BUREAU OF RECLAMATION

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Hazardous Materials in Coatings

Kevin L. Kelly, Ph.D.
Research Chemist
Materials & Corrosion Laboratory Group

Webinar Objectives

- What are hazardous materials?
- Understand what hazardous materials may be present in existing coatings in Reclamation facilities.
- Regulations and directives for the removal and disposal of hazardous materials in existing coatings.
- Evaluation process for identifying and documenting potentially hazardous waste that may be generated from the removal of existing coatings or equipment with existing coatings.

Bureau of Reclamation

- Established June 17, 1902
- Federal water management agency.
- Most of Reclamation's infrastructure > 50 years.
- Many materials used during construction were not as regulated as they are today.

Environmental Protection Agency

- Established December 2, 1970
- Consolidates federal environmental research, monitoring, and enforcement activities in a single agency.
- Mission: To protect human health by safeguarding air, water, and land.

Hazardous Materials – Working Definition

- An existing material, when being removed and disposed of, generates a solid waste that is subject to hazardous waste regulations.

  In other words, we are looking at the potential of an existing material becoming a hazardous waste. If it has the potential of becoming hazardous waste during solid waste generation, we preemptively call it a hazardous material.

- For coatings, a solid waste may be generated during the removal of existing coatings or the removal of equipment that has existing coatings.
- We will not discuss OSHA regulations……..

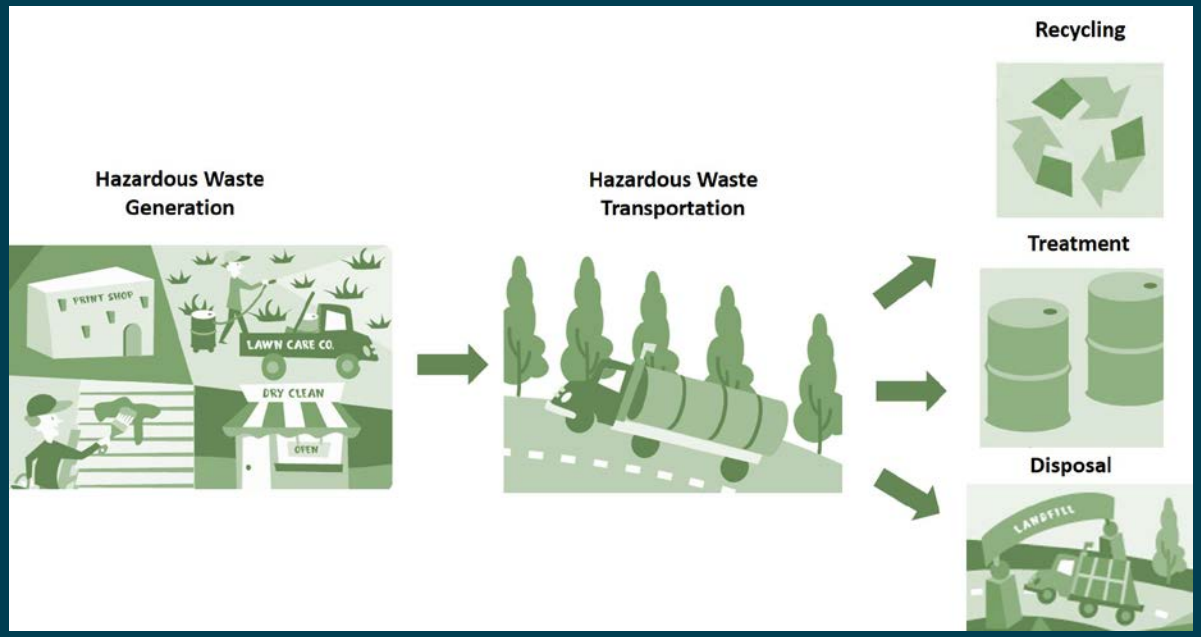
Primary Federal Regulation

Resource Conservation and Recovery Act (RCRA) - 1976

40 CFR 239-282 (www.ecfr.gov)

- **Governs the disposal of solid and hazardous waste.**
- **Amended the Solid Waste Disposal Act of 1965.**

"Hazardous Waste Cradle to Grave"



Source: www.epa.gov/hw/learn-basics-hazardous-waste

What is a Solid Waste? (40 CFR 261.2)

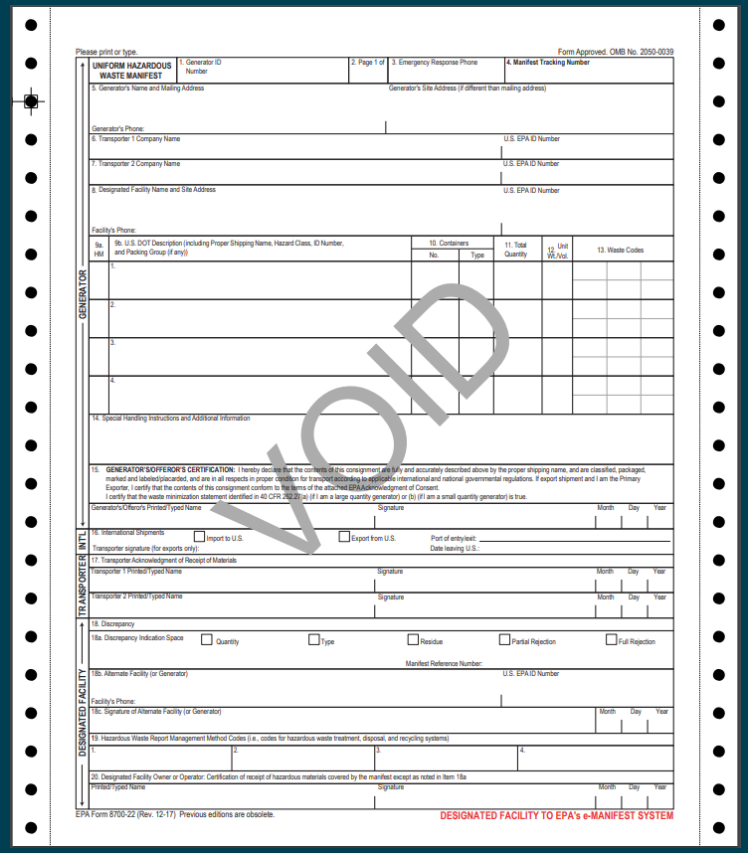
A solid waste is any material that is discarded by being:

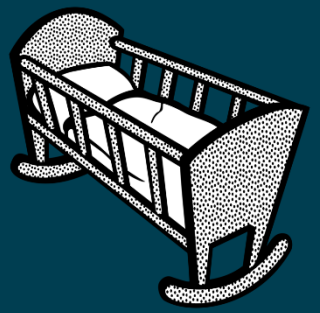
- Abandoned: A material is abandoned if it is disposed of, burned, incinerated, or sham recycled.
- Inherently Waste-Like: Materials that pose such a threat to human health and the environment that they are always considered solid wastes.
- Discarded Military Munition: Ammunition products and components produced for or used by the U.S. Department of Defense.
- Recycled: Material is recycled to be used or reused, reclaimed, or used in certain ways.

What is a Hazardous Waste?

"Hazardous wastes are solid wastes that cause or significantly increase mortality or serious irreversible or incapacitating reversible illness or that pose a substantial present or potential hazard to human health or the environment when improperly managed."

Uniform Hazardous Waste Manifest





"Cradle to Grave"

All hazardous waste are solid waste, but not all solid waste are hazardous waste.

Reclamation Directive on Hazardous Waste

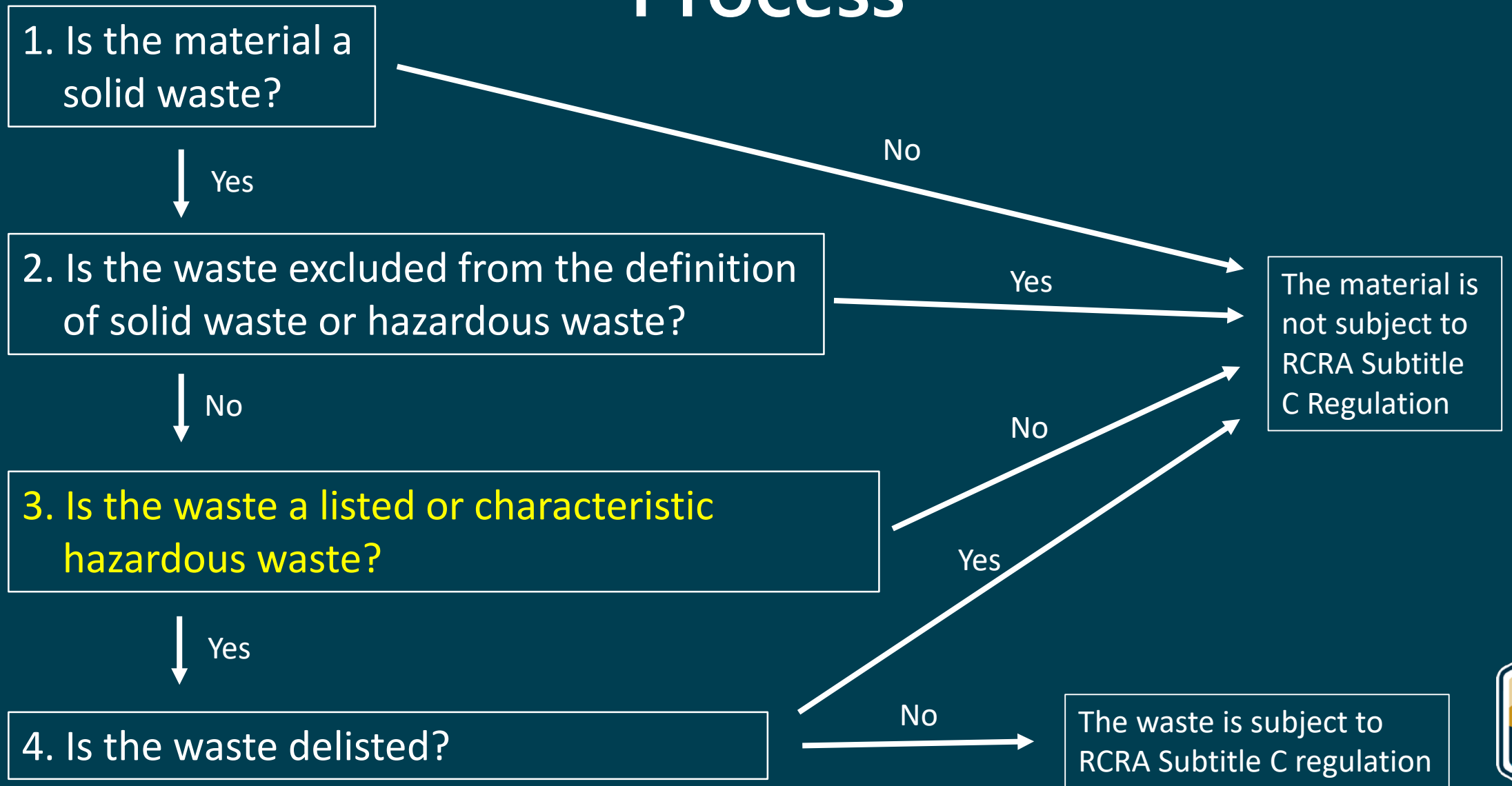
Reclamation's facility managers shall consider hazardous waste handling before the initial purchase of hazardous materials, hazardous substances, oils, or as early as possible in the design of processes which use hazardous materials or have the potential to generate hazardous wastes. It is Reclamation policy to carefully consider such purchases or designs with the intention of substituting nonhazardous materials or of making process changes where possible to avoid or reduce the generation of hazardous wastes. Whenever the generation of hazardous waste is unavoidable, Reclamation will ensure effective management is employed to minimize potential releases to the environment and any long-term liability.

- Reclamation Manual ENV P15 Section 5A

Executive Order 12088
Federal Compliance with Pollution Control Standards

- The head of each Executive agency is responsible for:
  - Ensuring that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to Federal facilities and activities under the control of the agency.
  - Compliance with applicable pollution control standards. (including RCRA)
  - "Applicable control standards" means the same substantive, procedural, and other requirements that would apply to a private person.
- Each Executive agency shall cooperate with the Administrator (EPA), and State, interstate, and local agencies in the prevention, control, and abatement of environmental pollution.

The EPA Hazardous Waste Identification Process



The EPA Hazardous Waste Identification Process

3. Is the waste a listed or characteristic hazardous waste?

Four Characteristic Wastes – hazardous waste characteristics that pose a sufficient threat to merit regulation as hazardous.

- Ignitability
- Corrosivity
- Reactivity
- Toxicity

The EPA Hazardous Waste Identification Process

How do we determine toxicity characteristic?

Toxicity Characteristic Leaching Procedure (TCLP)

- 40 CFR 261.24
- SW-846 Test Method 1311

DC-20 Rotary Agitator (Analytical Testing Corp)

TCLP (or RCRA)

Target Analyte List and Action Levels

EPA Hazardous Waste No.	Contaminant	Regulatory Level (mg/L)	Total Concentration above which a solid waste may fail TCLP (mg/kg)
D004	Arsenic	5.0	100
D005	Barium	100.0	2000
D018	Benzene	0.5	10
D006	Cadmium	1.0	20
D019	Carbon tetrachloride	1.0	20
D020	Chlordane	0.03	0.6
D021	Chlorobenzene	100.0	2000
D022	Chloroform	6.0	120
D007	Chromium	5.0	100
D023	o-cresol	[2]200.0	4000
D024	m-cresol	[2]200.0	4000
D025	p-cresol	[2]200.0	4000
D026	Cresol	[2]200.0	4000
D016	2,4 D	10.0	200
D027	1,4-Dichlorobenzene	7.5	150
D028	1,2-Dichloroethane	0.5	10
D029	1,1-Dichloroethylene	0.7	14
D030	2,4 Dinitrotoluene	[1]0.13	2.6
D012	Endrin	0.02	0.4
D031	Heptachlor (and its epoxide)	0.008	0.16
D032	Hexachlorobenzene	[1]0.13	2.6
D033	Hexachlorobutadine	0.5	10
D034	Hexachloroethane	3.0	60
D008	Lead	5.0	100
D013	Lindane	0.4	8
D009	Mercury	0.2	4
D014	Methoxychlor	10.0	200
D035	Methyl Ethyl Ketone	200.0	4000
D036	Nitrobenzene	2.0	40
D037	Pentachlorophenol	100.0	2000
D038	Pyridine	5.0	100
D010	Selenium	1.0	20
D011	Silver	5.0	100
D039	Tetrachloroethylene	0.7	14
D015	Toxaphene	0.5	10
D040	Trichloroethylene	0.5	10
D041	2,4,5-Trichlorophenol	400.0	8000
D042	2,4,6-Trichlorophenol	2.0	40
D017	2,4,5-TP (Silvex)	1.0	20
D043	Vinyl chloride	0.2	4

[1] Quantitation limit is greater than calculated regulatory level. The quantitation limits therefore becomes the regulatory level.

Other Federal Regulations -

Toxic Substance Control Act (TSCA) – 1979 (40 CFR 700 – 799)

- Wastes containing PCBs ≥ 50 ppm are regulated as hazardous waste.
- TSCA banned manufacturing, processing, distribution, and use of PCBs.

Asbestos Hazard Emergency Response Act (AHERA) – 1986 (40 CFR 763, Subpart E)

- Implemented under TSCA
- Asbestos-containing material (ACM) means any material containing more than 1% asbestos
- Model Accreditation Plan (must be certified)
- Asbestos School Hazard Abatement Reauthorization Act (ASHARA) – 1992
    - Extended AHERA to public and commercial buildings

Other Federal Regulations -

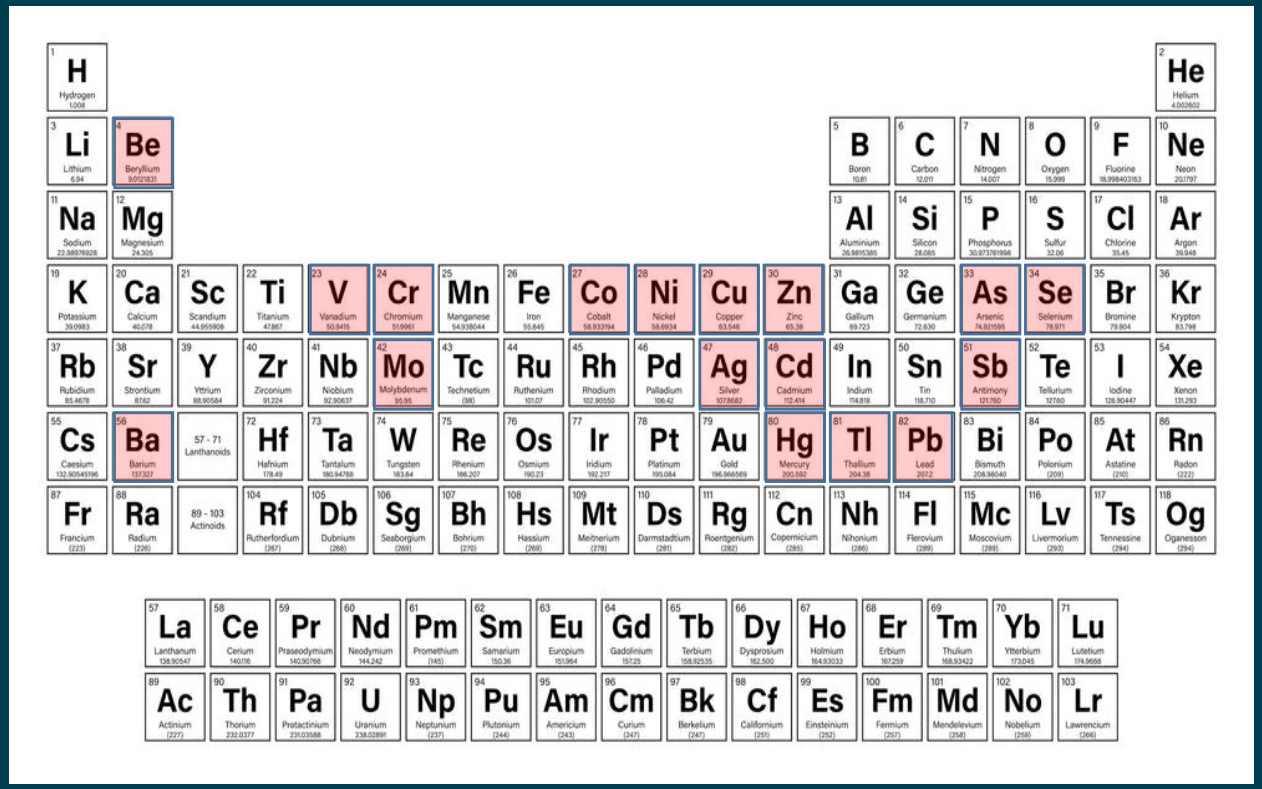
National Emission Standards for Hazardous Air Pollutants (NESHAP) – 1979
(40 CFR 700 – 799)

- Toxic air regulations under the Clean Air Act.
- Includes standards for renovations and demolitions
- Structures to be demolished or renovated, must be thoroughly inspected for the presence of asbestos. (also HAP = Hazardous Air Pollutants)
- Requires filing a notification (usually a state agency)
- Requires work practices designed to minimize release of asbestos fibers, waste packaging, transportation and disposal.

State Authorization Under RCRA

- A rulemaking process where EPA may delegate the primary responsibility of implementing the RCRA hazardous waste program to individual states.
- Currently, all 50 states and territories have been granted authority by the EPA to implement the base program.
- Important for our construction design specifications.
- Requires a lot of research into regulations to find the ones that apply to:
    - Type of hazardous materials to be removed and disposed
    - How will it be disposed of (landfill vs recycling vs treatment)
    - Location of the facility (state and local regulations)
    - Regulations that has “primacy”

Good Example - California



CAM17 Metals

- Antimony (Sb)
- Arsenic (As)
- Barium (Ba)
- Beryllium (Be)
- Cadmium (Cd)
- Chromium (Cr)
- Cobalt (Co)
- Copper (Cu)
- Lead (Pb)
- Mercury (Hg)
- Molybdenum (Mo)
- Nickel (Ni)
- Selenium (Se)
- Silver (Ag)
- Thallium (Tl)
- Vanadium (V)
- Zinc (Zn)

RCRA 8 Metals

- Arsenic (As)
- Barium (Ba)
- Cadmium (Cd)
- Chromium (Cr)
- Lead (Pb)
- Mercury (Hg)
- Selenium (Se)
- Silver (Ag)

What hazardous materials may be found in existing coatings at Reclamation facilities?

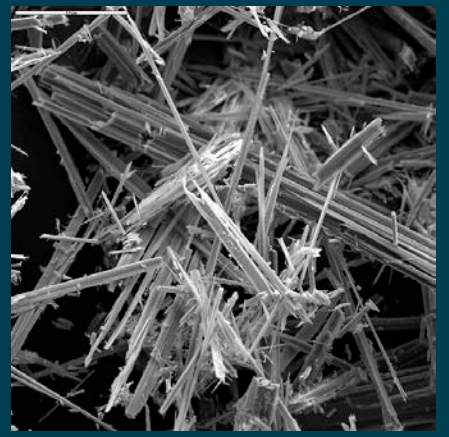
- Resource Conservation and Recovery Act

  "RCRA 8 Metals"

  Arsenic (As)
  Barium (Ba)
  Cadmium (Cd)
  Chromium (Cr)
  Lead (Pb)
  Mercury (Hg)
  Selenium (Se)
  Silver (Ag)

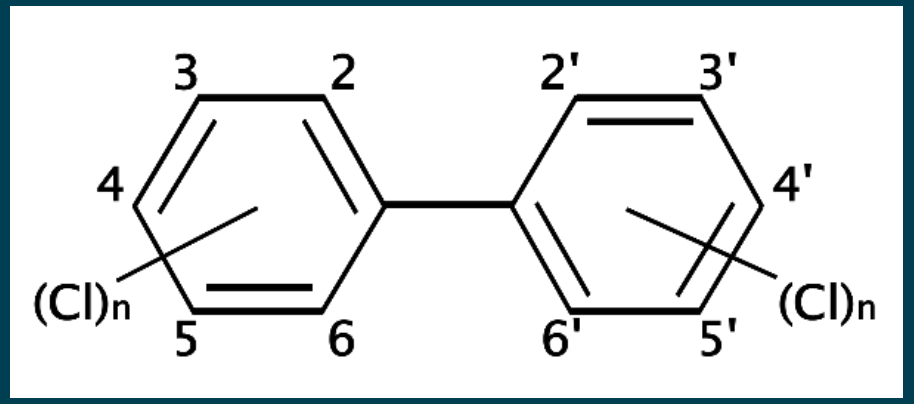
- Asbestos

  Naturally occurring silicate minerals



What hazardous materials may be regulated in existing coatings at Reclamation facilities?

- Polychlorinated Biphenyls (PCBs)
  - Arochlor – mixtures of PCB congeners
  - Used as plasticizers in paints



- Coal Tar
  - Byproduct of coking
  - Water-immersed structures
    - Penstocks, roofing, gates, trashracks, etc.

Common Misperceptions

Who is the hazardous waste generator?

- EPA Definition: *"Generator means any person, by site, whose act or process produces hazardous waste identified or listed in [40 CFR 261] or whose act first causes a hazardous waste to become subject to regulation."*
- Co-generator status is common.
    - "person" = anyone! (could be the contractor)
    - "by site" = physical location where the waste is generated. (assigned an EPA identification number)
- Reclamation must ensure and fully document that the hazardous waste is properly identified, managed, and disposed.

Common Misperceptions

Lead-Based Paint

- Paint or other surface coatings that contain lead ≥ 1.0 mg/cm2 or 0.5% by weight or 5,000 ppm by weight.
- Definition applies to a “child-occupied facility.”

X-ray Fluorescence (XRF) Metal Analyzer

- In-situ elemental surface analysis.
- Screening only.
- EPA requires BULK sampling for hazardous waste characterization.

Hazardous Materials Evaluation Process

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1. Contact us
2. Purpose of Evaluation
3. Data Collection
   - Schedule a hazmat survey
   - Perform inspection
   - Archival research
   - Find Relevant Environmental Regulations
4. What we may need from client
   - Scope of work
   - Photographs
   - Historical Data
   - Drawings
5. Final products
   - Survey Report: data, photographs, observations, and recommendations/conclusions
   - Construction Design Specifications (Div 02 and 51)
   - Quantity Estimates

Hazardous Materials Evaluation Process

Hazmat Survey

Ship to Laboratory under Chain of Custody (COC)

Lab Report

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

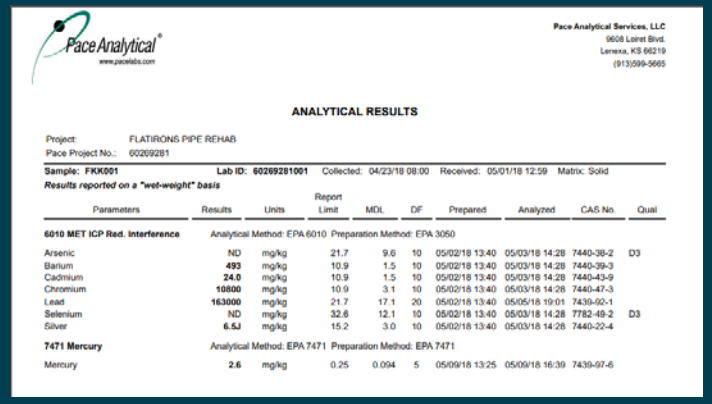
Project: FLATIRONS PIPE REHAB
Pace Project No.: 60269281

Sample: FKK001 **Lab ID: 60269281001** Collected: 04/23/18 08:00 Received: 05/01/18 12:59 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP Red. Interference	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	ND	mg/kg	21.7	9.6	10	05/02/18 13:40	05/03/18 14:28	7440-38-2	D3
Barium	**493**	mg/kg	10.9	1.5	10	05/02/18 13:40	05/03/18 14:28	7440-39-3	
Cadmium	**24.0**	mg/kg	10.9	1.5	10	05/02/18 13:40	05/03/18 14:28	7440-43-9	
Chromium	**10800**	mg/kg	10.9	3.1	10	05/02/18 13:40	05/03/18 14:28	7440-47-3	
Lead	**163000**	mg/kg	21.7	17.1	20	05/02/18 13:40	05/05/18 19:01	7439-92-1	
Selenium	ND	mg/kg	32.6	12.1	10	05/02/18 13:40	05/03/18 14:28	7782-49-2	D3
Silver	**6.5J**	mg/kg	15.2	3.0	10	05/02/18 13:40	05/03/18 14:28	7440-22-4	
7471 Mercury	Analytical Method: EPA 7471 Preparation Method: EPA 7471								
Mercury	**2.6**	mg/kg	0.25	0.094	5	05/09/18 13:25	05/09/18 16:39	7439-97-6	

Hazardous Materials Evaluation Process



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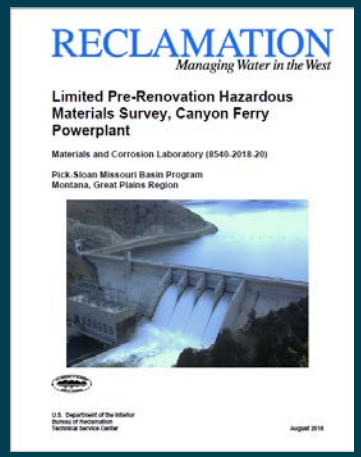


RECLAMATION
Managing Water in the West

Limited Pre-Renovation Hazardous Materials Survey, Canyon Ferry Powerplant

Materials and Corrosion Laboratory (8540-2018-20)

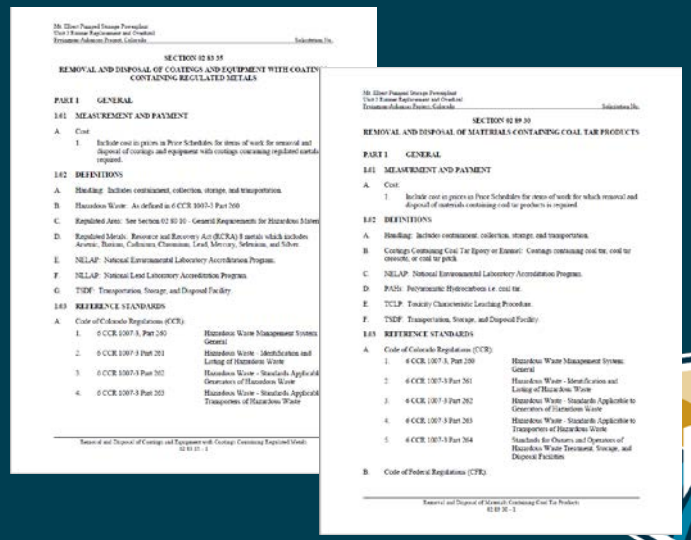
Pick-Sloan Missouri Basin Program
Montana, Great Plains Region

U.S. Department of the Interior
Bureau of Reclamation
Technical Service Center

August 2018

Survey Reports

Construction Design Specifications



SECTION 02 83 35
REMOVAL AND DISPOSAL OF COATINGS AND EQUIPMENT WITH COATINGS CONTAINING REGULATED METALS

PART 1 GENERAL

1.01 MEASUREMENT AND PAYMENT

1.02 DEFINITIONS

1.03 REFERENCE STANDARDS

SECTION 02 89 30
REMOVAL AND DISPOSAL OF MATERIALS CONTAINING COAL TAR PRODUCTS

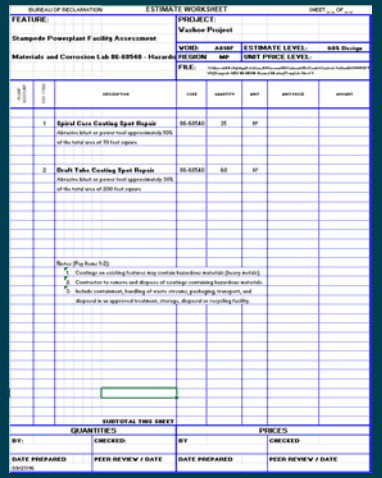
PART 1 GENERAL

1.01 MEASUREMENT AND PAYMENT

1.02 DEFINITIONS

1.03 REFERENCE STANDARDS

Quantity Estimates



BUREAU OF RECLAMATION — ESTIMATE WORKSHEET

FEATURE: Stampede Powerplant Facility Assessment
Materials and Corrosion Lab 86-68540 - Hazardo

PROJECT: Vashon Project
WORK: ASSIF
REGION: MP
FILE:
ESTIMATE LEVEL: 60% Design
UNIT PRICE LEVEL:

	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	**Spiral Core Coating Spot Repair** Abrasive blast or power tool approximately 50% of the total area of 50 foot spans	86-68540	25	SF		
2	**Draft Tube Coating Spot Repair** Abrasive blast or power tool approximately 20% of the total area of 200 foot spans	86-68540	60	SF		

Notes (Pay Item: 1,2):
1. Coatings on existing hydraulic may contain hazardous materials (heavy metals).
2. Contractor to remove and dispose of coatings containing hazardous materials.
3. Include containment, handling of waste streams, packaging, transport, and disposal in an approved treatment, storage, disposal or recycling facility.

SUBTOTAL THIS SHEET

QUANTITIES: BY: | CHECKED: | DATE PREPARED | PEER REVIEW / DATE
PRICES: BY: | CHECKED | DATE PREPARED | PEER REVIEW / DATE

Materials and Corrosion Laboratory Group

MCL personnel have specialized training and certifications:

- Coating Specialists, Chemists, and Professional Engineers
- Asbestos Building Inspectors (AHERA)
- Certified Hazardous Materials Manager (CHHM)
- Safety and Health Training:
  - Hazardous Energy Control Program (HECP)
  - Confined Space
  - Fall Protection
  - Personal Protection Equipment
- Special Access Surveys (normally-inaccessible features)
  - Underwater Inspection
  - Rope Access

Materials and Corrosion Laboratory Staff - 8540

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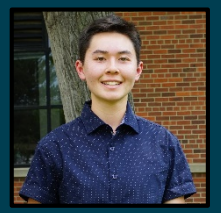

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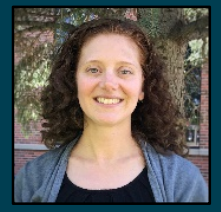

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