

<u>SUBJECT</u>		<u>DATE</u>
1188. RCRA Empty Containers vs. TSCA PCB Decontaminated Containers - Scenario II	ENCORE	AUG 11, 2016
1189. RCRA Empty Containers vs. TSCA PCB Decontaminated Containers - Scenario III	ENCORE	AUG 18, 2016
1190. Product Spills and Waste Determinations	ENCORE	AUG 25, 2016
1191. Product Spills, Waste Determinations, and LDR	ENCORE	SEP 1, 2016
1192. Regulatory Status of Caustic Rinse Waters Contaminated with Trace Solvents	ENCORE	SEP 8, 2016
1193. Regulatory Status of Sand Blast Grit Contaminated with Trace Listed Solvents	ENCORE	SEP 15, 2016
1194. Hazardous Waste "F" Listings and Trace Contamination	ENCORE	SEP 22, 2016
1195. Hazardous Waste "F" Listings and Trace Contamination – Again!	ENCORE	SEP 29, 2016
1196. Hazardous Waste Determinations and Phase Separation		OCT 6, 2016
1197. Asbestos and DOT Relief	ENCORE	OCT 13, 2016
1198. PCB Containers and Concentration of PCBs	ENCORE	OCT 20, 2016
1199. PCB Analytical Waste Disposal Requirements	ENCORE	OCT 27, 2016
1200. PCB Analytical Waste Disposal Requirements – Water vs. Organic Liquids and Non-aqueous Inorganic Liquids		NOV 3, 2016
1201. Listed Waste Codes and Pre-RCRA Wastes	ENCORE	NOV 10, 2016
1202. Purpose of the ≤90-day Hazardous Waste Accumulation Exemption		NOV 17, 2016
1203. Used Oil Eligibility for Turkey and Ham Oils	ENCORE	NOV 23, 2016
1204. PCB Reporting and Recordkeeping Relief	ENCORE	DEC 1, 2016
1205. Defining Criteria for Household Waste Exclusion	ENCORE	DEC 8, 2016
1206. The Household Waste Exclusion and Renovation Debris	ENCORE	DEC 15, 2016
1207. 'Twas the Night before Christmas – The Twenty-Fourth Annual Edition		DEC 24, 2016
1208. The Household Waste Exclusion and Renovation Debris – Part II	ENCORE	DEC 29, 2016
1209. Absorbent Additions and Treatment		JAN 5, 2017
1210. Frozen RCRA Wastewater - DOT Liquid or Solid When Manifested?	ENCORE	JAN 12, 2017
1211. DOT Marking Specifications for the "UN", "NA" and "ID" Markings		JAN 19, 2017
1212. Satellite Accumulation within a ≤90-day Accumulation Area	ENCORE	JAN 26, 2017
1213. Washington State-Only Dangerous Waste Markings – Accumulation vs. Pre-Transport	ENCORE	FEB 2, 2017
1214. RCRA Empty Tanker Trailers and Listed Waste Codes	ENCORE	FEB 9, 2017
1215. RCRA Empty vs. DOT Empty	ENCORE	FEB 16, 2017
1216. RCRA Empty vs. DOT Empty II	ENCORE	FEB 23, 2017
1217. Multiple Characteristic Hazardous Waste Codes and Underlying Hazardous Constituents	ENCORE	MAR 2, 2017
1218. Multiple Characteristic and Listed Hazardous Waste Codes and the "in lieu of" LDR Principle	ENCORE	MAR 9, 2017
1219. LDR Storage Prohibitions and the One-Year Rule	ENCORE	MAR 16, 2017
1220. LDR Storage Prohibitions and Treated Wastes	ENCORE	MAR 23, 2017
1221. LDR Storage Prohibitions and Treated Hazardous Debris or Contaminated Soil		MAR 30, 2017
1222. LDR Requirements for Universal Wastes		APR 6, 2017
1223. LDR Requirements for Spent Lead-Acid Batteries Being Reclaimed		APR 13, 2017
1224. When is When Defined for the RCRA Phrase "When Reclaimed"?	ENCORE	APR 20, 2017
1225. RCRA Characteristic of Ignitability and DOT Oxidizers	ENCORE	APR 27, 2017
1226. Safety Data Sheets (SDSs) and Hazardous Wastes	ENCORE	MAY 4, 2017
1227. Containers and Tanks – RCRA Wastes vs. TSCA PCB Wastes	ENCORE	MAY 11, 2017
1228. Universal Waste Lamps and Prohibition on Crushing	ENCORE	MAY 18, 2017
1229. Operating Record vs. Operating Log		MAY 25, 2017
1230. Operating Records Not Referenced in "Facility Recordkeeping"		JUN 1, 2017
1231. Used Oil and Weekly Inspections	ENCORE	JUN 8, 2017
1232. Used Oil, Secondary Containment and Response to Spills	ENCORE	JUN 15, 2017
1233. Used Oil and Keeping Containers Closed – Washington State vs. The Feds	ENCORE	JUN 21, 2017
1234. DOT Shipping of Damaged, Defective or Recalled Lithium Batteries	ENCORE	JUN 29, 2017
1235. Conditioned Exclusion for Listed Hazardous Waste Debris Treated via Extraction/Destruction	ENCORE	JUL 6, 2017
1236. Conditioned Exclusion for Characteristic Debris Treated via Immobilization	ENCORE	JUL 13, 2017

DISCLAIMER - "Two Minute Training" ("2MT") is a peer-to-peer communication, presented to share the benefit of the author's work experience with other professionals, who can independently evaluate his analysis. 2MT does not necessarily reflect the opinions, conclusions or policies of the author's past or current employers or the US Department of Energy. The author's employers do not take any responsibility for the accuracy of its conclusions. 2MT is not intended to be used as authoritative guidance or direction by any person or entity. Anyone transmitting or reproducing it is prohibited from modifying its content, this disclaimer, or other text, or republishing it independent of its original source.

TWO MINUTE TRAINING

TO: CH2M HILL PLATEAU REMEDIATION COMPANY

FROM: PAUL W. MARTIN, RCRA Subject Matter Expert
CHPRC Environmental Protection, Hanford, WA

SUBJECT: CONDITIONED EXCLUSION FOR CHARACTERISTIC DEBRIS TREATED VIA IMMOBILIZATION

DATE: JULY 13, 2017

<u>CHPRC Projects</u>	<u>CH PRC - Env. Protection</u>	<u>MSA</u>	<u>Hanford Laboratories</u>	<u>Other Hanford Contractors</u>	<u>Other Hanford Contractors</u>
Richard Austin Roni Ashley Tania Bates Rene Catlow Richard Clinton Larry Cole John Dent Brian Dixon Eric Erpenbeck Stuart Hildreth Mike Jennings Stephanie Johansen Jeanne Kisielnicki Melvin Lakes Jim McGrogan Stuart Mortensen Dean Nester Dave Richards Phil Sheely Connie Simiele Jennie Stults Jeff Westcott Jeff Widney	Ron Brunke Bob Bullock Bill Cox Laura Cusack Lorna Dittmer Ted Hopkins Sasa Kosjerina Jim Leary Rick Oldham Anthony Nagel Robert Nielson Linda Petersen Fred Ruck Ray Swenson Wayne Toebe Daniel Turlington Dave Watson Joel Williams	Brett Barnes Jerry Cammann Jeff Ehlis Garin Erickson Panfilo Gonzales Jr. Dashia Huff Mark Kamberg Edwin Lamm Candice Marple Jon McKibben Saul Martinez Jon Perry Christina Robison Lana Strickling Lou Upton	(TBD) <u>DOE RL, ORP, WIPP</u> Mary Beth Burandt Duane Carter Cliff Clark Tony McKarns Ellen Mattlin Greg Sinton Scott Stubblebine	Bill Bachmann Dean Baker Scott Baker Lucinda Borneman Paul Crane Tina Crane Jeff DeLine Ron Del Mar John Dorian Mark Ellefson Darrin Faulk Joe Fritts Lori Fritz Tom Gilmore Rob Gregory Gene Grohs James Hamilton Andy Hobbs Ryan Johnson Dan Kimball Megan Lerchen Richard Lipinski Charles (Mike) Lowery Michael Madison Terri Mars Cary Martin Marty Martin Grant McCalmant Steve Metzger Tony Miskho Matt Mills Tom Moon Chuck Mulkey Mandy Pascual Kirk Peterson	Jean Quigley Dan Saueressig Merrie Schilperoort Joelle Moss Glen Triner Greg Varljen Julie Waddoups Jay Warwick Kyle Webster Ted Wooley

DISCLAIMER - "Two Minute Training" ("2MT") is a peer-to-peer communication, presented to share the benefit of the author's work experience with other professionals, who can independently evaluate his analysis. 2MT does not necessarily reflect the opinions, conclusions or policies of the author's past or current employers or the US Department of Energy. The author's employers do not take any responsibility for the accuracy of its conclusions. 2MT is not intended to be used as authoritative guidance or direction by any person or entity. Anyone transmitting or reproducing it is prohibited from modifying its content, this disclaimer, or other text, or republishing it independent of its original source.

TWO MINUTE TRAINING

SUBJECT: Conditioned Exclusion for Characteristic Debris Treated via Immobilization

Q: [40 CFR 268.45\(c\)](#), “Conditioned exclusion for debris”, basically states that if a debris waste is treated via an extraction or destruction technology identified in [40 CFR 268.45](#), Table 1, the resulting treated debris is not a hazardous waste. Hence debris treated via extraction or destruction technologies could be disposed in a nonhazardous waste Subtitle D landfill. Note that the wording makes no distinction between listed hazardous waste and characteristic hazardous waste when treated via extraction or destruction. The regulation clarifies that if the debris waste is a listed hazardous waste and treated via the other debris treatment technology of immobilization, the treated debris remains a hazardous waste. But what about debris that is a characteristic hazardous waste; if a characteristic debris is treated via an immobilization technology, i.e., macroencapsulation, microencapsulation or sealing, is the treated debris a hazardous waste or not?

A: Per an EPA RCRA Hotline Monthly Report dated April 2000, ([Faxback 14446](#)), it states:

“Immobilized hazardous debris which still exhibits characteristics cannot be sent to a Subtitle D [nonhazardous waste] landfill. Characteristic debris that has been treated using an immobilization technology and no longer exhibits a characteristic of hazardous waste may be disposed in a nonhazardous waste landfill ([Memo, Shapiro to Deitchman; June 23, 1994](#)). On the other hand, debris contaminated with a listed hazardous waste and treated using an immobilization technology must always be managed in a Subtitle C [hazardous waste] landfill unless the owner and operator gets a site-specific determination from the EPA Regional Administrator (Section 268.45(c)).”

40 CFR 268.45(c) is fairly clear that any debris - listed and/or characteristic - is not a hazardous waste following debris treatment by the extraction or destruction technologies in 40 CFR 268.45, Table 1, if no characteristics of hazardous waste are exhibited. 40 CFR 268.45(c) is very clear that a listed debris remains a hazardous waste following debris treatment by immobilization. The two EPA guidance letters are also very clear that if characteristic debris is treated via immobilization, (or extraction or destruction) the debris remains a hazardous waste if characteristics are exhibited, but is not a hazardous waste if no characteristics are exhibited.

SUMMARY:

- Listed or characteristic hazardous debris treated via extraction or destruction is no longer a hazardous waste once treated, if no characteristics of hazardous waste are exhibited.
- Listed hazardous debris waste treated via immobilization remains a hazardous waste.
- Characteristic debris waste treated via immobilization remains a hazardous waste if characteristics of hazardous waste are exhibited. Characteristic debris waste treated via immobilization is not a hazardous waste if characteristics of hazardous waste are not exhibited.

40 CFR 268.45(c), the April 2000 RCRA Hotline Monthly Report, the June 23, 1994 EPA letter and [all](#) of 40 CFR 268.45, Table 1 are attached. If you have any questions, please contact me at [Paul W Martin@rl.gov](mailto:Paul_W_Martin@rl.gov) or at (509) 376-6620.

FROM: Paul W. Martin

DATE: 7/13/17

FILE: 2MT\2017\071317.rtf

PG: 1

DISCLAIMER - “Two Minute Training” (“2MT”) is a peer-to-peer communication, presented to share the benefit of the author’s work experience with other professionals, who can independently evaluate his analysis. 2MT does not necessarily reflect the opinions, conclusions or policies of the author’s past or current employers or the US Department of Energy. The author’s employers do not take any responsibility for the accuracy of its conclusions. 2MT is not intended to be used as authoritative guidance or direction by any person or entity. Anyone transmitting or reproducing it is prohibited from modifying its content, this disclaimer, or other text, or republishing it independent of its original source.

TWO MINUTE TRAINING - ATTACHMENT

SUBJECT: Conditioned Exclusion for Characteristic Debris Treated via Immobilization

40 CFR Part 268.45 Treatment standards for hazardous debris

(c) Conditioned exclusion of treated debris.

Hazardous debris that has been treated using one of the specified extraction or destruction technologies in Table 1 of this section and that does not exhibit a characteristic of hazardous waste identified under subpart C, part 261, of this chapter after treatment is not a hazardous waste and need not be managed in a subtitle C facility. Hazardous debris contaminated with a listed waste that is treated by an immobilization technology specified in Table 1 is a hazardous waste and must be managed in a subtitle C facility.

EPA530-R-00-003d

PB2000-104 951

RCRA, SUPERFUND & EPCRA HOTLINE MONTHLY REPORT

April 2000

2. Immobilized Debris and Subtitle D Landfills

Under the land disposal restrictions (LDR) in 40 CFR Part 268, hazardous debris must either be treated to meet the LDR treatment standard for the listed or characteristic waste which contaminates it, or be treated by a specific technology appropriate for the debris and contaminant type (57 FR 37221; August 18, 1992). The latter includes a variety of extraction, destruction, and immobilization technologies described in Table 1 of Section 268.45. Hazardous debris which is treated by an extraction or destruction technology and is no longer characteristic can be sent to a Subtitle D landfill (Section 268.45(c)). Can debris which exhibits a characteristic of hazardous waste, and is then treated using an immobilization technology, also be sent to a Subtitle D landfill?

Immobilized hazardous debris which still exhibits characteristics cannot be sent to a Subtitle D landfill. Characteristic debris that has been treated using an immobilization technology and no longer exhibits a characteristic of hazardous waste may be disposed in a nonhazardous waste landfill (Memo, Shapiro to Deitchman; June 23, 1994). On the other hand, debris contaminated with a listed hazardous waste and treated using an immobilization technology must always be managed in a Subtitle C landfill unless the owner and operator gets a site-specific determination from the EPA Regional Administrator (Section 268.45(c)).

Faxback 14446

FROM: Paul W. Martin

DATE: 7/13/17

FILE: 2MT\2017\071317.rtf

PG: 2

DISCLAIMER - "Two Minute Training" ("2MT") is a peer-to-peer communication, presented to share the benefit of the author's work experience with other professionals, who can independently evaluate his analysis. 2MT does not necessarily reflect the opinions, conclusions or policies of the author's past or current employers or the US Department of Energy. The author's employers do not take any responsibility for the accuracy of its conclusions. 2MT is not intended to be used as authoritative guidance or direction by any person or entity. Anyone transmitting or reproducing it is prohibited from modifying its content, this disclaimer, or other text, or republishing it independent of its original source.

TWO MINUTE TRAINING - ATTACHMENT

SUBJECT: Conditioned Exclusion for Characteristic Debris Treated via Immobilization

9553.1994(01)

RO 13681

On-Site Treatment of Manhole Sediment Which May Exceed the Toxicity Characteristic for Lead

United States Environmental Protection Agency
Washington, D.C. 20460
Office of Solid Waste and Emergency Response

Mr. Roy Deitchman, Managing Director Environmental Policy
Technology and Network Planning, Telesector Resources Group
1111 Westchester Avenue
White Plains, New York 10604

June 23, 1994

Dear Mr. Deitchman:

Thank you for your letter dated March 9, 1994, concerning on-site treatment of manhole sediment which may exceed the toxicity characteristic for lead.

Although you refer to the waste as debris, it does not appear to meet EPA's definition. It seems the pertinent part of the definition of debris at 40 CFR 268.2 (57 FR 37270, August 18, 1992) is that the material must exceed a 60 mm particle size. If your waste does not meet the S 268.2 definition of debris, it would likely be subject to the treatment standard promulgated in the June 1, 1990 Third Third rule for lead waste displaying the characteristic of toxicity as analyzed by both the Toxicity Characteristic (TC) and the Extraction Procedure (EP) (see 55 FR at 22660). That treatment standard requires treatment to achieve a level of 5.0 mg/l, as measured by the TCLP (see 40 CFR 268.41, Table CCWE). Because this is also the characteristic level for lead, the treated waste would no longer be considered a hazardous waste and could be disposed in a nonhazardous waste landfill.

If your waste meets the debris definition, the stabilization process you described (i.e., stabilization using lime, fly ash, or Portland-cement) fits under the category of microencapsulation, an immobilization treatment technology described at 268.45, Table 1, (57 FR 37278). To dispose the immobilized debris in a nonhazardous waste landfill, you would have to ascertain that it does not display a hazardous characteristic. If it displays no hazardous characteristic, it may be disposed in a nonhazardous waste landfill; otherwise, it must be disposed in a hazardous waste landfill.

As to the paperwork requirements, a uniform hazardous waste manifest would not be needed if the debris is disposed in a nonhazardous waste landfill. You would still need to determine whether the material would be regulated by the Department of Transportation (DOT), and if so, comply with any applicable DOT requirements. You should also contact the appropriate state agency regarding more stringent state requirements for transporting solid waste. Furthermore, the waste would be subject to the recordkeeping requirements of the LDR program found at 268.9. For your convenience, I have attached a copy of those notification and certification requirements.

If you have any further questions or need additional clarification, please call Richard Kinch of my staff at (703) 308-8434.

Sincerely,

Michael Shapiro, Director, Office of Solid Waste

FROM: Paul W. Martin

DATE: 7/13/17

FILE: 2MT\2017\071317.rtf

PG: 3

DISCLAIMER - "Two Minute Training" ("2MT") is a peer-to-peer communication, presented to share the benefit of the author's work experience with other professionals, who can independently evaluate his analysis. 2MT does not necessarily reflect the opinions, conclusions or policies of the author's past or current employers or the US Department of Energy. The author's employers do not take any responsibility for the accuracy of its conclusions. 2MT is not intended to be used as authoritative guidance or direction by any person or entity. Anyone transmitting or reproducing it is prohibited from modifying its content, this disclaimer, or other text, or republishing it independent of its original source.

TWO MINUTE TRAINING - ATTACHMENT

SUBJECT: Conditioned Exclusion for Characteristic Debris Treated via Immobilization

40 CFR 268.45 Table 1 Alternative Treatment Standards for Hazardous Debris¹

Technology description	Performance and/or design and operating standard	Contaminant restrictions ²
A. Extraction Technologies:		
1. Physical Extraction		
a. Abrasive Blasting: Removal of contaminated debris surface layers using water and/or air pressure to propel a solid media (e.g., steel shot, aluminum oxide grit, plastic beads)	<i>Glass, Metal, Plastic, Rubber:</i> Treatment to a clean debris surface. ³ <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Removal of at least 0.6 cm of the surface layer; treatment to a clean debris surface. ³	All Debris: None.
b. Scarification, Grinding, and Planing: Process utilizing striking piston heads, saws, or rotating grinding wheels such that contaminated debris surface layers are removed	Same as above	Same as above.
c. Spalling: Drilling or chipping holes at appropriate locations and depth in the contaminated debris surface and applying a tool which exerts a force on the sides of those holes such that the surface layer is removed. The surface layer removed remains hazardous debris subject to the debris treatment standards	Same as above	Same as above.
d. Vibratory Finishing: Process utilizing scrubbing media, flushing fluid, and oscillating energy such that hazardous contaminants or contaminated debris surface layers are removed. ⁴	Same as above	Same as above.
e. High Pressure Steam and Water Sprays: Application of water or steam sprays of sufficient temperature, pressure, residence time, agitation, surfactants, and detergents to remove hazardous contaminants from debris surfaces or to remove contaminated debris surface layers	Same as above	Same as above.
2. Chemical Extraction		
a. Water Washing and Spraying: Application of water sprays or water baths of sufficient temperature, pressure, residence time, agitation, surfactants, acids, bases, and detergents to remove hazardous contaminants from debris surfaces and surface pores or to remove	All Debris: Treatment to a clean debris surface ³ ; <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 1.2 cm (1/2 inch) in one dimension (i.e., thickness limit, ⁵ except that this thickness limit may be waived under an	<i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Contaminant must be soluble to at least 5% by weight in water solution or 5% by weight in emulsion; if debris is contaminated with a dioxin-listed waste, ⁶ an "Equivalent

FROM: Paul W. Martin

DATE: 7/13/17

FILE: 2MT\2017\071317.rtf

PG: 4

DISCLAIMER - "Two Minute Training" ("2MT") is a peer-to-peer communication, presented to share the benefit of the author's work experience with other professionals, who can independently evaluate his analysis. 2MT does not necessarily reflect the opinions, conclusions or policies of the author's past or current employers or the US Department of Energy. The author's employers do not take any responsibility for the accuracy of its conclusions. 2MT is not intended to be used as authoritative guidance or direction by any person or entity. Anyone transmitting or reproducing it is prohibited from modifying its content, this disclaimer, or other text, or republishing it independent of its original source.

contaminated debris surface layers	"Equivalent Technology" approval under §268.42(b); ⁸ debris surfaces must be in contact with water solution for at least 15 minutes	Technology" approval under §268.42(b) must be obtained. ⁸
b. Liquid Phase Solvent Extraction: Removal of hazardous contaminants from debris surfaces and surface pores by applying a nonaqueous liquid or liquid solution which causes the hazardous contaminants to enter the liquid phase and be flushed away from the debris along with the liquid or liquid solution while using appropriate agitation, temperature, and residence time. ⁴	Same as above	<i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Same as above, except that contaminant must be soluble to at least 5% by weight in the solvent.
c. Vapor Phase Solvent Extraction: Application of an organic vapor using sufficient agitation, residence time, and temperature to cause hazardous contaminants on contaminated debris surfaces and surface pores to enter the vapor phase and be flushed away with the organic vapor. ⁴	Same as above, except that brick, cloth, concrete, paper, pavement, rock and wood surfaces must be in contact with the organic vapor for at least 60 minutes	Same as above.
3. Thermal Extraction		
a. High Temperature Metals Recovery: Application of sufficient heat, residence time, mixing, fluxing agents, and/or carbon in a smelting, melting, or refining furnace to separate metals from debris	For refining furnaces, treated debris must be separated from treatment residuals using simple physical or mechanical means, ⁹ and, prior to further treatment, such residuals must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris	<i>Debris contaminated with a dioxin-listed waste:</i> ⁵ Obtain an "Equivalent Technology" approval under §268.42(b). ⁸
b. Thermal Desorption: Heating in an enclosed chamber under either oxidizing or nonoxidizing atmospheres at sufficient temperature and residence time to vaporize hazardous contaminants from contaminated surfaces and surface pores and to remove the contaminants from the heating chamber in a gaseous exhaust gas. ⁷	<i>All Debris:</i> Obtain an "Equivalent Technology" approval under §268.42(b); ⁸ treated debris must be separated from treatment residuals using simple physical or mechanical means, ⁹ and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 10 cm (4 inches) in one dimension (i.e., thickness limit), ⁵ except that this thickness limit may be waived under the "Equivalent Technology" approval	<i>All Debris:</i> Metals other than mercury.
B. Destruction Technologies:		
1. Biological Destruction (Biodegradation): Removal of hazardous contaminants from debris surfaces and surface pores in an aqueous solution and biodegradation of organic or nonmetallic inorganic compounds (i.e., inorganics that contain phosphorus, nitrogen, or sulfur) in units operated under either aerobic or anaerobic conditions	<i>All Debris:</i> Obtain an "Equivalent Technology" approval under §268.42(b); ⁸ treated debris must be separated from treatment residuals using simple physical or mechanical means, ⁹ and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must	<i>All Debris:</i> Metal contaminants.

	be no more than 1.2 cm (1/2 inch) in one dimension (i.e., thickness limit), ⁵ except that this thickness limit may be waived under the "Equivalent Technology" approval	
2. Chemical Destruction		
a. Chemical Oxidation: Chemical or electrolytic oxidation utilizing the following oxidation reagents (or waste reagents) or combination of reagents-(1) hypochlorite (e.g., bleach); (2) chlorine; (3) chlorine dioxide; (4) ozone or UV (ultraviolet light) assisted ozone; (5) peroxides; (6) persulfates; (7) perchlorates; (8) permanganates; and/or (9) other oxidizing reagents of equivalent destruction efficiency. ⁴ Chemical oxidation specifically includes what is referred to as alkaline chlorination	All Debris: Obtain an "Equivalent Technology" approval under §268.42(b); ⁸ treated debris must be separated from treatment residuals using simple physical or mechanical means, ⁹ and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood</i> : Debris must be no more than 1.2 cm (1/2 inch) in one dimension (i.e., thickness limit), ⁵ except that this thickness limit may be waived under the "Equivalent Technology" approval	All Debris: Metal contaminants.
b. Chemical Reduction: Chemical reaction utilizing the following reducing reagents (or waste reagents) or combination of reagents: (1) sulfur dioxide; (2) sodium, potassium, or alkali salts of sulfites, bisulfites, and metabisulfites, and polyethylene glycols (e.g., NaPEG and KPEG); (3) sodium hydrosulfide; (4) ferrous salts; and/or (5) other reducing reagents of equivalent efficiency. ⁴	Same as above	Same as above.
3. Thermal Destruction: Treatment in an incinerator operating in accordance with Subpart O of Parts 264 or 265 of this chapter; a boiler or industrial furnace operating in accordance with Subpart H of Part 266 of this chapter, or other thermal treatment unit operated in accordance with Subpart X, Part 264 of this chapter, or Subpart P, Part 265 of this chapter, but excluding for purposes of these debris treatment standards Thermal Desorption units	Treated debris must be separated from treatment residuals using simple physical or mechanical means, ⁹ and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris	<i>Brick, Concrete, Glass, Metal, Pavement, Rock, Metal</i> : Metals other than mercury, except that there are no metal restrictions for vitrification. <i>Debris contaminated with a dioxin-listed waste.</i> ⁶ Obtain an "Equivalent Technology" approval under §268.42(b), ⁸ except that this requirement does not apply to vitrification.
C. Immobilization Technologies:		
1. Macroencapsulation: Application of surface coating materials such as polymeric organics (e.g., resins and plastics) or use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media	Encapsulating material must completely encapsulate debris and be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes)	None.
2. Microencapsulation: Stabilization of the debris with the following reagents (or waste reagents) such that the leachability of the hazardous contaminants is reduced: (1) Portland cement; or (2) lime/pozzolans (e.g., fly ash and	Leachability of the hazardous contaminants must be reduced	None.

<p>cement kiln dust). Reagents (e.g., iron salts, silicates, and clays) may be added to enhance the set/cure time and/or compressive strength, or to reduce the leachability of the hazardous constituents.⁵</p>		
<p>3. Sealing: Application of an appropriate material which adheres tightly to the debris surface to avoid exposure of the surface to potential leaching media. When necessary to effectively seal the surface, sealing entails pretreatment of the debris surface to remove foreign matter and to clean and roughen the surface. Sealing materials include epoxy, silicone, and urethane compounds, but paint may not be used as a sealant</p>	<p>Sealing must avoid exposure of the debris surface to potential leaching media and sealant must be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes)</p>	<p>None.</p>

¹Hazardous debris must be treated by either these standards or the waste-specific treatment standards for the waste contaminating the debris. The treatment standards must be met for each type of debris contained in a mixture of debris types, unless the debris is converted into treatment residue as a result of the treatment process. Debris treatment residuals are subject to the waste-specific treatment standards for the waste contaminating the debris.

²Contaminant restriction means that the technology is not BDAT for that contaminant. If debris containing a restricted contaminant is treated by the technology, the contaminant must be subsequently treated by a technology for which it is not restricted in order to be land disposed (and excluded from Subtitle C regulation).

³"Clean debris surface" means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area.

⁴Acids, solvents, and chemical reagents may react with some debris and contaminants to form hazardous compounds. For example, acid washing of cyanide-contaminated debris could result in the formation of hydrogen cyanide. Some acids may also react violently with some debris and contaminants, depending on the concentration of the acid and the type of debris and contaminants. Debris treaters should refer to the safety precautions specified in Material Safety Data Sheets for various acids to avoid applying an incompatible acid to a particular debris/contaminant combination. For example, concentrated sulfuric acid may react violently with certain organic compounds, such as acrylonitrile.

⁵If reducing the particle size of debris to meet the treatment standards results in material that no longer meets the 60 mm minimum particle size limit for debris, such material is subject to the waste-specific treatment standards for the waste contaminating the material, unless the debris has been cleaned and separated from contaminated soil and waste prior to size reduction. At a minimum, simple physical or mechanical means must be used to provide such cleaning and separation of nondebris materials to ensure that the debris surface is free of caked soil, waste, or other nondebris material.

⁶Dioxin-listed wastes are EPA Hazardous Waste numbers FO20, FO21, FO22, FO23, FO26, and FO27.

⁷Thermal desorption is distinguished from Thermal Destruction in that the primary purpose of Thermal Desorption is to volatilize contaminants and to remove them from the treatment chamber for subsequent destruction or other treatment.

⁸The demonstration "Equivalent Technology" under §268.42(b) must document that the technology treats contaminants subject to treatment to a level equivalent to that required by the performance and design and operating standards for other technologies in this table such that residual levels of hazardous contaminants will not pose a hazard to human health and the environment absent management controls.

⁹Any soil, waste, and other nondebris material that remains on the debris surface (or remains mixed with the debris) after treatment is considered a treatment residual that must be separated from the debris using, at a minimum, simple physical or mechanical means. Examples of simple physical or mechanical means are vibratory or trommel screening or water washing. The debris surface need not be cleaned to a "clean debris surface" as defined in note 3 when separating treated debris from residue; rather, the surface must be free of caked soil, waste, or other nondebris material. Treatment residuals are subject to the waste-specific treatment standards for the waste contaminating the debris.

FROM: Paul W. Martin

DATE: 7/13/17

FILE: 2MT\2017\071317.rtf

PG: 7

DISCLAIMER - "Two Minute Training" ("2MT") is a peer-to-peer communication, presented to share the benefit of the author's work experience with other professionals, who can independently evaluate his analysis. 2MT does not necessarily reflect the opinions, conclusions or policies of the author's past or current employers or the US Department of Energy. The author's employers do not take any responsibility for the accuracy of its conclusions. 2MT is not intended to be used as authoritative guidance or direction by any person or entity. Anyone transmitting or reproducing it is prohibited from modifying its content, this disclaimer, or other text, or republishing it independent of its original source.