's technical report *Non-RCRA Tanks, Containers, and Buildings,* U.S. EPA, 1998, provides examples of acceptable units for the storage of mineral processing secondary materials.

EPA disagrees with comments from public interest groups stating that nothing short of RCRA Subtitle C standards could assure protectiveness and so demonstrate that these non-land-based storage units were not part of the waste management problem. The plenary conditions urged by the public interest group commenters are indeed those necessary for protective management of hazardous wastes, but the Agency's task here is different. It is to delineate discard from non-discard (i.e. wastes from non-wastes), and, as noted at proposal, not only is this a different test than determining protective waste management conditions, but there are jurisdictional constraints on the types of conditions EPA can impose when considering the situation presented here, i.e., secondary materials generated and reclaimed within a single industry sector. 62 FR at 2342. Thus, the conditions EPA is adopting are designed to assure that these units are not essentially sieves functioning as means of disposal.

The Agency discussed its definition of non-RCRA tanks, containers and buildings in its Technical Background Document (See 62 FR at 26050, *Non-RCRA Tanks Containers, and Buildings,* 1997). *Industry* commenters requested clarification on whether their smelter or refiner buildings would meet the definition of "building" if tanks, containers or buildings were required. As set out in the final rule, a building is a structure with four walls, a roof, and floor constructed of non-earthen materials. Smelter and refinery buildings are quite large and include floor areas which, in part, use earthen materials. As long as mineral processing secondary materials (i.e. those sludges, by-products, and spent materials which would otherwise be identified as hazardous wastes) are stored in those sections of the smelter and refinery building that do have floors constructed of non-earthen materials, these structures would qualify for the exclusion included in today's rule as non-RCRA buildings.

Industry commenters also noted that the Agency made reference to tanks and containers having to meet applicable industry standards for their construction and operation, such as those established by the American Society of Testing Materials (ASTM) or the American Petroleum Institute (API) (See 62 FR at 26050). They pointed out that API standards deal specifically with tanks, while ASTM standards relate more specifically to testing procedures. The commenters argued that units storing mineral processing secondary materials do not need to comply with these standards to be safe. The Agency agrees that the references to applicable industry standards such as ASTM and API were overly broad and has not included them in today's rule. Industry commenters requested clarification on whether tanks and containers needed covers to meet the condition of "no land placement." The Agency expects that the storage of mineral processing secondary materials will prevent uncontrolled fugitive emissions. Tanks and containers do not need covers as long as the materials stored in them are managed to reduce fugitive emissions. The facility operator will therefore need to determine if covers are needed to effectively control fugitive emissions. For example, tanks and containers placed inside buildings may not need covers.

The gold and copper industries stated that their secondary materials would meet legitimacy conditions and that they do not need to store these materials prior to placement back onto gold heap leaches or copper dump leaches. The final rule indicates that process units, as opposed to storage units, are excluded from RCRA Subtitle C. EPA believes that the heap and dump leach units are process units, notwithstanding the fact that they are land-based. This is because dump and heap leach piles simultaneously produce products and waste. The issue is also academic with respect to these units. This is because the Agency determined that these units are extraction/beneficiation activities in 1986 and reiterated that position in 1989 (see 51 FR 24496 and 54 FR 36592), and their Bevill regulatory status is unchanged by today's rule. Thus, if the heap leach pile becomes a disposal unit because wastes remain there permanently, those wastes presently have Bevill status. The Agency continues to be concerned that there may be environmental risks related to dump and heap leaching, but has determined that this rule is not the appropriate means to address those concerns.

Industry commenters also raised concern that under the "no land placement" option, described in the May 1997 proposal, they would no longer be able to place slags on the ground. This is an incorrect reading of the regulations and the proposals since at 40 CFR 261.4(b)(7), iron and steel, copper, lead, zinc, and elemental phosphorus slags are all classified as Bevill exempt mineral processing wastes and would not be affected by this rule. The management of these slags on the ground can continue as long as they meet other applicable federal and state regulations.

(ii) Solid Mineral Processing Secondary Materials Resting On Pads. As noted, EPA proposed at 61 FR 2346 to allow land-based units which had been approved as protective on a site-specific basis by an authorized State or EPA Region. The Agency is retaining a portion of that proposal in the final rule in order to allow solid mineral processing secondary materials resting on pads to be used for storage of mineral processing secondary materials being reclaimed within the industry. The Agency defines "solid mineral processing secondary materials" as those mineral processing secondary materials containing no free liquids. The provision functions effectively as a variance to allow conditionally excluded storage using pads to occur.

Industry comments pointed out that there are materials which can be placed on concrete or asphalt pads in a manner that provides the equivalent protection of a tank, container, or building. The Agency is aware that in the arid Southwest, the copper industry places materials on pads to dry them prior to their reentry into processes. The Agency agrees with industry comments that a degree of flexibility is needed regarding the storage of solid mineral processing secondary materials in this sector, particularly given the number of such storage units presently used in arid conditions, and (to a lesser degree of importance) given the number of existing piles used by this industry which conceivably could be upgraded to operate protectively and for which a more flexible approach could be warranted.[12]

In today's rule EPA is adopting a provision whereby persons storing only solid mineral processing secondary materials (those mineral processing secondary materials containing no free liquids) on pads prior to legitimate reclamation in a mineral processing process may seek a determination from an authorized State or (if the pile is located in an unauthorized State) EPA Region such that the unit is approved as protective and materials stored in the unit are conditionally excluded from the regulatory definition of solid waste provided that the pad is not serving as a mode of discard.

Minimum design criteria for pads are as follows: (1) Pads must be designed of non-earthen materials which are compatible with the chemical nature of the mineral processing secondary material being stored, (2) Pads must be capable of withstanding physical stresses associated with placement and removal, (3) Pads must have run on/runoff controls, (4) Pads must be operated in a manner which controls fugitive dust, and (5) Owner/operators must conduct inspections and maintenance programs to ensure the integrity of the pads.

The decision-maker would evaluate the application for storage on pads against a general environmental performance standard: whether the pad is located, designed, constructed and operated so as to be protective of human health and the environment and is not used for disposal. A broad benchmark of performance would be that the approved pad must afford the same degree of protectiveness as non-RCRA tanks, containers and buildings eligible for exclusion.

The decision-maker would have to consider potential releases via groundwater, surface water, and air exposure pathways. Factors to be considered for assessing the groundwater, surface water, air exposure pathways are:

—The volume and physical and chemical properties of the secondary material, including its potential for migration off the pad;
—The potential for human or environmental exposure to hazardous constituents migrating from the pad via each exposure pathway, and the possibility and extent of harm to human and environmental receptors via each exposure pathway.[13]

Thus, under this regime, a State could approve placement of solid mineral processing secondary materials (those materials containing no free liquids) on a pad where, after consideration of relevant exposure pathways, a determination is made that the mode of storage will not adversely affect human health and the environment, and where the operator has demonstrated compliance with the minimum design and operating criteria. Approval would be more problematic if a pad was located in an area which experiences flooding, or in an area where ground water was close to the surface and used for drinking water purposes.

The Agency is confident that site-specific determinations can be accomplished as part of existing State regulatory programs. The situations eligible for this variance are considerably more circumscribed than at proposal, and the decision criteria consequently more focused, meeting some of the objections in comments from public interest groups on the proposals. Today's rule only allows the placement of mineral processing secondary materials that are physical solids, and the rule also specifies certain minimum conditions such pads must meet to be approved. Further, the rule identifies the factors a State must consider prior to making such determinations. The Agency will review a State's regulatory authorities it intends to use in implementing this determination to assure that an authorized state can effectively implement this element of the rule.

As proposed, EPA is requiring that there be opportunity for public participation in the evaluation and approval process of pads storing solid mineral processing secondary materials. 62 FR at 2366. The Agency believes it is important that those citizens who may be directly affected by these determinations be notified of them and

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[12] EPA has not provided for this type of site-specific approval of land-based storage units in other rules providing for conditioned exclusion from the regulatory definition of solid waste. In some cases, this is because management of solids was not at issue (proposed petroleum listing rule and rules on recovered oil), or the industry sector did not use piles for solids management (steel industry coke-byproducts listing rule). As noted in the text above, EPA believes that there are certain factors peculiar to the mineral processing industry that have persuaded EPA to allow for a site-specific authorization process, but this provision should not be considered to be a precedent for any other industry sector.

[13] As proposed, these general decision factors are drawn from the environmental performance standard in the row-revoked 40 CFR 267.10.62 FR at 2347. Commenters noted correctly that Part 267 is no longer codified, so that these requirements should not be placed in regulatory language (or preamble) by means of a cross-reference to the revoked provisions.

participate in the process, and notes further that this requirement is fully consistent with RCRA's strong preference for public participation. See RCRA section 7004(b).

On the other hand, EPA is not adopting any site-specific approval process for storage of mineral processing secondary materials in surface impoundments. The Agency has concluded that storage in impoundments would likely lead to their contributing to the waste management problem. Many damage incidents in this industry involve the use of impoundments (see damage case on phosphorus impoundments in Idaho). Furthermore, the Agency has determined that there are no engineering or economic constraints on requiring liquid mineral processing secondary materials to be placed in tanks.

d. Speculative Accumulation. In this rule, the Agency is establishing a condition that mineral processing secondary materials cannot be accumulated speculatively as defined in 40 CFR 261.1(c)(8). EPA proposed this condition, 61 FR at 2372, and indeed, this condition already applies to every other secondary material being recycled which is excluded from being a solid waste. See, e.g., 261.2 (e). Industry comments noted that the 12-month limit on speculative accumulation was overly restrictive and that many mineral processing secondary materials need to be stored until economic conditions warrant their recycling. The Agency rejects these comments because no data were presented that would indicate that the volumes of materials being generated could not be efficiently recycled within a 12-month period. In the 12 years the speculative accumulation provision has been in effect, the Agency is unaware of other industries suffering economic burdens by complying with the limits placed on speculative accumulation. Nor is EPA aware of any mineral processing facility which has applied, pursuant to the variance provision in 40 CFR 260.30(a) and 260.31(a) (which allow an extension of the 12-month speculative accumulation period), to extend the existing 12-month requirement for currently excluded mineral processing secondary materials (like unlisted sludges and by-products). The Agency infers that the existing 12-month requirement is not imposing any type of significant constraint on this industry.

e. One Time Notification. EPA proposed that mineral processing plants generating mineral processing secondary materials and utilizing the conditional exclusion to the definition of solid waste provide EPA (or an authorized State) with a one-time notification which describes the mineral processing materials to be recycled and the recycling processes being used. (See 61 FR at 2345). The Agency is finalizing this provision in today's rule. It applies to any facility utilizing the conditional exclusion.

Today's rule requires that the one time notification must specify the types and amounts of mineral processing secondary materials to be recycled and the location and type of unit storing mineral processing secondary material. The notice should be submitted to the appropriate EPA regional office or authorized State. An amended notification would not be required unless the facility has significant process changes affecting the generation, location, or recovery of mineral processing secondary materials.

The reason the provision is needed is to assure that the conditioned-exclusion approach in today's rule can be feasibly implemented. To do so, EPA or States must know what secondary materials are being stored, and where storage is occurring, in order to determine whether the other conditions in the rule are being satisfied. As described above, these other conditions are necessary to assure that secondary material storage within the industry does not become part of the waste management problem. In this very real sense, the notification condition is likewise necessary to assure that the storage is not part of the waste management problem, since notification is necessary to successfully implement the other conditions.

Industry comments opposed this condition, not so much on grounds of unreasonable burden, but based on the argument that the Agency lacks legal authority over non-waste activities. Since EPA finds that the notification condition is an integral part of a group of conditions necessary to assure that storage of these hazardous secondary materials does not become part of the waste management problem, EPA has legal authority to adopt it. In addition, the Agency notes that RCRA section 3007(a) provides authority to enter facilities and obtain information needed to assist in the enforcing of provisions of Subtitle C. This provision can reasonably be read to apply to gathering information to determine whether or not a particular hazardous secondary material is a waste. The notification condition obtains this same type of information by regulatory condition. The Agency thus believes that section 3007(a) (implemented here by rule, pursuant to the Agency's general rulemaking authority under RCRA section 2002(a)) likewise provides authority to adopt this condition.

In the January 1996 proposal, the Agency solicited comment on whether a Facility Operating Plan should be required for facilities that generate, store, or process hazardous mineral processing secondary materials. (See 61 FR at 2345) Under this approach, a Facility Operating Plan would include: a spill prevention plan and procedures; types, quantities, and analysis of recycled materials; product specifications; speculative accumulation and storage requirements; closure plan; and record keeping and reporting for off-site shipments. In today's rule, the Agency is not requiring the preparation of such a plan. This requirement is not necessary given the burden of proof under existing 40 CFR section 261.2(f) that a facility must meet to comply with the conditions of legitimacy, containment, and speculative accumulation. The Agency does, however, strongly encourage facilities to develop a plan or at least components of a plan as part of responsible environmental management.

5. Bevill Related Issues

a. Uniquely Associated. Under the Agency's longstanding interpretation of the Act, the Bevill amendment applies to special wastes that are uniquely associated with extraction/beneficiation and certain mineral processing activities. Because the decision whether a particular waste is uniquely associated may determine whether a particular waste is subject to Subtitle C controls, the Agency believed that it was important and useful to receive public input regarding the manner in which EPA and authorized States apply this principle and solicited comment regarding the criterion for determining whether a waste is uniquely associated with mineral operations. The Agency has described non-uniquely associated wastes at 45 FR 76619, November 19, 1980 and 54 FR 36623, September 1, 1989. In the May 1997 proposal, the Agency noted examples of non-uniquely associated wastes, which include spent solvents, pesticide wastes, and discarded commercial chemicals. As stated in the May 1997 proposal, in the Agency's view, these wastes are logically viewed as not being "from" extraction, beneficiation, or mineral processing, and, therefore, are not subject to the Bevill exclusion. (See 62 FR 26054–56, May 12, 1997).

In May 1997, the Agency proposed several alternative approaches to determining whether a waste was uniquely associated. One option to determine if a waste is uniquely associated was the simple application of the high volume threshold used in the Agency's 1989 rulemaking. Under this option, the volume criterion would obviate the need to consider the uniquely associated principle further.

The Agency based this option on the fact that Congress and the courts have established that only large volume special wastes should be eligible for the Bevill exclusion (62 FR 26041, May 12, 1991; *Environmental Defense Fund* v. *EPA*, 852 F.2d 1316 (D.C. Cir 1988), *cert. denied* 489 U.S. 1011, *Solite Corporation* v. *EPA*, 952 F.2d 473, 494–495 (D.C. Cir 1991)). The Agency reasoned that a large volume criterion is simple to apply and is consistent with the broad parameters of Congressional intent. Further, this approach would help prevent additional toxic constituents from being disposed with Bevill wastes, potentially encouraging recycling, and may result in reduction of cleanup costs.

Industry commenters voiced strong opposition to the use of a volume criterion to determine whether a waste was uniquely associated. Commenters stated that the Bevill exclusion was intended to exempt all mining wastes, regardless of their volume or toxicity. As the regulatory history of EPA's implementation of the Bevill exemption makes clear, however, this is not the case. (see 54 FR 36592, September 1, 1989).

Nonetheless, while the Agency has used volume to make certain Bevill determinations, it has not in the past used the high volume criterion to make uniquely associated determinations. The Agency assessed the impact of applying a high volume criteria in making uniquely associated determinations and found that such an application would make virtually all such wastes non-uniquely associated and subject to Subtitle C controls, regardless of the extent to which the waste was, in fact, associated with mining and mineral processing. EPA does not believe that it would be appropriate to ignore altogether the extent to which a particular waste is associated with mining and mineral processing activities that are subject to the Bevill exclusion, since that exclusion on its face applies to wastes *from* those processes. In addition, the Agency believes that a certain degree of flexibility is needed for making uniquely associated determinations due to the complex and varied mineral operations and site-specific factors that must be considered in making these decisions. In today's rule, the Agency is, therefore, not adopting the use of a volume criterion to determine whether a waste is uniquely associated.

The Agency also proposed an option where a waste would be uniquely associated if it came into direct contact with an ore or mineral or wastes from the extraction, beneficiation, or processing of ores and minerals. Several commenters expressed the view that, while contact can be one useful indicator of whether a waste is uniquely associated with mining, such contact should not be required in all cases. These commenters believed that the test should be whether the conduct of mining and mineral processing necessitates the generation of a particular waste; if so, then the waste should be considered uniquely associated. Other commenters believed that the "contact" principle was potentially overly broad, since it would have the potential to sweep into Bevill wastes that typically would not be considered uniquely associated. As proposed, however, the contact option would consider only contact that occurred as part of a processing operation.

After consideration of public comments, the Agency has concluded that a strict application of the "contact" principle, while appealing because of its simplicity, would not provide the best means of determining whether a waste is uniquely associated with mining or mineral processing. The Agency is concerned that, while contact may be one indicator of when a waste is associated with the mineral recovery process where, for example, the contact with the process imparts chemical characteristics to the waste, EPA agrees with commenters that simple application of the contact principle has the potential to be over-inclusive of wastes that are properly viewed as "uniquely associated." The Agency has not, therefore, adopted that criterion as being determinative of whether a waste is uniquely associated.

The other option in the May 1997 proposal would modify the contact principle to exclude, as non-uniquely associated, wastes that only exhibit the same hazardous characteristic both before and after contact with the Bevill waste, feedstock, or product. This "modified contact" approach may reduce the potential for Bevill wastes to be dumping grounds for non-Bevill hazardous wastes. Under this approach, wastes that are inherently hazardous prior to contact with a Bevill waste, and which retain the same hazardous characteristic after contact, would be subject to Subtitle C regulation when discarded.

Commenters pointed out that the Agency had never before proposed to use the hazardous characteristic to determine whether a waste was uniquely associated, nor had the Agency used this criterion in making uniquely associated determinations since 1980. They also pointed out that the Agency had already studied the hazardous characteristics of uniquely associated wastes but nevertheless stated that these wastes should not be subject to RCRA Subtitle C (51 FR 24496).

Some commenters also contended that the real issue is whether the waste is indigenous to the mining and mineral recovery process—i.e., whether it is necessary to generate the waste in order to conduct the process—and that the hazardousness of a material prior to its use in the process is, therefore, irrelevant.

EPA agrees, in part, with these commenters that the characteristics of a material (i.e., whether it is hazardous) prior to use in mineral recovery processes should not be solely determinative of whether the wastes are "uniquely associated." As a general matter, the closer the nexus between a particular waste and the mineral recovery process, the more likely it is "uniquely associated" within the meaning of Bevill. The Agency recognizes, however, that one fact that might help evaluate the relationship between a particular waste and the mineral recovery process is the extent to which the properties of a particular waste can be attributed to the process itself. Thus, while the Agency does not believe that hazardousness of a material prior to use in the mineral recovery process should be determinative of its Bevill status after use, the extent to which the material has acquired attributes through its involvement in that process is relevant.

Based on consideration of all the public comments, the Agency believes that it is appropriate to evaluate whether a particular waste is uniquely associated with mining and mineral processing as follows. First, any waste from ancillary operations are not "uniquely associated" because they are not properly viewed as being "from" mining or mineral processing. In evaluating wastes from non-ancillary operations, one must consider the extent to which the waste originates or derives from processes that serve to remove mineral values from the ground, concentrate or otherwise enhance their characteristics or remove impurities, and the extent to which the mineral recovery process imparts its chemical characteristics to the waste. Under this test, the greater the extent to which the waste results from the mineral recovery process itself, and the more the process imparts to the waste its chemical characteristics, the more likely the waste is "uniquely associated."

The Agency believes that this approach provides a reasonable basis to determine whether a waste is "uniquely associated." The Agency believes that these factors touch on the full range of facts that are likely to be relevant in any particular case. As is evident from the criteria summarized above, judgment must be exercised where the question is whether a waste from a non-ancillary operation is uniquely associated. EPA believes that this is appropriate because of the fact-specific nature of this determination and the myriad circumstances that can arise. However, as noted above, the Agency believes that wastes generated from ancillary operations (such as truck maintenance shops at a mine and not from the mining or mineral recovery process itself), are not uniquely associated. Such circumstances would likely present the most readily identifiable cases of non-uniquely associated wastes.

The approach noted above reflects the longstanding principle, based on the clear language in Section 3001 of RCRA, that uniquely associated wastes must result from mining and mineral processes themselves. This approach also is generally consistent with industry's underlying contention that the uniquely associated concept should exempt wastes that are "indigenous" to mining. EPA disagrees, however, with industry's contention that uniquely associated wastes are any wastes that are unavoidably generated by mining operations. For example, arguably, it is unavoidably necessary to conduct maintenance on machinery that supports mining at a site (e.g., used to transport ores and minerals among processes); however, such maintenance is not necessarily part of the mining or mineral recovery process itself. EPA believes that the proper focus should be the extent to which a waste is generated as part of the mining and mineral recovery process, not the extent to which a facility must conduct an activity as part of its operation.

The elements of the "contact" options discussed in the preamble to the proposal, as well as regulatory language contained in the May 1997 proposed rule (see proposed 40 CFR 261.4(b)(7) (stating that exempt extraction and beneficiation wastes must "originate from the extracted ore or mineral")) may affect uniquely associated determinations. While, as discussed above, the Agency believes that sole reliance on a contact principle would be unjustifiably rigid, consideration of the extent to which the mineral recovery imparts to the waste its chemical characteristics provides a useful means of evaluating whether a waste is uniquely associated. The greater the extent to which the waste acquires its chemical characteristics from the process from the processing of an ore or mineral, the more likely that waste would be uniquely associated with the Bevill process. Conversely, the less a particular waste originated from or acquired its characteristics from such processes, the less likely it is uniquely associated.

Some commenters asserted that the Agency's proposal represented a sharp departure from past Agency practice under the uniquely associated principle and would constitute, in effect, a revision of prior Bevill regulatory determinations. Neither contention is correct. While the Agency has articulated here its approach to the uniquely associated principle in more detail than previously, the Agency believes that the approach is fundamentally the same as how the Agency has applied the uniquely associated principle in the past. Second, the Agency is not, through the uniquely associated principle, seeking to revise past regulatory determinations that exempted extraction and beneficiation wastes and certain mineral processing wastes from Subtitle C regulation. The list of exempt extraction/beneficiation processes and mineral processing wastes in section 261.4(b)(7) is not altered by this approach. Even under these existing regulatory provisions, it was necessary to determine in certain cases whether a particular waste stream was, in fact, "from" (i.e., "uniquely associated" with) one of the enumerated Bevill processes. EPA's past regulatory determinations did not, therefore, obviate the need for determining the applicability of Bevill to particular waste streams. In this rule, EPA is simply ensuring that the uniquely associated criteria have the benefit of full public notice and comment; we have not, however, altered the scope of prior regulatory determinations through this process.

Industry commenters nonetheless had concerns about certain applications of the uniquely associated principle articulated in the mineral processing identification document contained in the docket at proposal. In particular, commenters expressed concerns that the document concluded that spent kerosene in copper solvent extraction, crud from electrowinning, crucibles and cupels, and acid cleaning solutions from gold heap leaches are not uniquely associated. All of the wastes just noted are generated as a result of beneficiation. It should be noted that all wastes generated after the commencement of mineral processing are mineral processing wastes. As a result of the Agency's 1989 rule (54 FR 2322), all mineral processing wastes, except those noted in 40 CFR 261.4(b)(7), are subject to RCRA Subtitle C, if they exhibit a hazardous characteristic. Therefore, the effect of the uniquely associated principle is of less import than at beneficiation facilities.

The Agency received numerous comments challenging the Agency's position that these wastes were not uniquely associated. Comments from the copper industry noted that slimes/muds, crud, and spent kerosene generated from copper solvent extraction and electrowinning were uniquely associated because these wastes had been determined by the Agency in 1989 (see 54 FR 36592) to be wastes from extraction and beneficiation. Based on these comments, the Agency has reassessed its prior conclusions regarding these wastes and agrees with the copper industry that slimes/muds, crud, and spent kerosene generated from copper solvent extraction and electrowinning are uniquely associated. 40 CFR 261.4 states that wastes from solvent extraction and electrowinning are extraction/beneficiation wastes and are not subject to regulation under Subtitle C. Applying the approach described above, it is clear that solvent extraction and electrowinning are clearly not ancillary activities since their sole purpose is to concentrate copper values out of pregnant leach solution. The "uniquely associated" nature of these wastes is also supported by the degree to which the wastes originate and derive from the mineral recovery process. Thus, the Agency's view is that these wastes are "uniquely associated" with beneficiation.

Comments received from the gold industry noted that acid wash solutions are generated solely from processes used to concentrate gold values from cyanide leach solutions. Again, the Agency has reassessed its earlier interpretation and now believes that acid wash solutions from gold heap leaching are uniquely associated. The Agency came to this conclusion in light of the non-ancillary nature of the process generating these wastes (carbon columns must be kept "clean" for the gold to be effectively recovered), the extent to which the wastes originate and derive from this mineral recovery process, as well as the fact that the process imparts some chemical characteristics to the waste (i.e., the ore material that is cleaned from the carbon).

Based on the approach articulated above, the Agency now believes that other wastes are best viewed as non-uniquely associated. For example, the Agency believes that lead anodes used in the electrowinning process are not non-uniquely associated wastes. While lead anodes are used in the mineral recovery process and thus could be viewed as uniquely associated based on this consideration in isolation, a countervailing consideration is that the mineral recovery process imparts virtually no characteristics to these materials. Lead anodes are virtually identical both before and after being used in the process. On balance, the Agency concludes that lead anodes are not uniquely associated with mining and mineral processing.

The Agency also reassessed the status of cupels and crucibles and finds that they remain non-uniquely associated wastes. These wastes are the result of laboratory testing. Cupels and crucibles are also used in other industries (e.g., jewelry companies test the precious metal content of metals using cupels). These wastes are from an ancillary operation, laboratory analyses, and are not generated due to the direct recovery of gold and, therefore, fail to meet the Agency's uniquely associated criteria. It should also be noted that the Agency has consistently found that laboratory wastes are generally non-uniquely associated.

As stated previously, the applications of the "uniquely associated" principle articulated here reflect the Agency's interpretation of the criteria as applied to those particular wastes based on the best current information available to EPA. Like the positions articulated in the Identification Document, these calls represent the Agency's current best evaluation of whether these wastes are "uniquely associated," based on available information. However, the discussion above and in the Identification Document simply provides guidance on these issues, and therefore, the determinations are not legally binding on decisionmakers, the public, or the courts.

Finally, one commenter argued that the uniquely associated principle as discussed by EPA is an impermissible reading of the Act to the extent it would authorize EPA to consider factors other than high volume/low toxicity in making Bevill determinations. The Agency disagrees with this position. The Court in *EDF II* directed the Agency to apply a high volume/low toxicity criteria to determine if a mineral processing waste would retain the Bevill exclusion. The uniquely associated inquiry is somewhat different. The question here is the threshold issue whether a particular waste is "from" extraction, beneficiation or mineral processing in the first place. The Agency does not believe that the decision in *EDF II* spoke to that inquiry. Rather, *EDF II* was concerned solely with the circumstances under which a waste that is "from" these processes qualifies for the Bevill exclusion. Stated another way, a waste is only subject to the Bevill exclusion if it is, in fact, "uniquely associated" with extraction/beneficiation or one of the 20 exempt mineral processing wastes. Thus, the uniquely associated principle does not expand the scope of the Bevill exemption, and the Agency's approach is, therefore, entirely consistent with the decision in *EDF II.*

b. Addition of Mineral Processing Secondary Materials to Units Processing Bevill Raw Materials. The question addressed in this section is: if a Bevill extraction/beneficiation process uses as feedstock a mineral processing secondary material which otherwise would be a hazardous waste, would the resulting wastes still be considered to be from extraction/beneficiation and hence Bevill exempt?

There are two bases for potential environmental concern prompting this question. The narrower issue is that if otherwise-hazardous wastes are used as partial feedstocks, could they change the resulting wastes' character in a manner such that the existing exclusion should no longer apply, or, put another way, is the Bevill exemption being used to shield disposal of non-exempt hazardous wastes? The broader issue is whether the Bevill amendment, which creates an exemption from rules designed to protect the public and the environment from unsafe hazardous waste disposal practices, should be interpreted any more broadly than necessary given that the effect is to exempt more waste from protective controls.

EPA proposed two different answers to these questions. In the January 1996 proposal, the Agency proposed to apply the same "significantly affected" test used in the partially analogous context of a Bevill device which co-processes hazardous waste along with normal raw material feedstock. 61 FR at 2351 and 40 CFR section 266.112. So long as resulting wastes from the extraction/beneficiation process were not "significantly affected" by the addition of hazardous secondary materials, resulting wastes would remain exempt. Id. Significantly affected meant either that the resulting wastes reflecting co-processing were statistically different over the non-waste baseline, or that there was an environmentally significant increase in hazardous constituents over the non-waste baseline. Id.

The May 1997 proposal would have gone further and interpreted the Bevill amendment narrowly (a common rule of construction when construing exceptions to plenary protective regulatory schemes to apply only to situations when extraction/beneficiation raw material feedstocks are utilized) to apply only to situations when extraction/beneficiation raw material feedstocks are utilized (see 62 FR at 26052).

After reviewing the public comments, the Agency has decided not to adopt either of these alternatives. As explained below, EPA ultimately has decided that the likely result of either proposal would be unwarranted disruption to legitimate (and desirable) recovery practices within the industry. Nonetheless, as discussed in the final subsection of this part of the preamble, the Agency retains concerns that the Bevill amendment not be used as a means of shielding disposal of non-Bevill hazardous wastes, and therefore cautions that the Agency intends to scrutinize especially carefully claims of legitimate recycling when hazardous secondary materials are co-processed in extraction/beneficiation operations.

(i) Should the Bevill amendment apply only when virgin materials are processed in extraction/beneficiation operations? In the Agency's May 1997 proposal, EPA sought comment on whether a narrow reading of the Bevill exclusion should be implemented which would limit the availability of the Bevill exemption to wastes generated exclusively from the use of Bevill raw materials, namely ores and minerals. Under this approach only virgin ores used as a feedstock to a beneficiation operation and only concentrates derived from beneficiation and then used as a feedstock to mineral processing would be eligible for the Bevill exclusion. If any alternative materials were used as feedstocks, the resulting waste would not be eligible for the Bevill exclusion. 62 FR at 26052.

In today's rule, the Agency is declining to pursue this option. Industry comments were uniformly opposed. Industry noted that since 1989, the Agency has established a clear use of the 50 percent rule and was well aware that the co-processing of a range of materials was occurring at both extraction/beneficiation and mineral processing facilities when it finalized its

1989 rulemaking (see 54 FR 33620, September 1, 1989). Industry further pointed out that in the 1989 rulemaking the Agency found that 20 mineral processing wastes (see 40 CFR 261.4(b)(7)) would retain their Bevill exempt status even though co-processing was occurring. Industry also noted that the Agency had not presented any data to confirm that the co-processing of virgin and non-virgin materials would actually increase risks to the environment. Public interest groups on the other hand indicated that the proposed option more closely follows the intent of Congress to limit the Bevill exemption to high volume, low toxicity wastes.

The Agency has reviewed the data on co-processing of non-virgin and virgin material and finds that it did evaluate co-processing issues in its 1990 Report to Congress on Wastes from Mineral Processing (EPA Office of Solid Waste, July 31, 1990). This review, as it relates to the 20 mineral processing waste streams that are still exempt, found that co-processing had not significantly changed the hazardous properties of the resultant wastes.

The Agency noted in its proposal that it was unaware of the extent of co-processing at extraction/beneficiation facilities, particularly after 1985. Industry comments noted that background reports to the Agency's 1985 "Report to Congress on Extraction and Beneficiation Wastes" (EPA Office of Solid Waste, December 31, 1985) discussed this co-processing issue. Agency review of these documents indicates that while some references to feedstocks are discussed, the Agency was not aware of the extent of this practice until it began to restudy mining and mineral waste management practices in 1989 and initiated a series of visits to mines and mineral processing facilities in 1991–92.

Industry also submitted comments indicating that implementing this option would have significant adverse impacts on the mining and mineral processing industries. The Agency assessed industry comments and conducted its own economic analysis. The Agency found that implementation of this option may reduce current recycling in the copper and lead sectors, and could cause potentially serious economic disruption to industry. (See EPA's Regulatory Risk Impact Analyses.) Both the gold and copper sectors pointed out that they routinely reintroduce mineral-bearing streams from their processing activities into their beneficiation plants to further recover metal values. Such practices would diminish if this option were implemented, since affected extraction/beneficiation operations would not recycle secondary materials if the result is to lose Bevill status of the resulting wastes. It makes little sense for the Agency to implement a program which may reduce recycling where its knowledge of the environmental benefit of the approach is limited.

(ii) Significantly Affected. Under the Agency's January 1996 proposal, mineral processing secondary materials could be introduced into beneficiation units generating Bevill-exempt wastes (without affecting the wastes' Bevill status) if they were legitimately recycled, secondary materials comprised less than 50% of the total feed to the unit, and the resulting wastes were not "significantly affected" by the recycling practice.

EPA has decided to adopt the proposed approach except the Agency has decided not to adopt the proposed "significantly affected" test in today's final rule. It should be pointed out that small volumes of mineral processing secondary materials likely to be recycled at beneficiation facilities would be processed along with enormous quantities of raw ore. Therefore, the probability that the introduction of such materials would affect the characteristic of the resultant wastes is very low.

Given the likelihood of minimal environmental effect, the Agency must therefore judge whether the benefits of encouraging recycling these materials outweigh the potential additive risks that, however unlikely, could potentially occur in unusual cases. The Agency has decided that, from both an implementation and an overall environmental perspective, not requiring a "significantly affected" evaluation makes sense. While it is possible that adoption of a "significantly affected" test might catch the unusual circumstance where addition of secondary materials substantially changes the characteristics of the resultant wastes, imposing such a requirement could potentially have a chilling effect on the amount of secondary material that the industry recycles. This is because industry would not risk imperilling Bevill status, since a consequence could be RCRA permitting and facility-wide corrective action potentially affecting areas of historic contamination. From an environmental perspective, EPA believes that the benefits of recycling such materials are substantial, and far outweigh the largely marginal benefits that could be associated with requiring a "significantly affected" analysis on a waste stream by waste stream basis.

EPA originally viewed the situation presented here as analogous to when hazardous wastes are co-processed in Bevill units, and so proposed the identical test for resulting residues. 61 FR at 2351. On reflection, there are important distinctions between the two fact patterns. EPA applies the "significantly affected" tests when what are admittedly hazardous wastes are co-processed. The usual case is when a hazardous waste fuel is burned in a Bevill unit (like a cement kiln) which also processes normal raw materials. The hazardous wastes can contribute more and different hazardous constituents not normally found in the raw materials. In the extraction/beneficiation example, however, the mineral processing secondary materials are being used as feedstock precisely because those materials share attributes found in raw materials (i.e., recoverable amounts of metals). Because the rule limits co-processing to mineral processing secondary materials, such materials would typically be similar in nature to the raw materials being processed, making it far less likely that co-processing would significantly alter the attributes of resulting wastes. In addition, unlike the burning in furnaces example noted above, the mineral processing secondary materials being recycled are not hazardous wastes. Although they are secondary materials, the Agency has decided to exclude them from the regulatory definition of solid waste (assuming legitimate recycling) because the activity resembles normal reclamation practices within the industry. Put another way, since the mineral processing secondary materials are from the same industry sector and are being reclaimed within the same industry, they can be viewed as secondary materials which are not wastes. It is, thus, less appropriate to apply a significantly affected test to these non-waste feedstocks.

EPA also was unable to apply the "significantly affected" test in a manner that would focus on those secondary materials that actually could cause significantly increased environmental risks. The proposed test was the Burning in Furnaces (BIF) 2-part test, which would function in a different manner in this rule. Under the BIF rule, the concern was with the use of hazardous wastes from outside industries, and residuals rarely fail the second part of the test, exceeding the hazardous characteristic. Here, we are dealing with materials from within the industry, metal values are reclaimed, and wastes typically exhibit a hazardous characteristic. Since mineral processing secondary materials often contain other metals in them, the resultant wastes from co-processing may show statistical increases or decreases in the metals content of the resultant wastes. The increases or decreases in metal constituents, however, does not necessarily mean that risk has increased. An increase in one constituent may be offset by a decrease in another constituent or by additional volumes of raw material feedstocks that would be needed to replace the mineral processing secondary materials. The application of the proposed test therefore could not be effectively used to determine if risks would increase if secondary materials are co-processed at beneficiation facilities.

(iii) Conclusion. For these reasons, the Agency has decided to retain as a condition for retaining Bevill status the standard requirement that an extraction/beneficiation unit processes at least 50 percent raw material. 54 FR at 33620 (Sept. 1, 1989); 50 FR at 49190 (Nov. 25, 1985); and 56 FR at 7198 (Feb. 21, 1991) (previous instances where EPA has used this test); 61 FR at 2351 (proposal of that test here). If the 50 percent criterion is met, the resulting waste would still be from extraction/beneficiation and hence exempt. Raw materials can be mineral processing secondary materials and be placed into units generating Bevill-exempt wastes provided that the facility legitimately recycles these materials.

The proviso is important. EPA repeats that the Bevill amendment is not to serve as a means of disposing of non-Bevill hazardous wastes. As explained later in the preamble, if a hazardous waste is mixed with a Bevill waste, the mixing is regulated under RCRA Subtitle C, and the mixed wastes may be Subtitle C hazardous wastes. While the mixture rule does not apply when materials are placed in a beneficiation unit for legitimate recycling, it would apply if a hazardous secondary material is not being recycled legitimately. See *U.S.* v. *Self*, 2 F.3d at 1071, 1079 (10th Cir. 1993)(sham recycling is simply hazardous waste disposal or treatment).

It should also be pointed out that today's rule prohibits the storage on the ground of any characteristically hazardous mineral processing secondary material. Should a beneficiation facility wish to legitimately reclaim such materials, it should be aware that placement of these materials in raw material piles may change the RCRA status of the pile.

c. Bevill Mixture Rule and Disposal. Disposal of waste mixtures is the focus of this section. The Agency promulgated the Bevill mixture rule in 1989 (see 54 FR 36592). That rule was remanded to the Agency in *Solite Corp* v. *EPA*, 952 F.2d 473, 493–94 (D.C. Cir. 1991). EPA reinstated the mixture rule in 1992; however, this reinstatement was found to be procedurally defective in *Mobil Oil* v. *EPA*, 35 F. 3d 579 (D.C. Cir. 1994).

In the January 1996 proposal, the Agency proposed that if any mineral processing hazardous waste, or indeed any hazardous waste, is mixed with and disposed with a Bevill waste, the resulting waste is, under certain circumstances, regulated under RCRA Subtitle C. The Agency further stated that the mixture of Bevill wastes and hazardous wastes would normally be regulated as a form of treatment subject to regulation under Subtitle C. The Agency stated its concern about the potential human health and environmental risks due to increased hazardous constituents resulting from the disposal of mixtures of hazardous waste with Bevill-exempt wastes. The Agency based the proposal on the policy that Bevill wastes not be allowed to serve as an unregulated dumping ground for hazardous wastes. Cf. *Horsehead Resource Development Co.* v. *Browner*, 16 F. 3d at 1258.

The rule being adopted today is a reinstatement of the mixture rule promulgated in 1989. The Agency continues to believe that the approach adopted in 1989 is sound, and properly balances the objectives of the Bevill amendment with those of RCRA as a whole. While commenters criticized EPA on the grounds that the prior mixture rule has twice been struck down by the courts, those decisions did not address the merits of the Bevill mixture rule.

One clarification of statements in the 1996 proposal is in order. The Agency stated that the proposed rule differed from the 1989 Bevill mixture rule in that the earlier rule had exempted mixtures of Bevill wastes and characteristic hazardous wastes from requirements pertaining to treatment. *See* 61 Fed. Reg. 2352. This statement was, however, in error. The Agency stated in the 1989 rulemaking that such mixing would, in fact, constitute treatment of a hazardous waste, and would be subject to the appropriate regulation for treatment storage and disposal of hazardous wastes, including obtaining a permit. 54 Fed. Reg. 36622. Thus, the Agency is not taking a more stringent approach to regulating mixtures than was taken in 1989. As in 1989, moreover, the Agency is not amending in any way the definition of treatment, storage, or disposal of hazardous wastes; nor is the Agency promulgating any specific provisions related to how those definitions apply to mineral processing wastes. The Agency is simply stating that mixtures of Bevill and non-Bevill wastes can, depending upon the particular facts, constitute treatment, storage or disposal under the existing regulatory program.

Industry commenters generally opposed the proposed mixture rule. Several commenters argued that the proposed rule was contrary to the Act because it undermined the protection that the Bevill amendment was intended to provide the industry. These commenters argued that the legislative history indicates Congress intended the Bevill amendment to be read broadly, to incorporate waste products generated in the "real world," and that Congress recognized co-management of wastes practiced by the industry occurred in the "real world." According to these commenters, integrated facilities conducting extraction, beneficiation and processing operations at a single location have historically co-managed wastes from these operations, including certain newly identified mineral processing wastes, and the proposed rule would effectively undermine the protections of the Bevill amendment for these operations. One commenter contended that the mixture rule would subject "high volume/low hazard" waste mixtures from the mining and mineral processing industry to Subtitle C regulation without having conducted the special study and regulatory determination process set forth in section 3001 of RCRA. Since such mixtures of wastes are "high volume/low hazard," these commenters argued that section 3001, as construed by the Court in *EDF v. EPA*, 852 F.2d 1316 (D.C. Cir. 1988), mandates exclusion of those wastes from regulation under Subtitle C.

After careful consideration of these comments, EPA has concluded that they misconstrue the scope of the Bevill amendment, and that the proposed approach to Bevill mixtures is a reasonable one. First, the Agency disagrees with these commenters' interpretation of the Bevill amendment as applying to not only to "special wastes" themselves, but also to any other hazardous waste that may be co-managed with them. Congress simply provided that "solid waste from extraction, beneficiation and processing of ores and minerals" are not subject to Subtitle C. RCRA § 3001(b)(3)(A). Congress did not, as these commenters suggested, apply this exclusion to such wastes "and other hazardous wastes that may be co-managed" with them. Rather, Congress endorsed EPA's conclusion that high volume/low toxicity "special wastes" deserved special treatment under the Act by virtue of the difficulties that would be associated with managing these wastes under the Subtitle C program. Moreover, EPA's decade-long effort to demarcate the line between special wastes and non-excluded wastes was premised on the notion that the line between them is of some significance. If any hazardous waste can come within the scope of the Bevill amendment simply by being mixed with Bevill waste, that line becomes blurred, potentially creating a universe of excluded wastes far beyond that envisioned by Congress when it enacted the Bevill amendment.

The Court in *EDF II* indicated that those mineral processing wastes which did not meet the high volume/low toxicity criteria should be fully subject to Subtitle C. The Agency, in today's rule, has taken prudent steps to encourage the legitimate recycling of hazardous secondary materials. If hazardous mineral processing wastes can not be recycled and must be disposed, the Agency finds nothing in *EDF II* which precludes the Agency from treating these hazardous wastes like any other hazardous wastes. It should also be pointed out that today's rule does not affect the disposal of extraction/beneficiation wastes as long as there is no mixing of non-exempt hazardous wastes with them. EPA believes that this rule is consistent with the scope of the Bevill amendment because it maintains the Bevill exclusion for mixtures that are hazardous due solely to any hazardous constituents of the Bevill waste. The fact that these resulting wastes retain their Bevill status does not mean, however, that the act of storing, treating, or disposing of hazardous wastes with Bevill wastes should be exempted from normal Subtitle C controls.

EPA also disagrees with the notion advanced by some commenters that EPA is required by section 3001 to conduct a study to determine whether mixtures of Bevill and other wastes meet the high volume/low toxicity test and thereby merit being covered by the Bevill amendment. EPA reads section 3001 as mandating that EPA study wastes generated by the mining and mineral processing industry for purposes of determining whether particular waste streams are subject to the Bevill amendment. EPA has done so and determined that mineral processing wastes that do not meet the high volume/low toxicity threshold are not subject to Bevill. EPA's orderly decision-making (see 54 FR 36592 and 55 FR 2322), would be undermined if the Agency were then required to revisit these determinations based upon how facilities happen to manage their wastes.

Stated another way, EPA reasonably based its Bevill regulatory determinations on the volumes of each type of mineral processing waste *generated* within the industry; the Agency does not believe it is reasonable to interpret section 3001 as mandating that EPA disregard the volumes in which wastes are generated and instead base its determinations on the vagaries of how those waste streams may be aggregated through industry's disposal practices. Such a result would be counter to EPA's special waste concept, and ignore the fact that mineral processing wastes streams that are not generated above Bevill's high volume/low toxicity threshold would, in fact, be amenable to management under Subtitle C. Thus, the commenter's interpretation would effectively allow the mining and mineral processing industry to "bootstrap" smaller volume wastes into Bevill simply by co-disposing them with Bevill wastes. The Agency and the courts have never interpreted Bevill in such an awkward fashion, and the Agency declines to follow such an approach here.

The Agency does not agree with comments that any change to the Bevill mixture rule would effectively eliminate Bevill for integrated facilities. Today's rule does not change the Bevill status of extraction/beneficiation wastes nor does it alter the Bevill status of 20 mineral processing wastes (see 40 CFR 261.4). Since a large number of "newly identified" mineral processing waste streams become subject to the LDR, the Agency took steps to clarify the status of non-exempt "Bevill" wastes (i.e. mineral processing wastes not within the scope of the Bevill amendment) in this rulemaking. The Identification report, placed in the docket in January 1996, was developed by the Agency to assist companies in determining if wastes were or were not exempt. The Agency sought comment on the draft Identification document and has finalized this report. This report is, however, guidance. Mineral processing companies now have the ability to identify the status of each waste stream and to cease mixing non-exempt hazardous wastes with exempt waste streams.

Regarding commenters' critique of the concerns expressed by EPA in the proposal justifying the proposed mixture rule, the Agency continues to be concerned about the mixture of hazardous wastes with Bevill exempt wastes for treatment, storage or disposal. The Agency has noted earlier that it is not imposing the significantly affected option because the mixture of hazardous secondary materials with feedstocks does not appear to adversely affect risk. This is so because the mixtures are destined for legitimate recovery of metal, acid, water or cyanide, or other values. Mixtures destined for disposal will not have any of their hazardous constituents removed or other values utilized and may contribute to the waste disposal problem. Nor is there the slightest indication in law that normal Subtitle C rules should not apply to disposal of normal Subtitle C hazardous wastes.

Commenters did point out several errors made by EPA in the proposed rule language. Many commenters noted that there was an inconsistency between the preamble of the January proposal and its proposed regulatory language. The proposed regulatory language inadvertently omitted language in the general mixture rule stating that mixture of a solid waste with a hazardous wasted listed solely because it exhibits a characteristic identified in Part 261 subpart C is a hazardous waste "unless the resultant mixture no longer exhibits any characteristic of hazardous waste. . . " 40 C.F.R. 261.3(a)(2)(iii). It was not EPA's intent to propose deleting this language, and it therefore is included in the final rule.

In addition, as pointed out by commenters, the proposed language failed to track the preamble discussion of mixtures of Bevill wastes and characteristic hazardous wastes (as well as wastes that are listed because they exhibit a hazardous characteristic). Under the proposed rule language, mixtures of Bevill wastes and hazardous wastes would be a hazardous waste whenever it exhibited a hazardous waste characteristic, even where that characteristic was imparted to it solely from the Bevill waste. (See proposed section 261.3(i).) As shown by the preamble, this was clearly not EPA's intent, which was to preserve the Bevill exclusion for mixtures that are hazardous solely because of the Bevill component of the mixture. See 61 FR 2352–53.

Conversely, the preamble, although ambiguous in spots on this issue, did say at one point that mixtures of characteristic hazardous waste and Bevill wastes would be considered hazardous waste only if the mixture continued to be hazardous due to characteristics imparted to it by the non-Bevill waste. 61 FR at 2352. If the mixture exhibited a hazardous characteristic due solely to the Bevill waste, the Agency did not intend to designate the mixture as a hazardous waste.

Consistent with that discussion, under today's rule, the Agency has decided that if Subtitle C hazardous waste exhibiting a characteristic is mixed with Bevill-exempt waste exhibiting the same characteristic and the mixture continues to exhibit that common characteristic, then the entire mixture should be considered to be non-exempt hazardous waste. This result is consistent with normal rules on when wastes are hazardous, which state that if a waste exhibits a hazardous waste characteristic, it remains a hazardous waste unless and until it no longer exhibits a characteristic. 40 CFR 261.3(d)(1). In addition, such a principle will make this rule easier to administer (should this situation actually occur), since enforcement officials will not have to parse out which portion of the waste mixture is imparting the characteristic property. Finally, the result is consistent with the overall object of today's rule: not to let Bevill wastes be used as a means of allowing unregulated management of normal Subtitle C hazardous wastes.

Several commenters noted concern that existing exemptions to the Agency's mixture rule, such as that given to totally enclosed treatment facilities and elementary neutralization units, would be eliminated under this rule. The Agency reiterates that this rule does not alter in any way the current Agency mixture rule. The purpose of this rulemaking is to place the mixing of hazardous wastes that may occur at mineral processing plants on the same status as all other hazardous waste management.

(i) Illustrations of how today's rule operates. Although the regulatory parlance for today's rule has always been the "Bevill mixture rule", the greatest practical consequence of the rule is probably on the units where mixing occurs. This is because units (i.e. tanks, impoundments, piles, landfills, etc.) where hazardous wastes are placed will (absent some exemption or exclusion other than that provided by the Bevill amendment) be regulated units, i.e. units subject to Subtitle C standards for treatment, storage, and/or disposal. This point is illustrated by the following examples, which also illustrate the effect of the rule on the resulting mixtures:

Example 1. Facility A generates F 001 listed spent solvents which it mixes with a solid waste that has Bevill exempt-status. The mixing occurs in a landfill.

The landfill is a regulated unit because hazardous waste—F 001—is being disposed in it. (Among other things, this means that the F 001 wastes could not be placed in the landfill until the LDR treatment standard is satisfied.) In addition, all of the wastes with which the F 001 wastes are mixed are hazardous wastes carrying the F 001 waste code by application of the mixture rule.

Example 1a. Same facts as in example 1, except that the waste being mixed is F 003 spent solvent, a waste listed only because it exhibits a characteristic of hazardous waste.

The landfill becomes a regulated unit for the same reason as in example 1. (See *Chemical Waste Management v. EPA,* 976 F.2d at 20 n.4 and 24 n. 10 (placement of waste which is hazardous for any amount of time in a unit subject that unit to Subtitle C regulation); 61 FR at 2352 (same). However, the status of the resulting waste mixture is determined by the principles for characteristic hazardous wastes, illustrated below.

Example 2. Facility B generates a characteristic ignitable solvent which it adds to a surface impoundment containing a Bevill-exempt waste that would exhibit the TC for lead. The resulting mixture exhibits TC for lead but is no longer ignitable.

The surface impoundment is a regulated unit, since it is engaged in treatment (elimination of the ignitability characteristic) and disposal (the placement of the ignitable waste). The remaining wastes in the unit retain their Bevill-exempt status because they do not exhibit the characteristic property of the non-Bevill hazardous waste. Thus, if the waste were to be removed from the impoundment and disposed elsewhere, disposal need not occur in a regulated unit.

Example 3. Facility C generates a characteristic hazardous waste exhibiting TC for lead which it mixes in a tank with Bevill-exempt wastes which also would exhibit the TC for lead. The resulting mixture continues to be TC for lead.

The tank is engaged at least in storage of hazardous waste, and possibly treatment (depending on how the D008 hazardous waste is affected by the mixing). If waste is removed from the tank, it remains subject to Subtitle C because it continues to exhibit the characteristic of the non-exempt hazardous waste.

d. Remining. The Agency clarified in its January 1996 proposal that the removal of historically land placed mineral processing wastes for the purposes of mineral recovery would not constitute disposal for purposes of triggering Subtitle C. Moreover, removal of wastes would not render the historic disposal unit subject to RCRA hazardous waste requirements (see 53 FR at 51444, December 21, 1988). The Agency is today again clarifying that removal of waste from a unit does not constitute disposal for the purposes of triggering Subtitle C regulation.

Commenters noted that the proposed mixture rule would in effect eliminate opportunities for remining. The Agency disagrees. As noted previously, the mixture restrictions in today's rule deals primarily with disposal of mixtures. The mixture rule therefore, will not affect the co-processing of historically disposed mineral processing secondary materials with other feedstocks.

6. Responses to Court Remands

a. Applicability of the Toxicity Characteristic Leaching Procedure (TCLP) to Mineral Processing Wastes. In the January 1996 proposal, the Agency proposed to continue using the TCLP (SW–846 Test Method 1311) as the basis for determining whether mineral processing wastes and manufactured gas plant wastes exhibit the toxicity characteristic (TC) of hazardous wastes, and developed a record supporting this position. When the Agency promulgated the TCLP method for testing whether wastes exhibit the toxicity characteristic, the applicability of the TCLP test to mineral processing wastes was challenged in *Edison Electric Institute* v. *EPA,* 2 F.3d 438 (D.C. Cir. 1993) ("*Edison*"). The Court held that the information in the record at the time was insufficient to show a rational relationship between the TCLP and a likely mismanagement scenario for mineral processing wastes.

Under the Court's holding, the Agency must at least provide some factual support that such a mismanagement scenario is plausible (2 F.3d at 446–47). The Agency is addressing this remand in today's final rule because any applicable land disposal restrictions would have little meaning unless the Agency has a basis for determining whether these mineral processing wastes are hazardous, and, therefore, subject to the restrictions.

Under the Court's ruling in *Edison,* the application of the TCLP test to mineral processing wastes is appropriate if the evidence available to EPA shows that disposal of such wastes in municipal solid waste landfills (MSWLF) is a "plausible" mismanagement scenario (not necessarily requiring that it be typical or common) 2 F.3d at 446. Moreover, it is sufficient if there is "evidence or explanation on the record to justify a conclusion that mineral wastes ever come into contact with any form of acidic leaching medium." *Id.* at 447.

In considering the plausibility of this mismanagement scenario, the Agency has first carefully evaluated those circumstances that industry has argued make such mismanagement implausible. Industry has argued that co-disposal with municipal solid waste is not plausible because the huge volumes in which the wastes are generated could simply not be handled by an MSWLF. EPA has, however, conducted a comprehensive review of such wastes and concluded that many wastestreams are generated at low volumes. (See

Characterization of Mining and Mineral Processing Wastestreams, USEPA, 1998.) Thus, the volumes in which mineral processing wastes are generated do not render disposal in an MSWLF implausible.

Industry comments also indicated that the location of its facilities were remote and not close to municipal landfills. Based on physical location alone, industry suggested that disposal of their wastes in municipal landfills was very unlikely. This contention is not, however, supported by the facts. The Agency evaluated the location of mineral processing facilities and found that a considerable number of them are located east of the Mississippi River and some are located in or near urban areas. (see *Population Studies of Mines and Mineral Processing Sites*, 1998, U.S. EPA.) This report indicates that there is factual information which rebuts the industry's position that the location of mineral processing facilities is routinely so remote so as to make co-disposal with municipal solid waste implausible. Thus, based on the Agency's population study noted above, the Agency concludes that some mineral processing facilities are in fact located in or near urban areas and their location in such urban areas means that it is plausible that their wastes could be disposed of in urban landfills.

Factual information collected by the Agency (made available for public comment) supports the conclusion that mineral processing wastes may plausibly be disposed of with municipal solid wastes. Industry comments contested EPA's factual basis for the landfill disposal cases found in *Applicability of the Toxicity Characteristic Leaching Procedure to Mineral Processing Waste*, U.S. EPA, 1998. Industry commenters contended that the cases presented by the Agency do not reflect current waste management practices (which primarily involve on-site disposal). Industry commenters also argued that the facts of particular cases did not, in fact, support the conclusion that co-disposal had occurred. EPA has reviewed the information and concluded some of these comments had merit, and EPA has deleted from the final document those cases for which there was not sufficient information to be relied upon by the Agency. However, even after a careful sifting of the case studies, there continues to be evidence to support the conclusion that co-disposal of mineral processing wastes with municipal solid waste is plausible. While most mineral processing wastes are generated in large volumes and disposed on-site as industry contends, the Agency has found that some mineral processing wastes are placed in dumpsters, or similar containers, and shipped off-site for commercial disposal.

These cases include, but are not limited to, co-disposal of mineral processing wastes from the refining of alumina, copper, gold, ferrous metals, lead, silver, and zinc. Such wastes have been disposed in MSWLFs in various states throughout the United States. The Agency also found several cases where manufactured gas plant wastes were disposed in MSWLFs. (See *Applicability of the Toxicity Characteristic Leaching Procedure to Mineral Processing Waste*, U.S. EPA, 1998.)

EPA acknowledges that the information obtained by the Agency does not show that the mismanagement scenario is either typical or common, but such a level of proof is not required. *Edison*, 2 F.3d at 446. It is, moreover, not surprising that the practice does not appear to be widespread because, since 1989, disposal of any non-Bevill hazardous mineral processing wastes in a municipal solid waste landfill has been illegal. Nonetheless, since some mineral processing facilities are located near urban areas and generate low volume wastes, and some of these facilities appear to have, in fact, co-disposed of these wastes in this manner, EPA believes it is reasonable to conclude that application of its mismanagement scenario to mineral processing wastes is reasonable; that is, if these wastes were no longer identified as hazardous by means of the TCLP, then the type of improper disposal which occurred in the past could resume.

Industry commenters further contend that an alternative test, the Synthetic Precipitation Leaching Procedure (SPLP), is more appropriate for mineral processing wastes. The National Mining Association (NMA) noted in its comments that the leach solution used in the SPLP test protocol would more accurately reflect the environmental exposure of mineral processing wastes. The SPLP test uses a leach solution which mimics acid rain, while the TCLP uses a leach solution which mimics acids formed in municipal landfills. The TCLP test therefore uses a leach solution which is more acidic that the SPLP test. However, "[n]othing in [RCRA] requires EPA to tailor the TCLP to the conditions to which mineral wastes are typically exposed." *Edison*, 2 F.3d at 443. If that were the case, it would not have been appropriate for EPA to even have adopted a generic mismanagement scenario as the basis for establishing its approach for testing for the hazardous characteristic. This approach has, however, been upheld as a reasonable exercise of the Agency's discretion. *Id.*

Industry commenters supplied data indicating that the TCLP is more aggressive than the SPLP for most metals and especially lead. Certain states supported use of the test under all or limited circumstances. EPA received very limited data comparing the leach tests. Because these data were extremely limited, the Agency still does not have data broadly comparing TCLP results to SPLP results for a range of mineral processing waste streams. Industry-supplied data appear to indicate that the SPLP test generates results which show lower levels of lead than comparable results using the TCLP. Thus, due to the limited amount of data, the Agency is unable to determine if the SPLP would routinely show lower levels of lead, or how the two tests compare when analyzing other metals or whether such lower levels would, in fact, better reflect actual field conditions than would the TCLP. At bottom, the fundamental issue is not whether one test is more conservative than the other. Rather, the issue is whether it is plausible that mineral processing wastes may be disposed of in environments reflected by the conditions mimicked in the TCLP.

Aside from the plausibility of the Agency's mismanagement scenario, application of the TCLP to mineral processing wastes is supported by comments from industry submitted during the rulemaking regarding disposal practices that are taking place or advantageous at integrated mineral processing/beneficiation facilities in the industry. The proposed (and now final) rule regarding mixtures of Bevill wastes with non-Bevill hazardous wastes (including mineral processing hazardous wastes) effectively prohibits such mixing. Some commenters opposed the proposed mixture rule on the grounds that integrated facilities typically co-dispose of hazardous mineral processing wastes (including those exhibiting the TC) with extraction and beneficiation wastes, and desired to continue this practice or to have mixing available as a management option for these mineral processing hazardous wastes. It is well-documented that extraction and beneficiation wastes can often generate highly acidic environments. (See Acid Rock Drainage Prediction, U.S. EPA, 1994) Disposal of mineral processing wastes with such wastes means that the mineral processing wastes would be subject to acidic conditions that, in some cases, may be comparable to the acidic leacheate medium utilized in the TCLP (if not somewhat more aggressive). This is because water contacting the acidic waste would thereupon become acidic itself (an example being acid mine drainage). EPA's concern is that if the mineral processing wastes are no longer identified as hazardous because a test other than the TCLP is used, then these wastes could be disposed with the acidic extraction/beneficiation wastes and be exposed to metal-mobilizing acidic leaching conditions as water percolates through the mixture. Given the evident economies noted in the public comments in disposing of mineral processing wastes along with extraction/beneficiation wastes, such a scenario is at least plausible. Such a disposal scenario, which industry states is not only plausible, but is typical of some facilities, provides an additional justification for the application of the acidic leachate approach reflected in the TCLP.

EPA recognizes that the TCLP utilizes organic acids, while the disposal scenario discussed above would involve exposure to mineral acids. In part because of this difference, EPA utilized the SPLP in screening low hazard wastes as part of its 1989 Bevill determination. See 54 FR 36592 (Sept 1, 1989). Commenters have pointed to this statement as undercutting any application of TCLP to mineral processing wastes.

EPA made clear in 1989, however, that the TCLP was still the appropriate test for determining whether a particular mineral processing waste is a hazardous waste subject to Subtitle C. Morever, EPA believes that the general statement contained in the 1989 preamble arguably swept too broadly in its conclusions. Notwithstanding that statement, standard chemistry texts establish that certain metals are highly soluble in acidic environments, including inorganic acids. Numerous factors can affect the precise solubility of a particular metal, and it is generally not possible to generalize whether organic or inorganic acids would cause more or less of a particular metal compound to solubilize. Based on generally accepted chemistry principles, however, a highly acidic environment, whether organic or mineral in nature, can be aggressive towards certain metals typically found in mineral processing wastes. Given that acidic leaching media can result when mineral processing wastes are co-disposed with extraction/beneficiation wastes, EPA believes that the acidic leachate procedure utilized in the TCLP can be appropriate for characterizing mineral processing wastes.

EPA also notes a further policy justification in its choice of the TCLP. The final rule seeks to encourage properly conducted recycling of mineral processing secondary materials, and the scheme in the final rule (whereby recovery can occur provided facilities do not utilize land-based storage units) can be implemented at reasonable cost. (See the Regulatory Impact Analysis for the final rule, summarized later in this preamble.) However, the Agency is concerned that if integrated facilities have a lower cost option of simply disposing these mineral processing secondary materials with extraction/beneficiation wastes, facilities will choose this alternative. Thus, not only will the mineral processing wastes be potentially exposed to acidic leaching conditions, but properly conducted metal recovery will be foregone. (See RCRA section 1003 (a) (6) noting the statutory goal to encourage properly conducted recycling of hazardous wastes.)

In addition to questioning the choice of a leaching medium, commenters questioned certain other features of the test, notably a particle size feature which mirrors freeze/thaw cycles, and a dilution/attenuation factor which is premised on human receptors potentially living relatively proximate to the disposal site. These issues are addressed in greater detail in responses to comments and technical background documents. However, the Agency has documented in the record that many mineral processing facilities are located in parts of the country where freeze/thaw cycles which reduce particle size occur, and are also located near populations reflecting the degree of dilution and attenuation used in the model. (See *Population Studies of Mines and Mineral Processing Sites,* 1998, U.S. EPA)

Finally, EPA notes that nothing in the recent decision *Columbia Falls Aluminum Co. v. EPA* (no. 96–1234) (April 3, 1998) is contrary to this determination. *Columbia Falls* does not stand for the proposition that EPA must customize a test for particular wastes to reflect individual or even typical disposal circumstances, a proposition expressly rejected in *Edison,* 2 F. 3d at 445. Rather, *Columbia Falls* approvingly cites *Edison* for the proposition that "the TCLP must bear some rational relationship to mineral wastes in order for the Agency to justify the application of the toxicity test to those wastes.' " *Columbia Falls,* slip op. at 18; see also *Huls America Inc.* v. *Browner,* 83 F. 3d 445, 454 (*Edison* involved an instance "where the record was barren of any rational relationship between the methodology used by the EPA to set regulatory levels and the known behavior of the substance to which this methodology was applied"). EPA has rectified the record deficiencies noted in *Edison,* showing how the TCLP "bears a rational relationship to the reality it purports to represent." *Columbia Falls,* slip op. at 18. Today's action is thus consistent with both *Edison* and *Columbia Falls.*

EPA is making the decision to retain the TCLP as the test for identifying mineral processing wastes effective within 90 days, co-extensive with the LDR prohibition effective date. This effective date can be complied with feasibly within 90 days since the TCLP is already the applicable test for mineral processing wastes (since it was remanded, not vacated, by the *Edison* ruling). Thus, the regulated community does not need six months to come into compliance. See RCRA section 3010(b)(1).

b. Remanded Mineral Processing Wastes. In the January 1996 proposal, the Agency proposed to revoke the current hazardous waste listings for five court-remanded smelting wastes. The Agency also proposed not to re-list them as hazardous stating that these wastes would be regulated as hazardous wastes if they exhibit a characteristic of a hazardous waste.

In 1980, the Agency listed as hazardous eight wastes generated by primary metal smelters (45 FR 33066, 33124, 47832–34, (1980)). The Agency listed the wastes pursuant to 40 CFR 261.11(a)(3) because they contained one or more of the hazardous constituents listed in 40 CFR 261, Appendix VIII. The eight wastes are described as follows:

K064—Acid plant blowdown slurry/sludge resulting from the thickening of blowdown slurry from primary copper production.
K065—Surface impoundment solids contained in and dredged from surface impoundments at primary lead smelting facilities.
K066—Sludge from treatment of process wastewater and/or acid plant blowdown from primary zinc production.
K067—Electrolytic anode slimes/sludges from primary zinc production.
K068—Cadmium plant leach residue (from oxide) from primary zinc production.
K088—Spent potliners from primary aluminum reduction.
K090—Emission control dust or sludge from ferrochromium-silicon production.
K091—Emission control dust or sludge from ferrochromium production.

In October of 1980, in response to Congressional enactment of the Bevill Exclusion, the Agency suspended its listing of the eight wastes (46 FR 4614–15, 27473 October, 1980). In 1985, EPA proposed a new rule that would relist six of the eight wastes (50 FR 40292, 40295, October 2, 1985). (The Agency chose not to propose to re-list two of the original eight waste streams (electrolytic anode slimes/sludges, K067, and cadmium plant leach residue, K068, from primary zinc production) because it found that industry was routinely recycling these secondary materials in an environmentally sound manner.) However, the Agency withdrew its 1985 proposal on October 9, 1986 (51 FR 36233).

In *Environmental Defense Fund v. EPA*, 852 F.2d 1316 (D.C. Cir. 1988) EPA was ordered to make a final decision regarding whether to re-list the six metal smelting wastes that it had proposed to list in 1985, and to reduce the scope of the Bevill exemption as it applies to mineral processing wastes. The Agency complied with this order when it re-listed the six wastes.

The American Mining Congress (AMC) challenged these listings. In *American Mining Congress v. EPA*, 907 F.2d 1179 (D.C. Cir., 1990) the Court upheld the Agency's decision to re-list waste K088, spent potliners from primary aluminum reduction, but found that the Agency's record for the five remaining waste streams did not adequately address certain issues raised in comments during the rulemaking. Since the Court did not vacate the listings, they technically remain in effect.

In today's rule, the Agency is revoking the five remanded waste listings. The Agency has found that several of these wastes are still generated and in some cases land disposed, but there is a lack of information demonstrating threats to human health or the environment that would justify a listing at this time. The Agency believe that some wastes, specifically copper acid plant blowdown (K064) and surface impoundment solids at primary lead smelters (K065), are inherently hazardous due to the presence of arsenic and lead, respectively. These wastes can be effectively regulated under RCRA Subtitle C if they exhibit a hazardous characteristic.

The Agency received no comments opposing the proposed rule. To summarize, the Agency is revoking the listing for, and is not re-listing: copper acid plant blowdown (K064); surface impoundment solids at primary lead smelters (K065); acid plant blowdown from primary zinc production (K066); emission control dust and sludge from ferrochromium-silicon production (K090); and emission control dust or sludge from ferrochromium production (K091). However, as explained previously, should these wastes exhibit a characteristic of a hazardous waste, they will be subject to hazardous waste regulations, including the hazardous waste mixture rule.

c. Lightweight Aggregate Mineral Processing Wastes. In the January 1996 proposal, the Agency proposed that air pollution control dust and sludge from the production of lightweight aggregate be classified as a mineral processing waste that is no longer eligible for the Bevill exemption. Lightweight aggregate air pollution control (APC) dust and sludge were among the many mineral processing wastes made conditionally exempt from RCRA Subtitle C requirements under the 1980 Bevill Amendment to RCRA. In 1990, following more detailed study of the generation rates for this waste, the Agency determined that it did not qualify for the Bevill exemption (55 FR 2322, 2340, January 23, 1990). In 1991, the D.C. Circuit directed the Agency to reconsider, after providing notice and soliciting comments, whether these wastes qualify for the Bevill exemption. (*Solite Corporation v. EPA*, 952 F.2d at 500 (D.C. Cir. 1991)).

In the January 1996 proposal, the Agency stated that the wastes from lightweight aggregate production do not meet the high volume criterion for excluded mineral processing wastes. For purposes of EPA's 1989 and 1990 rules concerning Bevill eligibility for mineral processing wastes, high volume is defined as greater than 45,000 metric tons per year per facility, for a solid waste, or 1,000,000 metric tons per year per facility, for a liquid waste, averaged across all facilities generating a particular waste.

To determine whether APC dust and sludge from lightweight aggregate production satisfied the high volume criterion, the Agency analyzed data from its 1989 National Survey of Solid Wastes from Mineral Processing Facilities (SWMPF Survey) and data from public comments submitted by affected companies. The Agency finds that the lightweight aggregate wastes do not meet the high volume criterion.

None of the methods used resulted in a volume estimate that is greater than 45,000 metric tons per year per facility, the high volume criterion for mineral processing wastes. SWMPF survey data, which includes Confidential Business Information (CBI) from two facilities have been included in a separate analysis. The results, which remain confidential, are not substantially different from the results presented previously.

Solite acknowledged in comments that data do not support a determination that lightweight aggregate air pollution control (APC) dust and sludge is generated in volumes that meet the high volume cutoff. However, Solite requested that the Agency delay making a final determination on the Bevill status of its wastes due to other Agency rulemaking activities dealing with cement kiln dusts, which Solite contends would be addressing similar issues to those posed by lightweight aggregate air pollution control (APC) dust and sludge.

The Agency is aware that both cement kiln and aggregate kilns may both burn hazardous wastes fuels and that the dusts from air pollution control devices are often blended into final products. Under existing regulations, if these dusts resulting from burning listed hazardous waste fuels are blended into products that are used on the land, the product would be subject to RCRA's "derived from" rules which would render the product a hazardous waste. Since both cement and light weight aggregate products are usually placed on the land, the potential impacts on their use could be significant. The Agency noted in its 1993 *Report to Congress on Cement Kiln Dust* (CKD) that it did not have evidence that CKD was materially different when generated from kilns burning hazardous wastes as fuel and those which did not. The Agency does not have similar comparable analysis of light weight aggregate dusts and sludges, and can not at this point in time conclude that there is no difference between dusts and sludges from units burning hazardous waste fuels and those that do not. The Agency wants to encourage the sound recycling of these dusts and requires additional time to assess how to ensure that aggregate and cement kiln dusts are managed to ensure protection of human health and the environment. The Agency is currently developing a regulatory program for the safe management of cement kiln dusts and anticipates issuing a proposed rule in 1998. The Agency further anticipates that it will seek comment on how to best manage both wastes in this proposal and will seek information it needs to make a final determination on the status of lightweight aggregate wastes. The Agency is not finalizing its technical background document, *Lightweight Aggregate Production and Air Pollution Control Wastes* (1995), at this time.

d. Mineral Processing Wastes From the Production of Titanium Tetrachloride. (i) Summary. In 1989, following a study of this waste's circumstances of generation, the Agency determined that titanium tetrachloride waste acid did not qualify for the Bevill exemption because it was a mineral processing waste, not an extraction/beneficiation waste, and did not meet the high volume/low hazard criteria for determining eligibility for the Bevill exemption. (See 54 FR 36592, September 1, 1989.) One producer of titanium tetrachloride, DuPont, requested a determination that waste from its production process be categorized as beneficiation waste on the ground that, unlike processes used by other manufacturers, their process included a beneficiation step which generated the wastes at issue. However, EPA determined that DuPont's waste acids were mineral processing wastes. DuPont challenged this decision, and the Court remanded EPA's decision for further consideration on the grounds that the Agency's explanation for its decision was unclear. *Solite Corporation* v. *EPA*, 952 F.2d 473,494–95 (D.C. Cir. 1991).

DuPont submitted comments on the January 1996 proposal that contend its processes do not destroy the structure of the mineral as it is placed into its processes. The Agency does not accept this contention, and, as described below, finds that the waste iron chloride acid is a mineral processing wastes.

There are four sequential steps in DuPont's chloride-ilmenite process, the first two of which occur within the same vessel: (1) chlorine gas reacts with iron from the ilmenite ore to form iron chloride gas; (2) chlorine gas reacts with titanium in the ilmenite ore to form titanium tetrachloride gas; (3) the iron chloride is condensed and separated to form a waste iron chloride acid; and finally (4) the titanium tetrachloride is condensed and processed to form titanium oxide pigment, the saleable product. The issue remanded in *Solite* is whether the iron chloride acid waste, which is produced in gaseous form at step (1) but removed from the vessel as a liquid at step (3), is a mineral processing waste that does not qualify for the Bevill exemption, or is a beneficiation waste covered by the Bevill exclusion under 40 CFR 261.4(b)(7).

(ii) Proposal. In the January 1996 proposal, the Agency proposed that iron chloride waste acid from the production of titanium tetrachloride be classified as a mineral processing waste that is not eligible for the Bevill exemption. In the chloride-ilmenite production of titanium tetrachloride, the Agency found that mineral processing began with the chlorination of the iron in the ilmenite ore and the resulting acid is a waste from mineral processing. Specifically, the Agency found that the acid wastes from this process are not physically or chemically similar to the feedstocks entering the operation, which is indicative that mineral processing has occurred.

(iii) Response to Comments. One commenter agreed with EPA's proposed conclusion that Du Pont's process is properly classified as mineral processing because the reaction of ilmenite ore with chlorine gas forms new chemical compounds, namely titanium tetrachloride and ferric or ferrous chloride. The commenter remarked that such a reaction is a chemical processing step that fundamentally alters the make-up of the feedstock ore. The commenter said that EPA correctly drew the analogy between the mineral processing that occurs in the chloride-ilmenite operation and the mineral processing that occurs in other metallurgical operations.

One commenter noted that no beneficiation occurs in the chloride-ilmenite process at all and that the iron chloride waste stream is not eligible for the Bevill exemption. The commenter said that it too produces a waste iron chloride acid in the production of titanium tetrachloride but its waste acid is neutralized in a waste treatment unit. The commenter provided data showing that its treatment of waste iron chloride acid meets all proposed Land Disposal Restrictions (LDR) treatment standards for underlying hazardous characteristics.

DuPont objected to the Agency's proposed classification. DuPont claims that the removal of iron from the ilmenite ore is more appropriately classified as beneficiation. DuPont remarked that the separation of the iron chloride from the titanium ore grains results in a beneficiated ore, similar in nature to commercially available beneficiated ores that EPA has determined are Bevill exempt. The Agency disagrees with this characterization, and concludes that since the ore is chlorinated, that chlorination step changes the physical and chemical structure of ore. The Agency's rationale for this decision is discussed below.

The Agency reiterates its broad standard for making mineral processing determinations described in 54 Fed. Reg. 36592, 36616, September 1, 1989. Specifically, beneficiation operations typically serve to separate and concentrate the mineral values from waste material, remove impurities, or prepare the ore for further refinement. Beneficiation activities do not, however, change the chemical structure of the ore. Mineral processing operations, in contrast, generally follow beneficiation and serve to change the concentrated mineral value into a more useful chemical form and change the chemical composition of the waste. In contrast to beneficiation operations, processing activities often destroy the physical structure of the incoming ore or mineral feedstock such that the materials leaving the operation do not closely resemble those that entered the operation. Typically, beneficiation wastes are earthen in character, whereas mineral processing wastes are derived from melting or other chemical changes.

Today, the Agency again finds that DuPont's chloride-ilmenite operation is mineral processing. In DuPont's process, chlorine gas is reacted with the iron in the ore in the first step to produce a new and significantly different chemical compound than the feedstock ore, namely liquid waste iron chloride acid. The iron is more than simply removed; the solid iron in the ore undergoes a chemical reaction with the chlorine gas to form a new compound that is highly reactive and non-earthen in character, namely iron chloride gas. This reaction is the beginning of a significant change to the physical and chemical structure of the ore. This change is similar to the reaction of chlorine gas with solid titanium to form titanium tetrachloride gas. The Agency finds that the net result of the reaction of chlorine gas with both iron and titanium, which occur in the same vessel, destroys the physical and chemical nature of the ore.

DuPont contends that the formation of iron chloride gas is simply a process to remove an impurity from the ore. DuPont noted in its comments that activities which remove impurities from ores and minerals are classified as beneficiation and all wastes from beneficiation are exempt from regulation under RCRA Subtitle C (see 40 CFR 261.4). DuPont therefore contends that their processes are in fact beneficiation and should not be classified as mineral processing.

As noted earlier, the Agency clarified the definition of beneficiation and mineral processing in its 1989 rulemaking. That rule clearly indicated that beneficiation serves to remove impurities as long as the resultant materials remained earthen in nature and had not undergone a physical/chemical change. The Agency studied the DuPont process numerous times and met with the company several times to assure that the Agency fully understood DuPont process. The Agency concludes that chlorination of the ore causes a significant physical/chemical change to the ore, and therefore the process is more indicative of mineral processing than beneficiation. Further, in the DuPont case, the removal of impurities is taking place simultaneously with other reactions generating titanium gases. This reaction alone would classify the process as mineral processing since the ore and titanium gas are clearly physically and chemically dissimilar from that point on in the process. The Agency stated in 1989 that once mineral processing began, all wastes generated after that point would be classified as mineral processing wastes, even those wastes which are similar to those generated in beneficiation.

Thus, all wastes associated with the chloride-ilmenite production of titanium tetrachloride are mineral processing wastes. They are neither high volume nor low toxicity and therefore are not eligible for the Bevill exemption.

VII. LDR Treatment Standards for Soil

This section discusses final regulations establishing land disposal treatment standards specific to contaminated soil. Contaminated soil is subject to the land disposal restrictions, generally, when it contains a listed hazardous waste or when it exhibits a characteristic of hazardous waste. (Throughout this discussion, the specific term "hazardous contaminated soil" refers to soil which contains a listed hazardous waste or exhibits a characteristic of hazardous waste; the more general term "contaminated soil" refers to both hazardous contaminated soil and other soils—such as decharacterized soil—which may be subject to the land disposal restrictions.) Prior to today's rule, contaminated soil subject to LDRs was subject to the same land disposal restriction treatment standards that apply to industrial hazardous waste: soil contaminated by listed hazardous waste was subject to the standards that apply to those listed wastes and soil that exhibited a characteristic of hazardous waste was subject to the same standards that apply to the characteristic waste. Today's final rule establishes a new treatability group—contaminated soils—and establishes land disposal restriction treatment standards specifically tailored to that treatability group. Although EPA believes generators of contaminated soil will typically choose to comply with the new soil treatment standards promulgated today, under today's final rule, they have the option of complying either with the existing treatment standards for industrial hazardous waste (i.e., the universal treatment standards) or the soil treatment standards. This is consistent with the approach the Agency took in promulgating LDR treatment standards for hazardous contaminated debris. 57 FR 37221, August 18, 1992.

EPA first proposed tailored land disposal restriction treatment standards for contaminated soil in September 1993. 59 FR 48122—48131 (September 14, 1993). In the September 1993 proposal, EPA requested comment on three soil treatment standard options. These three options involved various combinations of percent reduction requirements for hazardous constituents (typically ninety percent—90%) and multipliers of the universal treatment standards (typically ten times the UTS—10 x UTS). In response to comment on the September 1993 proposal, EPA deferred a final decision on soil treatment standards to the Agency's broader evaluation of application of RCRA requirements to remediation wastes, the Hazardous Waste Identification Rule for Contaminated Media, or HWIR-Media.

On April 29, 1996, as part of the HWIR-Media proposal, EPA again proposed tailored land disposal restriction treatment standards for contaminated soils. 61 FR at 11804 (April 29, 1996). In the April 29, 1996 proposal, soil-specific treatment standards would have required reduction in concentrations of hazardous constituents by 90% with treatment for any given constituent capped at ten times the universal treatment standard. *Id.* This is commonly referred to as "90% capped at 10 times UTS."

In 1995, 1996 and 1997, EPA proposed new land disposal restriction treatment standards for waste identified as hazardous because of metal content and for mineral processing wastes. 60 FR 43654 (August 22, 1995) for metal wastes; 61 FR 2338 (January 25, 1996) for mineral processing wastes; and, 62 FR 26041 (May 12, 1997) supplemental proposal for both types of waste. In these proposals, soil contaminated with metal or mineral processing waste would have been subject to the new treatment standards for those wastes. This was consistent with the way EPA had historically addressed contaminated soil and, at the time, considered proper given that the proposals to establish soil-specific treatment standards were not yet resolved.

EPA did not reopen the issue of whether LDRs apply to contaminated soil or whether it is appropriate to require that contaminated soil achieve the same LDR treatment standards as the contaminating waste (soil contaminated by listed waste) or the characteristic property (soil that exhibits a characteristic of hazardous waste) in the August 22, 1995, January 25, 1996, or May 12, 1997 proposals. Commenters, nonetheless, strongly opposed application of the new LDR treatment standards for metal and mineral processing wastes to soil contaminated with those materials. At about the same time, EPA decided to go forward with the soil-specific LDR treatment standards proposed in April 1996. Therefore, the Agency is promulgating the land disposal restriction treatment standards tailored to contaminated soils proposed on April 29, 1996 (i.e., 90% capped at 10xUTS) today, with the new LDR treatment standards for metal and mineral processing wastes. The soil-specific treatment standards promulgated today may be applied to any contaminated soil that is restricted from land disposal, including but not limited to soil contaminated by metal and mineral processing wastes.

The land disposal restriction treatment standards for contaminated soil promulgated today differ from the standards proposed on April 29, 1996 in three major ways. First, the Agency proposed that the soil treatment standards would be available only for contaminated soil that was managed under an approved cleanup plan (termed a remediation waste management plan, or RMP). In today's final rule, the Agency is making the soil treatment standards available for all contaminated soil that is restricted from land disposal. Second, the Agency proposed that, for soil contaminated by listed hazardous waste, treatment would be required only for the hazardous constituents that originated from the contaminating listed hazardous waste. When the soil treatment standards are used, today's final rule requires all hazardous contaminated soil, including soil contaminated by listed hazardous waste, to be treated for each underlying hazardous constituent reasonably expected to be present when such constituents are initially found at concentrations greater than ten times the universal treatment standard. Third, in response to comments asserting that the proposed regulations governing the applicability of LDRs to contaminated soils were difficult to understand, the Agency has reformatted these regulations into an easier-to-read table. These changes, as well as other significant issues associated with the soil treatment standards and responses to comments, are discussed below.

Today's promulgation of land disposal restriction treatment standards specific to contaminated soil is largely based on the April 29, 1996 proposal (62 FR at 18804–18818). It also relies on the Agency's first effort to establish soil-specific treatment standards, the LDR Phase II proposal (58 FR 48092, September 14, 1993). Today's action resolves the portions of the April 29, 1996 and September 14, 1993 proposals that address land disposal restriction treatment standards for contaminated soil. However, other elements of the April 29, 1996 proposal remain open and will be acted on in a future rulemaking. Responses to comments submitted on the soil treatment standards proposals are included in the Soil Treatment Standards Response to Comments Background Document, available in the docket for today's action.

A. Application of Land Disposal Restriction Treatment Standards to Contaminated Soil and Justification for Soil Specific LDRs

Prior to today's rule, soil that contained listed hazardous waste or exhibited a characteristic of hazardous waste were prohibited from land disposal unless they had been treated to meet the treatment standards promulgated for pure industrial hazardous waste. This means the same treatment standards which apply to a pure, industrial hazardous waste were also applied to contaminated soil. 61 FR at 18804 (April 29, 1996) and other sources cited therein. In most cases then, contaminated soils were subject to the treatment standards listed in 40 CFR 268.40, and the associated treatment standards in 40 CFR 268.48(a) table Universal Treatment Standards (UTS).[14]

As EPA has discussed many times, the treatment standards developed for pure, industrial hazardous waste may be unachievable in contaminated soil or may be inappropriate for contaminated soil due to particularities associated with the soil matrix and the remediation context under which most contaminated soil is managed, as discussed below. For that reason, EPA is promulgating today's LDR treatment standards specifically tailored to contaminated soil and to the remedial context.

With respect to the soil matrix, the treatment standards developed for pure hazardous waste (i.e., the universal treatment standards) are generally either technically unachievable or technically or environmentally inappropriate. For metal constituents, the UTS may not be achievable in contaminated soil even using model technologies such as stabilization or high temperature metal recovery. Stabilization technologies are sensitive to soil characteristics such as the presence of oxidizing agents and hydrated salts, the distribution of soil particle size and the concentrations of sulfate and chloride compounds. Various combinations of soil characteristics can impair the effectiveness or rate of reaction in stabilization technologies. For example, insoluble materials, such as materials that will pass through a number 200 mesh sieve, can delay setting and curing during stabilization, or small soil particles can coat larger soil particles weakening bonds between particles and cement or other reagents. High temperature metal recovery technologies may not be appropriate for some contaminated soil given the low concentrations of metals that might be present in the soil. In addition, clay and silt content in some soil matrices may add undesired impurities to the metal concentrates or alloys that are formed during high temperature metal recovery. Although EPA has data showing that some soils can be treated to the existing universal treatment standards for metals using stabilization[15] and high temperature metals recovery, the Agency continues to believe that tailored soil treatment standards are appropriate for metal contaminated soil to ensure that the wide variety of soils can be effectively treated to meet the treatment standards. In addition, the soil treatment standards will have the added environmental benefit of encouraging greater use of innovative soil treatment technologies such as soil or enhanced soil (acid) washing. See, Proposed BDAT Background Document for Hazardous Soils, August 1993; Technical Resource Document: Solidification/Stabilization and its Application to Waste Materials, EPA/530/R–93/012, June 1993; and, Technology Screening Guide for Treatment of CERCLA Soils and Sludges, EPA 540/2–88/004, September 1988.

For soil contaminated with organic constituents, EPA has noted many times that, notwithstanding the fact that such soils can be treated by combustion to meet the universal treatment standards, it is generally unsuitable or impractical from a technical standpoint to combust large volumes of mildly contaminated soil. See, for example, 55 FR at 8760 and 8761 (March 8, 1990) and 61 FR 18806–18808 (April 29, 1996). In addition, the Agency has documented potential difficulties that may arise from the combustion of soil due to soil/contaminant characteristics that affect incineration performance such as the concentrations of volatile metals, the presence of alkali salts, fine particles of soils such as clays and silts, and the ash fusion point of the contaminating waste. For example, operation of an incinerator at or near the waste ash fusion temperature can cause melting and agglomeration of inorganic salts; the loading of clays and silts in some soils may also result in high loadings of particulate matter in flue gases. Proposed BDAT Background Document for Hazardous Soils, August 1993 and Technology Screening Guide for Treatment of CERCLA Soils and Sludges, EPA 540/2–88/004, September 1988.

With respect to the remedial context, EPA, the states, and the regulated and environmental communities have long recognized that application of the LDR treatment standards developed for pure, industrial hazardous waste to contaminated soil can be counterproductive. See, for example, "Hazardous Waste: Remediation Waste Requirements Can Increase the Time and Cost of Cleanups' U.S. General Accounting Office, GAO/RCED–98–4, October 1997. Application of LDRs developed for pure, industrial hazardous waste to contaminated soil often presents remediation project managers with only two choices: pursue a legal option of capping or treating hazardous contaminated soil in place thereby avoiding a duty to comply with LDRs, or excavate the soil and treat it to the full extent of best demonstrated available technology, usually, for organic constituents, incineration. EPA has found that this situation often creates an incentive to select remedies that minimize application of LDRs (e.g., remedies that involve capping or leaving untreated soil in place) a result obviously not contemplated by Congress in enacting the LDR program.[16] 62 FR at pages 64505–64506 (Dec. 5, 1997) and 61 FR at 18808 (April 29, 1996) and other sources cited therein.

Because of the differences between the remedial context (responding to wastes which have already been released to the environment) and

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[14] The exception is when waste contaminating soil is subject to a specified treatment method; in that case, the contaminated soil would also be subject to the specified treatment method.

[15] These soil treatment data have been claimed as confidential business information.

[16] As discussed in the April 29, 1996 proposal, EPA has, in the past, justified the existing treatment standards, in part, because they create an incentive to generate less of the affected waste in the first instance. See, Steel Manufactures Association v. EPA, 27 F.3d 642, 649 (D.C. Cir. 1994). In the remedial context, the waste is already in existence; therefore waste minimization is not an issue. Thus, application of the current LDR treatment standards to remediation waste can have the perverse effect of creating an incentive to avoid "generating" waste by leaving it in the ground. The Agency believes that the goals of remediation are better served by more aggressive remedial approaches, such as excavation and management (including some degree of treatment) of remediation wastes, that generally result in more permanent remedies. Such approaches should, therefore, be encouraged.

regulation of wastes generated by ongoing industrial process (preventing wastes from being released into the environment in the first instance), EPA has rejected the conclusion that treatment standards for soil must be based upon the performance of the "best" demonstrated available treatment technology in the way the Agency has historically interpreted these terms. Instead, the Agency has chosen to develop soil treatment standards that can be achieved using a variety of treatment technologies which achieve substantial reductions in concentration or mobility of hazardous constituents and, because they are generally used to treat contaminated soils in remedial settings, do not present site managers with the type of dilemma described above. As EPA has long maintained, the strong policy considerations that argue for using the traditional BDAT analysis as the basis for LDR treatment standards for hazardous wastes generated by ongoing industrial operations do not apply when evaluating BDAT in the remedial context. In the remedial context, for example, waste minimization is not an issue and the additional increment of treatment necessary to achieve traditional BDAT may yield little if any environmental benefit over other treatment options that adequately protect human health and the environment. 54 FR 41568 (October 19, 1989). Indeed there is a legitimate question as to whether a technology whose use results in foregoing other substantial environmental benefits (such as more aggressive, permanent remedies) can be considered a "best" technology. *Portland Cement Association* v. *Ruckelshaus*, 486 F. 2d 375, 385–86 at n. 42 (D.C. Cir. 1973); Essex Chemical Corp. v. Ruckelshaus, 486 F. 2d 427, 439 (D.C. Cir. 1973). This issue was discussed fully in the April 29, 1996 proposal and in a number of other EPA documents, see, for example, 54 FR 41568 (October 19, 1989) and 61 FR at 18808 (April 29, 1996) and other sources cited therein.

The soil treatment standards promulgated today will significantly improve management of contaminated soil and remediations that involve contaminated soil. However, the Agency emphasizes that today's rule does not resolve the larger, more fundamental issues associated with application of RCRA Subtitle C to remediation generally. The Agency maintains that additional reform is needed to address, more fundamentally, the application of certain RCRA subtitle C requirements to all remediation wastes, including contaminated soil. The Agency will continue to participate in discussions of potential legislation to promote this additional needed reform. If legislation is not forthcoming, the Agency may reexamine its approach to remediation waste management, including the soil treatment standards.

B. Detailed Analysis of Soil Treatment Standards

All land disposal restriction treatment standards must satisfy the requirements of RCRA section 3004(m) by specifying levels or methods of treatment that "substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from that waste so that short-term and long-term threats to human health and the environment are minimized." As EPA has discussed many times, the RCRA Section 3004(m) requirements may be satisfied by technology-based standards or risk-based standards. This conclusion was upheld in Hazardous Waste Treatment Council v. EPA, 886 F.2d 355, 362–64 (D.C. Cir. 1989), where technology-based LDR treatment standards were upheld as a permissible means of implementing RCRA Section 3004(m) provided they did not require treatment beyond the point at which threats to human health and the environment are minimized. Today's treatment standards for contaminated soils are primarily technology-based; however, a variance from the technology-based standards is allowed when EPA or an authorized state makes a site-specific determination that threats posed by land disposal of any given volume of contaminated soil are minimized at higher concentrations.

1. Technology Basis for Soil Treatment Standards

The land disposal restriction treatment standards for soil require that concentrations of hazardous constituents subject to treatment be reduced by ninety percent (90%) with treatment for any given constituent capped at ten times the universal treatment standard (10 X UTS). In other words, if treatment of a given constituent to meet the 90% reduction standard would reduce constituent concentrations to less than 10 X UTS, treatment to concentrations less than 10 X UTS is not required. This is commonly referred to as "90% capped by 10xUTS."

As first discussed in the September 14, 1993 proposal, the Agency has not used the statistical methods historically used in the land disposal restriction program to establish the soil treatment standards. In the past, the Agency has typically evaluated treatability data to identify the "most difficult to treat" waste and established treatment standards based on a statistical analysis of data from the best demonstrated available treatment technology for that waste. See, for example, 55 FR 26594 and 26605, June 23, 1989. While the existing regulations allow treatment using any technology that will satisfy the treatment standards, the practical impact of that approach is that treatment using the most aggressive treatment technology available (i.e., for organic constituents, destruction of organic constituents based upon the performance of incineration) is often necessary to achieve the treatment standards.

For contaminated soil, the Agency has chosen to establish technology-based soil treatment standards at levels that are achievable using a variety of common remedial technologies which destroy, remove or immobilize substantial amounts of hazardous constituents. 58 FR 48129 (September 14, 1993). The levels chosen—90% reduction capped at 10 X UTS—are within the zone of reasonable levels the Agency could have selected as treatment standards for contaminated soil.

Soil treatability data from EPA's Soil Treatment Database indicate that the soil treatment standards are achievable and that the Agency has selected a reasonable level of performance for the standard. After screening the Database to eliminate data from tests reflecting poorly designed or operated treatment, tests where EPA believes inappropriate technologies were applied (for example, data from "immobilization" of organic constituents), and other inappropriate data, the Agency was left with 2,541 data pairs representing treatment of eighty hazardous constituents including nine BDAT list metals.[17] EPA then analyzed these data to determine if the soil treatment standards could be reliably achieved using demonstrated soil treatment technologies. Based on this analysis, the Agency concluded that the soil treatment standards can be reliably achieved using a variety of available soil treatment technologies. The Agency concluded that the soil treatment standards can be reliably achieved using: biological treatment, chemical extraction, dechlorination, soil washing, stabilization and thermal desorption. Of course, since soil treatment is generally matrix dependent, the exact treatment technology which

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[17] A complete discussion of the Agency's method for screening the Soil Treatment Database can be found in the LDR Phase II proposal (58 FR 48129–48131, September 14, 1993) and the Best Demonstrated Available Technology Background Document for Hazardous Soil (August 1993).

Table 11.19.2-2 (English Units). EMISSION FACTORS FOR CRUSHED STONE PROCESSING OPERATIONS[a]

Source[b]	Total Particulate Matter	EMISSION FACTOR RATING	Total PM-10[c]	EMISSION FACTOR RATING
Screening (SCC 3-05-020-02,-03)	—[d]		0.015[e]	C
Screening (controlled) (SCC 3-05-020-02-03)	—[d]		0.00084[e]	C
Primary crushing (SCC 3-05-020-01)	0.00070[f]	E	ND[g]	
Secondary crushing (SCC 3-05-020-02)	ND		ND[g]	
Tertiary crushing (SCC 3-05-020-03)	—[d]		0.0024[h]	C
Primary crushing (controlled) (SCC 3-05-020-01)	ND		ND[g]	NA
Secondary crushing (controlled) (SCC 3-05-020-02)	ND		ND[g]	NA
Tertiary crushing (controlled) (SCC 3-05-020-03)	—[d]		0.00059[h]	C
Fines crushing[j] (SCC 3-05-020-05)	—[d]		0.015	E
Fines crushing (controlled)[j] (SCC 3-05-020-05)	—[d]		0.0020	E
Fines screening[j] (SCC 3-05-020-21)	—[d]		0.071	E
Fines screening (controlled)[j] (SCC 3-05-020-21)	—[d]		0.0021	E
Conveyor transfer point[k] (SCC 3-05-020-06)	—[d]		0.0014	D
Conveyor transfer point (controlled)[k] (SCC 3-05-020-06)	—[d]		4.8×10^{-5}	D
Wet drilling: unfragmented stone[m] (SCC 3-05-020-10)	ND		8.0×10^{-5}	E
Truck unloading: fragmented stone[m] (SCC 3-05-020-31)	ND		1.6×10^{-5}	E
Truck loading--conveyor: crushed stone[n] (SCC 3-05-020-32)	ND		0.00010	E

[a] Emission factors represent uncontrolled emissions unless noted. Emission factors in lb/ton of material throughput. SCC = Source Classification Code. ND = no data.

[b] Controlled sources (with wet suppression) are those that are part of the processing plant that employs current wet suppression technology similar to the study group. The moisture content of the study group without wet suppression systems operating (uncontrolled) ranged from 0.21 to 1.3 percent and the same facilities operating wet suppression systems (controlled) ranged from 0.55 to 2.88 percent. Due to carry over or the small amount of moisture required, it has been shown that each source, with the exception of crushers, does not need to employ direct water sprays. Although the moisture content was the only variable measured, other process features may have as much influence on emissions from a given source. Visual observations from each source under normal operating conditions are probably the best indicator of which emission factor is most appropriate. Plants that employ sub-standard control measures as indicated by visual observations should use the uncontrolled factor with an appropriate control efficiency that best reflects the effectiveness of the controls employed.

[c] Although total suspended particulate (TSP) is not a measurable property from a process, some states may require estimates of TSP emissions. No data are available to make these estimates. However, relative ratios in AP-42 Sections 13.2.2 and 13.2.4 indicate that TSP emission factors may be estimated by multiplying PM-10 by 2.1.

VIRGINIA MATERIALS

SANDBLASTING ABRASIVES AND EQUIPMENT

New report from NIOSH shows that Silica Sand is not the only bad abrasive!

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Virginia Materials and Supplies, Inc is a manufacturer of sandblasting abrasives for the professional sandblaster, including Crystalgrit (hematite), Black Blast (coal slag), Glassgrit (recycled glass), Brownblast (Andradite Garnet) and a distributor of other abrasives, equipment, and accessories for the ***Marine, Industrial and Commercial*** abrasive blasting industry. Originally established in 1958, we are the largest, most efficient, friendliest supplier of sandblasting media in the United States. With two plants located in Norfolk and Chesapeake, Virginia we can easily supply the professional sandblaster throughout the United States.

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You can reach us Monday through Friday from 7 AM to 5 PM EST by calling us, faxing us, e-mailing us, paging us, or even snail-mailing (you remember the old Postal Service) us! For after hours emergencies such as delivery problems or cancellations call our regular number to reach our duty supervisor - you may have to let it ring awhile to wake'em up!

Telephone:

- 757-855-0155
- 757-857-5631 (FAX)

Postal Address:

- 3306 Peterson Street, Norfolk, VA 23509-2415

Email:

- General information: info@sandblaster.com
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TOC

test

Beneficial Reuse Program

Handling spent abrasives with common sense and the environment in mind!

It has come to our attention in recent years that disposing of the spent abrasive is frequently almost as costly as actually buying the grit. In order to help customers with this problem, Virginia Materials has come up with a solution that not only helps our customers but also helps to preserve the environment.

Instead of disposing of the spent grit in landfills, as is customary, Virginia Materials accepts spent grit from our customers. After collecting and screening the grit to ensure the removal of all oversize trash we ship it to a portland cement manufacturer as a feed stock. The cement company superheats this raw material to a molten state (2600° F) along with other materials and uses it to make clinker, which is then ground up and used to produce portland cement. Thus, our customers no longer need to take up precious landfill space with tons of waste grit which can be better used to make a useful end product, which will probably itself be recycled, as concrete is almost infinitely recyclable these days. This also reduces the use of our natural resources by cutting into the use of precious minerals that would have been used.

Another benefit of this beneficial reuse plan is that the waste grit is safely disposed of in a manner whereby it will never become a problem and be traced back to the generator, as can happen with land filling. Such as could be the case in a "Superfund Site" with liability to everyone who disposed of something in it - hazardous or not! This plan is heartily endorsed by the Department of Environmental Quality Waste Division authorities and by all customers who have taken advantage of it. Virginia Materials is fully licensed by the State of Virginia as a material recovery facility.

To view our full program download this Adobe Acrobat file - Beneficial Reuse Program

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Virginia Materials & Supplies, Inc.

General Information

About Sandblasting Abrasives:

Even if you've never sandblasted before, you can figure this one out. These charts are designed to help you figure out the best abrasive for your needs. Use these and the information contained in our Products page to bring you up to speed on what to use and why. We have also compiled a comparison of "cleaning rates" of some of the more common abrasives.

About Sandblasting Equipment:

Use this chart to help you determine the right size nozzle and air compressor for your job (hint: figure out which abrasive you're going to use first!). Get the most out of your abrasive and your equipment. Use the information contained in this chart and our products page to help you find the absolute best fit -- abrasives, equipment, and accessories. Customize your sandblasting to fit your job needs.

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Examples of cleaning rates of some common abrasives:

Abrasive	Consumption	Production Rate	Comments
Silica Sand 16/40 mesh	2.6 lbs/sq/ft	4.75 sq/ft/min	1.5 mil profile Dusty
Coal Slag 12/40 mesh	3.2 lbs/sq/ft	3.83 sq/ft/min	2.5 - 3 mil profile Medium dust and embeddment
Steel Grit #40	5.5 lbs/sq/ft	3.06 sq/ft/min	2.5 mil profile No dust, but high embeddment
Garnet #36	3.6 lbs/sq/ft	3.55 sq/ft/min	1.5 mil profile Medium dust and embeddment
Aluminum Oxide #36	3.1 lbs/sq/ft	4.58 sq/ft/min	1.5 mil profile Very little dust
Staurolite 50/100 mesh	3.1 lbs/sq/ft	4.85 sq/ft/min	.5 mil profile medium dust
Copper Slag 16/40 mesh	3.1 lbs/sq/ft	4.36 sq/ft/min	2 mil profile Medium dust and embeddment
Brown Blast 16/50 mesh	1.5 lbs/sq/ft	3.0 sq/ft/min	3 mil profile Medium dust and embeddment
Glass Grit 8/40 mesh	2.8 lbs/sq/ft	3.33 sq/ft/min	4 mil profile Medium dust and embeddment
Crystalgrit 20/70 mesh	1.5 lbs/sq/ft	5.97 sq/ft/min	3 - 4 mil profile Very low dust and embeddment

The above numbers were derived from tests by Virginia Materials and others including SSPC. All testing was done with a #6 (3/8") nozzle at 100 PSI and blasting to a SSPC 10 (near white finish) on new steel with mil scale only.

Many, many, many factors contribute to the consumption and production rates of abrasive blasting and your results may be very different from the above. This is only for comparison purposes to show the **typical differences** between materials.

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Society of Toxicology Abstract

The following abstract was displayed via poster presentation at the March 1999 Society of Toxicology meeting:

Persistent Pulmonary Inflammation After Intratracheal Instillation of Abrasive Blasting Agents

N. S. Minhas, L. A. Battelli, D. W. Porter, T. Goldsmith, A. Dotson, W. Jones, M. Greskevitch, J. Ma, and A. F. Hubbs. HELD and DRDS, NIOSH, CDC, Morgantown, WV

Toxicological Sciences. 48(1 Suppl): 1-465. (March, 1999)

Use of silica sand in abrasive blasting is associated with pulmonary disability due to silicosis. However, the pulmonary toxicity of substitutes for silica sand in abrasive blasting remains incompletely investigated. Therefore, Sprague Dawley rats received a single intratracheal instillation (IT) dosage of 2.5 or 10 mg of the respirable fractions of abrasive blasting agents collected from the air during blasting of a steel bar. Four weeks post-IT, the right lung lobe was lavaged to isolate bronchoalveolar lavage cells and acellular bronchoalveolar lavage fluid (BALF); the left lung was processed for histopathology. Polymorphonuclear leukocyte (PMN) cell yield and alveolar macrophage (AM) chemiluminescence (CL) were significantly increased above control levels in rats instilled with coal slag (2.5 and 10 mg), silica sand (10mg), staurolite (10mg), and treated sand (10mg). Rats which received garnet (10mg) also had increased PMN numbers versus control but AM CL was not increased. Lactate dehydrogenase (LDH) was significantly elevated in the BALF of rats instilled with coal slag (2.5 and 10 mg), garnet (2.5 and 10 mg), silica sand (2.5 and 10 mg), staurolite (10 mg) and treated sand (10 mg), whereas BALF albumin was not increase in any of the exposed rats versus control. Hydroxyproline was significantly elevated over saline controls only in the rats receiving coal slag (10 mg). However, trichrome stained lung sections show focal to multifocal, minimal fibrosis in 6 of 6 silica exposed rats (10 mg) and 3 of 6 coal slag exposed rats (2.5 and 10 mg). **Only specular hematite (iron oxide) failed to increase some measure of pulmonary toxicity.**

For more about specular hematite see Crystalgrit

Note: "Toxicology Science" (Medical Journal) is expected to publish the full article in early 2001.

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Beneficial Reuse Program

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Another benefit of this beneficial reuse plan is that the waste grit is safely disposed of in a manner whereby it will never become a problem and be traced back to the generator, as can happen with land filling. Such as could be the case in a "Superfund Site" with liability to everyone who disposed of something in it - hazardous or not! This plan is heartily endorsed by the Department of Environmental Quality Waste Division authorities and by all customers who have taken advantage of it. Virginia Materials is fully licensed by the State of Virginia as a material recovery facility.

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Recycled Sandblast Grit

Description

This technology incorporates spent sandblast grit into asphalt and concrete. The sand-sized grit is substituted for portions "blender sand" that normally go into these aggregates. During ship cleaning operations, large quantities of spent sandblasting material are generated. The material generally contains low concentrations of metals from the paints, anti-fouling compounds, and other coatings that are applied to ship hulls. In the past, much of this spent abrasive sand-blasting material has been disposed in landfills - in some instances it has been used as fill material on the shoreline.

Limitations and Concerns

Spent abrasive sandblasting material may contain a variety of materials that are not suitable for recycling. These may contain extremely toxic biocides and anti-fouling compounds.

There is a concern that the contaminants may leach out of the asphalt or concrete. The material to be recycled must be well characterized, and leach tests measuring the full range of contaminants must be incorporated into any recycling activity. Most state regulations require leach tests for only a relatively small number of contaminants.

Applicability

This technology is used to recycle hazardous waste derived from surface cleaning operations.

Technology Development Status

The Navy has conducted two recycling projects. A series of concrete test strips were produced to determine if they comply with California EPA policy on waste recycling into construction materials. The test strips had good physical integrity and met the California EPA TTLC and STLC criteria (total threshold limit concentration and soluble threshold limit concentration, respectively) for total and soluble metals content.

Web Links

http://enviro.nfesc.navy.mil/ps/projects/sandblst.htm

Other resources

None have been identified.

For a list of other technologies that contain these properties click the **'SEARCH'** button.

○ **(AND)** Match all words ● **(OR)** Match any words	○ **(AND)** Match all words ● **(OR)** Match any words	○ **(AND)** Match all words ● **(OR)** Match any words
Contaminant	**Media**	**Technology**
☐ Fuel ☐ Organics/VOC ☐ Organics/SVOC ☐ Pest/Herbicides ☐ Metals ☐ Radionuclides ☐ Explosives-UXO ☑ Not Specific	☐ Off-gas ☐ Ground Water ☐ Surface Water / Sed. ☐ Soil ☐ Landfill Materials ☑ Bldg. Surfaces	☐ Analytical/ACM ☐ In-Situ Treatment ☐ Removal ☑ Treatment/Destruct. ☐ Containment
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Go back to the... **TECH CHART** | **TECH LIST** | **ABOUT PAGE** | **MAKE COMMENTS**

This page was last updated AUGUST 24, 1998
DISCLAIMER** The following technology description has not been updated since it was created in 1998. Please be aware that some information may be outdated. We are currently in the process of reviewing the web site for revision. If you have any comments/questions or are interested in donating resources to help expedite the revision process please contact
Tony Chenhansa at tonyc@cpeo.org

NFESC Environmental Department

Recycling Sandblasting Grit

The U.S. Navy generates spent abrasive blasting material (ABM) as a result of its ship-cleaning operations. The spent ABM generally contains low concentrations of metals from the paints, antifouling compounds, and other coatings that are applied to ship hulls. In the past, much of this spent ABM has been disposed in landfills - nonhazardous waste landfills for spent ABM having very low metal concentrations and hazardous landfills for spent ABM containing relatively high metal contents. However, landfill disposal is being scrutinized because of rising costs, land ban restrictions imposed by -the Resource Conservation and Recovery Act (RCRA), and the growing emphasis on waste minimization.

Spent ABM is a good candidate for recycling in asphalt concrete or other composites because its textural characteristics are compatible with those of the composites. Also, it was shown in a previous study that certain spent ABM does not respond well to the stabilization/ solidification technology used to insolubilize the metallic constituents.

NFESC has conducted two recycling projects, one at NCBC Port Hueneme, CA and one at NS Treasure Island, Hunters Point Annex (HPA). The ABM to be recycled was first characterized, then used as a "blender sand" for a portion of the sand-sized aggregate that normally goes into the production of asphalt concrete. A series of concrete test strips were produced for testing. The objective of the demonstrations was to determine if the resulting asphalt concrete product complies with California EPA policy on "Use Constituting Disposal" for waste material recycling into construction materials. The asphalt test strips were found to have excellent physical integrity and easily met the California EPA TTLC and STLC criteria for total and soluble metals content.

For further information, please send an email to our Information Liaison.

Return to the previous page.

Questions or comments? Send an e-mail to the 40 pagemaster.
Last updated: Wednesday, August 09, 2000 10:33 AM

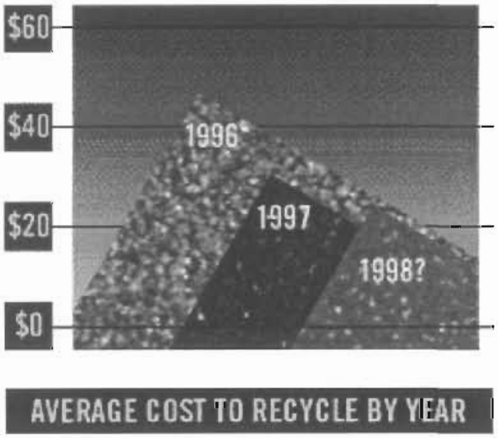
RECYCLING SERVICES

Minerals Research & Recovery, Inc. (MR&R) has from the onset pioneered the use of spent slag abrasives into the manufacturing process of cement clinker. Recently, at the request of many customers wanting to lower their recycling costs, MR&R has become an active participant in the process.

During the manufacturing of cement clinker the spent slag abrasive is completely incorporated into the clinker. There is no more slag available in its original form. This is truly the final step. From ore, to slag, to abrasive, to clinker, the cycle is complete.

MR&R's intent when we became involved directly with our customer's to recycle their spent Sharpshot was to lower their skyrocketing costs. MR&R fully investigated the situation and contacted the local cement plants and trucking companies. MR&R has succeeded in lowering the costs substantially and we intend to keep it that way!

RECYCLING COST COMPARISON – $ PER TON



Sandblasting Abrasives | Sandblasting Equipment | Spent Abrasive Recycling | Roofing Granules

INDEX

Have any needs we can help you with?

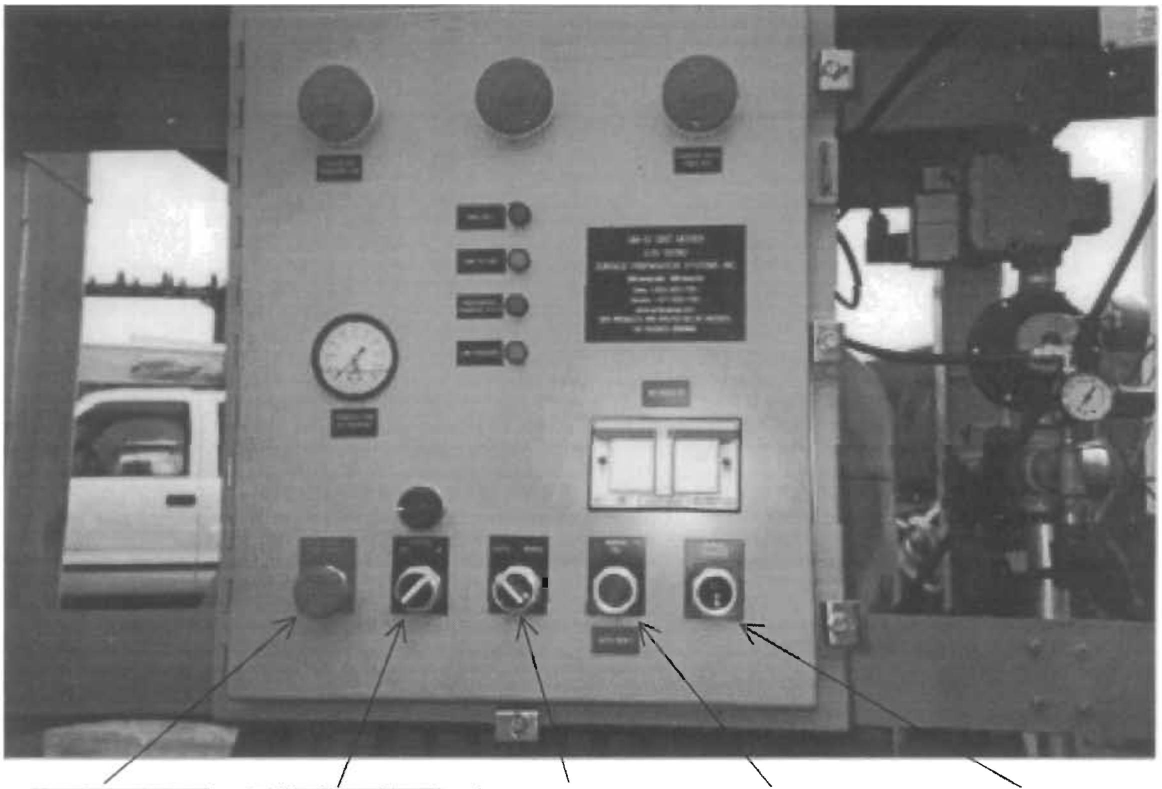
Please feel free to contact:

smehlman@mrrinc.com

Minerals Research & Recovery, Inc.

4620 S. Coach Drive | Tucson, Arizona 85714

Phone 520.748.9362 | Fax 520.748.9364 | 800.875.0776



Pump "Kill" push button

Power on/off

Manual or automatic set switch

Manual fill

Manual discharge

Simple to use control panel for the "Grit Mover"

1. Connect the discharge line between the mover and the silo
2. Connect the power and air supplies to the Grit Mover
3. Remove grit mover top
4. Set a bin on the top and open the bin valve
5. Turn the power to on and set the next switch to automatic

The machine does the rest. About every 10 minutes the fork truck operator sets another bin on top and opens the bin valve. When he has transferred as many bins as desired he turns the power button off. Removes the last bin and sets the Grit Movers top in place.

Virginia Materials
3306 Peterson Street
Norfolk, VA 23509
757-855-0155 – Fax 757-857-5631 – www.sandblaster.com

United States
Environmental Protection
Agency

Office of Research [illegible]
Development
Washington, DC 20460

EPA/625/R-94/004
September 1994

EPA

Handbook

Recycling and Reuse of Material Found on Superfund Sites

Chapter 4
Product Quality Specifications

Recycled materials are commodities in a competitive marketplace. Recycling is most successful where the supplier is aware of the needs of the end user. The end user is best served by a reliable supply of material conforming to an established specification. Given the variability of wastes, uniformity seldom is achieved but should be approached as closely as possible.

The volume of material available influences its recycling potential. Larger volumes of uniform material generally are more desirable. In a few special cases, however, the waste material inventory can exceed the short-term demand. Sudden appearance of a large supply in a small market depresses the value of the potentially recyclable material.

A few waste types may be profitable to recycle. Aluminum and copper metal demolition debris can be recycled profitably if sufficient volumes of clean material are available. In most cases, significant onsite processing is needed, or a processor requires a fee to accept waste as a feedstock to an offsite recycling process.

4.1 Feed Material to Petroleum Refining

Petroleum hydrocarbons recovered at Superfund or Resource Conservation and Recovery Act (RCRA) Corrective Action sites by nonaqueous-phase liquid (NAPL) pumping (Section 3.9), thermal desorption (Section 3.5), solvent extraction (Section 3.6), or other processes often require additional processing to produce a marketable petroleum product. When materials are suitable, a conventional refinery can efficiently carry out processing. This section outlines some of the key properties for determining the suitability of recovered petroleum for upgrading by conventional refinery separation processes.

The main consideration for successful refinery distillation (Section 3.1) is the difference in volatility of the components. A low boiling point mixture can be distilled at low temperature to reduce the complexity and cost of the still. When the component to be recovered is much more volatile than the contaminants, distillation can be accomplished with simple equipment.

The thermal properties (heat capacity, heat of vaporization, thermal conductivity, and heat transfer coefficient) of the material also are important. Low heat capacity and heat of vaporization indicate that low heat input is required to affect the distillation. High thermal conductivity and high heat transfer coefficient indicate that heating the waste can be accomplished with relative ease.

The physical properties must be compatible with pumping and heating the waste. A tendency to produce foam, indicated by a high surface tension, is undesirable. A waste containing high concentrations of suspended solids can form a dense, viscous sludge and clog distillation columns. High-viscosity materials are difficult to process. Organics that tend to form polymers can polymerize, clogging the column or coating the heat transfer surfaces (1).

To simplify distillation and maximize product quality, the waste solvent streams should be segregated as much as possible. Separating chlorinated from nonchlorinated and aliphatic from aromatic solvents is particularly beneficial (2).

4.2 Organic Chemicals

Organic liquids and gases can be recovered from soils by processes such as thermal desorption (Section 3.5), solvent extraction (Section 3.6), or NAPL pumping (Section 3.9), or can be produced from solid materials by chemolysis (Section 3.15) or thermolysis (Section 3.17). These organic fluids are then marketed as feedstock for refineries or chemical plants. Onsite recovery of petroleum from RCRA K wastes is occurring more frequently (3, 4). For onsite recovery of plant wastes, the source of the material is known, so less documentation is needed to gain plant acceptance of the recovered feedstock.

Use of materials recovered from offsite sources raises concerns for chemical processors. Small quantities of certain impurities can poison catalysts, increase corrosion, or generate acidic off-gas. Because even small amounts of the impurities are potentially damaging, satisfactory demonstration of acceptable quality requires sophisticated sampling and analysis (5). Particularly undesirable contaminants include metals and chlorine (6). Refineries and chemical processors also require low suspended solids levels and ash content (7).

4.3 Thermoplastic Particulate

Thermoplastic particulate can be re-extruded into new products (Section 3.14). American Society for Testing and Materials (ASTM) Standard Guide D 5033, "The Development of Standards Relating to the Proper Use of Recycled Plastics," provides definitions of terms, describes four general types of plastic recycling, and outlines factors important in developing standards for recycling plastic. The Standard Guide notes that, unless an existing standard specifically restricts the use of recycled plastic based on performance standards, recycled plastic can be used as feedstock. Specifically mentioning recycled plastic in the specification is unnecessary. ASTM Standard Specification D 5033, "Polyethylene Plastics Molding and Extrusion Materials From Recycled Postconsumer (HDPE) Sources," defines and specifies recycled postconsumer high-density polyethlene (HDPE) chips or pellets for molding and extrusion.

The polymer type and purity control the value of the particulate. The best candidates for reuse are single polymer types containing no impurities. Mixtures of different types of polymers, polymers containing coloring, solid additives, or impurities are much less valuable.

The properties vary substantially among the seven major polymer categories—polyethylene-terephthalate (PET), high-density polyethylene (HDPE), polyvinyl chloride (PVC), low-density polyethylene (LDPE), polypropylene (PP), polystyrene (PS), and all others. Even within a single category, polymers can have significantly different properties. For example, HDPE polymers with different molecular weights have different properties and applications. The low-molecular-weight, low-viscosity, injection-molded base cup for soft drink bottles is not interchangeable with the high-molecular-weight, high-viscosity material used in milk bottles (8). Achieving a finer separation of resin types increases the value of the recycled thermoplastic.

The price for granulated plastic typically is higher to adjust for the cost of granulation. However, users often accept only baled plastics to enable verification of impurity levels. The typical desired levels for nonplastic contaminants are either no metals or less than 3 percent nonplastic (9).

4.4 Rubber Particulate

Tires and similar rubber goods are composed mainly of polymers, carbon black, and softeners. The softeners are primarily aromatic hydrocarbons. The typical composition of a tire casing is 83 percent total carbon, 7 percent hydrogen, 2.5 percent oxygen, 1.2 percent sulfur, 0.3 percent nitrogen, and 6 percent ash (10).

Of the 278,000,000 tires discarded in 1990, about 34.5 percent were recycled, with the reuse options being retreading (13.7 percent), energy recovery (9.4 percent), fabricated products (4.3 percent), export (4.3 percent), asphalt (0.9 percent), and miscellaneous (1.9 percent) (10). Some energy recovery applications consume whole tires. Tires also can be cut into shapes or strips to make sandals, floor mats, washers, insulators, or dock bumpers (11).

For most reuse options, however, the tires must first be reduced to particulate. Particulate may be used to fabricate new rubber products or to make asphalt, or particulate can be burned to produce energy. The success of recycling and most appropriate reuse applications depends on the particle size and particle size distribution; the strength, elasticity, impurity content, and other properties; and the cost of the particulate produced.

Rubber particulate can be used to fabricate athletic field surfaces, carpet underlayment, parking bumpers, and railroad crossing beds (Section 3.16). Fine particulate rubber for these applications is produced by mechanical grinding with an abrasive or by cryogenically fracturing the material after cooling it in liquid nitrogen. Steel or fabric is separated from the rubber fragments by magnetic and/or gravity separation. The quality of the reclaimed rubber is lower than that of newly manufactured rubber because aging and treatment in the recycling process reduce elasticity.

In asphalt concrete, ground tire rubber replaces some of the aggregate in asphalt (Section 3.16). Section 1038 of the Intermodal Surface Transportation Efficiency Act of 1991 (Public Law #102-240) includes provisions to increase the number of tires used in asphalt for highway pavement.

Discarded tires are shredded to 2-in. and smaller chips for use as a fuel (Sections 3.2 and 3.3). The typical heating value is 32,500 kJ/kg (14,000 Btu/lb) for whole tire chips or 36,000 kJ/kg (15,500 Btu/lb) for steel-free tire chips. When used as fuel in cement kilns, iron from the tire belts and beads supplements the iron required for cement making. For other furnace types, the wire pieces from belts and beads are undesirable; the wires clog furnace feed equipment and generate ash. With the exception of cement kilns, most furnaces that use shredded tire fuels require dewired rubber particulate. Processing to remove the metals is commercially feasible but increases the cost of tire-derived fuel particulate.

4.5 Fuels for Energy Recovery

Substituting waste materials for fuel is an approach frequently applied to recover value from the waste (Sections 3.2 and 3.3). The ideal energy recovery fuel should be as similar to conventional fuels as possible. Most conventional boilers are fueled with coal, oil, or gas. ASTM D-396, "Standard Specification for Fuel Oils," divides fuel oils into grades based on suitability for specific burner types. The specification places limiting values on properties such as flashpoint, pour point, water and sediment content, carbon residue content, ash content, vaporization characteristics, viscosity, density, corrosivity, and nitrogen content. ASTM D-388, "Classification of Coal by Rank," describes classifications of coal based on factors such as carbon content, gross heat content, and agglomeration characteristics.

A high proportion of carbon and hydrogen present as organic compounds, low water content, and low ash content are the ideal conditions for a fuel material. High water content wastes heat due to the energy removed in the combustion gas by the heated water. High ash content increases the complexity of bottom ash and fly ash handling in the boiler. Specific impurities bring other possible complications. The presence of halogenated solvents in the fuel is highly undesirable because the combustion process produces acidic vapors.

Various impurities can volatilize, increasing the complexity of air pollution control requirements. High concentrations of volatile metals (arsenic, cadmium, lead, selenium, and mercury) may cause excessive concentrations of these metals to enter the combustion gases. Nonvolatile metals remain in the ash and may cause unacceptable levels of leachable metals. Halides, nitrogen, phosphorus, or sulfur can react to form corrosive gasses. Halides in the waste can combine with metals such as lead, nickel, and silver, forming volatile metal halides (12). Highly toxic chlorinated organics such as polychlorinated biphenyls (PCBs) or pesticides require high combustion temperatures and high destruction efficiencies (13).

The viscosity of liquid fuels is an important physical parameter. Liquid waste must be amenable to atomization at acceptable pressures. Liquids with a dynamic viscosity less than 10,000 standard Saybolt units (SSU) are considered pumpable. The optimum viscosity for atomization is about 750 SSU (13).

Pulp and paper making require significant energy input. To conserve resources, heat typically is supplied by onsite boilers burning wood waste (hog fuel). Hog fuel shows substantial variations in heat content and moisture. Because the hog fuel boilers are designed to feed solid wood and operate with varying quality feed, they can use solid waste materials such as broken pallets or rubber particulate more easily than conventional utility boilers can (10).

Off-specification production batches or outdated explosives contain chemical energy that can be recovered. For example, the approximate heating values of trinitrotoluene (TNT) and research department explosive (RDX) are 15,000 to 9,000 kJ/kg (6,460 and 3,900 Btu/lb), respectively (14). The use of energetic materials as fuel raises three main issues.

- The reactivity of the energetic materials must be accounted for in the design of fuel-handling and burning systems. Either the material must be dissolved in fuel oil to eliminate the possibility of explosion or the furnace must be designed to contain the largest possible explosion. TNT and RDX have low solubility in fuel oil and typically are dissolved in a solvent, such as toluene, before being mixed with fuel oil (14).
- Energetic materials contain more bound nitrogen than typical fuels, increasing the quantity of nitrogen oxide (NO_x) generated during combustion. The furnace off-gas treatment system may require special provisions to curtail or treat NO_x.
- Explosives dissolved in fuel oil increase viscosity. As discussed above, viscosity is a key parameter in the selection and design of the fuel oil atomizing nozzle. Up to limits imposed by reactivity, TNT does not significantly increase the viscosity of No. 2 fuel oil. A viscosity increase due to the addition of TNT to No. 6 fuel oil, however, is significant and may be more limiting than reactivity constraints (14).

4.6 Metals for Reuse

Site cleanup activities such as storage tank removal, building demolition (Section 3.36), and transformer disassembly (Section 3.37) can produce bulk metals for reuse. Iron, steel, aluminum, and copper shapes can be recycled through existing scrap recovery channels. The Institute of Scrap Recycling Industries (15) provides guideline specifications for nonferrous scrap, including copper, brass, bronze, lead, zinc, aluminum, magnesium, nickel, copper-nickel alloys, and stainless steel. These guidelines describe minimum metal content, maximum impurity levels, density, surface contamination, and other physical conditions defining various grades of metal scrap. For example, more than 30 categories of aluminum scrap are described.

For recycling of bulk metal from demolition, surface contaminants such as welds, rust, scale, paint, or coatings generally are acceptable. Hazardous contaminants must be removed, however (16). Mixtures of alloy types of the same metal also reduce value. Paradoxically, very expensive specialty stainless steels or aluminum alloys may be less valuable in the recycling market than low-alloy materials; the added alloying metals are viewed as impurities in the recycling process.

4.7 Metal-Containing Sludge or Slag for Feed to Secondary Smelters

Waste materials at Superfund or RCRA Corrective Action sites may contain a sufficiently high concentration of metals to be suitable for processing in a smelter (Section 3.31). Lower-concentration wastes may be amenable to processing by another method (e.g., physical separation [Section 3.33] or chemical leaching [Section 3.29]/precipitation [Section 3.18]) that would produce a smaller volume of residual with a metals content high enough to warrant smelting. The metal types and concentrations, matrix properties, and impurities control the suitability of wastes for processing in secondary smelters. The typically desired minimum concentrations of six metals for secondary smelters are indicated in Table 4-1.

The waste matrix also may contribute constituents needed to form slag. The main slag-forming components are silica, iron, and calcium. A waste matrix with high thermal conductivity is desirable. High thermal conductivity indicates that the matrix can be heated more quickly and uniformly (19).

Impurities that volatilize or react to form volatile products increase the complexity and expense of off-gas treatment. Examples include mercury, arsenic, nitrates, sulfates, sulfides, phosphates, and halides. Mercury and arsenic are amenable to pyrometallurgical processing but require special off-gas treatment provisions (1). Except for arsenic in lead battery alloys, arsenic- and mercury-containing materials are incompatible with most existing secondary smelters in the United States.

Pyrometallurgical processing relies on partitioning of different metals to vapor, slag, and molten metal phases to form purified products. Impurities that partition to the same phase as the target metal are undesirable. Incompatibilities are process specific. Volatile metals such as arsenic and antimony tend to contaminate the zinc oxide product fumed from a waelz kiln. Silver and bismuth are difficult to separate from lead in secondary refining because they tend to remain in the metal rather than partition to the slag.

Alkaline metals such as sodium and potassium decrease the viscosity and increase the corrosiveness of slag formed in a pyrometallurgical reactor. Excessive levels of alkaline metals increase the difficulty in controlling slag properties and may cause the slag to damage the reactor lining (20).

Table 4-1. Approximate Feed Concentration Requirements for Secondary Smelters (13, 17, 18)

Metal	Approximate Minimum Concentration for Pyrometallurgical Recovery
Cadmium	2%
Chromium	5%
Copper	30%
Lead	55%
Nickel	1.3%
Zinc	8%

4.8 Waste Feed to Hydrometallurgical Processing

Hydrometallurgical processes, such as acid leaching (Section 3.29), precipitation (Section 3.18), reverse osmosis (Section 3.21), or ion exchange (Section 3.19) are not highly selective. The difficulty of recovering products from mixed metal wastes increases as the number of metal contaminants present increases. Segregating spent processing solutions greatly enhances their compatibility with recycling processes. The waste stream should not be mixed or diluted. The highest concentration of metal possible should be maintained (21).

Typical parameters of interest for hydrometallurgical processing include calcium, cadmium, chromium, copper, iron, mercury, magnesium, nickel, phosphorus, lead, tin, zinc, organic content, color, smell, acid insolubles, moisture, cyanide, and filtration rate. Organics interfere with chemical leaching and many of the solution processing techniques used to recover metals from the leaching solution. Organic contaminants in wastes to be treated by hydrometallurgical methods should, therefore, be minimized (19). The speciation of the metal contaminants in the waste is an important factor. The valence state and counter ion affect the ability to dissolve the metal. Chelating agents or metal complexing anions can greatly increase the difficulty of recovering metals from solutions (22). Wastes with high pH and high alkalinity are difficult to treat by acid leaching due to the high consumption of acid by the reserve alkalinity.

4.9 High-Value Ceramic Products

Some waste streams can be treated at high temperature to produce valuable ceramic products (Section 3.30). For example, vitrified waste can be fritted to make abrasives, cast from a melt, or formed and sintered into products such as bricks or architectural dimension stone. The waste also may be converted to a frit for use as feed material in the manufacture of ceramics. Ceramic materials are products manufactured by high-temperature treatment of raw materials of mainly earthy origin. The main components of ceramics are silicon, silica, and/or silicate. The variety of possible products includes:

- *Structural clay products,* which include burned clay products such as brick, roof tile, and ceramic tile and pipe.
- *Refractories,* which include special materials for high-temperature applications such as kiln-lining bricks, high-temperature insulation materials, and castable refractories.
- *Abrasives,* which include particulate material (along with any supporting materials and binders) used for cutting, grinding, or polishing; common abrasives are fused alumina, silicon carbide, silica, alumina, and emery.

- *Architectural products,* which include decorative and structural ceramics such as brick, blocks, patio stones, wall and floor tile, art pottery, and chemical and electrical porcelain.
- *Glass products,* which include vitreous silicate products such as window glass, container glass, and glass fibers.
- *Porcelain enamel products,* which include products with a ceramic coating on a metal substrate such as sink and bathroom fixtures, architectural panels, and specialty heat and chemical-resistant equipment.

A variety of organizations publish specifications for ceramic feed materials or products. Example sources of specifications for ceramic products include ASTM, the American National Standards Institute, the U.S. Navy (MIL-A-22262(SH) for sandblasting media), and the Steel Structures Painting Council (SSPC-XAB1X for mineral and slag abrasives).

4.10 Inorganic Feed to Cement Kilns

Manufacture of hydraulic cement, a conventional building material, offers possibilities for recycling of contaminated waste materials (Section 3.32). Making hydraulic cement requires a significant input of energy and raw materials. Opportunities exist for input of nonhazardous metals-contaminated solids to cement kilns. Of particular interest to the recycling of metals-contaminated waste is the need for silica, iron, and alumina.

In raw material grinding, the input materials are ground so that 75 to 90 percent of the material passes through a 0.074-mm (2.9 in.) (200-mesh) sieve. The grinding may be done either wet or dry. In wet milling, water is added with the mill feed to produce a slurry containing about 65 percent solids.

Specifications for limestone feed for cement making require that the calcium carbonate ($CaCO_3$) content be greater than 75 percent and the magnesium carbonate ($MgCO_3$) content be less than 3 percent. Because the raw materials must be finely ground, chert nodules or coarse quartz grains are undesirable (23).

ASTM specifies five basic types of Portland cement. Type I is intended for use when the special properties of the other types are not required. Type IA is for the same uses as Type I where air entrainment is desired. Air entrainment is a technique to improve freeze/thaw resistance of the concrete and reduce the mix viscosity without increasing water addition. Type II also is a general-use cement but offers increased sulfate resistance and lower heat generation. Type IIA is similar to Type II but is intended for use where air entrainment is desired. Type III is formulated to maximize early strength production. Type IIIA is the air entrainment version of Type III. Type IV is intended for use where the heat generation must be minimized. Type V is for use when sulfate resistance is desired. The main constituents of Portland cement typically are tricalcium silicate (C_3S), dicalcium silicate (C_2S), tricalcium aluminate (C_3A), and tetracalcium aluminoferrite (C_4AF).

The U.S. production of Portland and masonry cement in 1991 was about 70,000,000 metric tons (77,000,000 tons). Portland cement makes up 96 percent of the total U.S. cement output. Types I and II account for about 92 percent of Portland cement production.

4.11 Cement Substitute

Use as a cement supplement or substitute is a viable option for some fly ash and slag wastes (Section 3.7). Fly ash is used in large quantities to stabilize sulfate sludge, and it can replace cement in construction applications. Construction applications require selection of fly ash that is low in sulfate impurity and consists of small, generally spherical particles. Spherical particles act to reduce the mix viscosity and thus allow preparation of concrete with less water addition (25). In mass concrete pours, excessive temperature increases may occur due to the heat of hydration released as the concrete sets. Replacement of some cement by a pozzolan can reduce the generation of this heat. Fly ash addition also can be valuable in reducing heat generation (26).

Slag cooled with sufficient speed to retain a largely vitreous structure exhibits cementitious properties when hydroxide activators are present. Blast furnace slag from iron production is the most commonly used slag pozzolan, but other types are used if they contain limited quantities of free calcium oxide (CaO) or magnesium oxide (MgO). Free alkaline earth oxides may reduce strength due to delayed hydration. Steel-making slags are reportedly poor candidates due to their high calcium content (26). However, magnesium slags are reported to be good candidates (27). In waste solidification/stabilization treatment, replacing some cement with blast furnace slag provides reducing power to help hold metals in a less mobile chemical state (28).

Portland cement is the most commonly used type of hydraulic cement. Recent environmental regulations and increased energy costs have increased the cost of cement making, which has increased the attractiveness of substituting slag pozzolans for conventional cement (29). Blended cements are available and may be used to reduce costs or for special purposes.

The U.S. Environmental Protection Agency (EPA) has developed guidelines to assist agencies in the procurement of cements and concretes that contain fly ash (40 CFR Part 249). Subpart B of this guide describes the development of the guide and contract specifications to allow use of cement containing fly ash, as well as provides specific recommendations for material specifications. For cement, these recommendations are:

- ASTM C 595—Standard Specification for Blended Hydraulic Cements.
- Federal Specification SS-S-1960/4B—Cement, Hydraulic, Blended.
- ASTM C 150—Standard Specification for Portland Cement and Federal Specification SS-C-1960/General (appropriate when fly ash is used as a raw material in the production of cement).

For concrete, these recommendations are:

- ASTM C 618—Standard Specification for Fly Ash and Raw Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
- Federal Specification SS-C-1960/5A—Pozzolan for Use in Portland Cement Concrete.
- ASTM C 311—Standard Methods of Sampling and Testing Fly Ash and Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete.

Subpart C describes recommended approaches to bidding and price analysis. Subpart D describes recommended certification procedures including measurement, documentation, and quality control.

4.12 Aggregate and Bulk Construction Materials

Sand and slag wastes can be used directly for various construction purposes (Section 3.7). Other inorganic wastes can be vitrified to produce rock-like materials (Section 3.30). The main requirements in using waste materials as aggregates or bulk materials are regulatory acceptance, customer acceptance, and performance. The waste material must meet the required leach resistance criteria and provide some useful function in the product; the end use should not be simply disposal in another form. Even if regulatory requirements are met, construction companies and local citizens are reluctant to accept the use of waste materials. Therefore, leach resistance and durability testing may be required beyond those specified in the regulations; the reused waste should meet the performance requirements of new materials. Some sources of information on performance of aggregate and construction materials are outlined below.

Aggregate is a mineral product from natural or manufactured sources used in concrete making. The specifications for fine and coarse aggregate are described in ASTM 33. The important features of aggregate are size grading; freedom from deleterious materials such as clay lumps, friable particles, and organic materials; and soundness.

The alkali reactivity of the cement and aggregate is an important factor in selecting an aggregate. The concern is reaction of an alkali with the aggregate, causing a volume increase and/or loss of concrete strength. The alkali causing the reaction usually is the calcium hydroxide released as the cement cures. In some cases, however, the alkali may come from external sources, such as ground water. There are two basic types of alkali-aggregate reactions:

- Reaction of alkali with siliceous rocks or glasses.
- Reaction of alkali with dolomite in some carbonate rocks.

Some waste slags can exhibit excessive reactivity. For example, four zinc smelter slag samples tested by Oklahoma State University were found to be unsuitable as aggregate for Portland cement because of excessive expansion during curing caused by alkali aggregate reactions (30).

One of several tests can determine the alkali activity of a potential aggregate, depending on the type of aggregate to be tested. The applicable tests or guides are ASTM C 227, "Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)"; ASTM C 289, "Potential Reactivity of Aggregates (Chemical Method)"; ASTM C 295, "Petrographic Examination of Aggregates for Concrete"; ASTM C 342, "Standard Test Method for Potential Volume Change of Cement-Aggregate Combinations"; and ASTM C 586, "Potential Alkali Reactivity of Carbonate Rocks for Concrete Aggregates (Rock Cylinder Method)." Guidance for selecting the appropriate test method is given in ASTM C 33, "Standard Specification for Concrete Aggregates."

Coarse aggregate for bituminous paving mixtures is specified in ASTM D 692. This specification covers crushed stone, crushed hydraulic-cement concrete, crushed blast-furnace slag, and crushed gravel for use in bituminous paving mixtures specified in ASTM D 3515 or D 4215. Air-cooled blast-furnace slag is required to have a compacted density of not less than 1120 kg/m^3 (70 lb/ft^3) when sizes number 57 [25 to 4.75 mm (1 to 0.19 in.)] or 8 [9.5 to 2.36 mm (0.38 to 0.09 in.)] (ASTM C 448) are tested. Additional guidance on polishing characteristics, soundness, and degradation is given.

The ASTM and the American Association of State Highway and Transportation Officials (AASHTO) are the main national organizations setting specifications regarding crushed stone for use in construction. However, states or localities develop many specifications for construction aggregates based on their specific needs. Most common specifications control size grades, soundness, shape, abrasion resistance, porosity, chemical compatibility, and content of soft particles. Due to the skid resistance imparted to road surfaces when blast

Ventura County Air Pollution Control District
Rule 74.1 Applicable Requirements
Abrasive Blasting

Rule 74.1, "Abrasive Blasting"
Federally-Enforceable OCS Version Adopted 11/12/91
District-Enforceable Version Adopted 11/12/91

The District-enforceable version of this rule will become federally enforceable when approved by EPA as part of the SIP.

Applicability:

This attachment applies to short term activities involving any abrasive blasting operation conducted at this facility. Abrasive blasting is the operation of cleaning or preparing a surface by forcibly propelling a stream of abrasive material against that surface. Abrasive materials subject to Rule 74.1 include, but are not limited to, sand, slag, steel shot, garnet or walnut shells.

Conditions:

Pursuant to Rule 74.1.B.1.a, all abrasive blasting operations shall be conducted within a permanent building, except for abrasive blasting operations conducted under one or more of the following conditions as detailed in Rule 74.1.B.1.b:

a. Steel or iron shot/grit is used exclusively;

b. The item to be blasted exceeds eight feet in any dimension;

c. The surface being blasted is situated at its permanent location or no further away from its permanent location than is necessary to allow the surface to be blasted.

Pursuant to Rule 74.1.B.1.c, any abrasive blasting that is allowed to be conducted outside of a permanent building, and is not exclusively using steel or iron shot/grit, must use one of the following:

a. Wet abrasive blasting;
b. Hydroblasting
c. Vacuum blasting;
d. Dry blasting with California ARB certified abrasives.

Abrasive blasting for pavement marking shall comply with the requirements of Rule 74.1.B.2.

4. Abrasive blasting of stucco and concrete shall comply with the requirements of Rule 74.1.B.3.

Packages or containers for abrasives certified in accordance with Section 92530 of the California Code of Regulations used for permissible outdoor blasting shall comply with the labeling requirements of Rule 74.1.B.4.

Abrasive blasting operations shall comply with the visible emission standards of Rule 74.1.C.1 and the nuisance prohibition of Rule 74.1.C.2. The visible emission evaluation of abrasive blasting operations shall be conducted in accordance with Section 92400 of the California Code of Regulations.

You shall perform routine surveillance and visual inspections of the abrasive blasting operation to ensure that compliance with Rule 74.1 is being maintained. This routine surveillance shall include assuring that operation and equipment requirements are being met, and that there are no opacity violations.

In addition, for each abrasive blasting operation conducted at the facility, you shall maintain records of the following information:

a. Date of operation;

b. Type of abrasive blasting media used;

c. Identity, size, and location of item blasted;

d. Whether operation was conducted inside or outside a permanent building;

e. California ARB certifications for abrasives used.

These records shall be maintained at the facility and submitted to the District upon request.