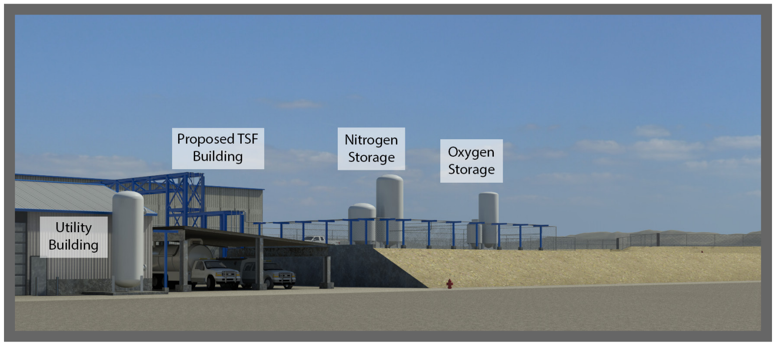
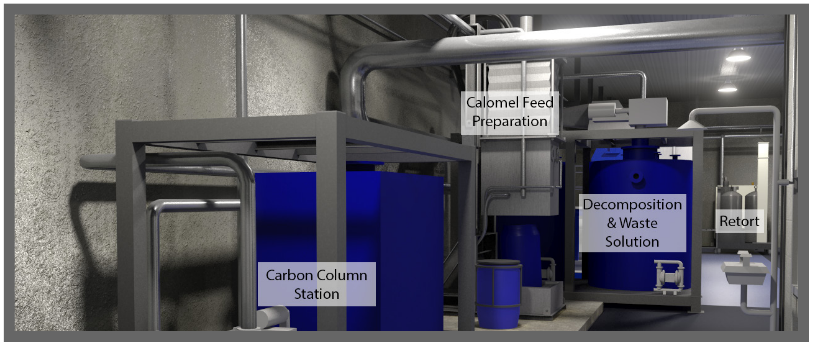
Precious Metals Recovery LLC
RCRA Permit Application
Dry Hills Facility | EPA ID# NVR000088542
Eureka County, Nevada

Prepared for:
Precious Metals Recovery LLC
460 W. 50 North, Suite 500
Salt Lake City, Utah 84101
Contact: Rich Haddock
Ph: 801.990.3773





Prepared by: JBR Environmental Consultants, Inc.
8160 S. Highland Drive,
Sandy, Utah 84093
Contact: Rachel Shilton
Ph: 801.943.4144 Ext. 1133

Hatch
2800 Speakman Drive
Mississauga, Ontario, Canada
Contact: Sonia Sennik
Ph: 905.403.4043

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ITEM #	REGULATIONS	GENERAL DESCRIPTION	LOCATION IN APPLICATION	ADMIN COMPLETE (Y / N / NA)	TECH COMPLETE (Y / N / NA)	COMMENTS
		Was the current version of the EPA Form 8700-23 used?	Form 8700-23 (2012)			
G-0	**270.10**	**GENERAL APPLICATION REQUIREMENTS**	Introduction			
G-1	270.10(a) 270.10(c)	Permit application completed and signed	Part A			
G-2	270.10(b)	Who applies - When facility is owned by one person but is operated by another, it is the operator's duty to obtain a permit. The owner must also sign the permit application	Introduction			
G-3	270.10(c)	Completeness - all elements included				
G-4	270.10(d)	Information requirements - information in 270.13 and applicable sections of 270.14 through 270.29				
Existing HWM facilities			**Not Applicable - New Facility**			
G-5	270.10(e)(1)	Must submit Part A	Not Applicable			
G-6	270.10(e)(2)		Not Applicable			
G-7	270.10(e)(3)		Not Applicable			
G-8	270.10(e)(4)	Timely Submittal of Part B	Not Applicable			
New HWM facilities						
	264.11	Application of an EPA ID number	Part A			
G-9	270.10(f)(1)	No construction before submittal of Parts A and B…	Not Applicable			
G-10	270.10(f)(2)	Must submit Parts A and B at least 180 days before construction is expected to commence	Part A			
G-11	270.10(f)(3)	Construction of an incinerator of PCBs	Not Applicable			
Updating Permit Applications			**Not Applicable - Initial application submittal**			
G-12	270.10(g)(1) 270.72	Amendment to Part A - as necessary for compliance	Not Applicable			
G-13	270.10(i)	Re-applications - 180 before the expiration of the existing permit	Not Applicable			
G-14	270.10(h)	Recordkeeping - at least 3 years	9.0; 23.13			
Exposure Information			**24.0 and 27.0; Not Applicable**			
G-15	270.10(j)(1)	Re: surface impoundments and landfills….	Not Applicable			
G-16	270.10(j)(2)		Not Applicable			
G-17	270.10(k)		Not Applicable			

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	270.11	**SIGNATORIES TO PERMIT APPLICATIONS AND REPORTS**				
S-1	270.11(a)(1)	For a corporation	Part A			
S-2	270.11(a)(2)	For partnership or sole proprietorship	Not Applicable			
S-3	270.11(a)(3)	For government or public agency	Not Applicable			
S-4	270.11(b)	Reports signed by authorized representative	Introduction			
S-5	270.11(b)(1)	Written authorization	Introduction			
S-6	270.11(b)(2)	Authorization for a responsible position	Introduction			
S-7	270.11(b)(3)	Submittal of written authorization	Introduction			
S-8	270.11(c)	Change to authorization for signing reports	Introduction			
S-9	270.11(d)	Certification for signature	Introduction			
	270.12	**CONFIDENTIALITY OF INFORMATION**	**Introduction**			
I-1	270.12(12)(a)	"confidential business information" stamped on each page containing such information	Not Applicable			
I-2	270.12(12)(b)	Name and address of permit applicant are public information	Not Applicable			
	270.13	**CONTENTS OF PART A APPLICATION**				
A-1	270.13(a) 270.13(m)	Description of the activities which require a RCRA permit, and description of the nature of the business	Part A			
A-2	270.13(b)	Name , mailing address, location (UTM coordinates)	Part A			
A-3	270.13(c)	NAICS codes	Part A			
A-4	270.13(d) 270.13(e)	Operator/Owner's name, address, phone number, and ownership status	Part A			
A-5	270.13(f)	Indian Lands?	No; property is privately owned			
A-6	270.13(g)	New or Existing Facility	New Facility; initial Part A application			
A-7	270.13(h)	Existing Facility…	Not Applicable			
A-8	270.13(i)	Description of processes for treating, storing and disposing of hazardous waste (design capacity).	Part A			
A-9	270.13(j)	Identify: hazardous waste codes to be treated, stored; estimate of annual quantity; general description of the process used	Part A			

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A-10	270.13(k)	List all permits or construction approvals associated with the facility: (a) HW Management – RCRA (b) UIC under CWA (c) NPDES under CWA (d) PSD under CAA (e) Non-attainment under CAA (f) NESHAPS under CAA (g) Ocean dumping under MPRSA (h) Dredge or fill under CWA (i) Other including state or county	Part A			
A-11	270.13(l)	Topographic Map 1-mile radius facility intake and discharge location TSF UICs Wells within 1/4 mile Springs within 1/4 mile water body within 1/4 mile	Part A Appendix 1-A and Appendix 11-B			
A-12	270.13(n)	Identify hazardous debris at the TSF	2-A			
	270.14	**GENERAL REQUIREMENTS FOR CONTENTS OF PART B APPLCIATION**				
General Information			**Introduction**			
B-1	270.14(b)(1)	General description of the facility	1.0			
B-1	264.1	Purpose, Scope, and Applicability	Introduction, 1.0			
B-1	264.3	Relationship to interim status standards	Not Applicable			
B-1	264.4	Imminent Hazard Action	Not Applicable			
B-1	264.10	Applicability of Part B	Introduction			
B-1	264.12(b)	Manages waste generated on-site Manages waste generated off-site	2.0, Appendix 2-A			
B-1	264.12(b)	Required Notices	Not Applicable; currently no hazardous waste activity occurring			
B-1	270.14(a)	Engineering drawings	Appendix 1-A			
B-2	270.14(b)(2)	Chemical and physical analysis of wastes	2.3.1, Appendix 2-E			
B-3	270.14(b)(3)	Waste Analysis Plan	Appendix 2-A			
B-3	264.13(b)(1)	Parameters	2.3, Appendix 2-A			

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B-3	264.13(b)(1)	Rationale	2.4, Appendix 2-A			
B-3	264.13(b)(2)	Test Methods	2.5, Appendix 2-A			
B-3	264.13(b)(3)	Sampling Methods	2.6, Appendix 2-A			
B-3	264.13(b)(4)	Frequency of Analysis	2.7, Appendix 2-A			
B-3	264.13(b)(5) 264.13(c)	Off-site generated waste	2.8, Appendix 2-A			
B-3	264.13(b)(6) 264.17	Ignitable, Reactive, or Incompatible	2.9, Appendix 2-A			
B-3	264.13(b)(6) 264.314	Bulk and Containerized Liquids in Landfill	2.10, Not Applicable			
B-3	264.13(b)(6)	Incinerators	2.11, Not Applicable			
B-3	264.1100	Containment Buildings	2.12, Not Applicable			
B-3	264.13(b)(6) 264.73 Part 268	LDRs	2.13, Appendix 2-A			
B-4	270.14(b)(4)	Security Measures	3.0			
B-4	264.14(b)	Security Procedures and Equipment	3.0			
B-4	264.14(b)(1)	24-hour surveillance system	3.1			
B-4	264.14(b)(2)	**Barrier** to entry, **control entry**	3.2, 3.3			
B-4	264.14(c)	Warning **signs**	3.3			
B-5	270.14(b)(5)	A copy of the **general inspection schedule**	4.0, Appendix 4-A			
B-5	264.15(b)(1)	Written Inspection Schedule: 1. Monitoring equipment 2. Safety/emergency equipment 3. Security devices 4. Operating/structural equipment	Appendix 4-A			
B-5	264.15(b)(3)	Identify types of problems (malfunctions or deterioration)	4.0, Appendix 4-A			
B-5	264.15(b)(4)	Frequency of Inspection **[Based on rate of deterioration of equipment and probability of environmental/human health incident]**	4.0, Appendix 4-A			
B-5	264.15c)	Schedule of Remedial Action	Appendix 4-A			
B-5	264.15(d)	Inspection Log	4.0, Appendix 4-B			
B-5	270.15(b)(5)	<u>Specific Inspection Requirements</u>	4.0, Appendix 4-A, 4-B			

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B-5	264.174	Containers: Inspect at least weekly	4.0, Appendix 4-A, 5.7, 22.2, 22.3, 22.4, 22.8,			
B-5	264.195	Tank System: Develop schedule and inspect at least once daily	4.0, Appendix 4-A, 23.5, 23.6, 23.7, 23.8			
B-5	264.195(a)	Overfill Controls: Develop and follow schedule for inspection	4.0, Appendix 4-A, 23.6			
B-5	264.195(b)(1)	Aboveground portions: Check for corrosion or releases	4.0, Appendix 4-A			
B-5	264.195(b)(2)	Data from monitoring and leak detection equipment: Analyze data to ensure tank is operating according to design	4.0, Appendix 4-A, 23.8			
B-5	264.195(b)(3)	Construction Materials & Surrounding Area: Check for erosion or releases check for erosion	4.0, Appendix 4-A, 23.8			
B-5	264.195(b)(3)	Surrounding Area	4.0, Appendix 4-B, 23.8			
B-5	264.195(c)	Cathodic Protection Systems (if present): Inspect according to minimum schedule	Not Applicable, 1.5, 23.1			
B-5	264.226(b)	Surface Impoundments: Inspect a least weekly and after storms	Not Applicable, 24.0			
B-5	264.226(b)(1)	Overtopping Control System: Check for deterioration, malfunction, or improper operation	Not Applicable			
B-5	264.226(b)(2)	Impoundment Contents: Check for sudden drops in level of contents	Not Applicable			
B-5	264.226(b)(3)	Containment Devices: Check for severe erosion or other signs of deterioration	Not Applicable			
B-5		Structural Integrity: Certification from qualified engineer	Not Applicable			
B-5	264.226(d) 270.17(c)	Leak Detection System: Record amount of liquids removed at least once each week.	Not Applicable			
B-5	264.254	Waste Piles: Inspect at least weekly and after storms	Not Applicable, 25.0			
B-5	264.273(g)	Land Treatment: Inspect at least weekly and after storms	Not Applicable, 27.0			
B-5	264.273(g)(1)	Run-on/Run-off Control Systems: Check for deterioration, malfunctions, or improper operation	Not Applicable			
B-5	264.303(b)	Inspections for Landfills	Not Applicable, 28.0			
B-5	264.347(b)	Inspections for Incinerators	Not Applicable; only batch feed to the retort, 26.0			
B-5	264.602	Inspections for Miscellaneous Units - Retort	4.0, Appendix 4-A, Appendix 4-B, 30.1.5			

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B-5	264.602	Inspections for Miscellaneous Units - Filter Press	4.0, Appendix 4-A, Appendix 4-B, 30.2			
B-6	270.14(b)(6)	Justification for waiver of Preparedness and Prevention	Not Applicable; no waiver requested			
B-6	264.32	Required Equipment	5.0			
B-6	264.33	Testing and maintenance of equipment	5.7			
B-6	264.34	Access to communications or alarm system	5.5.1			
B-6	264.35	Required aisle space	5.6			
B-6	264.37	Arrangements with local authorities: • Police • Fire • Emergency Response Team • Local Hospitals	Appendix 6-A			
B-6	264.37	Document Agreement Refusal	5.2.1			
B-6	264.5	Applicability	6.0, Appendix 6-A			
B-6	264.51	Purpose and implementation of contingency plan	6.0, Appendix 6-A			
B-7	270.14(b)(7)	Copies of the Contingency Plan	Appendix 6-A			
B-7	264.52	Content of contingency plan	6.0, Appendix 6-A			
B-7	264.52(c)	Arrangements with local authorities: police, fire, emergency response team	5.2.1			
B-7	264.52(d)	Emergency Coordinators: name, address, home phone number, office phone number	Appendix 6-A			
B-7	264.52(e)	Emergency Equipment List and Location	Appendix 6-A			
B-7	264.52(f)	Evacuation Plan	6.0			
B-7	264.53	Copies of contingency plan	6.0, Appendix 6-A			
B-7	264.54	Amendment of contingency plan	6.0, Appendix 6-A			
B-7	264.55	Emergency Coordinator	Appendix 6-A			
B-7	264.56	Emergency Procedures	6.0			
B-7	264.7	Applicability	9.0			
B-7	264.71	Use of manifest system	9.0			
B-7	264.72	Manifest discrepancies	9.0			
B-3	264.73	Operating record	9.0			
B-8	270.14(b)(8)	**Safety** procedures, equipment, construction to prevent:	7.0			
B-8	270.14(b)(8)(i)	Unloading	7.0			
B-8	270.14(b)(8)(ii)	Runoff	Not Applicable			

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B-8	270.14(b)(8)(iii)	Water Supplies	7.1			
B-8	270.14(b)(8)(iv)	Equipment and Power Failure	1.4			
B-8	270.14(b)(8)(v)	Personal Protection Procedures	7.1			
B-8	270.14(b)(8)(v)	Procedures to minimize release to the atmosphere	1.1.4			
B-9	270.14(b)(9)	**Prevention** of accidental ignition, reaction of ignitable, reactive, or incompatible wastes	7.0			
B-9	264.17(a)	Prevent Ignition	Not Applicable, 8.0			
B-9	264.17(b)	Prevent Reaction	Not Applicable, 8.0			
B-9	264.17(a),(b)	Precautions to prevent ignition of reaction	Not Applicable, 8.0			
B-9	264.17(a)	Precautions for handling and mixing	8.1			
B-9	264.17(c)	Documentation of Adequacy	Not Applicable, 8.0			
B-3, B-9, and T-11	264.17	General requirements for ignitable, reactive, or incompatible wastes	Not Applicable, 2.0, 8.0			
B-10	270.14(b)(10)	**Traffic** pattern information	10.0			
Show turns across traffic lanes and stacking lanes, if appropriate.						
B-10		Estimate of number and types of vehicles around the facility	10.2			
B-10		Information about waste transfer or pick-up stations	Not Applicable			
B-10		Quantity of waste moved per movement per vehicle	Not Applicable, 10.2			
B-10		Traffic control signs and persons	10.3			
B-10		Road surface composition and load-bearing capacity	10.4			
B-10		Hauling route of waste to treatment location	10.5			
B-11	270.14(b)(11)	Facility **location** information	11.0, Appendix 11-B			
Location of nearest community and potential impact on community, fire department other emergency facilities. Include locations based on GPS data.						
B-11	270.14(b)(11)(i)	Political jurisdiction in which facility is proposed to be located [county, township, or election district]	1.0			
B-11	270.14(b)(11)(i)	Indication of whether facility is listed in Appendix VI of 264 (new facilities)	Yes, 11.10, Appendix 20-C			
B-11	270.14(b)(11)(ii) 264.18(a)	New facility must meet seismic standards and be located at least 200 feet from a fault which has had displacement in Holocene time.	Yes, 11.10, Appendix 20-C			
B-11	270.14(b)(11)(iii)	Copy of Federal Insurance Association (FIA) or other flood map.	Appendix 11-B			

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B-11	270.14(b)(11)(iv)	If facility is located in 100-year floodplain:	Not Applicable, 11.2, Appendix 11-B			
B-11	270.14(b)(11)(v)	Plans and schedule for future compliance [Applicable for existing facilities not in compliance with 40 CFR 264.18(b).]	Not Applicable, 11.2			
B-12	270.14(b)(12)	**Training programs** in compliance with 264.16	12.0			
B-12	270.14(b)(12) 264.16(a)(1)	Outline of Introductory and Continuing Training Programs [Facility personnel must successfully complete classroom or on-the-job training which will allow them to responsibly perform in their positions.]	Appendix 12-A			
B-12	264.16(a)(1), (2)	Relevance of training to job tasks	Appendix 12-A			
B-12	264.16(a)(2)	Training Director [**Program must be directed by person trained in HW procedures.**]	Appendix 120-A			
B-12	264.16(a)(3)	Training for Emergency Response [**At a minimum, personnel must be made familiar with emergency procedures, equipment, and systems.**]	12.0, Appendix 12-A			
B-12	264.16(a)(b)	Training within 6 months of hire.	12.0, Appendix 12-A			
B-12	264.16(a)(c)	Annual review	12.0, Appendix 12-A			
B-12	264.16(d), (e)	Maintenance of training records	12.0, Appendix 12-A			
B-11	264.3	Applicability	7.0			
B-11	264.31	Design and operation of the facility	1.0			
B-13	270.14(b)(13)	A copy of the **closure plan** and, if applicable, **post closure plan**	13.0, Appendix 13-A			
B-13	264.111	Closure Performance Standard	13.1			
B-13	264.111(a)	Further maintenance [**Minimize need**]	13.1.1			
B-13	264.111(b)	Post-Closure Escape [**Control, Minimize, Eliminate**]	13.1.2			
B-13	264.111(c)	Unit-specific closure requirements	13.1.3			
B-13	264.111(b)	Steps for Partial and/or Final Closure at any point	13.1.4			
B-13	264.112(b)(1)	Description of how each HWMU will be closed in accordance with 264.111	Appendix 13-A			
B-13	264.112(b)(2)	Final closure of the facility, in accordance with 264.11. [**Identify the max extent of the operations which will be unclosed during the active life of the facility**.]	Appendix 13-A			
B-13	264.112(b)(3)	Max inventory of HW ever on-site	13.4			

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B-13		Methods for removing, transporting, treating, storing or disposing of all HW.	13.4			
B-13		Types of off-site HWMU's to be used, if applicable	13.4			
B-13	264.112(b)(4)	Steps to remove or decontaminate all HW residues and contaminated units/parts	13.4			
B-13	264.112(b)(5)	Other activities necessary during closure Specific Requirements (264.178, 264.197, 264.228, 264.258, 264.280, 264.310, 264.351, 264.601, 264.603)	13.4			
B-13	264.112(b)(6)	Schedule for Closure	13.7			
B-13	264.112(b)(7)	Estimate of final closure year [**if using trust fund for financial assurance**]	Not Applicable , 13.8			
B-13	264.112(b)(8)	Alternative Requirements	Not Applicable, 13.9			
B-13	264.118(a)	Written [Post-Closure Plan]	Not Applicable, 13.10			
B-13	264.118(b)	Post-Closure activities and frequency	Not Applicable, 13.11			
B-13	264.118(b)(1)	Monitoring activities and frequency	Not Applicable, 13.10			
B-13	264.118(b)(2)	Maintenance activities and frequency	Not Applicable, 13.10			
B-13	264.118(b)(2)(i)	Integrity of containment systems	Not Applicable, 13.10			
B-13	264.118(b)(2)(ii)	Function of monitoring equipment	Not Applicable, 13.10			
B-13	264.118(b)(3)	Contact info during post-closure care	Not Applicable, 13.10			
B-13	264.118(b)(3)	Alternative Requirements	Not Applicable, 13.10			
B-14	270.14(b)(14)	Documentation filed (required under 264.119) for closed units	Not Applicable, 14.0			
		This applies to Closed HW Disposal Units				
	264.119	Notice Documentation	Not Applicable, 14.0			
B-14	270.14(b)(15)	Post-Closure Notices	Not Applicable, 14.0			
B-15	270.14(b)(15)	**Closure estimates** (required under 264.142) and financial assurance (required under 264.143)	15.0			
B-15	246.142	Third Party Cost Estimate	Appendix 15-A			

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B-15	264.143	Financial Assurance for Closure □ Closure trust fund [264.143(a)] □ Surety bond into trust fund [264.143(b)] □ Surety bond guaranteeing performance of closure [264.143c] □ Closure letter of credit [264.143(d)] □ Closure insurance [264.13(e) □ Financial test and corporate guarantee for closure [264.143(f)] □ Multiple financial mechanisms [264.143(g)] □ Financial mechanism for multiple facilities [264.143(h)] □ Release of owner/operator from these requirements [264.143(i)]	15.3			
B-16	270.14(b)(16)	The most recent **post-closure estimates** (required under 264.144) and financial assurance (required under 264.145), where applicable.	Not Applicable, 14.0			
B-16	264.142	Third party cost estimate	Not Applicable, 16.0			
B-16	264.143	Financial assurance for closure	Not Applicable, 14.0			
B-16		□ Closure trust fund [264.143(a)] □ Surety bond into trust fund [264.143(b)]>Surety bond guaranteeing performance of closure [264.143c] □ Closure letter of credit [264.143(d)]>Closure insurance [264.13(e) □ Financial test and corporate guarantee for closure [264.143(f)] □ Multiple financial mechanisms [264.143(g)] □ Financial mechanism for multiple facilities [264.143(h)] □ Release of owner/operator from these requirements [264.143(i)]	Not Applicable, 14.0, 16.0			
B-17	270.14(b)(17)	Insurance policy or other documentation in compliance with 264.147, where applicable.	17.0			
B-17	264.147(a)	Coverage for **Sudden Accidental Occurrences**	17.2			
B-17		□ Liability insurance [264.147(a)(1)] □ Financial test of guarantee of liability coverage [264.147(a)(2)] □ Letter of credit [264.147(a)(3)] □ Surety bond [264.147(a)(4)] □ Trust fund [264.147(a)(5) □ Multiple liability mechanisms [264.147(a)(6)	17.2			

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B-17	264.147(b)	Coverage for **Non-Sudden Accidental Occurrences**				
B-17		☐ Liability insurance [264.147(a)(1)] ☐ Financial test of guarantee of liability coverage [264.147(a)(2)] ☐ Letter of credit [264.147(a)(3)] ☐ Surety bond [264.147(a)(4)] ☐ Trust fund [264.147(a)(5) ☐ Multiple liability mechanisms [264.147(a)(6)	17.3			
B-17	264.147(c)	Request for Variance	Not Applicable			
B-18	270.14(b)(18)	Coverage by a State financial mechanism in compliance with 264.149 and 264.150, where appropriate	Not Applicable			
B-19	270.14(b)(19)	A 1" = 200 ft topographic map with contours showing 1000 ft around the facility and: (i) Map scale and date (ii) 100-year floodplain (iii) Surface waters (iv) Surrounding land uses (v) Wind rose (vi) Orientation of the map (vii) Legal boundaries of the facility (viii) Access control (ix) Injection and withdrawal wells both on and offsite (x) Buildings, structures (xi) Barriers for drainage or flood control (xii) Location of operational units	Part A, Introduction, 18.0, Appendices 1-A and 11-B			
Must show a distance of 1,000 ft around the unit at a scale of 1" to not more than 200' (multiple maps may be submitted at this scale); should be shown and should be similar to Part A topographic map. Use GPS coordinates for locations of the below requirements for the map.						
B-19		Contours [***The contour interval must be sufficient to clearly show the pattern of surface water flow in the vicinity of and from each operational unit of the facility. For example, contours with an interval of 5', if relief is greater than 20', or an interval of 2' if relief is less than 20'. Mountainous areas should use large contour intervals to adequately show topographic profiles of facilities.***]	Part A, Introduction, 18.0, Appendices 1-A and 11-B			
B-19	270.14(b)(19)(i)	Map scale and date [Other scales may be used if justified.]	Part A, Introduction, 18.0, Appendices 1-A and 11-B			

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B-19	270.14(b)(19)(ii) NAC 444.8456[1.c]	The 100-year floodplain area	Part A and 11-B			
B-19	270.14(b)(19)(iii)	Surface waters (including intermittent streams)	18.0, Appendices 1-A Appendix 11-B			
B-19	270.14(b)(19)(iv)	Surrounding land use (residential, commercial, agricultural, recreational) [***Include considerations of EJ issues or National Historic Preservation Act (especially Indian lands***]	Appendix 11-B			
B-19	270.14(b)(19)(v)	Wind Rose (i.e., prevailing wind-speed and direction) [***The frequency of occurrence of various wind directions should be compared to sensitive (local/regional) receptor points downwind.***]	Appendix 11-B			
B-19	270.14(b)(19)(vi)	Map orientation	Maps and Figures			
B-19	270.14(b)(19)(vii)	Legal boundaries	Appendix 11-C			
B-19	270.14(b)(19)(viii)	Access Control (fences, gate)	3.2, Appendix 1-A			
B-19	270.14(b)(19)(ix)	Injection and withdrawal wells (on-site and off-site)	Not Applicable, Appendices 1-A and 11-B, 18.0			
B-19	270.14(b)(19)(x)	Buildings and other structures [See 40 CFR 270.14(b)(19)(x) for an example list.]	18. 0, Appendix 1-A			
B-19	270.14(b)(19)(xi)	Drainage and flood control barriers	3.2, 18.0, Appendix 1-A			
B-19	270.14(b)(19)(xii)	Location of Operational TSD Units(s) and Decontamination Areas:	1.0, 18.0, Appendix 1-A			
B-19		• Property boundary and distance of treatment unit to property boundaries • Distance to buildings on/off-site • Distance to public roadways • Distance to closest receptor [270.33(e)] • ***[Receptors include human and environmental receptors within the facility boundary.]***	1-A, Appendix 1-A			

ITEM #	REGULATIONS	GENERAL DESCRIPTION	LOCATION IN APPLICATION	ADMIN COMPLETE (Y / N / NA)	TECH COMPLETE (Y / N / NA)	COMMENTS
B-19	270.14(c)	• Additional info on the topographic map:				
B-19		• Uppermost aquifer and hydraulically connected aquifers beneath facility property [270.14(c)(2)] • Groundwater flow direction [270.14(c)(2)] • Waste management areas[270.14(c)(3 • Point of compliance location [270.14(c) (3) • ***[Defined in 264.95; however, for OB/OD units, this will be determined on a case-by-case basis and may be at the BOUNDARY DETERMINATION.]*** • Location of groundwater monitoring wells [270.14(c)(3)] • Extent of any groundwater contaminant plume[[270.14(c)(4)(i)] • Location of unsaturated zone monitoring [270.23(e)] ***[If unit incorporates the soil as part of the zone of engineering control, the monitoring of this zone should be shown]***	20.0, Appendix 20-A through 20-C			
B-20	270.14(b)(21)	Notice of **approval of petition for extension** for land disposal facilities, if applicable.	Not Applicable, no extension requested			
[If case-by-case extension has been approved under 268.5 or a petition has been approved under 268.6]						
B-20	270.14(b)(21)	Copy of Notice of Approval	Not Applicable			
B-20	270.14(b)(22)	**Summary of Pre-Application Meeting:** • List of Attendees • Attendees Addresses • Copies of Written Comments • Copies of Materials Submitted	Intro, Appendices I-A and I-B			
Additional information						
B-21	270.14(c)(1)	A summary of groundwater monitor data under 265.90-94), where applicable	20.0, Appendices 20-A through 20-C			
B-22	270.14(c)(2)	**Identification of**: • The uppermost aquifer, • Hydraulically connected aquifers, • Flow direction and rate, and • Basis for such identification	20.0, Appendices 20-A through 20-C			
B-23	270.14(c)(3)	On the **topo map**, a delineation of the waste management area, property boundary, the proposed point of compliance (264.95), proposed GW monitoring wells (264.97), and info from 270.14(c)(2)	18.0, 20.0, Appendices 1-A, 11-B, and 20-A through 20-C			

ITEM #	REGULATIONS	GENERAL DESCRIPTION	LOCATION IN APPLICATION	ADMIN COMPLETE (Y / N / NA)	TECH COMPLETE (Y / N / NA)	COMMENTS
B-24	270.14(c)(4)	Description of any plume of contamination from a regulated unit: (i) The extent of the plume on the topo map (ii) Identification of concentrations of constituents in Appendix IX of 264	Not Applicable, 20.0, Appendix 20-B, 20-C			
B-25	270.14(c)(5)	A detailed **GW monitoring program** with engineering report (264.97)	Not Applicable, 20.0			
B-26	270.14(c)(6)	If a hazardous constituent has not been detected at time of application, establish a **detection monitoring program** (264.98): (i) Indicator parameters, waste constituents, or reaction products (ii) A proposed groundwater monitoring system (iii) Background values (iv) Proposed sampling, analysis, and statistical procedures	Not Applicable, 20.0			
B-27	270.14(c)(7)	If a hazardous constituent has been detected at time of application, establish a **compliance monitoring program** (264.99): (i) A description of wastes previously handled (ii) A characterization of the contaminated GW (iii) A list of hazardous constituents (264.97 & 264.99) (iv) Proposed concentration limits (264.94(a)) or justification for alternate limits (v) A proposed GW monitoring system (vi) Proposed sampling, analysis, and statistical procedures (vii) A proposed Engineering Feasibility Plan for corrective action	Not Applicable, 20.0			
B-28	270.14(c)(8)	If hazardous constituents have exceeded concentration limits (Table 1, 264.94) or background values, establish a **corrective action program** (264.100): (i) A Characterization of contaminated GW (ii) Concentration limits (264.94) (iii) A detailed corrective action program and engineering report (iv) Demonstration of adequacy of the corrective program	Not Applicable, 20.0			
B-29	270.14(d)(1)	Information on SWMUs	Not Applicable, 21.0			
B-30	270.14(d)(2)	Releases from SWMUs	Not Applicable, 21.0			
B-31	270.14(d)(3)	Results of Sampling and Analysis	Not Applicable, 21.0			
Specific Part B Information Requirements for Containers – 270.15			22.0			
C-1	270.15(a)	**Description of the containment system** in compliance with 264.175	1.1, 1.2, 22.6			

ITEM #	REGULATIONS	GENERAL DESCRIPTION	LOCATION IN APPLICATION	ADMIN COMPLETE (Y / N / NA)	TECH COMPLETE (Y / N / NA)	COMMENTS
C-2	270.15(a)(1)	Basic design parameters, dimensions, and materials of construction	1.1, 1.2, 22.0			
C-3	270.15(a)(2)	Showing of **how design promotes drainage** or keeps containers from contacting standing liquid.	1.1, 1.2, Appendix 1-A, 22.7			
C-4	270.15(a)(3)	Capacity of the containment system relative to the number and volume of containers stored	1.1, Appendix 1-A, 20.0, 23.6.1, Table 1.2-1, Appendix 22-B			
C-5	270.15(a)(4)	Provisions for preventing or managing run-on	Not Applicable, 1.2, Appendix 1-A, 22.6, 22.9			
C-6	270.15(a)(5)	Showing of **how accumulated liquids can be analyzed and removed** to prevent overflow	1.1, 1.2, Appendix 1-A, 22.8			
C-7	270.15(b)	For storage areas with containers that do not contain free liquid, a showing of **compliance with 264.175(c)**	22.10			
C-8	270.15(b)(1)	Test procedures and results or documentation to **show wastes do not contain free liquids**	22.10.2			
C-9	270.15(b)(2)	Description of storage area design and operation to **drain/remove liquid or keep containers from contacting standing liquids**	22.8.2			
C-10	270.15(15)(c)	Sketches, drawings, or data to show compliance with 264.176 (ignitable reactive wastes) and 264.177(c) (incompatible wastes) • Location of containers and buffer zone • Location of incompatible wastes	Not Applicable, 22.11.1, 22.11.2			
C-11	270.15(d)	Procedures in c**ompliance with 264.177(a) & (b) and 264.17(b) & (c)** for storing of incompatible wastes • Incompatible waste must not be placed in the same container [264.177(a)] • No unwashed containers [264.177(b)] • Prevent reactions [264.17(b)] • Documentation of compliance with 264.17(b) [264.17(c)]	Not Applicable, 22.11.2			
C-12	270.15(3)	Air emission control equipment	22.12			
Specific Part B Information Requirements for Tanks – 270.16						
T-1	270.16(a)	A written assessment by an independent P.E. to certify the structural integrity and suitability for handling of hazardous wastes of each tank system as required under 264.191 & 192	23.0			
T-2	270.16(b)	Dimensions and capacity of each tank	23.1, Appendices 1-A, 1-B, and Table 23.1-1			

ITEM #	REGULATIONS	GENERAL DESCRIPTION	LOCATION IN APPLICATION	ADMIN COMPLETE (Y / N / NA)	TECH COMPLETE (Y / N / NA)	COMMENTS
T-3	270.16(c)	Description of: • Feed systems, • Safety cutoff, • Bypass systems, and • Pressure controls	23.6.1, Appendix 1-B			
T-4	270.16(d)	For each tank system, a diagram of: • Piping, • Instrumentation, and • Process flow	Appendix 1-B			
T-5	270.16(e)	A description of materials/equipment used for external corrosion protection, as required under 264.192(a)(3)(ii)	23.1,			
T-6	270.16(f)	For new tank systems, a description of how the tank system(s) will be installed in compliance with 264.192(b), (c), (d), (e); including testing plans and procedures	23.4			
T-7	270.16(g)	Detailed plans and description of the secondary containment system in compliance with 264.193(a), (b), (c), (d), (e), (f): • Tank age determination [264.193(a) • Design, construction, and operation of secondary containment system [2643.193(b)-(f)] ○ Secondary containment and leak detection [264.193(b), (c); 264.1101(b)(3)(iii) ○ External liner, vault, double-walled tank or equivalent device [264.193(d), (e)] ○ Ancillary equipment [264.193(f)]	1.2, 23.2			
T-8	270.16(g) 270.16(h)(1) 264.193(g)(1) 264.193(h)	Detailed plans, and engineering and hydrogeologic reports showing alternative safeguards Equivalent protection	Not Applicable, 23.4, 23.5			
T-9	270.16(h)(2)	A detailed assessment of hazards in event of release	23.1, 23.5, 23.8, Appendix 6-A			
	270.16(h)(2) 264.193(g)(2) 264.193(h)	Demonstration of no substantial present/potential hazard	5.7, 8.1, Appendix 6-A			
	264.190(a)	No free liquids and location inside a building	22.4, 22.10.2			
T-10	270.16(i)	Description of spill and overflow prevention as required under 264.194(b)	23.0			
	264.194(b)	Detailed description of controls/practices to prevent spills/overflows	23.0			

ITEM #	REGULATIONS	GENERAL DESCRIPTION	LOCATION IN APPLICATION	ADMIN COMPLETE (Y / N / NA)	TECH COMPLETE (Y / N / NA)	COMMENTS
T-11	270.16(j)	Description of operating procedures, tank system design, facility design for ignitable/reactive and incompatible wastes as required under 264.198, 199	Not Applicable, 23.0			
T-11	264.198	Special requirements for ignitable or reactive wastes	Not applicable, 23.10			
T-11	264.17(b)	Special requirements for incompatible wastes	Not applicable, 23.11			
SI-1 through SI-20	270.17	Specific part B information requirements for surface impoundments	24.0, Not Applicable; no surface impoundments			
W-1 though W-18	270.18	Specific part B information requirements for waste piles	25.0, Not Applicable; no waste piles			
IN-1 through IN-16	270.19	Specific part B information requirements for incinerators	26.0, Not Applicable; no incinerators			
LT-1 through LT-31	270.20	Specific part B information requirements for land treatment facilities	27.0, Not Applicable; no land treatment			
LF-1 through LF-19	270.21	Specific part B information requirements for landfills	28.0, Not Applicable; no landfill			
BF-1 through BF-16	270.22	Specific part B information requirements for boilers and industrial furnaces burning hazardous waste	29.0, Not Applicable; no boilers or industrial furnaces			
M-1	270.23	Specific part B information requirements for miscellaneous units: Retort, Filter Press	1.2, 30.0			
M-2	270.23(a)(1)	Description Retort Filter Press	1.2, 30.1 1.2, 30.2			
M-3	270.23(a)(2)	Engineering drawings	Appendix, 1-A, Appendix 30-A			
M-3	270.23(a)(2) 264.601 264.602	Operation Retort Filter Press	30.1 30.2			
M-3	270.23(a)(2) 264.601 264.602	Maintenance	30.0			

ITEM #	REGULATIONS	GENERAL DESCRIPTION	LOCATION IN APPLICATION	ADMIN COMPLETE (Y / N / NA)	TECH COMPLETE (Y / N / NA)	COMMENTS
M-3	270.23(a)(2) 264.601 264.602	Monitoring	30.0			
M-3	270.23(a)(2) 264.601 264.602	Inspection	30.0			
M-3	270.23(a)(2) 264.601 264.602	Closure	30.0			
M-4	270.23(a)	Post-closure requirements	Not Applicable			
M-4	264.603	Post-closure requirements	Not Applicable			
M-5	270.23(b)	Assessments for land-based Units	Not Applicable; no land-based units			
M-5	264.601	Assessments for land-based Units	Not Applicable; no land-based units			
M-6	270.23(c)	Exposure	Not Applicable; no land-based units			
M-7	270.23(d)	Report on effectiveness of treatment Retort Filter Press	30.1 30.2			
M-8	270.23(e)	Additional information	none requested			
V-1 through V-12	270.24	Specific part B information requirements for process vents	31.0, Not Applicable; no organic carbons present			
E-1 through E-15	270.25	Specific part B information requirements for equipment	32.0, Not Applicable; no organic carbons present			
D-1 through D-19	270.26	Special part B information requirements for drip pads	33.0, Not Applicable; no drip pads			

Precious Metals Recovery LLC
Dry Hills Facility
EPA ID# NVR000088542
Eureka County, Nevada

RCRA Part A Permit Application

Revision 3

December 2, 2013

PREPARED FOR:

Precious Metals Recovery LLC
460 W. 50 North, Suite 500
Salt Lake City, Utah 84101
Contact: Rich Haddock
Ph: 801.990.3773

PREPARED BY:

JBR Environmental Consultants, Inc.
8160 South Highland Drive
Sandy, Utah 84093
Contact: Rachel Shilton
Ph: 801.943.4144 Ext. 1133

Hatch
2800 Speakman Drive
Mississauga, Ontario, Canada
Contact: Sonia Sennik
Ph: 905.403.4043

Part A Application

Dry Hills Treatment and Storage Facility

OMB# 2050-0024; Expires 12/31/2014

SEND COMPLETED FORM TO: The Appropriate State or Regional Office.	United States Environmental Protection Agency **RCRA SUBTITLE C SITE IDENTIFICATION FORM**	

1. Reason for Submittal

MARK ALL BOX(ES) THAT APPLY

Reason for Submittal:

- ☐ To provide an Initial Notification (first time submitting site identification information / to obtain an EPA ID number for this location)
- ☐ To provide a Subsequent Notification (to update site identification information for this location)
- ☐ As a component of a First RCRA Hazardous Waste Part A Permit Application
- ☒ As a component of a Revised RCRA Hazardous Waste Part A Permit Application (Amendment # 3)
- ☐ As a component of the Hazardous Waste Report (If marked, see sub-bullet below)
  - ☐ Site was a TSD facility and/or generator of ≥1,000 kg of hazardous waste, >1 kg of acute hazardous waste, or >100 kg of acute hazardous waste spill cleanup in one or more months of the report year (or State equivalent LQG regulations)

2. Site EPA ID Number	**EPA ID Number** N V R 0 0 0 0 8 8 5 4 2		
3. Site Name	**Name:** Dry Hills Facility		
4. Site Location Information	**Street Address:** APN # 005-530-17		
	City, Town, or Village: Crescent Valley		**County:** Eureka
	State: NV	**Country:** USA	**Zip Code:** 89821-1250
5. Site Land Type	☑ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other		
6. NAICS Code(s) for the Site (at least 5-digit codes)	**A.** 5 6 2 2 1 1	**C.**	
	B.	**D.**	
7. Site Mailing Address	**Street or P.O. Box:** PO Box 1250		
	City, Town, or Village: Crescent Valley		
	State: NV	**Country:** USA	**Zip Code:** 89821-1250
8. Site Contact Person	**First Name:** Richie	**MI:**	**Last:** Haddock
	Title: Secretary, Precious Metals Recovery LLC		
	Street or P.O. Box: 460 W. 50 North, Suite 500		
	City, Town or Village: Salt Lake City		
	State: UT	**Country:** USA	**Zip Code:** 84101
	Email: rhaddock@barrick.com		
	Phone: (801) 990-3773	**Ext.:**	**Fax:**
9. Legal Owner and Operator of the Site	**A. Name of Site's Legal Owner:** Precious Metals Recovery LLC		**Date Became Owner:** 02/07/2013
	Owner Type: ☑ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other		
	Street or P.O. Box: 460 W. 50 North, Suite 500		
	City, Town, or Village: Salt Lake City		**Phone:** (801) 990-3900
	State: UT	**Country:** USA	**Zip Code:** 84101
	B. Name of Site's Operator: Precious Metals Recovery LLC		**Date Became Operator:** 2014
	Operator Type: ☑ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other		

10. Type of Regulated Waste Activity (at your site)
Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities; Complete all parts 1-10.

Y ☑ N ☐ **1. Generator of Hazardous Waste**
If "Yes", mark only one of the following – a, b, or c.

☑ a. LQG: Generates, in any calendar month, 1,000 kg/mo (2,200 lbs./mo.) or more of hazardous waste; **or** Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lbs./mo) of acute hazardous waste; **or** Generates, in any calendar month, **or** accumulates at any time, more than 100 kg/mo (220 lbs./mo) of acute hazardous spill cleanup material.

☐ b. SQG: 100 to 1,000 kg/mo (220 – 2,200 lbs./mo) of non-acute hazardous waste.

☐ c. CESQG: Less than 100 kg/mo (220 lbs./mo) of non-acute hazardous waste.

If "Yes" above, indicate other generator activities in 2-4.

Y ☐ N ☑ **2. Short-Term Generator** (generate from a short-term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section.

Y ☐ N ☑ **3. United States Importer of Hazardous Waste**

Y ☐ N ☑ **4. Mixed Waste (hazardous and radioactive) Generator**

Y ☐ N ☑ **5. Transporter of Hazardous Waste**
If "Yes", mark all that apply.

☐ a. Transporter

☐ b. Transfer Facility (at your site)

Y ☑ N ☐ **6. Treater, Storer, or Disposer of Hazardous Waste** Note: A hazardous waste Part B permit is required for these activities.

Y ☐ N ☑ **7. Recycler of Hazardous Waste**

Y ☐ N ☑ **8. Exempt Boiler and/or Industrial Furnace**
If "Yes", mark all that apply.

☐ a. Small Quantity On-site Burner Exemption

☐ b. Smelting, Melting, and Refining Furnace Exemption

Y ☐ N ☑ **9. Underground Injection Control**

Y ☑ N ☐ **10. Receives Hazardous Waste from Off-site**

B. Universal Waste Activities; Complete all parts 1-2.

Y ☐ N ☑ **1. Large Quantity Handler of Universal Waste (you accumulate 5,000 kg or more) [refer to your State regulations to determine what is regulated]. Indicate types of universal waste managed at your site. If "Yes", mark all that apply.**

a. Batteries ☐
b. Pesticides ☐
c. Mercury containing equipment ☐
d. Lamps ☐
e. Other (specify) ______________ ☐
f. Other (specify) ______________ ☐
g. Other (specify) ______________ ☐

Y ☐ N ☑ **2. Destination Facility for Universal Waste**
Note: A hazardous waste permit may be required for this activity.

C. Used Oil Activities; Complete all parts 1-4.

Y ☐ N ☑ **1. Used Oil Transporter**
If "Yes", mark all that apply.

☐ a. Transporter

☐ b. Transfer Facility (at your site)

Y ☐ N ☑ **2. Used Oil Processor and/or Re-refiner**
If "Yes", mark all that apply.

☐ a. Processor

☐ b. Re-refiner

Y ☐ N ☑ **3. Off-Specification Used Oil Burner**

Y ☐ N ☑ **4. Used Oil Fuel Marketer**
If "Yes", mark all that apply.

☐ a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner

☐ b. Marketer Who First Claims the Used Oil Meets the Specifications

D. Eligible Academic Entities with Laboratories—Notification for opting into or withdrawing from managing laboratory hazardous wastes pursuant to 40 CFR Part 262 Subpart K

❖ You can **ONLY** Opt into Subpart K if:

- you are at least one of the following: a college or university; a teaching hospital that is owned by or has a formal affiliation agreement with a college or university; or a non-profit research institute that is owned by or has a formal affiliation agreement with a college or university; AND
- you have checked with your State to determine if 40 CFR Part 262 Subpart K is effective in your state

Y ☐ N ☑ 1. Opting into or currently operating under 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories **See the item-by-item instructions for definitions of types of eligible academic entities. Mark all that apply:**

☐ a. College or University

☐ b. Teaching Hospital that is owned by or has a formal written affiliation agreement with a college or university

☐ c. Non-profit Institute that is owned by or has a formal written affiliation agreement with a college or university

Y ☐ N ☑ 2. Withdrawing from 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories

11. Description of Hazardous Waste

A. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g., D001, D003, F007, U112). Use an additional page if more spaces are needed.

D002						
D004						
D005						
D006						
D007						
D008						
D009						
D010						
D011						

B. Waste Codes for State-Regulated (i.e., non-Federal) Hazardous Wastes. Please list the waste codes of the State-Regulated hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

NA						

12. Notification of Hazardous Secondary Material (HSM) Activity

Y ☐ N ☑ Are you notifying under 40 CFR 260.42 that you will begin managing, are managing, or will stop managing hazardous secondary material under 40 CFR 261.2(a)(2)(ii), 40 CFR 261.4(a)(23), (24), or (25)?

If "Yes", you must fill out the Addendum to the Site Identification Form: Notification for Managing Hazardous Secondary Material.

13. Comments

Item 4: The site survey recorded the location of the site in UTM coordinates, North American Datum of 1983, (UTM Zone 11). The coordinates for the northwest corner of the Dry Hills TSF building are: N 14,681,068.24 and E 1,816,741.50. All RCRA hazardous waste units are located within the TSF building.

Item 11, Line A: Waste managed at PMR is treated for the mercury constituent; other waste codes may also apply to some wastes, and therefore, have been listed here.

14. Certification. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. For the RCRA Hazardous Waste Part A Permit Application, all owner(s) and operator(s) must sign (see 40 CFR 270.10(b) and 270.11).

Signature of legal owner, operator, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
[signature]	Richie Haddock, Secretary	12/02/2013

ADDENDUM TO THE SITE IDENTIFICATION FORM:

NOTIFICATION OF HAZARDOUS SECONDARY MATERIAL ACTIVITY

<u>**ONLY fill out this form if**</u>:

- You are located in a State that allows you to manage excluded hazardous secondary material (HSM) under 40 CFR 261.2(a)(2)(ii), 261.4(a)(23), (24), or (25) (or state equivalent). See http://www.epa.gov/epawaste/hazard/dsw/statespf.htm for a list of eligible states; **AND**

- You are or will be managing excluded HSM in compliance with 40 CFR 261.2(a)(2)(ii), 261.4(a)(23), (24), or (25) (or state equivalent) **or** you have stopped managing excluded HSM in compliance with the exclusion(s) and do not expect to manage any amount of excluded HSM under the exclusion(s) for at least one year. <u>Do not include any information regarding your hazardous waste activities in this section.</u>

1. Indicate reason for notification. Include dates where requested.

☐ Facility <u>will begin managing</u> excluded HSM as of ____________ (mm/dd/yyyy).

☐ Facility <u>is still managing</u> excluded HSM/re-notifying as required by March 1 of each even-numbered year.

☐ Facility <u>has stopped managing</u> excluded HSM as of ____________ (mm/dd/yyyy) and is notifying as required.

2. Description of excluded HSM activity. Please list the appropriate codes and quantities in **short tons** to describe your excluded HSM activity <u>ONLY</u> (do not include any information regarding your hazardous wastes). Use additional pages if more space is needed.

a. Facility code (answer using codes listed in the Code List section of the instructions)	**b. Waste code(s) for HSM**	**c. Estimated short tons of excluded HSM to be managed annually**	**d. Actual short tons of excluded HSM that was managed during the most recent odd-numbered year**	**e. Land-based unit code** (answer using codes listed in the Code List section of the instructions)

3. Facility has financial assurance pursuant to 40 CFR 261.4(a)(24)(vi). (Financial assurance is required for reclaimers and intermediate facilities managing excluded HSM under 40 CFR 261.4(a)(24) and (25))

Y☐ N☐ Does this facility have financial assurance pursuant to 40 CFR 261.4(a)(24)(vi)?

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EPA ID Number | N | V | R | 0 | 0 | 0 | 0 | 8 | 8 | 5 | 4 | 2 | OMB#: 2050-0024; Expires 12/31/2014

United States Environmental Protection Agency

HARDOUS WASTE PERMIT INFORMATION FORM

1. Facility Permit Contact	**First Name:** Richie	**MI:**	**Last Name:** Haddock
	Contact Title: Secretary, Precious Metals Recovery LLC		
	Phone: (801) 990-3773	**Ext.:**	**Email:** rhaddock@barrick.com
2. Facility Permit Contact Mailing Address	**Street or P.O. Box:** 460 W. 50 North, Suite 500		
	City, Town, or Village: Salt Lake City		
	State: UT		
	Country: USA	**Zip Code:** 84101	
3. Operator Mailing Address and Telephone Number	**Street or P.O. Box:** PO Box 1250		
	City, Town, or Village: Crescent Valley		
	State: NV	**Phone:**	
	Country: USA	**Zip Code:** 89821-1250	
4. Facility Existence Date	**Facility Existence Date (mm/dd/yyyy):** 12/31/2014		

5. Other Environmental Permits

A. Facility Type *(Enter code)*	B. Permit Number	C. Description
E		SAD Construction permit (not yet issued)
E		CAPP to construct permit, BAPC (not yet issued)
E		CAPP to operate permit, BAPC (not yet issued)
P		Minor Source, Class II Air permit, (not yet issued)
E		Fire Marshal Hazardous Materials Permit (not yet issued)
E		Uniform Fire Flammable Materials Permit (not yet issued)

6. Nature of Business: treatment of mercury-bearing mining wastes to recover elemental mercury; storage of pre-treated wastes; interim storage of elemental mercury pending shipment to National Mercury Repository

7. Process Codes and Design Capacities – Enter information in the Section on Form Page 3

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space provided in Item 8.

B. PROCESS DESIGN CAPACITY – For each code entered in Item 7.A; enter the capacity of the process.

1. **AMOUNT – Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.**
2. **UNIT OF MEASURE – For each amount entered in Item 7.B(1), enter the code in Item 7.B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.**

C. PROCESS TOTAL NUMBER OF UNITS – Enter the total number of units for each corresponding process code.

Process Code	Process	Appropriate Unit of Measure for Process Design Capacity
Disposal		
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Landfill	Acre-feet; Hectares-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure Listed Below
Storage		
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S03	Waste Pile	Cubic Yards or Cubic Meters
S04	Surface Impoundment	Gallons; Liters; Cubic Meters; or Cubic Yards
S05	Drip Pad	Gallons; Liters; Cubic Meters; Hectares; or Cubic Yards
S06	Containment Building Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure Listed Below
Treatment		
T01	Tank Treatment	Gallons Per Day; Liters Per Day
T02	Surface Impoundment	Gallons Per Day; Liters Per Day
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Metric Tons Per Hour; or Million BTU Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Short Tons Per Day; BTUs Per Hour; Gallons Per Day; Liters Per Hour; or Million BTU Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; or Million BTU Per Hour

Process Code	Process	Appropriate Unit of Measure for Process Design Capacity
Treatment (Continued)		**(for T81 – T94)**
T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; Liters Per Hour; Kilograms Per Hour; or Million BTU Per Hour
T82	Lime Kiln	
T83	Aggregate Kiln	
T84	Phosphate Kiln	
T85	Coke Oven	
T86	Blast Furnace	
T87	Smelting, Melting, or Refining Furnace	
T88	Titanium Dioxide Chloride Oxidation Reactor	
T89	Methane Reforming Furnace	
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used in the Recovery of Sulfur Values from Spent Sulfuric Acid	
T92	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed in 40 CFR 260.10	
T94	Containment Building Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTU Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million BTU Per Hour
Miscellaneous (Subpart X)		
X01	Open Burning/Open Detonation	Any Unit of Measure Listed Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Kilograms Per Hour; Gallons Per Hour; Liters Per Hour; or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; or Million BTU Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

Unit of Measure	Unit of Measure Code	Unit of Measure	Unit of Measure Code	Unit of Measure	Unit of Measure Code
Gallons	**G**	**Short Tons Per Hour**	**D**	**Cubic Yards**	**Y**
Gallons Per Hour	**E**	**Short Tons Per Day**	**N**	**Cubic Meters**	**C**
Gallons Per Day	**U**	**Metric Tons Per Hour**	**W**	**Acres**	**B**
Liters	**L**	**Metric Tons Per Day**	**S**	**Acre-feet**	**A**
Liters Per Hour	**H**	**Pounds Per Hour**	**J**	**Hectares**	**Q**
Liters Per Day	**V**	**Kilograms Per Hour**	**X**	**Hectare-meter**	**F**
		Million BTU Per Hour	**X**	**BTU Per Hour**	**I**

7. Process Codes and Design Capacities (Continued)

EXAMPLE FOR COMPLETING Item 7 (shown in line number X-1 below): A facility has a storage tank, which can hold 533.788 gallons.

Line Number		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	(2) Unit of Measure	C. Process Total Number of Units	For Official Use Only
X	1	S	0	2	533.788	G	001	
	1	S	0	1	28,000	G	001	
	2	S	0	2	7,200	G	002	
	3	T	0	1	1,500	U	004	
	4	X	0	2	400	U	001	
	5	X	0	3	220	U	002	
	6							
	7							
	8							
	9							
1	0							
1	1							
1	2							
1	3							

Note: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the line sequentially, taking into account any lines that will be used for "other" process (i.e., D99, S99, T04, and X99) in Item 8.

8. Other Processes (Follow instructions from Item 7 for D99, S99, T04, and X99 process codes)

Line Number (Enter #s in sequence with Item 7)		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	(2) Unit of Measure	C. Process Total Number of Units	For Official Use Only
X	2	T	0	4	100.00	U	001	

9. Description of Hazardous Wastes - Enter Information in the Sections on Form Page 5

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

B. ESTIMATED ANNUAL QUANTITY – For each listed waste entered in Item 9.A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in Item 9.A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE – For each quantity entered in Item 9.B, enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

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

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

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all listed hazardous wastes.

For non-listed waste: For each characteristic or toxic contaminant entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

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

1. **Enter the first two as described above.**
2. **Enter "000" in the extreme right box of Item 9.D(1).**
3. **Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 9.E.**

2. PROCESS DESCRIPTION: If code is not listed for a process that will be used, describe the process in Item 9.D(2) or in Item 9.E(2).

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

1. **Select one of the EPA Hazardous Waste Numbers and enter it in Item 9.A. On the same line complete Items 9.B, 9.C, and 9.D by estimating the total annual quantity of the waste and describing all the processes to be used to store, treat, and/or dispose of the waste.**
2. **In Item 9.A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In Item 9.D.2 on that line enter "included with above" and make no other entries on that line.**
3. **Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.**

EXAMPLE FOR COMPLETING Item 9 (shown in line numbers X-1, X-2, X-3, and X-4 below) – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter Code)									D. PROCESSES (2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))
X	1	K	0	5	4	900	P	T	0	3	D	8	0				
X	2	D	0	0	2	400	P	T	0	3	D	8	0				
X	3	D	0	0	1	100	P	T	0	3	D	8	0				
X	4	D	0	0	2												Included With Above

9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))
	1	D	0	0	9	226	T	S	0	1	X	0	3				elemental mercury
	2	D	0	0	2												same as line 1
	3	D	0	0	4												same as line 1
	4	D	0	0	5												same as line 1
	5	D	0	0	6												same as line 1
	6	D	0	0	7												same as line 1
	7	D	0	0	8												same as line 1
	8	D	0	1	0												same as line 1
	9	D	0	1	1												same as line 1
1	0	D	0	0	9	120	T	S	0	1	X	0	3				carbon
1	1	D	0	0	2												same as line 10
1	2	D	0	0	4												same as line 10
1	3	D	0	0	5												same as line 10
1	4	D	0	0	6												same as line 10
1	5	D	0	0	7												same as line 10
1	6	D	0	0	8												same as line 10
1	7	D	0	1	0												same as line 10
1	8	D	0	1	1												same as line 10
1	9	D	0	0	9	61	T	S	0	1	D	8	0				treated carbon residue
2	0	D	0	0	2												same as line 19
2	1	D	0	0	4												same as line 19
2	2	D	0	0	5												same as line 19
2	3	D	0	0	6												same as line 19
2	4	D	0	0	7												same as line 19
2	5	D	0	0	8												same as line 19
2	6	D	0	1	0												same as line 19
2	7	D	0	1	1												same as line 19
2	8	D	0	0	9	306	T	S	0	1	T	0	1				calomel
2	9	D	0	0	2												same as line 28
3	0	D	0	0	4												same as line 28
3	1	D	0	0	5												same as line 28
3	2	D	0	0	6												same as line 28
3	3	D	0	0	7												same as line 28
3	4	D	0	0	8												same as line 28
3	5	D	0	1	0												same as line 28
3	6	D	0	1	1												same as line 28

9. Description of Hazardous Wastes *(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)*																	
Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter code)									(2)PROCESS DESCRIPTION (if code is not entered in 9.D.1))
3	7	D	0	0	9	211	T	X	0	2	X	0	3				decomposed filter cake
3	8	D	0	0	2												same as line 37
3	9	D	0	0	4												same as line 37
4	0	D	0	0	5												same as line 37
4	1	D	0	0	6												same as line 37
4	2	D	0	0	7												same as line 37
4	3	D	0	0	8												same as line 37
4	4	D	0	1	0												same as line 37
4	5	D	0	1	1												same as line 37
4	6	D	0	0	9	14	T	S	0	1	X	0	3	D	8	0	treated filter cake residue
4	7	D	0	0	2												same as line 46
4	8	D	0	0	4												same as line 46
4	9	D	0	0	5												same as line 46
5	0	D	0	0	6												same as line 46
5	1	D	0	0	7												same as line 46
5	2	D	0	0	8												same as line 46
5	3	D	0	1	0												same as line 46
5	4	D	0	1	1												same as line 46
5	5	D	0	0	9	367	T	S	0	2	T	0	1	D	8	0	treated waste solution
5	6	D	0	0	2												same as line 55
5	7	D	0	0	4												same as line 55
5	8	D	0	0	5												same as line 55
5	9	D	0	0	6												same as line 55
6	0	D	0	0	7												same as line 55
6	1	D	0	0	8												same as line 55
6	2	D	0	1	0												same as line 55
6	3	D	0	1	1												same as line 55
6	4	D	0	0	9	500	P	S	0	1	X	0	3	D	8	0	generated debris
6	5	D	0	0	2												same as line 64
6	6	D	0	0	4												same as line 64
6	7	D	0	0	5												same as line 64
6	8	D	0	0	6												same as line 64
6	9	D	0	0	7												same as line 64
7	0	D	0	0	8												same as line 64
7	1	D	0	1	0												same as line 64
7	2	D	0	1	1												same as line 64

10. Map

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

11. Facility Drawing

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

12. Photographs

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

13. Comments

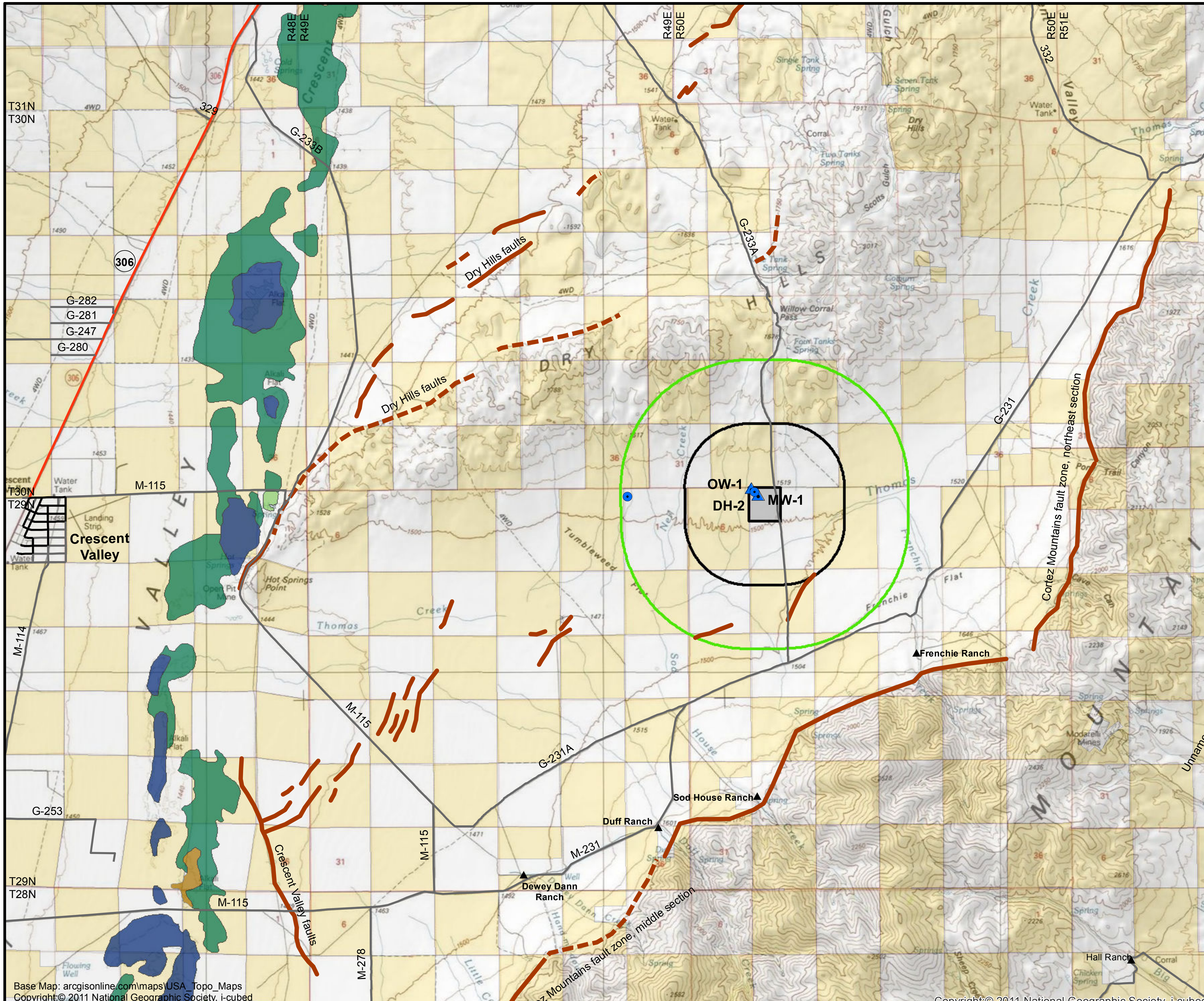
Item 7, line 1:Storage in containers - capacity primary for elemental mercury recovered from caustic leach process and received from off-site. Estimated storage capacity for the storage area is 28,000 gallons after the facility has been in operation for 11 years (maximum of 226 pigs/yr) 1024 pigs (19 gal/pig = 19,456 gal. ; 146 containers (55 gal/container = 8030 gal) of combination of calomel (76 drums), carbon (60 drums), and debris (10 drums).
The amount of elemental mercury in storage; corresponds to Item 9, lines 1, 10, 19, 28, 46, and 64.
Item 7, line 2: two 3,600 gallon tanks #1540-TK-012 and #1540-TK-035; corresponds to Item 9, line 55
Item 7, line 3: four tanks in caustic leach system: Decomposition Tank #1420-TK-033 (400 gal), Waste Solution Tank #1420 -TK-037 (400 gal), Waste Collection Tank #1440-TK-114 (400 gal), and Waste Settling Tank #1440-TK-116 (300 gal); corresponds to Item 9, lines 28 and 55.
Item 7, line 4: Filter Press #1420-FL-036 (400 gal, direct feed from caustic leach system); corresponds to Item 9, line 37
Item 7, line 5: Two retorts (initial unit and future unit) 110 gal per batch each; corresponds to Item 9, lines 1,10,37,46,and 64

Item 9: Refer to Drawings H340940-0000-05-015-0001and H340940-0000-05-015-0002 (attached).
Item 9, line 1: If a national repository is not available to accept elemental mercury, the amount of mercury in storage after 11 years of operation will be a maximum of 1024 pigs. If PMR is able to transfer elemental mercury to a national repository during the operational life of the TSF, PMR may regularly transfer stored elemental mercury to a national repository off-site.
Item 9, line 19: Treated carbon residue is generated from treatment of spent carbon in line 10.
Item 9, line 28: Recovered mercury is included in the stored mercury total on line 1; mercury may be recovered from the wastes listed on lines 10, 28, 37, 46, and 64.
Item 9, line 37: Filter cake is generated from treatment of calomel on line 28 and retorted in line 46.
Item 9, line 64: General debris includes PPE, rags, dust, miscellaneous dry waste is treated to recover elemental mercury and meet LDR requirements for D009 waste.
This facility is not permitted for disposal; all disposal occurs at off-site disposal facilities.

Item 10: Seven maps, drawings or figures are attached to the Part A application. Additional D-size maps and design drawings are included in the Part B application.

Item 11: There is one permitted facility building. All permitted hazardous waste storage and treatment units are located within the confines of the building, see Drawing H340940-0000-50-015-0013, attached. The building houses storage areas and processing areas for thermal treatment by retort, chemical treatment by caustic leach, and mechanical treatment by filter press.

Item 12: This facility is not yet constructed, therefore, no photographs are available.



Legend

- Site T29N R50E Sec. 5 NW/4
- 1 Mile Buffer
- 2 Mile buffer
- Water Well
- JBR Wells

Wetlands
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Lake
- Other

Quaternary Faults
- Well constrained
- Moderately constrained

Roads
- State Highway
- Road, dirt/gravel

Drainage
- Artificial Path
- Canal Ditch
- Connector
- Intermittent Stream
- Perennial Stream

Land Ownership
- BLM
- State
- Private

N

2 1 0 2 Miles

Data Sources
Water Well Data: State of Nevada Division of Water Resources (http://water.nv.gov/data/welllog/index.cfm)
Fault Data: USGS Geologic Hazards Science Center (http://geohazards.usgs.gov/qfaults/nv/Nevada.php
Wetland Data: U.S. Fish and Wildlife Service National Wetlands Inventory (http://www.fws.gov/wetlands/)

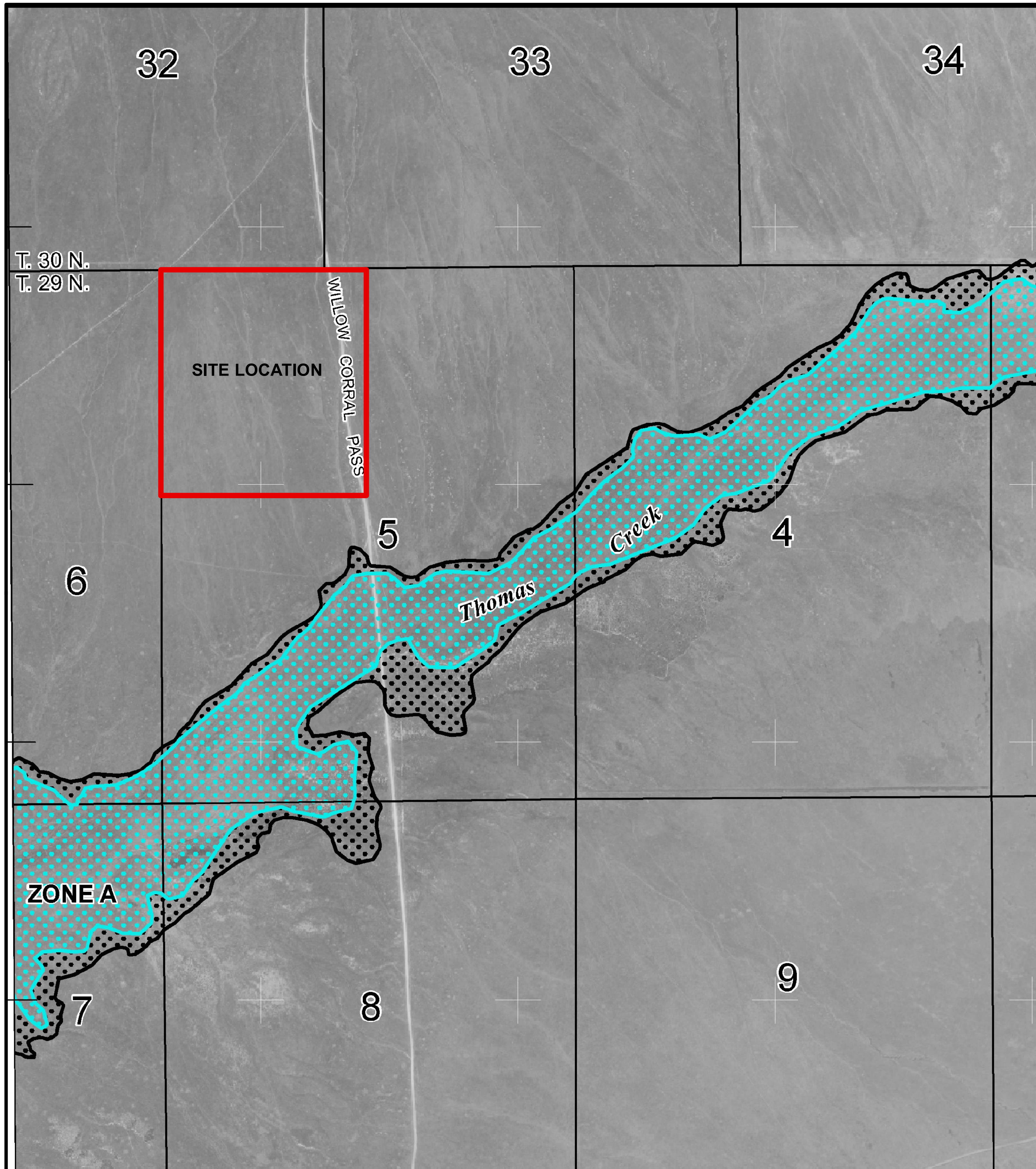
PRECIOUS METALS RECOVERY LLC

FIGURE 11.3-1
SITE MAP, WELL LOCATIONS, FAULTS, WETLANDS, AND LAND OWNERSHIP

JBR

DRAWN BY	CP	DATE DRAWN	10/30/2012
SCALE	1:100,000		

Path: M:\STATES\NV\Clients\Barrick\Precious_Metals_Recovery\RCRA\Fig 11.3-1 SiteMap_LandOwnership_Faults_wetlands.mxd



MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

METERS

NFIP

PANEL 0600D

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EUREKA COUNTY, NEVADA

ALL JURISDICTIONS

PANEL 600 OF 2300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EUREKA COUNTY	320028	0600	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

U.S. DEPARTMENT OF HOMELAND SECURITY

MAP NUMBER
32011C0600D

EFFECTIVE DATE
May 16, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

FLOODWAY AREAS

ZONE A — The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachement so that the 1% annual cance flood can be carried without substantial increases in

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual channel flood.

PRECIOUS METALS RECOVERY LLC

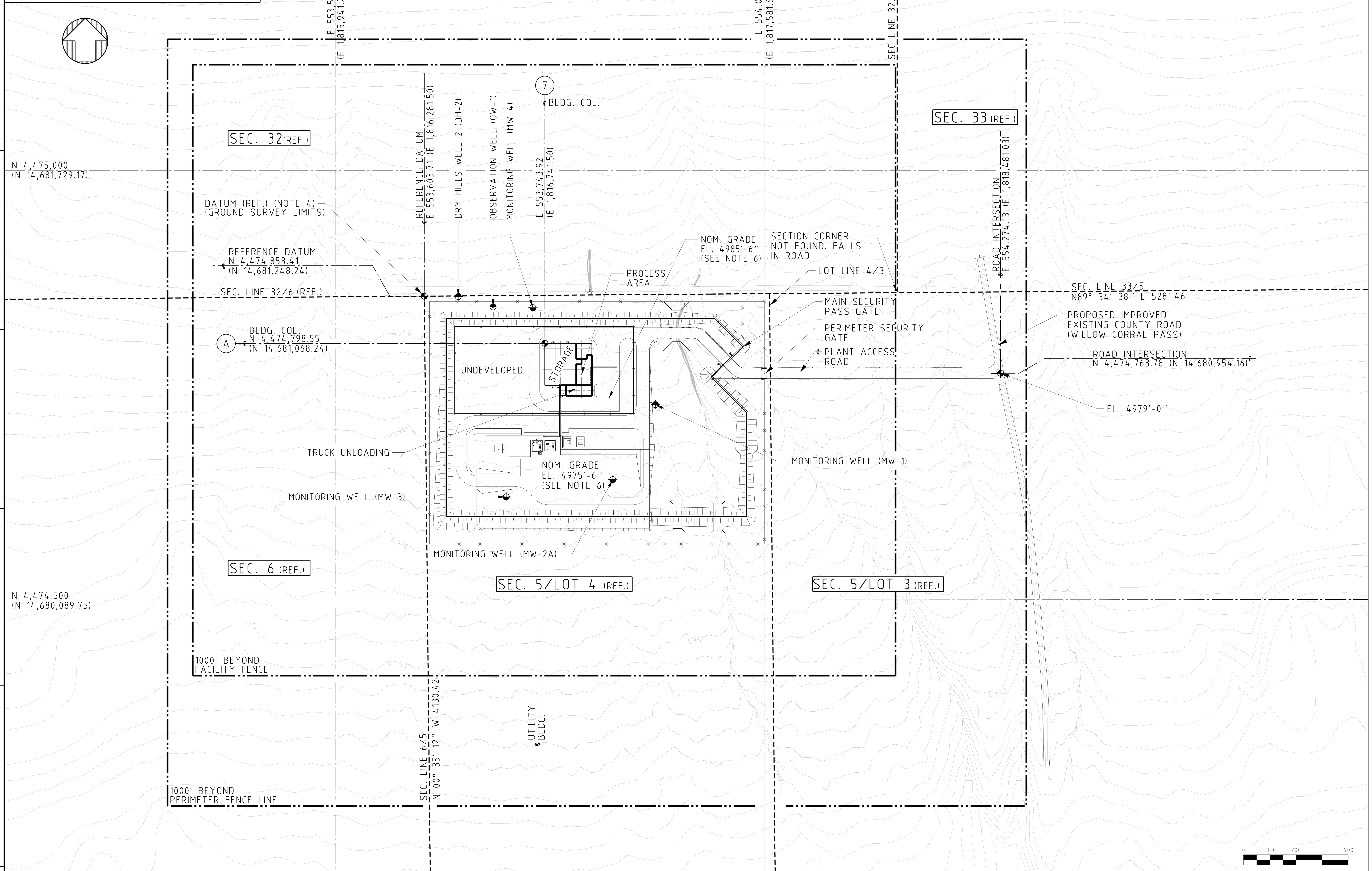
FIGURE 11.2-1
FIRM PANEL 0600D

JBR

DRAWN BY	DATE DRAWN
CP	12/3/2012
SCALE	As Shown

This document is for reference purposes only and should not be used as a legal document. JBR makes no guarantees to the accuracy of the data contained herein or any loss resulting therefrom.

Path: M:\STATES\NV\Clients\Barrick\Precious_Metals_Recovery\RCRA\Fig 11.12-1 Firm Panel 0600D.mxd



FOR INFORMATION

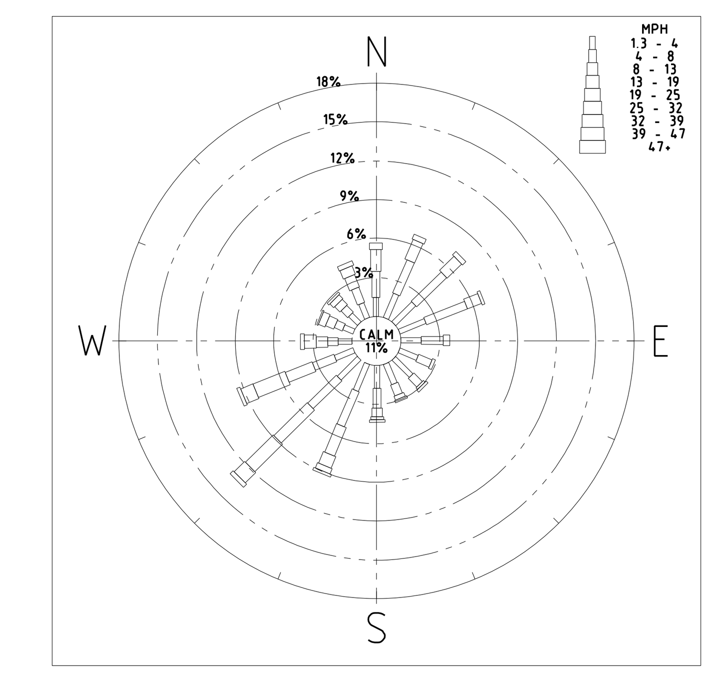
NOT FOR CONSTRUCTION

GENERAL NOTES:

1. ALL COORDINATES SHOWN ARE IN METERS (BRACKETED COORDINATES ARE IN U.S. SURVEY FEET).
2. ALL ELEVATIONS ARE IN FEET UNLESS NOTED OTHERWISE.
3. GRID COORDINATES SHOWN ARE BASED ON THE NORTH AMERICAN DATUM OF 1983, (UTM ZONE 11).
4. SURVEY COORDINATES AND ELEVATIONS SHOWN ARE AS RECORDED BY SUMMIT ENGINEERING (RYAN COOK - 08/24/2012).
5. WELL COORDINATES FOR MW-2A, MW-3 AND MW-4 AS PROVIDED BY JBR (09/26/2012).
6. NATURAL GRADE TOPOGRAPHIC INFORMATION (SUMMIT ENGINEERING SURVEY 08/24/2012) OVERLAYED ON THE ENGINEERED GRADE (NOM. GRADE EL. 4975'-6" & EL. 4985'-6")

WIND ROSE

STATION - CRESCENT VALLEY DEAN RANCH, NEVADA.



LEGEND:

- FACILITY FENCE
- PERIMETER FENCE LINE
- BERM FENCE
- BATTERY LIMIT
- SECTION\LOT LINE
- GRID COORDINATES
- TOPOGRAPHIC MAP BOUNDARY
- EXISTING WATER COURSE
- DATUM POINT
- GROUND SURVEY LIMITS
- WELL (SURVEY 08/24/2012)
- WELL (JBR 09/26/2012)

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REVISIONS

REV.	ISSUE FOR	AUTH. BY		DATE
E	INFORMATION	EC	SS	14-12-2012
D	INFORMATION	EC	SS	29-11-2012
C	INFORMATION	EC	SS	15-11-2012
B	INFORMATION	EC	SS	14-11-2012
A	INFORMATION	EC	SS	25-10-2012

ISSUE AUTHORIZATION

HATCH™

DESIGNED BY J. CHALMERS DATE 25-10-2012	DRAWN BY E. CRAWFORD DATE 25-10-2012
CHECKED BY S. SENNIK DATE 25-10-2012	DISCIP. ENGR. R. FUKUZAWA DATE 25-10-2012
PROJ. DES. COORD. J. CHALMERS DATE 25-10-2012	PROJ. ENGR. S. SENNIK DATE 25-10-2012
PROJ. MGR. M. SUCHARDA DATE 25-10-2012	

PRECIOUS METALS RECOVERY LLC

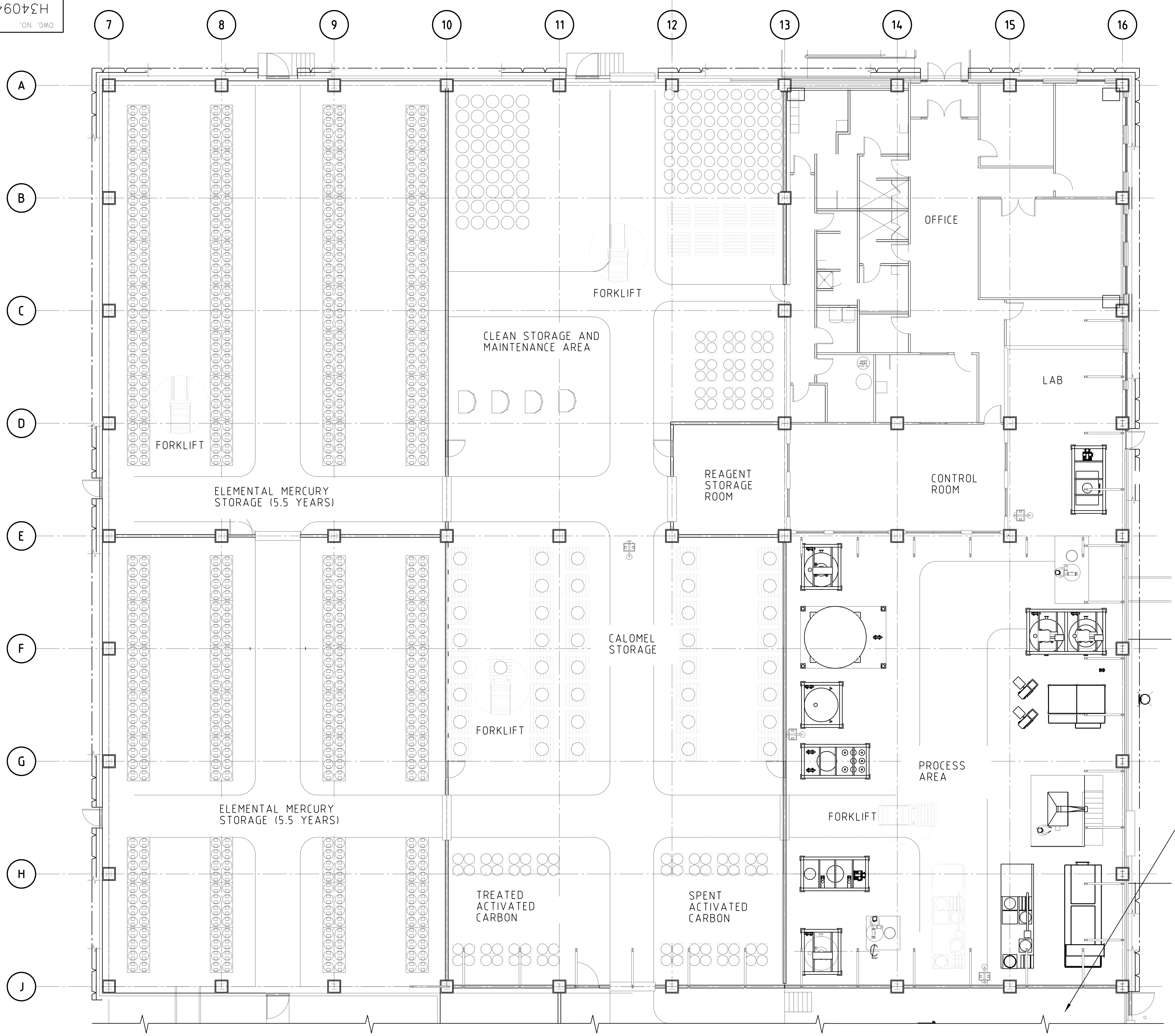
PRECIOUS METALS RECOVERY LLC
DRY HILLS FACILITY PROJECT

DRY HILLS FACILITY TOPOGRAPHIC MAP (RCRA PERMIT APPLICATION)

SCALE 1"=200' OR AS NOTED | DWG. NO. H340940-0000-07-015-0001 | REV. E

H340940-0000-50-015-0013

DWG. NO.

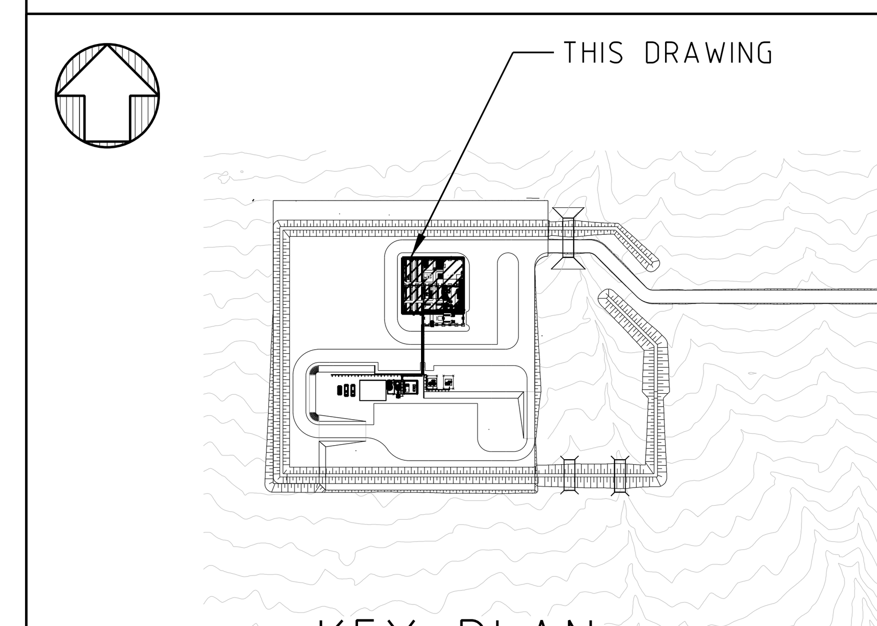


NOTES:

1. TRUCK LOADING AREA & MCC ROOM NOT SHOWN ON THIS SKETCH.
2. THIS SKETCH TO BE USED TO VIEW HAZARDOUS WASTE UNITS ONLY.
3. SKETCH TO BE USED IN CONJUNCTION WITH H340940-0000-50-014-0001, H340940-0000-50-014-0002 & H340940-0000-50-042-0001.

FOR INFORMATION

NOT FOR CONSTRUCTION



KEY PLAN

SCALE 1"-500'

DRAWING NO.	DRAWING TITLE
H340940-0000-50-042-0001	PROCESS/STORAGE BUILDING GENERAL ARRANGEMENT
H340940-0000-50-014-0002	PLOT PLAN
H340940-0000-50-014-0001	OVERALL SITE PLAN

REFERENCE DRAWINGS

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REVISIONS

REV.	ISSUE FOR	AUTH. BY	DATE
A	INFORMATION	BY SS	2013-08-15

ISSUE AUTHORIZATION

HATCH™

DESIGNED BY: J. CHALMERS, DATE 2013-08-15	DRAWN BY: B. YOGANATHAN, DATE 2013-08-15
CHECKED BY: DATE	DISCIP. ENGR.: D. KLUWAK, DATE 2013-08-15
PROJ. DES. COORD.: J. CHALMERS, DATE 2013-08-15	PROJ. ENGR.: S. SENNIK, DATE 2013-08-15
PROJ. MGR.: M. SUCHARDA, DATE 2013-08-15	

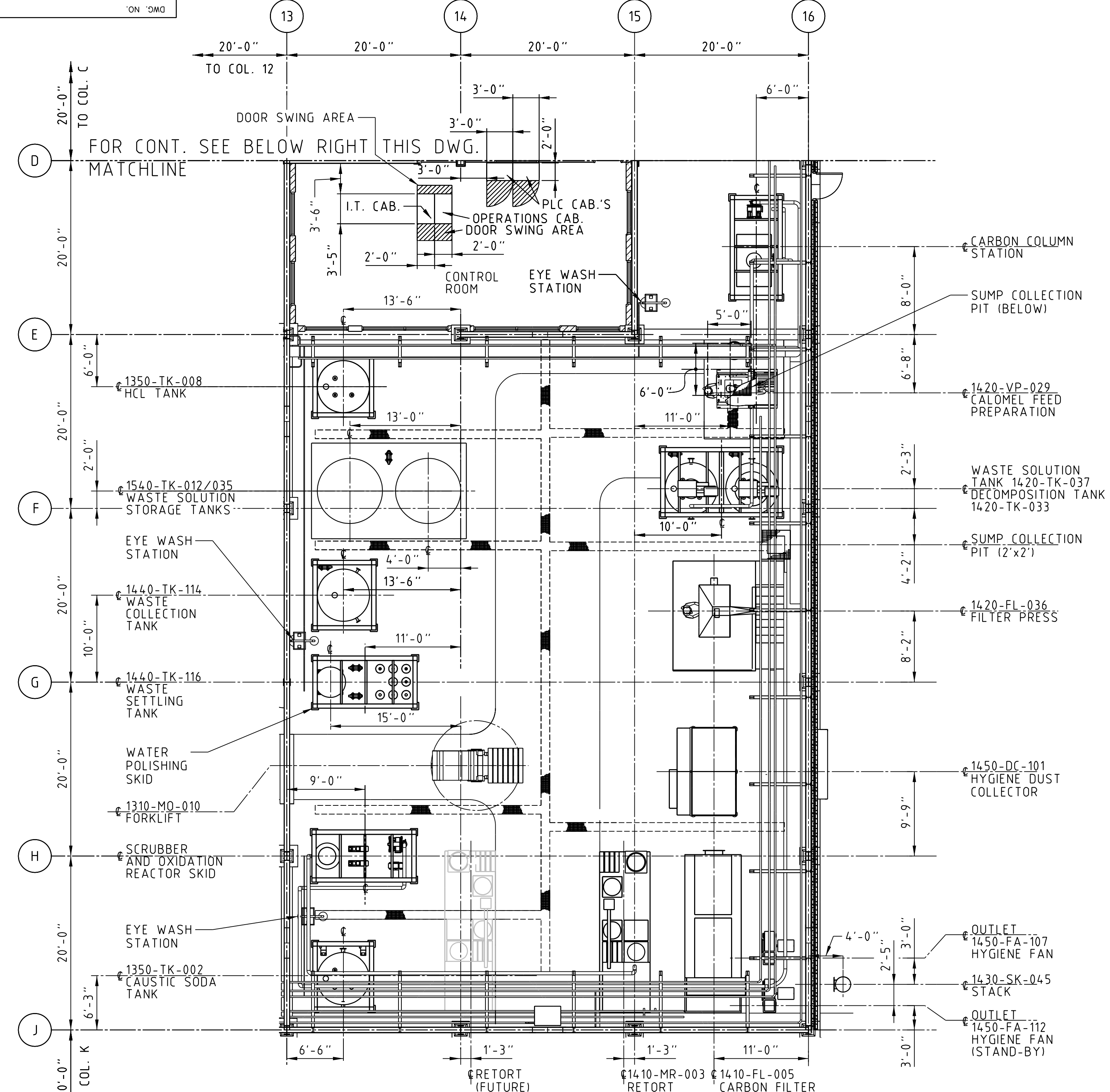
PRECIOUS METALS RECOVERY LLC

PRECIOUS METALS RECOVERY PROJECT
DRY HILLS FACILITY PROJECT

PMR FACILITY
HAZARDOUS WASTE UNITS
SKETCH

SCALE	DWG. NO.	REV.
3/32" = 1' OR AS NOTED	H340940-0000-50-015-0013	A

DWG. NO.
H340940-0000-50-042-0002



PART PLAN PROCESS AREA
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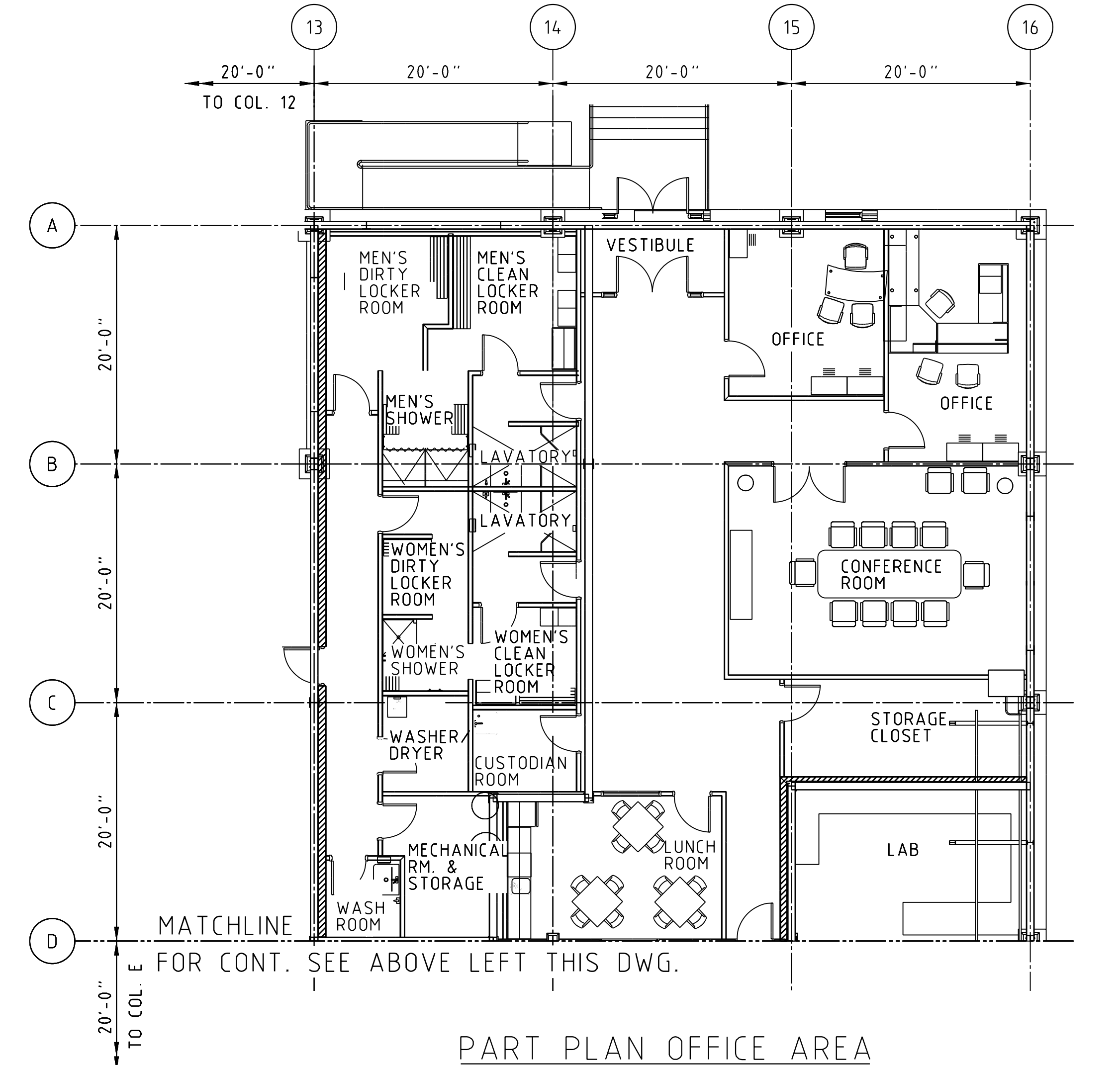
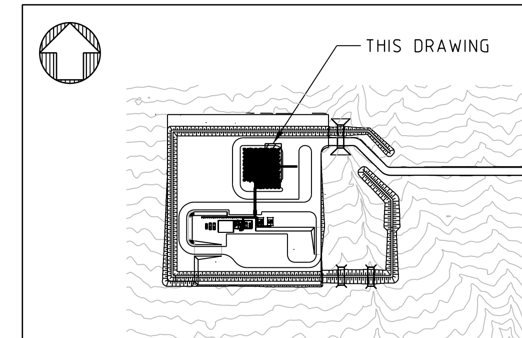


PART PLAN OFFICE AREA
@ FIN. FLR EL. 4989'-6"

FOR PROGRESS

NOT FOR CONSTRUCTION

0 4 8 16
SCALE IN FEET



KEY PLAN
SCALE 1"-500'

DRAWING NO.	DRAWING TITLE
H340940-0000-050-042-0001	PROCESS\STORAGE BLDG. GENERAL ARRANGEMENT

REFERENCE DRAWINGS

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REVISIONS

REV.	ISSUE FOR	AUTH.	BY	DATE
H	ISSUE FOR DESIGN	J.C.	S.S.	2013-07-17
G	ISSUE FOR DESIGN	E.C.	S.S.	2012-12-14
F	ISSUE FOR DESIGN	E.C.	S.S.	2012-11-14
E	ISSUE FOR DESIGN	D.K.	S.S.	2012-10-18
D	ISSUE FOR DESIGN	J.C.	S.S.	2012-10-11
C	FS FINAL REPORT	J.C.	S.S.	2012-07-31
B	FS FINAL REPORT	J.C.	S.S.	2012-07-05
A	DISCIPLINE ENGINEERING	J.C.	S.S.	2012-06-18

ISSUE AUTHORIZATION

HATCH

DESIGNED BY J. CHALMERS DATE 2012-06-18	DRAWN BY D. EAILEY DATE 2012-06-18
CHECKED BY J. CHALMERS DATE 2012-06-18	DISCIP. ENGR. D. KLUWAK DATE 2012-06-18
PROJ. DES. COORD. J. CHALMERS DATE 2012-06-18	PROJ. ENGR. S. SENNIK DATE 2012-06-18
PROJ. MGR. M. SUCHARDA DATE 2012-06-18	

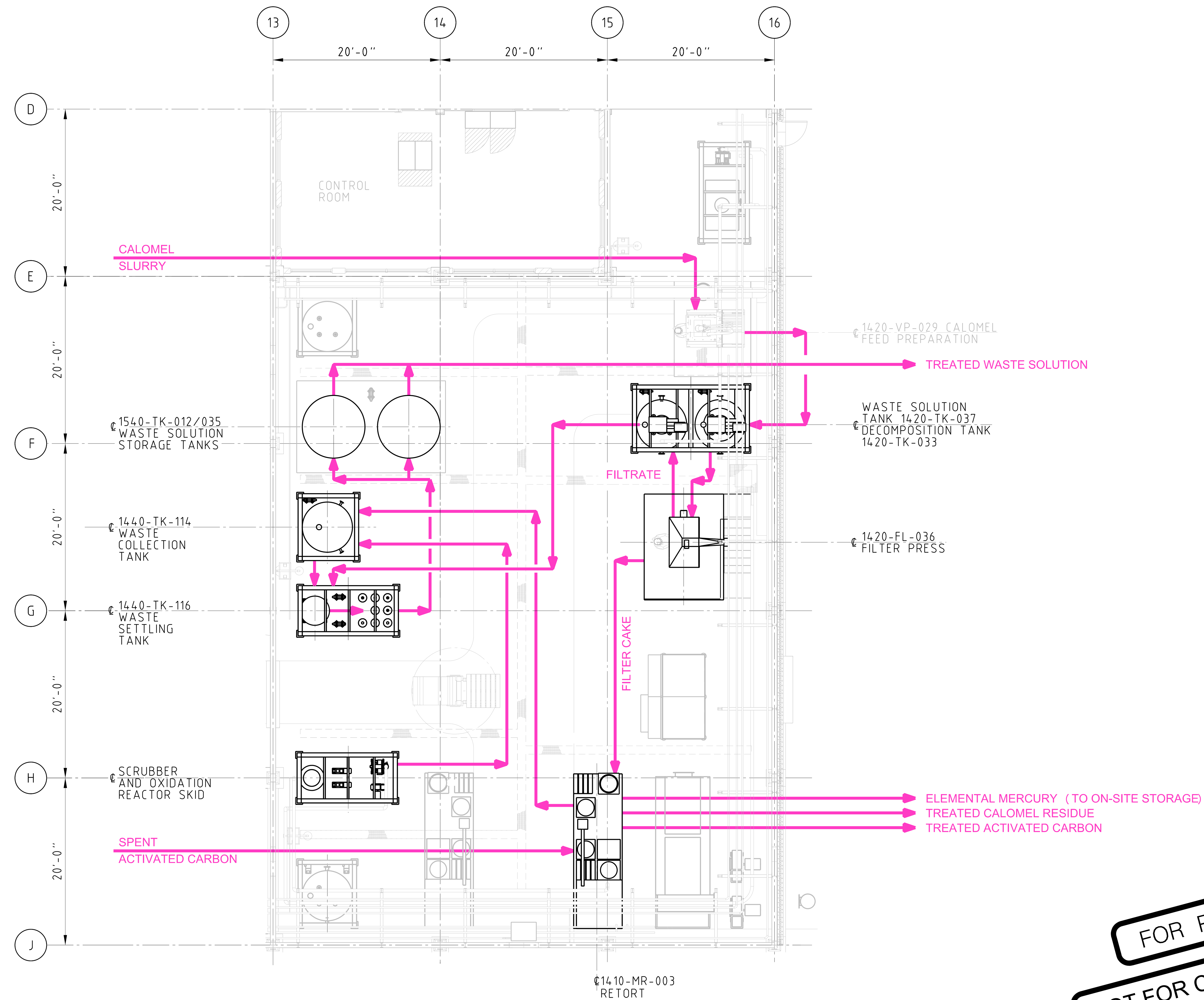
PRECIOUS METALS RECOVERY LLC

PRECIOUS METALS RECOVERY LLC
DRY HILLS FACILITY PROJECT

DRY HILLS FACILITY
PROCESS/STORAGE BUILDING
OFFICE & PROCESS AREA

SCALE	DWG. NO.	REV.
1/8" = 1' OR AS NOTED	H340940-0000-50-042-0002	H

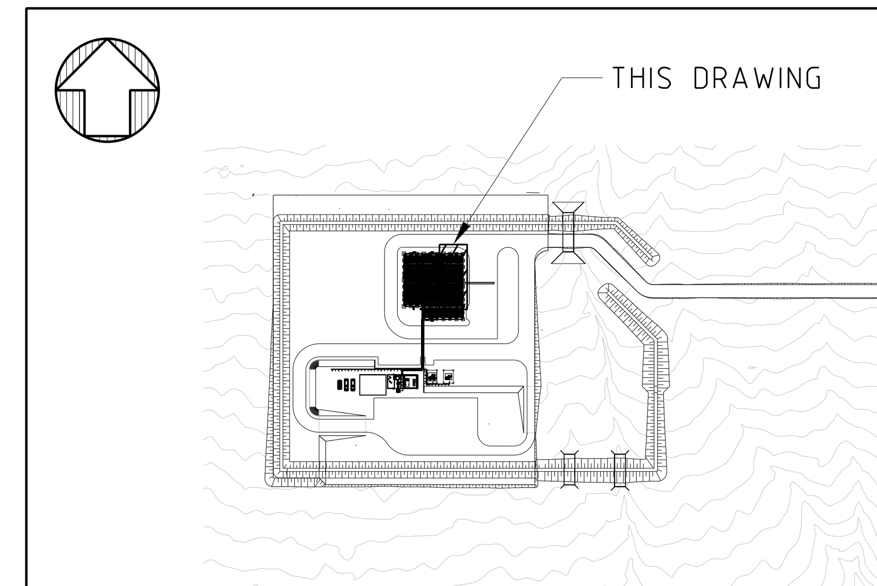
H340940-0000-05-015-0002
DWG. NO.



PART PLAN PROCESS AREA
@ FIN. FLR EL. 4989'-6"

FOR PROGRESS
NOT FOR CONSTRUCTION

0 4 8 16
SCALE IN FEET



KEY PLAN
SCALE 1"=500'

DRAWING NO.	DRAWING TITLE
H340940-0000-050-042-0001	PROCESS\STORAGE BLDG. GENERAL ARRANGEMENT

REFERENCE DRAWINGS

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REVISIONS

REV.	ISSUE FOR	AUTH. BY		DATE
B	INFORMATION	BY	SS	2013-08-15
A	INFORMATION	G.K.	S.S.	2013-07-18

ISSUE AUTHORIZATION

HATCH

DESIGNED BY
DATE
DRAWN BY B. JANJIC
DATE 2013-07-18
CHECKED BY
DATE
DISCIP. ENGR. G. KERAMARIS
DATE 2013-07-18
PROJ. DES. COORD.
DATE
PROJ. ENGR. S. SENNIK
DATE 2013-07-18
PROJ. MGR. M. SUCHARDA
DATE 2013-07-18

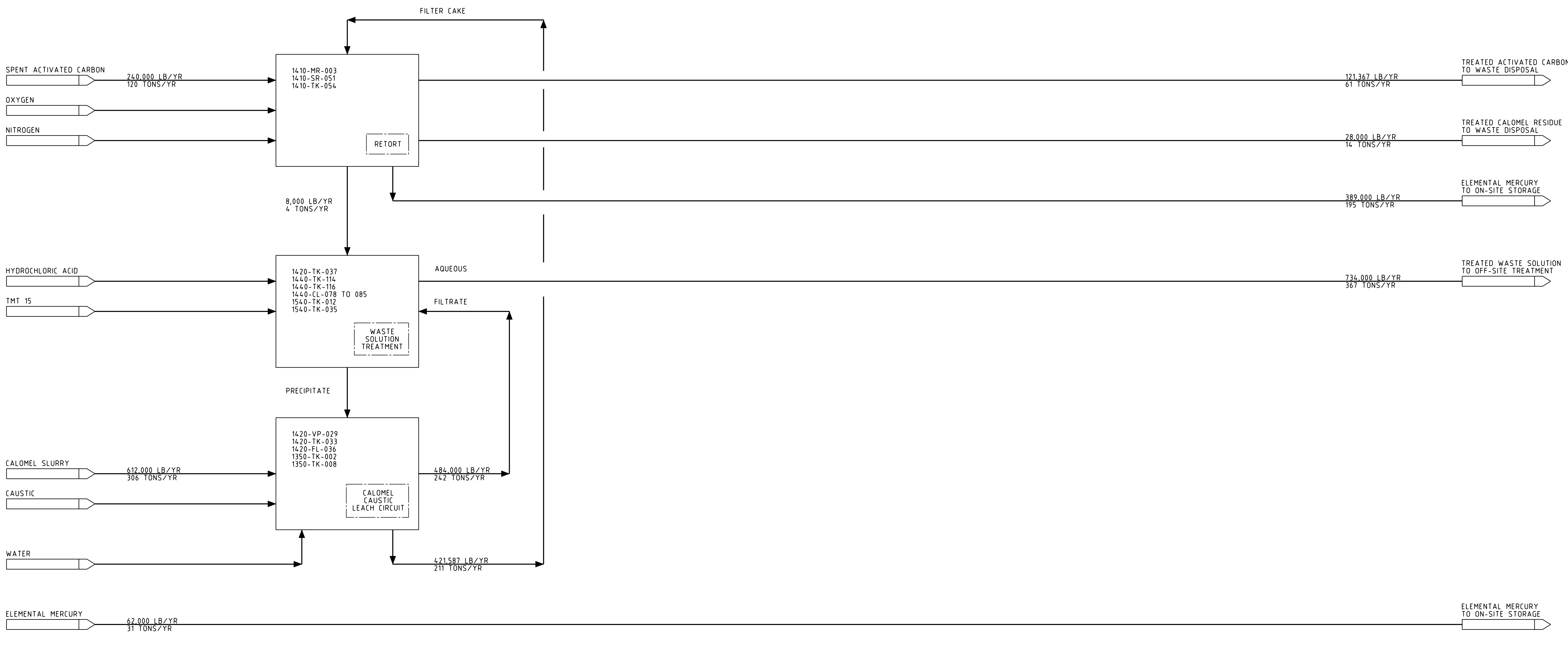
PRECIOUS METALS RECOVERY LLC

PRECIOUS METALS RECOVERY LLC
DRY HILLS FACILITY PROJECT

DRY HILLS FACILITY
PROCESS/STORAGE BUILDING
PROCESS FLOW SKETCH

SCALE 1/8" = 1' OR AS NOTED
DWG. NO. H340940-0000-05-015-0002
REV. B

DWG. NO.
H340940-0000-05-015-0001



LEGEND
- MAJOR PROCESS
- SECONDARY PROCESS
- INTERMITTENT PROCESS
- VENDOR SUPPLY LIMIT
- DUST PICKUP POINTS

NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
REVISIONS					

REV.	ISSUE FOR	AUTH. BY		DATE
A	FOR INFORMATION	G.K.	S.S.	15-07-2013
ISSUE AUTHORIZATION				

HATCH™

PRECIOUS METALS RECOVERY LLC

DESIGNED BY G. KERAMARIS DATE 15-07-2013	DRAWN BY B. JANJIC DATE 15-07-2013
CHECKED BY G. KERAMARIS DATE 15-07-2013	DISCIP. ENGR. G. KERAMARIS DATE 15-07-2013
PROJ. DES. COORD. J. CHALMERS DATE 15-07-2013	PROJ. ENGR. S. SENNIK DATE 15-07-2013
PROJ. MGR. M. SUCHARDA DATE 15-07-2013	

PRECIOUS METALS RECOVERY LLC
DRY HILLS FACILITY PROJECT

WASTE STREAMS
BLOCK FLOW DIAGRAM

SCALE	DWG. NO.	REV.
NTS OR AS NOTED	H340940-0000-05-015-0001	A

Precious Metals Recovery LLC
Dry Hills Facility
EPA ID Number NVR000088542
Eureka County, Nevada

RCRA Part B Permit Application

Revision 2

October 5, 2013

PREPARED FOR:

Precious Metals Recovery LLC
460 W. 50 North, Suite 500
Salt Lake City, Utah 84101
Contact: Rich Haddock
Ph: 801.990.3773

PREPARED BY:

JBR Environmental Consultants, Inc.
8160 South Highland Drive
Sandy, Utah 84093
Contact: Rachel Shilton
Ph: 801.943.4144 Ext. 1133

Hatch
2800 Speakman Drive
Mississauga, Ontario, Canada
Contact: Sonia Sennik
Ph: 905.403.4043

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Section 10 Appendices

10-A Figures

Section 11 Appendices

11-A COD Issuance Letter

11-B Figures

11-C Legal Description

Section 12 Appendices

12-A Personnel Training Plan

Section 13 Appendices

13-A Closure Plan

Section 15 Appendices

15-A CostPro Closure Cost Estimate Data

Section 20 Appendices

20-A Groundwater Study Plan

20-B Groundwater Study Report

20-C Geotechnical Survey Report

Section 22 Appendices

22-A Container Specifications

22-B Secondary Containment Sample Calculation

Section 30 Appendices

30-A Vendor Budget Quotes

LIST OF DRAWINGS

List of Drawings found in the Part A application

List of Renderings found in Appendix 1-A of the Part B application

Exterior Views

Interior Views

List of Drawings found in Appendix 1-A of the Part B application

H340940-0000-05-015-0001 (A)	Waste Streams Block Flow Diagram	July 19, 2013
H340940-0000-05-015-0002 (B)	Dry Hills Facility Process/Storage Building Process Flow Sketch	August 15, 2013
H340940-0000-07-015-0001 (E)	Dry Hills Facility Topographic Map	December 14, 2012
H340940-0000-07-15-0002 (D)	Figure 2 Monitoring Well Locations	December 14, 2012
H340940-0000-07-15-0003 (D)	Figure 3 Groundwater Elevation Contour Map	December 14, 2012
H340940-0000-07-15-0004 (B)	Dry Hills Facility Traffic Flow Diagram	December 14, 2012
H340940-0000-50-014-0001 (H)	Dry Hills Facility Overall Site Plan	December 14, 2012
H340940-0000-50-014-0002 (H)	Dry Hills Facility Process Area Plot Plan	December 14, 2012
H340940-0000-50-014-0003 (G)	Dry Hills Facility Area Plot Plan	December 14, 2012
H340940-0000-50-015-0008 (E)	Dry Hills Facility Process/Storage Building Drainage Arrangement	July 16, 2013
H340940-0000-50-015-0009 (B)	Elemental Mercury Storage Rack Sketch	December 14, 2012
H340940-0000-50-015-0011 (A)	Dry Hills Facility Evacuation Plan	July 19, 2013
H340940-0000-50-015-0013 (A)	PMR Facility Hazardous Waste Units Sketch	August 15, 2013

H340940-0000-50-042-0001 (G)	Dry Hills Facility Process/Storage Building General Arrangement	December 14, 2012
H340940-0000-50-042-0002 (H)	Dry Hills Facility Process/Storage Building Office & Process Area	July 19, 2013
H340940-0000-50-042-0003 (F)	Dry Hills Facility Utility Building General Arrangement	December 14, 2012
H340940-0000-50-042-0004 (E)	Dry Hills Facility Utility Building General Arrangement	December 14, 2012
H340940-0000-75-004-0002 (C)	Critical Alarms Communications Mechanisms	December 14, 2012
H340940-0000-75-004-0005 (C)	Communications Conceptual Logical Architecture	December 14, 2012
H340940-0000-75-004-0009 (D)	Systems Network Architecture	December 14, 2012

List of Drawings found in Appendix 1-B of the Part B application

H340940-0000-75-031-0001 (D)	Legend Sheet #1 Piping and Instrumentation Diagram	December 14, 2012
H340940-0000-75-031-0002 (D)	Legend Sheet #2 Piping and Instrumentation Diagram	December 14, 2012
H340940-0000-75-031-0003 (D)	Legend Sheet #3 Piping and Instrumentation Diagram	December 14, 2012
H340940-1300-75-031-0001 (D)	Reagent Storage and Distribution Piping and Instrumentation Diagram	December 14, 2012
H340940-1300-75-031-0002 (D)	Mercury Handling System Piping and Instrumentation Diagram	December 14, 2012

H340940-1400-75-031-0001 (D)	Retort Feed and Product Handling Area Piping and Instrumentation Diagram	December 14, 2012
H340940-1400-75-031-0002 (D)	Retort Package Piping and Instrumentation Diagram	December 14, 2012
H340940-1400-75-031-0003 (E)	Calomel Treatment Feed Preparation Piping and Instrumentation Diagram	July 16, 2013
H340940-1400-75-031-0004 (D)	Calomel Treatment Filtration System Piping and Instrumentation Diagram	December 14, 2012
H340940-1400-75-031-0005 (D)	Calomel Treatment Waste Solution Piping and Instrumentation Diagram	December 14, 2012
H340940-1400-75-031-0006 (D)	Retort Off-Gas Scrubber & Oxidation Reactor Piping and Instrumentation Diagram	December 14, 2012
H340940-1400-75-031-0007 (C)	Calomel Treatment Calomel Mixing Piping and Instrumentation Diagram	December 14, 2012
H340940-1400-75-031-0008 (D)	Process Plant Waste Solution Treatment Piping and Instrumentation Diagram	December 14, 2012

H340940-1400-75-031-0009 (D)	Process System Waste Solution Collection and Settling Piping and Instrumentation Diagram	December 14, 2012
H340940-1400-75-031-0010 (D)	Calomel Treatment Vent Gas Treatment Piping and Instrumentation Diagram	December 14, 2012
H340940-1400-75-031-0011 (D)	Hygiene Gas System Piping and Instrumentation Diagram	December 14, 2012
H340940-1500-75-031-0001 (D)	Compressed and Instrument Air System Piping and Instrumentation Diagram	December 14, 2012
H340940-1500-75-031-0002 (D)	Water Storage and Disposal Piping and Instrumentation Diagram	December 14, 2012
H340940-1500-75-031-0003 (D)	Fire Water System Piping and Instrumentation Diagram	December 14, 2012
H340940-1500-75-031-0004 (D)	Domestic/Process Water Supply Piping and Instrumentation Diagram	December 14, 2012
H340940-1500-75-031-0005 (D)	Gas Systems Piping and Instrumentation Diagram	December 14, 2012
H340940-1500-75-031-0006 (D)	Diesel Systems Piping and Instrumentation Diagram	December 14, 2012

List of Drawings found in Appendix 1-C of the Part B application

H340940-0000-05-030-0001 (3)	Legend Sheet	August 15, 2013
H340940-1300-05-030-0001 (3)	Process Flow Diagram Receiving & Storage 1	August 15, 2013
H340940-1300-05-030-0001 (C)	Process Flow Diagram Stream Tables for RCRA Application	December 11, 2012
H340940-1300-05-030-0002 (2)	Receiving & Storage 2	December 14, 2012
H340940-1300-05-030-0002 (C)	Process Flow Diagram Stream Tables for RCRA Application	December 11, 2012
H340940-1400-05-030-0001 (2)	Spent Carbon and Decomposed Calomel Filter Cake Treatment	December 14, 2012
H340940-1400-05-030-0001 (C)	Stream Tables for RCRA Application	December 11, 2012
H340940-1400-05-030-0002 (3)	Calomel Caustic Leach Circuit	August 15, 2013
H340940-1400-05-030-0002 (C)	Process Flow Diagram Stream Tables for RCRA Application	December 11, 2012
H340940-1400-05-030-0003 (2)	Retort Off-Gas	December 14, 2012
H340940-1400-05-030-0003 (C)	Process Flow Diagram Stream Tables for RCRA Application	December 11, 2012
H340940-1400-05-030-0004 (3)	Waste Solution Collection and Treatment	August 15, 2013
H340940-1400-05-030-0004 (C)	Process Flow Diagram Stream Tables for RCRA Application	December 11, 2012
H340940-1400-05-030-0005 (2)	Hygiene & Vent Gas Treatment and Exhaust	December 14, 2012
H340940-1400-05-030-0005 (C)	Process Flow Diagram Stream Tables for RCRA Application	December 11, 2012
H340940-1500-05-030-0001 (2)	Compressed Air System	December 14, 2012
H340940-1500-05-030-0001 (C)	Process Flow Diagram Stream Tables for RCRA Application	December 11, 2012

H340940-1500-05-030-0003 (2)	Sanitary and Waste Solution Storage Process Flow Diagram	December 14, 2012
H340940-1500-05-030-0003 (C)	Stream Tables for RCRA Application	December 11, 2012
H340940-1500-05-030-0004 (2)	Water Supply Process Flow Diagram	December 14, 2012
H340940-1500-05-030-0004 (C)	Stream Tables for RCRA Application	December 11, 2012
H340940-1500-05-030-0005 (2)	Diesel and Gas Systems Process Flow Diagram	December 14, 2012
H340940-1500-05-030-0005 (C)	Stream Tables for RCRA Application	December 11, 2012

List of Drawings found in Appendix 1-D of the Part B application

H340940-SK-1 (E)	Roof and Wall Construction	July 2, 2012
H340940-SK-2 (E)	Interior Block Wall & Roof	July 2, 2012
H340940-SK-3 (E)	Column at Precast Wall	July 2, 2012
H340940-SK-4 (F)	Precast at Foundation Wall	September 18, 2013
H340940-SK-5 (E)	Roof, Wall, & Ceiling in Process Area	July 2, 2012

LIST OF ACRONYMS AND ABBREVIATIONS

APN	Assessor Parcel Number
ASME	American Society of Mechanical Engineers
AST	Above ground Storage Tank
ASTM	American Society for Testing and Materials
BA	Bethlehem Apparatus Company
BGMI	Barrick Goldstrike Mines Inc.
BGNA	Barrick Gold of North America Inc.
BPVC	Boiler and Pressure Vessel Code
CAPP	Chemical Accident Prevention Program
CFR	Code of Federal Regulations
CO	Carbon Monoxide
COD	Certificate of Designation
COLIWASA	Composite Liquid Waste Sampler
CPVC	Chlorinated polyvinyl chloride
DOE	Department of Energy
DOT	Department of Transportation
EPA	Environmental Protection Agency
FIRM	Flood Insurance Rate Map
FRP	Fiberglass reinforced plastic
FSSMP	Floor Space Storage Management Plan
GVWR	Gross Vehicle Weight Rating
GPM	Gallons per Minute
HCl	Hydrochloric Acid
HDPE	High Density Polyethylene
HEPA	High Efficiency Particulate Air
HM	DOT Hazardous Materials
HMI	Human Machine Interface

HVAC	Heating, Ventilation, and Air Conditioning
IBC	International Building Code
IFC	International Fire Code
ID	Induced Draft
IT	Information Technology
lbs.	Pounds
LDR	Land Disposal Restriction
MCC	Motor Control Center
MEBA	Mercury Export Ban Act of 2008
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NaOH	Sodium Hydroxide (Caustic)
NAC	Nevada Administrative Code
NARBU	North America Regional Business Unit
National Repository	National Mercury Repository
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NFPA	National Fire Protection Association
NOx	Nitrogen Oxides
OSHA	Occupational Safety and Health Administration
PCS	Process Control System
PLCs	Programmable Logic Controllers
Poly	polyethylene
psig	Pounds Per Square Inch Gauge
PMR	Precious Metals Recovery LLC
PPE	Personal Protection Equipment
PVC	Polyvinyl chloride
R	Resistivity
RCRA	Resource Conservation and Recovery Act

RFID	Radio Frequency Identification
S-AC	Sulfur Impregnated Activated Carbon
SO2	Sulfur dioxide
SOP	Standard Operating Procedure
SWMUs	Solid Waste Management Units
TCLP	Toxicity Characteristic Leaching Procedure
TSDF	Treatment, Storage, and Disposal Facility
TSF	Treatment and Storage Facility
UHCs	Underlying Hazardous Constituents
UHF	Ultra High Frequency
UL	Underwriters Laboratories
US	United States of America
UV	Ultraviolet
VSD	Variable Speed Drive
WAP	Waste Analysis Plan
XRF	X-Ray Fluorescence

GLOSSARY OF SELECTED TERMS

[Authorized] Visitor – A person who has a lawful or rightful purpose to access the proposed TSF.

Building Envelope – A term used to describe the collective network of epoxy coated concrete walls, bunding, trenches, and sumps in the plant spaces. The building envelope is designed to serve as a secondary containment volume for the liquid hazardous waste that will be treated, stored, and managed at the proposed TSF, with an approximate total volume of 95,750 gallons.

Employee – A person who works for or is contracted by PMR LLC, as opposed to an [authorized] visitor.

Hygiene Gas – The interior air in the plant spaces.

Privacy Berm – A 10-foot tall berm that lies just inside the perimeter fence of the proposed TSF compound. The privacy berm serves as security barrier, as well as a fire protection barrier against wildfires.

Pig – A DOT-approved carbon steel container that is designed to hold approximately one metric tonne of elemental mercury.

Plant Spaces – All areas of the proposed TSF Building excluding the Office Area.

PMR LLC – A wholly owned subsidiary of Barrick Goldstrike Mines Inc., that is proposing to build and manage a hazardous waste treatment and storage facility. PMR LLC will own the proposed TSF, the proposed TSF Building, and the proposed TSF compound.

Proposed TSF – The facility described in this application which will be physically defined by a perimeter fence. The proposed TSF, APN #005-530-17, is identified as EPA ID#NVR000088542. The proposed TSF will be comprised of the proposed TSF Building and all the contiguous land area of the APN. The proposed TSF defines the RCRA regulated area of the proposed TSF compound wherein hazardous waste may be treated and managed. Conversely, no hazardous waste will be treated or managed outside of the proposed TSF.

Proposed TSF Building – The actual building located within the proposed TSF wherein hazardous waste may be treated and managed.

Proposed TSF compound – The portion of land that roughly occupies the northwest corner of Range 50 East, Township 29 North, Section 5 in Eureka County, Nevada, whereupon the proposed TSF and Utility Building will be located. The proposed TSF compound is physically defined by a perimeter fence that will lie outside of a proposed privacy berm.

Satellite Wastes – Miscellaneous articles, such as: rags, PPE, gloves, paper, tools, etc. that may become contaminated with mercury during routine operations in the plant spaces.

TMT-15 – A chemical reagent which acts like a flocculent, and is used to encourage precipitation of mercury and other heavy metals out of solution.

Ton – A weight equal to 2,000 pounds, also known as a short ton.

Tonne – A weight equal to 2,204.6 pounds, also known as a metric ton.

Utility Building – A building within the proposed TSF compound wherein equipment, tanks, and other ancillary components will be located necessary to support the operations of the proposed TSF.

INTRODUCTION

Precious Metals Recovery LLC (PMR), a subsidiary of Barrick Goldstrike Mines Inc. (BGMI), is designing a mercury recovery and storage facility to service the mercury management needs for Barrick Gold Corporation's subsidiary operations in the US. Based on an anticipated change in mercury management requirements as a result of the implementation of the Mercury Export Ban Act of 2008 (MEBA), Barrick Gold of North America, Inc. (BGNA), a subsidiary of Barrick Gold Corporation that provides management and technical services for Barrick Gold Corporation's subsidiary operations in the US, has decided that owning and managing a specialized mercury treatment and storage facility (TSF) represents the most effective and reliable means of managing mercury for Barrick operations in the US. Although elemental mercury is not necessarily managed as a hazardous waste, PMR is preparing the management of mercury at this facility to be in compliance with current state and federal solid and hazardous waste regulations. Mercury products (including elemental mercury) are not hazardous wastes as of the date of this Resource Conservation Recovery Act (RCRA) Part B Permit Application.

Throughout this application, references are made to regulations of the Environmental Protection Agency (EPA) for hazardous waste management, found in Chapter 40 of the Code of Federal Regulations (CFR) Parts 264 and 270. The State of Nevada is an EPA authorized state for the administration of the EPA's hazardous waste program. Federal regulations have been adopted by reference in the rules of the Nevada Division of Environmental Protection (NDEP).

In July 1987, the State of Nevada promulgated rules (NAC 444.8456) that specify particular requirements be met prior to locating a new hazardous waste TSF within the state. According to these rules, a Certificate of Designation (COD) may be issued per Nevada Administrative Code (NAC) 444.8458, when the Administrator of NDEP deems the proposed facility is in accordance with the location requirements and the operation will be in the best interest of the state. This application follows the October 8, 2012 issuance of a COD by the Administrator of NDEP to PMR to site a TSF at this location.

PMR is a newly formed company which proposes to construct a TSF, the Dry Hills Facility, as defined in this RCRA Part B Permit Application. This application details the process and facility designed to treat, store, and manage mercury and mercury-bearing materials generated primarily by BGMI near Carlin, Nevada. This application also proposes to accept mercury and mercury-bearing materials from other Barrick mines and associated joint venture operations in the United States.

PMR has selected a suitable site on the Dean Ranch in the Crescent Valley, located in Eureka County, Nevada, USA. The site, which has an Assessor Parcel Number (APN) #005-530-17, is owned by PMR. The site, EPA ID# NVR000088542 is a separate parcel within the proposed TSF compound that will comprise the RCRA area (i.e., the proposed TSF). No construction on this site will begin until authorization has been granted by the NDEP Administrator.

This RCRA hazardous waste permit application presents a description of the materials to be received, managed, treated and stored. This application describes the treatment processes as well as the treatment and storage units. Lastly, this application describes the operation, inspection, and maintenance of the TSF units, and the reporting procedures for the proposed facility and its personnel.

Authorized Signatories – 40 CFR 270.11

A responsible officer must be designated as the authorized signatory for the proposed TSF. Assignment may be made to a specific corporation position rather than to specific individuals. The Authorized Signatory for the proposed TSF will be the General Counsel for BGNA.

Change in Authorized Signatories – 40 CFR 270.11

If it becomes necessary to change the authorized representative, because a different position has responsibility for the overall operation of the proposed TSF, PMR will notify the Administrator of NDEP of the new authorization prior to or together with, any reports, information, or applications which require an authorized signature for PMR.

Certification – 40 CFR 270.11

The following certification will be included on all documents submitted to NDEP for review in the consideration of this permit application.

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

The certification will be included on all documents submitted to NDEP for review in the consideration of this permit application.

Confidential Information – 40 CFR 270.12

Information that is confidential, or contains business protected information and design components, will be clearly designated as such. No claim of business confidentiality is being asserted at this time. If future submissions contain confidential information, the claim will be made by stamping the words "confidential business information" on the cover of the document and on each page containing such information.

Pre-application Public Meeting – 40 CFR 124.31 & 270.14

A public information meeting was hosted by PMR at the Crescent Valley Community Center on Tuesday, December 11, 2012, in accordance with 40 CFR 124.31(c) and 40 CFR 270.14(b)(22). On behalf of PMR, representatives of BGNA were available to answer questions and discuss the proposed TSF.

Advance notice of the meeting was published in the *Eureka Sentinel* and *The Elko Daily Free Press*; written notices were posted in conspicuous places in the communities of Crescent Valley and Beowawe. In addition, and in accordance with the guidance provided in 40 CRF 124.31, a sign, large enough to be viewed from the nearest road, was posted on the site of the proposed TSF facing Willow Corral Pass. Lastly, a radio announcement for the meeting was broadcast on KELK radio station. All forms of public notice were delivered and given on November 9, 2012, thereby providing the public with at least thirty days' advance notice of the event.

Proof of the public notice is included in Appendix I-A.

An attendee register was located at the entrance for those who chose to sign in. Attendees who were interested in being added to the proposed TSF's mailing list were instructed to sign the register indicating such.

Copies of both the attendee register and submitted comments are included in Appendices I-A and I-B, respectively.

Displays of the proposed TSF were available for all attendees to browse. On behalf of PMR, BGNA representatives were stationed among the displays to answer questions and to direct attendees toward displays of interest.

1.0 FACILITY DESCRIPTION – 40 CFR 270.14 (b)(1)

This application seeks to permit PMR's subject Dry Hills Facility as a hazardous waste TSF governed by a Subtitle C Permit under RCRA 40 CFR 264. The site has been issued EPA ID#NVR000088542 in accordance with 40 CFR 264.11. The Part A form precedes this Part B application document, but is provided in the same submittal.

This proposed TSF will be located within the proposed TSF compound. The proposed TSF compound will be physically bounded by a perimeter fence and berm, inside of which includes:

- The proposed TSF (i.e., the RCRA area)
- The proposed TSF Building (inside the RCRA area)
- Utility Building
- Utility Area

The proposed TSF will receive mercury and mercury-bearing materials, primarily in the form of: calomel slurry (mercurous chloride), spent activated carbon containing mercury, and elemental mercury from BGNA and its joint venture operations in the United States. Calomel will typically be shipped to the facility in 55-gallon high density polyethylene (poly) drums; spent activated carbon will be shipped to the facility in 55-gallon steel drums; and elemental mercury will be shipped to the facility in carbon steel containers called ("pigs"), which are designed to hold one metric tonne of elemental mercury, or 76-pound flasks shipped in 55-gallon steel drums. Elemental mercury will be stored in pigs. The containers in which mercury and mercury-bearing materials are transported, treated, stored, and managed are discussed in Section 22.

After MEBA goes into effect on January 1, 2013, export of elemental mercury will be prohibited. Under MEBA, the Federal Government requires the Secretary of Energy to designate a facility for the long-term management and storage of elemental mercury generated within the United States. When operational, this National Mercury Repository (National Repository) will only accept mercury in its elemental form with purity of 99.5% or greater by weight.

The primary objective of the proposed TSF will be to recover mercury in its elemental form and store it until a National Repository becomes available. Mercury-bearing materials sent to the proposed TSF will undergo the necessary treatment processes to recover elemental mercury to meet the Federal purity requirement (Figure 1.0-1, below).

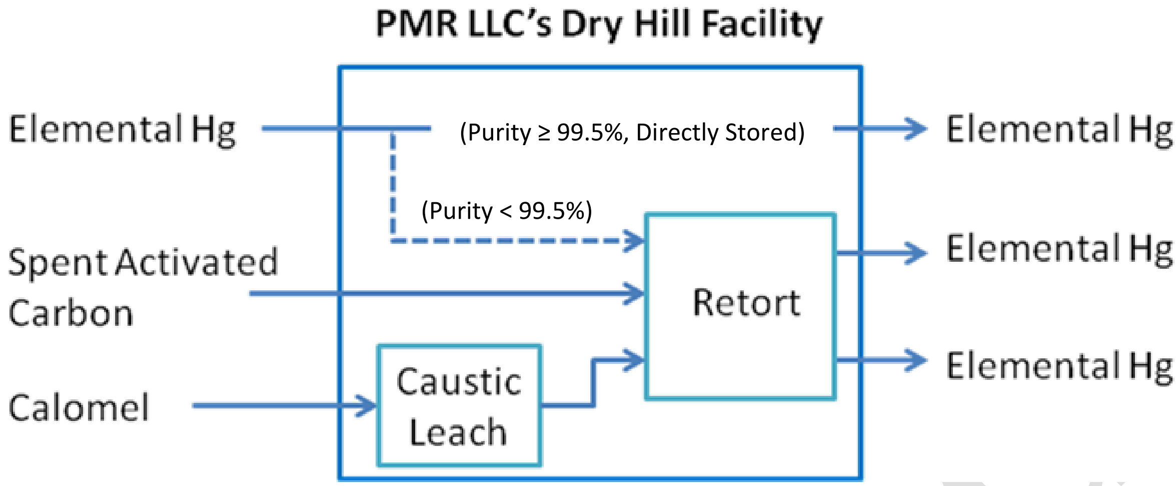


Figure 1.0-1: Input and Output of Proposed TSF

No liquid or non-liquid waste will be discharged from the proposed TSF to the environment.

Residual wastes generated by the treatment processes at the proposed TSF will be shipped off-site to other appropriately permitted facilities for further treatment and/or disposal. A sample of the residue will tested using approved test methods (e.g., Toxicity Characteristic Leaching Procedure (TCLP)) to determine the presence of hazardous characteristics. The residues will then be transported by truck to the appropriate, licensed disposal facilities.

This proposed TSF will be powered by a stand-alone electrical power generating system and will not be connected to any public or commercial power supply. Reagents, supplies, and fuels will be regularly delivered by truck to the proposed TSF and stored on-site in containers and tanks as proposed and described herein.

Three dimensional visualizations of the proposed TSF (exterior and interior) are included in Appendix 1-A.

1.1 Building Design – 40 CFR 270.14(b)(1) & 264.31

The construction of the process and storage building of the proposed TSF will follow the provisions set forth in the International Building Code (IBC) (Sections 414 and 415) and the International Fire Code (Chapters 50, 54, and 60). All spaces in the proposed TSF Building wherein mercury and mercury-bearing materials are treated, stored, and managed will be maintained under negative pressure. In these spaces, the floors will be coated with epoxy enamel, and an automatic fire suppression sprinkler system will be provided, along with prescribed fire separation distances in accordance with the above mentioned codes. (See Appendix 1-A, drawings H340940-0000-50-042-0001 and H340940-0000-50-042-0002).

The proposed TSF is 36 feet tall (from grade to the highest point on the storage area truss) and will have a footprint of approximately 33,600 square feet (180 feet long by 160 feet wide, with an additional 120 feet long and 40 feet wide for the receiving and inspection area). It will be divided into six areas, each with a separate ventilation system (Appendix 1-A drawing H340940-0000-45-083-0001). These six areas are as follows:

- Office Area.
- Process Area (including the Lab).
- Clean Storage and Maintenance Area.
- Elemental Mercury Storage Area.
- Motor Control Center (MCC) Room.
- Receiving and Inspection Area (Truck Unloading Area).

Note: All areas except for the Office Area are collectively referred to as the "plant spaces."

The Office Area will be a clean area and separated from the rest of the building by concrete walls. This area includes offices, a conference room, a lunch room, change rooms, and the control room. It will be situated in the northeast corner of the building.

All areas of the proposed TSF where mercury and mercury-bearing materials will be treated, stored, and managed will be separated from the other areas of the building by concrete walls. The proposed TSF will house the MCC Room, which will be in close proximity to the incoming power supply lines. Electrical power is supplied to the proposed TSF by diesel generators which are located in the Utility Area (outside the proposed TSF Building).

Elemental mercury will be stored in the west end of the building. Elemental mercury will be contained in pigs, and will be stored on racks equipped with spill trays (see Appendix 1-A H340940-0000-50-015-0009). All mercury and mercury-bearing materials will be stored in containers inside the building. The envelope of the proposed TSF Building proper has the following design features:

- Ceilings / roof coated with epoxy enamel.
- Exterior concrete wall panels coated with epoxy enamel.
- Interior concrete walls coated with epoxy enamel between office and process / storage areas.
- Interior concrete walls coated with epoxy enamel between process and storage areas.
- Interior metal walls coated with epoxy enamel within the storage area.
- Concrete floors within the process / storage areas coated with epoxy enamel.

The epoxy enamel coating will prevent mercury vapor from being absorbed into the building materials. This is consistent with the best practice guidelines in the Mine Safety and Health

Administration (MSHA) document, *Controlling Mercury Hazards in Gold Mining: A Best Practices Toolbox*.

An impermeable geo-membrane will be installed underneath the proposed TSF Building slab on grade as an additional level of containment.

A slab seal will be maintained at all floor and wall interfaces. Hard neoprene washers will be installed where racks are bolted to the slab with conventional anchor bolts. A watertight seal may be maintained with a durable touch-up epoxy coating. The building will be designed to prevent cracks in the concrete due to thermal expansion. Cracks that do form will be re-sealed with a concrete sealer. Waterproof expansion joints in the slab will be sealed with epoxy coating after being reset with fresh mastic.

Sealing of roll-up doors will be given special attention. Gaps will be eliminated to the fullest extent possible. The rubberized lower-lip on each roll-up door will be inspected regularly to ensure seal integrity.

1.1.1 Materials of Construction

Foundation and Floor Slab

The foundation and floor slab will be concrete reinforced with rebar on top of an impermeable membrane. The membrane barrier protecting the soil below the foundation and floor slab will be a spray-applied membrane. Liquid Boot, or a functional equivalent, is a two-component spray designed to quickly and permanently seal the soil below the building prior to construction of the floor slab.

Building Structure

The building will be constructed using steel columns with steel trusses supporting walls and ceilings. The interior exposed surface of structural members, concrete walls and floors will be coated with epoxy enamel.

Roofing

Roofing, awnings, and canopies will be pre-painted metal cladding placed over the steel trusses. The minimum thickness of the metal sheets will be 24 gauge. Roof insulation will be semi-rigid fiberglass with a thermally reflective vapor barrier.

Exterior Walls and Main Partitions

The exterior walls will be made from insulated, fire rated, and pre-fabricated concrete panels. All exterior walls and partitions will be fire-rated and will meet Underwriters Laboratories (UL) design requirements. The joints between panels, joints between panels and the roof, and joints between panels and the floor will be sealed with grout or flexible fill and finished with an epoxy coating. The exterior face of the panels will be covered with exterior pre-painted metal siding. The interior face of the panels will be coated with epoxy enamel.

Insulation

The following insulation values will be provided in the building of the proposed TSF:

- Roof R = 20
- Walls R = 13
- Walls Below Grade R = 7.5
- Unheated Slabs R = 10

Note: R-value is a measure of insulation resistivity.

Secondary Partitions

Secondary partitions within the storage area will be insulated sheet metal wall panels. The wall height will be from floor to the bottom chord of the roof trusses. All joints will be sealed with flexible seal materials and finished with an epoxy coating. The surfaces will be coated with epoxy enamel.

Secondary partitions within the office/washrooms areas will be concrete wall and sealed with epoxy coating.

Personnel Doors

Exterior and interior personnel doors within the facility will be constructed of a pressed steel frame and a door, both coated with epoxy enamel. A glazed panel will be inset at eye level wherever practical and necessary.

The industrial doors throughout the building are described below.

Exterior over-head doors

- Structural steel channel frame coated with epoxy enamel.
- Insulated, hurricane resistant roll-up metal sectional door coated with epoxy enamel.
- Motorized.
- Weather sealed.
- Safety reversing edges.

Interior Roll-up Doors

- Structural steel channel frame coated with epoxy enamel.
- Metal door coated with epoxy enamel.
- Motorized.
- Safety reversing edges.

Fire Doors/Emergency Exit Doors

- Pressed steel frame and doors with UL fire resistance rating with glazed panel at eye level.
- Motorized roll-up curtain door coated with epoxy enamel and with steel slats and fusible links.

Door Glazed Panels

- Fire doors/Emergency exit doors: 6 millimeters (mm) thick, wired clear glazing with steel wire mesh 13 mm on center for fire rated doors.
- Interior doors: 6 mm thick, clear tempered glass

Hardware

- Hardware, including panic hardware, for both interior/exterior personnel doors will be extra heavy-duty, industrial type.
- Key system will be based on a grand master, sub-master, and individual areas as required by industry standards.

Windows

- Exterior Windows: steel industrial frame with opening section, double-glazed units with paint finish.
- Interior Windows: steel industrial frame with sliding section and single-glazed units with paint finish.

Floor Finishes

- Concrete floors in all process and storage areas: coated with epoxy enamel.
- Clean and dirty locker rooms, washrooms, janitors' room, laundry room, and lunch room: non-slip ceramic or quarry tile.
- Offices and entrance lobby: sheet vinyl or vinyl composite tile.
- Concrete floors in service rooms: coated with epoxy enamel.

Wall Finishes

- Concrete walls in all process and storage areas: coated with epoxy enamel.
- Offices and entrance lobby: painted concrete.
- Clean and dirty locker rooms, washrooms: ceramic tile on concrete walls.

- Concrete walls in washrooms, janitors' room, laundry room, and lunch room: coated with epoxy enamel.
- Concrete walls in service rooms: sealed with epoxy enamel.

Ceiling Finishes

- All process and storage ceilings: suspended metal panels, sealed with epoxy enamel.
- Offices and entrance lobby ceiling: acoustic tile on suspended metal grid system.
- Washrooms: painted, suspended water-resistant gypsum board.
- Service rooms: epoxy enamel.

Epoxy Paint Finish

Epoxy coatings will be applied on the floors and walls of the proposed TSF. Examples of suitable coatings are: Stonclad GS, Stonshield HRI, and Stronglaze VSE. These products, or functional equivalents, will be used. The specifications for these example products can be found in Appendix 1-D.

1.1.2 Offices, Control Room, and Hygiene Area

The areas of the proposed TSF where mercury and mercury-bearing materials are treated, stored, and managed are referred to as "dirty"; the areas of the proposed TSF where these activities do not occur are referred to as "clean."

The office and hygiene areas represent the clean portion of the proposed TSF. All employees and authorized visitors will enter the building through the front door leading to the lobby area. The lobby will provide access to the offices, conference room, lunch room, men's and women's locker rooms, and storage closets.

The purpose of the hygiene area is to protect workers from inadvertently carrying mercury contaminated dust or clothing from the plant spaces. It is designed to act as a buffer, separating the areas of the facility where mercury and mercury-bearing materials are treated, stored, and managed from those that are not.

Facility workers going from the clean area of the building to the process or storage area will first have to enter their respective (men's or women's) clean locker room, where they will be required to doff their street clothes and store them in lockers. They will then be required to proceed through their respective shower room and into their respective dirty locker room, where their work clothes and boots are stored. From the dirty locker rooms, facility workers can then proceed to the plant spaces.

Authorized visitors to the proposed TSF will be required to follow a similar procedure, but will don disposable protective coverings (e.g., Tyvek booties) and PPE as appropriate instead of dedicated work clothes.

When leaving the plant spaces, work clothing and boots will be required to be removed and stored in the workers' respective dirty locker room. In their respective adjoining shower room, facility workers will wash off any dust which may have contacted their skin. Clean towels will be provided in the clean locker rooms, which are the designated areas for facility workers to change back into their street clothing before proceeding to the lobby and exiting the building.

Authorized visitors to the facility will be required to doff their disposable protective coverings in the appropriate dirty locker room, and wash their hands prior to entering the clean areas of the building.

A laundry room is provided in the hygiene area for washing and drying work clothing; work clothing will not be allowed to leave the building. In an effort to further prevent the spread of potential contamination, facility workers will be prohibited from washing or drying street clothing and other clean linens at the proposed TSF.

1.1.3 Office/Plant Area Separation

Within the building proper of the proposed TSF, there will be an engineered separation between the office side and the plant side. This concept is shown in the office layout in Appendix 1-A, drawing H340940-0000-50-042-0002. The office side will be enclosed and maintained under positive pressure. The remainder of the building will be maintained under negative pressure. In addition to engineered barriers, procedures and protocols will be established to ensure that employee travel between the two sides of the building will not be a source of potential cross-contamination.

The lunch room is only accessible from the office area. Eating, drinking, and the use of tobacco products will be strictly prohibited anywhere in the plant spaces. Smoking will be prohibited on the proposed TSF compound. Once employees have been in the plant spaces, they will be required to wash hands, doff work clothes, and change into street clothes before they can access the lunch room. This protocol is consistent with practices at metallurgical operations and is intended to protect facility workers from accidental ingestion of mercury. Due to the batch nature of the process and automation, employees are not expected to be in the process area for extended periods of time.

There will be a washroom located in the plant spaces which can also be accessed from the corridor for employee use during shift hours.

Even though the plant spaces are maintained at a lower pressure than the office area and the outdoor environment, vestibules are in place between these spaces to ensure the pressure difference between the office and the plant spaces is maintained.

1.1.4 Heating, Ventilation, and Air Conditioning

General

- Illustration of the overall ventilation system is shown in Figure 1.1-1 below with the HVAC Control Schematic provided in Appendix 1-A H340940-0000-45-083-0001.
- Independent HVAC units are provided for each of the six areas in the proposed TSF.
- The hygiene exhaust system will maintain the negative pressure in the proposed TSF's plant spaces.

  Note: Hygiene gas is the interior air in the plant spaces (i.e., all areas except the Office Area).

Ventilation

The building is designed to be as air tight as practical. Ventilation will be provided to create an overall negative pressure in the plant spaces, so that air flow will be forced to go from the outside environment into the building (refer to Figure 1.1-1 and Appendix 1-A H340940-0000-45-083-0001). All exhaust from the proposed TSF Building is designed to exit through one exhaust duct. Exhaust emissions will meet the criteria specified in Section 1.2.6.

The office/clean area will be maintained under positive pressure by fresh air from the outdoor environment, therefore, if there is any leakage, air will flow from the office area into the plant spaces. Temperatures in the process and storage areas will typically be maintained at or below 70°F to prevent mercury volatilization.

The plant spaces will be ventilated to create at least three air changes per hour in the process area. The exhaust air from the plant spaces will pass through a dust collector to remove any dust prior to entering a High Efficiency Particulate Air (HEPA) filter for further polishing, and will finally pass through a carbon filter for mercury control prior to exhausting to atmosphere. Individually enclosed ventilation points, such as tank vents and ventilation for calomel feed preparation will be cleaned in multi-staged, carbon-filtration units and then tied into the main exhaust.

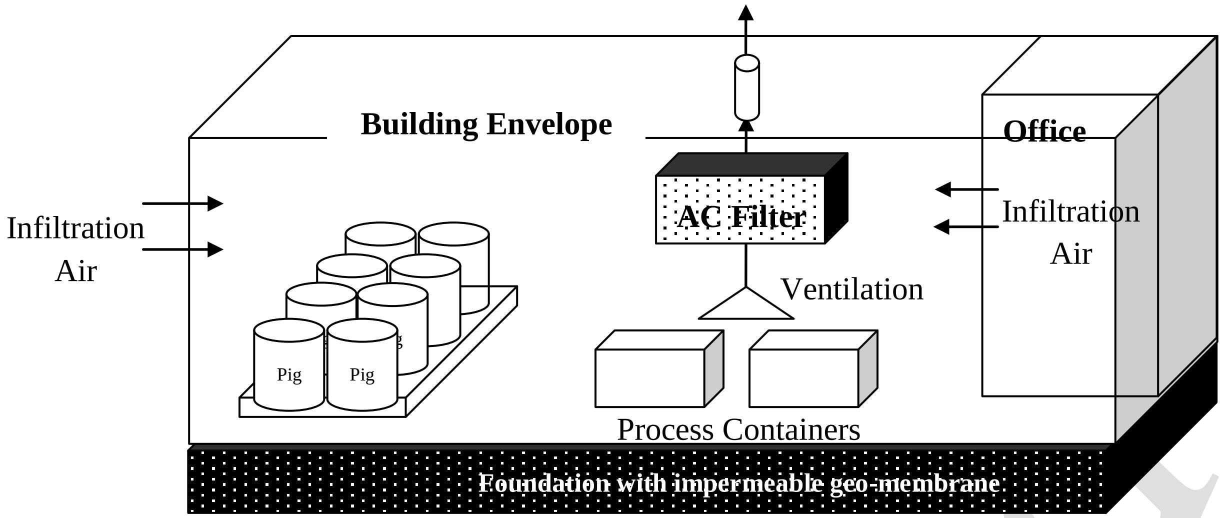


Figure 1.1-1: Illustration of Ventilation System

Office Area

The HVAC system for the office area consists of a roof-mounted, air conditioning unit, exhaust fans, air distribution ductwork, and HVAC system controls. The system will be powered by on-site produced electricity. The HVAC system will strive to maintain a comfortable indoor temperature, typically 75°F or below. Air makeup will maintain the office under positive pressure relative to the outdoor environment and plant spaces.

Motor Control Center Room

The HVAC system for the MCC Room consists of a roof-mounted, air conditioning unit, air distribution ductwork, and HVAC system controls. The system will be electric. The HVAC system will strive to maintain a target indoor temperature of 75°F or below. The MCC Room will be maintained under positive pressure relative to the surrounding building areas.

Elemental Mercury Storage Area

The HVAC system for the elemental mercury storage area consists of two, roof-mounted, air conditioning units, air distribution ductwork, and HVAC system controls. The HVAC system is designed to typically maintain a target indoor air temperature of 70°F or below. Heating, unless necessary for worker comfort, will not typically be provided in the elemental mercury storage area during the winter months, unless necessary. The elemental mercury storage area will also be maintained under negative pressure, in common with the rest of the plant spaces.

Clean Storage and Maintenance Area

The HVAC system for the Clean Storage and Maintenance Area consists of a roof-mounted, air conditioning unit, air distribution ductwork, and HVAC system controls. The HVAC system will be designed to maintain a target indoor air temperature at 70°F or below. Heating will not typically be provided in this area during the winter months. This area will be maintained under negative pressure, in common with the rest of the plant spaces.

Process Area

The HVAC system for the process area (including the laboratory area) consists of a roof-mounted, air conditioning unit, air distribution ductwork, and HVAC system controls. The HVAC system will be designed to typically maintain a target indoor air temperature of 70°F or below. The process area will be maintained under negative pressure relative to the surrounding areas.

Inspection Area

The HVAC system for the inspection area consists of a roof-mounted, air conditioning unit, air distribution ductwork, and HVAC system controls. The HVAC system will be designed to typically maintain a target indoor air temperature of 70°F or below. The inspection area will be maintained under negative pressure, in common with the rest of the plant spaces.

Truck Unloading Area

The HVAC system for the truck unloading area consists of exhaust fans, air intake louvers with motorized dampers, a carbon monoxide (CO) gas detection system, and a nitrogen oxides (NO_x) gas detection system, compliant with applicable workplace standards.

Within the truck unloading area, it is not expected that mercury vapor will be present. The inspection procedures taking place at the truck unloading area will involve:

- Mercury vapor detection using a portable device.
- Checking the container labels.
- Checking the delivery manifest(s).

This area is not designed for open containers containing mercury and mercury-bearing materials. Accordingly, temperature control will not be provided in the truck unloading area, but this area will be maintained under negative pressure when the bay doors are closed.

1.2 Facility Operation and Process Descriptions – 40 CFR 270.14(b)(1) & 264.31

The proposed TSF Building is specifically designed to follow the best practices for mercury managing facilities and to safely manage mercury. All loading and unloading will occur within this engineered structure. The building will be constructed of non-combustible materials to reduce fire susceptibility. Flammable materials will not be stored in the storage area.

All applicable engineering and building design standards have been applied to this building. Mercury spill kits and mercury absorbent will be available in sufficient quantities to prevent any spilled mercury from being released to the environment or threatening human health. All facility personnel will be trained in response procedures per the training plan presented in this application (see Section 12).

The spent activated carbon and calomel will be transported to the proposed TSF and treated on-site to extract mercury as discussed in this section. The extracted elemental mercury along with the elemental mercury delivered to the facility will be stored on-site, pending final completion of the National Repository. The proposed TSF is designed to store 1,024 pigs of elemental mercury. This is equivalent to approximately 11 years of received and extracted elemental mercury based on current production rates.

1.2.1 Material Receiving, Handling, and Storage

This section discusses the receipt, handling, and storage of elemental mercury, spent activated carbon, and calomel at the proposed TSF. The procedures discussed herein are in accordance with the *US DOE Interim Guidance on Packaging, Transportation, Receipt, Management, and Long-Term Storage of Elemental Mercury (2009)*.

Mercury and mercury-bearing materials will arrive by truck at the proposed TSF. Upon approval by the facility's security personnel:

- Trucks will be admitted through the Perimeter Security Gate of the outer Perimeter Fence
- Trucks will be admitted through the Main Security Pass Gate into the proposed TSF compound
- Trucks will be admitted into the fenced RCRA Facility Area where the truck will prepare to park in the receiving area.

The facility's outer loading door will open and the inner bay door (located between the truck bay and the proposed TSF's plant spaces) will remain closed. Once the truck fully enters the unloading area, the truck engine will be turned off and then the outer door will be closed.

The presence of any potential mercury vapor concentrations within the trucks will be measured before any visual inspection or unloading of the containers occurs. After mercury vapor concentrations are confirmed to be within acceptable limits (OSHA limit is 0.1 milligram per cubic meter [mg/m^3]), facility workers will visually inspect the containers and pallets before removing them from the truck bed.

This primary inspection will focus on manifest validation, evident spills, and evaluation of container and pallet integrity. Should a spill be discovered, standard facility cleanup procedures will be implemented. Refer to Section 22 for information on the acceptable types of material transport/storage containers.

The proposed TSF will retain the original, signed manifest and send a signed copy back to the waste generator. Any discrepancies between the manifest and the actual material received at site will be resolved in a timely manner. Where discrepancies cannot be accounted for within 15 days, the NDEP Administrator will be informed in writing and provided with a copy of the manifest.

After the initial inspection and manifest confirmation, a forklift will transport the pallets from the truck to a designated receiving area. Once inside, the containers and pallets will undergo a more thorough inspection for leaks, cracks, dents, beading, corrosion, and seal integrity. Mercury vapor levels will be monitored in the receiving area while these actions are being performed.

In the unlikely event mercury vapor is discovered above the threshold (i.e., OSHA limit), or a container is found to be compromised:

- For containers holding elemental mercury, the damaged container will be placed in a custom designed drum specifically designated for this purpose (see Section 22).
- For containers holding spent activated carbon, the contents of the damaged drum will be emptied into a designated clean drum and transported to the retort area to be retorted. The empty damaged drum will also be retorted.
- For containers holding calomel, the calomel slurry will typically be contained within secondary containment (e.g., overpacks, spill trays, or other appropriate containment). Calomel will then be pumped into a clean drum. At the automated feed preparation station, the calomel (in the clean drum) will be suctioned out and will enter the treatment process. Both the breached drum and secondary containment vessel will be triple rinsed at the calomel feed preparation area.

As part of the receiving process, a portion of the received material arriving at site will be fingerprinted before processing and storage. Fingerprinting will consist of random sampling and testing of the material (see Section 9). Test criteria will be dependent on the material being received, but may include some or all of the following: a physical description, elemental mercury purity, specific gravity, and pH. Testing of samples will be performed in a laboratory room within the proposed TSF's process area.

Pigs will be removed from their skids and transported by forklift to the storage area. Section 22 of this document and the General Arrangement Drawings (provided in Appendix 1-A) present details on elemental mercury storage.

Small quantities of elemental mercury may also be received at the proposed TSF in 76-pound flasks. These flasks will be staged at a dedicated elemental mercury transfer station where their contents will be emptied into pigs. (The mercury storage area is designed to store pigs.) The transfer station will be located in the process area, and will be equipped with spill containment and ventilation to prevent mercury or mercury vapors from escaping. A sketch of the elemental mercury transfer station is shown in Figure 1.2-1.

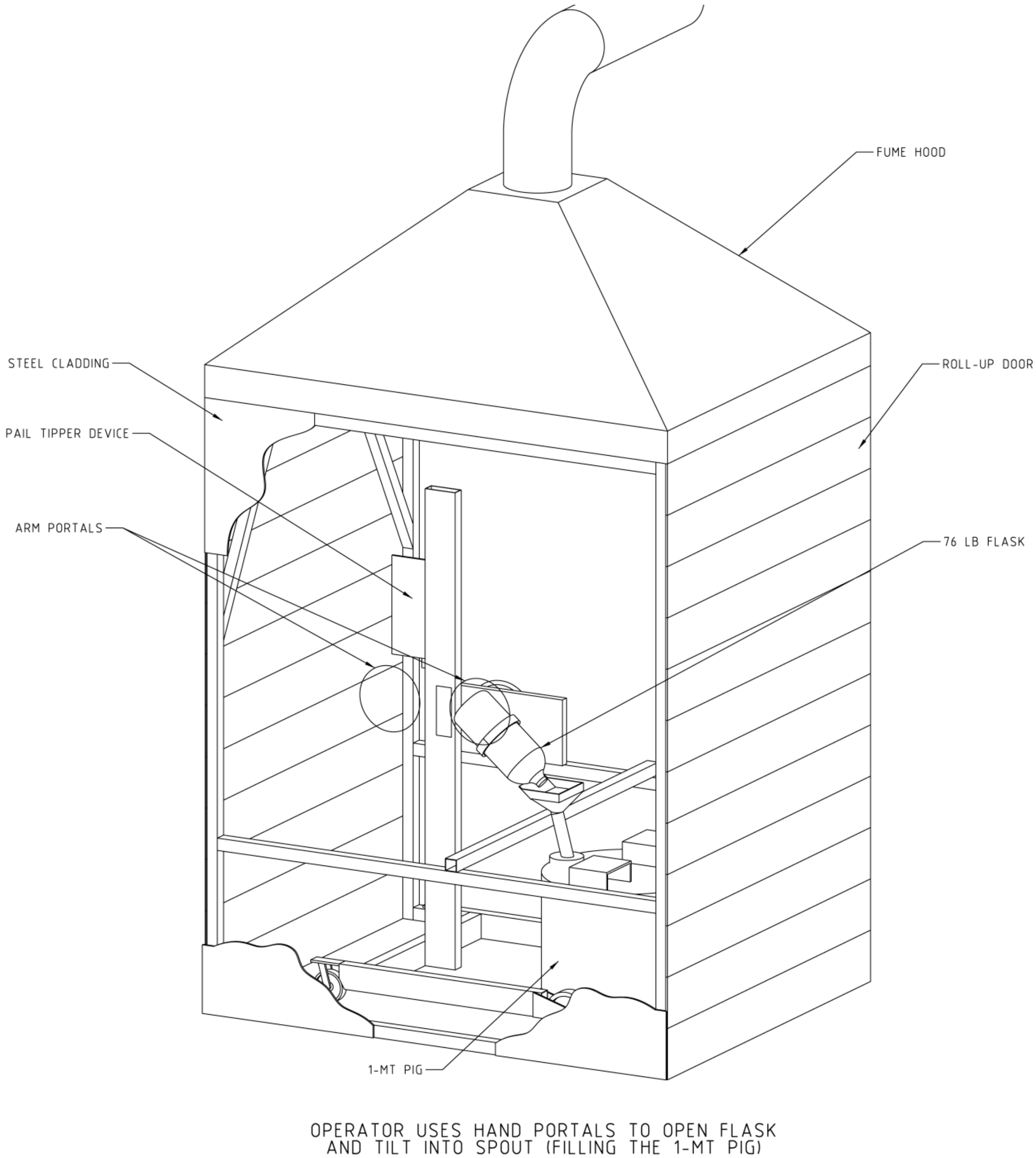


Figure 1.2-1: Elemental Mercury Transfer Station

Containers will be labeled after acceptance by facility personnel. Labels will be clearly legible and include the material type and date of receipt. Containers intended for treatment and/or storage will be managed pursuant to the proposed TSF's Floor Space Storage Management Plan (FSSMP). The FSSMP will allow the proposed TSF to procedurally modify and control the designated hazardous waste storage areas within the proposed TSF Building.

Initially, it is anticipated that more floor space will be required for storage of calomel, but as inventory levels of elemental mercury increase, pending completion of the National Repository, more floor space will be allocated for storage of elemental mercury. The FSSMP will be developed and implemented upon permit approval, but prior to material receipt. The FSSMP will be updated as necessary to govern the type and quantity of waste received.

Calomel drums will be kept in a designated temporary storage area until processed. Containment will be in accordance with Section 22 of this document.

Drums of calomel will be transported via forklift to the process area when they are ready to enter the treatment process. Spent activated carbon will be stored in the same area as calomel under identical conditions. Pallets will be transferred to the process area by forklift as required for treatment (see Appendix 1-C Process Flow Diagrams).

Management practices will prevent unauthorized personnel (e.g., delivery truck drivers) from accessing the inner plant spaces of the proposed TSF. Typically, the inner door will be opened only for authorized operational purposes, such as transfer of containers or maintenance. Once the inspection and material transfer procedure is complete and the truck driver receives appropriate documentation, the inner door will be closed.

Once the inner door is closed, the outside delivery bay door can be opened, allowing the truck driver to exit. During normal operations, the outside delivery bay door will close after the truck leaves and will remain closed until the next delivery (see General Arrangement Drawings provided in Appendix 1-A).

Secondary containment will be provided. A summary of the secondary containment features for the proposed TSF is set forth in the following Table 1.2-1.

Table 1.2-1: Secondary Containment Capacities

Tanks Or Containers	Maximum Working Volume	Regulatory Requirement at Full Capacity	Actual Containment Provided
Mercury Pigs	19,456 gallons (19 gallons per pig and max 1,024 pigs in storage at 11 years)	1,950 gallons	• Each spill tray w/ 8 pigs can hold 25 gallons (3,200 gallons at maximum capacity [1024 pigs]), • Total designed bunded storage area (i.e., the building envelope) – 95,750 gallons
Calomel Drums	4,180 gallons (55 gallons per drum and max 76 in storage at any time)	418 gallons	Total designed bunded storage area (i.e., the building envelope) – 95,750 gallons

Tanks Or Containers	Maximum Working Volume	Regulatory Requirement at Full Capacity	Actual Containment Provided
Carbon Drums (no free liquids)	60 drums max storage	N/A	N/A
Calomel Feed Preparation Station	55 gallon	55 gallons	• Dedicated sump – 55 gallons • Total designed bunded process area (i.e., the building envelope) – 26,900 gallons
Caustic Soda Storage Tank*	750 gallons	1,100 gallons	Total designed bunded area (i.e., the building envelope) – 122,650 gallons
Hydrochloric Acid Storage Tank*	100 gallons	265 gallons	
Decomposition Tank	400 gallons	880 gallons	
Waste Solution Tank	400 gallons	880 gallons	
Waste Solution Collection Tank	400 gallons	880 gallons	
Waste Solution Settling Tank	300 gallons	470 gallons	
Waste Solution Storage Tank #1	3,600 gallons	4,960 gallons	
Waste Solution Storage Tank #2	3,600 gallons	4,960 gallons	
Retort	220 gallons	220 gallons	Total designed bunded process area (i.e., the building envelope) – 26,900 gallons
Filter Press	170 gallons	170 gallons	Total designed bunded process area (i.e., the building envelope) – 26,900 gallons

*This tank is not a waste storage tank and is not subject to the RCRA requirements.

1.2.2 Calomel Treatment System

The calomel treatment circuit is designed to recover mercury from calomel (mercurous chloride) generated from the “Boliden Norzink” circuit installed at the BGMI facility, which recovers mercury vapor from the roaster off-gas (see Appendix 1-C Process Flow Diagrams).

The calomel treatment system to be employed at the proposed TSF is based on an existing technology used by Bethlehem Apparatus Company (BA), and consists of:

- A caustic leach circuit wherein calomel is converted to a mixture of elemental mercury and mercuric oxide solids.
- A retorting circuit where the elemental mercury and mercuric oxide mixture from the caustic leach circuit is converted to pure mercury in its elemental form.

The caustic leach circuit is shown in the Process Flow Diagram (Appendix 1-C) and is described below. The retorting portion of the calomel treatment system is described in Section 1.2.3.

The calomel caustic leach circuit includes the following key processing steps:

Step 1: Feed preparation (agitation and fluidization of calomel from the drums).

Step 2: Decomposition reaction (leaching).

Step 3: Solid-Liquid separation (filter press).

Step 4: Filtrate treatment.

The calomel caustic leach circuit is designed as a batch operating process where poly drums of calomel slurry will be transported with a forklift from the temporary calomel storage area to the calomel feed preparation station. The calomel feed preparation station is designed to be a fully automated and enclosed unit (see Figure 1.2-2).

The Calomel Feed Preparation station will be located within process area of the plant spaces surrounded by bunding. The bunded area provides 26,900 gallons of secondary containment in the process area.

Calomel will be pumped into the Calomel Decomposition Tank at the Calomel Feed Preparation station one container at a time. The skid mounted Calomel Feed Preparation unit will be completely self-contained. The shields and agitator/suction device are designed to be raised and lowered using a single hydraulic cylinder connected to a sliding frame similar to that of a forklift. The retractable shield will prevent any spray or splash from spilling to the process area equipment and floor. Flexible rubber hoses are used to transfer water, air and calomel to and from the drum.

Secondary containment for the unit will be provided by a fully sealed sump (integral to the calomel feed prep skid). A 55 gallon capacity sump is provided below the drum in order to contain any spills and the rinse water used to rinse the outside of the drum and lid. Additional secondary containment volume (26,900 gallons) will be provided by the process area perimeter bunding.

Calomel slurry will be agitated to suspend the settled solids in the drum. Process water may be added to the drum as needed to decrease the viscosity of the slurry and make it suitable for pumping. When a homogeneous mixture is attained, the calomel slurry will be pumped from the drum in the calomel feed preparation station to an agitated reaction tank (Decomposition Tank) which contains a caustic solution of sodium hydroxide (NaOH). The caustic solution will decompose calomel into a mixture of elemental mercury and mercuric oxide as per the following reaction:

$$\mathbf{Hg_2Cl_2\ (s) + 2\ NaOH\ (aq) \quad \rightarrow \quad Hg^{o}\ (l) + HgO\ (s) + 2\ NaCl\ (aq) + H_2O\ (l)}$$

After transferring calomel slurry to the Decomposition Tank, the drum will be triple rinsed in the calomel feed preparation station, and the rinsed drum will be transported to a temporary storage area. The drum rinsate will be added to the Decomposition Tank.

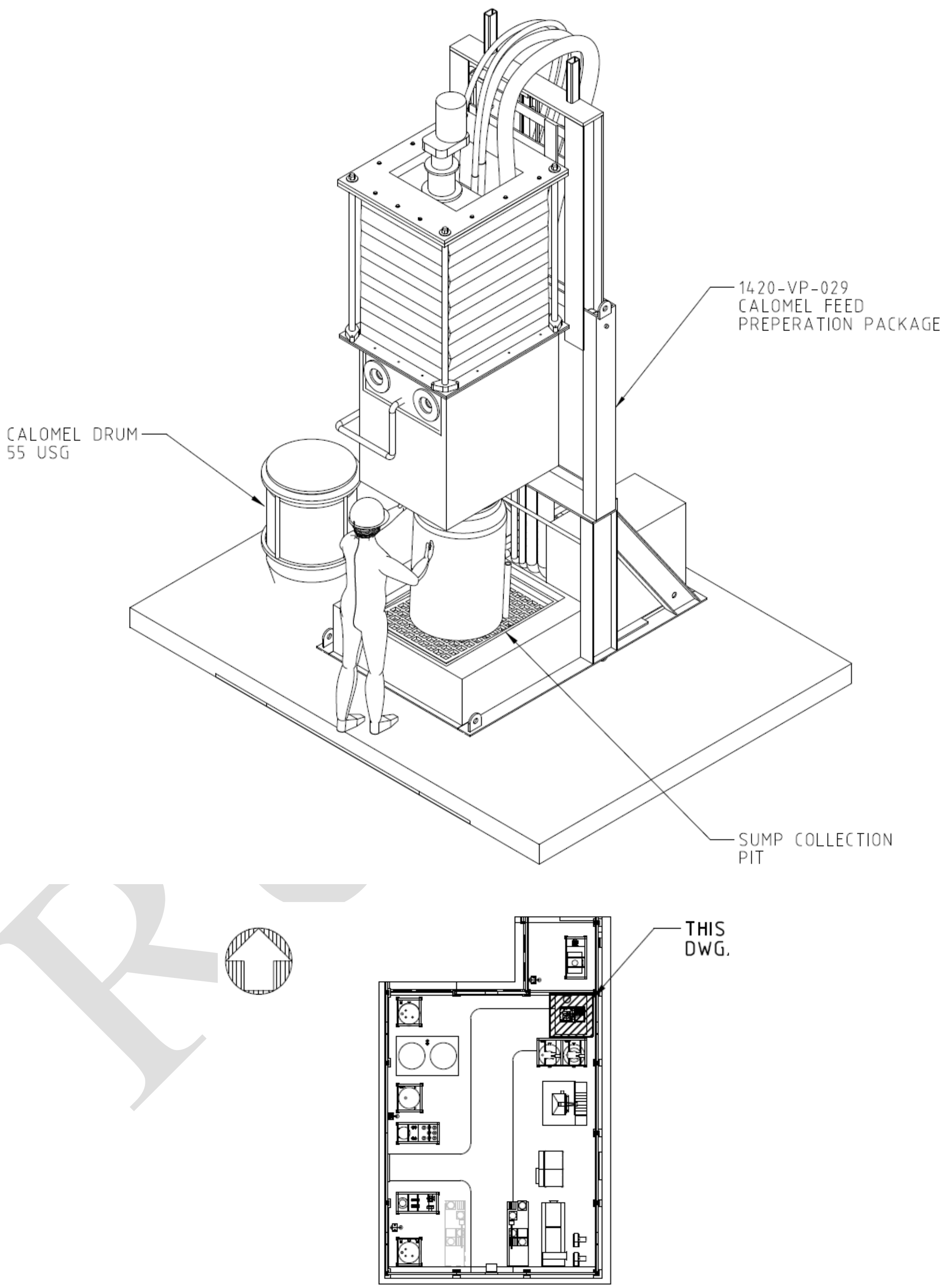


Figure 1.2-2: Calomel Feed Preparation Station and Location in Process Area

The highly alkaline decomposed slurry and salt solution in the Decomposition Tank will be pumped to a filter press (see Figure 1.2-3) for physical separation (see Appendix 1-C Process Flow Diagrams and Appendix 30-A for vendor specifications).

The Filter Press is located within process area of the plant spaces surrounded by bunding. The bunded area provides 26,900 gallons of secondary containment in the process area. The Filter Press skid is fabricated on two levels. The Filter Press is situated on the skid upper level.

In order to extract as much liquid as possible, spill collection is integral to the Filter Press design on the upper level. No additional external spill containment is provided on the upper level. Extracted liquid flows into the waste treatment tank.

During the mercuric oxide filter cake removal process, cake falls from the bottom of the Filter Press into a collection container located on the skid lower level via either of two chutes. Each transfer chute is enclosed and sealed to a collection container. Two 55-gallon containers are used for filter cake collection. The lower level of the Filter Press skid is enclosed, which provides spill collection.

The maximum secondary containment required for the Filter Press skid is 170 gallons (60 gallons for the filter press batch capacity and 110 gallons for the filter cake collection containers). Although the filter cake is not expected to contain free liquids, the filter cake collection containers have been considered in the calculated secondary containment volume.

The filter press is designed with ventilation hoods that connect to the hygiene exhaust system as discussed in Section 1.2.6.

The mercuric oxide filter cake collected in drums on the lower level will be retorted. The filtrate will be discharged into a neutralization tank (Waste Solution Treatment Tank) where hydrochloric acid (HCl) will be added to neutralize the alkaline waste solution into salt (NaCl) as per the following reaction:

$$\mathbf{NaOH\ (aq) + HCl\ (aq) \rightarrow NaCl\ (aq) + H_2O\ (l)}$$

A reagent (TMT 15, or functional equivalent) will be added to the Waste Solution Treatment Tank, which will precipitate dissolved mercury and assist with the settling of other heavy metals in a conical tank (Waste Solution Settling Tank) downstream in the waste solution treatment circuit. The waste solution treatment circuit is discussed in more detail in Section 1.2.7. The reagent material will be stored in the original vendor provided containers in the plant spaces.

All tanks as well as the calomel feed preparation station will be maintained under slight negative pressure by localized ventilation systems which are discussed in Section 1.2.6. All tanks in the calomel caustic leach circuit will be covered.

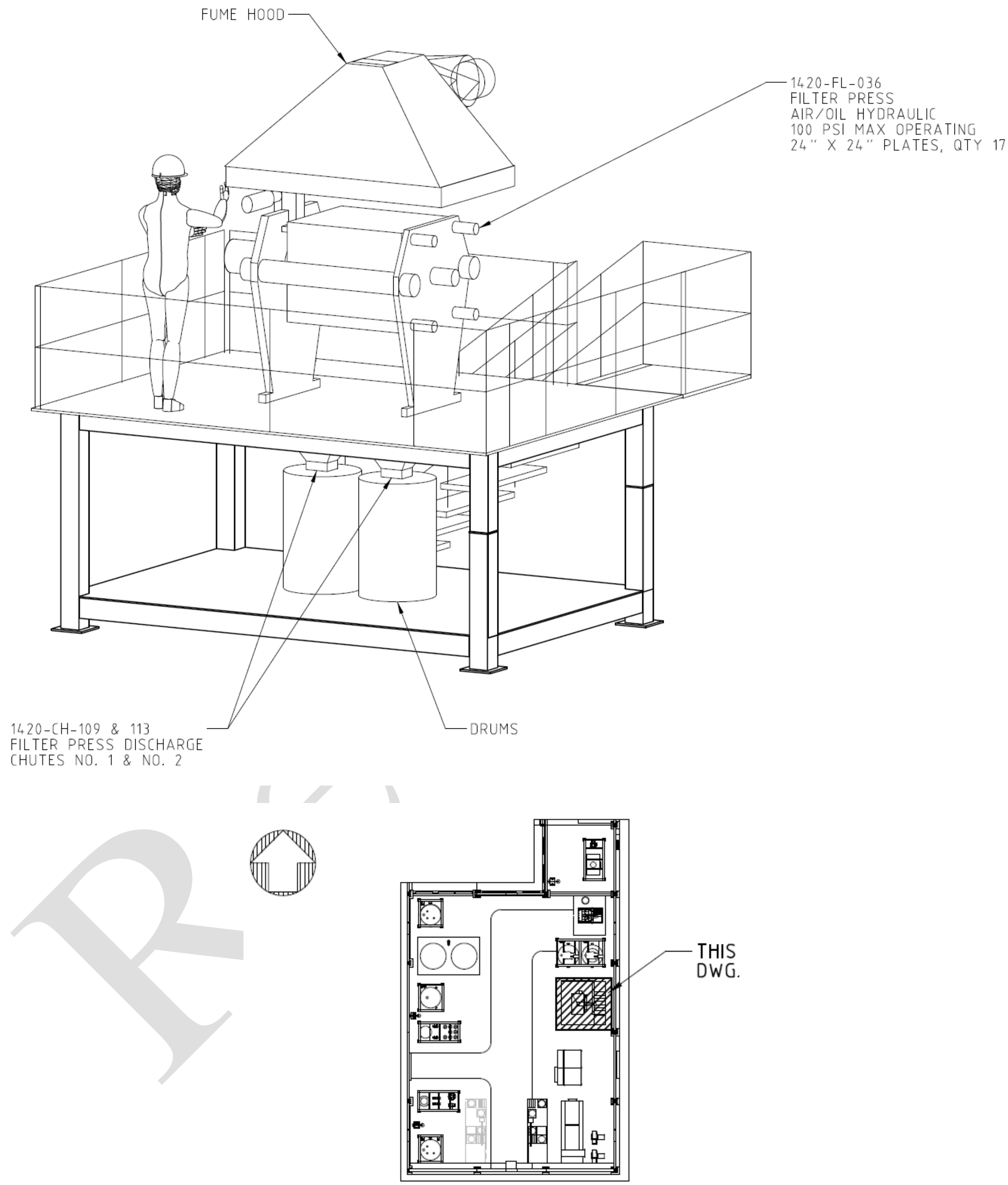


Figure 1.2-3: Filter Press and Location in Process Area

1.2.3 Retort

The retort system is designed to treat spent activated carbon and filter cake from the calomel treatment caustic leach circuit discussed in Section 1.2.2 above. The retort system and its location in the Process Area are shown below (Figure 1.2-4).

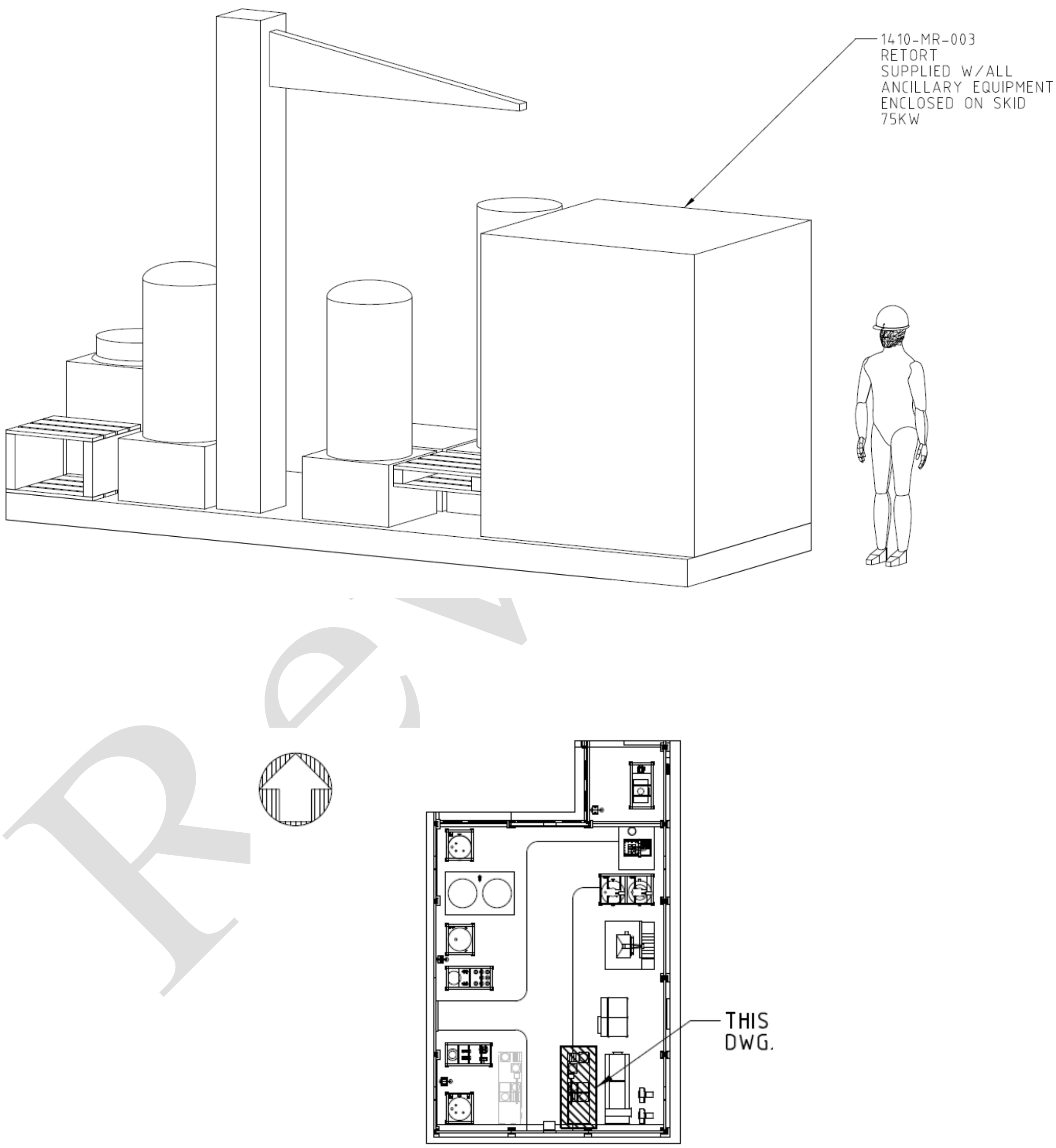


Figure 1.2-4: Retort and Location in Process Area

Activated carbon is used in the air emission control equipment (e.g., carbon beds) at BGMI, as well as other Barrick facilities. Spent activated carbon, a mercury-bearing material, will be shipped to the proposed TSF in 55-gallon steel drums. The drums will be off-loaded from trucks to temporary storage per procedures outlined in Section 1.2.1. The retort system for the proposed TSF will be designed to accept feed materials in both 55-gallon drums and vendor supplied retort trays. The spent activated carbon drums will be transferred to the retort for processing. The design retort capacity is two 55-gallon drums of spent activated carbon per batch.

Once a batch of spent activated carbon or filter cake is placed on the retort stand and the retort dome is set, the operator will initiate a pre-determined retort temperature and pressure cycle, consisting of the following steps:

1. A vacuum will be developed in the sealed retort, which promotes evaporation of volatile components (e.g., water, mercury, etc.) from the feed.
2. The retort temperature will be increased and maintained at a lower temperature sufficient to remove moisture from the feed.
3. The retort will be heated to the upper operating temperature to evaporate/sublimate mercury compounds and will be maintained at an elevated temperature for a fixed period of time. Near the end of the heat cycle, small amounts of bleed air will be added to the retort to promote deportment of mercury vapor to the retort off-gas system.
4. After the heating step is complete, the sealed retort will be left to cool. Cooling air will be drawn into the retort to promote cooling of the retort shell.

The spent activated carbon and filter cake will be processed in separate batches and will not be mixed as the retort temperature and pressure cycles will be customized to suit the specific feed material.

After the retort cycle is complete, the drums or retort trays will be unloaded from the retort stand. The retorted carbon as well as the drums will be tested using EPA methods to determine the hazardous characteristics and evaluate Land Disposal Restrictions (LDR) standards as described in Appendix 2-A.

Residues that are determined to be hazardous by characteristics (e.g., do not pass the TCLP test) or do not meet LDR standards, may be reprocessed or shipped to an appropriately licensed facility for further treatment and disposal. Other materials will be managed as appropriate (e.g., recovery of precious metals, off-site disposal, etc.). Similarly, the retorted filter cake residue will be tested to determine the hazardous characteristics and appropriate management.

In order for the proposed TSF to reach its maximum throughput of treating 240,000 pounds of spent activated carbon and 612,000 pounds of calomel per year, two identical retorts will be required. See H340940-0000-50-042-0002 in Appendix 1-A for a general arrangement of the process area.

The retort off-gas first passes through an afterburner which uses oxygen and air to oxidize any sulfur vapor and other combustibles in the retort off-gas. The off-gas then passes through a condenser, where the majority of the mercury and moisture from the gas condenses. Sulfur dioxide (SO_2) may also condense with moisture in the form of sulfuric acid in the condenser. The condensate will be collected in a tank, from which elemental mercury will be drained into pigs. The remaining condensate waste solution will be sent to the waste solution treatment circuit for further treatment.

Localized ventilation is also designed for the retort dome when it is opened for material loading and unloading. Dust laden gas will be drawn from the hoods to the hygiene exhaust system for filtering prior to carbon filtration of the building exhaust. Dust removed by the hygiene exhaust system will be sent back to the retort for processing. The hygiene exhaust system is further discussed in Section 1.2.6.

The retort cycle will take longer than 8 hours per batch (i.e., longer than normal working hours), thus the equipment will be designed to operate safely without supervision. Design features included to ensure safe retort operation outside of working hours are as follows:

- Automatic fail-safe shutdowns in design (e.g., over-pressure, over-temperature).
- Surveillance monitoring (CCTVs).
- Automated alarms and communication systems (see Section 1.5.2 for a description of response to alarms).

1.2.4 Retort Off-Gas System

The retort off-gas drawn off the condensate tank will be sent through a series of sulfur impregnated activated carbon (S-AC) columns which will remove residual mercury from the gas stream, before entering a rotary vacuum pump (see Appendix 1-C Process Flow Diagrams).

Gas will be sent to a small packed tower SO_2 scrubber (see Figure 1.2-5 below) where SO_2 generated in the retort will be removed from the gas according to the following overall reaction:

$$\mathbf{SO_2 + 2NaOH \rightarrow Na_2SO_3 + H_2O}$$

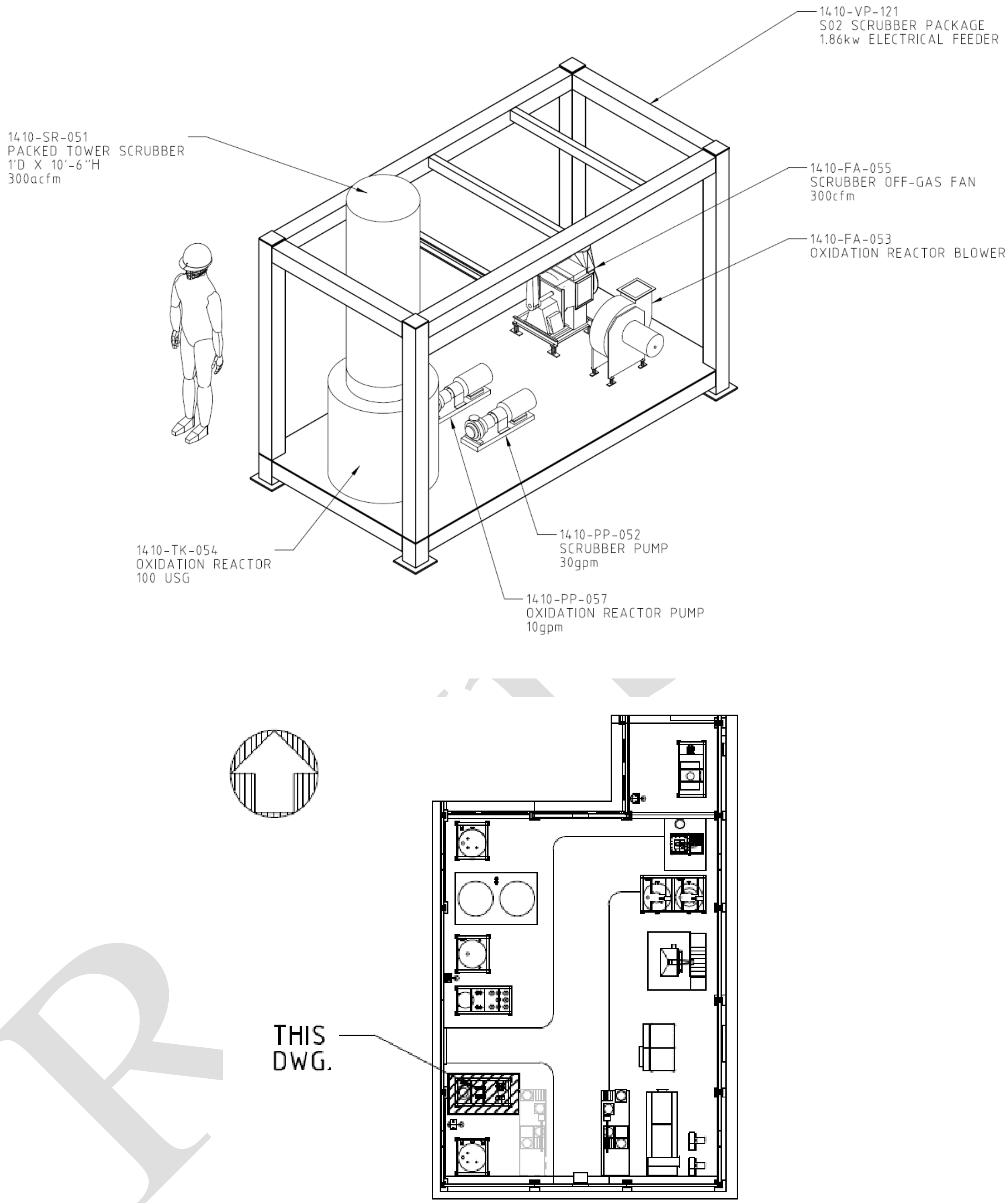


Figure 1.2-5: SO_2 Scrubber and Location in Process Area

Bleed gas from the scrubber solution will be sent to an oxidation tank, where a solution of sodium sulfate will be produced according to the following reaction:

$$\mathbf{Na_2SO_3 + \frac{1}{2}\, O_2 \quad \rightarrow \quad Na_2SO_4}$$

This salt solution will be sent to the process waste solution treatment system discussed below in Section 1.2.7. The scrubbed gas will flow through a mist eliminator located at the top of the scrubber before being drawn through an induced draft (ID) fan and discharged to the atmosphere.

When treating calomel filter cake, SO_2 is not expected in the off-gas. The gas can bypass the SO_2 scrubber through the SO_2 Scrubber Bypass Line, and discharge directly to the atmosphere via the exhaust duct. A block diagram illustrating the retort off-gas system is depicted in Figure 1.2-6.

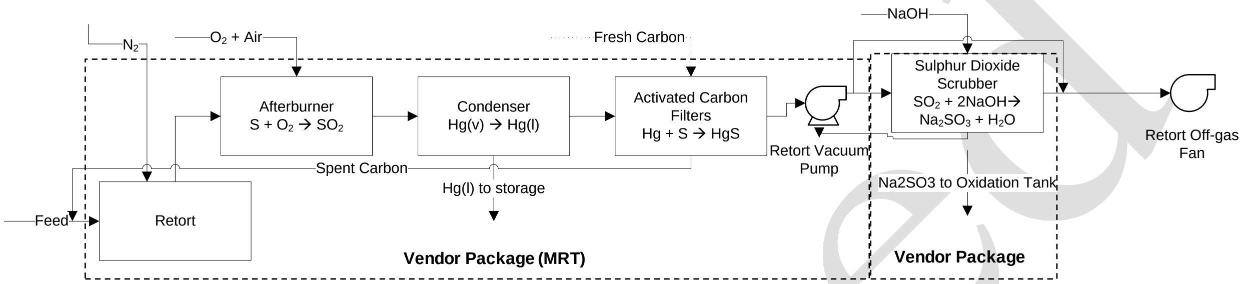


Figure 1.2-6: Block Diagram of the Retort Off-gas System

Other low volume mercury-bearing materials may be retorted to recover mercury on a periodic basis (e.g., tools, drums, and other contaminated debris and media).

1.2.5 Process Water

Fresh water will be trucked to the proposed TSF compound from an off-site source and will be used as makeup water for the treatment processes and maintenance of the proposed TSF compound. Process water will be supplied from the fresh water tank to meet the process water demand outlined in Section 1.2.7.

1.2.6 Hygiene Exhaust System

Both the spent activated carbon and calomel treatment systems will be located in the process area of the proposed TSF. This area will be separated by concrete walls from the rest of the building.

Local ventilation hoods will provide worker protection, and will capture any emissions generated during material transfers at the following locations:

- Above the filter press and at the filter cake discharge.
- Above the retort dome.

- Above the retort tray/drum transfer station in the event this feature is implemented in the future (Note: it is expected that drums can be retorted directly to minimize material transfer, but a provision has been made in the layout and sizing of the hygiene exhaust system for the transfer station).
- Above the Mercury Flask Transfer Station.

The design volume of the filter press hoods is to continuously provide a minimum of three air changes per hour for the process area. The retort dome hood will be operational intermittently, only when the operations take place (e.g., when retort domes are open for loading and unloading).

All exhaust flow is generated by the ventilation fan, which also creates negative pressure in the other plant spaces of the proposed TSF. There are two ventilation fans (one operating and one stand-by) to provide continuous ventilation and redundancy.

During shift hours, hygiene gas will pass through a dust collector to remove any dust prior to entering a HEPA filter for further polishing and a carbon filter for mercury removal. Dust from the dust collector is transferred to a drum via a rotary valve (see Figure 1.2-7 below). The captured dust is treated in the retort to recover mercury (see Appendix 1-C Process Flow Diagrams).

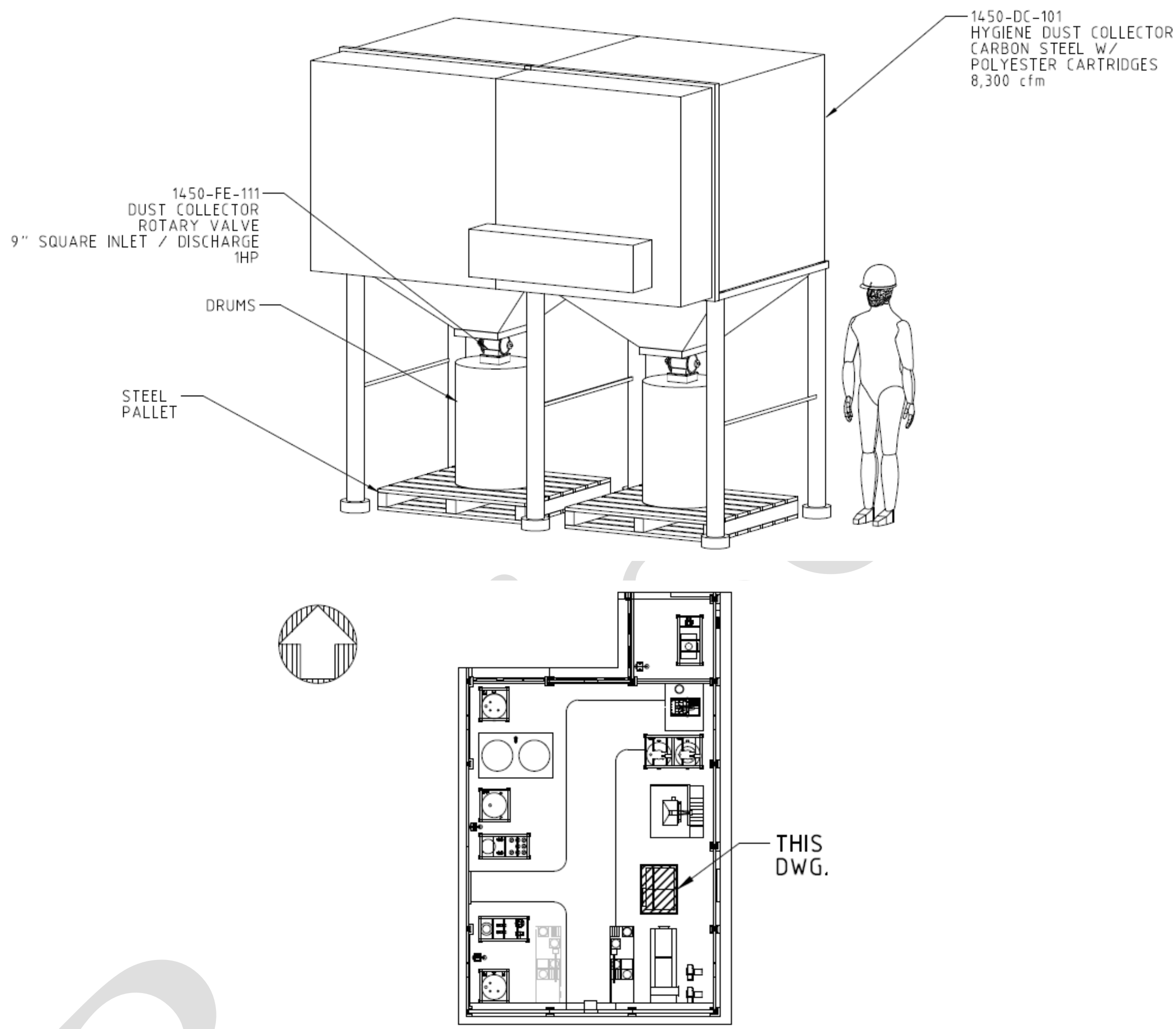


Figure 1.2-7: Hygiene Dust Collector and Location in Process Area

During non-shift hours, only the retort may be left operating through its pre-determined cycle.

When no dust generating activities are taking place, the ventilation exhaust is designed to be able to bypass the dust collector and be treated by the HEPA filter and the carbon filter (see Figure 1.2-8 below). When maintenance is required on the dust collector, no dust generating activities will occur in the plant spaces.

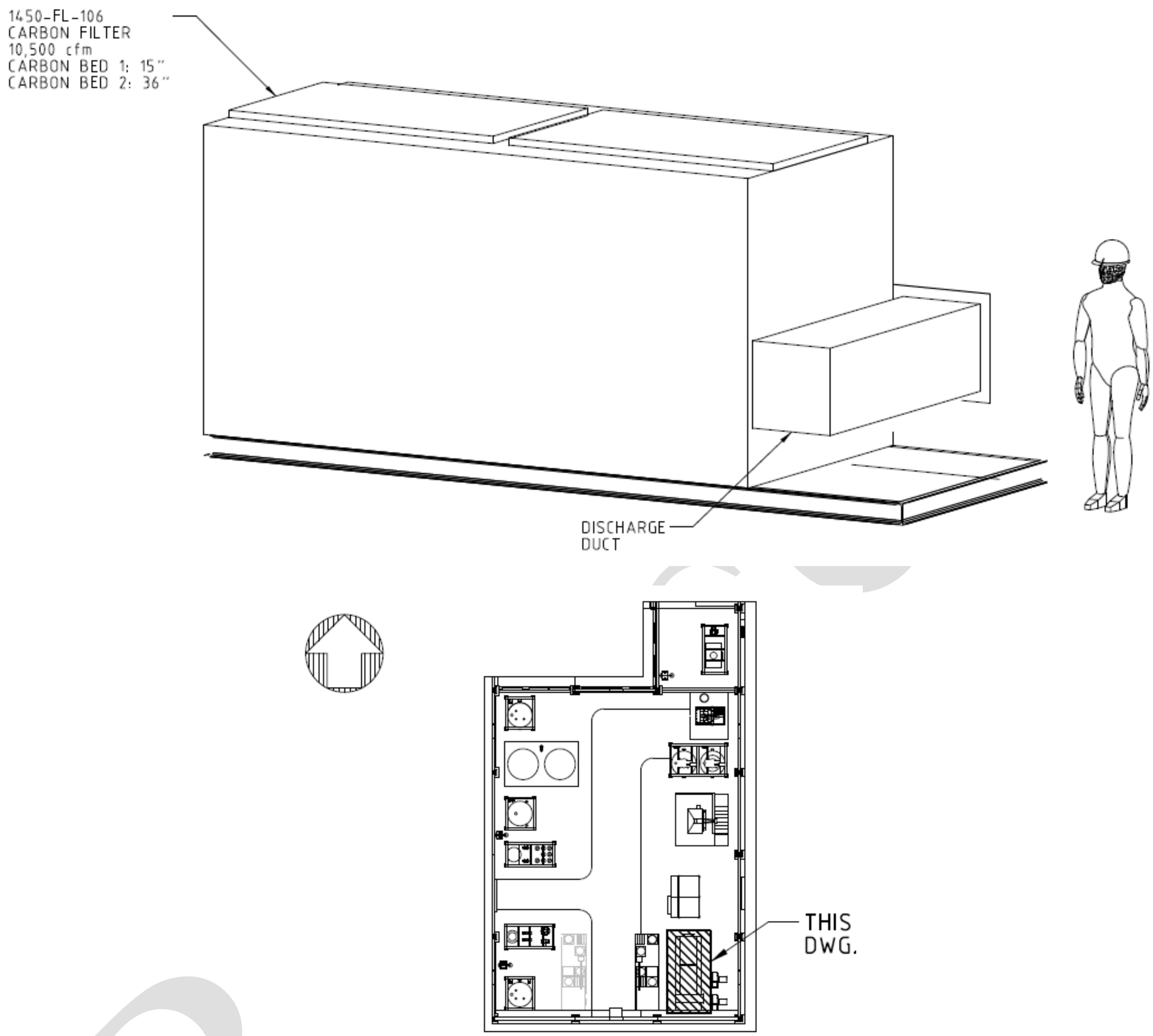


Figure 1.2-8: Carbon Filter and Location in Process Area

In addition to the general ventilation mentioned above, there will also be localized ventilation for the following enclosed systems:

- The calomel feed preparation station.
- All tanks.

The collected ventilation exhaust will be subject to moisture removal, as well as acid and mercury vapor removal steps using multi-staged carbon filtration (see Figure 1.2-9).

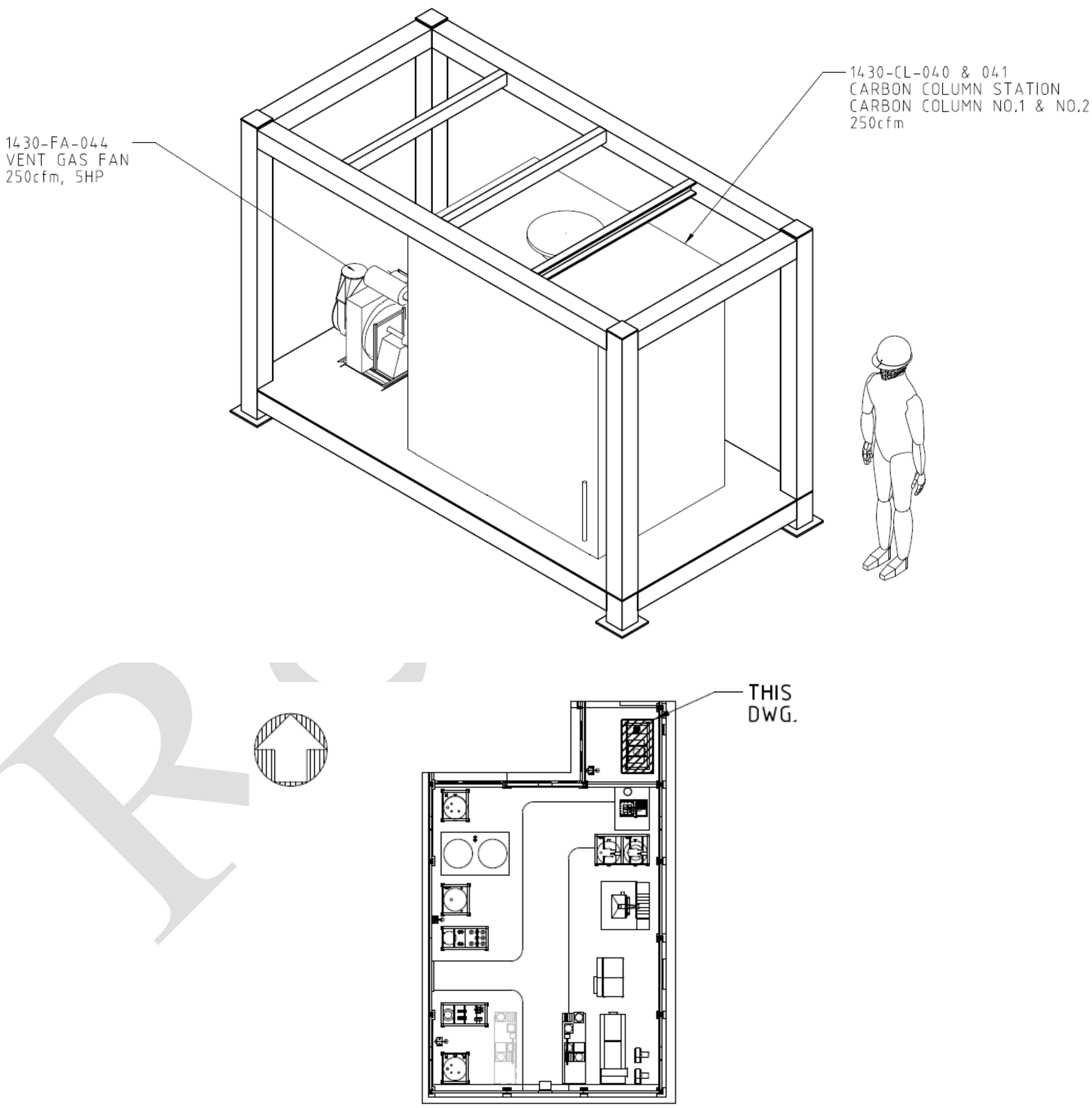


Figure 1.2-9: Carbon Columns and Location in Process Area

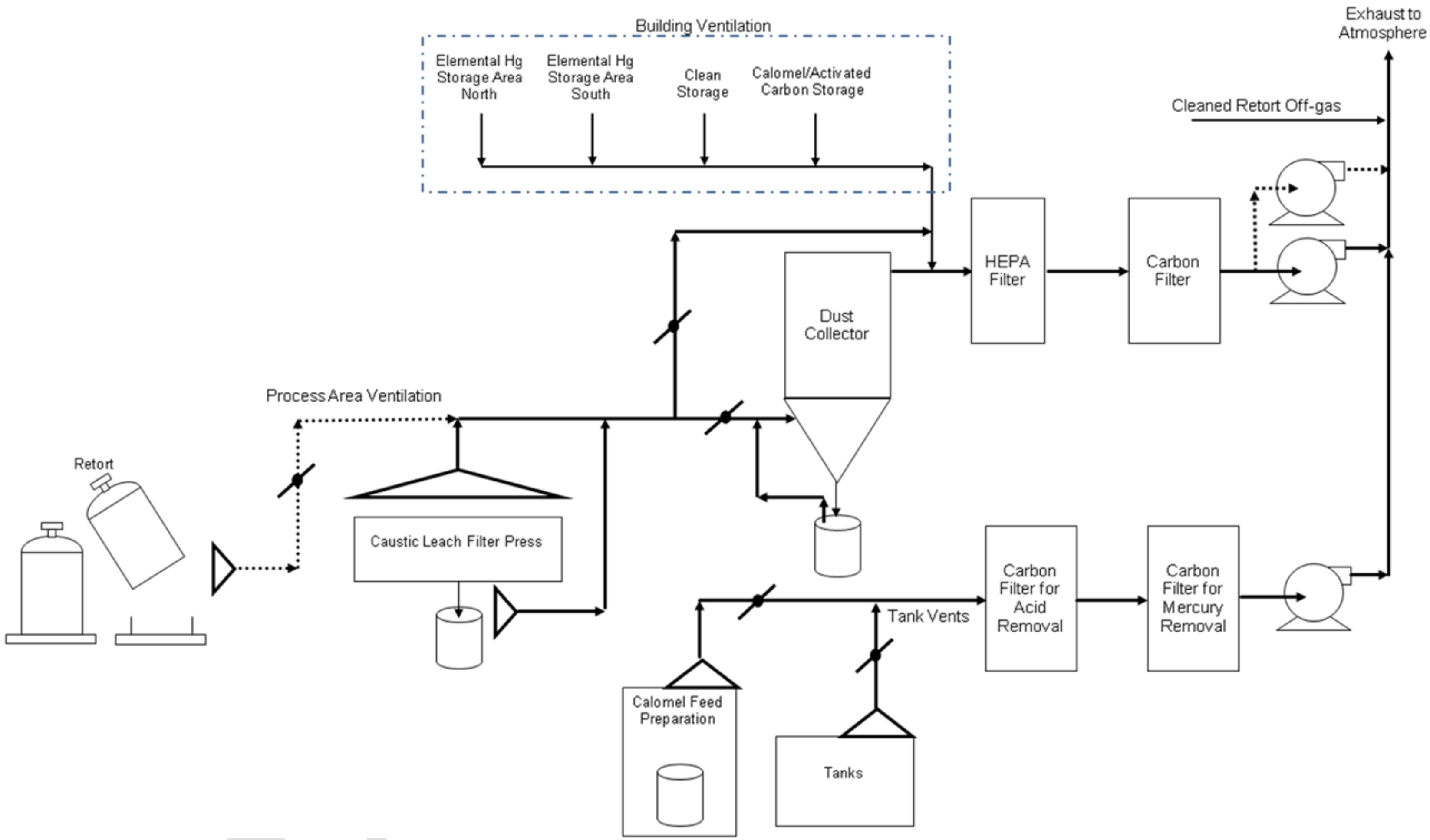


Figure 1.2-10: Overall Ventilation Concept

There will be only one exhaust point from the proposed TSF Building. This exhaust point combines the retort off-gas, the general ventilation system, and the localized ventilation system as shown in Figure 1.2-10 above. This exhaust duct will be continuously monitored for mercury vapor using an extractive gas analyzer. The design mercury emission criterion will be 0.00001 grain per standard cubic foot (gr/scf) (i.e., 0.023 milligram per cubic meter [mg/m^3]).

Airborne mercury levels in the plant spaces will be monitored continuously to ensure a safe working environment. Respirators will be worn if vapor levels exceed acceptable levels (i.e., OSHA limit).

1.2.7 Process Waste Management

Two forms of process waste will be generated at the facility; liquid and non-liquid. The following will be the sources of non-liquid waste:

- Retorted spent activated carbon.
- Crushed and retorted containers that were used to hold retort feed material.
- Residue from retorted filter cake.
- Residue of retorted non-liquids from screens installed in slurry pipes.
- Retorted plant tools and equipment.

Non-liquid waste which is not hazardous by characteristics (e.g., passes the TCLP test) may be shipped for disposal to an off-site, licensed facility as non-hazardous waste. Non-liquid waste which is found to be hazardous by characteristics (e.g., does not pass the TCLP test) may be shipped to an appropriately licensed facility.

Liquid waste will be treated in the waste solution treatment circuit prior to shipment off-site for further treatment, if necessary, or disposal (see Appendix 1-C Process Flow Diagrams). The wastewater treatment process is designed to achieve mercury concentration of less than 1 milligram per liter.

The following will be the sources of process waste solution:

- Calomel caustic leach waste solution.
- Retort condensate.
- Retort off-gas scrubber (SO_2 scrubber) blowdown.
- Laboratory wastewater.

- Wash water from open sumps.
- Safety showers and eye wash stations.
- Laundry machine, locker room showers, and sinks.

Process waste solution from all sources, with the exception of the calomel caustic leach circuit waste solution, will be collected in the Waste Solution Collection Tank. Process waste solution from all sources will be subjected to chemical treatment with TMT 15 (or functional equivalent) in the Waste Solution Treatment Tank in order to precipitate dissolved mercury (see Appendix 1-C Process Flow Diagrams).

Treated waste solution from the Waste Solution Treatment Tank will be pumped to the conical Waste Solution Settling Tank in the waste solution treatment circuit, where precipitates will be allowed to settle. The underflow slurry from the Waste Solution Settling Tank containing TMT 15-mercury precipitates will be periodically pumped to the Decomposition Tank to enter the calomel treatment process.

Following treatment with TMT 15 (or functional equivalent), decanted solution from the Waste Solution Settling Tank will be subjected to filtration (cartridge filters and activated carbon columns) to remove any suspended solids prior to final treatment of the clarified water with activated carbon (see Figure 1.2-11 below).

All of the treated process waste solution will be pumped to the Treated Waste Solution Storage Tanks prior to shipment off-site for further treatment and/or disposal.

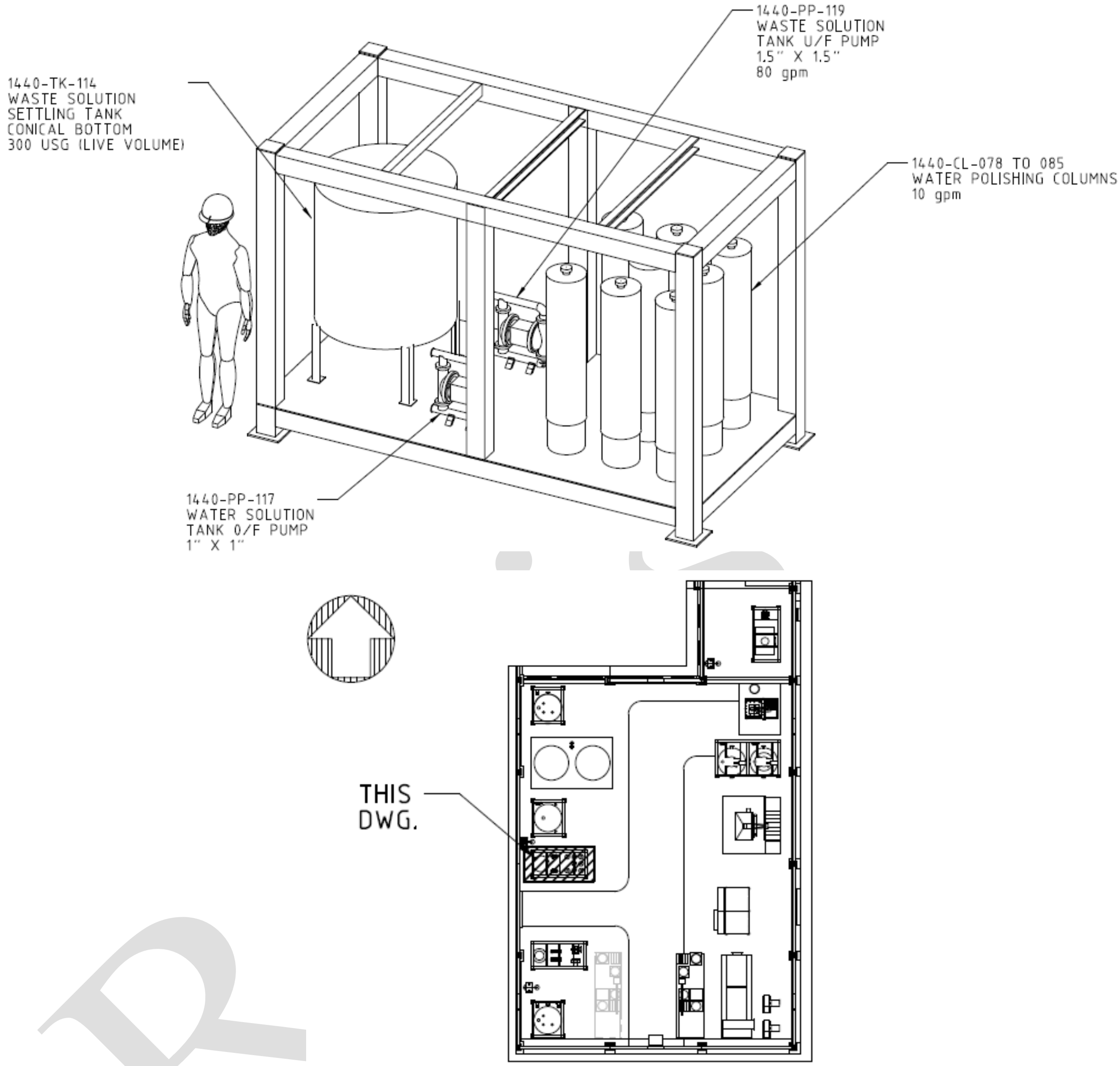


Figure 1.2-11: Water Polishing Skid and Location in Process Area

All tanks in the waste solution treatment circuit as well as the Waste Solution Storage Tank will be covered and operated under slight negative pressure by a dedicated ventilation system as discussed previously in Section 1.2.6 and described in Section 23.

1.3 Elemental Mercury Storage – 40 CFR 270.14(b)(1)

Elemental mercury will be stored in an enclosed area of the proposed TSF and contained in pigs. The proposed TSF is designed to store approximately 1,024 pigs of elemental mercury. This is equivalent to approximately 11 years of received and recovered elemental mercury based on current production rates (see Section 1.2). Refer to Section 22 for a detailed description of the container management measures.

This building design includes numerous containment measures which will minimize the release of mercury in a liquid or vapor state from the proposed TSF to the environment. Measures include closed pigs themselves; spill trays under the pigs; epoxy coatings on the walls, floor and ceiling; slab seals; hard washers where racks will be bolted to the floor; maintaining the plant spaces under negative pressure; appropriate ventilation; and an underlying impermeable membrane. All containment measures are specified in Section 22.

Pigs will be stacked on spill trays secured to seismically rated racks, as illustrated in Figure 1.3-1.

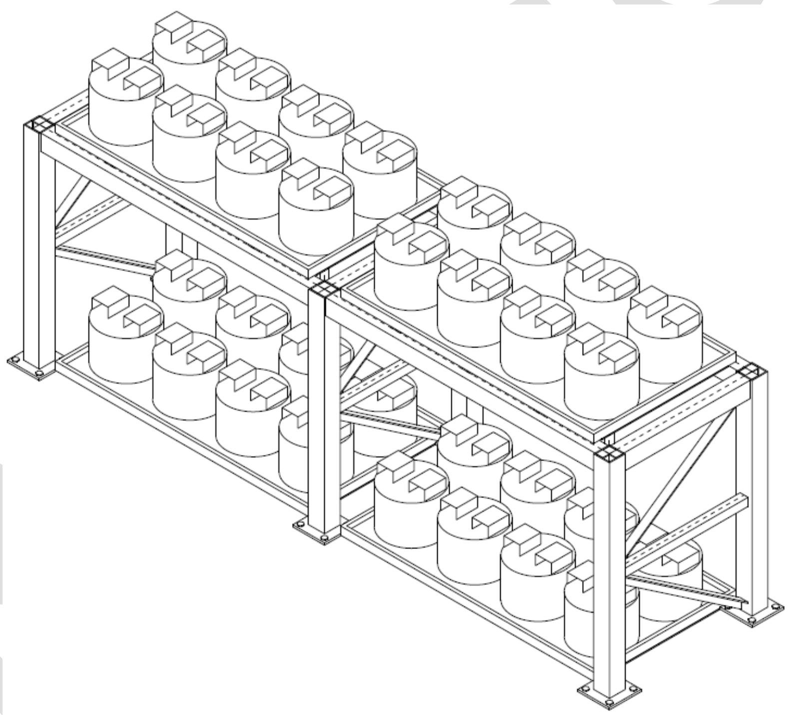


Figure 1.3-1: Isometric of Elemental Mercury Storage Rack

The storage racks will have two levels, thereby allowing one tray of pigs to rest on a spill tray on grade and one to rest on the elevated shelf, also equipped with a spill tray. The spill trays (made of carbon steel) will be sized to support eight pigs each, arranged two by four, and will have a lip height sufficient to contain the entire volume of 1 pig in case of leakage. Floors will be graded at a 1% slope, or more, toward the aisle so that free fluids flow toward the edge of the spill trays.

This satisfies the RCRA requirement found in 40 CFR 264.175(b)(2). Aisle space requirements are detailed in Section 5.6. Spill tray design is further specified in Section 22.5.

Mercury vapor concentrations will be monitored throughout the storage area to maintain mercury vapor concentrations below OSHA limits. Respirators will be worn if vapor levels exceed action levels.

There is no foreseen need to add or remove mercury from a stored pig; therefore, the containers will be maintained in a closed condition (i.e., vapor tight and spill proof). The racks will be positioned away from the wall thereby allowing easy inspection of all pigs on the shelf level. A stacking system on industrial racks will be used in the storage areas in order to minimize the footprint. A similar rack system has previously been reviewed and accepted by EPA Region I for the Pfizer Inc. facility in Groton, CT.

By design, the total secondary containment in the plant spaces is 122,650 gallons, sufficient to contain the full storage volume of the area. Table 1.2-1 summarizes the secondary containment features.

1.4 Emergency Power – 40 CFR 270.14(b)(1)

Each of the two 635 kW diesel generators will be capable of powering the entire facility. One generator will be on "stand-by" status or undergoing maintenance while the other provides power to the facility.

1.5 Utilities and Services – 40 CFR 270.14(b)(1)

1.5.1 Utility Building

Within the proposed TSF compound, but not within the proposed TSF (i.e., not within the RCRA Area), the Utility Building will be a single level structure, 23 feet tall at its highest point, with a footprint of 1,600 square feet (40 feet long by 40 feet wide). The emergency vehicle enclosure will be located to the east of the Utility Building with a footprint of 1,600 square feet (40 feet long by 40 feet wide), and 14 feet tall at its highest point. The Utility Building is not designed for regular occupancy and it will house the following key elements:

- (3) Fire water pumps; one electrically powered pump, one diesel powered pump, and one electric jockey pump.
- (1) Air compressor.
- (1) Air dryer.
- (1) [Fresh] water receiving tank.
- (4) Water pumps.
- Maintenance tools and parts.

The following items are located outdoors in the Utility Building area:

- (2) 635 kW diesel generators.
- (1) 11,000 U.S. gallons, above ground diesel storage tank.
- (1) Liquid oxygen above ground storage tank.
- (1) Liquid nitrogen above ground storage tank.
- (2) Diesel transfer pumps that service the diesel generators.

1.5.2 Systems and Process Controls

The Systems and Controls strategy to be implemented at the proposed TSF will follow the ISA-95 Activity Model. In the context of the proposed TSF, the model is described in Figure 1.5-1.

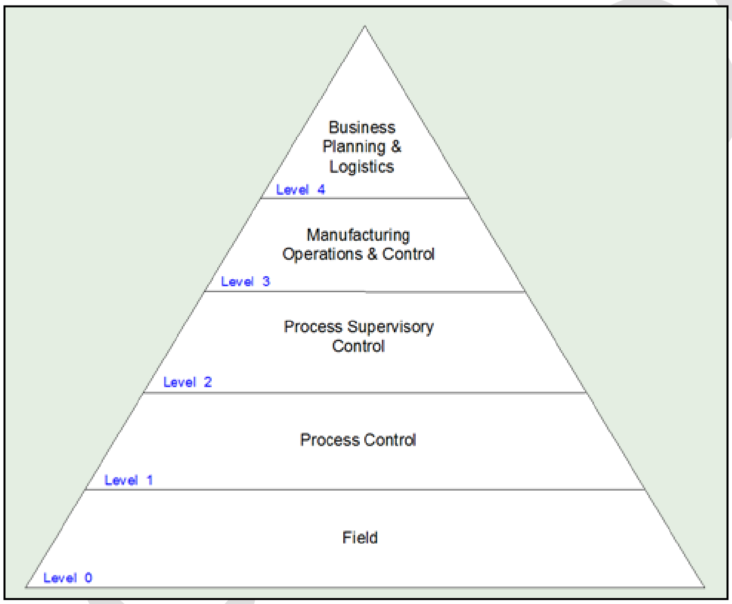


Figure 1.5-1: ISA-95 Manufacturing Operations Management Activity Model

Level 0

This level covers field components and devices, including instrumentation. With respect to the proposed TSF, the instrumentation will cover process control needs as well as monitoring requirements for environmental and energy purposes.

Level 1

Level 1 describes the process control systems that will be used for operation of the process equipment and utilities. These systems will primarily consist of programmable logic controllers (PLCs) as well as any other necessary controllers for the subsystems in the project.

Level 2

Level 2 will include the operator interaction to process plant (its control) through dedicated Human Machine Interfaces (HMI) located in the control room. The control Network will be based on Ethernet/IP. Level 0 through 2 will be what is commonly referred to as the Process Control System (PCS). Level 2 will also provide means of data acquisition and archiving.

Level 3

Level 3 refers to the operational systems that will be used throughout the facility.

Due to the nature of the proposed TSF, these systems will not be limited to those required only for process operations, but will also include all operational systems used across the entire facility. The data historian will be used to collect data throughout the facility, which will be provided in the Level 3 systems. The following provides a summary list of the Level 3 operational systems for the proposed TSF:

- Data Historian.
- Environmental Monitoring and Reporting.
- Production Management and Reporting.
- Water, Wastewater Monitoring and Reporting.
- Fuel and Consumables Management and Reporting.
- Laboratory Information Management.
- Alarm and Event Management and Reporting.

Level 4

Level 4 refers to the Business Systems Layer. The Business Systems Layer falls under the responsibility of BGNA. The proposed TSF will incorporate BGNA's well-established Business Systems Layer into the proposed TSF's process controls.

For effective and safe operation of the proposed TSF, specific systems in the Business Layer will be integrated with the proposed TSF's Level 3 systems. Integration between Level 3 and Level 4 systems will be focused on systems related to Supply Chain Management (logistics and materials management) and Maintenance.

The Systems Network Architecture is illustrated by the diagram included in Appendix 1-A (H340940-0000-75-004-0009). The architecture depicts the Process Control Network (Level 0, 1, and 2), the Production & Process Network (Level 3), and the Information Technologies, Business and North America Regional Business Unit (NARBU) network (Level 4).

Control System Architecture

The plant control hardware and operator interface terminals are collectively referred to as the PCS. The PCS will connect the elements of control at remote locations by the control network. The PCS will be used to control and monitor the equipment and information that will be displayed on the HMI.

All motor starters, variable speed drives (VSDs) and field device signals will be connected to the PLC. The PCS will perform all the motor control logics and interlocks as well as all the analog scaling and loop control.

Vendor supplied control systems for the equipment will be connected to the PCS.

The control system and instrumentation will be designed to enable an orderly and safe shutdown sequence of the equipment.

The PCS/Systems architecture (Figure 1.5-2) will be structured as a standard hierarchy, consisting of the following:

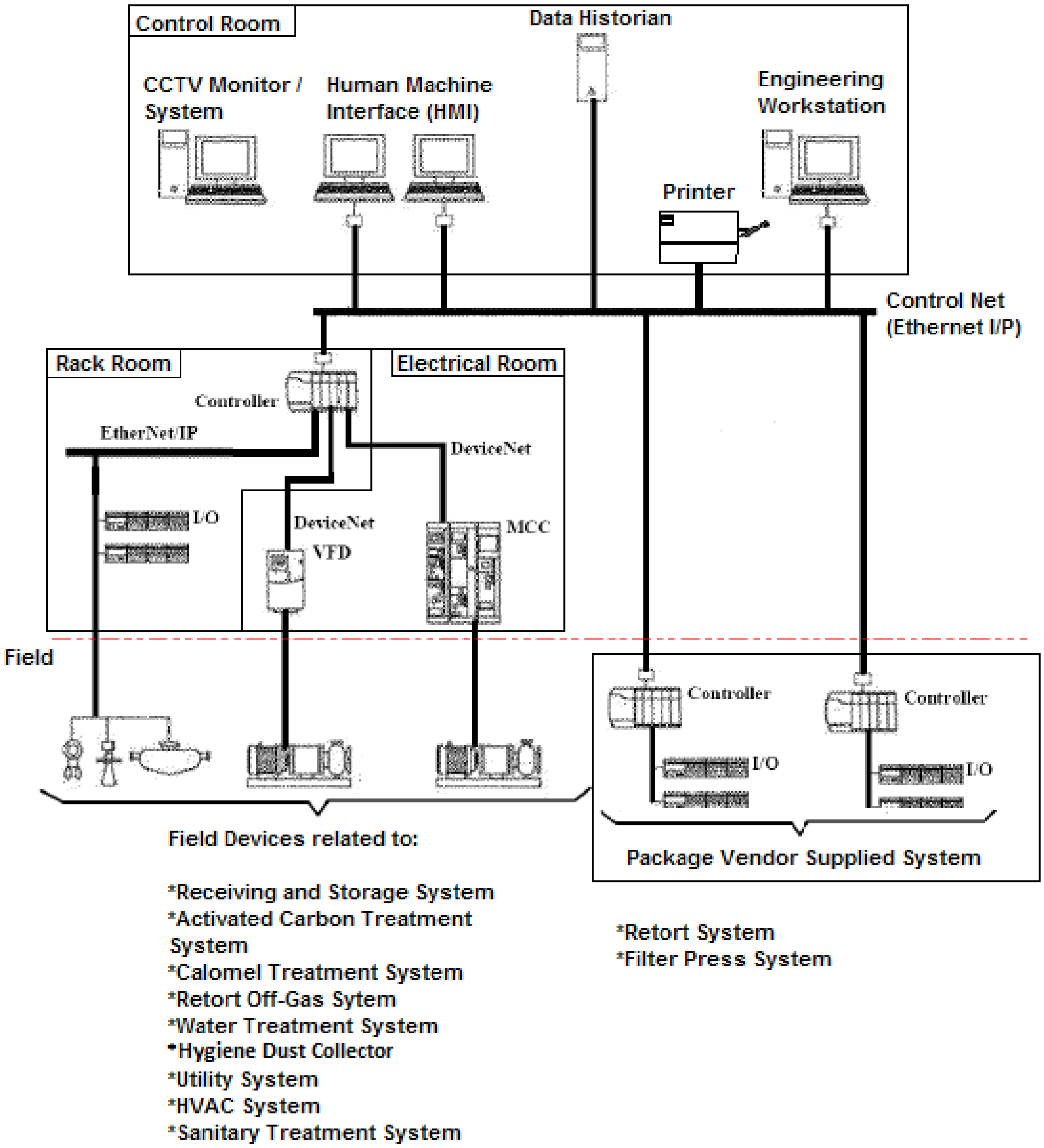


Figure 1.5-2: Preliminary Control System Architecture

1.5.3 Compressed Air/Gas Supply

Compressed Air

Compressed air will be supplied by a rotary screw air compressor in the Utility Building separate from the proposed TSF Building. Piping will be run using a rack between the Utility Building and the proposed TSF Building.

Air will be dried, oil-free, filtered for particulates, and delivered at approximately 130 psig at the compressor discharge (see Appendix 1-B Piping and Instrumentation Diagrams). The air receiver will be supplied in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, Division I.

Oxygen

Oxygen will be required for the operation of the retort. It will be delivered by truck and stored in a 1500-gallon liquid oxygen storage tank (6.5 feet in diameter by 15.75 feet tall), and equipped with a vaporizer. The tank will be provided by the oxygen supplier, having a maximum allowable working pressure of 250 psig, and the oxygen gas will be delivered by pipe to the retort. The tank will comply with ASME BPVC VIII Division I and will conform to the applicable guidelines of the National Fire Protection Association (NFPA), (see Appendix 1-B Piping and Instrumentation Diagrams).

Nitrogen

Nitrogen will also be required for the operation of the retort. It will be delivered by truck and stored in a 3000-gallon liquid nitrogen storage tank (8 feet in diameter by 17.67 feet tall). The tank will be provided by the nitrogen supplier, having a maximum allowable working pressure of 250 psig, and the nitrogen gas will be delivered by pipe to the retort. The tank will comply with ASME BPVC VIII Section I, (see Appendix 1-B Piping and Instrumentation Diagrams).

1.5.4 Water Supply and Treatment

The fresh water distribution system will be a constant pressure system. Given the length of storage (approximately seven days), the water will be filtered through a 0.45 micron cartridge filter, and disinfected using an ultraviolet (UV) beam before use. This water will be used for washrooms, locker rooms and showers. Drinking water will be supplied in bottles.

1.5.5 Fire Water/Suppression Systems

Related Codes and Standards

The following codes and standards were reviewed and consulted in designing the fire protection system:

- International Building Code - 2012 (IBC).
- International Fire Code - 2012 (IFC).
- NFPA Codes to the extent applicable.

Materials of Construction

The proposed TSF, Utility Building, and any structural elements will be constructed from non-combustible materials.

Automated process equipment will contain minimal combustible material, but will include motors and some form of mechanical actuation (e.g., electrical, pneumatic, hydraulic).

PVC/CPVC is the material which has been selected for much of the process fluids piping. Group C plastics (e.g., PVC less than 5% plasticized) have a similar burning rate and heat of combustion to that of ordinary combustibles (e.g., wood, cloth, rubber). Although there may be varying plasticized compositions of PVC, NFPA offers PVC pipe and pipe fittings as an example of a Group C plastic. As such, this material will be treated as an ordinary combustible.

Fiber reinforced plastic (FRP) tanks will be included in the process area for storage of various liquids (e.g., hydrochloric acid, domestic water, process water, etc.). The flammability of FRP will depend on the fiber, adhesives, and composites used in construction. It will be treated as a Group A plastic having a heat of combustion and burning rate greater than that of an ordinary combustible.

Office equipment (e.g., chairs, desks, books, etc.) is expected to be made from ordinary combustible materials concentrated within the office area and Control Room. The Clean Storage and Maintenance Area will be expected to contain similar combustible materials.

Indoor Material Storage

A list of materials that will be stored within the proposed TSF Building is presented in Table 1.5-1. Refer to Appendix 1-A (drawing H340940-0000-50-042-0001) for a general arrangement showing the storage locations of the various materials.

Table 1.5-1: Materials That Will Be Stored in the Proposed TSF Building

Material	Flammable / Combustible Risk	Means of Storage
Elemental Mercury	NO	Stored as liquid in pigs arranged on spill trays
Calomel Slurry	NO	55 Gallon Polymer Drum
Spent Activated Carbon	YES	55 Gallon Steel Drum
Treated Activated Carbon	YES	55 Gallon Steel Drum
Caustic (NaOH)	NO	FRP Tank
Hydrochloric Acid (HCl)	NO	FRP Tank
TMT 15	NO	Polymer Drum (HDPE)
Metal pallets	NO	Warehouse Racks
Office equipment and materials	YES	Office Space – Storage Area
Calomel Drums (HDPE)	YES	Floor Space – Storage Area
Overpack Drums (HDPE)	YES	Floor Space – Storage Area
FRP Tanks	YES	Floor Space – Process Area
Process Off Gas & Dust Collection	YES	Dust Collector – Process Area
Miscellaneous consumables (e.g., PPE)	YES	Floor Space – Storage Area

Outdoor Material Storage

A list of materials that will be stored outdoors in the area of the Utility Building is presented in Table 1.5-2. Refer to Appendix 1-A (drawing H340940-0000-50-014-0002) for a plot plan showing the storage locations for these materials.

Table 1.5-2: Materials Stored Outside the Proposed TSF

Material	Flammable / Combustible Risk	Means of Storage
Diesel	YES	11,000-gallon tank (8.25 ft. diameter x 33.5 ft. long). Diesel will be used to fuel the diesel fire water pump and the diesel generators. This tank is not designed as a supply source for fueling vehicles.
Nitrogen	NO	3,000-gallon liquid nitrogen storage tank (8 ft. diameter x 17.67 ft. tall). The tank will be provided by the nitrogen supplier. Nitrogen gas will be delivered (by pipe) to the retort.
Oxygen	YES	1,500-gallon liquid oxygen storage tank (6.5 ft. diameter x 15.75 ft. tall). The tank will be provided by the oxygen supplier. Oxygen gas will be delivered (by pipe) to the retorts.
Sanitary Wastewater	NO	5,000-gallon sanitary wastewater collection tank (10 ft. long x10 ft. wide x 9 ft. tall)

Fire Protection Description

The following is the basis for the proposed TSF's Fire Protection System:

- In the event of a fire, the Fire Water Tank (1542-TK-020) can provide up to two hours of firefighting capabilities at 2,000 gallons per minute (GPM) with no recirculation (see "Fire Water Supply and Distribution" below for details of Fire Water Tank design).
- Within these two hours the local fire department/emergency response team will be called to the site. At such time, tanker trucks may provide additional fire water resources.

All fire water discharged within the plant spaces of the proposed TSF may become contaminated; therefore, it will be collected.

- In the unlikely event of an extreme fire within the plant spaces of the proposed TSF where the building water containment volume limit is reached, the following means are available to continue combating a fire, in order of preference, illustrated in Figure 1.5-3:

- Circulation can be maintained by utilizing the retained volume of water in the Treated Water Storage Tanks (1540-TK-012 & 1540-TK-035) through the sprinkler system.
- Water collected in sumps will be pumped to the Waste Solution Storage Tank (1440-TK-114) and can be circulated through the sprinkler system.

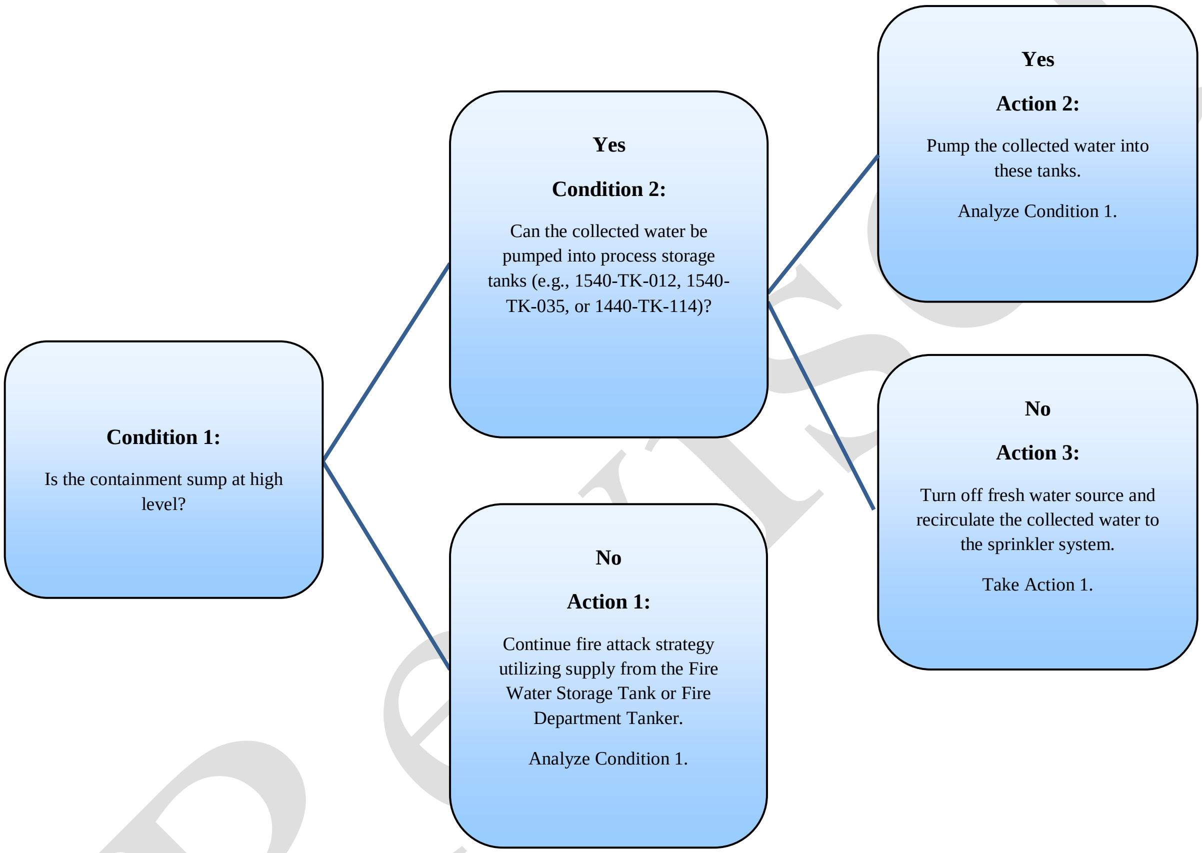


Figure 1.5-3: Fire Water Decision Tree

- The collected and potentially contaminated fire water is to be treated on site and/or shipped to a facility for further treatment (as necessary) and disposal.
- In the event of a fire in the area of the Utility Building, any water discharged will be naturally drained away (to the south).

It is recognized that the fire protection system design relates to the risk of property loss, injury, and environmental emissions.

It is recognized that the fire protection system design relates to the risk of property loss, injury, and environmental emissions. As such, the following parties will be consulted regarding the fire protection system:

- State Fire Marshall.
- NDEP.

The key elements of the system proposed for each area of the facility are presented in Table 1.5-3 below.

Table 1.5-3: Proposed Fire Protection/Detection Systems

Area Description	**Fire Extinguishers Class A/B/C [1]**	**Fire Extinguishers Class C [2]**	**Fire Alarm System**	**Automatic Sprinkler System**	**Automatic Clean Agent Suppression System [3]**	**Hydrant Coverage**	**Fire Water Containment**	**Gravel Bed (Fire Spread Resistance)**
The Proposed TSF Building – General	X	X	X	X	X	X	X	X
Electrical Room (MCC)		X	X		X			
Control Room		X	X	X[5]				
Laboratory Area	X		X	X				
Process Area	X		X	X				
Clean Storage and Maintenance Area	X		X	X				
Office Area	X		X	X				
The Area of the Utility Building	X		X	X	X	X		X
Utility Building	X		X	X				
Diesel Storage and Power Generation	X		X		X[4]			

NOTES:

1. Class A/B/C Fire Extinguishers are all purpose fire extinguishers used to fight ordinary combustible (Class A), flammable / combustible liquid (Class B), and energized electrical equipment (Class C) fires. Extinguishers will be in accordance with NFPA 10.
2. Class C Fire Extinguishers are those intended for use on Energized Electrical Equipment fires only. Extinguishers will be in accordance with NFPA 10.
3. A clean agent suppression system refers to extinguishants which vaporize readily and leave no residue. They are designed to extinguish a fire by displacing oxygen, reducing heat, or interrupting chemical reactions (ex. FM-200 or Ecaro-25). These systems are to be supplied by an approved vendor and will be in accordance with NFPA 2001.
4. Generators to include independent clean agent suppression systems. To be supplied by vendor and will be in accordance with NFPA 2001.

Fire Detection and Control Systems

Where a fire alarm system is listed in Table 1.5-3, the system will typically include smoke detectors, heat detectors, and/or manual fire pull stations. The fire protection system will also include the following elements:

- Audible and visual alarms.
- Automated controls.
  - All fire alarm control panels will be supplied by two independent connections from the power supply.
  - Control system will automatically notify appropriate emergency response. (See Appendix 6-A).
- Fire water level and flow detection. Instrumentation will monitor the level of water in the fire water tank as well as the flow of water.

Proposed TSF Building

- Fire extinguishers will be installed throughout the proposed TSF (including the office, electrical room, and plant spaces).
- Sprinklers will be installed to service all areas of the building except the electrical room. The system will be supplied by a fire water pump and reservoir external to the proposed TSF.
- The Hygiene Dust Collector will be equipped with a sprinkler system and explosion panels.

Utility Building

Adequate freeze protection will be provided in the fire water supply tank, pumps, and piping. In addition, the following elements of fire protection are included in the design:

- Fire extinguishers will be installed throughout the Utility Building.
- Independent detection/suppression systems will be provided with the diesel generator units.
- A one hour fire suppression wall (Fire Wall) is designed to separate the fire water pump room as per NFPA 20 4.12.1.1.

Outdoor Areas

- Hydrants and hose boxes will be located around the perimeter of the proposed TSF compound allowing for emergency response access.
- A 100-foot fire apron will encompass the proposed TSF compound with non-combustible ground cover.

Fire Water Supply and Distribution

The Fire Water Tank (1542-TK-020) has a live capacity of 240,000 gallons. This capacity is based on the following assumptions:

- Discharge flow rate of 2,000 GPM (Includes 33% contingency on the minimum flow requirements of IFC-2012 B105.2).
- Minimum two hour duration as per NFPA 122-2010 13.7.2 and IFC-2012 Table B105 with fire wall separation areas.
- The fire water tank will be located near the Utility Building. A description of the tank is provided below:
    - Concrete construction coated with epoxy enamel.
    - Located on grade west of the Utility Building.
    - Membrane in foundation impermeable to water.
    - Rectangular configuration (81 feet long by 63 feet wide by 15 feet deep).
    - Freeze protection will be provided.
    - Equipped with two, 2,000 GPM, vertical turbine pumps (one electric and one diesel) and an electric jockey pump to maintain pressure in the fire water supply piping.

1.5.6 Effluent Treatment and Disposal Systems

The Sanitary Wastewater System is designed to be separate from other regulated waste streams from the proposed TSF. This sanitary wastewater will flow into a Sanitary Wastewater Collection Tank. The Sanitary Wastewater Collection Tank will have approximately two weeks of storage.

Effluent from the Sanitary Wastewater Collection Tank will be managed in accordance with applicable regulations. For preliminary design purposes, the proposed TSF contemplates the Sanitary Wastewater Collection Tank will be intermittently emptied by vacuum truck for off-site treatment and disposal (see Appendix 1-C). Other alternatives, such as an in-ground septic system, or an off-site leach field may be considered, but are beyond the scope of this application.

Water from the site laundry, laboratory sinks, eye wash, and safety showers will flow to the process solution treatment system.

1.5.7. Diesel Storage and Distribution

Storage

The diesel storage tank (8.25 feet diameter by 33.5 feet long) has been sized to provide an uninterrupted two-week supply of fuel to maintain the nominal electrical load supplied by the diesel generator(s). The following storage requirements have been set as a benchmark and they will be reviewed and revised in conjunction with the requirements set by the design of the power supply network:

- Storage capacity – 11,000 gallons.
- Location – Utility Building area in accordance with NFPA 20 Paragraph 11.4.3.2.
- Tank design – above ground.
- Containment – double walled tank and bunded area.
- Standard of Design – UL 142.

Distribution

The diesel distribution system will include two (one operating and one on standby) positive displacement pumps which will supply the diesel generator and emergency diesel fire water pump. Each generator will have a day tank and fuel injector pumps (see Appendix 1-B Piping and Instrumentation Diagrams).

1.6 Parking

A paved parking lot for small vehicles will be provided close to the proposed TSF Building. Stalls are designed to be perpendicular to the building, 10 feet wide and 17 feet long. Two parking stalls will be provided for persons with disabilities, and are designed to be 12 feet wide. Parking stalls for persons with disabilities will comply with applicable requirements of the American Disabilities Act (ADA). All stalls will be asphalt paved, striped, set with precast concrete bumpers, and provided with signage as required.

1.7 Security Systems – 40 CFR 270.14(b)(4)

The proposed TSF will be equipped with a security and access control system. The design contemplates a security and access control system utilizing personnel Radio Frequency Identification (RFID) badges, as well as cameras and motion detectors.

Security personnel will be on-site during normal working hours (i.e., 8 hours per day, 5 days per week). During periods when security personnel are not on-site, a cooperative agreement will be arranged with BGNA's Cortez Mine to provide oversight security. The proposed TSF's security and access control system will be monitored via off-site security personnel at the Cortez Mine. In the event of a security violation, the system is designed such that an alarm will be raised with appropriate TSF personnel and off-site Cortez Mine personnel.

In order to reduce visibility of the proposed TSF, a 10-foot tall privacy berm will be constructed around the perimeter of the proposed TSF compound. Three access fences will provide additional security around the proposed TSF.

The innermost barrier is a chain-link fence that will run around the perimeter of APN #005-530-17; thus, this innermost fence will physically define the barrier that encompasses the contiguous land area, EPA ID# NVR000088542, for which this application is seeking a RCRA Subtitle C permit.

The middle barrier will consist of the privacy berm surrounding the proposed TSF compound, with a chain link fence installed on top of the entire berm.

The outermost barrier is a perimeter chain-link fence, and is the first exclusion barrier to the proposed TSF compound located external to the privacy berm.

The Overall Site Plan, drawing H340940-0000-50-014-0001 (Appendix 1-A), illustrates the security barriers for the proposed TSF.

2.0 WASTE CHARACTERISTICS

The principal waste management activity at the proposed TSF will be processing mercury-bearing wastes generated from Barrick mines and associated joint venture operations in the United States for the recovery and storage of elemental mercury. Mercury stored as a hazardous waste at the proposed TSF will be stored until it can be transferred to a National Repository for long-term storage and management.

2.1 Purpose – 40 CFR 270.14(b)(3)

The purpose of this waste characterization plan is to specify the proper handling procedures, and effective treatment methodologies to be implemented at the proposed TSF. Adequate waste characterization processes will ensure appropriate information is available to manage mercury and mercury-bearing materials safely, and in accordance with the regulatory requirements.

2.2 Waste Analysis Plan – 40 CFR 270.14(b)(3)

The Waste Analysis Plan (WAP) (see Appendix 2-A), presents the complete details of how waste will be characterized for treatment and storage. The WAP addresses wastes that will be received and generated by the proposed TSF.

The WAP establishes the following items for inclusion in this application:

- Procedures for determining if a waste stream will be acceptable for management at the proposed TSF.
- Procedures for notifying the waste generator that the waste will be accepted.
- Procedures for characterizing wastes.
- Appropriate management strategies.
- Frequency of sampling and analyzing incoming loads of waste.
- Methods for sampling and analyzing incoming loads of waste.
- Analytical parameters for each waste.
- Rationale for the selection of analytical parameters.

The WAP will be supported by SW-846 Methods, American Society for Testing and Materials (ASTM) Methods, and Standard Operating Procedures (SOPs) for the on-site laboratory. The proposed TSF's laboratory personnel will use these supporting documents as detailed instructions for performing the necessary procedures. The incorporated SOPs may be updated as appropriate without modifying the WAP.

2.3 Determination of Treatment Parameters – 40 CFR 264.13(b)(1) & 270.14(b)(3)

The proposed TSF may generate two general categories of non-liquid waste that, in accordance with 40 CFR 261, could be considered hazardous waste:

- Mercury-bearing waste that may be characteristic for the presence of mercury and other metals at concentrations above the established regulatory limit.
- Secondary materials that may be characteristic for mercury and/or other properties.

2.3.1 Characteristic Waste

Mercury-bearing materials with leached mercury concentrations above the 0.2 milligrams per liter (mg/L) limit are characteristically hazardous for mercury toxicity per 40 CFR 261.24 Table 1. Analytical results, typically using the TCLP method, will be used to assess the toxicity of the generated waste stream (e.g., filter cake) and to determine the applicable waste code(s). As an alternative to the TCLP method, other approved analytical methods may be used to make this determination. Wastes that are less than 0.2 mg/L are not characteristic for mercury and will not carry a D009 waste code.

Other potential waste codes may include D002 (corrosivity), D004 (arsenic), D005 (barium), D006 (cadmium), D007 (chromium), D008 (lead), D010 (selenium), and D011 (silver).

2.3.2 Hazardous Secondary Material

Hazardous secondary material (e.g., spent material, byproduct, and sludge) include materials, that when discarded, would be identified as hazardous waste. The proposed TSF has process knowledge for all of its secondary material waste streams. An annual evaluation will be performed to verify chemical composition and concentration ranges. All new or modified secondary material waste streams will be initially assessed at the point of generation and annually thereafter to maintain proper characterization of all waste streams.

2.4 Rationale for Parameter Selection – 40 CFR 264.13(b)(1) & 270.14(b)(3)

Analytical parameters have been specifically selected to identify the nature of the waste, the LDR status of the wastes generated at the proposed TSF, and the organic concentration of those wastes. Materials may enter the proposed TSF as wastes characteristically hazardous for mercury content, but after completing the treatment process the material may no longer demonstrate a characteristic for mercury. These materials will be analyzed for mercury as well as underlying hazardous constituents (UHCs) to determine the RCRA and LDR status of the materials. Table 2.4-1 presents the waste streams that are expected to be generated by the proposed TSF, the proposed analytical parameters, the proposed analytical methods, and the rationale for selection.

Table 2.4-1: Analytical Parameters and Rationale

Waste Stream	Analytical Parameter*	Rationale for Selection
Elemental mercury	Total Mercury	Storing elemental mercury
Calomel	Total Mercury, Corrosivity	Transferring mercury-laden materials
Spent Activated Carbon	TCLP-RCRA Metals or Total Metals, Total VOC	Carbon designed to adsorb mercury; other trace metals may also be a concern for LDR; VOCs evaluated for storage
Retort Residues	TCLP-RCRA Metals or Total Metals, Corrosivity, Reactivity	Retort process may concentrate metals; LDR documentation needed for all trace RCRA metals
Caustic Leach Filter Cake	TCLP-RCRA Metals or Total Metals, Corrosivity, Reactivity	Characterization based on TCLP metals concentrations; non-liquids may contain the metal precipitate and may retain some NaOH
Dust Collector Dust	Total Metals	Non-liquids may contain metals from the process
Wastewater Spent Resin	TCLP-RCRA Metals or Total Metals, Corrosivity, Reactivity	Metals and caustic may concentrate
Housekeeping Debris (e.g., rags, Tyvek booties, etc.)	TCLP-RCRA Metals or Total Metals, Ignitibility, Corrosivity, Reactivity	Miscellaneous process contact and non-routine tasks may be represented in this stream
Containers of Retort Residues	TCLP–RCRA Metals or Total Metals, Total Mercury	Non-liquids may contain the metals from the process

*Multiple negative results during initial characterization for a parameter may result in removing a parameter from the analytical list for that waste stream.

2.5 Analytical Test Methods - 40 CFR 264.13(b)(2) and (3)

The primary source for analytical test methods to be used at the proposed TSF is *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846).*The SW-846 methods are available on-line at: http://www.epa.gov/waste/hazard/testmethods/sw846/online.

Where SW-846 does not have a method for the specified parameter, an ASTM method will be used. Test methods to measure the parameters discussed throughout this document are identified in Table 2.5-2.

Table 2.5-2: Test Methods

Parameter	Method Name	Method Number
Leachable Metals	TCLP	SW-846 Method 1311
Total RCRA Metals	TCLP XRF Evaluation	SW-846 Method 1311 (Total) SW-846 Method 6200
Corrosivity	pH	SW-846 Method 9040 (liquids) SW-846 Method 9045 (non-liquids)
Total Organics	TCLP	SW-846 Method 1311 (Total)
Ignitability	Flashpoint	ASTM D93-11
Free Liquids	Paint Filter Test	SW-846 Method 9095

An appropriately certified off-site analytical laboratory will analyze waste characterization samples for the applicable SW-846 or ASTM method. The analytical laboratory selected for these analyses will be required to comply with SW-846 Quality Assurance/Quality Control procedures for each procedure performed.

2.6 Sampling Methods – 40 CFR 264.13(b)(2) & 40 CFR 264.13(b)(3)

2.6.1 Collection Method

The appropriate representative sampling techniques, devices, and containers will be selected from the SW-846 or the ASTM method. Samples will be collected in a representative manner, either as a composite sample or as a discrete grab sample (i.e., randomly collected small sample), based on the material characteristics, container size, and access.

Safe sampling procedures will be developed and reviewed prior to implementation. Laboratory preparation methods will be selected based on the data use. If the TCLP procedure is required for characterization, the appropriate leaching and extraction methods specified in SW-846 will be followed. All metals samples will be preserved per quality control requirements. Specific sampling methods and analytical methods are specified in Table 2.6-1.

Repeat negative results may result in the analysis being removed for that waste stream. Multiple negative results during initial characterization for a parameter may result in removing a parameter from the analytical list for that waste stream.

Table 2.6-1: Sampling and Analytical Methods

Parameter	Sampling Type	Analytical Method
Container Weight	N/A	Scale
Physical Description	N/A	Visual observation in container
Specific Gravity	Composite	ASTM Method 5057
Free Liquids	Grab	SW-846 Method 9095
pH (corrosivity determination)	Grab or Composite	SW-846 Method 9040 (liquids) SW-846 Method 9045 (non-liquids)
Mercury TCLP	Grab or Composite	SW-846 Method 7470 or 7471
Mercury (Total)	Grab	SW-846 Method 7473 SW-846 Method 6200 (XRF)
Residue Metals (Total)	Grab	SW-846 Method 1311/6010/7060/7061
Metals (Total)	Grab	Method 6200 (XRF)
Leachable Metals	Grab	SW-846 Method 6010
Zinc	Grab	SW-846 Method 6010
Organics (Total)	Grab	SW-846 Method 8260 (volatiles) SW-846 Method 8270 (semi-volatiles)
Moisture Content	Grab	EPA Method 600/4-79-020
Ash	Composite	ASTM Method D482-87
Ignitability	Composite	ASTM D93-11
Water Reactivity	Grab	SW-846 Method 1110A
Cyanide Reactivity	Grab	EPA Method 600/4-79-020 #335.2
Sulfides	Grab	SW-846 Method 9031

Sampling Containerized Waste

The term "container" refers to receptacles designed for transporting materials (e.g., drums, flasks, and pigs). Sampling devices include Composite Liquid Waste Samplers (COLIWASAs), tubes, trowel, drum thieves, and tube samplers.

Sampling of Tanks

A representative sample of the waste will be collected from the side or bottom of each tank. Samples will be collected such that various depths in the tank will be evaluated if the material phase separates or contains multiple batches. Multiple grab samples may be composited to obtain a weighted representation of the tank contents. Sampling SOPs for each process tank will be developed and reviewed by the laboratory staff when necessary.

Frozen Waste

The proposed TSF will not sample waste that is frozen. The waste will be held in the truck unloading area until the waste can be sampled. A sample will then be collected as outlined in this section.

2.7 Waste Characterization & Frequency of Analysis – 40 CFR 270.14(b)(2) & 264.13(b)(4)

Waste characterization data can be found in Appendix 2-E.

2.7.1 Routine Wastes

Process Wastes

The processes at the proposed TSF will generate a number of routine waste streams. These waste streams will be evaluated initially at the beginning of operations and annually updated to verify accuracy. The waste characterization will also be re-evaluated whenever the process that generated the waste changes or there is an unresolved discrepancy on a shipment.

Elemental Mercury

The chemical composition of the recovered elemental mercury is well known and consistent. As discussed above, the proposed TSF will use waste generator knowledge to characterize this material. Elemental mercury purity will be evaluated based on weight. While these waste streams will not be routinely analyzed prior to being stored, the proposed TSF will review all waste streams on an annual basis or any time the waste generating process changes.

Calomel

The chemical composition of the calomel is well known and is within the process design range. As discussed above, the proposed TSF will use waste generator knowledge to characterize this material. While this waste stream will not be routinely analyzed prior to being treated, the proposed TSF will review all waste streams on an annual basis or any time the waste generating process changes.

Spent Activated Carbon

The chemical composition of the spent activated carbon is known and consistent. As discussed above, the proposed TSF will use waste generator knowledge to characterize this material. While these waste streams will not be routinely analyzed prior to being treated, the proposed TSF will review all waste streams on an annual basis or any time the waste generating process changes.

It is known that some spent activated carbon may have economically recoverable amounts of precious metals (e.g., gold). After the spent activated carbon is treated for mercury removal, it may be sent off-site for recovery of the precious metal(s).

2.7.2 Other Wastes

Satellite Waste From Plant Spaces

Small amounts of non-liquid waste will be generated as a result of the proposed TSF's operations in the plant spaces. Satellite waste will be comprised of wipes, rags, towels, paper goods, disposable booties, gloves, disposable coveralls, disposable sampling devices, etc. These materials may be contaminated with mercury or other chemicals used in the processes, potentially making these materials hazardous wastes.

Continuous air monitoring devices and discrete sampling instruments will also generate spent sample cartridges or other small amounts of waste. The analyses that will be conducted on-site will generate a lab waste stream. Disposable protective clothing, gloves, spill clean-up materials, paper cleaning materials, and wipes will be generated during routine housekeeping activities. The cartridge filters and activated carbon used in the hygiene exhaust system may become contaminated with mercury.

It is not anticipated that diesel waste will be generated; neither vehicle fueling nor maintenance will occur within the proposed TSF compound.

Hygiene facilities (e.g., showers and wash basins) may contain trace amounts of mercury, and therefore will be managed as process wastewater. Operations within the facility will be conducted in dedicated work clothing, coveralls, and shoes, which will remain in the proposed TSF Building. Laundry facilities will be located in the proposed TSF Building and will generate grey water possibly containing trace amounts of mercury. The grey water will be managed as process wastewater system.

Treatment Residues

Should treatment residues not meet LDR standards, they will be either reprocessed or shipped off-site to an appropriately licensed treatment and disposal facility. If it is reprocessed at the proposed TSF, the waste code on the daily assignment sheet will be completed as though the residual solid is original with one exception: the reprocessed treatment residue will not be tested for parameters for which LDR standards were previously met.

Process Waste Solution

A discrete process waste solution sample will be collected from each process batch and characterized prior to being transported for disposal. The characterization will document the mercury concentration in each batch. The process waste solution is expected to meet the LDR standards for all metals.

2.7.3 Outbound Manifests

Once it has been determined that the treatment residues will be shipped off-site for additional treatment or disposal, a profile and manifest will be prepared. Analytical data indicating the applicable LDR standards which have been met will be attached. For treatment residues that have not been treated to the LDR treatment standard, a statement will accompany the shipment indicating that the waste requires further treatment prior to land disposal. Waste generator certifications will be attached as appropriate to each outbound manifest.

2.8 Off-site Generated Wastes – 40 CFR 264.13(b)(5), 264.13(c), & 270.14(b)(3)

2.8.1 Acceptance of Off-site Generated Waste

The proposed TSF will receive hazardous waste (i.e., mercury and mercury-bearing materials) from Barrick mines and associated joint venture operations in the United States. All off-site generated wastes received at the proposed TSF will be approved in advance. Before the waste will be accepted into the storage area of the proposed TSF, the operators will review the shipping papers and visually inspect the containers to confirm agreement between the waste description and the previously approved waste. Incoming loads will be fingerprinted (sampled) to confirm the visual observation as further discussed in Appendix 2-A.

All wastes received from an off-site source will be profiled in advance, and will be assigned a container number at the time of delivery. Each shipment will be visually inspected to verify that the type and quantity of the waste matches the appropriate waste stream and manifest. The manifest numbers for off-site generated hazardous waste will be entered into the chemical waste tracking system upon acceptance. Waste generated on-site may be characterized after delivery to the storage area.

Whenever a waste is accepted all the pertinent information on the waste will be entered into the operating record. This information includes: the waste stream description, EPA codes, quantity, date of generation, date received at the proposed TSF, storage location within the proposed TSF, treatment date, and date it was shipped off-site.

The chemical waste tracking system will also include the manifest number for all hazardous waste received from an off-site source and all shipments of hazardous waste to an off-site treatment and/or disposal facility. At a minimum, the following resources will be used to help characterize chemical waste:

- 40 CFR 261, including appendices.
- Waste generator process knowledge.
- MSDS.
- Laboratory analysis.
- *National Institute for Occupational Safety and Health: Pocket Guide to Chemical Hazards*.

A random sampling strategy will be employed to sample incoming shipments of containerized waste. Samples from containers holding the same type of waste may be composited prior to analysis. The following procedure will be used to determine how many containers will be sampled and which samples will be composited:

1. Each container will be opened and visually inspected. Wastes on a single delivery that have the same profile number and DOT description (excluding waste codes) and appear to be of the same waste type will be grouped together.
2. Each group will be sampled as described below. The samples within each separate group may be composited for laboratory analysis.
3. A unique tracking number will be assigned to each container.
4. Samples will be taken from locations displaced vertically throughout the waste.
    a. For liquids (or liquids with precipitated solids), the sampling person will use a COLIWASA or equivalent.
        i. The sampling device will be inserted into the container from the top and will be pushed down slowly until the bottom of the container is reached.
        ii. The device will be sealed to retain the contents.
        iii. The contents of the sampling device will then be transferred to a polyethylene or glass bottle, which will be labeled with waste identification information. The sampling device may also be stoppered at both ends, wiped dry with a disposable cloth, and then transferred to the lab for analysis.
    b. For materials that are solid in nature, a hollow probe or thief will be used to collect the sample.
        i. Several areas from the container will be sampled and composited into a jar in order to ensure a representative sample.

ii. The sampling person removes a sample that uniformly represents the waste composition of the container (i.e., all layers and phases will be represented in the sample).

Sample containers will be labeled, recorded on the sampling log and delivered to the laboratory under strict Chain of Custody practices.

2.8.2 Incoming Waste Code Assignment

The waste generator will be responsible for assigning waste codes. Acceptance of waste at the proposed TSF will consist, in part, of facility personnel checking completeness and accuracy of the assigned waste codes. This step will be done by checking the "process generating the waste" against the waste codes recorded on the manifest. This verification may be based on "waste generator knowledge," analytical results, or a combination of both, as appropriate for the materials under scrutiny.

When the truck arrives, the waste codes on the shipping papers/manifest will be checked against the waste codes on the profile. The codes on the shipping papers/manifest will be the codes assigned to the delivery once it is accepted for storage, provided that the codes will be either identical or a subset of the waste codes on the profile.

2.8.3 Waste Codes for Containers

Waste codes for containers will be those contained on the line item of the manifest. Facility personnel will be able to track incoming accepted materials by line item on a manifest, or by using all the waste codes on the profile or the subset on the manifest.

2.8.4 Waste Code Tracking and Residue Disposition

The proposed TSF will track waste codes chronologically from the moment they arrive on site, throughout storage, treatment, and LDR characterization (40 CFR 268).

1. Discrepancies will be resolved with the waste generator before the waste is accepted.
2. After the waste has been visually inspected and accepted by the proposed TSF, it will be entered into the proposed TSF's waste tracking system described in Section 4.
3. Material will be entered into the proposed TSF's inventory records.
4. Material will be tracked through the treatment process by mass/volume and date of treatment. If material will only be entered into storage (i.e., elemental mercury that requires no treatment), the material will move to the appropriate location and be entered into the inventory records for that area.
5. Materials generated in the treatment process (e.g., filter cake, Hygiene Dust Collector dust, etc.) will be logged into inventory at the time of generation.

6. Generated waste materials will be characterized, recorded, and entered into inventory.
7. Outbound materials will be tracked and then moved to the "shipped materials" portion of the proposed TSF's records.

Waste streams generated on-site will require approval from the proposed TSF's Manager for movement throughout the proposed TSF. Sampling and analyses, inspections of batches, resolving discrepancies, and determining treatment parameters are all tasks facility personnel will perform. Procedures may vary based on differences in physical form, packaging, ability to sample and/or analyze the different waste matrices, and management options for the various waste types that will be handled at the proposed TSF. These procedures for internal tracking purposes may be modified without amendment to or alteration of this application.

The proposed TSF will clearly document the waste characterization procedure applicable to each accepted waste stream, as well as the generated waste streams. If more than one characterization procedure applies to a given waste stream, one will be selected from among the applicable characterization procedures and documented accordingly.

The proposed TSF will perform the fingerprint analyses in the laboratory area (see Table 2.8-1). Laboratory fume hoods will be installed in the fingerprinting areas. When open waste samples and/or open chemical containers are present under a fume hood, management practices will require the exhaust fan to be running, and the hood to be positioned for maximize effectiveness.

Table 2.8-1: Fingerprint Analyses

Parameter	Rationale for Selection
Physical Description	• Determine the general characteristics of the waste stream • Ensure correct grouping of wastes for sampling • Detect discrepancies in waste types • Determine waste characterization procedure
pH	• Determine acid-base characterization to ensure proper storage
XRF	• Determine mercury
Water Reactivity	• Indicate the potential to react with water • Determine if heat, flammable gases or other products will be generated
Reactive Sulfides Screen	• Indicate whether the waste produces hydrogen sulfide upon acidification
Reactive Cyanides Screen	• Indicate whether the waste produces hydrogen cyanide upon acidification
Oxidizer Screen	• Determine if the waste is an oxidizer

2.9 Screening for Ignitable, Reactive, or Incompatible Wastes

No ignitability testing on accepted liquid/slurry materials will be necessary, because neither elemental mercury nor calomel is ignitable. Ignitibility characteristics may be present for the "containers of debris" generated on-site if shop rags are used for cleaning and maintenance. This characteristic will be evaluated when applicable, based on the proposed TSF's "waste generator knowledge."

Based on the characteristics for the types of activated carbon used by the waste generators, it is not expected that spent activated carbon with an ignition point below 482° F will be encountered (see Appendix 2-E).

2.9.1 Ignitable Wastes

As discussed in Section 2.9, the waste that will be treated at the proposed TSF is not expected to be ignitable.

2.9.2 Reactive Wastes

The waste that will be treated at the proposed TSF is not expected to be reactive with water. No materials generated in the process or operations of the proposed TSF are anticipated to be reactive.

2.9.3 Incompatible Wastes

A chart of materials that may be incompatible with the waste that will be treated at the proposed TSF is presented in Appendix 2-B. Compatibility with the primary waste streams will be evaluated before a new reagent or waste stream is introduced to the proposed TSF.

2.10 Bulk Liquids and Containerized Liquids – 40 CFR 264.13(b)(6), 264.314, & 270.14(b)(3)

This section is not applicable, because the proposed TSF will not generate bulk liquids for disposal in a landfill. Elemental mercury will be stored in containers (pigs). It is anticipated that elemental mercury will be transferred to a National Repository once one becomes available.

2.11 Requirements for Incinerators – 40 CFR 264.13(b)(6), & 270.14(b)(3)

This section is not applicable, because the proposed TSF does not include an incinerator unit nor will the proposed TSF transport waste to an off-site facility for treatment by incineration.

2.12 Requirements for Containment Buildings – 40 CFR 264.1100 & 270.14(b)(3)

This section is not applicable, because the proposed TSF will not have a containment building for the storage or management of bulk waste. Additionally, the proposed TSF will not accept bulk waste (as defined by 40 CFR 260.10) for storage or treatment.

2.13 Ensure Compliance with LDR Requirements – 40 CFR 264.13(b)(3), 264.73, 268, & 270.14(b)(3)

LDR standards are detailed in 40 CFR 268. Each waste for which a treatment standard has been set will be evaluated for the applicable parameters as described in Appendix 2-A. All analytical results completed in support of the LDR requirements will be entered into the proposed TSF's operating record.

Wastes generated in the operations at the proposed TSF that exceed the high mercury inorganic threshold of 260 milligrams per kilogram (mg/kg) for total mercury, will be retorted to meet the LDR treatment standard or sent to an appropriately licensed facility for additional treatment and disposal in compliance with applicable regulations.

An LDR notification, including information required by 40 CFR 268.7, will accompany the shipment of hazardous waste and identify the waste as LDR regulated and indicate that further treatment is necessary prior to disposal. The wastes will be labeled with all applicable waste codes. In addition to the LDR notification, the waste profile sheet and current analytical data sheets for the waste stream will be provided to the receiving treatment facility.

Hazardous wastes meeting the applicable treatment standard and no longer exhibiting a hazardous characteristic may be sent for disposal to an appropriately licensed landfill with no further treatment. An LDR certification, including all analytical records to support the certification, will be prepared and will accompany the shipment of waste to the receiving facility.

3.0 SECURITY PLAN – 40 CFR 270.14(b)(4)

Security and control procedures to be implemented at the proposed TSF will comply with the security requirements found in 40 CFR 264.14, as adopted by NDEP. The manager of the proposed TSF, or the manager's designee, will be responsible for the facility's security. Unauthorized personnel will be physically restricted from entering the proposed TSF's property and the proposed TSF Building by the three barriers discussed in Section 1.7. Additional security measures will be accomplished by surveillance, entry controls, and warning signs.

3.1 Facility Surveillance – 40 CFR 264.14(b)(1)

Among other things, after-hours security will be provided by locking the proposed TSF's access gates. Surveillance cameras will be monitored after normal business hours by security personnel at the Cortez Mine. Initially, the facility is expected to operate eight hours per day, five days per week. However, working hours are subject to change based on the proposed TSF's operational demand. Facility employees who may be working after hours will be supplied with an outside phone and a radio to contact the emergency coordinator or the Eureka County Sheriff, if necessary. Deviation from established security measures will be brought to the attention of the proposed TSF's Manager for corrective action upon discovery.

The proposed TSF is surrounded by a 100-foot-wide gravel perimeter for wildfire protection. The 10-foot-tall privacy berm provides an additional wildfire protection barrier. Surveillance cameras will monitor the property inside and outside of the privacy berm as deemed necessary by the proposed TSF's Manager.

3.2 Barrier and Means to Control Entry – 40 CFR 264.14(a) & 264.14(b)(2)

Unauthorized access to the proposed TSF will be minimized by means of physical exclusion barriers as described in Section 1.7. The integrity of the outer perimeter fence will be evaluated monthly via physical inspection. Any noted problems will be documented and corrected in a timely fashion.

Controlled access to the RCRA area will be through a main security pass gate, which will be located northeast of the proposed TSF Building. This main security pass gate serves as the main entrance for facility workers, authorized visitors, service providers, delivery traffic, and waste transporters. This gate will generally remain open during normal working hours and will be monitored by the proposed TSF's security personnel. All gates will be closed and locked at the end of each workday and will remain closed during non-working hours.

All deliveries to the proposed TSF will be scheduled; thus, all deliveries will be expected by the proposed TSF's security personnel. Unscheduled delivery traffic to the proposed TSF will be turned away. Incoming delivery traffic will approach the facility westbound on the main access road, and will be directed by posted signs to the main security gate for further instructions. Transport operators (i.e., vehicle drivers) of waste and non-waste deliveries to the proposed TSF will be directed to the receiving bay, where they will be required to register with security personnel. Management practices will require transport operators to register with the proposed TSF's security personnel prior to accessing any space inside the proposed TSF Building. Management practices will also require that, for a transport operator to access the proposed TSF's plant spaces, express written permission from the proposed TSF's Manager first be obtained, and an escort provided.

Authorized visitors to the proposed TSF will also be required to register with the proposed TSF's security personnel, and may then be allowed access, under escort, to areas of the property as necessary for the purposes of their visit.

3.3 Warning Signs – 40 CFR 264.14(c)

Warning signs will be posted at each entrance to the proposed TSF, and on the outer perimeter fencing at approximately 50-foot intervals such that they may be visible from any approach to the property. Typical language for warning signs may be as follows: "Danger – Unauthorized Personnel Keep Out." The signs will be of sufficient size to be legible from a distance of 25 feet.

4.0 INSPECTION PLAN – 40 CFR 270.14(b)(5)

An Inspection Plan, including examples of typical Inspection Forms, has been developed for the proposed TSF. The Inspection Plan is included as Appendix 4-A of this permit application. The inspection forms #1 through #4 are found in Appendix 4-B.

Inspections of the containers, container shelving, container storage areas, the process area, tanks and equipment, the monitoring instruments, safety equipment, emergency response equipment, communication system, and security devices will be conducted at the frequency specified in Table 4.0-1 below. Daily inspections will occur each workday, as indicated in Table 4.0-1.

Table 4.0-1: Inspection Frequencies

Area or Equipment	Frequency	Form
Fire Extinguishers	Monthly	Inspection Form #4
Fire Suppression Equipment	Monthly	Inspection Form #4
Fire Suppressions Flow	Annually	Inspection Form #4
Security Fence and Gate	Monthly	Inspection Form #4
Safety and Emergency Response Equipment	Monthly	Inspection Form #4
Structural Condition of Tanks	Monthly	Inspection Form #4
Associated Piping	Monthly	Inspection Form #4
Containers of mercury and mercury-bearing materials	Daily	Daily Inspection Form #1
Tank Levels, Content, and Leak Detection	Daily	Daily Inspection Form #2
Shelving for Elemental Mercury	Daily	Daily Inspection Form #1
Spill Trays	Daily	Daily Inspection Form #1
Storage Area	Daily	Daily Inspection Form #1
Miscellaneous Treatment Units	Weekly	Weekly Inspection Form #2 & Weekly Inspection Form #3
Equipment and Inventory Supply	Monthly	Inspection Form #4
On-site Lab	Daily	Daily Inspection Form #1
Parking Areas (Run-on/Run-off)	Monthly	Inspection Form #4
Load/Unload Docks	Monthly	Inspection Form #4
Safety Showers/Eyewash Stations	Weekly	Weekly Inspection Form #3
Monitoring Wells	Quarterly	Inspection Form #4
Good Housekeeping	Daily	Daily Inspection Form #1
Communication System	Daily	Daily Inspection Form #1
Overhead Door Seals	Daily	Daily Inspection Form #2

5.0 COMMUNICATION PLAN – 40 CFR 264.34

5.1 Internal Communications

The communications system that will be in place at the proposed TSF will be connected to the existing BGNA communications infrastructure by linking to the appropriate network at the Cortez Mine. The communications system will be vital for operations at the proposed TSF, and will be necessary for the off-site communication of critical alarms and events.

With respect to data transmission, the network connection to BGNA's Wide Area Network (WAN) will first be established via a redundant dual-hop wireless point-to-point link to the Cortez Mine site. An existing repeater is located at Mount Tenabo (the highest peak in the area).

This wireless point-to-point link is designed to have sufficient bandwidth for all of BGNA's network facilities, systems, and applications. In this manner, the proposed TSF's site operational systems can be completely integrated with BGNA's systems. (For further detail regarding BGNA's Systems that will be utilized by the proposed TSF, refer to Section 1.5.)

A third connection for data transmission will be established for critical data using the cellular data network. This is designed to provide a permanent connection to BGNA's network. This architecture is expected to provide redundancy and an automatic path change in the event one of the links fails.

The communications strategy is described by the drawing in Appendix 1-A.

5.2 External Communications

5.2.1 Arrangements with Local Authorities – 40 CFR 264.37

Facility workers will be trained to respond to emergency situations. At least one trained Emergency Medical Technician (EMT) will be on-site during working hours to respond to an emergency.

When additional help is needed, the Cortez Mine may be contacted. The Cortez Mine operations are staffed 24 hours a day, 365 days a year. The general sequence of events to respond to emergency situations requiring external communications is as follows:

- Contact local response services off-site as appropriate.
- Contact a clean-up contractor qualified for response to releases as appropriate.
- Notify NDEP and the National Response Center as required.

Details of emergency response protocols are provided in the Contingency Plan in Appendix 6-A.

40 CFR 264.37(a)(1)

PMR will make arrangements to familiarize police, fire departments, and other first responders with the layout of the proposed TSF, properties of the hazardous waste handled at the proposed

TSF, associated hazards, places where facility personnel would normally be working, entrances to roads inside the proposed TSF, and possible evacuation routes.

40 CFR 264.37(a)(2) & 264.37(a)(3)

Primary emergency authority will be provided by a trained EMT on-site at the proposed TSF. Secondary response will come from the Cortez Mine or local authorities, whichever can respond first.

40 CFR 264.37(a)(4)

Local hospitals will be made familiar with the properties of the hazardous waste stored at the proposed TSF and the types of injuries or illnesses which could result during its operation.

40 CFR 264.37(b)

Documentation will be kept if state or local authorities decline to participate with the Preparedness and Prevention Plan.

5.3 Non-Critical Alarms Communications Strategy

Non-critical alarms will be classified as those alarms for which human intervention will be required, but the alarm will not be related to a condition that in any way would threaten the safety of on-site personnel or the public (e.g., operational alarms that do not impact containment).

The PCS will include monitoring and annunciation of process and environmental non-critical conditions. These conditions will be evaluated, and should they fall outside the specification limits, an alarm will be generated and annunciated via the operator HMI screens. Alarms are designed to require operator acknowledgement prior to resetting. HMI screens will be accessible via the proposed TSF's Control Room.

The Data Historian and Operational Systems will also be utilized as part of the alarm management strategy. All events including alarms, warnings, and notification events are designed to be recorded within the Data Historian for auditing and reporting, as well as for root cause analysis. Early warning events are designed to be generated wherever possible in order to minimize risk to personnel, equipment, and the environment.

Events, depending on priority, will be communicated to personnel using a variety of mechanisms. These mechanisms could include a combination of portal visualization, automated emails, and automated report generation.

5.4 Critical Alarms Communications Strategy

Critical alarms will be classified as those alarms that have the potential to threaten on-site personnel, public safety, or the safety of the proposed TSF itself. All critical alarms will involve 24-hour monitoring and notification. Access to critical alarm information will be provided to facility personnel (whether on-site or off-site), and PMR's continuous-service monitoring parties.

There will be four categories of critical alarm events:

Security Violation Events

A comprehensive security system is designed to be in place using surveillance cameras, access control, and motion detection.

During regular shift operation, security violation events will be monitored by on-site personnel through the security CCTV system and through notification via the access control system. A phone system (VoIP) will be provided such that emergency assistance and/or local law enforcement authorities can be summoned. A backup system utilizing a UHF two-way radio voice connection will also be supplied such that appropriate assistance can be summoned.

Outside of working hours, arrangements will be made for security monitoring by off-site personnel. The site security systems will be directly linked to BGNA's security system via the communications infrastructure. A backup system for emergency communications of security events will be in place via UHF radio.

Fire Event

Fire events will be monitored during regular shift operation by on-site personnel, and electronically by the proposed TSF's on-site fire detection system. A phone system (VoIP) will be provided such that emergency assistance and firefighting equipment can be summoned. A backup system utilizing a UHF two-way radio connection will also be supplied such that assistance can be summoned.

Fire events will be monitored during off-shift hours through the fire detection system; alarming events will be monitored by off-site personnel. The fire detection system will be linked to the communications infrastructure for notifications with a backup communications strategy provided via UHF radio. Off-site security personnel will summon emergency assistance and firefighting equipment by direct communications to local authorities.

Release of Hazardous Chemicals

Monitoring systems have been designed to warn of a release of hazardous chemicals within the plant spaces. Outside of working hours, a notification system will be in place using the communications infrastructure. A backup communications strategy will be provided via UHF radio. Off-site security personnel will summon emergency assistance as necessary.

Critical Process or Operational Event

Critical process or operational events (e.g., retort over-pressure or over-temperature) will be dealt with in a manner similar to hazardous chemical events. Critical process events will be monitored via instrumentation and control systems and will raise alarms via the Control Room's HMIs. A phone system (VoIP) will be provided such that emergency assistance can be summoned as necessary. A backup system utilizing a UHF two-way radio connection will also be supplied.

Outside of working hours, a notification system will be in place using the communications infrastructure. A backup communications strategy will be provided via UHF radio. Off-site security personnel will summon emergency assistance as necessary.

5.5 Required Equipment

40 CFR 264.32(a) & 264.32(b)

The required communication devices that will be used at the proposed TSF are portable radios and telephones. These devices will be maintained in proper working order thereby allowing facility workers to report emergencies and receive immediate emergency instructions per 40 CFR 264.32, 264.34, and 264.52(e). Installed alarm systems, mercury spill response kits, and a suitable quantity of chemical absorbent will be provided at appropriate locations throughout the proposed TSF. Emergency response stations will be located near eye wash stations.

40 CFR 264.32(c) & 264.32(d)

The proposed TSF is designed not be conducive to fire:

- The facility walls are designed to be made from concrete, which does not combust.
- Mercury has a fire hazard rating of zero.
- Pallets, spill-trays, and shelving will be non-flammable.
- The roof will have a metal liner.

Equipment within the proposed TSF may be electric. Incompatible materials will not be stored in common areas. As first responders, facility personnel will be trained to appropriately respond to fires and other emergency situations. Fire extinguishers will be available in the lunch room, office area, and plant spaces. Provisions for handheld fire extinguishers will be in addition to the fire suppression system, which will also be located in these areas.

Facility communications or alarm systems, fire protection equipment, spill control equipment, and decontamination equipment, where required, will be tested and maintained as necessary to assure its proper operation during emergency situations. Fire suppression equipment will be tested monthly and flow tested annually. Fire extinguishers will be inspected monthly and pressure tested annually.

40 CFR 264.34(a) & 264.34(b)

Employees will have easy access to an internal alarm or communication device at all times, especially when handling mercury or mercury-bearing materials. Alarms are subdivided into non-critical and critical alarms. Non-critical alarms are related to conditions that do not threaten the safety of on-site personnel or the public. All key process parameters (e.g., pressure, temperature) will be monitored by the instrumentation and control system (PCS system). During operations, if a parameter exceeds it high or low set-point (e.g., tank level high), an alarm will be sent via the PCS system to the operator HMI screens. The operator can then adjust operations at their discretion back within desired boundaries. After an operator acknowledges an alarm, the alarm will be reset.

The specific type of alarm equipment installed will depend on the parameter being monitored. These will include pressure monitors, level monitors, flow meters, among others. Refer to Appendix 1-B: P&IDs for the control parameters that will be monitored

Critical alarms will notify personnel and/or authorities of conditions that are a potential threat to on-site personnel, public safety, property and the environment. Critical alarms will operate continuously and will be monitored 24/7 by personnel at the PMR facility or Cortez Mine. Refer to Section 5.1 for details on the communication strategy with Cortez Mine.

Employees will have easy access to an internal alarm or communication device at all times, especially when handling mercury or mercury-bearing materials. Personnel may summon local authorities via phone or radio for additional assistance during emergency situations, if deemed necessary. Refer to Section 5.2 of Part B of the RCRA permit for details on the communication strategy with local authorities.

There are 4 types of critical alarms:

- Security violation
- Fire events
- Hazardous material releases
- Critical process or operation event

Security Violation Alarms

Site security will be monitored by surveillance cameras, access control (e.g., Radio Frequency Identification (RFID) badges) and motion detectors at all entrances to the facility. In addition, a security guard will be located at the facility entrance during working hours. Security breaches will be communicated to on-site personnel and/or Cortex Mine. Enforcement authorities may be summoned by phone or radio, if deemed necessary.

Fire Events

The fire alarm system will include smoke detectors, heat detectors and manual pull alarms. Audible and visual alarms will notify personnel to evacuate. Notification will be sent to the control rooms at the PMR facility and/or Cortez Mine. Emergency assistance and firefighting equipment may be summoned by phone or radio, if deemed necessary.

Hazardous Material Releases

Major hazardous material releases (e.g., mercury, sodium hydroxide) will be detected by a level alarm on the sumps located beneath the process and storage areas. Notification of a spill will be sent to the Control Room. Emergency spill support may be summoned by phone or radio, if deemed necessary.

Small spills will mainly be detected by regular visual inspections by personnel. Daily inspections will be conducted on mercury containers (e.g., calomel storage), tanks, elemental mercury shelves, spill trays and storage areas. Monthly inspections will be conducted on tank and piping integrity. Discovery of a spill will be communicated by UHF radio to on-site personnel for clean-up. All spills will be captured by secondary containment (refer to Table 1.2-1, Secondary Containment Capacities, for details on secondary containment).

In addition to visual inspections, building exhaust will be continuously monitored for mercury vapor through an extractive gas analyzer. An increase to mercury vapor in building air may indicate a release of mercury and/or mercury compounds within the building sounding an audible alarm. Finally, all tank levels will be monitored and mass balances will be kept of in-coming and out-going material. A sudden low level alarm for tank level may indicate a tank rupture. Discrepancies between tank feed and discharge volumes may indicate small leaks.

Critical Process or Operation Event

All key process parameters (e.g., pressure, temperature) will be monitored by the instrumentation and control system (PCS system). During operations, if a parameter exceeds it high-high or low-low set-point (e.g., tank level high-high), indicating an imminent process upset condition, an alarm will be sent via the PCS system to the operator HMI screens at the PMR facility or Cortez Mine. Alarms will request immediate operator intervention and/or automated safe equipment shutdown to return operations back within safe boundaries. Refer to Appendix 1-B: P&IDs for control parameters that will be monitored.

Employees will be trained to follow the posted evacuation routes and to assemble in the designated gathering area. The area will be identified at various locations throughout the proposed TSF Building.

There will always be at least two employees on-site during normal working hours.

5.6 Required Aisle Space – 40 CFR 264.35

Minimum aisle width in the storage areas of the facility will be 11 feet. This will be sufficient for forklift access and personnel egress. Additionally, a minimum of three feet of clearance will be kept between walls and obstructions to personnel movement, such as storage racks and mechanical equipment.

Exit travel distance from an aisle to a common egress path will be no longer than 175 feet. Travel distance on common egress paths to an exit will be no longer than 75 feet. These distances will be in accordance with IBC-2006, Table 1016.1.

Aisle space will be maintained such that personnel movement will be unobstructed, and such that fire protection equipment, spill control equipment, and decontamination equipment can be delivered in a timely manner to any active area of the proposed TSF in case of an emergency.

5.7 Testing and Maintenance of Equipment – 40 CFR 264.33

Management practices will be implemented to operate and maintain equipment in good working order to minimize the possibility of fire, explosion, or any other release of materials that may threaten human health or the environment. This will be accomplished in the following ways:

- Materials necessary for the treatment, storage, and management of mercury and mercury-bearing materials will be kept in tightly closed containers, except during periods of addition or removal of material, or when the substance is actively being used during a plant process.
- Containers will be properly marked and labeled identifying the contents.
- Containers in trays will be placed such that the labels' faces are unobstructed, lend themselves to inspection, and can be easily identified by observers.
- Containers will be compatible with their intended contents, of appropriate type and quality.
- Drinking, eating, and chewing will be prohibited in all plant spaces of the proposed TSF as discussed in Section 1.1.3. The layout of the proposed TSF is shown in Appendix 1-A.
- Smoking will be prohibited within the proposed TSF compound.
- Handling of materials will only occur using the appropriate equipment, such as: drum handlers, drum dollies, slings, hoists, and powered industrial truck attachments.
- Containers will be secured and covered prior to movement.
- Containers will be handled so as to prevent damage.

- Damaged containers will be placed into new containers made from similar material.
- Spill containment materials will be located near material handling and storage areas.

Inspections will be conducted as discussed in Section 4.

6.0 CONTINGENCY PLAN – 40 CFR 270.14(b)(7)

A Contingency Plan has been developed for the proposed TSF. The Contingency Plan, including a spill response plan, is included as Appendix 6-A of this permit application. In addition to this Contingency Plan, the proposed TSF will be operated pursuant to the applicable emergency response requirements of the Chemical Accident Prevention Program (CAPP).

A map (Drawing H340940-0000-50-015-0011) showing evacuation routes and designated gathering areas is included in Appendix 6-A. The D-size drawing is included in Appendix 1-A and listed on the List of Drawings. The evacuation map will be posted at various locations throughout the proposed TSF Building.

7.0 PREVENTION AND SAFETY PROCEDURES – 40 CFR 264 Subpart C

These Preparedness and Prevention Procedures have been prepared in compliance with the requirements of the Federal Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities found in 40 CFR Part 264 Subpart C.

7.1 Design and Operation of the Facility – 40 CFR 264.31

The purpose of the proposed TSF is described in Section 1. The characteristics of the hazardous wastes to be managed at the proposed TSF are discussed in Section 2.

Preventative measures incorporated into the design of the proposed TSF structure are described in Section 1.1; procedures incorporated into the facility processes and operations are described in Section 1.2; incorporated measures in the storage area are described in Section 1.3; and a description of the Utility Building is presented in Section 1.5.

Additionally, the following precautions have been engineered into the PMR facility design to protect the water supply from being compromised. The water supply storage tank (Water Storage Tank 1540-TK-015) for the PMR TSF is located in the utility building, intentionally placed outside the TSF building area (external to the RCRA Permitted Area, which is defined by the Facility Fence).

The water supply storage tank (Water Storage Tank 1540-TK-015) supplies water to the TSF building by an over-head water pipeline which is designed with backflow prevention. Therefore, water flows only into the TSF building.

The water supply tank (Water Storage Tank 1540-TK-015) is filled by a supply truck in the utility building area, external to the TSF building area (external to the RCRA Permitted Area, which is defined by the Facility Fence).

The utility building access route used by trucks supplying water is a perimeter road which skirts the outside of the TSF area (external to the Facility Fence) to the utility building area. This access road is intentionally planned external to the TSF building area / Facility Fence so that water supply vehicles do not enter the TSF building area.

The facility will be located approximately 11 miles from the nearest population center. Access will be controlled by fencing and automatic security. The building will be specifically designed to follow best practices for mercury managing facilities. Exposed interior wall surfaces will be made of concrete coated with epoxy enamel, designed to prevent secondary exposure to mercury that could result from absorption of mercury onto porous construction materials. A metal liner, coated with epoxy enamel will seal the roof, and separate the roof insulation from the interior of the building. Air emissions are designed to be filtered prior to discharge and all transfer, treatment, process, and storage operations will be conducted and contained within the building structure. The proposed TSF Building is designed to totally enclose the processing operations and operate under negative pressure with the aforementioned ventilation system operating continuously.

Facility workers will receive training on proper loading and unloading procedures. This training may include: instruction on machinery operation, safety equipment, waste identification, and processing procedures.

Equipment redundancy is built into the facility design as necessary to prevent an inadvertent interruption of operation. Measures preventing equipment failure are described in more detail in Section 1.

Personnel protection measures include engineering controls, administrative controls, training, and PPE. The following will be available at the facility:

- Cartridge Air Mask - There will be two types of cartridge masks, full face and half face. They will both be equipped with fittings to which contaminant-specific cartridges may be attached. Each employee will be issued a mask and cartridges appropriate to their work area.
- Protective Clothing - Employees will be issued hard hats, protective coveralls, waterproof safety boots, specialized gloves, safety glasses, and hearing protection on a routine basis.
- Laboratory - While all personnel will be required to wear safety glasses in the plant spaces, personnel working in the laboratory will be required to wear additional protective equipment (e.g., chemically resistant coveralls, gloves, safety goggles, face shields, and/or lab aprons), as necessary.

Facility workers will be responsible for decontaminating their work clothing and PPE on a regular basis. The chemically resistant coveralls and gloves will be disposable and will be discarded as necessary. Laundry facilities will be available to workers as described in Section 1.1.2. All personal protective equipment will be left on-site; removing personal protective equipment from the premises of the proposed TSF will be strictly prohibited.

8.0 PREVENTION OF ACCIDENTAL IGNITION, REACTION OF IGNITABLE, REACTIVE, INCOMPATIBLE WASTES – 40 CFR 270.14(b)(9)

This section satisfies the requirements for the prevention of reacting ignitable, reactive, or incompatible wastes. The mercury and mercury-bearing materials to be treated, stored, and managed at the proposed TSF, which are discussed in Section 2 of this application, are neither ignitable nor reactive, as defined in 40 CFR 261.21 and 40 CFR 261.23.

8.1 Precautions

The hazardous wastes to be treated, stored, and managed at the proposed TSF are expected to be non-ignitable and stable. No known ignitable or reactive waste will be accepted at the proposed TSF. During treatment and storage, wastes will be protected from sources of ignition and reaction. There will be no wastes on-site that are incompatible with each other.

Precautions will be taken at the proposed TSF during storage, treatment, and handling to prevent the accidental mixing of incompatible materials. These precautions are intended to prevent unwanted heat, pressure, fire, explosion, toxic gases, and fumes, which could result in damage to the structural integrity of the proposed TSF, or cause a threat to human health or the environment. The precautions may include:

- Ignitable materials will be protected from open ignition sources.
- Signs prohibiting smoking will be conspicuously placed throughout the proposed TSF compound.
- The proposed TSF will be well ventilated as described in Section 1.1.4.
- The determination of incompatibility will be in accordance with the procedures outlined in the WAP.

9.0 MANIFEST SYSTEM, RECORDKEEPING, AND REPORTING – 40 CFR 264 Subpart E

9.1 Manifest System 40 CFR 264.71

The proposed TSF will only accept waste that is accompanied by a manifest which has been accurately completed. After checking the waste to be received, the manifest will by sign and date the manifest indicating that the describe shipment has been received for treatment and storage by the proposed TSF.

9.2 Manifest Discrepancies 40 CFR 264.72

Manifest discrepancies will be resolved in accordance with 40 CFR 264.72(c). First the generator will be contacted by phone to explain the discrepancy. A course of action will be developed with the generator to resolve the discrepancy as soon as possible. In the event the discrepancy is not resolved within 10 working days of receiving the shipment, the shipment will be rejected and returned to the generator.

In accordance with 40 CFR 264.72(d), the generator will be contacted before a shipment of waste is rejected by the proposed TSF.

9.3 Operating Record 40 CFR 264.73

Recordkeeping and reporting will be required for the following areas:

- Health and safety.
- Emergency response.
- Facility security.
- Process monitoring.
- Waste acceptance.
- Inspection.
- Container storage management.
- Waste management.
- Training.
- Annual certifications.

The recordkeeping and reporting that will be incorporated into the operation of the proposed TSF will be handled through the Operational Systems (Level 3 Systems) and Business Systems (Level 4 Systems) as discussed in Section 1.5.2 and Section 5.

The recordkeeping and reporting will be based on the following:

- Electronic recordkeeping and reporting will be used wherever possible.
- The electronic recordkeeping systems will be able to store and print out high-quality images including handwritten signatures (when necessary).
- Recordkeeping and reporting for which electronic recording means are unavailable will be done manually. Manual records will further be scanned and included in the electronic recordkeeping and reporting system as appropriate.
- Data collection for the population of records and reports will be automated using the PCSs (Level 0, 1, 2) wherever possible.
- In the event data collection for the population of records and reports cannot be automated, tools will be provided to facility workers that will streamline data collection and reduce the potential for erroneous data. These instruments will be able to incorporate electronic signatures and provide date/time stamps as appropriate.
- Procedures will be in place to ensure that all required data is captured (i.e., SOPs).
- Records and reports will be available for inspectors.
- In accordance with 40CFR 264.73(b), the operating record (electronic and hard-copy) will be stored on-site for a minimum of three years.
- Hazardous waste training records will be kept on-site a minimum of three years.

10.0 TRAFFIC – 40 CFR 270.14(b)(10)

10.1 Traffic Patterns

10.1.1 Getting to the Site

The route to the proposed TSF is shown in Figure 10.1-1 in Appendix 10-A. From Elko, Nevada the facility can be reached by travelling southwest on I-80 for 40 miles to Exit 261, then south toward the towns of Beowawe and Crescent Valley. From Exit 261, continue approximately six miles south on Nevada State Road 306, and then turn east onto Rose Ranch Road. From there, travel approximately three miles on Rose Ranch Road and then turn right onto Willow Corral Pass, which is a maintained county road. The proposed TSF can be accessed from Willow Corral Pass, which continues south past the proposed TSF to the east-west Cottonwood Canyon road.

10.1.2 On the Site

It is anticipated that on-site traffic patterns will resemble the depictions shown in Figure 10.1-2 in Appendix 10-A. Inbound delivery trucks will travel along the proposed TSF access road toward the perimeter security gate and enter the proposed TSF as described in Section 1.2.1.

After registering with security and properly unloading and delivering their shipment, delivery drivers will be directed to drive around the perimeter of the proposed TSF to the north, back toward the exit at the Facility Fence. Vehicles will then be able to pass through the main security gate and perimeter security gate to exit the property.

10.1.3 Truck Specification

Transportation will be provided by licensed hazardous waste transporters. The transporters will use trucks to transport mercury and mercury-bearing materials to the proposed TSF.

For design purposes, it was assumed that the delivery truck will be a Ford F-750, or functional equivalent, with a flat bed that has a custom built box to accommodate the mercury-bearing containers. The maximum length of such a truck was assumed to be 30 feet, with a wheelbase of 224 inches (18 feet 8 inches). This type of truck is a dual axle truck with dual wheels on the rear axle only.

The gross vehicle weight rating (GVWR) of this type of truck is 37,000 pounds, with the front axle rated for 10,000 pounds and the rear axle rated at 21,000 pounds. An illustration of this type of truck is given in Figure 10.1-3.

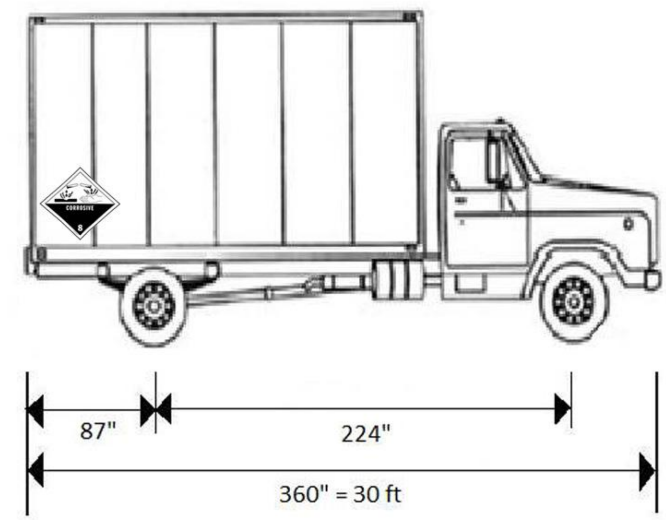


Figure 10.1-3: General Parameters for Typical Delivery Truck

10.2 Estimated Traffic Volume

Expected traffic frequencies to and from the site are presented in Table 10.2-1. The following assumptions were made while compiling this data:

- An ISO standard 30 inch by 30 inch composite fiber or steel pallet will be used for transporting mercury and mercury-bearing materials.
- Trucks delivering hazardous waste to the proposed TSF will be able to carry 24 such pallets.
- Expected transport frequencies of calomel, spent activated carbon, and elemental mercury to the proposed TSF are based on quantities indicated in the facility design basis (i.e., up to 612,000 lbs/year of calomel; up to 240,000 lbs/year of spent activated carbon; up to 124,000 lbs/year of elemental mercury).
- A tanker truck (maximum gross weight 60,000 lbs.) will be used for deliveries of liquids.
- A weekly delivery schedule is planned for water. Sanitary wastewater and waste solution is planned to be transported off-site for treatment as required.
- A monthly delivery schedule is planned for deliveries of oxygen and nitrogen. Storage tanks were sized to accommodate this delivery schedule.
- The delivery frequency of diesel fuel will be based on a storage tank with approximately three weeks of storage at the nominal power load and supply scenario.

- Delivery frequency of reagents will be based on the design throughput.
- Crushed drums (and other containers) will be backhauled from the proposed TSF on trucks similar to those used to deliver mercury and mercury-bearing materials.
- There will be approximately 20 working days per month.
- The proposed TSF will be staffed by a team consisting of a maximum of five people (one manager, three operators, and one security person).
- Road surface composition and design loading characteristics are detailed in Section 10.4.

Table 10.2-1: Estimated Traffic Volume

Vehicle Purpose	Vehicle Description						Point of Origin/ Destination	Round Trips		
	Description	Size	Axles	Vehicle Weight (lbs)	Load per Trip (lbs)	Gross Weight (lbs)		Daily	Monthly	Annually
Proposed TSF Workforce Transport	Personal Vehicles	-	2	4,400	-	4,400	Workforce residences	4.00	85.0	1020
Calomel Delivery	Delivery Truck	26'	2	12,600	14,400	27,000	Barrick mine operations	0.18	3.58	43
Spent Activated Carbon Delivery	Delivery Truck	26'	2	12,600	17,120	29,720	Barrick mine operations	0.06	0.7	8
Elemental Mercury Delivery	Delivery Truck	26'	2	12,600	22,000	34,600	Barrick mine operations	0.01	0.3	3
Caustic Solution Delivery	Tanker Truck	3,000 gal	3	19,000	39,000	58,000	Supplier Location	0.01	0.3	3
HCl Solution Delivery	Tanker Truck	3,000 gal	3	19,000	27,000	46,000	Supplier Location	0.01	0.3	3
Other Reagents Delivery	Delivery Truck	26'	2	12,600	7,400	20,000	Supplier Location	0.02	0.3	4
Water	Tanker Truck	5,000 gal	3	19,000	42,000	61,000	Supplier Location	0.21	4.3	51
Effluents - Sanitary Water	Tanker Truck	5,000 gal	3	19,000	42,000	61,000	Supplier Location	0.21	4.3	51
Effluents - Water	Tanker Truck	5,000 gal	3	19,000	42,000	61,000	Supplier Location	0.21	4.3	51
Diesel	Tanker Truck	5,000 gal	3	19,000	35,000	54,000	Supplier Location	0.03	0.5	6
Oxygen	Tanker Truck	5,000 gal	3	19,000	48,000	67,000	Supplier Location	0.05	1.0	12
Nitrogen	Tanker Truck	5,000 gal	3	19,000	34,000	53,000	Supplier Location	0.05	1.0	12
Total Round Trips								**5.05**	**105.88**	**1267**

10.3 Traffic Control Signs

Traffic routing and control at the proposed TSF will allow for free and safe access of routine and emergency traffic. PMR is working with the Eureka County Public Works Department to meet the traffic safety needs of the proposed TSF workers and general commuters who may use Willow Corral Pass.

Signage designating delivery entrance, delivery routes, off-loading areas, and employee parking will be installed.

Upon completion, the final road design, as approved by the Eureka County Public Works Department, will be submitted to NDEP to supplement information contained in this application.

10.4 Road Surfaces and Load-Bearing Capacity

All access roads and the new parking lot within the proposed TSF compound will be surfaced with asphalt, and will be designed with a load-bearing capacity in excess of 40,000 lbs. The expected gross vehicle weight rating (GVWR) for delivery trucks is 37,000 pounds, therefore, the load-bearing capacity of these roads should not be exceeded.

10.5 Road Surface Composition and Design Loading

10.5.1 Hierarchy of Existing Road for Access

The only existing local road close to the proposed TSF site will be Willow Corral Pass. Vehicles will access the plant according to the route described in Figure 10.1-1 (see Site Access in Appendix 10-A).

Proposed Road Infrastructure

The road infrastructure for the proposed TSF compound will be comprised of an access road, proposed TSF internal roads, and parking lot.

Access Road

A new two-lane gravel road, 40 feet wide, with a maximum grade of 7% will provide access to the proposed TSF compound from the Willow Corral Pass Road turnoff during construction, and eventually for operations. This new road will branch from a proposed intersection on the existing county road, Willow Corral Pass, and continue for an approximate length of 1,400 feet.

The topography across the alignment of this plant access route is flat, with only one significant ground surface depression.

Internal Roads

Asphalt paved internal roads will be provided for the proposed TSF Building, Utility Building, and for equipment and storage areas. The total length of the internal roads within the proposed TSF compound will be approximately 4,000 linear feet.

Parking

The parking lot for the proposed TSF is discussed in Section 1.6.

11.0 FACILITY LOCATION – 40 CFR 270.14(b)(11) & 264.18

The site for the proposed TSF is located on the Dean Ranch, which is in Eureka County, approximately 40 miles west of Elko, Nevada; 17 miles southeast of the town of Beowawe, Nevada; 11 miles east of the town of Crescent Valley, Nevada. It will be located in the northwest corner of Section 5, Township 29 North, Range 50 East, Mount Diablo Meridian, in an unincorporated area of Eureka County.

Eureka County has not adopted zoning ordinances for development on private land. The RCRA area (within the proposed TSF compound) will occupy approximately five acres. The proposed TSF compound will occupy approximately 30 acres.

The locations of major tanks, buildings, and roads are illustrated in general arrangement drawings provided in Appendix 1-A.

The proposed TSF is planned to be located on a parcel of land that, having satisfied the criteria specified in NAC 444.8456 and 444.8458 without a variance, has been issued a COD by the Administrator of NDEP. Supporting data for the facility location is found in the COD application, dated September 10, 2012. A copy of the COD Issuance Letter can be found in Appendix 11-A.

11.1 Topographic Map – 40 CFR 270.14(b)(19)

The topographic map (H340940-0000-07-015-0001) provided in Appendix 1-A illustrates the buildings, tanks, roads, berms, and other surface features. It shows a distance of 1,000 feet around the facility. The map is drawn to a scale of one inch equals 200 feet (1” = 200’).

11.2 Floodplain – 40 CFR 270.14(b)(11), 270.14(b)(19), & 264.18(b)

A comparison of the site for the proposed TSF to the most current Flood Insurance Rate Map (FIRM) for Eureka County (Figure 11.2-1 in Appendix 11-B) indicates the proposed TSF will not be located within an identified 100-year flood plain.

The ground elevation at the site for the proposed TSF is approximately 4,994 feet above mean sea level. Based on the FIRM Panel 0600D, the flood plain in this area follows the 4,900 foot elevation contour; therefore, the proposed TSF lies above the designated 100-year floodplain. The distance from the southeast corner of the site for the proposed TSF to the closest flood plain contour is two-thirds of a mile; therefore, the TSF will be located outside the designated 100-year floodplain, and no flood control structures or drainage barriers will be required.

11.3 Surface Waters – 40 CFR 270.14(b)(19) & 264.18(b)

The proposed TSF will be built at least one mile from an area where surface water or wetlands occur. Figure 11.3-1 in Appendix 11-B shows the proposed TSF’s location relative to the closest occurrence of surface water and delineated wetlands. The closest surface water is an artificial stock pond southeast of the site. The closest delineated wetlands are found west of the site.

11.4 Surrounding Land Use – 40 CFR 270.14(b)(19) & 264.18(c)

No hazardous waste will be land disposed of at the proposed TSF. No material will be placed in salt dome formations, salt bed formations, underground mines, or caves.

The land use within 1,000 feet of the proposed TSF will be primarily open range grazing. The proposed TSF will protect the surrounding environment by constructing a system of physical barriers as described in Section 1.7.

11.5 Wind Rose – 40 CFR 270.14(b)(19)

A wind rose for the Crescent Valley is presented in Figure 11.5-1 in Appendix 11-B, the Crescent Valley Wind Rose (http://www.wrcc.dri.edu/cgi-bin/wea_windrose2.pl). Prevailing wind direction in the Crescent Valley is out of the southwest.

11.6 Legal Boundaries – 40 CFR 270.14(b)(19)

The property that will comprise proposed TSF compound was surveyed by a Nevada licensed professional land surveyor in July 2012. The proposed TSF compound will be located in the northwest quadrant of Section 5 in Township 29 North, Range 50 East (NW¼ Sec. 5 T29N R50E).

The proposed TSF compound property, APNs #005-530-16 and #005-530-17, is owned by PMR. A legal description of the smaller parcel, APN #005-530-17, that will comprise the RCRA area, EPA ID# NVR000055842, (i.e., the proposed TSF) is provided in Appendix 11-C.

11.7 Access Control – 40 CFR 270.14(b)(19) & 264.14(c)

The proposed TSF compound will occupy approximately five acres, enclosed by a security fence. A complete description of site security is presented in Section 3.

Signs will be posted along the outer perimeter fence at an interval of 50 feet or less. Signs will also be posted at the fence corners and at access gates as described in Section 3.3.

11.8 Injection and Withdrawal Wells – 40 CFR 270.14(b)(19)

There are no known injection or withdrawal wells on-site or within one mile of the proposed TSF, as shown on Figure 11.3-1 in Appendix 11-B. This determination is based on information publically available from the Nevada Division of Water Resources.

11.9 Location of Solid Waste Management Units – 40 CFR 270.14(d)(1)

Solid Waste Management Units (SWMUs) are not applicable in this permit application because no releases have been identified. The general facility layout is shown in Appendix 1-A. All Hazardous Waste Management Units and activities involving the treatment, storage, and management of hazardous waste will be confined inside the proposed TSF Building. The site of the proposed TSF will be located on undisturbed land with no history of hazardous waste or industrial activity.

11.10 Seismic Considerations – 40 CFR 270.14(b)(11), 264.18(a), & 264 Appendix VI

The site will not be located within 3,000 feet of a fault that has had a displacement in Holocene time, as required by 40 CFR 270.14(b)(11). The nearest identified fault is approximately four miles south southeast of the PMR TSF site.

Figure 11.3-1 in Appendix 11-B is a graphical representation of the proposed TSF. A geotechnical evaluation of the site was conducted in 2012. The report findings are contained in Appendix 20-C. A description of the seismic findings is presented in Part II, Section C of the report. Supporting figures are presented in the Sheets appendix following the report narrative. Sheet 4 of 51 shows the location of the identified fault.

All building structures, storage racks, process equipment, and supporting foundations/structures will be designed based on the seismic load criteria presented in Table 11.10-1 below.

Table 11.10-1: Seismic Conditions

Parameter	Value
Mapped Spectral Acceleration - S_s (g):	0.619 (g) for Site D
Mapped Spectral Acceleration - S_1 (g):	0.197 (g) for Site D
Building Occupancy Category	IV
Seismic Importance Factor	1.5

S_s and S_1 are defined in ASCE7-2010 “Minimum Design Loads for Buildings and Other Structures” as:
S_s = Mapped MCER, 5% damped, spectral response acceleration parameter at short periods.

S_1= Mapped MCER, 5% damped, spectral response acceleration parameter at a period of 1s.

11.11 Buildings and Other Structures – 40 CFR 270.14(b)(19)

As currently designed, two buildings will be located within the proposed TSF compound: the proposed TSF Building and the Utility Building, which is not located within the RCRA area.

The total area of the proposed TSF Building will be approximately 33,600 square feet, and is further discussed in Section 1.1.

The Utility Building is discussed in Section 1.5.

12.0 PERSONNEL TRAINING PLAN – 40 CFR 270.14(b)(12) & 264.16

A Personnel Training Plan has been developed for the proposed TSF. The Personnel Training Plan is included as Appendix 12-A of this permit application.

13.0 CLOSURE AND POST-CLOSURE – 40 CFR 270.14(b)(13)

Clean closure is planned for the proposed TSF. Clean closure will be practical, because the design of the proposed TSF does not include any land based units. Clean closure of the site by removal of all structures is presented in the Closure Plan found in Appendix 13-A. Alternative clean closure options may be considered at the time of closure. Closure plan requirements that are applicable only to land based units are indicated as "not applicable" for this permit application.

A closure cost estimate based on demolition removal of the proposed TSF will be conservative for all other options considered, because demolition and complete removal of the facility will require the most planning, resources, and effort.

13.1 Closure Performance Standards – 40 CFR 264.111

The clean closure described in Appendix 13-A meets each of the performance standards identified below.

13.1.1 Minimize Maintenance – 40 CFR 264.111(a)

At the end of closure, the land will be graded to blend with surrounding topography. The area will be seeded with a native mix to promote vegetation. PMR will monitor the site for two years to assess the successfulness of the revegetation effort. Based upon the first year assessment, supplemental seeding will occur at the end of the first growing season, if necessary. Upon successful revegetation of the area, neither future maintenance nor care will be necessary.

13.1.2 Prevent Post Closure Release – 40 CFR 264.111(b) & 264.603

No hazardous wastes are expected to remain after clean closure, because the waste and structures will be removed from the site. With no potential source, a future release will be prevented.

13.1.3 Unit-specific Closure Requirements – 40 CFR 270.14(b)(13), 264.111(c), & 264.112(b)(5)

General closure activities for the specific types of areas and treatment units within the proposed TSF can be found in Appendix 13-A.

13.1.4 Partial Closure – 40 CFR 264.112(b)

Partial closure at the proposed TSF will be closure of one or more units prior to closure of the entire proposed TSF. In this case, partial closure will follow all of the stages for a specific unit outlined in Appendix 13-A. No separate Closure Plan has been developed for partial closure of the proposed TSF.

13.2 Closure Plan Requirements – 40 CFR 264.112(b)

The proposed TSF will be closed in accordance with the requirements for closure of containers and container storage areas, tanks within a secondary containment area, and miscellaneous units that are not land based. Closure of the retort system also includes a burn out stage similar to closure of an incinerator or industrial furnace. The closure details for each type of unit are presented in the Closure Plan (see Appendix 13-A).

13.2.1 Written Plan – 40 CFR 270.14(b)(13) & 264.112

The written Closure Plan is presented in Appendix 13-A of this application. The Closure Plan will be updated per permit requirements. A copy of the Closure Plan will be available at the proposed TSF until closure is complete and has been certified.

The Closure Plan addresses each of the following regulatory requirements outlined in the sections below.

13.3 Final Closure of the TSF – 40 CFR 264.111 & 264.112(b)

The detailed Closure Plan is presented in Appendix 13-A.

13.4 Maximum Inventory – 40 CFR 264.112(b)(3)

As discussed in Section 1.2.1, the FSSMP will allow the proposed TSF to procedurally modify and control the designated hazardous waste storage areas within the proposed TSF Building. Accordingly, calculating the maximum foreseeable inventory of hazardous waste will depend on the arrangement authorized by the FSSMP.

Since the FSSMP is subject to change based on the needs of the proposed TSF, a conservative estimate of the maximum foreseeable hazardous waste inventory has been assumed, and is detailed in Section 13.4.3 and Section 13.4.4 below.

13.4.1 Calomel Leach Process

The maximum design throughput for the calomel leach process is 612,000 pounds of calomel per year. This design throughput value has been used for all the tanks associated with the caustic leach system: caustic soda storage tank, hydrochloric acid storage tank, decomposition tank, waste solution tank, waste solution collection tank, and waste solution settling tank. An additional 7,200 gallons of processed wastewater may be stored in the two waste solution storage tanks.

13.4.2 Retort System with the Oxidation Unit

Limited capacity exists within the retort system. Each retort is designed to process up to 110 gallons (two drums of material) at any given time.

13.4.3 Maximum Stored Elemental Mercury

It is anticipated that the volume of stored elemental mercury will continue to increase while the proposed TSF processes incoming materials, until a National Repository becomes available.

Assuming the FSSMP will only allow elemental mercury to be stored in the elemental mercury storage area, at maximum capacity, with both tiers of the storage racks full, the elemental mercury storage area will be able to store 1,024 pigs (approximately 19,456 gallons of elemental mercury).

13.4.4 Maximum Stored Calomel and Carbon

Calomel

As shown in the building floor plan design in Appendix 1-A, drawing H340940-0000-50-042-0001, a dedicated calomel storage area has been incorporated into the design of the proposed TSF Building. The maximum number of 55-gallon calomel drums that can be stored in this area is 76.

However, the FSSMP may allow drums of calomel to be stored in other storage areas within building envelope of the proposed TSF Building. Assuming a minimal inventory of other stored hazardous waste (i.e., 16 pigs of elemental mercury and four 55-gallon drums of spent activated carbon), the maximum foreseeable number of 55-gallon calomel drums to be stored within the building envelope of the proposed TSF Building should not exceed 330.

Spent Activated Carbon

As shown in the building floor plan design in Appendix 1-A, drawing H340940-0000-50-042-0001, a dedicated spent activated carbon storage area has been incorporated into the design of the proposed TSF Building. The maximum number of 55-gallon drums of activated carbon that can be stored in this area is 60.

However, the FSSMP may allow drums of spent activated carbon to be stored in other storage areas within building envelope of the proposed TSF Building. Assuming a minimal inventory of other stored hazardous waste (i.e., 16 pigs of elemental mercury and four 55-gallon drums of calomel), the maximum foreseeable number of 55-gallon drums of spent activated carbon to be stored within the building envelope of the proposed TSF Building should not exceed 346.

13.4.5 Methods for Removing, Transporting, Treating, Storing and Disposing

The treatment systems will be dismantled and removed from the service area. Foundations and structural supports will be demolished. Heavy equipment will be used to demolish the proposed TSF. Covered dump trucks will transport demolition debris to an appropriate landfill for disposal. Wastewater will be transported using the tanker trucks similar to those that will be contracted to transport water during the life of the proposed TSF.

Disposal of debris will occur as the demolition progresses. The staged removal of demolition debris will minimize the volume of debris at any time during closure. Regular shipments of accumulated waste and debris will minimize the area that can potentially be impacted by demolition activities.

13.4.6 Types of Off-site Waste Management Units to be Used – 40 CFR 264.112(b)(3)

During closure, four different types of management units may be used to dispose of waste from the closure of the proposed TSF. These include: municipal waste disposal landfills, industrial waste landfills, wastewater treatment facilities, and hazardous waste treatment, storage, and disposal facilities.

Typical municipal wastes generated from office activities will be disposed in a municipal landfill. These wastes will be collected for disposal by a commercial waste collection company contracted by the proposed TSF for this purpose.

Industrial waste will be characterized; waste that is not a hazardous waste will be disposed of in an industrial landfill designed for that purpose.

Wastewater will be treated to meet all pre-treatment standards necessary prior to transporting it to an appropriate facility for additional treatment and discharge.

Hazardous wastes will be characterized and a profile sheet will be completed prior to being transported to an appropriately licensed facility for management and disposal.

13.5 Steps to Remove Units – 40 CFR 264.112(b)(4)

General steps to remove equipment from the proposed TSF are details are presented in Appendix 13-A.

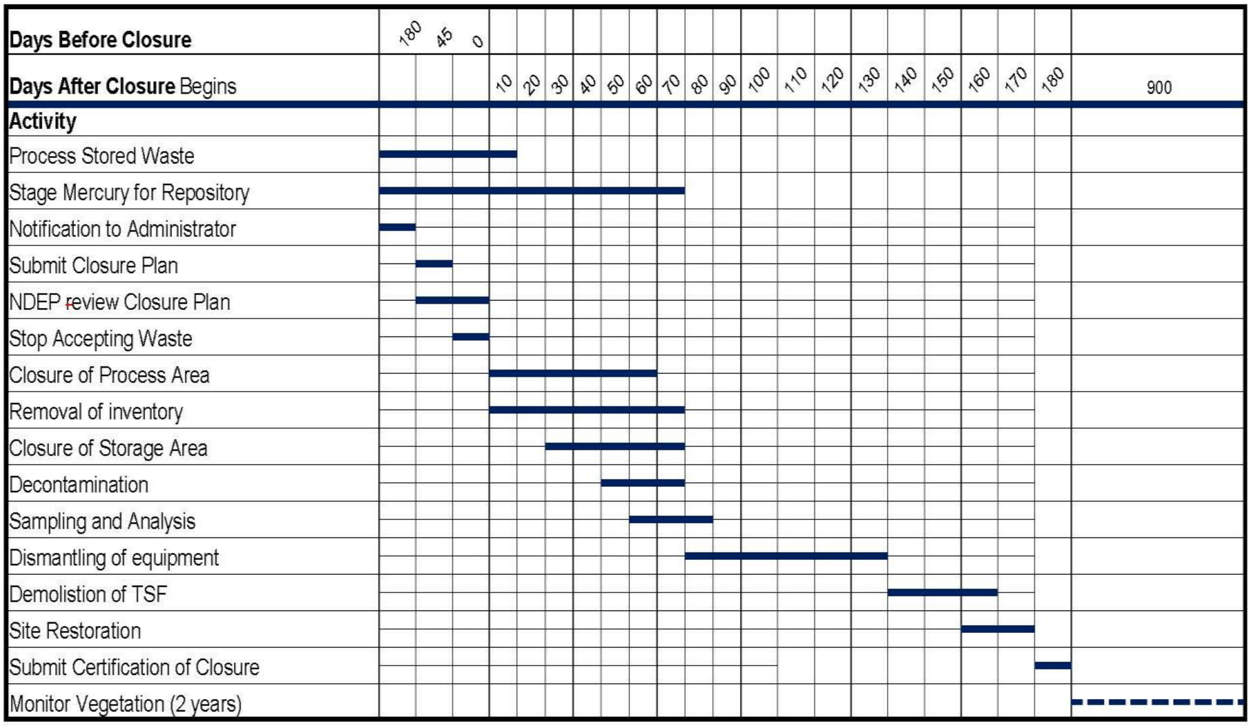
13.6 Other Activities Necessary During Closure – 40 CFR 264.112(b)(5)

All anticipated activities necessary for clean closure of the proposed TSF have been described in the Closure Plan. The closure cost estimate incorporates contingency funds to accommodate unexpected expenses that may arise with clean closure of the proposed TSF.

13.7 Schedule for Closure – 40 CFR 264.112(b)(6)

Closure will be expected to occur over a six month period, with re-vegetation monitoring to continue for twenty-four months thereafter. Table 13.7-1 presents the anticipated schedule for closure of the proposed TSF.

Table 13.7-1: Anticipated Closure Schedule



13.8 Estimate of Final Closure Year – 40 CFR 264.112(b)(7)

The proposed TSF will potentially operate as long as BGNA's US operations produce the hazardous waste for which the proposed TSF is to be permitted. The life expectancy of the proposed TSF is estimated to be 25 years, or longer. It is anticipated that PMR will renew the permit for the proposed TSF in accordance with NDEP's requirements for continuation of an expiring RCRA permit during the life of the proposed TSF.

13.9 Alternative Requirements – 40 CFR 264.112(b)(8)

This section is not applicable to the proposed TSF, because no alternative requirements have been identified.

13.10 Written Post Closure Plan – 40 CFR 264.118(a)

The regulations regarding post closure activities are not applicable to the proposed TSF. Clean closure is planned for the facility. In accordance with clean closure regulations, no post closure is required for the proposed TSF, and a Post Closure Plan is not required.

If it is determined the proposed TSF cannot be clean closed, a post closure management plan will then be developed in accordance with 40 CFR 264.118 and submitted the Administrator of NDEP for approval.

13.11 Post Closure Activities and Frequency – 40 CFR 264.118(b)

This section is not applicable to the proposed TSF, because no post closure activities are planned.

14.0 CLOSED HAZARDOUS WASTE DISPOSAL UNITS – 40 CFR 270.14(b)(14)

This section is not applicable, because there will be no disposal units at the proposed TSF.

15.0 CLOSURE ESTIMATES – 40 CFR 270.14(b)(15)

15.1 Closure Estimate Program

CostPro, a program developed by RS Means for the EPA, was used to estimate the cost of clean closure for the proposed TSF.

15.2 Closure Estimate – 40 CFR 264.142

An initial evaluation of the cost to clean close the facility has been completed. A copy of the CostPro data is provided in Appendix 15-A. When the RCRA permit application for the proposed TSF is determined to be complete, an updated CostPro data file will be provided to NDEP for review. The closure cost estimate will be reevaluated before the issuance of the permit.

15.2.1 Closure Cost Estimate Methodology

The largest determining factor in calculating the closure cost estimate is the quantity of mercury destined for disposal. Since the quantity of mercury destined for disposal can vary depending on the stored hazardous waste arrangement allowed by the FSSMP (see Section 1.2.1), a conservative methodology for calculating the closure cost estimate has been developed. This methodology is described as follows:

While the FSSMP may allow for any number of various arrangements, there are three different arrangements that maximize the foreseeable inventory for each different type of stored hazardous waste; that is to say, one arrangement maximizes the quantity of stored elemental mercury, another maximizes the quantity of stored calomel, and the third arrangement maximizes the quantity of stored spent activated carbon.

A closure cost estimate was calculated for each of these three arrangements. In order to provide the most conservative estimate, the most expensive arrangement (i.e., the arrangement that maximizes the quantity of stored elemental mercury) has been selected as the basis for the final closure cost estimate.

A summary of the closure cost estimate for each of these three arrangements is discussed in Section 15.2.3.

15.2.2 Closure Cost Estimate Summary

The closure cost estimate is divided in sections for each type of permitted unit or area. The container storage section of the estimate includes: the site-wide line items for removal of equipment; transportation and disposal of the equipment; transportation and disposal of the building, and foundation; grading the site; and seeding the site.

The container storage section also includes the standard line items specific to the storage area, which include: removal, transportation, and disposal of the stored waste; demolition of the storage area (e.g., storage racks), decontamination of the area (dry sweep), and sampling and analysis for the area.

Since CostPro does not include a “miscellaneous units” section, closure of the retort system is found in the “boiler and industrial furnace” section. This section includes costs for removing any waste residue present, decontamination of the two units by conducting a 72-hour “burn,” disassembly and removal of the two units and the associated equipment (e.g., dust collector, ductwork, etc.), and sampling and analysis of the equipment and area. Transportation and disposal costs of the equipment are included in the container section and are not duplicated in this section.

The tank section of the estimate includes all storage and processing tanks at the proposed TSF. It also encompasses the filter press and the packed tower SO_2 scrubber. These units did not readily fit in other sections. The tank section includes removal of waste from the tank systems, followed by a purge and flush. This section also includes the standard line items specific to the tanks, which include: removal, transportation, and disposal of the stored waste; demolition of the tank secondary containment, decontamination of the area, and sampling and analysis of the area.

Engineering and Contingency Rates

The closure cost estimate program adds a percentage to the subtotal to account for contingencies and engineering oversight required for a third party to accomplish the work. The engineering oversight cost is estimated at 7% and the contingency is estimated at 20% of the total.

15.2.3 Closure Cost Estimate Values

As discussed in Section 15.2.1, three different closure cost estimates were calculated based on the three different arrangements that maximize the different types of stored hazardous waste allowed by the FSSMP. These arrangements are presented in Table 15.2-1.

Table 15.2-1: Arrangements of Maximum Foreseeable Stored Hazardous Waste Inventory

Quantity	Maximum Foreseeable Stored Hazardous Waste Inventory		
	Arrangement 1	Arrangement 2	Arrangement 3
Number of pigs	1024	16	16
Number of drums of calomel	76	330	4
Number of drums of spent activated carbon	60	4	346

Summaries of the closure cost estimates for Arrangement 1, Arrangement 2, and Arrangement 3 are presented in Table 15.2-2.

Table 15.2-2: Closure Cost Estimate Summary

	Closure Cost Estimate		
Unit or Area	**Arrangement 1**	**Arrangement 2**	**Arrangement 3**
Container Storage Areas	$10,870,926.66	$10,479,428.30	$10,868,739.35
Incinerator/BIFs (Retort)	$39,167.43	$39,167.43	$39,167.43
Tank Systems	$48,669.72	$48,669.72	$48,669.72
Reclamation of Site*	Included above	Included above	Included above
Contingency and Engineering Oversight (27%)†	Included above	Included above	Included above
Total – Approximate	**$10,958,763.81**	**$10,567,265.45**	**$10,956,576.50**

*NOTE: Reclamation of the site is included in the Container Storage Areas closure cost.
†NOTE: Contingency and Engineering oversight costs are included in each Unit or Area subtotal.

Since Arrangement 1 is the most expensive, it has been selected as the basis for the closure cost estimate. Therefore, it is calculated that complete clean closure of the proposed TSF will be approximately $10,958,764. The CostPro data set for this arrangement is included in Appendix 15-A.

15.2.4 Updates to Closure Cost Estimate

The closure cost estimate will be updated with each RCRA permit renewal application for the proposed TSF. The estimate will be revised to reflect current economic conditions at the time of renewal.

15.3 Financial Assurance – 40 CFR 270.14(b)(15) & 264.143

It is anticipated that PMR will provide a corporate guarantee from Barrick Gold Corporation for closure of the proposed TSF. The guarantee will be in place prior to commissioning the proposed TSF.

16.0 POST-CLOSURE ESTIMATES – 40 CFR 270.14(b)(16)

This section is not applicable, because clean closure is planned for the proposed TSF.

17.0 INSURANCE – 40 CFR 270.14(b)(17) & 264.147

Pursuant to 40 CFR 264.147, it is anticipated that PMR will obtain comprehensive general liability coverage for the proposed TSF, which will cover liability and sudden accidental occurrences. Insurance will be in place prior to commissioning the proposed TSF, and equivalent coverage will be maintained for the life of the proposed TSF.

18.0 TOPOGRAPHICAL MAP – 40 CFR 270.14(b)(19)

Drawings and figures have been created that present all items required in 40 CFR 270.14(b)(19). All maps display an orientation arrow (North arrow), map scale, and date. Drawing H340940-0000-07-015-0001 (in Appendix 1-A) is a topographic map with a scale of one inch equal to two hundred feet (1" = 200') of the facility footprint. It presents a 1,000-foot perimeter of the site, the Crescent Valley wind rose (Figure 11.5-1 in Appendix 11-B), legal boundaries of the proposed TSF, access control points, buildings and structures, and barriers for drainage. Drawing H340940-0000-05-015-0002 (in Appendix 1-A) depictsthe locations of the operational units within the proposed TSF Building. Figure 11.2-1 in Appendix 11-B is the most current FIRM panel for the Crescent Valley; Figure 11.3-1 in Appendix 11-B shows the surface waters, surrounding land uses, injections wells, and barriers used for flood control.

No injection wells are shown on Figure 11.3-1 in Appendix 11-B, because there are no injection wells in Section 5 of Range 50 East, Township 29 North, or the eight surrounding sections of land. Likewise, no specific measures have been taken to engineer flood barriers, because the site will be not located within a 100-year flood plain.

19.0 APPROVAL OF PETITION FOR EXTENSION – 40 CFR 270.14(b)(21)

This application is the initial RCRA Permit Application for the proposed TSF; therefore, no extension has been requested. This section is not applicable.

20.0 GROUNDWATER MONITORING – 40 CFR 270.14(c)

As required by 40 CFR 270.14(c) the groundwater system underlying the proposed TSF has been characterized. Copies of the Groundwater Study Plan, Groundwater Study Report, and Geotechnical Survey Report are included in this permit application as Appendices 20-A, 20-B, and 20-C, respectively.

The proposed TSF incorporates a number of design features (e.g., air monitoring, an impermeable membrane under the proposed TSF's foundation, epoxy coatings on concrete surfaces, spill trays, etc.) to detect and protect against releases of hazardous constituents to groundwater.

Based on a thorough review of 40 CFR 270 and 40 CFR 264, it has been concluded that groundwater monitoring is not mandated for the proposed TSF, because no regulated land based unit is associated with the proposed TSF.

Nonetheless, independent of this permit application, the proposed TSF will voluntarily implement a groundwater monitoring program designed to detect releases that could negatively affect groundwater.

It is currently anticipated that the voluntary groundwater monitoring program will consist of up-gradient and down-gradient monitoring wells. This voluntary groundwater monitoring program will be similar to other groundwater monitoring programs designed to analyze Profile I constituents. After establishing baseline conditions, the frequency for subsequent sampling and monitoring will be adjusted as necessary. An annual groundwater monitoring report will be prepared and made available to NDEP.

Based on a thorough review of 40 CFR 270.14(b), it has been concluded that the post-closure groundwater monitoring requirements are not applicable, because the proposed TSF is planned to be clean closed (see Appendix 13-A).

21.0 SOLID WASTE MANAGEMENT UNITS – 40 CFR 270.14(d)(2)

21.1 Identification of SWMUs

This section is not applicable to the proposed TSF. A SWMU is defined under RCRA as any discernible unit at which solid wastes have been placed at any time, regardless of whether the unit was intended for the management of solid or hazardous waste. The site of the proposed TSF is an undisturbed area with no history of industrial or hazardous waste activity. Therefore, there are no past releases to be identified. No SWMUs have been identified. Potential SWMUs, such as the above ground storage tanks, will be located within the proposed TSF compound, but not within the RCRA area.

Therefore, SWMUs are not discussed in this application.

22.0 CONTAINERS AND CONTAINMENT – 40 CFR 270.15, 264.171, & 264.172

This section provides specific information for the design and construction of the container storage areas and container management activities at the proposed TSF.

22.1 Description of Containers – 40 CFR 270.15(a)

22.1.1 Types of Containers

The proposed TSF will be receiving mercury and mercury-bearing materials in containers. It is anticipated that four primary types of containers will be accepted. Dimensions and weights of these types of containers, both dry and full are detailed below in Table 22.1-1.

Table 22.1-1: Summary of Accepted Container Dimensions and Weights

Description	Typical Use	Diameter or Width (in.)	Height (in.)	Dry Weight (lbs.)	Approximate Full Weight (lbs.)
HDPE Drum	Calomel	23	35	22	735
Carbon Steel Drum	Activated Carbon	22 ½	34 ½	48	300
Carbon Steel Pig	Elemental Mercury	20	19 ¾	220	2,420
Carbon Steel Flask	Elemental Mercury	5	13	10	76

Elemental Mercury Containers

Elemental mercury will arrive at the TSF in either pigs or flasks. These containers, illustrated in Figure 22.1-1 below, are made of carbon steel and will be DOT Hazardous Materials (HM) 81 approved. The recommended head space will be maintained in each container to allow for thermal expansion of the mercury.

C-channels welded to the tops of the pigs allow forklifts to easily transport them. The pigs will be robust and will be designed for the physical and chemical properties of mercury. (See Section 1.3 for details of elemental mercury storage.)

The pigs will be designed in accordance with the following:

- *US DOE Interim Guidance on Packaging, Transportation, Receipt, Management, and Long-Term Storage of Elemental Mercury* (2009).
- DOT codes and standards.

- American Welding Society Standard D1.1 – Structural Welding Code – Steel.
- Containers will be stress-relieved prior to use.

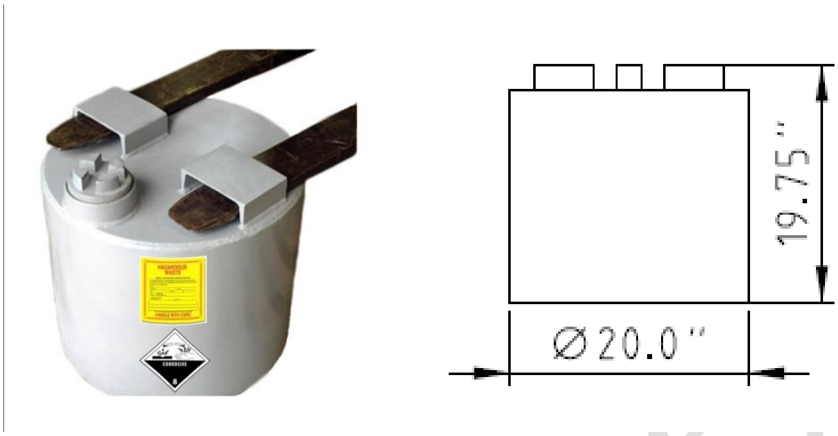


Figure 22.1-1: Elemental Mercury Container, 1-Tonne Pig

In the unlikely event that a pig containing elemental mercury arrives at the facility and has been damaged or punctured (i.e., damaged to the extent that a leak has occurred or is likely to occur), elemental mercury will not be poured into a new container, but instead will be placed directly into a specialized carbon steel container (Figure 22.1-2). The specialized carbon steel container (which at this point would contain the damaged mercury pig) will then be transported by forklift directly to the retort and retorted. As soon as the damaged mercury pig is securely in the dedicated container, the appropriate spill response actions will be carried out, if necessary.

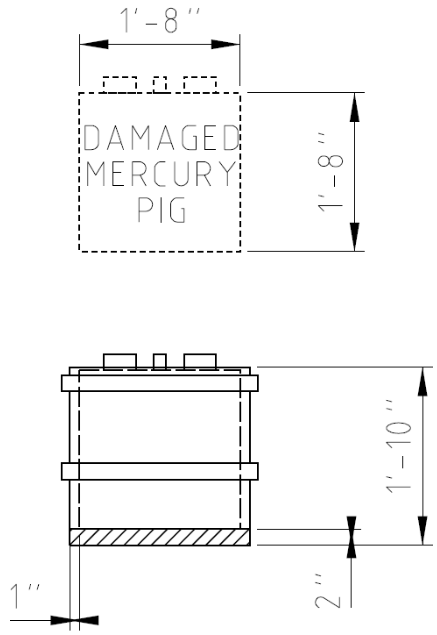


Figure 22.1-2: Dedicated Transfer Container for a Damaged Elemental Mercury Pig

Mercury will occasionally be shipped to the proposed TSF in 76-pound flasks (Figure 22.1-3). Mercury arriving at the proposed TSF in 76-pound flasks will be transferred to pigs for storage. Transferring of elemental mercury from these flasks to pigs is discussed in Section 1.2.1.

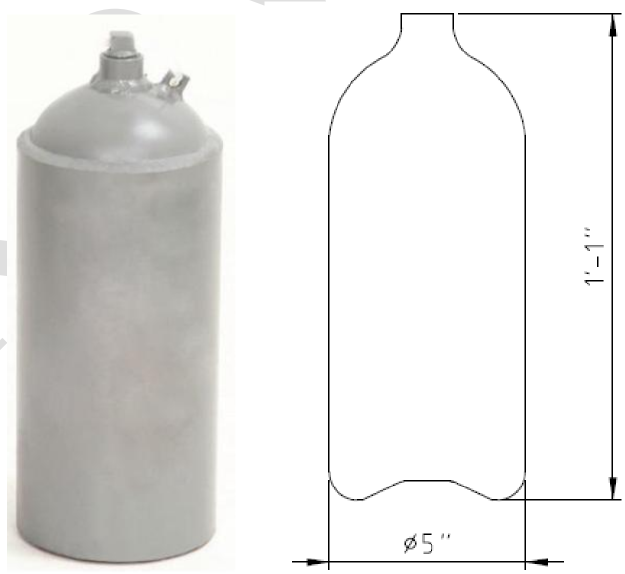


Figure 22.1-3: Elemental Mercury Flask, 76 Pounds

Spent Activated Carbon Drums

Spent activated carbon will arrive at the proposed TSF in 55-gallon, steel drums (Figure 22.1-4 below). If required, the contents of these drums may be emptied into a vendor provided retort tray prior to retorting.

Figure 22.1-4: Steel Drums Containing Spent Activated Carbon, 55-gallon

Calomel Drums

Calomel will typically arrive at the proposed TSF in 55-gallon HDPE drums. Figure 22.1-5 below illustrates an example of a typical 55-gallon HDPE drum that will be accepted at the proposed TSF.

Figure 22.1-5: Calomel Storage Drums, 55-gallon

Larger sized HDPE drums may be used as secondary containment measures when transporting calomel. An example of this type of larger sized HDPE container is a 95-gallon “overpack” drum, and is illustrated in Figure 22.1-6 below. Along with the aforementioned 55-gallon HDPE drums, these containers may also be used as a means to collect hazardous waste when responding to a spill.

Figure 22.1-6: Typical 95-gallon Overpack Drum

22.1.2 Condition of Containers – 40 CFR 264.171

The condition of incoming containers will be evaluated as the shipment is unloaded from the delivery truck. Containers will be checked for dents, leaks, or defects. Management practices will require containers to remain closed during the visual evaluation. Containers in good condition will be staged and transferred to the appropriate storage area within the plant spaces.

Refer to Section 1.2.1 for a detailed description of procedures in the event a breached container is received at the proposed TSF.

22.1.3 Empty Containers – 40 CFR 261.7(b)

After the content of a container is emptied, the container will be rinsed to meet the definition of a RCRA empty container. RCRA empty containers may be reused, at the discretion of the proposed TSF’s Manager to contain the same type of waste.

Containers used to transport and store spent activated carbon (i.e., 55-gallon steel drums) can be placed in the retort to remove any residual mercury and crushed to optimize storage space. They may then be transported off-site for disposal. The polyethylene drums used for calomel transport will be triple rinsed during calomel feed preparation; the cleaned drums can then be returned to the waste generator for reuse.

22.2 Waste Acceptance – 40 CFR 270.14(b)(3) & 264.13

22.2.1 Waste Acceptance Process

The detailed waste acceptance process is presented in the WAP, Appendix 2-A. Containers are expected to be filled, closed, and labeled by the waste generator before being shipped to the proposed TSF. Containers will be accepted at the proposed TSF only when the waste is: compatible with the container, has been authorized in accordance with the proposed TSF's operating permit, and the container has a visible label identifying the contents.

In general, waste acceptance at the proposed TSF will be in accordance with the following:

- Calomel, spent activated carbon, mercury-bearing waste, and elemental mercury will arrive at the proposed TSF in containers, with accompanying manifests.
- The containers will be visually evaluated and unloaded.
- The containers will be staged in the receiving and inspection area.
- Containers will be randomly selected and fingerprinted in accordance with the WAP (see Appendix 2-A).
- If a discrepancy is discovered, the containers will be flagged and placed in a designated staging area until the discrepancy is resolved.
- If the waste is consistent with the profile and manifest, the waste will be received at the proposed TSF and directed to the appropriate storage area.

22.3 Management of Containers – 40 CFR 264.35 & 264.173

When not in use (e.g., being actively processed, inspected, transferred, etc.) containers will normally be stored on steel racks. An aisle space between racks of three feet or greater will be maintained. This aisle width will be sufficient to allow for the unobstructed movement of personnel, forklifts, spill control equipment, and decontamination equipment to any area of the plant spaces in an emergency. Sufficient access exists for inspection, emergency response, and fire protection equipment.

22.3.1 Closed Containers

In storage, the normal condition for containers at the proposed TSF is closed. Containers that contain hazardous waste will be opened only to remove or add waste, or during treatment.

22.3.2 Labeling Containers – 40 CFR 262.30 through 262.32

All containers will be labeled prior to being transported. Transportation will be in accordance with the applicable US DOT regulations.

Containers of elemental mercury intended for storage will be marked with the words, "Elemental Mercury." Calomel containers intended for processing will be marked with the word, "Calomel." Containers of spent activated carbon intended to be processed will be marked with the words, "Spent Activated Carbon."

In addition, the proposed TSF will only accept mercury and mercury-bearing materials from waste generators with the appropriate labels and markings on each container. Each container will be required to display the appropriate marking per NFPA Section 704, including a hazardous waste marking as follows:

"HAZARDOUS WASTE – Federal Law Prohibits Improper Disposal. If found, contact the nearest police, or public safety authority, or the U.S. Environmental Protection Agency."

The waste generator's name and complete address will be required to be clearly legible on the marking.

Each label will also include the EPA Hazardous Waste Code(s) (e.g., D009).

22.3.3 Satellite Wastes Accumulated in the Plant Spaces of the Proposed TSF – NAC 444.8671

Satellites wastes, such as miscellaneous articles that may have been contaminated with mercury (e.g., PPE, gloves, tools, rags, paper, etc.), are expected to be accumulated in the plant spaces. Containers, specifically designated to collect satellite wastes will be located in close proximity to areas where these wastes are expected to be generated; these containers will be identified with labels indicating they contain hazardous waste, and in accordance with NAC 444.8671.

22.3.4 Waste and Container Compatibility – 40 CFR 264.172

The selected containers that are expected to be used at the proposed TSF will be compatible with the hazardous waste(s) they are intended to contain.

22.3.5 Inspections – 40 CFR 264.174

The storage areas are shown in general arrangement drawings provided in Appendix 1-A, and all containers stored in these areas will be inspected in accordance the Inspection Plan as described in Appendix 4-A.

22.3.6 Storage – 40 CFR 264.177(c)

See Section 1.3 for details on elemental mercury storage.

22.4 Number of Containers – 40 CFR 264.171, 264.172, & 264.175

While actual production rates are expected to be less, each year, until a National Repository is available, up to 190 pigs of elemental mercury may be added to storage at the proposed TSF. Assuming maximum production rates are sustained, the proposed TSF will reach its maximum elemental mercury storage capacity in less than 5 ½ years, unless a National Repository begins to accept elemental mercury during that time.

55-gallon HDPE drums will be stored in the calomel storage area. As designed, and during normal operations, the number of calomel drums in storage is not expected to exceed 76. However, as described in Section 1.2.1, the FSSMP may allow for calomel to be stored in other plant spaces. In the event the proposed TSF experiences a greater than normal influx of calomel, additional floor space can be made available, which would allow up to a total of 330 containers to be stored.

55-gallon steel drums of spent activated carbon will be stored in the spent activated carbon storage area. As designed, and during normal operations, the number of spent activated carbon drums in storage is not expected to exceed 60. However, as described in Section 1.2.1, the FSSMP may allow for spent activated carbon to be stored in other plant spaces. In the event the proposed TSF experiences a greater than normal influx of spent activated carbon, additional floor space can be made available, which would allow up to a total of 346 containers to be stored.

55-gallon steel drums containing waste generated from activities at the proposed TSF will be stored in the general storage area. As designed, and during normal operations, the number of stored drums containing this type of waste is not expected to exceed 10. However, as described in Section 1.2.1, the FSSMP may allow for this type of waste to be stored in other plant spaces. In the event the proposed TSF experiences an unexpected increase in production, additional floor space can be made available, which would allow up to a total of 346 containers to be stored. Note: this material is not expected to contain liquids, and it is assumed that in order for 346 containers to be stored, a minimal inventory of all other wastes would have to be kept.

22.4.1 Containers with Free Liquids

Two types of stored materials are expected to contain free liquids: elemental mercury and calomel. Details on the containers for these free liquids are provided in Section 22.1.

Containers with liquids will be stored in storage areas where secondary containment, described in Section 22.5, will be provided.

22.4.2 Aisle Spacing to Allow for Inspection – 40 CFR 264.174

In order to facilitate proper inspection of containers pursuant to 40 CFR 264.174, containers containing hazardous waste will be easily visible from all directions. The aisle spacing for the proposed TSF has been designed to accommodate this consideration. Mounted inspection mirrors may be implemented to assist visibility.

22.5 Description of Secondary Containment – 40 CFR 264.175 & 270.15(a)

The containment system for areas where liquid hazardous waste is designated to be stored will be designed to have sufficient capacity to contain 10% of the total volume of liquid stored or 100% of the volume of the largest container, whichever is greater. The secondary containment system at the proposed TSF will consist of spill trays, bunded areas, sumps, and trenches.

Secondary containment for elemental mercury will be provided by spill trays. Each spill tray is designed to provide secondary containment for a group of eight pigs. The spill tray as depicted in Appendix 1-A, is designed to contain 2,200 lbs of elemental mercury, which is the volume of one pig, and is greater than 10% of the combined volume of eight pigs. A sample calculation is presented as Appendix 22-B.

Additional secondary containment in the plant spaces is provided by bunding. Two discrete secondary containment areas are created by the plant spaces bunding: the storage area and the process area. 95,750 gallons of secondary containment is provided in the storage area by the bunding and area collection sump; and 26,900 gallons of secondary containment is provided in the process area by the perimeter bunding and area collection sump. The epoxy enamel coating on these surfaces is designed to prevent absorption of mercury. See Drainage Arrangement H340940-0000-50-015-0008 provided in Appendix 1-A. Containment volume calculations are included in Appendix 22-B.

The largest type of container that is expected to be stored in the plant spaces will be the drums that contain calomel, which each have a maximum volume of 55 gallons; therefore, the secondary containment volume in the plant spaces is designed to contain 10% of the total expected volume of elemental mercury and calomel that can be stored. At maximum capacity, the total volume of these combined liquids is estimated to be 32,300 gallons. The building envelope of the proposed TSF (i.e., the volume of the bunded area), is designed to provide a secondary containment volume of 122,650 gallons, which is significantly larger than 3,230 gallons (i.e., 10% of the estimated total volume of liquids to be stored in this area).

22.6 Description of Containment System – 40 CFR 270.15 & 264.175(b)(3)

Spent activated carbon containers and calomel containers will be stored in a common storage area. Containers that do not contain free liquids need not be considered in this calculation. For the purpose of calculating necessary containment volume, containers of spent activated carbon will not be included in the inventory of containers with free liquids.

22.6.1 Floor Design – 40 CFR 264.175(b)(1)

The floor in the container storage areas is designed to be free of cracks or gaps and will be sufficiently impervious to contain leaks or spills until the collected material is detected and removed. The floor will be inspected in accordance with the Inspection Plan (see Appendix 4-A).

Consideration of precipitation and run-on volumes for the storage area will not be applicable for the proposed TSF, because the storage areas will be located inside the proposed TSF Building. No precipitation is expected to enter or collect in the container storage areas.

22.7 Description of Drainage in Storage Areas – 40 CFR 270.15 & 264.175

See Drainage Arrangement H340940-0000-50-015-0008 in Appendix 1-A for details on drainage in storage areas.

22.8 Management of Accumulated Liquids – 40 CFR 270.15 & 264.175

22.8.1 Identification

Inspections of the storage area will be conducted to identify the presence of liquids in the secondary containment in accordance with the Inspection Plan (see Appendix 4-A).

22.8.2 Collection and Removal – 40 CFR 270.15(a)(5) & 264.175(b)(5)

In the unlikely event liquid hazardous waste inadvertently escapes its primary container, it will be collected in the curbed drainage and sump network (see Appendix 1-A). A typical sump design is presented in Appendix 1-A. A portable sump pump may then be used to remove standing liquid from the sump, and appropriate spill response measures can be taken. Depending on the type of liquid (i.e., calomel or elemental mercury), it may be added to the Decomposition Tank, retorted, or placed in a pig.

22.8.3 Analysis

Liquids recovered from a collection sump will be presumed as hazardous waste, and will be managed in accordance with the proposed TSF procedures for wastes of that type. Wastes sent off-site for treatment and/or disposal will be characterized.

22.9 Management of Run-on – 40 CFR 270.15(a)(4) & 264.175(b)(4)

The storage areas will be enclosed within the proposed TSF Building. The building roof and walls are designed to prevent precipitation run-on to the storage area.

22.10 Storage without Free Liquids – 40 CFR 264.175(c)

22.10.1 Spent Activated Carbon Storage Area

Spent activated carbon will be stored in a shared area with calomel. A description of the area and the management practices is presented in Section 22.4. Secondary containment is included in the shared storage area, although not required for the spent activated carbon itself.

22.10.2 Demonstrate No Free Liquids – 40 CFR 270(15)(b)(1) & 264.175(c), & 264.314

Spent activated carbon is not expected to contain free liquids. Annually, the spent activated carbon will be tested for liquids using the Paint Filter Test (SW846 Method 9095B). The processes used by the waste generators that produce spent activated carbon, as well as the processes that will produce spent activated carbon at the proposed TSF, are expected to operate within known variations. Management practices will be implemented to allow advanced notice of changes to these processes. In the event a significant change occurs, a full characterization will be done on the new waste stream. In the absence of significant change, an annual characterization of the spent activated carbon waste stream is expected to be sufficient.

22.11 Special Requirements for Ignitable, Incompatible, or Reactive Wastes – 40 CFR 270.15, 261.23, 264.176, & 264.177

22.11.1 Ignitable or Reactive Wastes – 40 CFR 261.21 & 261.23

No ignitable or reactive wastes will be accepted at the proposed TSF. No special accommodations have been incorporated into the proposed TSF design to allow acceptance of ignitable or reactive wastes.

Explosives will not be accepted at the proposed TSF. Use of water throughout the proposed TSF will be minimized. The proposed TSF will not be connected to a municipal water treatment plant, and therefore, minimizes the introduction of water. Water will be transported to and from the proposed TSF. It will be a priority of the process design and operation to limit water usage.

22.11.2 Incompatible Wastes – 40 CFR 264.17(b), 264.177, & 270.15(b)

The mercury and mercury-bearing materials that will be accepted by the proposed TSF are not incompatible wastes.

Incoming Materials

Waste generators (who send mercury and mercury-bearing materials to the proposed TSF) will be responsible for placing waste streams in appropriate containers. The proposed TSF will inspect and receive these wastes as described in Section 1.2.1.

No material that is incompatible with the primary materials to be processed at the proposed TSF will be accepted.

Wastes Generated at the Proposed TSF

Similar wastes generated at the proposed TSF may be placed in the same container, provided that the container itself is not made from an incompatible material; incompatible wastes will not be mixed or placed in the same container. The compatibility chart (see Appendix 2-B) will be used to determine compatibility.

The WAP (Appendix 2-A) presents the procedure for cleaning and reusing containers at the proposed TSF.

22.12 Air Emission Standards – 40 CFR 270.15(e), 264.179, & 264.1086

Independent of this application, the proposed TSF will pursue the applicable air permits through NDEP, Bureau of Air Quality. The proposed TSF will comply with the air emission standards established in the issued air permit. Additionally, the proposed TSF will conform to the air emission standards of Subpart CC of 40 CFR Part 264, as applicable.

Management practices at the proposed TSF will be implemented to satisfy OSHA standards. Mercury concentration in the air of the plant spaces is expected to be very low, because pigs and other containers will be covered at all times when not actively being used. The mercury concentration in the air of the plant spaces will be continuously monitored and recorded.

No detectable amount of mercury vapor is expected to be present in the Office Area.

22.13 Closure – 40 CFR 264.178

All containers will be removed from storage and transported off-site during the initial stages of closure. Upon closure of the proposed TSF, hazardous waste will be removed and managed appropriately. Procedures for closure are detailed in Section 13 of this permit application.

23.0 TREATMENT AND STORAGE TANKS

Mercury-bearing wastes are designed to be treated in tank systems at the proposed TSF. Tanks will also be used to store caustic soda solution, hydrochloric acid, process waste solutions, process water, domestic water, diesel, oxygen, and nitrogen. Tanks at the proposed TSF will be selected to be compatible with the material(s) intended to be stored or treated in them. Tanks at the proposed TSF will be above ground storage tanks (ASTs) of various sizes; no underground storage tanks will be used.

Tanks will be located in three areas. The water supply will be received and stored in two tanks located in the Utility Building, adjacent to the proposed TSF Building (not within the RCRA area). The Fire Water Storage Tank and the Water Storage Tank have been designed with sufficient capacity and free board to prevent overflow.

The oxygen, nitrogen, and diesel storage tanks will not be located inside the proposed TSF Building. These tanks are not regulated under RCRA and are not included in this permit application. The tanks will be managed in accordance with the hazardous materials requirements applicable to each substance.

Reagent storage tanks and treatment tanks associated with the treatment and management of mercury-bearing materials process will be located inside the proposed TSF Building. The caustic soda and hydrochloric acid tanks will be managed by administrative controls (SOPs) to prevent them from being overfilled.

The Caustic Soda Storage Tank is shown in Figure 23.0-1 and the Hydrochloric Acid Storage Tank is shown in Figure 23.0-2.

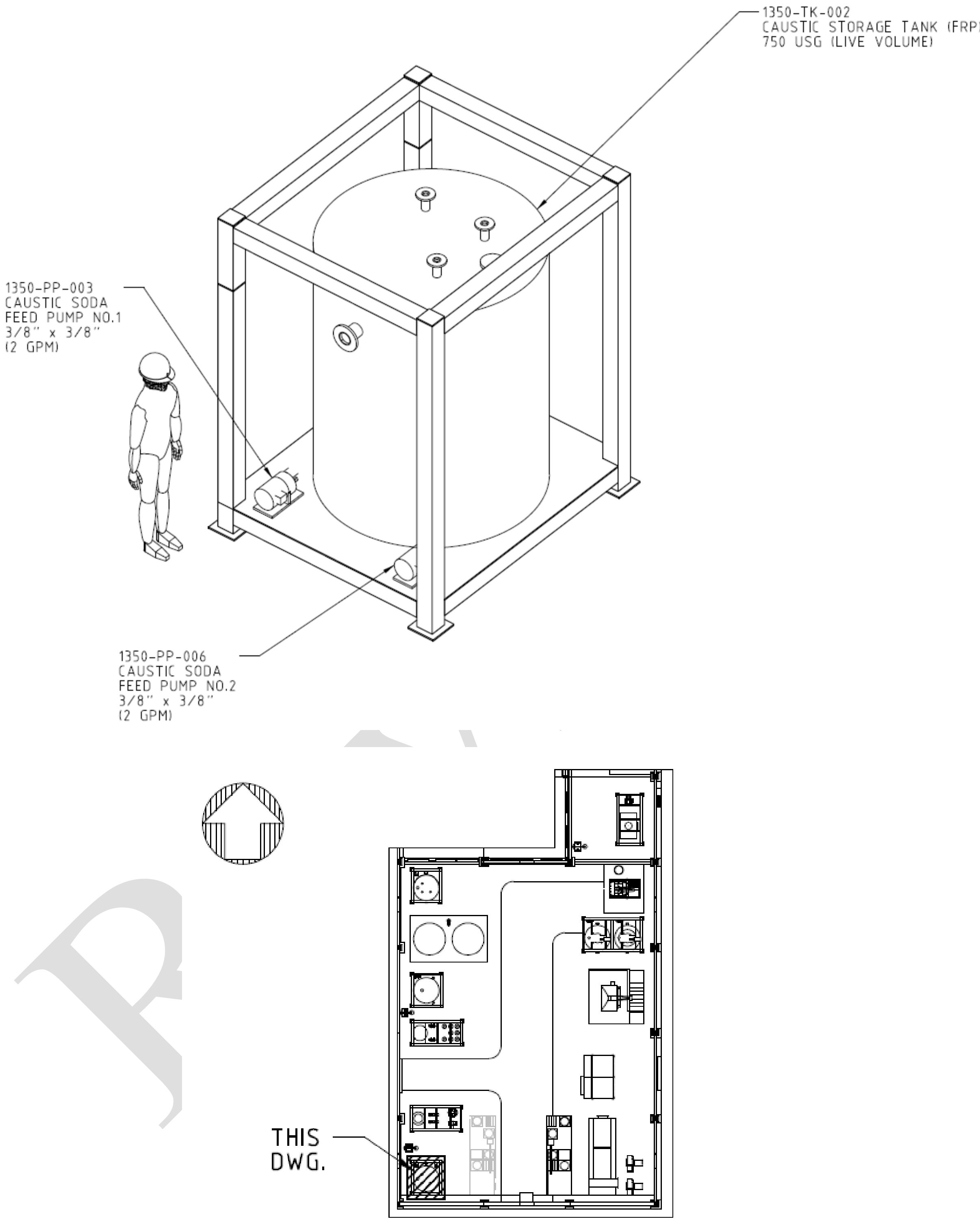


Figure 23.0-1: Caustic Storage Tank and Location in Process Area

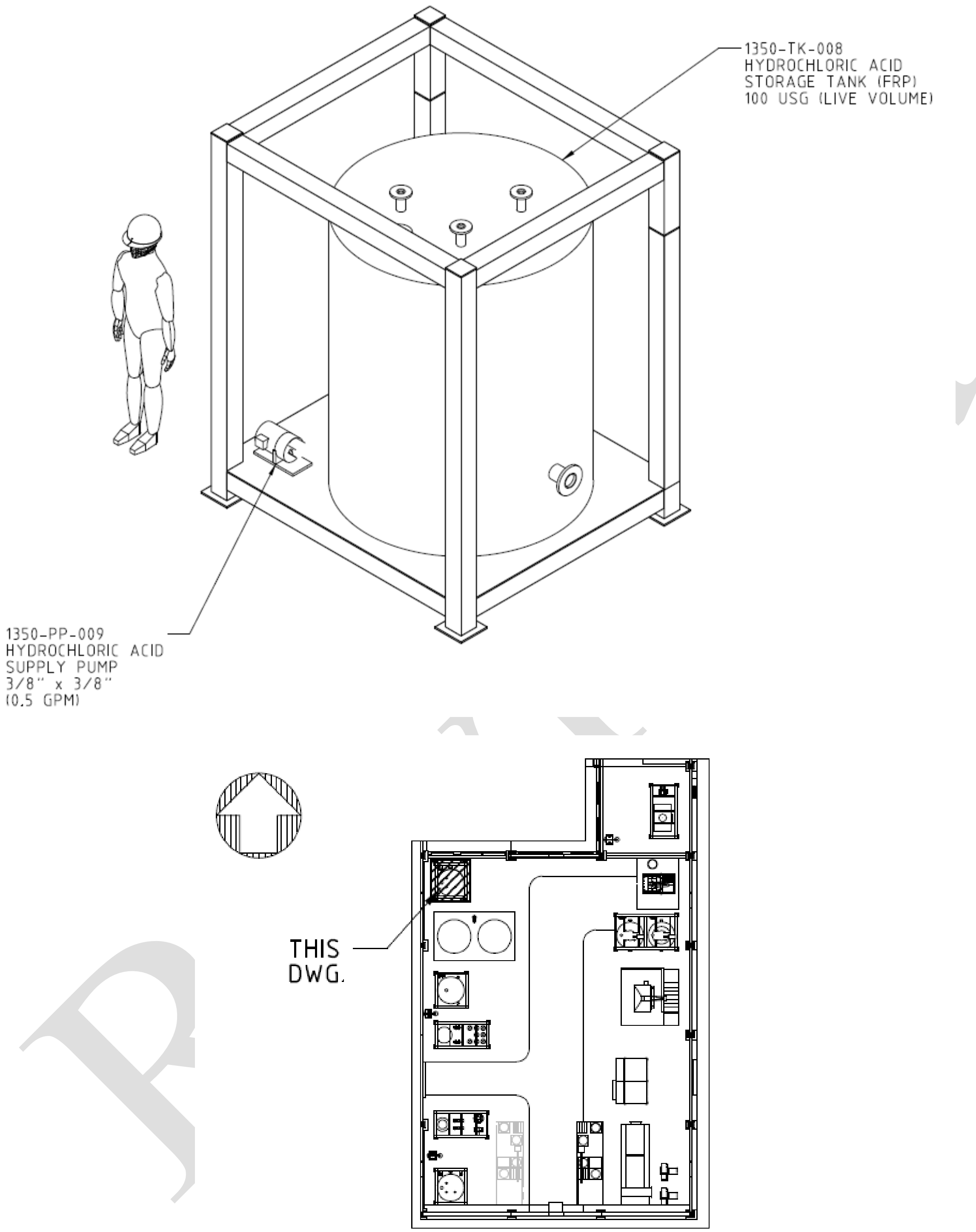


Figure 23.0-2: HCl Tank and Location in Process Area

Upon installation, tanks will be certified by a Professional Engineer licensed in Nevada to be leak tight.

Tank alarms will be provided in the Control Room to notify personnel when the tank levels are above normal levels. Furthermore, interlocks will be provided from the level measurement transmitters, and are designed to stop flow automatically upon detecting high levels.

While unlikely to occur, a network of epoxy coated concreted curbs, trenches, and sumps is designed to collect fluids if a tank overflows or leaks (see H340940-0000-50-015-0008 in Appendix 1-A). High levels in the sumps will be annunciated in the Control Room. Fluids that collect in these sumps will be managed as discussed in Section 22.8.2 and Section 22.8.3.

The ASTs will be situated such that the tank may be visually inspected. They will be fixed in place on steel frame skids and provided with secondary containment for at least 100% of the largest tank volume within the area.

23.1 Tanks

All tanks will be covered. Tank systems will be designed to prevent the release of any hazardous materials to the environment. Tanks handling hazardous materials will be manufactured of FRP. Tanks will be selected based on suitability for handling of the process fluid. FRP tanks will be built in accordance with the applicable ASME standards. Tank strength and wall thickness are designed to be sufficient for the process fluid(s) intended to be contained in them, and designed to withstand the pressures, temperatures, and stresses of day-to-day operations. Table 23.1-1 identifies the tank dimensions, capacities, and their locations at the proposed TSF.

Table 23.1-1: Specifications for RCRA Tanks and Reagent Storage Tanks

Tank	Dimensions	Material of Construction	Design Capacity (gallons)	General Location
Caustic Soda Storage Tank*	5 ft. D x 7.5 ft. H	FRP	750	Process Area
Hydrochloric Acid Storage Tank*	3 ft. D x 5 ft. H	FRP	100	Process Area
Decomposition Tank	5 ft. D x 6 ft. H	FRP	400	Process Area
Waste Solution Tank	5 ft. D x 6 ft. H	FRP	400	Process Area
Waste Solution Collection Tank	5 ft. D x 6 ft. H	FRP	400	Process Area
Waste Solution Settling Tank	3.5 ft. D x 6.5 ft. H	FRP	300	Process Area
Waste Solution Storage Tank #1	7.5 ft. D x 15 ft. H	FRP	3,600	Process Area

Tank	Dimensions	Material of Construction	Design Capacity (gallons)	General Location
Waste Solution Storage Tank #2	7.5 ft. D x 15 ft. H	FRP	3,600	Process Area
Sanitary Wastewater Collection Tank	10 ft. L x 10 ft. W x 9 ft. H	Concrete	5,000	East of the proposed TSF Building
Water Storage Tank	11 ft. D x 12 ft. H	FRP	7,150	Utility Building (outside of the RCRA area)
Fire Water Storage Tank	81 ft. L x 63 ft. W x 15 ft. H	Concrete	240,000	West of Utility Building (outside of the RCRA area)

*This is reagent storage tank; therefore, it is not regulated under RCRA.

23.1.1 Retort and Retort Off-Gas

The retort will be provided as a self-contained vendor package. See Section 1.2.3 for a description of the retort system.

The retort off-gas will pass through the SO_2 scrubber, which is also a self-contained vendor package. See Section 1.2.4 for a description of the SO_2 Scrubber system.

23.1.2 Calomel Caustic Leach Circuit

Calomel slurry will pumped from the calomel feed preparation station into the Decomposition Tank (see Figure 23.1-1). The caustic leach circuit is designed as a batch operating process, and will not require a continuous feed interlock.

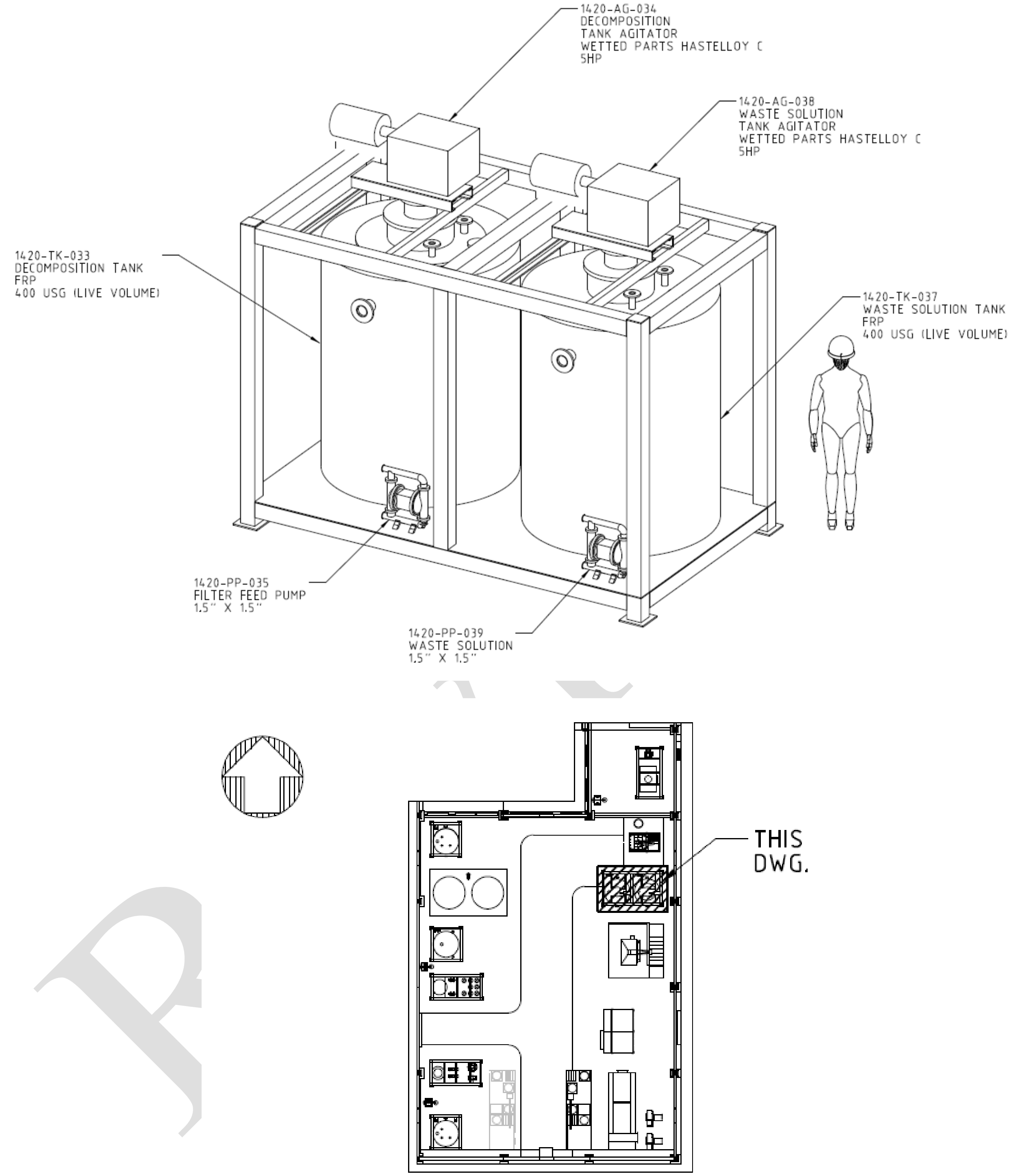


Figure 23.1-1: Decomposition & Waste Solution Tank and Location in Process Area

The Decomposition Tank will normally contain concentrated caustic solution from the Caustic Soda Storage Tank. As part of the automated batch process, once the calomel has been decomposed in the Decomposition Tank, (forming salt, mercury, and mercuric oxide in solution), it is then pumped to a filter press for physical separation. See Figure 1.2-3 for a sketch of the filter press. Filter Press vendor specifications are included in Appendix 30-A.

After the filter press completes its cycle, the filtrate from the filter press is then pumped into the Waste Solution Tank (see Section 1.2).

23.1.3 Waste Solution Treatment Circuit

Caustic leach waste solution will be treated in the waste solution treatment circuit in the Waste Solution Settling Tank. The underflow slurry from the Waste Solution Settling Tank containing mercury precipitants may be periodically pumped to the Decomposition Tank located in the calomel caustic leach circuit.

The process is designed to allow mercury to precipitate out of the settling tank so it can be pumped to the Decomposition Tank.

The clarified waste solution from the Waste Solution Settling Tank may be periodically pumped through activated carbon columns to remove any residual mercury. After this occurs, the polished waste solution is then sent to the Waste Solution Storage Tank(s) (see Section 1.2.7).

Process waste solution from sources other than the calomel caustic leach circuit may be collected in the Waste Solution Collection Tank (see Figure 23.1-2).

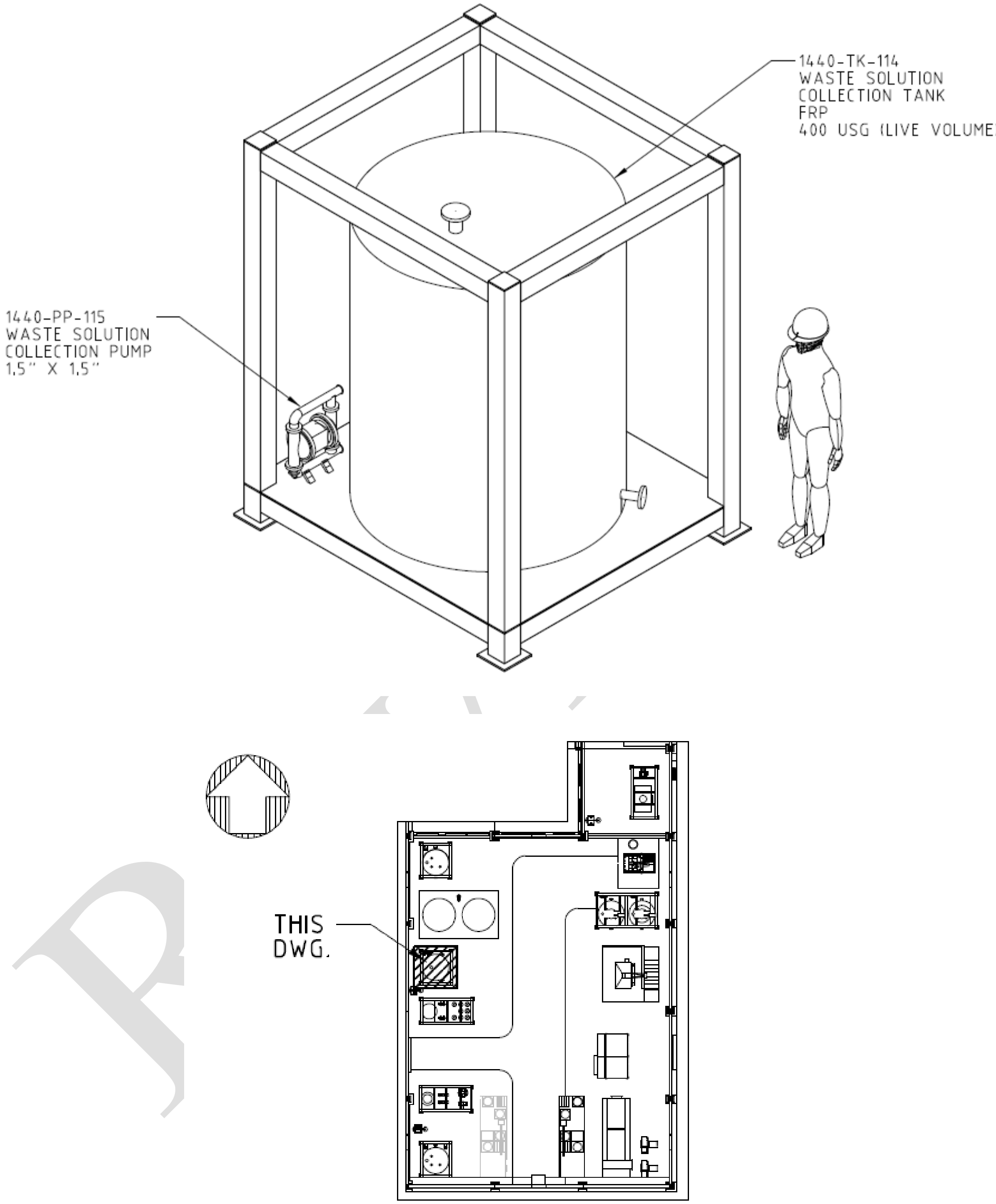


Figure 23.1-2: Water Collection Tank and Location in Process Area

Once the waste solution has been treated, it may be pumped to the Waste Solution Storage Tanks (see Figure 23.1-3).

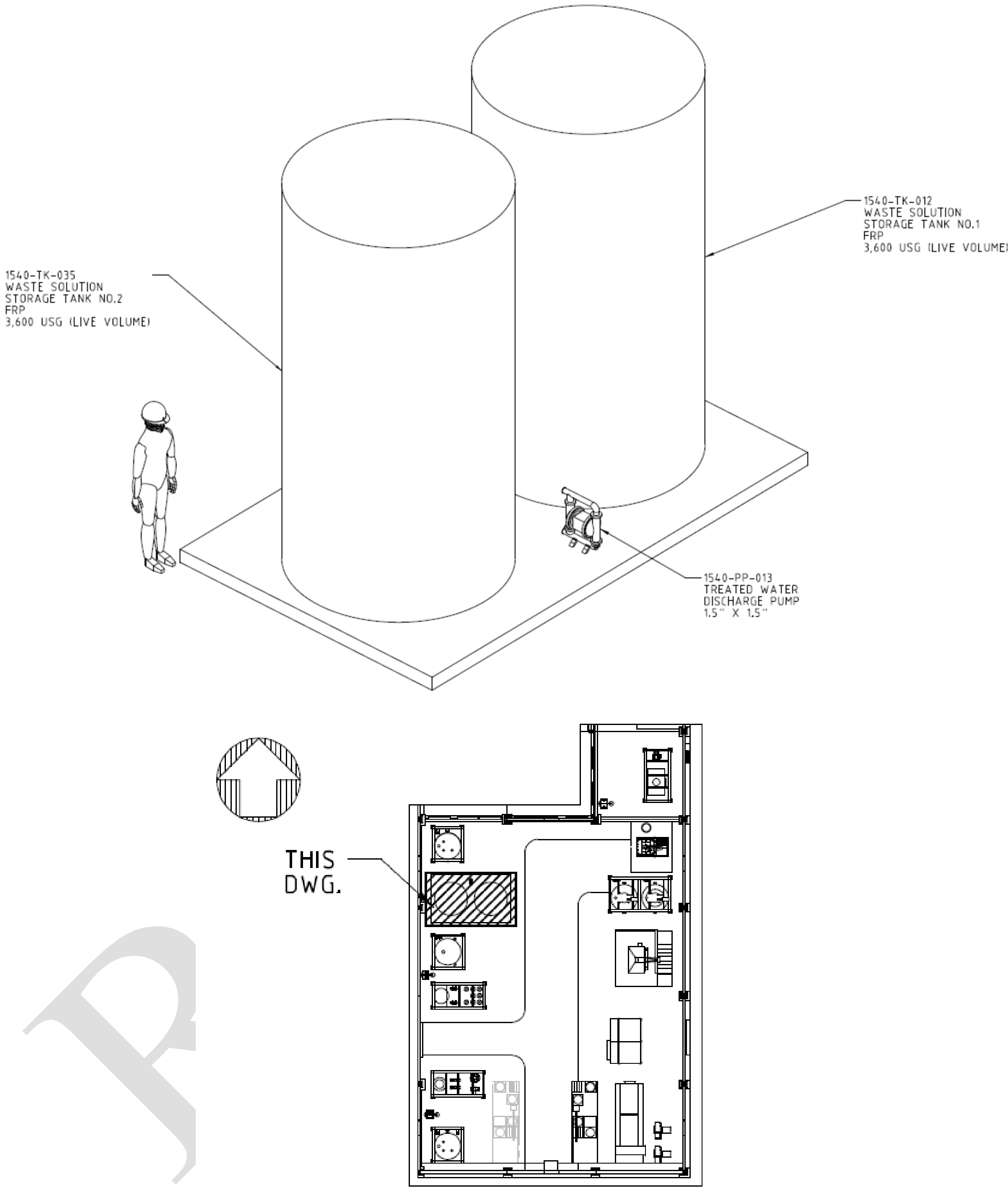


Figure 23.1-3: Waste Solution Storage Tanks and Location in Process Area

Due to the wet nature of the caustic leach process, dust is not expected to be significant. The multi-staged carbon filtration system is designed to remove moisture, acid, and mercury vapors present in the air. This concept is shown in Figure 23.1-4 below.

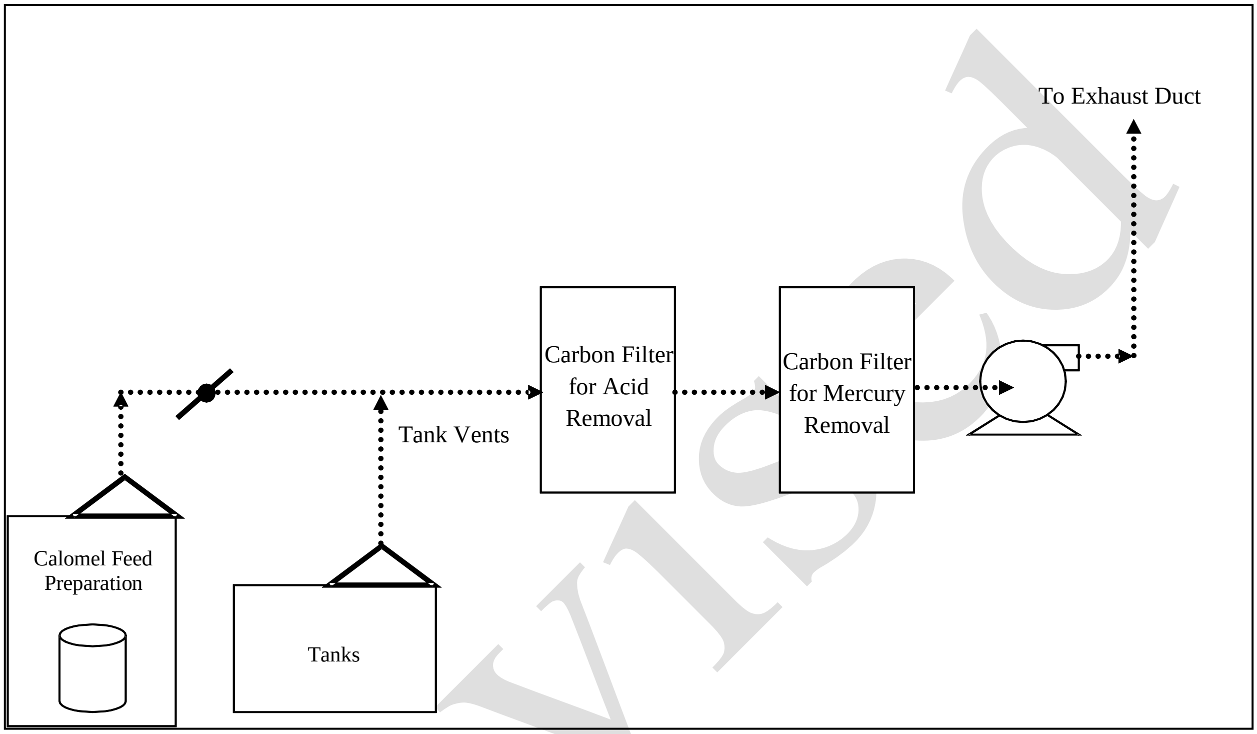


Figure 23.1-4: Ventilation System Concept

23.1.4 Tank Off-Gas Conditioning

The tank off-gas from the Waste Solution Storage Tank, Waste Solution Treatment Tank, and the Caustic Leach Circuit is designed to be scrubbed via two carbon columns (see Figure 1.2-9). After being scrubbed in the carbon columns, the off-gas can be discharged through the exhaust duct. A detailed diagram of the exhaust gas is included in the Process Flow Diagrams in Appendix 1-C.

23.1.5 Water and Sanitary Water Tanks

A municipal water supply tanker will bring domestic water to the proposed TSF for both the Water Storage Tank and the Fire Water Storage Tank, which are both located in the Utility Building (see H340940-0000-50-042-0003 in Appendix 1-A). The Fire Water Storage Tank is also designed to receive fresh water from other sources via supply tanker.

The Water Storage Tank will supply water for the processes and for domestic users. Fire water will be pumped from the Fire Water Storage Tank to the sprinkler system in case of a fire emergency. The Fire Water Storage Tank is an above ground concrete holding tank (see Section 1.5.5).

Sanitary wastewater is discussed in Section 1.5.6.

23.2 Secondary Containment Systems

The secondary containment system consists of spill trays, bunded areas, and the proposed TSF Building envelope itself. The Hydrochloric Acid Storage Tank and the Caustic Soda Storage Tank will be equipped with a secondary containment sized to hold the entire contents of the primary tank in the event of a rupture.

All tanks located in the process area will be installed on skids outfitted with bunding to contain any minor leaks. In the unlikely event of a tank rupture, gravity will force spilled fluids to drain via a trench system to a sump at the process area floor level (see H340940-0000-50-015-0008 in Appendix 1-A).

The sump will be sized to contain the entire volume of the largest tank or 10% of the total volume of tanks in the containment area, whichever is greater. The trench and sump system is designed to be epoxy coated, free of cracks and gaps, and impermeable to all process fluids. The trench system will be dry during normal operation at the proposed TSF, making the entire volume available to contain a spill.

23.3 Assessment of Existing Tank System's Integrity – 40 CFR 264.191

As a new facility, there are no existing tank systems. This section is not applicable to the proposed TSF.

23.4 Design and Installation of New Tank Systems or Components – 40 CFR 270.16(f) & 264.193

Proper handling techniques will be used in order to prevent damage to the systems during installation. All tanks and ancillary equipment will be tested for tightness prior to being placed into use. If a tank system is found not to be tight, it will be repaired or replaced.

Upon completion of construction of the proposed TSF, a written assessment will be provided to NDEP that will address the condition of each tank's foundation and structural support. The assessment will also document the integrity of each tank, and its compatibility to contain wastes to be treated, stored, and managed at the proposed TSF. Each tank system will be certified by a qualified Professional Engineer attesting that the tank system has sufficient structural integrity and is acceptable for storing and treating the hazardous waste for which it is intended. The certification will be maintained in the operating record.

23.5 Containment and Detection of Releases – 40 CFR 264.193

Secondary containment and leak-detection systems are common industry measures of ensuring that a spill resulting from a tank leak or during product transfer is quickly halted and does not result in a significant release. The secondary containment at the proposed TSF will be constructed of an impervious surface that has the structural integrity to support the tanks contained within the area. The construction materials and sealant will be selected to be compatible with the materials to be stored.

Where automated leak detection is not integral to the design of the tank system, inspections will be conducted in accordance with the Inspection Plan (see Appendix 4-A).

23.6 General Operating Requirements – 40 CFR 264.194

Management protocols will be implemented to prevent hazardous wastes and treatment reagents from being placed in a tank system if they could cause the tank, its ancillary equipment or the containment system to rupture, leak, corrode, or otherwise fail.

23.6.1 Overfill Prevention

Spill and overfill prevention controls have been incorporated into the design of the proposed TSF. Care will be taken to prevent overfilling of tanks by providing additional 20% of the tank volume as reserve storage capacity to accommodate fluctuations in operations. The level of the material in the tank will be noted in accordance with the Inspection Plan (see Appendix 4-A).

Table 23.6-1 presents the operating capacity and the calculated tank capacity for the process tanks at the proposed TSF. Pneumatic, tank mounted shutoff controllers will be installed on these tanks, and are designed to execute a high level shutoff of incoming liquids. All shutoff valves will be field-proven controls and use fail-safe and redundant mechanisms to ensure that the pumping system can be reliably switched off after the High Level Alarm has been triggered, but before the shutoff capacity is reached.

Table 23.6-1: Tank Capacities and Level Controls

Tank	Design Capacity (gallons)	Maximum Capacity (gallons)	Permit Limit (gallons)	High Level Alarm (gallons)	Shutoff Level (gallons)
Caustic Soda Storage Tank*	750	1,100	880	946	990
Hydrochloric Acid Storage Tank*	100	265	212	228	239
Decomposition Tank	400	880	704	757	792
Waste Solution Tank	400	880	704	757	792
Waste Solution Collection Tank	400	880	704	757	792
Waste Solution Settling Tank	300	470	376	404	423
Waste Solution Storage Tank #1	3,600	4,960	3,968	3,412	4,464
Waste Solution Storage Tank #2	3,600	4,960	3,968	3,412	4,464

* As a product storage tank, this tank is not subject to RCRA regulations.

23.7 Inspections – 40 CFR 264.192(b), 264.195, 270.14(b) and 270.16

Inspection details are presented in Section 4 and Appendix 4-A. Tanks will be placed in designated areas with sufficient space separating each tank so that the inspector can observe all sides of each tank, and connected piping. Tanks and containment areas will be routinely inspected for leaks, drips, or other indications of fatigue and/or failure. The inspection will include identification of cracks, corrosion, or damage to the tank, ancillary equipment, or containment surfaces. Proper labels, locks, emergency valves, and other safety devices will also be checked during each inspection.

23.8 Response to Leaks or Spills and Disposition of Leaking or Unfit-for-Use Tank Systems – 40 CFR 270.16(i), 264.196

The first priority when a release from a tank system occurs will be to secure the source. Spill containment and cleanup materials will be located in the process area. If a tank system or secondary containment system has a leak or is unfit for use, it will be removed from service.

Within 24 hours of detection, the tank will be emptied. All containment areas will be cleaned before treatment and processing operations will be allowed to resume. The tank system will not be placed back into service until it has been leak tested.

In the unlikely event there is a release from a tank system, all containment areas affected by the release will be cleaned and available for use before placing the tank system back into service. The system will not be placed into service until it has been leak tested.

The site Contingency Plan address spill response measures, and can be found in Appendix 6-A.

23.9 Closure – 40 CFR 264.197

Closure details are presented in Section 13. In general, tanks and vessels will be drained of liquid. If solids are present, they will also be removed. The drained liquid will be transported to an appropriate facility for disposal. Each tank system will be dismantled into manageable sections and disposed of at an appropriately licensed facility.

Tanks are located within the proposed TSF in areas where secondary containment is provided. No contamination of soil from a tank system is expected at the proposed TSF.

23.10 Special Requirements for Ignitable or Reactive Waste – 40 CFR 264.198 & 270.16(j)

No ignitable or reactive wastes will be stored at the proposed TSF.

23.11 Special Requirements for Incompatible Wastes – 40 CFR 264.199 & 270.16(j)

Tanks of incompatible hazard classes will be separated by physical barriers or a minimum of 26 feet to separate spills and prevent mixing of incompatible materials. The Caustic Soda Storage Tank and Hydrochloric Acid Storage Tank will be stored on separate skids in the process area. The Caustic Soda Storage Tank is located in the southwest corner of the process area while the Hydrochloric Acid Storage Tank is located in the northwest corner of the area. No other incompatible material streams will be used at the proposed TSF.

23.12 Air Emission Standards – 40 CFR 264.200, 264.1030, 264.1050, 264.1080, 270.16, 270.24, 270.25, & 270.27

A review of 40 CFR 264.1080 (Subpart CC) and 40 CFR 270.27 have been completed to determine this section is not applicable to the proposed TSF, because no organic materials are managed at the proposed TSF.

23.13 Recordkeeping

A recordkeeping system will be maintained on-site. Permanent records will be kept for a minimum of three years.

24.0 SURFACE IMPOUNDMENTS – 40 CFR 270.17, 270.10(j), & 264.220 Subpart K

Based on a thorough review of 40 CFR 264.220 (Subpart K), 40 CFR 270.17, and 40 CFR 270.10(j), it has been concluded that this section is not applicable to the proposed TSF, because no unit that fits the description of surface impoundment will be associated with the proposed TSF. Therefore, no exposure information is included in this permit application.

25.0 WASTE PILES – 40 CFR 270.18 & 264.250 Subpart L

Based on a thorough review of 40 CFR 264.250 (Subpart L) and 40 CFR 270.18, it has been determined that this section is not applicable to the proposed TSF, because no unit that fits the description of waste pile will be associated with the proposed TSF.

26.0 INCINERATORS – 40 CFR 270.19 & 264.340 Subpart O

Based on a thorough review of 40 CFR 264.340 (Subpart O) and 40 CFR 270.19, it has been determined that this section is not applicable to the proposed TSF, because no unit that fits the description of incinerator is associated with the proposed TSF.

27.0 LAND TREATMENT - 40 CFR 270.20 & 264.270 Subpart M

Based on a thorough review of 40 CFR 264.270 (Subpart M) and 40 CFR 270.20, it has been determined that this section is not applicable to the proposed TSF, because no unit that fits the description of land treatment is associated with the proposed TSF.

28.0 LANDFILLS – 40 CFR 270.21, 270.10(j), 264.300 Subpart N

Based on a thorough review of 40 CFR 264.300 (Subpart N), 40 CFR 270.21, and 40 CFR 270.10(j), it has been determined that this section is not applicable to the proposed TSF, because no landfill is associated with the proposed TSF. Therefore, no exposure information is included in this permit application.

29.0 BOILERS/INDUSTRIAL FURNACE - 40 CFR 270.22 & 266.100 Subpart H

Based on a thorough review of 40 CFR 266.100 (Subpart H) and 40 CFR 270.22, it has been determined that this section is not applicable to the proposed TSF, because no boiler or industrial furnace will be associated with the proposed TSF.

30.0 MISCELLANEOUS TREATMENT – 40 CFR 270.23 & 264.600 Subpart X

Two treatment systems will be permitted as miscellaneous treatment unit systems at the proposed TSF: the retort, along with an associated afterburner (defined as an “oxidation unit” under the RCRA regulations), as well as the caustic leach treatment filter press. These are not regulated under other subparts of the RCRA regulations and are described in this section.

Note: the oxidation unit referenced in this section does not refer to the oxidation reactor (tank) for the SO_2 scrubber bleed. There is a separate tank to oxidize the bleed from the SO_2 scrubber, which is not defined as miscellaneous treatment.

30.1 Retort – 40 CFR 270.23(a), 270.23(d), & 264.601

The retort will be the primary treatment unit to reclaim elemental mercury from mercury-bearing materials accepted for treatment at the proposed TSF, as well as for mercury-bearing wastes generated by the proposed TSF. The retort does not meet the definition of an incinerator, boiler, or industrial furnace, because it is an electric thermal treatment unit with no flame. Mercury-bearing materials are heated in the retort and the mercury is recovered as it vaporizes and separates from the feed, rather than being destroyed.

The retort will be located in the process area (see Section 1.2.3) followed by the afterburner located in the process area.

Retorting is an effective means to recover mercury. The retort is designed to recover elemental mercury with a purity content of 99.5% or greater.

30.1.1 Retort Description – 40 CFR 270.23(a) & 264.601

The retort circuit is primarily designed to treat spent activated carbon and filter cake from the calomel treatment caustic leach circuit described in Section 1.2.2. The retort may also treat other mercury-bearing materials.

Dimensions of the retort circuit are 13.6 feet long by 8.1 feet wide by 12.4 feet tall. The system includes the two retort domes, a condenser, an air cooling unit, and a controller. The retort circuit is described in detail and illustrated in Section 1.2.3.

30.1.2 Retort Design – 40 CFR 270.23(a)(1)

The retort will be designed, fabricated, and supplied as a commercially available item by a qualified vendor with experience in such applications (e.g., MRT Systems). The vendor will provide a certification for the unit. The retort for this permit application has been designed by MRT Systems. Drawings for the retort and associated equipment included in Appendix 30-A.

The Retort will be located within process area of the plant spaces surrounded by bunding. The bunded area provides 26,900 gallons of secondary containment in the process area.

Each retort can process two 55-gallon containers per batch. The maximum volume of waste to be processed per batch will be 220 gallons when two units are operating with two containers each. Waste is charged to the retort for treatment in either a storage container or a tray. The treatment container retains its integrity during the retorting process. Because the container is not compromised during treatment, the retort unit provides a second level of containment during processing. Additionally, the retort is located within the process area secondary containment bunding.

The retort circuit is described in detail and illustrated in Section 1.2.3.

30.1.3 Retort Operating Procedures

The retort process is described in detail in Section 1.2.3. The retort will be operated in accordance with the vendor operating and maintenance procedures manual.

30.1.4 Process Area and Building Ventilation

The ventilation system is discussed in Section 1.1.4 and Section 1.2.6.

30.1.5 Inspection – 40 CFR 264.347 & 270.23(a)(2)

The retort inspection procedures are described in Section 4. The detailed Inspection Plan with inspection forms is included in Appendices 4-A and 4-B, respectively.

Generally, the retort is visually inspected each day prior to introducing the batch to be processed. The associated equipment is inspected for leaks, spills, indications of fugitive emissions, or any mechanical issues.

30.1.6 Closure – 40 CFR 270.23(a)(2)

The retort closure procedures are summarized in Section 13 and the detailed Closure Plan is included in Appendix 13-A.

In general, waste will be removed from the unit at closure and the retort will be operated continuously at maximum temperature for 72 hours. Emissions will be monitored to indicate if any residue remains in the unit. The retort will be cooled, and wipe samples will be taken. The unit will be dismantled and stored in the calomel storage area until results from the wipe samples are obtained. It is expected that the wipe samples will pass not be hazardous by characteristics for mercury (e.g., pass the TCLP test) and the debris will be sent to a landfill for disposal.

30.1.7 Post Closure – 40 CFR 264.603 & 270.23(a)(3)

This section is not applicable, because a clean closure is planned for the proposed TSF, including all miscellaneous units.

30.1.8 Site Description – 40 CFR 264.601 & 270.23(b)

Description of the site is included in Section 1.

30.1.9 Identification Exposure Potential – 40 CFR 270.23(c)

This section is not applicable, because the proposed TSF treatment units will be located within the engineered structure.

30.1.10 Fugitive Emissions – 40 CFR 266.102(e)(7) 270.66(b)(1)

Section 1.2.6 describes the process area ventilation scheme that will be used to prevent fugitive emissions from the retort system. The process area will be kept under slightly negative pressure to minimize the possibility of fugitive emissions.

30.1.11 Dispersion Modeling – 40 CFR 299.109(h)

An air model will be run to calculate ambient air quality impacts from the proposed TSF, in accordance with standards set by NDEP, Bureau of Air Quality.

30.1.12 Ground Level Concentration – 40 CFR 266.109(a)(2)

Air emissions from the proposed TSF will be permitted by NDEP, Bureau of Air Quality. The maximum annual average ground level concentration of each relevant substance will be calculated based on the feed rate, feed composition, and equipment efficiency. The allowable ambient levels for mercury, as outlined in Appendices IV and V of 40 CFR 266, are not expected to be exceeded (or 0.1 $\mu g/m^3$).

30.1.13 Environmental Assessment – 40 CFR 270.23 & 264.601(a)

This section is not applicable, because all units at the proposed TSF, including the retort system, are enclosed in an engineered structure that prevents a release to the environment. The potential for a release to groundwater or land is extremely minute as a result of the engineered design.

30.1.14 Protection of Surface Water, Wetlands, and Soil Surface – 40 CFR 270.23(b), 270.23(c), & 264.601,

This section is not applicable, because all units at the proposed TSF, including the retort system, are enclosed in an engineered structure, which will prevent a release to the environment. The potential for a release to groundwater or land is extremely minute as a result of the engineered design.

30.1.15 Performance Standards – 40 CFR 270.23 & 264.601

Performance of the retort will be evaluated by analyzing samples of the retort residual solids for mercury.

30.1.16 Reporting – 40 CFR 270.23(d)

Treatment time and operating temperature will be recorded in the operating record. The operating record will be maintained on-site for a minimum of three years.

30.1.17 Additional Requirements – 40 CFR 270.23(e) & 264.601

No additional information requirements have been identified at this time.

30.2 Filter Press

A filter press will used to physically separate solids from liquids. The filter press does not meet the definition of a tank, and is therefore being described in this section of the application.

30.2.1 Filter Press Description – 40 CFR 270.23(a) & 270.23(d)

The filter press is a solid-liquid separation device that consists of a shell with plates in a chamber. The unit is constructed of epoxy coated carbon steel with the approximate dimensions of 13.5 feet long by 4.7 feet wide by 4.9 feet tall. Each plate within the shell measures approximately 625 square inches. A high density polypropylene filter cloth is used to filter solids from the waste solution. The filter press description and arrangement is provided in Section 1.2.2.

The filter press was selected as the most effective means to achieve solid-liquid separation.

30.2.2 Filter Press Design – 40 CFR 270.23(a)(1)

The filter press is described in detail and illustrated in Section 1.2.2.

The filter press specification is included in Appendix 30-A (document H340940-PM006-50-328-0001). As the proposed TSF design approaches the construction phase, more detailed specifications will be provided to update the information presented in Appendix 30-A.

30.2.3 Filter Press Design Details – 40 CFR 270.23(a)(2)

The filter press will be a prefabricated unit; therefore, no construction details will be provided. The vendor will certify proper installation of the unit prior to beginning operation in the proposed TSF.

30.2.4 Secondary Containment

The filter press will discharge filtrate via attached piping. The filter cake will drop through chute(s) into collection drum(s). The discharge chute area will be enclosed. See Section 1.2 for a more detailed description of the filter press secondary containment.

30.2.5 Filter Press Operating Procedures – 40 CFR 270.23(a)(2)

The filter press is described in detail in Section 1.2.2. The filter press will be operated in accordance with the vendor operating and maintenance procedures manual.

30.2.6 Monitoring – 40 CFR 270.23(a)(2)

The filter press is a vendor supplied package. Monitoring parameters will be implemented based on vendor recommendations.

30.2.7 Inspection – 40 CFR 270.23(a)(2)

The filter press will be visually inspected at the beginning of each day. Inspection details are included in the Inspection Plan (see Appendix 4-A).

30.2.8 Closure – 40 CFR 270.23(a)(2)

At closure, all waste will be removed from the filter press. The filter press will be dismantled and the debris will be sent to a hazardous waste landfill for disposal. The container of filter cake will be closed and disposed of. A detailed description of the closure process is included in the Closure Plan (see Appendix 13-A).

30.2.9 Post Closure – 40 CFR 264.603 & 270.23(a)(3)

This section is not applicable, because a clean closure is planned for the proposed TSF, including all miscellaneous units.

30.2.10 Site Description – 40 CFR 264.601 & 270.23(b)

Description of the site is included in Section 1.

30.2.11 Identification Exposure Potential – 40 CFR 270.23(c)

This section is not applicable, because the proposed TSF treatment units will be located within the engineered structure.

30.2.12 Fugitive Emissions – 40 CFR 270.66(b)(1)

Section 1.2.6 describes the process area ventilation scheme that will be used to prevent fugitive emissions from the filter press system.

30.2.13 Reporting – 40 CFR 270.23(d)

The volume of waste processed through the filter press will be recorded. The filter cake will be analyzed according to the WAP (see Appendix 2-A). The results will be recorded in the operating record.

30.2.14 Additional Requirements – 40 CFR 264.601 & 270.23(e)

No additional information requirements have been identified at this time.

31.0 PROCESS VENTS - 40 CFR 270.24 & 264.1030 Subpart AA

Based on a thorough review of 40 CFR 264.1030 (Subpart AA) and 40 CFR 270.24, it has been concluded this section is not applicable to the proposed TSF, because no organic materials are treated at the proposed TSF. The wastes that will be treated, stored, and managed are inorganic materials.

PMR is pursuing a Class 2 air permit through NDEP for the proposed TSF. The proposed TSF equipment will be operated in compliance with the conditions set forth in the air permit.

Process ventilation is discussed in Section 1.1.4 and Section 1.2.6.

32.0 EQUIPMENT - 40 CFR 270.25 & 264.1050 Subpart BB

Based on a thorough review of 40 CFR 264.1050 (Subpart BB) and CFR 270.25, it has been concluded that this section is not applicable to the proposed TSF, because no organic materials are managed at the proposed TSF. The wastes that will be treated and stored are inorganic materials.

PMR is pursuing a Class 2 air permit through NDEP for the proposed TSF. The proposed TSF equipment will be operated in compliance with the conditions set forth in the air permit.

33.0 DRIP PADS - 40 CFR 270.26 & 264.570 Subpart W

Based on a review of 40 CFR 264.570 (Subpart W) and CFR 270.26, it has been determined that this section is not applicable to the proposed TSF, because no drip pads are associated with the proposed TSF.

34.0 AIR EMISSION STANDARDS - 40 CFR 270.27 & 264.1080 Subpart CC

Based on a review of 40 CFR 264.1080 (Subpart CC) and CFR 270.27, it has been determined that this section is not applicable to the proposed TSF, because no organic materials will be treated at the proposed TSF. The wastes that will be treated and stored are inorganic materials.

PMR is pursuing a Class 2 air permit through NDEP for the proposed TSF. The proposed TSF equipment will be operated in compliance with the conditions set forth in the air permit.

35.0 REFERENCES

American Society of Civil Engineers. Ground Motions of the ASCE 7-2010 Seismic Subcommittee. www.asce.org.

American Society of Mechanical Engineers. Boiler and Pressure Vessel Code VIII. www.asme.org.

American Society for Testing and Materials. www.astm.org/.

American Welding Society Standard. Standard D 1.1. Structural Welding Code. www.aws.org.

International Building Code. 2012. Sections 414 and 415. www.iccsafe.org.

International Building Code. 2006. Sections 1016.1. Travel Distance Limitations. www.iccsafe.org.

International Energy Conservation Code. 2009. http://www.iccsafe.org/Store/Pages/Product.aspx?id=3800X09.

International Finance Corporation. 2006. www.ifc.org.

International Fire Code. 2012. www.iccsafe.org.

Mercury Export Ban 2008. http://www.gpo.gov/fdsys/pkg/PLAW-110publ414/pdf/PLAW-110publ414.pdf.

Mine Safety and Health Administration, Controlling Mercury Hazards in Gold Mining: A Best Practices Tool Box. http://www.msha.gov/s&hinfo/mercury/hgmain.htm.

National Fire Protection Agency. 2010. www.nfpa.org.

Nevada Department of Transportation. Customer Vehicle Guidelines. http://www.nevadadot.com/Doing_Business/Trucking/Trucker_Services__Information.aspx.

Occupational Safety and Health Administration. Air Emission Standards. www.osha.gov.

SW-846 Test Methods for Evaluating Solid Waste Physical/Chemical Methods. http://www.epa.gov/osw/hazard/testmethods/sw846/index.htm.

Underwriters Laboratories. http://www.ul.com/.

U.S. Department of Energy. 2009. Interim Guidance on Packaging, Transportation, Receipt, Management, and Long-Term Storage of Elemental Mercury. By Oak Ridge National Laboratory. Western Regional Climate Center. Crescent Valley Dean Ranch Nevada. www.wrcc.dri.edu/

APPENDIX I-A
Attendee Register
and
Proof of Public Notice

At the PMR Dry Hills Facility Open House, PMR provided an attendee sign-in sheet (included), and NDEP provided a contact list sheet. No attendees signed the PMR Attendee List.

A copy of the NDEP contact list is included to document the Open House attendees who chose to sign-in. Contact information has been hidden on the included copy of the NDEP contact list. The NDEP contact list is on file at NDEP for official use.

In accordance with 40 CFR 124.31(c) and 40 CFR 270.14(b)(22), a register was available at the PMR open house for attendees to sign. Signing the register was not required. A copy of the register is included below.

Attendee List

PMR Mercury Treatment Facility

Open House

Crescent Valley Town Hall

December 11, 2012

Name	Address	Include on Mailing List?	
		Yes	No

Sponsored by Precious Metals Recovery LLC

Precious Metals Recovery, LLC

RCRA Permit Pre-Application Meeting

December 11, 2012

***Request to be included on the Public Mailing List for this project**

	Name		Address				e-mail	Would you prefer to receive public notices via email?	
	First	*Last*	*Mailing Address*	*City*	*St*	*Zip*		*Yes*	*No*
1	Mike	Leigh							
2	MJ	SULLIVAN							
3	Jan	Archuleta							
4	Stephanie	Hallinan							
5	JIMMIE	DAVIDS							
6	KEITH	LOGAN							
7	DWIGHT	Tompkins							
8	Angie	Black							
9	Troy	Black							
10	PAT & Julie	DEMPSEY							
11	Betty & Charles	MILLSPAUGH							
12	Mike	Miller							
13	* Mike	Hill							

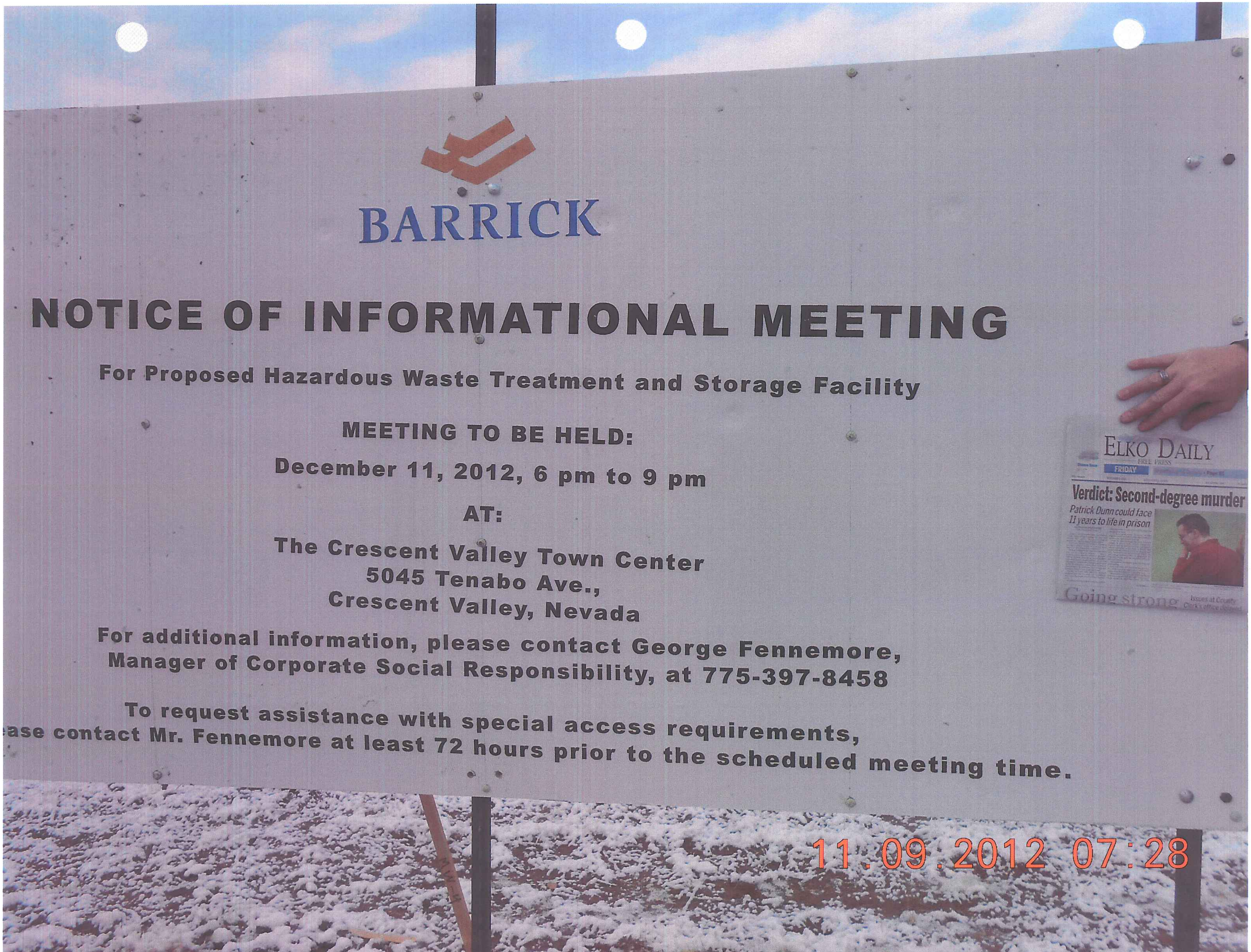
Precious Metals Recovery, LLC

RCRA Permit Pre-Application Meeting

December 11, 2012

***Request to be included on the Public Mailing List for this project**

	Name		Address				e-mail	Would you prefer to receive public notices via email?	
	First	*Last*	*Mailing Address*	*City*	*St*	*Zip*		*Yes*	*No*
14	Katie	Neddenriep							
15	Patrick	Malone							
16	JESSE	TOEPFER							
17	DAVid	MASON							
18	BRIAN	GREBENC							
19	STEVE	SCHOEN							
20									
21									
22									
23									
24									
25									
26									
27									


BARRICK
NOTICE OF INFORMATIONAL MEETING
For Proposed Hazardous Waste Treatment and Storage Facility
MEETING TO BE HELD:
December 11, 2012, 6 pm to 9 pm
AT:
The Crescent Valley Town Center
5045 Tenabo Ave.,
Crescent Valley, Nevada
For additional information, please contact George Fennemore,
Manager of Corporate Social Responsibility, at 775-397-8458
To request assistance with special access requirements,
ase contact Mr. Fennemore at least 72 hours prior to the scheduled meeting time.
ELKO DAILY
FRIDAY
Verdict: Second-degree murder
Patrick Dunn could face
11 years to life in prison
Going strong
11.09.2012 07:28


BARRICK
NOTICE OF INFORMATIONAL MEETING
For Proposed Hazardous Waste Treatment and Storage Facility
MEETING TO BE HELD:
December 11, 2012, 6 pm to 9 pm
AT:
The Crescent Valley Town Center
5045 Tenabo Ave.,
Crescent Valley, Nevada
For additional information, please contact George Fennemore,
Manager of Corporate Social Responsibility, at 775-397-8458
To request assistance with special access requirements,
please contact Mr. Fennemore at least 72 hours prior to the scheduled meeting time.
ELKO DAILY
Verdict: Second-degree murder
11.09.2012 07:29

HELP WANTED

Manager of Client Relations

Need a change?

We are looking for a dynamic person willing to engage with clients (and potential clients) to help us deliver on our promise!

In this role your responsibilities will include constant communication with clients. We will expect excellent telephone etiquette. You will implement and develop our existing marketing strategy and look for ways to better integrate new media ideas on a consistent basis.

As we are a small company additional responsibilities will include administrative management requiring computer and organizational skills. This position is full time with benefits. A background in customer service is essential - sales experience will be helpful. Only professional candidates with great people skills need apply. Please mail your resume and cover letter to 3720 Idaho St. Blind Box E Elko, NV 89301

THE BATTLE MOUNTAIN BAND COUNCIL IS ACCEPTING APPLICATIONS FOR FULL OR PART (TIME) POSITIONS:

BATTLE MOUNTAIN ADMINISTRATOR
F-T
$32,000 TO $40,000 - D.O.E.

ENVIRONMENTAL RESOURCE AIDE
P-T (32 HRS. PER WEEK)
$8 - $10 - D.O.E.

CUSTODIAN
P-T (20 HRS. PER WEEK)
$8.25 Per Hour

CCDF TUTOR
P-T (15 HRS. PER WEEK)
$8.00 Per Hour

ALL POSITIONS OPEN: 10/30/12 & CLOSE: 11/12/12

JOB DESCRIPTIONS/APPLICATIONS CAN BE PICKED UP AT THE BATTLE MOUNTAIN BAND COUNCIL ADMINISTRATION BUILDING LOCATED AT 37 MOUNTAIN VIEW DRIVE, BATTLE MOUNTAIN, NV DURING REGULAR BUSINESS HOURS OR YOU CAN CONTACT ANGELA AT (775) 635-2004 FOR MORE INFORMATION.

Public Notice
Informational Meeting

On behalf of its wholly-owned subsidiary, Precious Metals Recovery LLC, Barrick Gold of North America will host an informational meeting regarding a proposed hazardous waste treatment and storage facility in Eureka County, Nevada. The meeting is scheduled for **Tuesday, December 11, 2012, 6:00-9:00 p.m., at the Crescent Valley Town Center, 5045 Tenabo Ave., Crescent Valley, Nevada.**

In accordance with 60 FR 63431 Subpart B, Barrick representatives will provide information relative to the proposed construction of a facility for the safe treatment and storage of mercury by-product wastes recovered from environmental controls at the company's gold processing operations in Nevada. The proposed facility would be located on private land in northern Eureka County, about 12 miles east of the Town of Crescent Valley.

For additional information, please contact George Fennemore, Manager of Corporate Social Responsibility, at 775-397-8458 or by mail at Barrick Gold of North America, P.O. Box 29, Elko, NV 89803. To request assistance with special access requirements, please contact Mr. Fennemore at least 72 hours prior to the scheduled meeting time.

HELP WANTED

THE BATTLE MOUNTAIN BAND COUNCIL IS ACCEPTING APPLICATIONS:

SMOKE SHOP MANAGER
1 FULL-TIME POSITION
SALARY: D.O.E.
OPEN: 10/30/12 &
CLOSE: 11/12/12

Performs difficult and varied management work, using marketing, accounting training and supervision with managerial skills at the Battle Mountain Smoke Shop enterprise for the Battle Mountain Band Council.

ONLY QUALIFIED/ ELIGIBLE APPLICANTS OF TE-MOAK TRIBALLY ENROLLED MEMBERS WILL BE ACCEPTED, PER THE TE-MOAK TOBACCO TAXATION ORDINANCE 87-ORD-TM-06, SECTION B.3.

JOB DESCRIPTIONS/APPLICATIONS CAN BE PICKED UP AT THE BATTLE MOUNTAIN BAND COUNCIL ADMINISTRATION BUILDING LOCATED AT 37 MOUNTAIN VIEW DRIVE, BATTLE MOUNTAIN, NV DURING REGULAR BUSINESS HOURS OR YOU CAN CONTACT ANGELA AT (775) 635-2004 FOR MORE INFORMATION.

HELP WANTED

HosepowerUSA, has an opening at its Elko Nevada office for an Outside Sales, Responsibilities Include: Product/ Service Sales- Knowledge, application, Maintenance Acquisition and Development of New Business, Lead Generation (strategic industry research) i.e., internet, publications, networking, referrals etc, Meet and qualify, Close deals. Territory Projections (goals and Objectives)- Short/ Long term. Follow through, Scheduled/ Consistent review and updates.Territory Maintenance- Consistent site visits- Inventory (i.e., Bin stock), equipment, Customer service (i.e., order processing, follow up). Fulfill customer requirements. Account management- Understanding individual customers requirements, introduce new products and services, Build strong contact relationships (i.e., hierarchy). Experience: Minimum three years of hose and fitting sales experience required, Must have strong problem solving and communication skills. Must have solid understanding of sales/support/account management work flow. Must be detail oriented with strong organizational and planning skills. Must be a team player. Must pass all pre-employment tests, which include drug test, background check and MVR. Education Requirements: Bachelor of Science degree in business mgmt. Salary DOE. Email resume to employment @hosepowerusa.com Please Put Outside Sales in subject line of email. HosePower USA is an Equal Opportunity Employer (EOE). Qualified applicants are considered for employment without regard to age, race, color, religion, sex, national origin, sexual orientation, disability, or veteran status.

HELP WANTED

Ames Construction, Inc. has an immediate opening for **Project Safety Supervisor** based out of Carlin, NV. Candidates must have a minimum of five years' experience in advanced safety & health program in a construction, surface mining environment, or MSP/ CMSP Certification. MSHA instructor card required. Must provide support in implementing & continuously improving Formal, Team and Personal Risk Assessment programs. Excellent communication skills will help candidate to assist in maintaining a safety culture of excellence leading to "0" incident performance and provide leadership to meet Ames Construction and client safety & health goals. Applicants may contact HR at nvjobs@amesco.com fax resume to 775-754-6367, or apply online at www.amescontruction.com. Ames Construction is an EEO/AA employer and drug-free workplace.

FIND YOUR DREAM HOME! Look in the Elko Daily Free Press Classifieds.

HELP WANTED

DEA Incorporated - Precision Manufacturing For Precious Metals Industry

Due to continued customer commitments, our Elko, NV facility has an immediate need for the following positions:

- **Welder** -Minimum 2 years of welding and fabrication
- **Laborer** (Pre-employment drug screen will be required for all positions) (Must have a clean driving record and valid license)

This is a full time position. Benefits included are:

- Health insurance
- Paid holidays
- Paid vacation
- 401 k program
- Weekly Safety/Attendance Bonus

Send Resume to:
jransom@dealnc.net
Fax: (775) 777-3172

HELP WANTED

Part-time office assistant wanted. The Elko office of the Nevada State Education Association is looking for a part-time office assistant. Computer skills required are Microsoft Office–Word, Excel, PowerPoint and Publisher. Other duties include filing, office organization, correspondence preparation and answering the phone. 20 hours a week/flexible work hours. $10.00 per hour. Access NSEA work application at www.nsea-nv.org. Submit application and a letter of interest to Debbie Cahill, debbie.cahill@nsea-nv.org. Or mail to 3511 E. Harmon Avenue, Las Vegas, NV 89121. Position closes on November 12.

HELP WANTED

Drivers & Mechanics
Wanted!
Transport & Tank Wagons
Full-Time • Benefits • Competitive Wages
Call 775-754-6765
Thomas

HELP WANTED

John Davis Trucking

Has Openings for the Following Positions in Battle Mountain, Elko & Carlin Areas:

- **MAINTENANCE MECHANICS**
- **CDL CLASS A DRIVERS**

Call and Inquire About Our
NEW 2012 PAY AND BENEFITS PACKAGE!

Please Call 866-635-2805 for an application, pick one up at: Our Battle Mountain Office: 1110 Mule Shoe Rd. OR at the Employment Office in Elko or Winnemucca.

Learn more about John Davis Trucking and current openings or download application at: www.jdt3d.net

HELP WANTED

NOW HIRING
Coach USA
A STAGECOACH GROUP Company

CONTROLLER

Coach USA – Elko, Inc. is looking for a talented business professional to manage all company accounting and reporting functions. As our controller, you will plan an instrumental role in our business, assuming responsibility for a variety of challenging projects that will make a positive impact on our ability to serve our clients. Coach USA – Elko, Inc., a premier transportation company throughout the world, is growing and expanding our Elko, NV office.

Position Summary:
Direct financial activities, such as planning, procurement, and investments for all or part of an organization.

Tasks:

- Maintain current knowledge of organizational policies and procedures, federal and state policies and directives, and current accounting standards.
- Prepare or direct preparation of financial statements, business activity reports, financial position forecasts, annual budgets, or reports required by regulatory agencies.
- Develop internal control policies, guidelines, and procedures for activities such as budget administration, cash and credit management, and accounting.
- Advise management on short-term and long-term financial objectives, policies, and actions.
- Receive, record, and authorize requests for disbursements in accordance with company policies and procedures.
- Develop and maintain relationships with banking, insurance, and nonorganizational accounting personnel to facilitate financial activities. Responsible for overseeing and supervising the payroll and accounts payable functions, reporting and staff.

Other Skills and Abilities:

- Management of Financial Resources - Determining how money will be spent to get the work done.

HELP WANTED

BARRICK
NORTH AMERICA

NOW HIRING

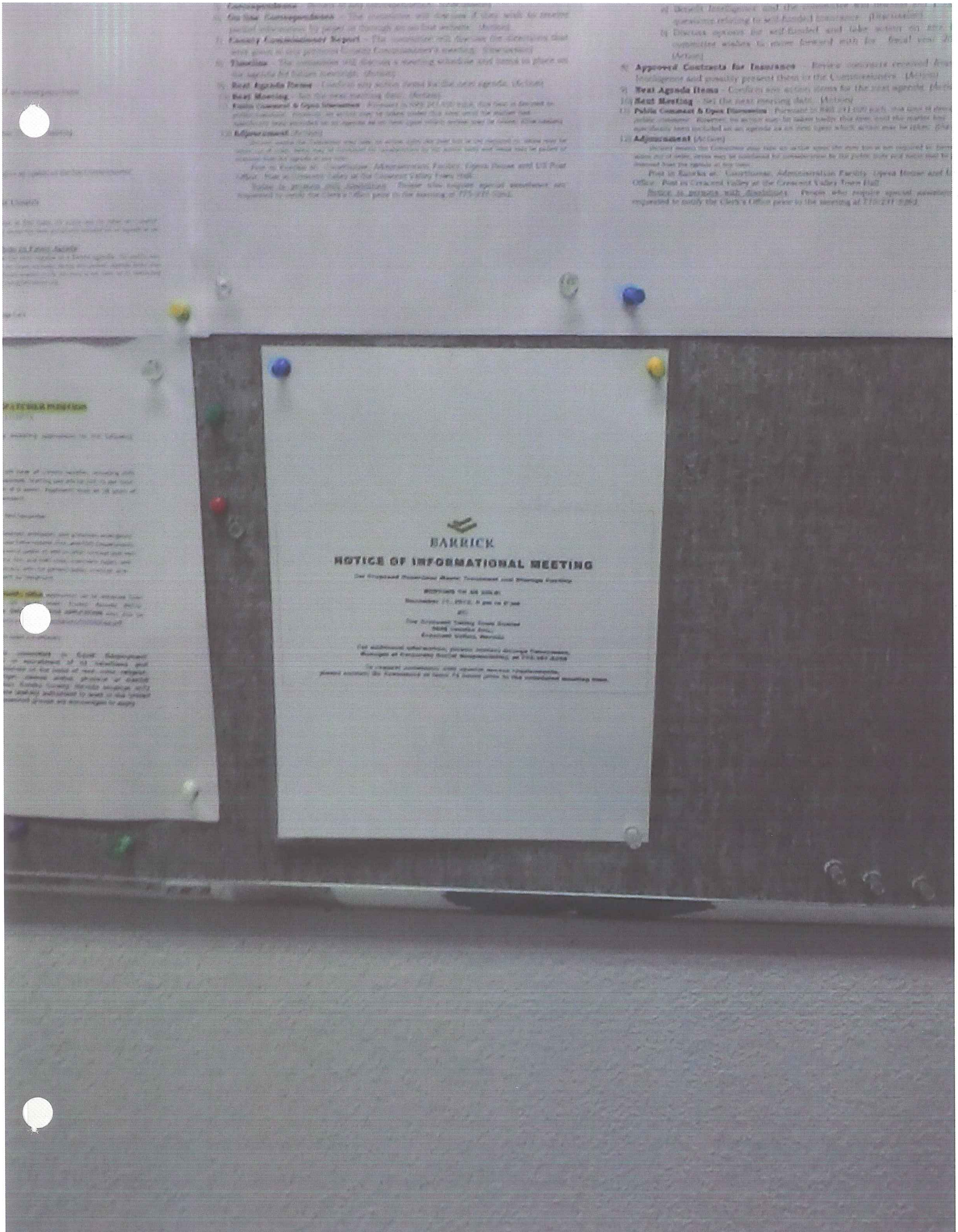
Goldstrike
PDM/Reliability Technician

SELECTION CRITERIA

GENERAL JOB DESCRIPTION

Public notice posted at the Beowawe Library

Public notice posted in the Crescent Valley Post Office


BARRICK
NOTICE OF INFORMATIONAL MEETING

KZBi 94.5 FM News Talk Invoice

Ruby Radio Corporation
1750 Manzanita Drive #1
Elko, NV 89801
775-777-1196

Invoice ID: 12110460
Invoice Date: 11/25/2012
Account ID: 0024
Order ID: 0024-055
Account Rep: Sue Craft

Amount Due: $0.00

Amount Paid: ___________

BARRICK GOLDSTRIKE MINES
COMMUNITY RELATIONS
PO BOX 29
ELKO, NV 89801

If your non-profit organization is planning an event, Ruby Radio woud like to help. Please fax the information to 777-9587.

Sponsor: Barrick Goldstrike Mines for P.O./Estimate # Gold Report Noon
Barrick Goldstrike Mines

Page 1

Date	Description	Times	Qty	Rate	Cost
10/29/2012	:30 Spot	12:18 PM	1	9.70	9.70
10/30/2012	:30 Spot	12:18 PM	1	9.70	9.70
10/31/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/1/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/2/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/5/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/6/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/7/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/8/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/9/2012	:60 Spot	12:18 PM	1	9.70	9.70
11/12/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/13/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/14/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/15/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/16/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/19/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/20/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/21/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/22/2012	:30 Spot	12:18 PM	1	9.70	9.70
11/23/2012	:30 Spot	12:18 PM	1	9.70	9.70
	20 Total Items		**Total Cost:**		**194.00**
		12/19/2011 PrePayment Applied Check 1052293:			-194.00
			Amount Due:		**0.00**

AFFIDAVIT OF PERFORMANCE: I certify that, in accordance with the Official Station Logs, announcements were broadcast as shown on this invoice.

Alene Sutherland

ALENE SUTHERLAND
NOTARY PUBLIC · STATE of NEVADA
Elko County · Nevada
CERTIFICATE # 03-79669-5
APPT. EXP. FEB. 4, 2015

Amount Due: 0.00

Ruby Radio Corporation
1750 Manzanita Drive #1
Elko, NV 89801
775-777-1196

Advertiser: Barrick Goldstrike Mines
Co-Op:
ScriptID: 11/9 only
Length: :60

The following is a public announcement from Barrick Gold of North America.

On behalf of its wholly-owned subsidiary, Precious Metals Recovery LLC, Barrick will host an informational meeting regarding a proposed hazardous waste treatment and storage facility in Eureka County.

The meeting is scheduled for Tuesday, December 11, 2012, from 6 to 9 p.m., at the Crescent Valley Town Center, 5045 Tenabo [Ten-"short a"-bo] Avenue in Crescent Valley.

Barrick representatives will provide information relative to the proposed construction of a facility for the safe treatment and storage of mercury by-product wastes recovered from environmental controls at the company's gold processing operations in Nevada. The proposed facility would be located on private land in northern Eureka County, about 12 miles east of the Town of Crescent Valley.

For additional information, please contact George Fennemore, Manager of Corporate Social Responsibility, at 775-397-8458 or by mail at Barrick Gold of North America, P.O. Box 29, Elko, NV 89803. To request assistance with special access requirements, please contact Mr. Fennemore at least 72 hours prior to the scheduled meeting time

---

Station Documentation Statement

This announcement was broadcast 1 times, as entered in the station's program log. The times this announcement was broadcast were billed to this station's client on our invoice number 12110460 dated 11/25/2012 at his earned rate of:

9.70 each for 1 announcements, for a total of	$9.70
For a total of 1 announcements for a total of	$9.70

Station Official Signature

ALENE SUTHERLAND
NOTARY PUBLIC · STATE of NEVADA
Elko County · Nevada
CERTIFICATE # 03-79669-5
APPT. EXP. FEB. 4, 2015

STATE OF Nevada COUNTY OF Elko
Subscribed and sworn before me this 5 day of Dec / 12

NOTARY PUBLIC
Alene Sutherland
Commission expires 2/4/2015

KBGZ FM Big Country Invoice

Ruby Radio Corporation
1750 Manzanita Drive, Suite 1
Elko, NV 89801
775-777-1196

Invoice ID: 12110458
Invoice Date: 11/25/2012
Account ID: 0024
Order ID: 0024-054
Account Rep: Sue Craft

Amount Due: $0.00

Amount Paid: ___________

BARRICK GOLDSTRIKE MINES
COMMUNITY RELATIONS
PO BOX 29
ELKO, NV 89801

If your non-profit organization is planning an event, Ruby Radio would like to help. Please fax the information to 777-9587.

Sponsor: Barrick Goldstrike Mines for P.O./Estimate # Gold Report Noon
Barrick Goldstrike Mines

Date	Description	Times	Qty	Rate	Cost
10/29/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
10/30/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
10/31/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/1/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/2/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/5/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/6/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/7/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/8/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/9/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/12/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/13/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/14/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/15/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/16/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/19/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/20/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/21/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/22/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/23/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
	20 Total Items		**Total Cost:**		**194.00**
		12/19/2011 PrePayment Applied Check 1052293:			-194.00
			Amount Due:		**0.00**

AFFIDAVIT OF PERFORMANCE: I certify that, in accordance with the Official Station Logs, announcements were broadcast as shown on this invoice.

Alene Sutherland

ALENE SUTHERLAND
NOTARY PUBLIC - STATE of NEVADA
Elko County • Nevada
CERTIFICATE # 03-79669-5
APPT. EXP. FEB. 4, 2015

Amount Due: **0.00**

Ruby Radio Corporation
1750 Manzanita Drive, Suite 1
Elko, NV 89801
775-777-1196

Advertiser: Barrick Goldstrike Mines
Co-Op:
ScriptID: 11/9 only
Length: :60

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Station Documentation Statement

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9.70 each for 1 announcements, for a total of	$9.70
For a total of 1 announcements for a total of	$9.70

Station Official Signature

STATE OF Nevada COUNTY OF Elko

Subscribed and sworn before me this 15 day of Dec/12

NOTARY PUBLIC
Alene Sutherland
Commission expires 2/4, 2015

ALENE SUTHERLAND
NOTARY PUBLIC · STATE of NEVADA
Elko County · Nevada
CERTIFICATE # 03-79669-5
APPT. EXP. FEB. 4, 2015

KHIX Mix 96.7 FM Invoice

Ruby Radio Corporation
1750 Manzanita Drive, Suite 1
Elko, NV 89801
775-777-1196

Invoice ID: 12110457
Invoice Date: 11/25/2012
Account ID: 0024
Order ID: 0024-054
Account Rep: Sue Craft

Amount Due: $0.00

Amount Paid: ___________

BARRICK GOLDSTRIKE MINES
COMMUNITY RELATIONS
PO BOX 29
ELKO, NV 89801

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Sponsor: Barrick Goldstrike Mines for P.O./Estimate # Gold Report Noon
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11/6/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/7/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/8/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/9/2012	:60 Sponsorship	12:18 PM	1	9.70	9.70
11/12/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/13/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/14/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/15/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/16/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/19/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/20/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/21/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
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ALENE SUTHERLAND
NOTARY PUBLIC · STATE of NEVADA
Elko County · Nevada
CERTIFICATE # 03-79669-5
APPT. EXP. FEB. 4, 2015

Amount Due: **0.00**

Ruby Radio Corporation
1750 Manzanita Drive, Suite 1
Elko, NV 89801
775-777-1196

Advertiser: Barrick Goldstrike Mines
Co-Op:
ScriptID: 11/9 only
Length: :60

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---

Station Documentation Statement

This announcement was broadcast 1 times, as entered in the station's program log. The times this announcement was broadcast were billed to this station's client on our invoice number 12110457 dated 11/25/2012 at his earned rate of:

9.70 each for 1 announcements, for a total of $9.70
For a total of 1 announcements for a total of $9.70

Station Official Signature

ALENE SUTHERLAND
NOTARY PUBLIC - STATE of NEVADA
Elko County • Nevada
CERTIFICATE # 03-79669-5
APPT. EXP. FEB. 4, 2015

STATE OF Nevada COUNTY OF Elko
Subscribed and sworn before me this 5 day of Dec 12

NOTARY PUBLIC
Alene Sutherland
Commission expires 2/4/2015

Coyote Invoice

Invoice ID: 12110461
Invoice Date: 11/25/2012
Account ID: 0024
Order ID: 0024-057
Account Rep: Sue Craft

Amount Due: $0.00

Amount Paid: __________

Ruby Radio Corporation
1750 Manzanita Drive, Suite 1
Elko, NV 89801
775-777-1196

BARRICK GOLDSTRIKE MINES
COMMUNITY RELATIONS
PO BOX 29
ELKO, NV 89801

If your non-profit organization is planning an event Ruby Radio would like to help. Please fax the information to 777-9587.

Sponsor: Barrick Goldstrike Mines for P.O./Estimate # Gold Report Noon
Barrick Goldstrike Mines

Date	Description	Times	Qty	Rate	Cost
10/29/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
10/30/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
10/31/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/1/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/2/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/5/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/6/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/7/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/8/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/9/2012	:60 Sponsorship	12:18 PM	1	3.00	3.00
11/12/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/13/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/14/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/15/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/16/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/19/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/20/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/21/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/22/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
11/23/2012	:30 Sponsorship	12:18 PM	1	3.00	3.00
	20 Total Items		**Total Cost:**		**60.00**
		6/27/2012 PrePayment Applied Check 1059402:			-60.00
			Amount Due:		**0.00**

AFFIDAVIT OF PERFORMANCE: I certify that, in accordance with the Official Station Logs, announcements were broadcast as shown on this invoice.

[signature]

ALENE SUTHERLAND
NOTARY PUBLIC · STATE of NEVADA
Elko County · Nevada
CERTIFICATE # 03-79669-5
APPT. EXP. FEB. 4, 2015

Amount Due: **0.00**

Ruby Radio Corporation
1750 Manzanita Drive, Suite 1
Elko, NV 89801
775-777-1196

Advertiser: Barrick Goldstrike Mines
Co-Op:
ScriptID: 11/9 only
Length: :60

The following is a public announcement from Barrick Gold of North America.

On behalf of its wholly-owned subsidiary, Precious Metals Recovery LLC, Barrick will host an informational meeting regarding a proposed hazardous waste treatment and storage facility in Eureka County.

The meeting is scheduled for Tuesday, December 11, 2012, from 6 to 9 p.m., at the Crescent Valley Town Center, 5045 Tenabo [Ten-"short a"-bo] Avenue in Crescent Valley.

Barrick representatives will provide information relative to the proposed construction of a facility for the safe treatment and storage of mercury by-product wastes recovered from environmental controls at the company's gold processing operations in Nevada. The proposed facility would be located on private land in northern Eureka County, about 12 miles east of the Town of Crescent Valley.

For additional information, please contact George Fennemore, Manager of Corporate Social Responsibility, at 775-397-8458 or by mail at Barrick Gold of North America, P.O. Box 29, Elko, NV 89803. To request assistance with special access requirements, please contact Mr. Fennemore at least 72 hours prior to the scheduled meeting time

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Station Official Signature

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NOTARY PUBLIC-STATE of NEVADA
Elko County • Nevada
CERTIFICATE # 03-79669-5
APPT. EXP. FEB. 4, 2015

STATE OF Nevada COUNTY OF Elko
Subscribed and sworn before me this 5 day of Dec 12
Alene Sutherland, NOTARY PUBLIC
Alene Sutherland
Commission expires 2/4/2015

Z107 Hits of the 70's and 80's Invoice

Ruby Radio Corporation
1750 Manzanita Drive #1
Elko, NV 89801
775-777-1196

Invoice ID: 12110459
Invoice Date: 11/25/2012
Account ID: 0024
Order ID: 0024-054
Account Rep: Sue Craft

Amount Due: $0.00

Amount Paid: ___________

BARRICK GOLDSTRIKE MINES
COMMUNITY RELATIONS
PO BOX 29
ELKO, NV 89801

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11/5/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/6/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/7/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/8/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/9/2012	:60 Sponsorship	12:18 PM	1	9.70	9.70
11/12/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/13/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/14/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/15/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/16/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/19/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/20/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/21/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/22/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
11/23/2012	:30 Sponsorship	12:18 PM	1	9.70	9.70
	20 Total Items		**Total Cost:**		**194.00**
		12/19/2011 PrePayment Applied Check 1052293:			-194.00
			Amount Due:		**0.00**

AFFIDAVIT OF PERFORMANCE: I certify that, in accordance with the Official Station Logs, announcements were broadcast as shown on this invoice.

Alene Sutherland

ALENE SUTHERLAND
NOTARY PUBLIC-STATE of NEVADA
Elko County • Nevada
CERTIFICATE # 03-79669-5
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Station Official Signature

ALENE SUTHERLAND
NOTARY PUBLIC · STATE of NEVADA
Elko County · Nevada
CERTIFICATE # 03-79669-5
APPT. EXP. FEB. 4, 2015

STATE OF Nevada COUNTY OF Elko
Subscribed and sworn before me this 15 day of Dec 12

NOTARY PUBLIC
Alene Sutherland
Commission expires 2/4/2015

Public Notice
Informational Meeting

On behalf of its wholly-owned subsidiary, Precious Metals Recovery LLC, Barrick Gold of North America will host an informational meeting regarding a proposed hazardous waste treatment and storage facility in Eureka County, Nevada. The meeting is scheduled for Tuesday, December 11, 2012, 6:00-9:00 p.m., at the Crescent Valley Town Center, 5045 Tenabo Ave., Crescent Valley, Nevada.

In accordance with 60 FR 63431 Subpart B, Barrick representatives will provide information relative to the proposed construction of a facility for the safe treatment and storage of mercury by-product wastes recovered from environmental controls at the company's gold processing operations in Nevada. The proposed facility would be located on private land in northern Eureka County, about 12 miles east of the Town of Crescent Valley.

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APPENDIX I-B

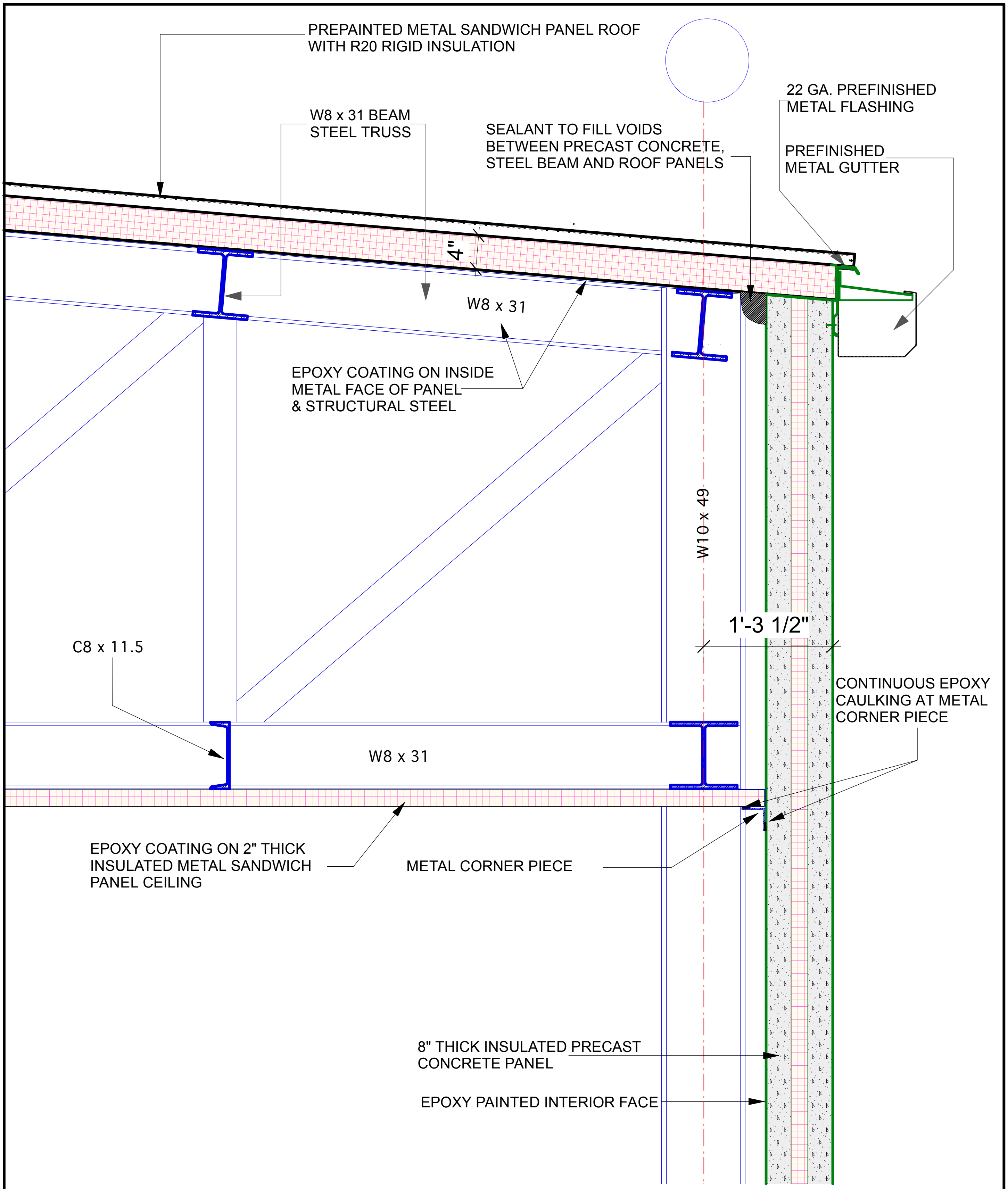
Open House Comments

No comments were received by PMR at the Open House.

APPENDIX 1-D

Floor and Wall Sealant Description

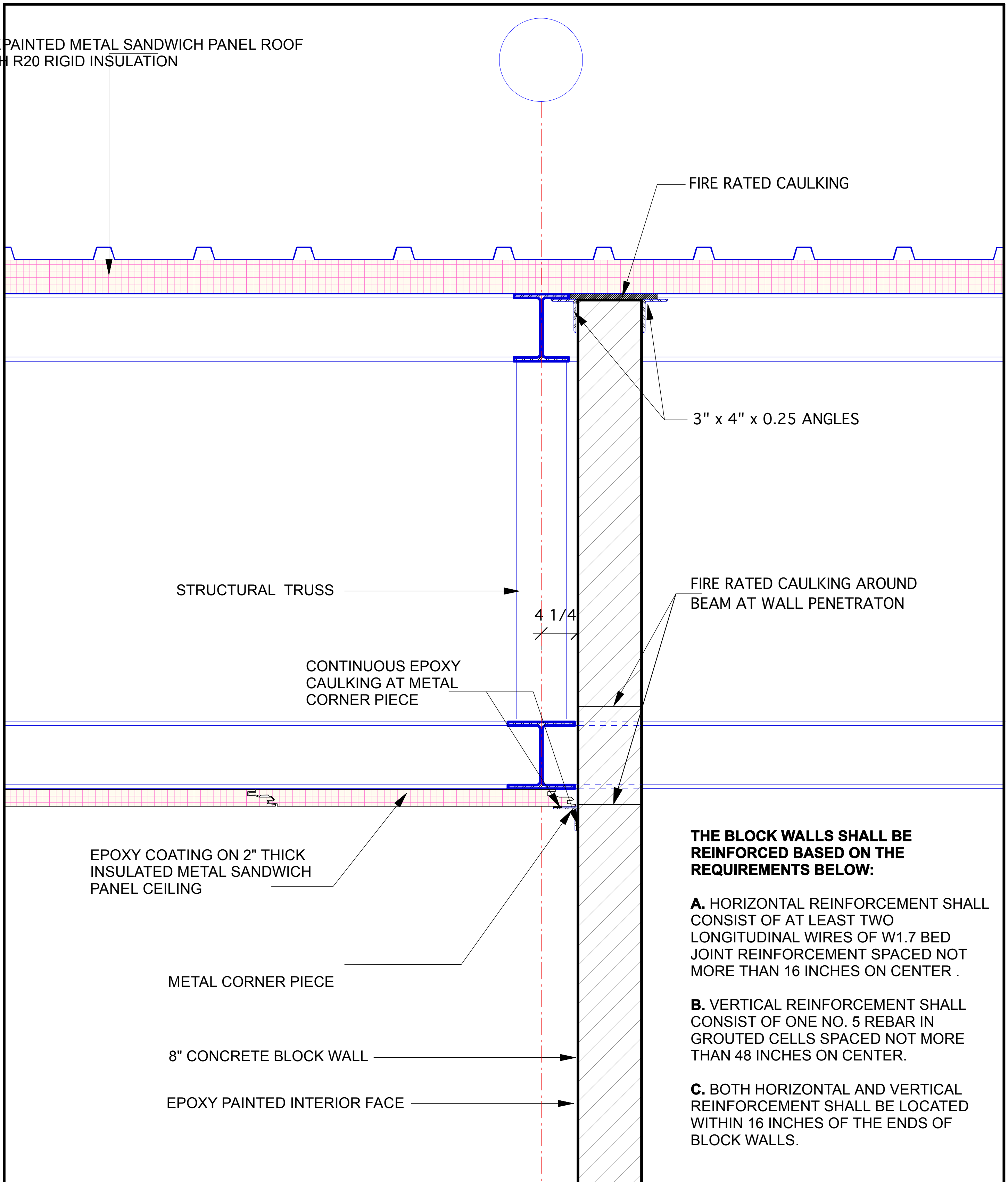
Process/Storage Building Floors, Walls, Ceilings Sketches



DETAIL OF ROOF AND WALL CONSTRUCTION

SCALE 3/4" = 1'-0"

HATCH™	DESCRIPTION: ROOF AND WALL CONSTRUCTION		PROJECT NO. H340940
	PROJECT: BARRICK GOLDSTRIKE MINES PRECIOUS METALS RECOVERY PROJECT MERCURY TSDF BUILDING		DRAWING NO. SK-1
			DATE: 2012/07/02 — REV.0 E
	SCALE: 3/4" = 1'-0"	DESIGN: T. JACKSON — DRAWN: T. JACKSON	APPROVED:



THE BLOCK WALLS SHALL BE REINFORCED BASED ON THE REQUIREMENTS BELOW:

A. HORIZONTAL REINFORCEMENT SHALL CONSIST OF AT LEAST TWO LONGITUDINAL WIRES OF W1.7 BED JOINT REINFORCEMENT SPACED NOT MORE THAN 16 INCHES ON CENTER .

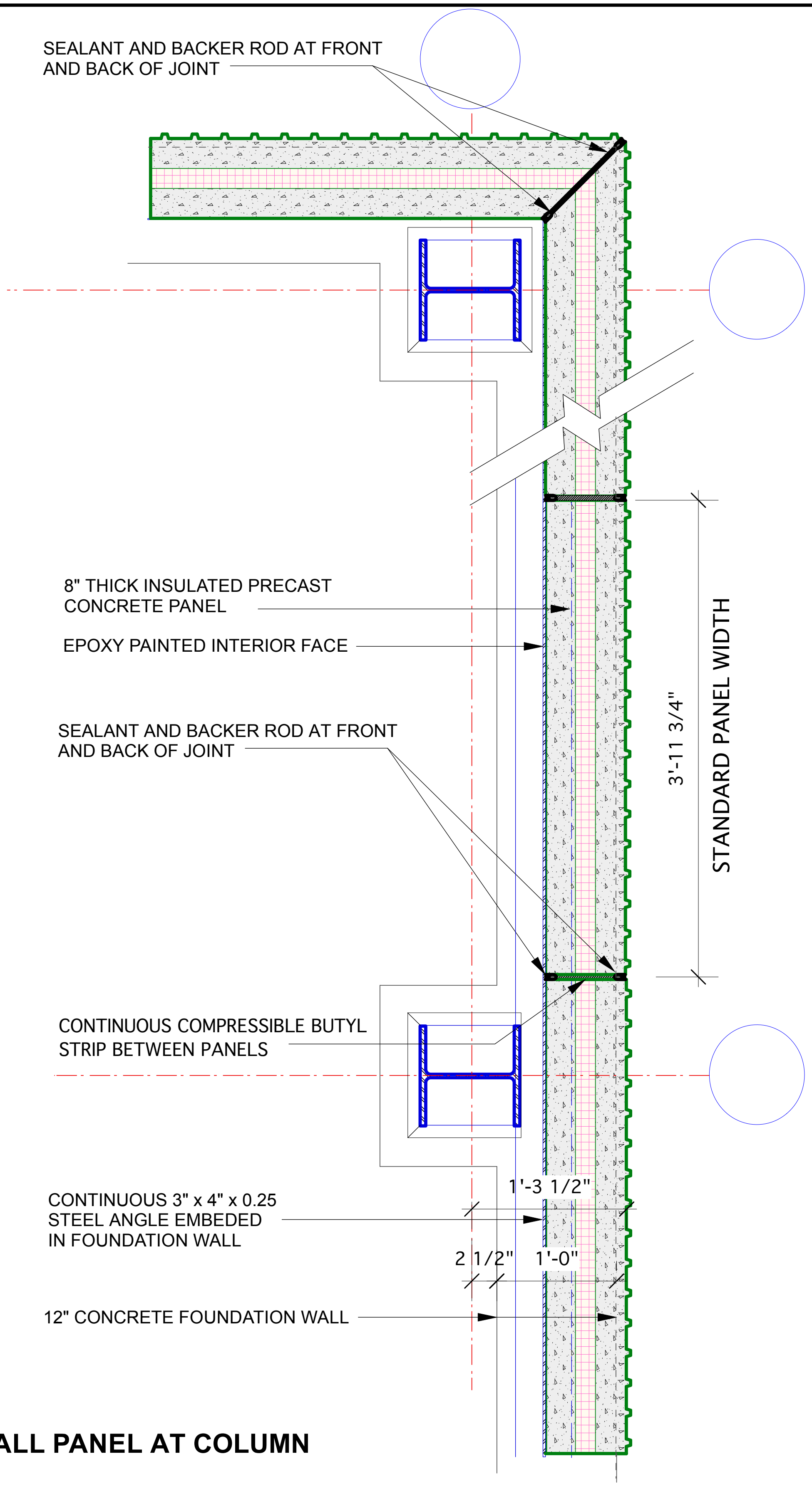
B. VERTICAL REINFORCEMENT SHALL CONSIST OF ONE NO. 5 REBAR IN GROUTED CELLS SPACED NOT MORE THAN 48 INCHES ON CENTER.

C. BOTH HORIZONTAL AND VERTICAL REINFORCEMENT SHALL BE LOCATED WITHIN 16 INCHES OF THE ENDS OF BLOCK WALLS.

DETAIL INTERIOR BLOCK WALL & ROOF

SCALE 3/4" = 1'-0"

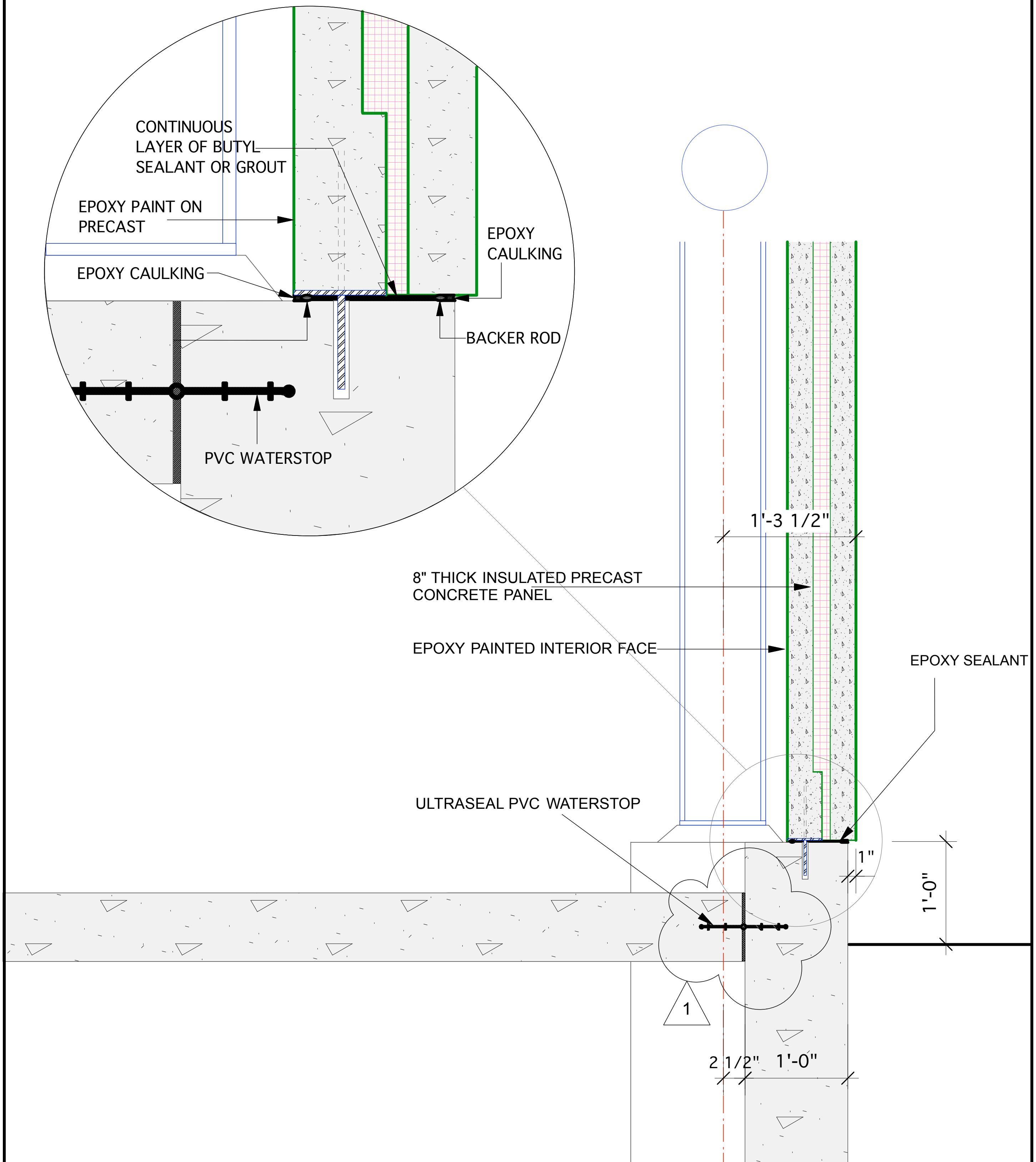
HATCH™	DESCRIPTION: INTERIOR BLOCK WALL & ROOF			PROJECT NO. H340940
	PROJECT: BARRICK GOLDSTRIKE MINES PRECIOUS METALS RECOVERY PROJECT MERCURY TSDF BUILDING			DRAWING NO. SK-2
				DATE: 2012/07/02 — REV.0 E
	SCALE: 3/4" = 1'-0"	DESIGN: T. JACKSON	DRAWN: T. JACKSON	APPROVED:



DETAIL OF PRECAST WALL PANEL AT COLUMN

SCALE 3/4" = 1'-0"

HATCH™	DESCRIPTION: COLUMN AT PRECAST WALL			PROJECT NO. H340940
	PROJECT: BARRICK GOLDSTRIKE MINES PRECIOUS METALS RECOVERY PROJECT MERCURY TSDF BUILDING			DRAWING NO. SK-3
				DATE: 2012/07/02 — REV.0 E
	SCALE: 3/4" = 1'-0"	DESIGN: T. JACKSON	DRAWN: T. JACKSON	APPROVED:



DETAIL OF PRECAST WALL PANEL AT FOUNDATION WALL

SCALE 3/4" = 1'-0"

REVISION NO. 1 WATERSTOP AT FOUNDATION WALL AND CONCRETE FLOOR SLAB

HATCH™

DESCRIPTION: PRECAST AT FOUNDATION WALL

PROJECT: BARRICK GOLDSTRIKE MINES
PRECIOUS METALS RECOVERY PROJECT
MERCURY TSDF BUILDING

PROJECT NO. H340940

DRAWING NO. SK-4

DATE: 2013/09/18

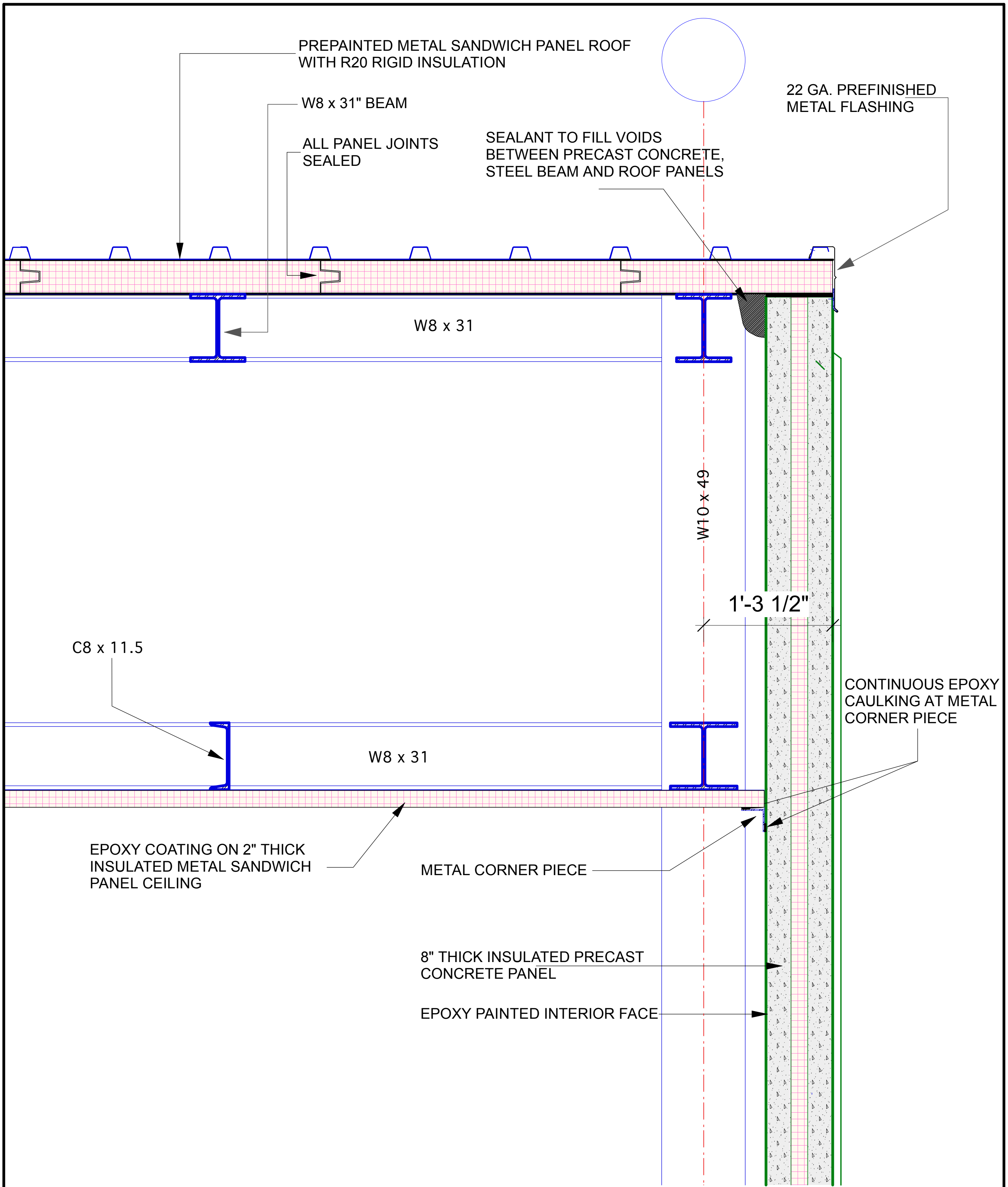
REV. 0 F

SCALE: 3/4" = 1'-0"

DESIGN: T. JACKSON

DRAWN: T. JACKSON

APPROVED:



DETAIL OF ROOF, WALL & CEILING CONSTRUCTION - PROCESS AREA

SCALE 3/4" = 1'-0"

HATCH™	DESCRIPTION: ROOF, WALL & CEILING IN PROCESS AREA			PROJECT NO. H340940
	PROJECT: BARRICK GOLDSTRIKE MINES PRECIOUS METALS RECOVERY PROJECT MERCURY TSDF BUILDING			DRAWING NO. SK-5
				DATE: 2012/07/02 — REV.0 E
	SCALE: 3/4" = 1'-0"	DESIGN: T. JACKSON	DRAWN: T. JACKSON	APPROVED:

Project Memo

H340940

November 12, 2012

TO: J. Toepfer

FROM: D. Kluwak / T. Jackson

cc: Sonia Sennik – Hatch
Mark Sucharda – Hatch
Brian Buck – JBR
Rachel Shilton – JBR

Barrick Goldstrike Mines
Precious Metals Recovery Project

RCRA Permit Application - Floor and Wall Sealant Description

1. GENERAL

1.1 Quality Assurance

The installation of the floor and wall coating systems shall be performed by skilled workers experienced in this field and recommended by the Manufacturer.

For each type of coating, two samples of the coating will be submitted for approval by the proposed TSF's manager.

1.2 Reference Standards

ASTM C-579	Compressive Strength
ASTM D-2240	Hardness
ASTM D-2794	Impact Resistance
ASTM F-1679	Slip Resistance
ASTM E-648	Flammability
ASTM E-84	Fire Resistance

1.3 Warranty

For this Work, the Period of Warranty is ten years from date of issue of the Completion Certificate.

1.4 Environmental Conditions

Material and substrate should be maintained at a temperature between 60.8°F to 86°F, 48 hours before, during and 48 hours after installation.

2. PRODUCTS

2.1 Stonclad GS

Stonclad GS from Stonhard is a three-component, troweled, epoxy mortar flooring system. The system consists of an epoxy resin, amine curing agent and selected, graded aggregates blended with inorganic pigments. The thickness ranges from 0.118 inches to 0.236 inches depending on application requirements. Stonclad GS cures to an extremely hard and impact resistant mortar.

- Stonclad GS shall be applied over Stonhard Standard Primer.
- Stonkote GS4 coatings shall be added to improve cleanability and resistance to damage from abrasion.
- Cover base of 5.9 inches high shall be provided for an integral seal at the joint between the floor and wall.
- Color to be determined.

2.2 Stonshield HRI

Stonshield HRI will provide a nominal 0.197-inch thick flooring system with a slip resistant surface. The basecoat is a three-component, troweled mortar base consisting of epoxy resin, curing agent and finely graded silicate aggregate. The undercoat is a three-component, free flowing epoxy formulation consisting of resin, curing agent, and fine aggregate. The aggregate is brightly colored, quartz broadcast aggregate.

- Stonshield HRI shall be applied over Stonhard Standard Primer.
- Stonproof ME7 waterproofing membrane shall be applied in the shower areas.
- Cover base of 5.9 inches high shall be provided for an integral seal at the joint between the floor and wall.
- Stonshield Sealer shall be applied to produce a medium texture.
- Color to be determined.

2.3 Stonglaze VSE

Stonglaze VSE is a multi-layer, impact resistant, light, stable, flexible urethane wall system. The basecoat is a two-component urethane membrane. The first and second topcoats are two-component waterborne, aliphatic, polyurethane coatings.

Stonglaze Topcoat EPX shall be applied as a primer over concrete or concrete masonry units.

Color to be determined.

D. Kluwak / T. Jackson

DK/TJ:pp

STONHARD

STONGLAZE® VSE TOPCOAT

PRODUCT DATA

PRODUCT DESCRIPTION

Stonglaze VSE Topcoat is a two-component, high performance, waterborne, polyurethane coating designed for use on vertical surfaces. Stonglaze VSE Topcoat combines superior chemical and impact resistance with excellent adhesion and resistance to color and gloss changes from ultraviolet light.

USES, APPLICATIONS

Stonglaze VSE Topcoat is a general service urethane coating designed to improve cleanability, increase stain resistance, and improve UV resistance on vertical surfaces. Typical uses for Stonglaze VSE Topcoat include:

- UV resistant topcoat
- Increased stain resistance

OPTIONS

Antimicrobial

Stonplus AM9 is an antimicrobial, organic thione compound that acts as a permanent bacteriostat and fungistat against a broad range of gram-positive and gram-negative bacteria and fungi. Stonplus AM9 is EPA registered and contains no heavy metals.

PRODUCT ADVANTAGES

- Maximum ultraviolet light resistance
- Easily cleaned surface for simple maintenance
- Excellent abrasion resistance
- Minimal odor during application
- May be applied with a brush or a roller or an airless sprayer

PACKAGING

Stonglaze VSE Topcoat is packaged in units for easy handling. Each unit consists of:

Stonglaze VSE Topcoat

1 carton containing:

2 foil bags of isocyanate curing agent

(2) 1 gallon pails of polyol resin

COVERAGE

Approximately 300 sq. ft./27.87 sq. m per unit for two coats 4 to 6 mils/100 to 150 microns (WFT) over a smooth substrate. Stonglaze VSE Topcoat requires two coats for a proper finish.

STORAGE CONDITIONS

Store both components of Stonglaze VSE Topcoat between 65 to 85°F/18 to 30°C in a dry area. Avoid excessive heat. Do not freeze. The shelf life is one year in the original, unopened container.

PHYSICAL CHARACTERISTICS

VOC Content (ASTM D-2369)	5 g/l
Pot Life (@ 70°F/21°C)	35 to 45 minutes
Cure Rate (@77°F/25°C)	24 hours for tack-free surface; 24 hours minimum for normal operations
Abrasion Resistance (ASTM D-4060, CS-17 wheel)	0.03 gm weight loss

Note: The above physical properties were measured in accordance with the referenced standards.

COLOR

Stonglaze VSE Topcoat is currently available in 6 dynamic colors. Custom colors are available upon request.

SUBSTRATES/PREPARATION

When used in conjunction with its appropriate base layer, Stonglaze VSE Topcoat is suitable for use over wall board, wood, metal and concrete substrates. These substrates must be clean, dry, and free of any laitance or unbonded materials.

Any wall board surface must be finished to a level 1,2, or 3 drywall finish with an appropriate spackle compound (green board and cement board will require water resistant drywall compound or setting compound). **To ensure excellent, long term performance, it is critical that Stonglaze VSE Topcoat is never installed over a level 4 or 5 drywall finish.**

Concrete block walls (CMU) must be given sufficient time for the mortar to fully cure. Excess mortar and any residual laitance or debris must be removed by mechanical means prior to installing Stonglaze VSE Topcoat .

Formed or poured concrete walls must be prepared by mechanical means to remove any laitance or efflorescence and provide a sandpaper texture suitable for bonding.

Previously painted substrates must be inspected to determine the level of drywall finish (for wall boards) and the type of paint.

Stonglaze VSE Topcoat will bond well to prepared epoxy paints, but will not bond to latex, oil, urethane, or acrylic paints. If upon inspection, a level 4 or 5 drywall finish, or one of the previously mentioned paints is found, it must be removed by mechanical means prior to application of the Stonglaze system.

MIXING

1. Using a heavy-duty, slow speed drill (400 to 600 rpm) with a mixing paddle or Jiffy mixer, premix the polyol for 30 seconds to ensure the suspension of solids.
2. Slowly pour the contents of the bag of isocyanate directly into the 1 gallon bucket of polyol.
3. Mix the polyol and Iso for a minimum of 90 seconds until well blended.
4. Pour the contents into a 5 gallon/18.93 liter bucket, paint tray or suitable container for application.

POT LIFE

After mixing, Stonglaze VSE Topcoat has a working time of 35 to 40 minutes at 70°F/21°C.

APPLYING

Two layers of Stonglaze VSE Topcoat are required to ensure proper coverage and hiding of the basecoat. Stonglaze VSE Topcoat must be applied immediately after mixing the two components. The Topcoat may be applied using a 1/4 in. to 3/8 in. /6 mm to 10 mm nap roller. Dip and roll the Topcoat onto the wall surface at a thickness of 4 to 6 mils/100 to 150 microns (wft). Immediately after rolling the coating on the wall, a saturated nap roller should be used to remove roller lines and drips. Finish roll on one direction only, picking the roller up between passes.

Application of the second coat of Topcoat can begin once the first layer is cured. Installing the Topcoat thicker than 8 mils in one coat is not recommended and may result in drips and runs.

CURING

The curing time of Stonglaze VSE Topcoat is 12 hours at 77°F/25°C. Before resuming normal operations, a curing period of 24 hours is recommended. The coating will achieve ultimate physical characteristics in 7 days.

RECOMMENDATIONS

- Apply only on a clean, sound, properly prepared substrate.
- Application and curing times are dependent upon ambient and surface conditions.
- Minimum ambient and surface temperature is 60°F/16°C at the time of application.
- Stonglaze VSE Topcoat should be allowed to cure for a minimum of 48 hours before being covered with non-porous material such as plastic sheeting.

PRECAUTIONS

- Water is recommended for clean up of Stonglaze VSE Topcoat material spills. The cured material will require mechanical means of removal.
- NIOSH/MSHA approved respirators, safety goggles and impervious gloves are recommended.
- In case of contact with eyes, flush with water for 15 minutes and seek medical attention. Wash skin with soap and water.
- Mechanical ventilation is recommended.

NOTES

- Material Safety Data Sheets for Stonglaze VSE Topcoat are available on line at www.stonhard.com under Products or upon request.
- A staff of technical service engineers is available to assist with product application, or to answer questions related to Stonhard products.
- Requests for technical literature or service can be made through local sales representatives and offices, or corporate offices located worldwide.

CHEMICAL RESISTANCE GUIDE

The purpose of this guide is to aid in determining the potential value of Stonglaze VSE Topcoat when exposed to the damaging effects of corrosive chemical environments.

RATING CODE

E - Excellent
G - Good
NR - Not Recommended
OS - Suitable for use where "occasional spillages" occur, when flushing with water immediately follows.

ACIDS

	RATING
Acetic - 5%	G
Acetic - 20%	OS
Acetic - Glacial	NR
Benzoic - Sat. 3%	E
Boric - Sat. 30%	E
Butyric - 10%	OS
Chromic - 10%	G
Chromic - 20%	OS
Citric - 50%	E
Cresylic	OS
Diglycolic	G
Fatty	G
Fluoboric	G
Formic - up to 10%	OS
Heptanoic	OS
Hydrochloric - 15%	G
Hydrochloric - 37%	OS
Hydrofluoric 5%	G
Hydrofluoric - 10%	OS

	RATING
Hypochlorous - 5%	E
Lactic - up to 20%	OS
Maleic - 30%	OS
Maleic - 40%	OS
Nitric - 10%	G
Nitric - 30%	OS
Oleic	G
Oxalic - Sat.	E
Perchloric - 35%	OS
Phosphoric - up to 50%	OS
Picric - Sat.	E
Phthalic	G
Succinic - Sat.	E
Sulfuric - 20%	E
Sulfuric - 50%	OS
Sulfuric - 70%	OS
Tannic - Sat.	G
Tartartic - Sat.	E

ALKALIES AND SALTS

Stonglaze VSE Topcoat is rated *Good* to *Excellent* when exposed to most alkalies and salts.

SOLVENTS AND OTHER CHEMICALS

	RATING
Acetone	NR
Alcohol (Methyl)	OS
Alcohol (Ethyl, Propyl, Isopropyl, Butyl)	G
Benzene	OS
Carbon Tetrachloride	OS
Corn Oil	E
Cyclohexane	OS
Denatured Alcohol	NR
Ethylene Glycol	G
Ether	OS
Formaldehyde	OS
Gasoline	E
Glycerine	E
Hydrogen Peroxide - 10%	NR
JP5 Jet Fuel	G
Juices - Fruit	E
Juices - Vegetable	E
Lard	G

	RATING
Linseed Oil	G
Methyl Ethyl Ketone	NR
Methylene Chloride	NR
Milk	E
Mineral Spirits	G
Naphtha	OS
Oils - Cutting	G
Oils - Mineral	E
Oils - Vegetable	G
Perchloroethylene	OS
Skydrol	G
Sucrose - Sat. (Sugar)	E
Toluene	OS
Trichloroethylene	NR
Urea	G
Vinegar (Household)	G
Water	E
Xylene	OS

Note: This data is based on laboratory tests performed under carefully controlled conditions. (All solutions are at ambient temperatures.) No warranty can be expressed nor implied regarding the accuracy of this information as it will apply to actual plant operation or job site use. Plant operations and job site uses vary widely, and the individual results obtained are affected by the specific conditions encountered, which are beyond our control.

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Worldwide Offices:

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Canada	800.263.3112	South America	(54-3327)44.2222	Middle East	(971)4.3470460	Asia	(86)21.5466.5118

STONHARD

PRODUCT DATA

STONGLAZE® VSE

PRODUCT DESCRIPTION

Stonglaze VSE is a multi-layer, impact resistant, light stable, flexible urethane wall system for harsh environments. This product is specifically designed for use on vertical surfaces to provide a seamless, smooth, tough surface that promotes a sanitary environment. It is comprised of:

Basecoat

A two-component urethane membrane.

First Topcoat

A two-component waterborne, aliphatic, polyurethane coating.

Second Topcoat

A two-component waterborne, aliphatic,polyurethane coating.

USES, APPLICATIONS

Stonglaze VSE is specifically designed where impact resistance and minor crack-bridging are desired on a vertical surface. Stonglaze VSE is an ideal wall system for institutional and industrial facilities, for both new construction and renovation. Typical wall applications for Stonglaze VSE include:

- Medical facilities
- Educational facilities
- Pharmaceutical facilities
- Food processing facilities
- Detention facilities

OPTIONS

Antimicrobial

Stonplus AM9 is an antimicrobial, organic thione compound that acts as a permanent bacteriostat and fungistat against a broad range of gram-positive and gram-negative bacteria and fungi. Stonplus AM9 is EPA registered and contains no heavy metals.

PRODUCT ADVANTAGES

- Excellent bond strength assures superior adhesion
- Seamless and monolithic
- Permanently elastic
- Easily applied to vertical surfaces
- Factory proportioned packaging ensures consistent, high quality mixing
- UV Resistance
- High gloss
- Stain Resistance
- Crack Bridging

PHYSICAL CHARACTERISTICS

Pot Life	Basecoat 20 minutes @ 70°F/21°C Topcoat 35 to 40 minutes @ 70°F/21°C
Minimum Dry Film Thickness	12 to 15 mil/304 to 381 microns
Cure Rate (@ 77°F/25°C)	12 hours for tack-free surface 24 hours minimum for normal operations
Temperature Limitations	140°F/60°C continuous exposure 200°F/93°C intermittent exposure
Fire Resistance of Dry Film (ASTM E84)	Class B Flame spread 40 Smoke developed 115
V.O.C. (ASTM D-2369)	Stonglaze VSE Basecoat - 10 g/l Stonglaze VSE Topcoat - 5 g/l

Note: The above physical properties were measured in accordance with the referenced standards. Samples of the actual wall system, including binder and filler, were used as test specimens.

PACKAGING

Stonglaze VSE is packaged in units for easy handling. Each unit contains:

Stonglaze VSE Basecoat

0.5 carton containing:

6 poly bags of Stonglaze VSE Basecoat Polyol

0.5 carton containing:

6 poly bags of Stonproof ME7/Stonglaze VSE Basecoat Isocyanate

First Topcoat
Stonglaze VSE Topcoat

0.5 carton containing:
2 foil bags of Isocyanate
(2) 1 gallon pails of Polyol

Second Topcoat
Stonglaze VSE Topcoat

0.5 carton containing:
2 foil bags of Isocyanate
(2) 1 gallon pails of Polyol

COVERAGE

Approximately 300 sq. ft./27.9 sq. m per unit at an application thickness of 12 to 15 mil/300 to 380 microns.

STORAGE CONDITIONS

Store all components of Stonglaze VSE at or above 65˚F/18˚C in a dry area. Avoid excessive heat. Do not freeze. The shelf life of basecoat is 2 years and the topcoat is one year in the original, unopened container.

SUBSTRATES/PREPARATION

When used in conjunction with its appropriate primer, Stonglaze VSE is suitable for use over wall board, wood, metal and concrete substrates. These substrates must be clean, dry, and free of any laitance or unbonded materials.

Any wall board surface must be finished to a level 1,2, or 3 drywall finish with an appropriate spackle compound (green board and cement board will require water resistant drywall compound or setting compound). **To ensure excellent, long term performance, it is critical that Stonglaze VSE is never installed over a level 4 or 5 drywall finish.**

Concrete block walls (CMU) must be given sufficient time for the mortar to fully cure. Excess mortar and any residual laitance or debris must be removed by mechanical means prior to installing Stonglaze VSE.

Formed or poured concrete walls must be prepared by mechanical means to remove any laitance or efflorescence and provide a sandpaper texture suitable for bonding.

Previously painted substrates must be inspected to determine the level of drywall finish (for wall boards) and the type of paint. Stonglaze VSE will bond well to prepared epoxy paints, but will not bond to latex, oil, urethane, or acrylic paints. If upon inspection, a level 4 or 5 drywall finish, or one of the previously mentioned paints is found, it must be removed by mechanical means prior to application of the Stonglaze system.

PRIMING

Priming for wall board applications, including sheetrock, green board, and paperless drywall, Primer 180 should be used to ensure proper adhesion and serve as a sealer coat between the Stonglaze coating and the substrate. The coverage for Primer 180 will be approximately 400 sq. ft./37.16 sq. m per unit over any of the wall boards mentioned. For concrete and concrete masonry unit (CMU) walls, Stonglaze E4 should be used as a primer. The coverage for Stonglaze E4 will fall between 250 to 400 sq.ft/23.23 to 37.16 sq. m per unit depending on the condition and porosity of the substrate.

MIXING

The components of Stonglaze VSE are mixed just prior to use and must be applied immediately. Mixing is accomplished as follows:

Stonglaze VSE Basecoat

1. Pour the contents of one bag of polyol and one bag of Iso into a 5 gallon/18.93 liter bucket or appropriate mixing container.
2. Using a heavy-duty, slow speed drill (400 to 600 rpm) with a mixing paddle or Jiffy mixer, mix the polyol and Iso for a minimum of 120 seconds until well blended.

Stonglaze VSE Topcoat

1. Using a heavy-duty, slow speed drill (400 to 600 rpm) with a mixing paddle or Jiffy mixer, premix the polyol for 30 seconds to ensure the suspension of solids.
2. Slowly pour the contents of the bag of isocyanate directly into the one gallon bucket of polyol.
3. Mix the polyol and Iso for a minimum of 90 seconds until well blended.
4. Pour the contents into a 5 gallon/18.93 liter bucket, paint tray or suitable container for application.

CURING

The surface of Stonglaze VSE will be tack-free in 12 hours at 77˚F/25˚C. The coated area may be put into service in 24 hours. Ultimate physical characteristics will be achieved in 7 days.

POT LIFE

Stonglaze VSE Basecoat has a working time of approximately 20 minutes and the Topcoat URE has a working time of approximately 35-40 minutes both at 70˚F/213˚C. The working time may vary depending upon ambient and surface conditions.

APPLYING

Stonglaze VSE can be applied at ambient temperatures ranging from 60 to 85˚F/16 to 30˚C. It is important that the relative humidity is below 70% during the application and cure of the Stonglaze VSE Topcoat to allow the material to cure properly. Stonglaze VSE can be roller or spray applied as follows:

Roller Application

Stonglaze VSE Basecoat

Stonglaze VSE Basecoat must be applied immediately after mixing the two components. The Basecoat may be applied using a 3/8 in. to 1/2 in./10 mm to 13 mm nap roller. Dip and roll the Basecoat onto the wall surface at a thickness of 10 to 12 mils/250 to 300 microns (wft). Immediately after rolling the coating on the wall, a saturated nap roller should be used to remove roller lines and drips. Finish roll on one direction only, picking the roller up between passes.

If a thicker finish is required, additional layers of Basecoat URE may be applied per the above method once the first layer has cured. Installing the Basecoat thicker than 15 mils in one coat is not recommended and may result in drips and runs.

Stonglaze VSE Topcoat

Two layers of Stonglaze VSE Topcoat are required to ensure proper coverage and hiding of the Basecoat. Stonglaze VSE Topcoat must be applied immediately after mixing the two components. The Topcoat may be applied using a 1/4 in. to 3/8 in. /6 mm to 10 mm nap roller. Dip and roll the Topcoat onto the wall surface at a thickness of 4 to 6 mils/101 to 152 microns (wft). Immediately after rolling the coating on the wall, a saturated nap roller should be used to remove roller lines and drips. Finish roll on one direction only, picking the roller up between passes.

Application of the second coat of Topcoat can begin once the first layer is cured. Installing the Topcoat thicker than 8 mils in one coat is not recommended and may result in drips and runs.

CHEMICAL RESISTANCE GUIDE

The purpose of this guide is to aid in determining the potential value of Stonglaze VSE when exposed to the damaging effects of corrosive chemical environments.

RATING CODE

E - Excellent
G - Good
NR - Not Recommended
OS - Suitable for use where "occasional spillages" occur, when flushing with water immediately follows.

ACIDS

	RATING
Acetic - 5%	G
Acetic - 20%	OS
Acetic - Glacial	NR
Benzoic - Sat. 3%	E
Boric - Sat. 30%	E
Butyric - 10%	OS
Chromic - 10%	G
Chromic - 20%	OS
Citric - 50%	E
Cresylic	OS
Diglycolic	G
Fatty	G
Fluoboric	G
Formic - up to 10%	OS
Heptanoic	OS
Hydrochloric - 15%	G
Hydrochloric - 37%	OS
Hydrofluoric 5%	G
Hydrofluoric - 10%	OS
Hypochlorous - 5%	E
Lactic - up to 20%	OS
Maleic - 30%	OS
Maleic - 40%	OS
Nitric - 10%	G
Nitric - 30%	OS
Oleic	G
Oxalic - Sat.	E
Perchloric - 35%	OS
Phosphoric - up to 50%	OS
Picric - Sat.	E
Phthalic	G
Succinic - Sat.	E
Sulfuric - 20%	E
Sulfuric - 50%	OS
Sulfuric - 70%	OS
Tannic - Sat.	G
Tartartic - Sat.	E

ALKALIES AND SALTS

Stonglaze VSE is rated *Good* to *Excellent* when exposed to most alkalies and salts.

SOLVENTS AND OTHER CHEMICALS

	RATING
Acetone	NR
Alcohol (Methyl)	OS
Alcohol (Ethyl, Propyl, Isopropyl, Butyl)	G
Benzene	OS
Carbon Tetrachloride	OS
Corn Oil	E
Cyclohexane	OS
Denatured Alcohol	NR
Ethylene Glycol	G
Ether	OS
Formaldehyde	OS
Gasoline	E
Glycerine	E
Hydrogen Peroxide - 10%	NR
JP5 Jet Fuel	G
Juices - Fruit	E
Juices - Vegetable	E
Lard	G
Linseed Oil	G
Methyl Ethyl Ketone	NR
Methylene Chloride	NR
Milk	E
Mineral Spirits	G
Naphtha	OS
Oils - Cutting	G
Oils - Mineral	E
Oils - Vegetable	G
Perchloroethylene	OS
Skydrol	G
Sucrose - Sat. (Sugar)	E
Toluene	OS
Trichloroethylene	NR
Urea	G
Vinegar (Household)	G
Water	E
Xylene	OS

Note: This data is based on laboratory tests performed under carefully controlled conditions. (All solutions are at ambient temperatures.) No warranty can be expressed nor implied regarding the accuracy of this information as it will apply to actual plant operation or job site use. Plant operations and job site uses vary widely, and the individual results obtained are affected by the specific conditions encountered, which are beyond our control.

Spray Application

To spray Stonglaze VSE, suitable NIOSH/MSHA approved respirators should be worn by all personnel in the area. Stonglaze VSE Basecoat can be spray applied in a single application at a thickness ranging from 10 to 15 mil/254 to 380 microns (WFT.) Spray applying this material should be done using the Graco King System or comparable equipment with the following specifications:

63:1 pump - 2 1/2 gallons per minute
0.019 - 0.035 inch spray tip
3,000 - 4,000 psi spray tip pressure

It is recommended that the spray equipment be purged with Xylene every 30 minutes of use to avoid potential line damage. It should also be noted that the finished texture of a sprayed surface will be much smoother than the orange peel texture that is associated with roller applications. For more information on spraying Stonglaze VSE, contact Stonhard's Technical Service Department.

CURING

The surface of Stonglaze VSE will be tack-free in 12 hours at 77°F/25°C. The coated area may be put back into service in 24 hours. Ultimate physical characteristics will be achieved in 7 days.

RECOMMENDATIONS

- Apply only on a clean, sound and properly prepared substrate.
- Minimum ambient and surface temperatures are 60°F/16°C at the time of application.
- Do not use water or steam in the vicinity of the application. Moisture can seriously affect the working time and properties of the material.
- Application and curing times are dependent upon ambient and surface conditions.

PRECAUTIONS

- Application time (20 minutes) and curing time (24 hours) are dependent upon ambient conditions.
- The use of safety glasses and impervious gloves are required.
- In case of contact, flush the area with copious amounts of water for 15 minutes and seek medical attention. Wash skin with soap and water.
- The use of NIOSH/MSHA approved respirators with organic vapor/acid gas cartridges is required when spray applying this product.
- Material, air and substrate temperatures should be 60 to 85°F/16 to 30°C during installation.

NOTES

- For environments not referenced in the Chemical Resistance Guide, consult Stonhard's Technical Service Department for recommendations.
- Material Safety Data Sheets for Stonglaze VSE are available on line at www.stonhard.com under Products or upon request.
- A staff of technical service engineers is available to assist with product application or to answer any questions related to Stonhard products.
- Requests for technical literature or service can be made through local sales representatives and offices, or corporate offices located worldwide.

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STONHARD

PRODUCT DATA

STONCLAD® GS

PRODUCT DESCRIPTION

Stonclad GS is a three-component, troweled, epoxy mortar system. The system consists of an epoxy resin, amine curing agent and selected, graded aggregates blended with inorganic pigments. Stonclad GS can be applied at thickness ranging from 1/8 in./3 mm to 1/4 in./6 mm depending on application requirements. Stonclad GS cures to an extremely hard, impact resistant mortar which exhibits excellent abrasion, wear and chemical resistance and can be used anywhere an epoxy mortar is required.

SYSTEM OPTIONS

Coatings

To improve cleanability and increase the resistance to damage from abrasion and chemical spillages, the following coatings are recommended: Stonkote GS4 and Stonkote HT4. Other coating options are available, please contact your local Stonhard representative or Technical Service for specific requirements.

Waterproofing

Where the total system must be waterproof, use of Stonhard's Stonproof ME7 membrane system is required, with strict adherence to application instructions.

Cove Base

To provide for an integral seal at the joint between the floor and the wall, cove bases in varying heights are available, contact your local Stonhard representative or Technical Service for details.

PACKAGING

Stonclad GS is packaged in units for easy handling. Each unit consists of:

2 cartons, each containing:
- 6 foil bags of Amine
- 6 poly bags of Resin

12 individual bags of aggregate

COVERAGE

Each unit of Stonclad GS will cover approximately 200 sq. ft./18.6 sq. m of surface at a nominal 1/4 in./6 mm thickness.

STORAGE CONDITIONS

Store all components of Stonclad GS between 60 to 85˚F/16 to 30˚C in a dry area. Avoid excessive heat and do not freeze. The shelf life is 3 years in the original, unopened container.

PHYSICAL CHARACTERISTICS

Compressive Strength (ASTM C-579)	10,000 psi after 7 days
Tensile Strength (ASTM C-307)	1,750 psi
Flexural Strength (ASTM C-580)	4,000 psi
Flexural Modulus of Elasticity (ASTM C-580)	2.0×10^6 psi
Hardness (ASTM D-2240, Shore D)	85 to 90
Impact Resistance (ASTM D-2794)	>160 in./lbs.
Abrasion Resistance (ASTM D-4060, CS-17)	0.1 gm *
Coefficient of Friction (ASTM F-1679)	0.83*(dry)
Slip Resistance Index (ASTM F-1679, F-2508)	0.66* (wet)
Flammability (ASTM E-648)	Class 1
Thermal Coefficient of Linear Expansion (ASTM C-531)	1.5×10^{-5} in./in.˚F
Water Absorption (ASTM C-413)	0.2%
Heat Resistance Limitation	140˚F/60˚C (continuous exposure) 200˚F/93˚C (intermittent spills)
VOC Content (ASTM D-2369, Method E)	40 g/l
Cure Rate (at 75˚F/25˚C)	24 hours for normal operations

* Test samples finished with one coat of high solids epoxy coating

Note: The above physical properties were measured in accordance with the referenced standards. Samples of the actual floor system, including binder and filler, were used as test specimens. All sample preparation and testing is conducted in a laboratory environment, values obtained on field applied materials may vary and certain test methods can only be conducted on lab made test coupons.

COLOR

Stonclad GS is available in 12 standard colors. Refer to the Stonclad Color Sheet. Color variations will exist if the Stonclad GS surface is not coated with a pigmented coating. Please contact your local Stonhard representative or Technical Service with any questions.

SUBSTRATE

Stonclad GS, with the appropriate primer, is suitable for application over concrete, wood, brick, quarry tile, metal or Stonhard Stonset grouts. For questions regarding other possible substrates or an appropriate primer, contact your local Stonhard representative or Technical Service.

SUBSTRATE PREPARATION

Proper preparation is critical to ensure an adequate bond and system performance. The substrate must be dry and properly prepared utilizing mechanical methods. Questions regarding substrate preparation should be directed to your local Stonhard representative or Technical Service.

PRIMING

The use of Standard Primer is necessary for all applications of Stonclad GS over all substrates except Stonset grouts. Over Stonset grouts, Stonhard's Stonset Primer is used. Please see the appropriate primer Product Data sheet for details.

MIXING

- Proper mixing is critical for the product to exhibit the proper application properties, cure properties and ultimate physical properties.
- Mechanical mixing using a JB Blender (or equivalent 5 gal. pail mixer) or a larger mortar mixer (e.g., a Baugh 3 Batch Mixer) is required.
- See Stonclad GS Directions for further details.

APPLYING

- DO NOT attempt to install material if the temperature of Stonclad GS components and substrate are not within 60 to 85°F/16 to 30°C. The cure time and application properties of the material are severely affected at temperatures outside of this range.
- Material must be applied immediately after mixing.
- A suitable screed applicator is used to distribute the mixed Stonclad GS onto the floor.
- Steel finishing trowels are used to compact and smooth the surface of the material to the required thickness.
- Detailed application instructions can be found in the Stonclad GS Directions.

NOTES

- Procedures for cleaning of the flooring system during operations can be found in the Stonhard Floor Maintenance Guide.
- Specific information regarding chemical resistance is available in the Stonclad Chemical Resistance Guide. If a coating is utilized to seal the Stonclad GS surface, please ensure that you consult the Product Data sheet for the coating for details regarding chemical resistance of the coating utilized.
- Material Safety Data Sheets for Stonclad GS are available on line at www.stonhard.com under Products or upon request.
- A staff of technical service engineers is available to assist with installation or to answer questions related to Stonhard products.
- Requests for literature can be made through local sales representatives and offices, or corporate offices located worldwide.

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CHEMICAL RESISTANCE GUIDE

STONCLAD

STONHARD

STONCLAD CHEMICAL RESISTANCE GUIDE

The purpose of this guide is to aid in determining the potential value of the Stonclad family surfacers when exposed to the damaging effects of corrosive chemical environments.

The test procedure used to determine the values listed is as follows:

Samples of the completely cured Stonclad were totally immersed in the chemicals listed for a period of 7 days at normal room temperatures (73˚F/23˚C). (This is an exceptionally severe testing method since most floors subject to these types of chemical spillages are “flushed down” periodically with water as part of the normal floor maintenance operation.)

The resultant resistance of Stonclad to the various chemicals is rated using the symbols listed in the Rating key. (It is recommended that normal “good housekeeping procedures” be used, including a daily flushing with clean water.)

RATING KEY
E – Excellent
G – Good
NR – Not Recommended
OS – Suitable for use where “occasional spillages” occur, when followed by immediate water flushing.

The data contained herein is based on laboratory tests performed under carefully controlled conditions. No warranty can be expressed or implied regarding the accuracy of this information, as it will apply to actual plant operational use. Plant operations vary widely, and the individual results obtained are affected by the specific conditions encountered, which are beyond our control.

Note: *Staining may occur depending upon length of exposure time, chemical concentration and temperature.

Acids

Chemical	GS	HT	UT	UR	XP	HD
Acetic – 5%	G	E	E	E	G	G
Acetic – 10%	OS	E	E	E	OS	OS
Acetic – 15%	NR	G	E	E	NR	NR
Acetic – 20%	NR	G	E	E	NR	NR
Acetic – 50%	NR	OS	G	G	NR	NR
Acetic – Glacial	NR	NR	G	G	NR	NR
Benzoic – 3%	E	E	E	E	E	E
Benzoic – Sat.	OS	E	E	E	OS	OS
Boric – Sat.	E	E	E	E	E	E
Butyric – 10%	OS	E	E	E	OS	OS
Chromic – 10%	G	G	G	G	G	G
Chromic – 20%	OS	G	G	G	OS	OS
Chromic – 40%	NR	NR	NR	NR	NR	NR
Citric – 50%	OS	G	E	E	OS	OS
Citric – Sat.	OS	E	E	E	OS	OS
Cresylic – Sat.	OS	G	G	G	OS	OS
Diglycolic – Sat.	G	G	G	G	G	G
Fatty – Sat.	G	E	E	E	G	G
Fluoboric – Sat.	G	OS	OS	OS	G	G
Formic – 10%	OS	OS	E	E	OS	OS
Formic – 50%	NR	NR	G	G	NR	NR
Formic – over 50%	NR	NR	OS	OS	NR	NR
Heptanoic – Sat.	OS	G	G	G	OS	OS
Hydrochloric – 15%	E	E	E	E	E	E
Hydrochloric – 37%	G	E	E	E	G	G
Hydrofluoric – 5%	G	G	G	G	OS	G
Hydrofluoric – 10%	OS	OS	OS	OS	OS	OS
Hydrofluoric – 15%	NR	NR	NR	NR	NR	NR
Hypochlrous – 5%	E	E	E	E	E	E

Acids (continued)

Chemical	GS	HT	UT	UR	XP	HD
Lactic – 20%	G	E	E	E	G	G
Lactic – over 20%	OS	G	E	E	OS	OS
Maleic – 30%	G	E	E	E	G	G
Maleic – 40%	OS	G	G	G	OS	OS
Maleic – Sat.	NR	G	G	G	NR	NR
Monochloroacetic – 5%	G	E	E	E	G	G
Monochloroacetic – 10%	OS	G	E	E	OS	OS
Monochloroacetic – 20%	NR	OS	G	G	NR	NR
Nitric – 10%	E	E	E	E	E	E
Nitric – 20%	G	E	E	E	G	G
Nitric – 30%	OS	G	G	G	G	OS
Nitric – 40%	NR	NR	NR	NR	NR	NR
Oleic – Sat.	E	E	E	E	E	E
Oxalic – Sat.	E	E	E	E	E	E
Pelargonic – Sat.	OS	E	E	E	OS	OS
Perchloric – 35%	OS	OS	OS	OS	OS	OS
Phosphoric – 50%	G	E	E	E	G	G
Phosphoric – 70%	OS	E	E	E	G	OS
Phosphoric – 85%	NR	OS	OS	OS	NR	NR
Picric – Sat.	OS	G	E	E	OS	OS
Phthalic – Sat.	OS	G	G	G	OS	OS
Succinic – Sat.	E	E	E	E	E	E
Sulfuric – 20%	E	E	E	E	E	E
Sulfuric – 50%	G	G	G	G	G	G
Sulfuric – 70%	OS	OS	NR	NR	G	OS
Sulfuric – 98%	NR	NR	NR	NR	NR	NR
Tannic – Sat.	E	E	E	E	E	E
Tartanic – Sat.	E	E	E	E	E	E
Trichloroacetic – 10%	NR	G	E	E	NR	NR
Trichloroacetic – 20%	NR	OS	E	E	NR	NR

Alkalies and Salts

Chemical	GS	HT	UT	UR	XP	HD
Aluminum Chloride – 50%	E	E	E	E	E	E
Ammonium Chloride – 50%	E	E	E	E	E	E
Ammonium Chloride – Sat.	E	E	E	E	E	E
Ammonium Hydroxide – up to 20%	E	E	E	E	E	E
Ammonium Hydroxide – 40%	G	G	G	G	G	G
Ammonium Hydroxide – Sat.	G	E	E	E	G	G
Ammonium Nitrate – Sat.	E	E	E	E	E	E
Ammonium Persulfate – Sat.	E	E	E	E	E	E
Ammonium Sulfate – Sat.	E	E	E	E	E	E
Calcium Chloride – Sat.	E	E	E	E	E	E
Calcium Hydroxide – Sat.	E	E	E	E	E	E
Calcium Hypochlorite – up to 15%	G	G	G	G	G	G
Calcium Hypochlorite – Sat.	OS	E	E	E	OS	OS
Copper Fluoroborate – Sat.	E	E	E	E	E	E
Ferric Chloride – Sat.	G	E	E	E	G	G

Alkalies and Salts (continued)

Chemical	GS	HT	UT	UR	XP	HD
Ferrous Sulfate – Sat.	G	E	E	E	G	G
Potassium Hydroxide – up to 40%	E	E	E	E	E	E
Sodium Benzoate – Sat.	E	E	E	E	E	E
Sodium Carbonate (Soda Ash) – Sat.	E	E	E	E	E	E
Sodium Bicarbonate – Sat.	E	E	E	E	E	E
Sodium Bisulfate – Sat.	E	E	E	E	E	E
Sodium Bisulfite – Sat.	E	E	E	E	E	E
Sodium Chloride (Salt) – Sat.	E	E	E	E	E	E
Sodium Glutamate – Sat.	E	E	E	E	E	E
Sodium Hydroxide – up to 50%	E	E	E	E	E	E
Sodium Hypochlorite – up to 10%	G	G	G	G	G	G
Sodium Propionate – Sat.	E	E	E	E	E	E
Sodium Sulfate – Sat.	E	E	E	E	E	E
Sodium Sulfide – Sat.	E	E	E	E	E	E
Trisodium Phosphate – Sat.	E	E	E	E	E	E
Zinc Nitrate – Sat.	G	E	E	E	G	G

Solvents and Other Chemicals

Chemical	GS	HT	UT	UR	XP	HD
Acetone	OS	OS	OS	OS	NR	OS
Acrylonitrile	OS	OS	OS	OS	NR	OS
Aniline	NR	NR	NR	NR	NR	NR
Alcohol (Methyl)	OS	G	G	G	OS	OS
Alcohol (Ethyl, Propyl, Isopropyl, Butyl)	G	G	G	G	G	G
Amyl Acetate	E	E	E	E	NR	E
Beer	E	E	E	E	E	E
Benzene	OS	E	E	E	NR	OS
Butyl Acetate	G	G	G	G	NR	G
Butyl Lactate	G	G	G	G	G	G
Bromine	NR	OS	OS	OS	NR	NR
Carbon Disulfide	NR	NR	NR	NR	NR	NR
Carbon Tetrachloride	E	E	E	E	E	E
Chlorobenzene	E	E	E	E	NR	E
Corn Oil	E	E	E	E	E	E
Cyclohexane	E	E	E	E	E	E
Cyclohexanol	E	E	E	E	E	E
Cyclohexanone	OS	G	G	G	OS	OS
Chloroform	NR	NR	OS	OS	NR	NR
Diacetone Alcohol	E	E	E	E	E	E
Diethyl Phthalate	E	E	E	E	E	E
Dimethyl Phthalate	E	E	E	E	E	E
Ethyl Acetate	OS	G	G	G	NR	OS
Ethylene Glycol	E	E	E	E	E	E
Ether	OS	G	E	E	OS	OS
Ethylene Dichloride	NR	OS	OS	OS	NR	NR
Formaldehyde	E	E	E	E	E	E
Gasoline	E	E	E	E	E	E
Glycerine	E	E	E	E	E	E
Gyoxal	E	E	E	E	E	E

Solvents and Other Chemicals (continued)

Chemical	GS	HT	UT	UR	XP	HD
Hydrogen Peroxide – 10%	E	E	E	E	E	E
JP5 Jet Fuel	E	E	E	E	E	E
Juices – Fruit	E	E	E	E	E	E
Juices – Vegetable	E	E	E	E	E	E
Kerosene	OS	E	E	E	G	OS
Lanoline	E	E	E	E	E	E
Lard	G	E	E	E	G	G
Linseed Oil	E	E	E	E	E	E
Mayonnaise	G	E	E	E	G	G
Methyl Ethyl Ketone	NR	OS	OS	OS	NR	NR
Methyl Isobutyl Ketone	NR	G	G	G	NR	NR
Methyl Salicylate – 50% in Toluene	NR	G	G	G	NR	NR
Methylene Chloride	NR	NR	OS	OS	NR	NR
Milk	E	E	E	E	E	E
Mineral Spirits	E	E	E	E	E	E
Mustard	E	E	E	E	E	E
Naphtha	G	E	E	E	G	G
Naphthalene	G	E	E	E	G	G
Oils – Cutting	E	E	E	E	E	E
Oils – Mineral	E	E	E	E	E	E
Oils – Vegetable	G	E	E	E	E	G
Peanut Butter	E	E	E	E	E	E
Perchloroethylene	OS	E	E	E	OS	OS
Phenol – 5%	NR	OS	E	E	NR	NR
Pyridine	NR	OS	OS	OS	NR	NR
Skydrol	E	E	E	E	G	E
Sucrose (Sugar) – Sat.	E	E	E	E	E	E
Toluene	OS	E	E	E	NR	OS
Triacetin	E	E	E	E	E	E
Trichloroethane	G	G	G	G	OS	G
Trichloroethylene	OS	OS	OS	OS	NR	OS
Triethanolamine	OS	OS	G	G	OS	OS
Triethylene Glycol	E	E	E	E	E	E
Urea	E	E	E	E	E	E
Vinegar (Household)	E	E	E	E	E	E
Water	E	E	E	E	E	E
Wine	E	E	E	E	E	E
Xylene	G	E	E	E	OS	G

10/09
Rev. 10/09

Material Safety Data Sheet

STONHARD

1. Identification

Manufacturer:	STONHARD, DIVISION OF STONCOR GROUP, INC
Mailing Address:	1000 EAST PARK AVENUE MAPLE SHADE, NJ 08052
Customer Information:	**(856) 779-7500**
24 Hour Emergency Telephone:	**CHEMTREC: 1-800-424-9300**
	Outside U.S. (703) 527-3887

Product Name:	STONCLAD GS RESIN	**Revision Date:**	6/3/2013
Product Code:	01736/B	**Supercedes Date:**	10/11/2012
Preparer:	Darnell, Benjamin		

2. Hazard Identification

General Advice : Harmful to aquatic organisms. Prolonged or repeated exposure increases the risk. May cause sensitization by skin contact. Irritating to skin.

EFFECTS OF OVEREXPOSURE - EYE CONTACT: MAY CAUSE SLIGHT TRANSIENT EYE IRRITATION. CORNEAL INJURY IS UNLIKELY.

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: PROLONGED EXPOSURE NOT LIKELY TO CAUSE SIGNIFICANT SKIN IRRITATION. REPEATED EXPOSURE MAY CAUSE IRRITATION. HAS CAUSED ALLERGIC SKIN REACTIONS IN HUMANS.

EFFECTS OF OVEREXPOSURE - INHALATION: SINGLE DOSE ORAL TOXICITY IS EXTREMELY LOW. NO HAZARDS ANTICIPATED FROM SWALLOWING SMALL AMOUNTS DURING HANDLING.

EFFECTS OF OVEREXPOSURE - INGESTION: VAPORS ARE UNLIKELY DUE TO PHYSICAL PROPERTIES.

EFFECTS OF OVEREXPOSURE - SYSTEMIC: EXCEPT FOR SKIN SENSITIZATION, REPEATED EXPOSURES ARE NOT ANTICIPATED TO CAUSE ANY SIGNIFICANT ADVERSE EFFECTS.

* This product contains the following chemicals classified by the International Agency for Research on Cancer (IARC) as 1, 2A, or 2B carcinogens:

No IARC components exist in this product.

3. Composition/Information On Ingredients

CAS-No.	Chemical Name	Weight % Range	OSHAPEL	ACGIHTLV
25068-38-6	reaction product: bisphenol-a-(epichlorhydrin) epoxy resin	60-100		
64742-94-5	solvent naphtha (petroleum), heavy aromatic	1-5	500.0 PPM	300.0 PPM

4. First-aid Measures

After Eye Contact: Remove contact lens. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists, consult a specialist.

After Skin Contact: If skin irritation persists, call a physician. Use a mild soap if available. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.

After Inhalation: Move to fresh air. Consult a physician after significant exposure.

After Ingestion: Never give anything by mouth to an unconscious person. Gently wipe or rinse the inside of the mouth with water. Give small amounts of water to drink. Do NOT induce vomiting.

5. Fire-fighting Measures

Flash Point, °F	199.4	**Lower Explosive Limit, %:**	Not determined
Flash Point Method:	PMCC	**Upper Explosive Limit, %:**	Not determined

Suitable Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam

Hazardous Combustion Products: No Information

FIRE FIGHTING INSTRUCTIONS: Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Keep containers and surroundings cool with water spray.

Special Firefighting Protection Equipment: High volume water jet Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. In the event of fire, wear self-contained breathing apparatus. Contains epoxy constituents. See information supplied by the manufacturer.

Other information: No Information

6. Accidental Release Measures

Personal Safety Measures/Environmental Measures/Method of Cleaning/Containment: Use personal protective equipment. Prevent further leakage or spillage if safe to do so. Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13). Prevent product from entering drains. Ensure adequate ventilation. Do not allow material to contaminate ground water system.

7. Handling and Storage

Instructions for Safe Handling: Wear personal protective equipment. Use only in area provided with appropriate exhaust ventilation.

Storage Conditions: Keep locked up or in an area accessible only to qualified or authorised persons. Store in original container. Store in a dry, well ventilated place away from sources of heat, ignition and direct sunlight.

8. Exposure Controls/Personal Protection

ENGINEERING CONTROLS: Ensure adequate ventilation, especially in confined areas. Avoid contact with skin, eyes and clothing.

Respiratory Protection: No personal respiratory protective equipment normally required.

Hand Protection: Rubber or plastic gloves. Rubber or plastic apron Remove and wash contaminated clothing before re-use. Long sleeved clothing.

Eye Protection: Safety glasses

Other Protective Equipment: No Information

9. Physical and Chemical Properties

Physical State:	Liquid
Appearance:	CLEAR / LIGHT YELLOW
Odor:	FAINT EPOXY ODOR
Vapor Pressure:	Less than 1.0 mmHg @ 70F
Vapor Density:	Not determined
Boiling Range:	N.D. - N.D.
Solubility in Water:	INSOLUBLE
Specific Gravity:	1.088
Viscosity:	400 cps
pH:	NON-AQUEOUS

(See section 16 for abbreviation legend)

10. Stability and Reactivity

STABILITY: Stable Stable under normal conditions. No decomposition if stored and applied as directed.

CONDITIONS TO AVOID: Extremes of temperature and direct sunlight.

Materials to Avoid: Acids and bases Strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS: Alcohols Exothermic reaction Thermal decomposition can lead to release of irritating gases and vapours. Carbon dioxide (CO_2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke.

HAZARDOUS POLYMERIZATION: Hazardous polymerisation does not occur.

Notes: Hazardous decomposition products formed under fire conditions.

11. Toxicological Information

Product LD50: No Information

Product LC50: No Information

CAS-No.	Chemical Name	LD50	LC50
25068-38-6	reaction product: bisphenol-a-(epichlorhydrin) epoxy resin	5000 mg/kg, rat, oral	
64742-94-5	solvent naphtha (petroleum), heavy aromatic		

12. Ecological Information

Elimination Information: No Information

Environmental Considerations: No Information

Ecotoxic Effects: No Information

13. Disposal Information

Waste treatment methods: Dispose of wastes in an approved waste disposal facility. If recycling is not practicable, dispose of in compliance with local regulations. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport Information

DOT Proper Shipping Name:	Environmentally Hazardous Substance, Liquid, N.O.S.
DOT Technical Name:	reaction product: bisphenol-a-(epichlorhydrin) epoxy resin
DOT Hazard Class:	9
Hazard SubClass:	N/A
DOT UN/NA Number:	UN3082
Packing group:	III
Resp. Guide Page:	171

15. Hazards Identification

U.S. Federal Regulations: As follows -

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA ‘Hazard Categories’ promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Acute Health Hazard

SARA SECTION 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS-No.
naphthalene	91-20-3

TOXIC SUBSTANCES CONTROL ACT:

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

Chemical Name	CAS-No.
naphthalene	91-20-3

U.S. Clean Air Act:

EPA Coating Category:	Industrial Maintenance Coating
EPA VOC Content Limit (g/l):	450
Product VOC Content (g/l)	4
Thinning Recommendations:	NONE
Application Recommendations:	For professional use only.

* As per the federal EPA definition for coating categories in 40 CFR 59.401.
** Grams of VOC per liter of coating product as applied (mixture of Part A and Part B) per ASTM D2369 Method E.

U.S. State Regulations: As follows -

NEW JERSEY RIGHT-TO-KNOW:

The following materials are non-hazardous, but are among the top five components in this product.

Chemical Name	CAS-No.
pine oil blend	18275200000-5056

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

No PA Right-To-Know components exist in this product.

CALIFORNIA PROPOSITION 65:

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

Chemical Name	CAS-No.
naphthalene	91-20-3

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards.

No Proposition 65 Reproductive Toxins exist in this product.

International Regulations: As follows -

CANADIAN WHMIS:

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

* CANADIAN DSL:

All chemical ingredients included on inventory

16. Other Information

When using, do not eat, drink or smoke.
Wash hands before breaks and at the end of workday.

HMIS Ratings:

Health: 2 **Flammability:** 1 **Reactivity:** 1 **Personal Protection:** C

REASON FOR REVISION:

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

Information presented herein has been compiled from sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief but is not guaranteed to be so. Nothing herein is to be construed as recommending any practice or any product in violation of any patent or in violation of any law or regulation. It is the user's responsibility to determine for himself the suitability of any material for a specific purpose and to adopt such safety precautions as may be necessary. We make no warranty as to the results to be obtained in using any material and, since conditions of use are not under our control, we must necessarily disclaim all liability with the respect to the use of any material supplied by us.

Material Safety Data Sheet

STONHARD

1. Identification

Manufacturer:	STONHARD, DIVISION OF STONCOR GROUP, INC
Mailing Address:	1000 EAST PARK AVENUE MAPLE SHADE, NJ 08052
Customer Information:	**(856) 779-7500**
24 Hour Emergency Telephone:	**CHEMTREC: 1-800-424-9300**
	Outside U.S. (703) 527-3887

Product Name:	STONCLAD GS AMINE	**Revision Date:**	6/3/2013
Product Code:	01736/A	**Supercedes Date:**	4/22/2013
Preparer:	Darnell, Benjamin		

2. Hazard Identification

General Advice : Irritating to eyes and respiratory system. Harmful in contact with skin and if swallowed. Causes severe burns. May cause long-term adverse effects in the aquatic environment.

EFFECTS OF OVEREXPOSURE - EYE CONTACT: CORROSIVE TO THE EYES AND MAY CAUSE SEVERE DAMAGE INCLUDING BLINDNESS. VAPORS MAY BE IRRITATING.

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: CORROSIVE TO THE SKIN. MAY CAUSE SKIN SENSITIZATION.

EFFECTS OF OVEREXPOSURE - INHALATION: CORROSIVE AND MAY CAUSE SEVERE AND PERMANENT DAMAGE TO MOUTH, THROAT & STOMACH. MAY BE MODERATELY TOXIC.

EFFECTS OF OVEREXPOSURE - INGESTION: VAPORS/MIST MAY BE CORROSIVE TO UPPER RESPIRATORY TRACT. MAY CAUSE RESPIRATORY TRACT SENSITIZATION.

EFFECTS OF OVEREXPOSURE - SYSTEMIC: MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION BY INHALATION OR INGESTION.

* This product contains the following chemicals classified by the International Agency for Research on Cancer (IARC) as 1, 2A, or 2B carcinogens:

No IARC components exist in this product.

3. Composition/Information On Ingredients

CAS-No.	Chemical Name	Weight % Range	OSHAPEL	ACGIHTLV
111-40-0	diethylenetriamine	30-60	1.0 PPM	1.0 PPM
80-05-7	4,4'-isopropylidenediphenol	15-40		
31326-29-1	4,4' - isopropylidenediphenol oligomeric reaction products with 1-chloro-2,3-epoxypropane, reaction products with dietheylenetriamine	10-30		

4. First-aid Measures

After Eye Contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lens.

After Skin Contact: Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Use a mild soap if available.

After Inhalation: Move to fresh air. Consult a physician after significant exposure.

After Ingestion: Do NOT induce vomiting. Gently wipe or rinse the inside of the mouth with water. Never give anything by mouth to an unconscious person.

5. Fire-fighting Measures

Flash Point, °F	228.2	**Lower Explosive Limit, %:**	Not determined
Flash Point Method:	PENSKY-MARTENS CLOSED CUP	**Upper Explosive Limit, %:**	Not determined

Suitable Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam

Hazardous Combustion Products: No Information

FIRE FIGHTING INSTRUCTIONS: Keep containers and surroundings cool with water spray. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

Special Firefighting Protection Equipment: High volume water jet Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. In the event of fire, wear self-contained breathing apparatus.

Other information: No Information

6. Accidental Release Measures

Personal Safety Measures/Environmental Measures/Method of Cleaning/Containment: Prevent product from entering drains. Ensure adequate ventilation. Prevent further leakage or spillage if safe to do so. Do not allow material to contaminate ground water system. Use personal protective equipment. Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

7. Handling and Storage

Instructions for Safe Handling: Wear personal protective equipment. Use only in area provided with appropriate exhaust ventilation. Do not breathe vapours or spray mist.

Storage Conditions: Keep locked up or in an area accessible only to qualified or authorised persons. Store in a dry, well ventilated place away from sources of heat, ignition and direct sunlight. Store in original container.

8. Exposure Controls/Personal Protection

ENGINEERING CONTROLS: Avoid contact with skin, eyes and clothing. Ensure adequate ventilation, especially in confined areas.

Respiratory Protection: No personal respiratory protective equipment normally required. Respirator with filter for organic vapor

Hand Protection: Remove and wash contaminated clothing before re-use. Long sleeved clothing. Rubber or plastic apron Rubber or plastic gloves.

Eye Protection: Safety glasses

Other Protective Equipment: No Information

9. Physical and Chemical Properties

Physical State:	Liquid
Appearance:	CLEAR / COLORLESS
Odor:	AMMONICAL
Vapor Pressure:	7.8 mmHg @ 21C
Vapor Density:	Not detemined
Boiling Range:	N.D. - N.D.
Solubility in Water:	INSOLUBLE
Specific Gravity:	1.030
Viscosity:	400 CPS
pH:	Alkaline

(See section 16 for abbreviation legend)

10. Stability and Reactivity

STABILITY: Stable under normal conditions.

CONDITIONS TO AVOID: Direct sources of heat.

Materials to Avoid: Strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke.

HAZARDOUS POLYMERIZATION: Hazardous polymerisation may occur.

Notes: Hazardous decomposition products formed under fire conditions.

11. Toxicological Information

Product LD50: No Information

Product LC50: No Information

CAS-No.	Chemical Name	LD50	LC50
111-40-0	diethylenetriamine	1080 mg/kg, oral, rat	10 mg/L / 1 hour, inh, rat
80-05-7	4,4'-isopropylidenediphenol	11400 mg/kg, oral, rat	
31326-29-1	4,4' - isopropylidenediphenol oligomeric reaction products with 1-chloro-2,3-epoxypropane, reaction products with dietheylenetriamine	540 mg/kg, oral (rat)	

12. Ecological Information

Elimination Information: No Information

Environmental Considerations: No Information

Ecotoxic Effects: No Information

13. Disposal Information

Waste treatment methods: Empty containers should be taken to an approved waste handling site for recycling or disposal. If recycling is not practicable, dispose of in compliance with local regulations.

14. Transport Information

DOT Proper Shipping Name:	POLYAMINES, LIQUID, CORROSIVE, n.o.s.
DOT Technical Name:	(CONTAINS DIETHYLENETRIAMINE, AMINOETHYLPIPERAZINE)
DOT Hazard Class:	8
Hazard SubClass:	N/A
DOT UN/NA Number:	UN2735
Packing group:	III
Resp. Guide Page:	153

15. Hazards Identification

U.S. Federal Regulations: As follows -

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA ‘Hazard Categories’ promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Acute Health Hazard

SARA SECTION 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS-No.
diethylenetriamine	111-40-0
4,4'-isopropylidenediphenol	80-05-7

TOXIC SUBSTANCES CONTROL ACT:

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA components exist in this product.

U.S. Clean Air Act:

EPA Coating Category:	Industrial Maintenance Coating
EPA VOC Content Limit (g/l):	450
Product VOC Content (g/l)	4
Thinning Recommendations:	NONE
Application Recommendations:	For professional use only.

* As per the federal EPA definition for coating categories in 40 CFR 59.401.
** Grams of VOC per liter of coating product as applied (mixture of Part A and Part B) per ASTM D2369 Method E.

U.S. State Regulations: As follows -

NEW JERSEY RIGHT-TO-KNOW:

The following materials are non-hazardous, but are among the top five components in this product.

No NJ Right-To-Know components exist in this product.

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

No PA Right-To-Know components exist in this product.

CALIFORNIA PROPOSITION 65:

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

No Proposition 65 Carcinogens exist in this product.

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards.

No Proposition 65 Reproductive Toxins exist in this product.

International Regulations: As follows -

CANADIAN WHMIS:

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

* CANADIAN DSL:

All chemical ingredients included on inventory

16. Other Information

Wash hands before breaks and at the end of workday.
When using, do not eat, drink or smoke.

HMIS Ratings:

Health:	3	**Flammability:**	1	**Reactivity:**	0	**Personal Protection:**	H

REASON FOR REVISION:

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

Information presented herein has been compiled from sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief but is not guaranteed to be so. Nothing herein is to be construed as recommending any practice or any product in violation of any patent or in violation of any law or regulation. It is the user's responsibility to determine for himself the suitability of any material for a specific purpose and to adopt such safety precautions as may be necessary. We make no warranty as to the results to be obtained in using any material and, since conditions of use are not under our control, we must necessarily disclaim all liability with the respect to the use of any material supplied by us.

APPENDIX 2-A

Waste Analysis Plan

TABLE OF CONTENTS

WASTE ANALYSIS PLAN

WASTE ANALYSIS PLAN

1 PURPOSE AND SCOPE

The purpose of this Waste Analysis Plan (WAP) is to establish necessary methodologies, analytical techniques, and overall procedures that will be followed at the proposed Precious Metals Recovery LLC (PMR) Dry Hills Facility, a dedicated Treatment and Storage Facility (TSF) for mercury and mercury-bearing materials. This will ensure that adequate information is available to manage Resource Conservation and Recovery Act (RCRA) hazardous waste safely, and in accordance with the regulatory requirements. This plan also anticipates that the proposed TSF will treat and store mercury-bearing wastes that it generates, or will send such wastes to an off-site licensed treatment, storage, and disposal facility.

This WAP establishes the following:

- Procedures for determining what waste streams will be acceptable for management at the proposed TSF, and for notifying the waste generator of the waste that will be accepted by the proposed TSF.
- Procedures for characterizing wastes and establishing appropriate management strategies.
- Frequency and methods for sampling and analyzing waste.
- Parameters for which each waste will be analyzed.
- Rationale for the selection of these parameters.
- Methods to ensure compliance with the land disposal restrictions.

This WAP is supported by SW-846 and ASTM Methods. The methods are incorporated by reference (see Section 35.0). Select methods are included in Appendices 2-C and 2-D, respectively. These methods will be followed for compliance with the RCRA permit. Procedures not specifically delineated and authorized in the permit may be updated as appropriate without prior NDEP approval.

For example, PMR may establish a procedure which requires two workers to be present while containers of calomel are being staged at the calomel unit. Upon successful operation of the unit during start up, it may be demonstrated that only one worker is required to operate the unit. In that event, the requirement could be changed to require one worker to be present during unit operation. The change in procedure would not require NDEP approval prior to implementation because the RCRA permit did not require two workers be present to operate the unit.

2 IDENTIFICATION OF WASTES TO BE MANAGED

Wastes Generated Off-Site

The proposed TSF will accept wastes for storage and treatment in three primary forms: elemental mercury, calomel slurry, and spent activated carbon. The proposed TSF can accept wastes with waste codes D002, D004, D005, D006, D007, D008, D009, D010, and D011. The proposed TSF is designed to recover mercury from the accepted waste streams. Other metal contaminants will pass through the process. The waste residue will be labeled with all applicable waste codes when it is shipped to an appropriate off-site treatment and disposal facility. The principal treatment activity at the proposed TSF is the processing of mercury-bearing materials for the recovery of elemental mercury. Recovered elemental mercury will be either transferred for sale or to a National Repository for long-term storage and management. Elemental mercury will also be accepted for interim storage at the proposed TSF pending the availability of a National Repository.

Wastes Generated On-Site

Elemental mercury will be reclaimed from accepted wastes as a result of successful treatment. Treatment residues resulting from the processes will include, but not be limited to, spent activated carbon from carbon filters, sludge, residues, and hygiene dust collector dust which may carry one or more of the following waste codes: D002, D004, D005, D006, D007, D008, D009, D010, and D011. Waste residue will be labeled with all applicable waste codes when it is shipped to an appropriate off-site treatment and disposal facility.

Small amounts of waste will be generated as a result of the proposed TSF's operations. Housekeeping waste will be comprised of wipes, rags, towels, paper goods, booties, gloves, disposable coveralls, disposable sampling devices, etc. These housekeeping materials may contain mercury or other chemicals used in the processes. Continuous ambient air monitoring devices and discrete sampling instruments will also generate spent sample cartridges or other small amounts of waste.

The activities necessary to characterize and validate that received materials are within acceptable limits will generate some mercury-containing waste materials (gloves, respirator cartridges, sampling devices, wipes, paper towels, discarded sample containers, etc.). The fingerprinting analyses conducted on-site will generate another lab waste stream.

The hygiene air ventilation system will generate spent carbon filters that may contain mercury. No vehicle maintenance or fueling will occur at the proposed TSF.

3 WASTE CHARACTERIZATION - 40 CFR 264.13(b)

A hazardous waste determination will be made for all waste streams generated, stored, or treated at the proposed TSF. The test methods to measure the parameters discussed throughout this document are identified in Table 1. Whenever possible, the proposed TSF will use established methods from *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)*, US EPA, 1986 and its updates. If a method has not been established by the EPA, an American Society for Testing and Materials (ASTM) method will be used.

When a contracted laboratory performs analyses using a method found in SW-846, and the method is one that is certifiable by the State of Nevada, the laboratory performing the analyses will be certified for that method.

Table 1: Analytical Methods for the Proposed TSF Waste Streams

PARAMETER	METHOD NUMBER
Arsenic (ICP)	6010A
Ash	D482-87
Barium (ICP)	6010A
Cadmium (ICP)	6010A
Chromium (ICP)	6010A
Lead (ICP)	6010A
Mercury Cold Vapor (AA)	7470A, 7471A
Paint Filter	9095
pH Electrometric	9040B
pH Paper	9041A
pH Waste	9045C
Physical Description	D4979-89
Selenium (ICP)	6010A
Silver (ICP)	6010A
Specific Gravity	D1429-86-MOD
TCLP	1311
Zinc (ICP)	6010A

Profile Process for Waste Generated Off-site

Before the proposed TSF can approve a waste stream for storage or treatment, a completed Waste Profile Sheet must be provided by the waste generator. When the profile information is determined to be complete, it will be reviewed to assess the acceptability of the waste stream for management at the proposed TSF. This profile review and approval occurs prior to notifying the waste generator that the waste stream is acceptable for management at the proposed TSF.

The Waste Profile Sheet contains information about the waste generator, physical and chemical characteristics of the waste, the process that generated the waste, applicable waste codes, applicable DOT shipping name, and the waste generator certification that the information provided is accurate. The waste generator must also certify that the waste is not one of the types prohibited at the proposed TSF. The waste profile form, included as Attachment 2-A-1 of this document, shows the information needed to properly manage the waste.

The Waste Profile Sheet evaluation includes a review of:

- The appropriate documents to ensure that acceptance of the waste material at the proposed TSF will be in compliance with company policies and all applicable federal, state, and local laws and regulations.
- The available capacity in the treatment and storage facilities to ensure that the waste material can be satisfactorily managed by the proposed TSF.
- The waste characteristics to ensure that the material is compatible with other wastes which are present.
- The waste characterization information and available analytical data to ensure that the waste material does not contain any specific waste codes, compounds, or properties which are prohibited at the proposed TSF.

All profiles for all waste streams must be approved by the proposed TSF's manager. Final approval is indicated by a dated and initialed "APPROVED" stamp on the profile review form. Following approval of the candidate waste stream, but prior to shipment of the waste, the waste generator will be notified in writing that the proposed TSF has the appropriate permits for, and will accept the waste stream in accordance with 40 CFR 264.12(b).

At a minimum, the profile evaluation is repeated:

- When a waste generator notifies the proposed TSF that the process generating the waste has changed (e.g., when the raw materials to the process have changed).

- If the proposed TSF has reason to suspect that the waste is in non-conformance with profile documentation.
- Annually.

For an annual recertification, the proposed TSF will ask the waste generator to note any changes in the waste stream or to certify that the waste stream has not changed. After a review of the waste generator's certification, the profile will be recertified. If there are changes in the waste stream which do not result in the waste stream being unacceptable, the profile will be updated and recertified. If there are changes in the waste stream which result in the waste stream becoming unacceptable, the profile will be canceled and the waste generator will be notified.

A unique identification number will be assigned to the waste stream. This number is used to track the material through the subsequent stages of the waste management process.

All wastes received will have been characterized in advance, and a profile form will be kept on file at the proposed TSF. Before unloading, each shipment is checked against the manifest to verify that the type and quantity of the waste agrees with the manifest.

Upon receipt, containers will be visually inspected to verify proper labeling, packaging, and paperwork. Each incoming load will be fingerprinted according to the frequency specified in Table 4 (found in Section 12) to confirm the visual observation. When the waste is accepted, the shipment will be entered into the operating record. This information includes the waste stream description, EPA codes, quantity, date of generation, date received at proposed TSF, storage location within the proposed TSF, treatment date, and date it (or treatment residue) was shipped off site for disposal.

Fingerprinting

The proposed TSF will document in the operating record the waste characterization procedures which apply to each waste stream accepted at the proposed TSF. Fingerprint analyses performed in the on-site lab are identified in Table 2.

Table 2: Fingerprint Analysis

Parameter	Rationale for Selection
Physical Description	Used to determine the general characteristics of the waste stream. Used to detect discrepancies in waste types.
Weight of Container	Use to determine load discrepancies.
pH	Used to determine the corrosivity of the waste to ensure proper storage of the waste.
Density	Used to determine purity of elemental mercury.

Viscosity	Needed to determine the solids concentration of the waste stream. Only applies to calomel.
Volatile Organic Concentration	Ensure the plant spaces will not exceed 500 ppm VOC.
XRF Evaluation	Used to determine the concentration of metals present.

Elemental Mercury Fingerprinting

Elemental mercury will be fingerprinted for:

- Physical description.
- Weight of container.
- pH.
- Density.

Calomel Fingerprinting

Calomel will be fingerprinted for:

- Physical description.
- Weight of container.
- pH.
- Density.
- Viscosity.
- XRF Evaluation.

Spent Activated Carbon Fingerprinting

Spent activated carbon will be fingerprinted for:

- Volatile organic concentration.
- Physical description.
- Weight of container.
- pH.
- XRF Evaluation.

Waste Generated On-Site

Waste generator knowledge will be the primary basis for on-site generated wastes. Wastes generated on-site are expected to be characteristic D009 wastes and will be analyzed to establish if applicable land restriction standards have been met or if additional treatment is required at the proposed TSF. On-site generated wastes will be tested for total metals to determine if other constituents which are limited by Land Disposal Restrictions (LDR) require treatment. Waste generated at the proposed TSF will meet the waste profiling requirements of the disposal facility.

4 LOAD ACCEPTANCE

Upon arrival at the proposed TSF, the air in the transport vehicle will be sampled to help determine if a spill has occurred, then the waste will be fingerprinted and analyzed as described above prior to it being accepted. TSF personnel will compare the waste characteristics of the actual load with those listed on the profile and on the waste manifest. The proposed TSF will determine the acceptability of the waste based on the level of agreement between the waste profile and the load analyses.

Waste will not be accepted until the waste has been determined to match the profile or all discrepancies have been adequately resolved (e.g., corrected manifest).

5 HANDLING OF DISCREPANCIES

Potential discrepancies for waste shipments include differences in quantity or type between the manifested waste and the waste actually received. To check for quantity discrepancies, the number and weight of containers will be reconciled with the manifest. The number of containers must be correct; there is no tolerance.

Discrepancies involving the type of waste are determined by inspection or by comparing the analyses of the incoming load to the profile information and the manifest description. Changes in the proper shipping name, weight, etc. will be noted. If any of these conditions occur, the manifest is considered discrepant, and actions will be taken to resolve the discrepancy.

If discrepancies in the quantity of waste occur, the waste generator will be contacted to resolve the difference. A discrepancy must be resolved before a waste can be accepted. If discrepancies concerning the type of waste occur, one or more of the following actions will be taken to resolve the discrepancy:

- Additional analyses may be necessary in order to resolve discrepancies or to re-profile the waste.

- The waste generator will be contacted by the proposed TSF. In cases where the waste is amenable to treatment at the proposed TSF, the discrepancy can be resolved between the proposed TSF and the waste generator. This may involve creating a new profile for the waste or updating the existing profile. Waste which is not amenable to acceptance by the proposed TSF will be rejected.

Manifest discrepancies must be resolved between the proposed TSF and the waste generator, and will be noted on the manifest and in the operating record. If the discrepancies are not resolved within 15 days, the Administrator of the NDEP will be notified.

6 GENERATOR CERTIFICATIONS

Land Disposal Restriction Certification

The waste generator will attach the completed Land Disposal Restriction certification to each manifest for each shipment. The certification will be recorded in the operating record.

Waste Organic Concentration Certification

The waste generator will attach the completed Organic Concentration certification to each manifest for each shipment. The certification will be recorded in the operating record.

7 SHIPMENT EVALUATION

Materials will arrive by truck at the proposed TSF. Containers or pallets in the transportation vehicle will be monitored for mercury vapor and visually inspected for integrity, leaks and spills. After the initial inspection and manifest confirmation, a forklift will transport the pallets from the truck to the receiving and inspection area, where the containers and pallets will undergo a more thorough inspection for leaks, cracks, dents, beading, corrosion, and seal integrity.

Mercury vapor levels will be monitored, and containers will be inspected and sampled in the ventilated receiving and inspection area. During this inspection, the volatile organic concentration in carbon containers will be monitored.

Material arriving at the proposed TSF will be fingerprinted before storage and processing. Fingerprinting will consist of visual inspection, vapor monitoring, sampling, and testing of the material. Testing of samples will be performed in the on-site lab.

8 SAMPLING

The appropriate representative sampling techniques, devices, and containers are selected from the EPA document, *Test Methods for Evaluating Solid Wastes (SW-846)* or *American Society for Testing and Materials (ASTM)* methods. Specific sampling methods (Table 3) and analytical methods (Table 1) are specified.

Waste sampled at the proposed TSF will consist of new waste, unknown waste, waste from changed processes, and waste sampled for annual re-verification analysis. Representative samples will be collected and handled in accordance with the procedures and protocols identified in Table 3. At a minimum, the following safety precautions are used when sampling waste materials:

- Chemical resistant gloves and safety glasses will be used while sampling all waste.
- Based on the chemical hazards and splash potential, protective clothing and a splash shield or respirator may also be utilized.
- All necessary equipment and materials will be readily available and staged prior to sampling.

Table 3: Waste Sampling Matrix

Type of Waste	Sampling Device
Free Flowing Liquids/Slurries	Sampling Port, Pump/Dipper
Sludges	COLIWASA
Moist Powder/Granules	Trier/Spoon
Dry Powder/Granules	Trier/Spoon
Large Grained Solids	Thief/Spoon
Debris (i.e. Rags, Gloves, Towels, etc.)	Large Trier/Spoon, Rag

The rag technique will be used for sampling solid material such as rags, gloves and paper towels. After a container has been selected, it will be opened and a representative sample collected and placed in the sample container. One or more of the varied materials (e.g. gloves, rags, paper, plastic, etc.) will be sampled depending on the mix of the container.

A variety of sampling equipment and materials will be used to collect waste samples. Types of equipment and specified sampling methods are described in the SW-846 publication.

Sampling of Containers

Container shipments will be sampled and the sample composites will be analyzed for the acceptance parameters listed in Table 2. If the wastes can be managed and are not prohibited at the proposed TSF, the containers can then be accepted.

All of the analyses needed for the acceptance and storage functions are performed during incoming load verification. Treatment of the waste changes its characteristics and requires additional sampling, inspection, and analysis to determine the appropriate disposal of the waste.

A random sampling strategy will be employed to sample incoming shipments of containerized waste. Samples from containers holding the same type of waste may be composited. The following procedure will be used to determine how many containers will be sampled and which samples will be composited. Each container will be opened and visually inspected. Wastes on a single load that have the same profile number and DOT description (excluding waste codes), and appear to be of the same waste type will be grouped together. Containers in each of these groups will be sampled as described below (Table 4 found in Section 12). The samples within each separate group may be composited for analysis.

A unique tracking number will be assigned to each container.

Samples will be taken from locations displaced vertically throughout the waste. For liquids (or liquids with precipitated solids), the operator performing the sampling will use a COLIWASA or equivalent. The sampling device will be inserted into the container from the top and is pushed down slowly until the bottom of the container is reached. The device will be sealed to retain the contents. The contents of the sampling device will then transferred to a polyethylene or glass bottle, which will be labeled with waste identification information. The sampling device may also be stoppered at both ends, wiped dry with a disposable cloth, and then transferred to the lab for analysis.

A trier or thief will be used to sample containers that are solid in nature. These containers are generally filled with dirt and sludges. Several areas from the container will be sampled and composited into a jar in order to ensure a representative sample. The operator performing the sampling will remove a sample that uniformly represents the waste composition of the container (i.e., all layers and phases will be represented in the sample).

Sampling of Tanks

A representative sample will be collected on either the side or bottom of each tank.

Frozen Waste

The proposed TSF will not sample waste that is frozen. The truck will park in the truck unloading area until the waste can be sampled. A sample will then be collected as outlined in this section.

Sampling of Treatment Residue

Samples of incoming waste, treatment residue, filter cake, and hygiene dust collector dust will be collected to determine if LDR treatment standards are met. For retort residues, grab samples may be taken at the end of processing batch. Sampling events will be recorded in the operating record. For hygiene dust collector dust, a sample will be taken in preparation for off-site disposal.

9 LDR TREATMENT STANDARDS

Waste Description (D009 Mercury)	**Management**	**LDR Requirement (Non-wastewater)**	**Treatment Standard**
Elemental Mercury	Storage	N/A (not disposed)	N/A
Calomel	Treatment	High mercury inorganic subcategory (D009 with total mercury greater than 260 mg/kg)	UHC applies to the treatment residues.
Spent Activated Carbon	Retort	High mercury inorganic subcategory (D009 with total mercury greater than 260 mg/kg)	Retorting (RMERC) UHC may apply to the treatment residues.
Filter Cake	Pretreated and then retorted	High mercury inorganic subcategory (D009 with total mercury greater than 260 mg/kg)	Retorting (RMERC) UHC applies to treatment residues.

Treated Waste

Waste Description	Management	LDR Requirement (Non-wastewater)	Treatment Standard
Hygiene Dust Collector Dust	Retorted	Low mercury subcategory (D009 with total mercury less than 260 mg/kg)	0.20 mg/L TCLP and meet 40 CFR 268.48 standards.
HEPA Filter Cartridge / Air Filters	Retorted	Low mercury subcategory (D009 with total mercury less than 260 mg/kg)	0.20 mg/L TCLP and meet 40 CFR 268.48 standards.

Other Waste

Waste Description	Management	LDR Requirement (Non-wastewater)	Treatment Standard
Empty or Crushed Metal Drums	Retorted	N/A not a hazardous waste (RCRA empty containers).	N/A
Plastic drums	Triple rinsed RCRA empty containers.	N/A not a hazardous waste (RCRA empty containers).	N/A
Monitoring equipment waste (e.g. Jerome monitor).	Vendor responsibility	N/A	N/A
Equipment Cleaning Wastes	Use the waste description for the waste produced from the equipment.	N/A	N/A

Drummed consolidation waste will be randomly sampled at the frequency outlined in Table 4 (in Section 12). Samples will be obtained in the first quarter of each calendar year.

All sample containers used during a sampling event will be new, and certified clean from the analyzing laboratory. Container selection will be based on the container and content compatibility, physical state, and sample volume. A label will be attached to each sample container which will include the following minimum information:

- Sample number.
- Sampler's name.
- Date.
- Time.
- Location.

In addition to the information included on the label, the chain of custody, which accompanies all waste characterization samples, will also include the following:

- Composite or grab sample.
- Number of containers.
- Remarks section.
- Relinquishment signature block.

The proposed TSF will ensure that all samples are preserved as specified in SW-846.

10 REPROCESS

Should residue not meet LDR standards, it may be either reprocessed or may be shipped off-site to an appropriately licensed facility.

11 LABORATORY SELECTION

A Nevada certified lab may be used for waste characterization of on-site generated wastes as specified in this plan. Analytical methods will be in accordance with this plan. After a sample has been taken and analyzed, the container will be sealed to ensure that no changes are made to the composition.

12 FREQUENCY OF ANALYSIS

The wastes that will be stored treated at the proposed TSF are derived from the processing of mined ores. The processes that generate these wastes are well established and stable.

In the event a waste generating process changes, the proposed TSF will be given advanced notice of the intended change. The waste will be analyzed after the change occurs and prior to the first shipment being delivered to the proposed TSF.

The proposed TSF will use the following resources to characterize the waste streams treated and managed at the facility:

- MSDS.
- Waste generator process knowledge.
- Laboratory analytical results.
- DOT Emergency Response Guide.
- DOT hazard classification and supporting test data.

Table 4 below is based on the cube root basis found in ASTM Method D140-70. Due to the small load size, this selection of samples is reasonable.

Table 4: Frequency of Analysis

Average Monthly Drum Number	Aliquots Selected
1	1
2 to 8	2
9 to 27	3
28 to 64	4

Frequency of Analysis for Elemental Mercury, Calomel, and Spent Activated Carbon

The chemical composition of the recovered elemental mercury is well known and consistent. While these waste streams are not routinely analyzed prior to being treated, the proposed TSF will review all waste streams on an annual basis or any time the waste generating process changes.

Frequency of Analysis for Routine Wastes

The processes at the proposed TSF will generate routine waste streams (e.g., residues from retorted filter cake). These waste streams will be evaluated initially at the beginning of operations, and annually updated to verify accuracy. The waste characterization will also be reevaluated whenever the process that generated the waste changes to determine if the process change altered the characteristics of the waste stream.

Frequency of Analysis for Process Waste Water

Samples from each batch of process waste water will be drawn and analyzed. The samples will be analyzed prior to transporting the process waste water off-site.

The National Pretreatment Program identifies specific requirements that apply to all industrial user sources of wastewater intended to be sent to a Publicly Owned Treatment Works (POTW). The proposed TSF will follow these requirements for every batch of process wastewater.

Each sample will be analyzed by Method 245.7 (Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry Rev. 2.0.)

The analytical results from the pretreated process waste water will be compared to the standards for the contracted POTW prior to shipment.

13 SCREENING FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES

The only liquid wastes that will be accepted at the proposed TSF are elemental mercury and calomel as a slurry (a chemical suspension in an aqueous solution).

Ignitable Screening

No ignitability testing is necessary, because neither elemental mercury nor calomel is ignitable.

Reactive Screening

No reactive testing is necessary, because neither elemental mercury nor calomel is reactive with water.

Incompatible Screening

No incompatibility testing is necessary, because elemental mercury and calomel are compatible wastes. These waste streams are compatible with all other wastes to be managed at the PMR TSF.

14 OUTBOUND MANIFESTS

Wastes Generated On-Site

Once it has been determined that the residue will be shipped off-site for final treatment and disposal, the outbound manifest will be prepared, bearing all appropriate waste codes. Analytical data indicating that applicable LDR standards have been met will be attached. For residues that fail LDR treatment standards, a statement will be attached indicating that further treatment is necessary prior to land disposal. Also, waste generator certifications will be attached as appropriate to each outbound manifest.

Wastes Generated Off-Site

Hazardous waste received at the proposed TSF will be accompanied by a manifest. Before acceptance of the waste, the manifest and associated land ban form (if applicable), will be reviewed for accuracy, completion, and the waste codes will be checked for acceptability. The proposed TSF will primarily accept materials and waste classifiable as D009. These wastes may also bear one or more of the following waste codes: D002, D004, D005, D006, D007, D008, D010, and D011.

Upon receipt of a shipment, the proposed TSF personnel will review the hazardous waste manifest and the land ban notification form prepared by the waste generator. The manifest will be reviewed to ensure it is properly signed by the waste generator and transporter, and that it contains all the information required by 40 CRR 262. In addition, the proposed TSF personnel will check the manifest to determine whether there are any significant discrepancies in the quantity actually received in the shipment. Significant discrepancies in quantity of bulk shipments occur when the weight of a shipment varies by greater than 10%.

15 ENSURE COMPLIANCE WITH LDR REQUIREMENTS

Hazardous wastes will be treated according to the LDR treatment standards contained in 40 CFR 268. Each waste for which a treatment standard has been set will be evaluated for the applicable parameters. Analytical results completed in support of the LDR requirements will be entered in the proposed TSF's operating record.

Hazardous wastes resulting from operations at the proposed TSF will be analyzed to determine if the LDR standard has been met. Hazardous wastes that exceed the applicable LDR treatment standards for mercury (D009) will be processed in the retort, if applicable, or sent to an appropriately licensed treatment facility. A LDR notification required by 40 CFR 268.7 will accompany the shipment of hazardous waste, identify the waste as LDR regulated, and indicate that further treatment is necessary prior to disposal. In addition to the LDR notification, the waste profile sheet and current analytical data sheets for the waste stream will be provided to the receiving treatment facility.

Hazardous wastes that meet the applicable treatment requirements for disposal and no longer exhibit a hazardous characteristic, will be prepared for shipment to an appropriately licensed landfill with no further treatment necessary. A LDR certification, including analytical records to support the certification, will be prepared and accompany the shipment of waste to the receiving facility.

ATTACHMENT 2-A-1

Profile Instructions and Form

PMR LLC

460 West 50 North, Suite 500
Salt Lake City, UT 84101

Profile #: ____________________

A. CUSTOMER INFORMATION

Generator: ____________________
Facility Address: ____________________
(No PO Box)
Mailing Address: ____________________
City/State/Zip: ____________________
Technical Contact: ____________________
Phone: ____________ Fax: ____________

☐ Check if Billing is Same
Billing Company: ____________________
Billing Address: ____________________
City/State/Zip: ____________________
Billing Contact: ____________________
Phone: ____________ Fax: ____________
Email: ____________________

NAICS#: ________ ☐CESQG ☐SQG ☐LQG EPA ID # ____________________

B. SHIPPING INFORMATION

1. US DOT Shipping Name ____________________ 2. Hazard Class ________
3. UN/NA# ____________ 4. Packaging Group ____________ 5. RQ ____________
6. Container Type: ☐1 tonne pig Size ________ ☐Drums ☐Other ________ Quantity ______
7. Frequency: ☐Year ☐QTR ☐Month ☐1 Time ☐Other

C. GENERAL MATERIAL & REGULATORY INFORMATION

1. Common name for this waste ____________________
2. Process generating the material ____________________
3. Describe physical appearance of waste ____________________
4. Describe odor of waste: ☐None ☐Slight ☐Strong Describe ____________________
5. Knowledge is from: ☐Lab Analysis ☐MSDS ☐Process/Generator knowledge

☐Yes ☐No Is the waste restricted under EPA Land Disposal Restrictions (40 CFR 268): *If yes, please complete LDR form*

☐Yes ☐No Is the material <500 PPMW VOC as generated?

☐Yes ☐No Is the waste, or generating facility, subject to regulation under 40 CFR Part 61 Subpart FF (Benzene Rule) of NESHAPS?

☐Yes ☐No State waste codes | | | |

☐Wastewater ☐Non-wastewater ☐Debris

☐Yes ☐No CERCLA Regulated (Superfund) Waste

☐Yes ☐No Alternative standards for soil?

☐Yes ☐No EPA Hazardous Waste (list codes)

☐Yes ☐No Contains UHCs/Constituents of Concern: List in Section D
☐Yes ☐No Has the waste been treated after the initial point of generation?
☐Yes ☐No Exempt Waste: if Yes, list ref. 40 /CFR________
Source Code G ______ Form Code W ______ Mgt. Method H ______

D. MATERIAL COMPOSITION (Physical/Chemical)

(Range Total > or = 100%) Values are ☐TCLP ☐ TOTALS
(include additional sheets as necessary)

	Typical Value	Unit	Range

E. DOES THE WASTE EXHIBIT OR CONTAIN ANY OF THE FOLLOWING: ☐Yes ☐No

React. Sulfides ______ppm
React. Cyanides ______ppm
Halogenated Organic Compounds? (per 40 CFR 268, Appendix III)
Water/Air (Pyrophoric) React. — Organic Peroxide
Thermally Unstable — Shock Sensitive
TSCA Regulated PCB Waste — Tires
Regulated Med/Infectious Waste — Pyrophoric
Compressed Gasses — Radioactive
Exempt RAD — Oxidizer
Explosive

If yes, to any item, it cannot be accepted at PMR TSF

F.PHYSICAL CHARACTERISTICS

pH Range ______ to ______

1. Flash Point:______ ^{O} F (if <140^{O} F) 2. Typical pH:________ pH Range: ☐ ≤ ☐ > 2, <12.50 ☐ ≥ 12.5

☐Yes ☐No Possibility of incidental liquids from transportation?

☐Yes ☐No Does waste pass the EPA specified paint filter test? *(Pass is a solid)*

G.GENERATOR'S CERTIFICATION: ☐Yes ☐No **I certify this material may be disposed of without further treatment.**

Certification Statement: I certify under penalty of law that I am familiar with this waste stream through analysis and/or process knowledge, and that all information provided is true, accurate, representative and complete, and that all known or suspected hazards have been disclosed. Furthermore, I certify that this form was completed in accordance with the instructions provided.

Print Name: ____________________
Signature: ____________________ Title: ____________________ Date: ____________

(Facility Use Only)
First review ____________ Second review ____________ Final Review ____________
Date Approved: Date Denied:

PMR LLC

460 W. 50 North

Suite 500

Salt Lake City, UT 84101

WASTE PROFILE INSTRUCTIONS

Section A. Customer Information

Provide BGMI generating mine's name, facility address, and the mailing address (if different from facility address).

Provide the generator's EPA status (e.g. CESQG, SQG, **LQG**) and EPA ID number.
The National Industry Classification Code (NAICS) associated with gold mining is **# 212221**.

Provide a technical contact name and telephone number for technical inquiries and resolution of non-conforming waste loads. If you wish to receive electronic notifications, please provide the appropriate email address.

Section B. Shipping Description

Provide the following DOT regulation information:

1. Proper Shipping Name that will appear on the manifest[1];
2. Hazard Class;
3. UN or NA number;
4. Packing group; and,
5. Reportable quantity (RQ), if applicable.

<u>For all wastes</u>:

6. Provide the container type(s) that will be used for shipments. Provide an estimated annual quantity and size of container in tons, pounds, and/or gallons, etc. If estimates are not known, please write "unknown".
7. Provide estimated frequency[2] of waste shipments.

Section C. General Material and Regulatory Information

<u>Items 1 through 5</u>

1. Provide the common name for this waste (e.g., elemental mercury, calomel, spent carbon, etc.).
2. Describe the process that generated the waste, include additional sheets as necessary. Please provide as much information as possible in order to identify safety hazards associated with the waste.

---

[1] Refer to 49 CFR §172.101- Hazardous Materials Table, and 49 CFR §172.101 Appendix A for reportable quantities (RQ's).

[2] This information enables PMR to determine if the profile will need to be renewed on its anniversary date, which PMR may be required according to the facility permit.

3. Describe the physical appearance of the waste (e.g., soil with scrap metal) in order to perform a visual confirmation.[3]
4. Describe any odor that the waste may have.
5. Enter the source of knowledge used to determine the waste's regulatory status[4]. Check all boxes that apply. Please attach the appropriate information such as lab results and/or Material Safety Data Sheets (MSDS).

Information on Remaining Items

- 40 CFR §264.1080 and §265.1080- Subpart CC regulate waste material greater than 500 ppmw VOC's managed in tanks and containers.
- US EPA waste codes are found in 40 CFR Part 261-Identification and Listing of Hazardous Waste.
- Provide a completed LDR form, which is available from PMR.
- 40 CFR §268.2 defines US EPA's "Treatment sub-categories" for wastes requiring LDR treatment.
- 40 CFR §268.2 and §268.40- Treatment Standards for Hazardous Wastes define "Underlying Hazardous Constituents" (UHCs).
- US EPA defines "treatment" of hazardous waste in 40 CFR §260.10 – Definitions.
- For form codes, source codes and management codes, see EPA's Hazardous Waste Report Instructions and Forms at: http://www.epa.gov/epaoswer/hazwaste/data/br05/forms.htm

Section D. Material Composition (physical/chemical)

Describe the physical nature of the material and identify important chemical constituents. For example, if a waste is primarily soil and debris and is contaminated with oil, then describe the percentage and range of soil and debris and quantify the concentrations of oil compounds measured in the mixture.

The description should be as informative as possible. The sum of the percentages must equal 100%.

Chemical concentrations must include appropriate units of measure and differentiate TCLP results from Total results. List the typical value or range of concentrations. If additional space is needed, attach a list. List all TRI reportable components.

Section E. Does the Waste Exhibit or Contain the Following

- The EPA classifies oxidizers with an EPA waste code of D001. The correct DOT reference for oxidizers is 49 CFR §173.127. In general if the material has a DOT hazard class of 5.1, it is an EPA waste code of D001.
- Is the waste explosive?[a] See 40 CFR §261.23
- Does the waste contain organic peroxide?[a]
- Is the waste shock sensitive?[a] See 40 CFR §261.23

[3] Any material that does not reasonably match the physical description will be placed on hold and off-loading delayed while PMR contacts the broker/generator to resolve the discrepancy.
[6] Refer to 40 CFR §262.11- Hazardous Waste Determinations.

- Is the waste pyrophoric?[a] See 40 CFR §261.21 and 23
- Is the waste radioactive?[b]
- Is the waste exempt radioactive material? [b]
- Does the waste contain halogenated organic compounds? See §268 Appendix III.
- Does the waste contain reactive sulfides? If "Yes" provide the concentration in ppm- See 261.23
- Does the waste contain reactive cyanides? If "Yes" provide the concentration in ppm-. See 261.23. If the material contains reactive cyanides that cause the material to be classified as waste code D003, then the amenable portion of the cyanides will need to be determined. Amenable cyanides are amenable to treatment by chlorination. Prior to land disposal, both the total and the amenable cyanides must meet the LDR treatment standards (i.e., 590 ppm and 30 ppm, respectively).
- Is the waste reactive to air or water?[a] See 40 CFR 261.23
- Is the waste thermally unstable?[a] See 40 CFR 261.21 and 23
- Is the waste TSCA PCB regulated?[c]
- Is the waste medical/infectious?[a]
- Are there compressed gasses?[d]

[a]Explosive material is not accepted at the PMR TSF.
[b]Radioactive material is not accepted at the PMR TSF.
[c]TSCA PCB in not accepted at the PMR TSF.
[d]Compressed gasses are not accepted at the PMR TSF.

Section F. Physical Properties

1. Is the waste flash point <140^0 F? See 40 CFR §261.2 If "Yes", provide the flash point.
2. Provide the typical pH range. See 40 CFR §261.22
3. If the material is a solid, determine whether or not the material has the potential for the presence of incidental liquids due to transport (rain, etc.) or other reasons.
4. Does the waste pass the paint filter test when shipped?

Section G. Certification

If the material is:

- A restricted waste meeting LDR, mark the box "Yes"; and submit the appropriate LDR signed certification with the first shipment.
- A restricted waste needing treatment prior to landfill, mark the box "No" and submit the appropriate LDR documentation.
- Print and sign name with title, and date the form.

For further guidance, please use the Code of Federal Regulations.

APPENDIX 2-B

Chemical Compatibility Chart

EPA's Chemical Compatibility Chart

EPA-600/2-80-076 April 1980

A METHOD FOR DETERMINING THE COMPATIBILITY OF CHEMICAL MIXTURES

Please Note: This chart is intended as an indication of some of the hazards that can be expected on mixing chemical wastes. Because of the differing activities of the thousands of compounds that may be encountered, it is not possible to make any chart definitive and all inclusive. It cannot be assumed to ensure compatibility of wastes because wastes are not classified as hazardous on the chart, nor do any blanks necessarily mean that the mixture cannot result in a hazard occurring. Detailed instructions as to hazards involved in handling and disposing of any given waste should be obtained from the originator of the waste.

CODE	CONSEQUENCE
H	Heat Generation
F	Fire
G	Innocuous and non-flammable gas generation
GT	Toxic Gas formation
GF	Flammable Gas formation
E	Explosion
P	Violent Polymerization
S	Solubilization of toxic substance
U	May be hazardous, but Unknown

#	REACTIVITY GROUP NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	101	102	103	104	105	106	107
1	Acids, Mineral, Non-oxidizing	1																																								
2	Acids, Mineral, Oxidizing		2																																							
3	Acids, Organic		G H	3																																						
4	Alcohols and Glycols	H	H F	H P	4																																					
5	Aldehydes	H P	H F	H P		5																																				
6	Amides	H	H GT				6																																			
7	Amines, Aliphatic and Aromatic	H	H GT	H		H		7																																		
8	Azo Compounds, Diazo Compounds and Hydrazines	H G	H GT	H G	H G	H			8																																	
9	Carbamates	H G	H GT						G H	9																																
10	Caustics	H	H	H		H				H G	10																															
11	Cyanides	GT GF	GT GF	GT GF					G			11																														
12	Dithiocarbamates	H,F GF	H,F GF	H,GT GF		GF GT		U	H G				12																													
13	Esters	H	H F						H G		H			13																												
14	Ethers	H	H F												14																											
15	Fluorides, Inorganic	GT	GT	GT												15																										
16	Hydrocarbons, Aromatic		H F														16																									
17	Halogenated Organics	H GT	H,F GT					H GT	H G		H GF	H						17																								
18	Isocyanates	H G	H,F GT	H G	H P			H P	H G		H,P G	H G	U						18																							
19	Ketones	H	H F						H G		H	H								19																						
20	Mercaptans and Other Organic Sulfides	GT GF	H,F GT						H G									H	H	H	20																					
21	Metals, Alkali and Alkaline Earth, Elemental	H,F GF	H,F GF	H,F GF	H,F GF	H,F GF	GF H	GF H	GF H	GF H	GF H	GF H	GF,H GT	GF H				H E	GF H	GF H	GF H	21																				
22	Metals, Other Elemental & Alloys as Powders, Vapors, or Sponges	H,F GF	H,F GF	G F					H,F GT	U	GF H							H E	GF H		H,F GF		22																			
23	Metals, Other Elemental & Alloys as Sheets, Rods, Drops, etc.	H,F GF	H,F GF						H,F G									H F						23																		
24	Metals and Metal Compounds, Toxic	S	S	S			S	S			S														24																	
25	Nitrides	GF HF	H,F E	H GF	H,E GF	GF H			U	H G	U	GF H	GF H	GF H				GF H	U	GF H	GF H	E				25																
26	Nitriles	H,GT GF	H,F GT	H							U											H P			S	GF H	26															
27	Nitro Compounds, Organic		H,F GT			H					H E											H,E GF				H,E GF		27														
28	Hydrocarbons, Aliphatic, Unsaturated	H	H F			H																	H E						28													
29	Hydrocarbons, Aliphatic, Saturated		H F																											29												
30	Peroxides and Hydroperoxides, Organic	H G	H E		H F	H G		H GT	H,F E	H,F GT		H,E GT	H,F GT					H E	H	E	H,F GT	H E	H G		H G	H,E GF	H,P GT		H P		30											
31	Phenols and Cresols	H	H F						H G										H P			GF H				GF H					H	31										
32	Organophosphates, Phosphothioates, Phosphodithioates	H GT	H GT						U		H E											H									U		32									
33	Sulfides, Inorganic	GT GF	HF GF	GT		H			E										H												H GT			33								
34	Epoxides	H P	H P	H P	H P	U		H P	H P		H P	H P	U								H P	H P	H P		H P	H P					H P	H P	U	H P	34							
101	Combustible and Flammable Materials, Miscellaneous	H G	H,F GT																			H,F G				H,F GF					H,F GT					101						
102	Explosives	H E	H E	H E					H E		H E			H E								H E	H E	H E	E	E					H E	H E		H E	H E	H E	102					
103	Polymerizable Compounds	P H	P H	P H					P H		P H	P H	U									P H	P H	P H	P H	P H					P H	P H		P H			H E	103				
104	Oxidizing Agents, Strong	H GT		H GT	H F	H F	H,F GT	H,F GT	H E	H,F GT		H,E GT	H,F GT	H F	H F		H F	H GT	H,F GT	H F	H,F GT	H,F E	H,F E	H F		H,F E	H,F GT	H E	H F	H F	H G	H F	H,F GT	H,F GT	H,F G	H,F G	H E	H,F GT	104			
105	Reducing Agents, Strong	H GF	H,F GT	H GF	H,F GF	H,F GF	H GF	H G				H GT	H F				H,F E	H E	H GF	H GF	H GF						H GF	H E			H E	H GF	H,GT GF		H	H GF	H E	H,P GF	H,F E	105		
106	Water and Mixtures Containing Water	H	H						G										H G			H GF	H GF		S	H GF								GT GF						GF GT	106	
107	Water Reactive Substances	<---EXTREMELY REACTIVE! DO NOT MIX WITH ANY CHEMICAL OR WASTE MATERIAL! EXTREMELY REACTIVE!--->																																								107

APPENDIX 2-C

Selected SW-846 Methods

METHOD 9045D

SOIL AND WASTE pH

1.0 SCOPE AND APPLICATION

1.1 This method is an electrometric procedure for measuring pH in soils and waste samples. Wastes may be solids, sludges, or non-aqueous liquids. If water is present, it must constitute less than 20% of the total volume of the sample.

2.0 SUMMARY OF METHOD

2.1 The sample is mixed with reagent water, and the pH of the resulting aqueous solution is measured.

3.0 INTERFERENCES

3.1 Samples with very low or very high pH may give incorrect readings on the meter. For samples with a true pH of >10, the measured pH may be incorrectly low. This error can be minimized by using a low-sodium-error electrode. Strong acid solutions, with a true pH of <1, may give incorrectly high pH measurements.

3.2 Temperature fluctuations will cause measurement errors.

3.3 Errors will occur when the electrodes become coated. If an electrode becomes coated with an oily material that will not rinse free, the electrode can (1) be cleaned with an ultrasonic bath, or (2) be washed with detergent, rinsed several times with water, placed in 1:10 HCl so that the lower third of the electrode is submerged, and then thoroughly rinsed with water, or (3) be cleaned per the manufacturer's instructions.

4.0 APPARATUS AND MATERIALS

4.1 pH meter with means for temperature compensation.

4.2 Glass electrode.

4.3 Reference electrode -- A silver-silver chloride or other reference electrode of constant potential may be used.

NOTE: Combination electrodes incorporating both measuring and referenced functions are convenient to use and are available with solid, gel-type filling materials that require minimal maintenance.

4.4 Beaker -- 50-mL.

4.5 Thermometer and/or temperature sensor for automatic compensation.

4.6 Analytical balance -- capable of weighing 0.1 g.

5.0 REAGENTS

5.1 Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

5.2 Reagent water. All references to water in this method refer to reagent water, as defined in Chapter One.

5.3 Primary standard buffer salts are available from the National Institute of Standards and Technology (NIST) and should be used in situations where extreme accuracy is necessary. Preparation of reference solutions from these salts requires some special precautions and handling, such as low-conductivity dilution water, drying ovens, and carbon-dioxide-free purge gas. These solutions should be replaced at least once each month.

5.4 Secondary standard buffers may be prepared from NIST salts or purchased as solutions from commercial vendors. These commercially available solutions, which have been validated by comparison with NIST standards, are recommended for routine use.

6.0 SAMPLE PRESERVATION AND HANDLING

Samples should be analyzed as soon as possible.

7.0 PROCEDURE

7.1 Calibration

7.1.1 Because of the wide variety of pH meters and accessories, detailed operating procedures cannot be incorporated into this method. Each analyst must be acquainted with the operation of each system and familiar with all instrument functions. Special attention to care of the electrodes is recommended.

7.1.2 Each instrument/electrode system must be calibrated at a minimum of two points that bracket the expected pH of the samples and are approximately three pH units or more apart. Repeat adjustments on successive portions of the two buffer solutions until readings are within 0.05 pH units of the buffer solution value. If an accurate pH reading based on the conventional pH scale [0 to 14 at 25 EC] is required, the analyst should control sample temperature at 25 ± 1 EC when sample pH approaches the alkaline end of the scale (e.g., a pH of 11 or above).

7.2 Sample preparation and pH measurement of soils:

7.2.1 To 20 g of soil in a 50-mL beaker, add 20 mL of reagent water, cover, and continuously stir the suspension for 5 min. Additional dilutions are allowed if working with hygroscopic soils and salts or other problematic matrices.

7.2.2 Let the soil suspension stand for about 1 hr to allow most of the suspended clay to settle out from the suspension or filter or centrifuge off the aqueous phase for pH measurement.

7.2.3 Adjust the electrodes in the clamps of the electrode holder so that, upon lowering the electrodes into the beaker, the glass electrode will be immersed just deep enough into the clear supernatant solution to establish a good electrical contact through the ground-glass joint or the fiber-capillary hole. Insert the electrodes into the sample solution in this manner. For combination electrodes, immerse just below the suspension.

7.2.4 If the sample temperature differs by more than 2 EC from the buffer solution, the measured pH values must be corrected.

7.2.5 Report the results as "soil pH measured in water at _EC" where "_EC" is the temperature at which the test was conducted.

7.3 Sample preparation and pH measurement of waste materials

7.3.1 To 20 g of waste sample in a 50-mL beaker, add 20 mL of reagent water, cover, and continuously stir the suspension for 5 min. Additional dilutions are allowed if working with hygroscopic wastes and salts or other problematic matrices.

7.3.2 Let the waste suspension stand for about 15 min to allow most of the suspended waste to settle out from the suspension or filter or centrifuge off aqueous phase for pH measurement.

NOTE: If the waste is hygroscopic and absorbs all the reagent water, begin the experiment again using 20 g of waste and 40 mL of reagent water.

NOTE: If the supernatant is multiphasic, decant the oily phase and measure the pH of the aqueous phase. The electrode may need to be cleaned (Step 3.3) if it becomes coated with an oily material.

7.3.3 Adjust the electrodes in the clamps of the electrode holder so that, upon lowering the electrodes into the beaker, the glass electrode will be immersed just deep enough into the clear supernatant to establish good electrical contact through the ground-glass joint or the fiber-capillary hole. Insert the electrode into the sample solution in this manner. For combination electrodes, immerse just below the suspension.

7.3.4 If the sample temperature differs by more than 2 EC from the buffer solution, the measured pH values must be corrected.

7.3.5 Report the results as "waste pH measured in water at _EC" where "_EC" is the temperature at which the test was conducted.

8.0 QUALITY CONTROL

8.1 Refer to Chapter One for the appropriate QC protocols.

8.2 Electrodes must be thoroughly rinsed between samples.

9.0 METHOD PERFORMANCE

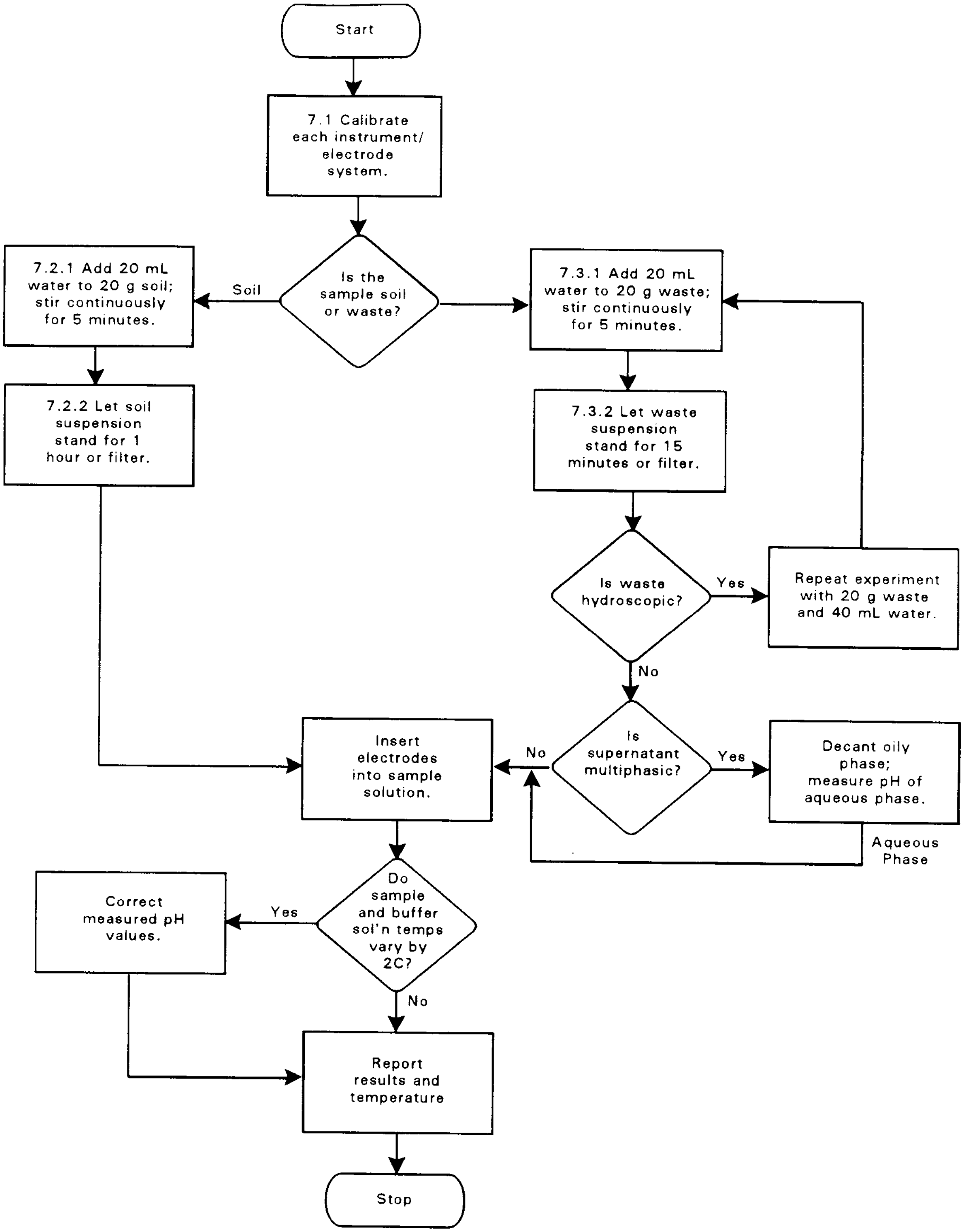
9.1 No data provided.

10.0 REFERENCES

1. Black, Charles Allen; Methods of Soil Analysis; American Society of Agronomy: Madison, WI, 1973.

2. National Bureau of Standards, Standard Reference Material Catalog, 1986-87, Special Publication 260.

SOIL AND WASTE pH



METHOD 9040C

pH ELECTROMETRIC MEASUREMENT

1.0 SCOPE AND APPLICATION

1.1 This method is used to measure the pH of aqueous wastes and those multiphase wastes where the aqueous phase constitutes at least 20% of the total volume of the waste.

1.2 The corrosivity of concentrated acids and bases, or of concentrated acids and bases mixed with inert substances, cannot be measured. The pH measurement requires some water content.

2.0 SUMMARY

2.1 The pH of the sample is determined electrometrically using either a glass electrode in combination with a reference potential or a combination electrode. The measuring device is calibrated using a series of standard solutions of known pH.

3.0 INTERFERENCES

3.1 The glass electrode, in general, is not subject to solution interferences from color, turbidity, colloidal matter, oxidants, reductants, or moderate (<0.1 molar solution) salinity.

3.2 Sodium error at pH levels >10 can be reduced or eliminated by using a low-sodium-error electrode.

3.3 Coatings of oily material or particulate matter can impair electrode response. These coatings can usually be removed by gentle wiping or detergent washing, followed by rinsing with distilled water. An additional treatment with hydrochloric acid (1:10) may be necessary to remove any remaining film.

3.4 Temperature effects on the electrometric determination of pH arise from two sources. The first is caused by the change in electrode output at various temperatures. This interference should be controlled with instruments having temperature compensation or by calibrating the electrode-instrument system at the temperature of the samples. The second source of temperature effects is the change of pH due to changes in the sample as the temperature changes. This error is sample-dependent and cannot be controlled. It should, therefore, be noted by reporting both the pH and temperature at the time of analysis.

4.0 APPARATUS AND MATERIALS

4.1 pH meter -- Laboratory or field model. Many instruments are commercially available with various specifications and optional equipment.

4.2 Glass electrode.

4.3 Reference electrode -- A silver-silver chloride or other reference electrode of constant potential may be used.

NOTE: Combination electrodes incorporating both measuring and referenced functions are convenient to use and are available with solid, gel-type filling materials that require minimal maintenance.

4.4 Magnetic stirrer and Teflon-coated stirring bar.

4.5 Thermometer and/or temperature sensor for automatic compensation.

5.0 REAGENTS

5.1 Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

5.2 Primary standard buffer salts are available from the National Institute of Standards and Technology (NIST) and should be used in situations where extreme accuracy is necessary. Preparation of reference solutions from these salts requires some special precautions and handling, such as low-conductivity dilution water, drying ovens, and carbon-dioxide-free purge gas. These solutions should be replaced at least once each month.

5.3 Secondary standard buffers may be prepared from NIST salts or purchased as solutions from commercial vendors. These commercially available solutions have been validated by comparison with NIST standards and are recommended for routine use.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

Samples should be analyzed as soon as possible.

7.0 PROCEDURE

7.1 Calibration

7.1.1 Because of the wide variety of pH meters and accessories, detailed operating procedures cannot be incorporated into this method. Each analyst must be acquainted with the operation of each system and familiar with all instrument functions. Special attention to care of the electrodes is recommended.

7.1.2 Each instrument/electrode system must be calibrated at a minimum of two points that bracket the expected pH of the samples and are approximately three pH units or more apart. (For corrosivity characterization, the calibration of the pH meter should include a buffer of pH 2 for acidic wastes and a pH 12 buffer for caustic wastes; also, for corrosivity characterization, the sample must be measured at 25 ± 1 EC if the pH of the waste is above 12.0.) Various instrument designs may involve use of a dial (to "balance" or "standardize") or a slope adjustment, as outlined in the manufacturer's instructions. Repeat adjustments on successive portions of the two buffer solutions until readings are within 0.05 pH units of the buffer solution value.

7.2 Place the sample or buffer solution in a clean glass beaker using a sufficient volume to cover the sensing elements of the electrodes and to give adequate clearance for the magnetic stirring bar. If field measurements are being made, the electrodes may be immersed directly into the sample stream to an adequate depth and moved in a manner to ensure sufficient sample movement across the electrode-sensing element as indicated by drift-free readings (< 0.1 pH).

7.3 If the sample temperature differs by more than 2 EC from the buffer solution, the measured pH values must be corrected. Instruments are equipped with automatic or manual compensators that electronically adjust for temperature differences. Refer to manufacturer's instructions.

7.4 Thoroughly rinse and gently wipe the electrodes prior to measuring pH of samples. Immerse the electrodes into the sample beaker or sample stream and gently stir at a constant rate to provide homogeneity and suspension of solids. Note and record sample pH and temperature. Repeat measurement on successive aliquots of sample until values differ by < 0.1 pH units. Two or three volume changes are usually sufficient.

8.0 QUALITY CONTROL

8.1 Refer to Chapter One for the appropriate QC protocols.

8.2 Electrodes must be thoroughly rinsed between samples.

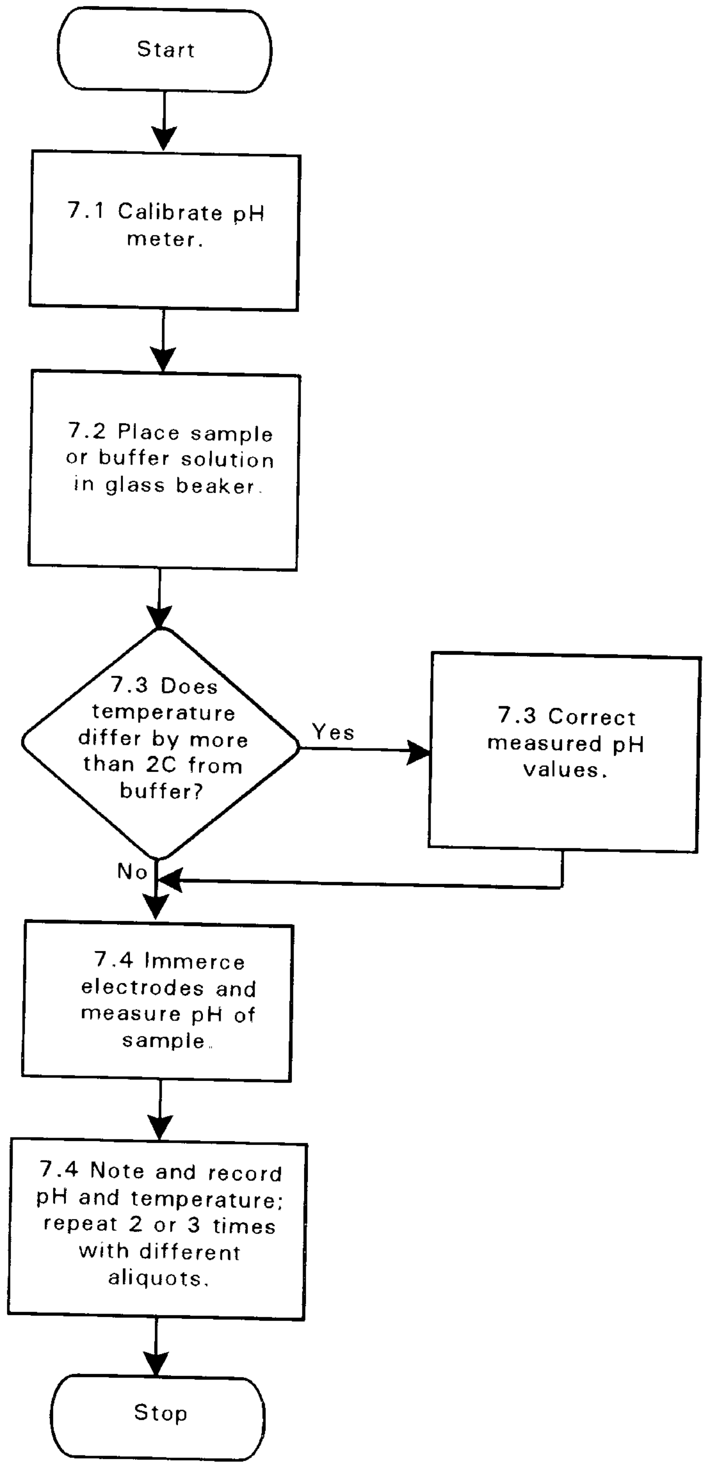
9.0 METHOD PERFORMANCE

9.1 Forty-four analysts in twenty laboratories analyzed six synthetic water samples containing exact increments of hydrogen-hydroxyl ions, with the following results:

		Accuracy as	
pH Units	Standard Deviation pH Units	Bias %	Bias pH Units
3.5	0.10	-0.29	-0.01
3.5	0.11	-0.00	
7.1	0.20	+1.01	+0.07
7.2	0.18	-0.03	-0.002
8.0	0.13	-0.12	-0.01
8.0	0.12	+0.16	+0.01

10.0 REFERENCES

1. National Bureau of Standards, Standard Reference Material Catalog 1986-87, Special Publication 260.


Start
7.1 Calibrate pH meter.
7.2 Place sample or buffer solution in glass beaker.
7.3 Does temperature differ by more than 2C from buffer?
Yes
7.3 Correct measured pH values.
No
7.4 Immerce electrodes and measure pH of sample.
7.4 Note and record pH and temperature; repeat 2 or 3 times with different aliquots.
Stop

METHOD 1311

TOXICITY CHARACTERISTIC LEACHING PROCEDURE

1.0 SCOPE AND APPLICATION

1.1 The TCLP is designed to determine the mobility of both organic and inorganic analytes present in liquid, solid, and multiphasic wastes.

1.2 If a total analysis of the waste demonstrates that individual analytes are not present in the waste, or that they are present but at such low concentrations that the appropriate regulatory levels could not possibly be exceeded, the TCLP need not be run.

1.3 If an analysis of any one of the liquid fractions of the TCLP extract indicates that a regulated compound is present at such high concentrations that, even after accounting for dilution from the other fractions of the extract, the concentration would be above the regulatory level for that compound, then the waste is hazardous and it is not necessary to analyze the remaining fractions of the extract.

1.4 If an analysis of extract obtained using a bottle extractor shows that the concentration of any regulated volatile analyte exceeds the regulatory level for that compound, then the waste is hazardous and extraction using the ZHE is not necessary. However, extract from a bottle extractor cannot be used to demonstrate that the concentration of volatile compounds is below the regulatory level.

2.0 SUMMARY OF METHOD

2.1 For liquid wastes (i.e., those containing less than 0.5% dry solid material), the waste, after filtration through a 0.6 to 0.8 µm glass fiber filter, is defined as the TCLP extract.

2.2 For wastes containing greater than or equal to 0.5% solids, the liquid, if any, is separated from the solid phase and stored for later analysis; the particle size of the solid phase is reduced, if necessary. The solid phase is extracted with an amount of extraction fluid equal to 20 times the weight of the solid phase. The extraction fluid employed is a function of the alkalinity of the solid phase of the waste. A special extractor vessel is used when testing for volatile analytes (see Table 1 for a list of volatile compounds). Following extraction, the liquid extract is separated from the solid phase by filtration through a 0.6 to 0.8 µm glass fiber filter.

2.3 If compatible (i.e., multiple phases will not form on combination), the initial liquid phase of the waste is added to the liquid extract, and these are analyzed together. If incompatible, the liquids are analyzed separately and the results are mathematically combined to yield a volume-weighted average concentration.

3.0 INTERFERENCES

3.1 Potential interferences that may be encountered during analysis are discussed in the individual analytical methods.

4.0 APPARATUS AND MATERIALS

4.1 Agitation apparatus: The agitation apparatus must be capable of rotating the extraction vessel in an end-over-end fashion (see Figure 1) at 30 $\pm$ 2 rpm. Suitable devices known to EPA are identified in Table 2.

4.2 Extraction Vessels

4.2.1 Zero-Headspace Extraction Vessel (ZHE). This device is for use only when the waste is being tested for the mobility of volatile analytes (i.e., those listed in Table 1). The ZHE (depicted in Figure 2) allows for liquid/solid separation within the device, and effectively precludes headspace. This type of vessel allows for initial liquid/solid separation, extraction, and final extract filtration without opening the vessel (see Section 4.3.1). The vessels shall have an internal volume of 500-600 mL, and be equipped to accommodate a 90-110 mm filter. The devices contain VITON®[1] O-rings which should be replaced frequently. Suitable ZHE devices known to EPA are identified in Table 3.

For the ZHE to be acceptable for use, the piston within the ZHE should be able to be moved with approximately 15 psi or less. If it takes more pressure to move the piston, the O-rings in the device should be replaced. If this does not solve the problem, the ZHE is unacceptable for TCLP analyses and the manufacturer should be contacted.

The ZHE should be checked for leaks after every extraction. If the device contains a built-in pressure gauge, pressurize the device to 50 psi, allow it to stand unattended for 1 hour, and recheck the pressure. If the device does not have a built-in pressure gauge, pressurize the device to 50 psi, submerge it in water, and check for the presence of air bubbles escaping from any of the fittings. If pressure is lost, check all fittings and inspect and replace O-rings, if necessary. Retest the device. If leakage problems cannot be solved, the manufacturer should be contacted.

Some ZHEs use gas pressure to actuate the ZHE piston, while others use mechanical pressure (see Table 3). Whereas the volatiles procedure (see Section 7.3) refers to pounds per square inch (psi), for the mechanically actuated piston, the pressure applied is measured in torque-inch-pounds. Refer to the manufacturer's instructions as to the proper conversion.

[1] VITON® is a trademark of Du Pont.

4.2.2 Bottle Extraction Vessel. When the waste is being evaluated using the nonvolatile extraction, a jar with sufficient capacity to hold the sample and the extraction fluid is needed. Headspace is allowed in this vessel.

The extraction bottles may be constructed from various materials, depending on the analytes to be analyzed and the nature of the waste (see Section 4.3.3). It is recommended that borosilicate glass bottles be used instead of other types of glass, especially when inorganics are of concern. Plastic bottles, other than polytetrafluoroethylene, shall not be used if organics are to be investigated. Bottles are available from a number of laboratory suppliers. When this type of extraction vessel is used, the filtration device discussed in Section 4.3.2 is used for initial liquid/solid separation and final extract filtration.

4.3 Filtration Devices: It is recommended that all filtrations be performed in a hood.

4.3.1 Zero-Headspace Extractor Vessel (ZHE): When the waste is evaluated for volatiles, the zero-headspace extraction vessel described in Section 4.2.1 is used for filtration. The device shall be capable of supporting and keeping in place the glass fiber filter and be able to withstand the pressure needed to accomplish separation (50 psi).

NOTE: When it is suspected that the glass fiber filter has been ruptured, an in-line glass fiber filter may be used to filter the material within the ZHE.

4.3.2 Filter Holder: When the waste is evaluated for other than volatile analytes, any filter holder capable of supporting a glass fiber filter and able to withstand the pressure needed to accomplish separation may be used. Suitable filter holders range from simple vacuum units to relatively complex systems capable of exerting pressures of up to 50 psi or more. The type of filter holder used depends on the properties of the material to be filtered (see Section 4.3.3). These devices shall have a minimum internal volume of 300 mL and be equipped to accommodate a minimum filter size of 47 mm (filter holders having an internal capacity of 1.5 L or greater, and equipped to accommodate a 142 mm diameter filter, are recommended). Vacuum filtration can only be used for wastes with low solids content (<10%) and for highly granular, liquid-containing wastes. All other types of wastes should be filtered using positive pressure filtration. Suitable filter holders known to EPA are shown in Table 4.

4.3.3 Materials of Construction: Extraction vessels and filtration devices shall be made of inert materials which will not leach or absorb waste components. Glass, polytetrafluoroethylene (PTFE), or type 316 stainless steel equipment may be used when evaluating the mobility of both organic and inorganic components. Devices made of high density polyethylene (HDPE), polypropylene (PP), or polyvinyl chloride (PVC) may be used only when evaluating the mobility of metals. Borosilicate glass bottles are recommended for use over other types of glass bottles, especially when inorganics are analytes of concern.

4.4 Filters: Filters shall be made of borosilicate glass fiber, shall contain no binder materials, and shall have an effective pore size of 0.6 to 0.8 µm, or equivalent. Filters known to EPA which meet these specifications are identified in Table 5. Pre-filters must not be used. When evaluating the mobility of metals, filters shall be acid-washed prior to use by rinsing with 1N nitric acid followed by three consecutive rinses with deionized distilled water (a minimum of 1 L per rinse is recommended). Glass fiber filters are fragile and should be handled with care.

4.5 pH Meters: The meter should be accurate to ± 0.05 units at 25 °C.

4.6 ZHE Extract Collection Devices: TEDLAR®[2] bags or glass, stainless steel or PTFE gas-tight syringes are used to collect the initial liquid phase and the final extract of the waste when using the ZHE device. The devices listed are recommended for use under the following conditions:

4.6.1 If a waste contains an aqueous liquid phase or if a waste does not contain a significant amount of nonaqueous liquid (i.e., <1% of total waste), the TEDLAR® bag or a 600 mL syringe should be used to collect and combine the initial liquid and solid extract.

4.6.2 If a waste contains a significant amount of nonaqueous liquid in the initial liquid phase (i.e., >1% of total waste), the syringe or the TEDLAR® bag may be used for both the initial solid/liquid separation and the final extract filtration. However, analysts should use one or the other, not both.

4.6.3 If the waste contains no initial liquid phase (is 100% solid) or has no significant solid phase (is 100% liquid), either the TEDLAR® bag or the syringe may be used. If the syringe is used, discard the first 5 mL of liquid expressed from the device. The remaining aliquots are used for analysis.

4.7 ZHE Extraction Fluid Transfer Devices: Any device capable of transferring the extraction fluid into the ZHE without changing the nature of the extraction fluid is acceptable (e.g., a positive displacement or peristaltic pump, a gas tight syringe, pressure filtration unit (see Section 4.3.2), or other ZHE device).

4.8 Laboratory Balance: Any laboratory balance accurate to within ± 0.01 grams may be used (all weight measurements are to be within ± 0.1 grams).

4.9 Beaker or Erlenmeyer flask, glass, 500 mL.

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[2] TEDLAR® is a registered trademark of Du Pont.

4.10 Watchglass, appropriate diameter to cover beaker or Erlenmeyer flask.

4.11 Magnetic stirrer.

5.0 REAGENTS

5.1 Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

5.2 Reagent Water. Reagent water is defined as water in which an interferant is not observed at or above the method's detection limit of the analyte(s) of interest. For nonvolatile extractions, ASTM Type II water or equivalent meets the definition of reagent water. For volatile extractions, it is recommended that reagent water be generated by any of the following methods. Reagent water should be monitored periodically for impurities.

5.2.1 Reagent water for volatile extractions may be generated by passing tap water through a carbon filter bed containing about 500 grams of activated carbon (Calgon Corp., Filtrasorb-300 or equivalent).

5.2.2 A water purification system (Millipore Super-Q or equivalent) may also be used to generate reagent water for volatile extractions.

5.2.3 Reagent water for volatile extractions may also be prepared by boiling water for 15 minutes. Subsequently, while maintaining the water temperature at 90 $\pm$ 5 degrees C, bubble a contaminant-free inert gas (e.g. nitrogen) through the water for 1 hour. While still hot, transfer the water to a narrow mouth screw-cap bottle under zero-headspace and seal with a Teflon-lined septum and cap.

5.3 Hydrochloric acid (1N), HCl, made from ACS reagent grade.

5.4 Nitric acid (1N), HNO_3, made from ACS reagent grade.

5.5 Sodium hydroxide (1N), NaOH, made from ACS reagent grade.

5.6 Glacial acetic acid, CH_3CH_2OOH, ACS reagent grade.

5.7 Extraction fluid.

5.7.1 Extraction fluid # 1: Add 5.7 mL glacial CH_3CH_2OOH to 500 mL of reagent water (See Section 5.2), add 64.3 mL of 1N NaOH, and dilute to a volume of 1 liter. When correctly prepared, the pH of this fluid will be 4.93 $\pm$ 0.05.

5.7.2 Extraction fluid # 2: Dilute 5.7 mL glacial CH_3CH_2OOH with reagent water (See Section 5.2) to a volume of 1 liter. When correctly prepared, the pH of this fluid will be 2.88 $\pm$ 0.05.

NOTE: These extraction fluids should be monitored frequently for impurities. The pH should be checked prior to use to ensure that these fluids are made up accurately. If impurities are found or the pH is not within the above specifications, the fluid shall be discarded and fresh extraction fluid prepared.

5.8 Analytical standards shall be prepared according to the appropriate analytical method.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 All samples shall be collected using an appropriate sampling plan.

6.2 The TCLP may place requirements on the minimal size of the field sample, depending upon the physical state or states of the waste and the analytes of concern. An aliquot is needed for preliminary evaluation of which extraction fluid is to be used for the nonvolatile analyte extraction procedure. Another aliquot may be needed to actually conduct the nonvolatile extraction (see Section 1.4 concerning the use of this extract for volatile organics). If volatile organics are of concern, another aliquot may be needed. Quality control measures may require additional aliquots. Further, it is always wise to collect more sample just in case something goes wrong with the initial attempt to conduct the test.

6.3 Preservatives shall not be added to samples before extraction.

6.4 Samples may be refrigerated unless refrigeration results in irreversible physical change to the waste. If precipitation occurs, the entire sample (including precipitate) should be extracted.

6.5 When the waste is to be evaluated for volatile analytes, care shall be taken to minimize the loss of volatiles. Samples shall be collected and stored in a manner intended to prevent the loss of volatile analytes (e.g., samples should be collected in Teflon-lined septum capped vials and stored at 4 °C. Samples should be opened only immediately prior to extraction).

6.6 TCLP extracts should be prepared for analysis and analyzed as soon as possible following extraction. Extracts or portions of extracts for metallic analyte determinations must be acidified with nitric acid to a pH < 2, unless precipitation occurs (see Section 7.2.14 if precipitation occurs). Extracts should be preserved for other analytes according to the guidance given in the individual analysis methods. Extracts or portions of extracts for organic analyte determinations shall not be allowed to come into contact with the atmosphere (i.e., no headspace) to prevent losses. See Section 8.0 (QA requirements) for acceptable sample and extract holding times.

7.0 PROCEDURE

7.1 Preliminary Evaluations

Perform preliminary TCLP evaluations on a minimum 100 gram aliquot of waste. This aliquot may not actually undergo TCLP extraction. These preliminary evaluations include: (1) determination of the percent solids (Section 7.1.1); (2) determination of whether the waste contains insignificant solids and is, therefore, its own extract after filtration (Section 7.1.2); (3) determination of whether the solid portion of the waste requires particle size reduction (Section 7.1.3); and (4) determination of which of the two extraction fluids are to be used for the nonvolatile TCLP extraction of the waste (Section 7.1.4).

7.1.1 Preliminary determination of percent solids: Percent solids is defined as that fraction of a waste sample (as a percentage of the total sample) from which no liquid may be forced out by an applied pressure, as described below.

7.1.1.1 If the waste will obviously yield no liquid when subjected to pressure filtration (i.e., is 100% solids) proceed to Section 7.1.3.

7.1.1.2 If the sample is liquid or multiphasic, liquid/solid separation to make a preliminary determination of percent solids is required. This involves the filtration device described in Section 4.3.2 and is outlined in Sections 7.1.1.3 through 7.1.1.9.

7.1.1.3 Pre-weigh the filter and the container that will receive the filtrate.

7.1.1.4 Assemble the filter holder and filter following the manufacturer's instructions. Place the filter on the support screen and secure.

7.1.1.5 Weigh out a subsample of the waste (100 gram minimum) and record the weight.

7.1.1.6 Allow slurries to stand to permit the solid phase to settle. Wastes that settle slowly may be centrifuged prior to filtration. Centrifugation is to be used only as an aid to filtration. If used, the liquid should be decanted and filtered followed by filtration of the solid portion of the waste through the same filtration system.

7.1.1.7 Quantitatively transfer the waste sample to the filter holder (liquid and solid phases). Spread the waste sample evenly over the surface of the filter. If filtration of the waste at 4 °C reduces the amount of expressed liquid over what would be expressed at room temperature then allow the sample to warm up to room temperature in the device before filtering.

NOTE: If waste material (>1% of original sample weight) has obviously adhered to the container used to transfer the sample to the filtration apparatus, determine the weight of this residue and subtract it from the sample weight determined in Section 7.1.1.5 to determine the weight of the waste sample that will be filtered.

Gradually apply vacuum or gentle pressure of 1-10 psi, until air or pressurizing gas moves through the filter. If this point is not reached under 10 psi, and if no additional liquid has passed through the filter in any 2 minute interval, slowly increase the pressure in 10 psi increments to a maximum of 50 psi. After each incremental increase of 10 psi, if the pressurizing gas has not moved through the filter, and if no additional liquid has passed through the filter in any 2 minute interval, proceed to the next 10 psi increment. When the pressurizing gas begins to move through the filter, or when liquid flow has ceased at 50 psi (i.e., filtration does not result in any additional filtrate within any 2 minute period), stop the filtration.

NOTE: Instantaneous application of high pressure can degrade the glass fiber filter and may cause premature plugging.

7.1.1.8 The material in the filter holder is defined as the solid phase of the waste, and the filtrate is defined as the liquid phase.

NOTE: Some wastes, such as oily wastes and some paint wastes, will obviously contain some material that appears to be a liquid. Even after applying vacuum or pressure filtration, as outlined in Section 7.1.1.7, this material may not filter. If this is the case, the material within the filtration device is defined as a solid. Do not replace the original filter with a fresh filter under any circumstances. Use only one filter.

7.1.1.9 Determine the weight of the liquid phase by subtracting the weight of the filtrate container (see Section 7.1.1.3) from the total weight of the filtrate-filled container. Determine the weight of the solid phase of the waste sample by subtracting the weight of the liquid phase from the weight of the total waste sample, as determined in Section 7.1.1.5 or 7.1.1.7.

Record the weight of the liquid and solid phases. Calculate the percent solids as follows:

$$\text{Percent solids} = \frac{\text{Weight of solid (Section 7.1.1.9)}}{\text{Total weight of waste (Section 7.1.1.5 or 7.1.1.7)}} \times 100$$

7.1.2 If the percent solids determined in Section 7.1.1.9 is equal to or greater than 0.5%, then proceed either to Section 7.1.3 to determine whether the solid material requires particle size reduction or to Section 7.1.2.1 if it is noticed that a small amount of the filtrate is entrained in wetting of the filter. If the percent solids determined in Section 7.1.1.9 is less than 0.5%, then proceed to Section 7.2.9 if the nonvolatile TCLP is to be performed and to Section 7.3 with a fresh portion of the waste if the volatile TCLP is to be performed.

7.1.2.1 Remove the solid phase and filter from the filtration apparatus.

7.1.2.2 Dry the filter and solid phase at 100 $\pm$ 20 °C until two successive weighing yield the same value within $\pm$ 1%. Record the final weight.

NOTE: Caution should be taken to ensure that the subject solid will not flash upon heating. It is recommended that the drying oven be vented to a hood or other appropriate device.

7.1.2.3 Calculate the percent dry solids as follows:

$$\text{Percent dry solids} = \frac{(\text{Wt. of dry waste + filter}) - \text{tared wt. of filter}}{\text{Initial wt. of waste (Section 7.1.1.5 or 7.1.1.7)}} \times 100$$

7.1.2.4 If the percent dry solids is less than 0.5%, then proceed to Section 7.2.9 if the nonvolatile TCLP is to be performed, and to Section 7.3 if the volatile TCLP is to be performed. If the percent dry solids is greater than or equal to 0.5%, and if the nonvolatile TCLP is to be performed, return to the beginning of this Section (7.1) and, with a fresh portion of waste, determine whether particle size reduction is necessary (Section 7.1.3) and determine the appropriate extraction fluid (Section 7.1.4). If only the volatile TCLP is to be performed, see the note in Section 7.1.4.

7.1.3 Determination of whether the waste requires particle size reduction (particle size is reduced during this step): Using the solid portion of the waste, evaluate the solid for particle size. Particle size reduction is required, unless the solid has a surface area per gram of material equal to or greater than 3.1 cm^2, or is smaller than 1 cm in its narrowest dimension (<u>i.e.</u>, is capable of passing through a 9.5 mm (0.375 inch) standard sieve). If the surface area is smaller or the particle size larger than described above, prepare the solid portion of the waste for extraction by crushing, cutting, or grinding the waste to a surface area or particle size as described above. If the solids are prepared for organic volatiles extraction, special precautions must be taken (see Section 7.3.6).

NOTE: Surface area criteria are meant for filamentous (<u>e.g.</u>, paper, cloth, and similar) waste materials. Actual measurement of surface area is not required, nor is it recommended. For materials that do not obviously meet the criteria, sample specific methods would need to be developed and employed to measure the surface area. Such methodology is currently not available.

7.1.4 Determination of appropriate extraction fluid: If the solid content of the waste is greater than or equal to 0.5% and if the sample will be extracted for nonvolatile constituents (Section 7.2), determine the appropriate fluid (Section 5.7) for the nonvolatiles extraction as follows:

NOTE: TCLP extraction for volatile constituents uses only extraction fluid #1 (Section 5.7.1). Therefore, if TCLP extraction for nonvolatiles is not required, proceed to Section 7.3.

7.1.4.1 Weigh out a small subsample of the solid phase of the waste, reduce the solid (if necessary) to a particle size of approximately 1 mm in diameter or less, and transfer 5.0 grams of the solid phase of the waste to a 500 mL beaker or Erlenmeyer flask.

7.1.4.2 Add 96.5 mL of reagent water to the beaker, cover with a watchglass, and stir vigorously for 5 minutes using a magnetic stirrer. Measure and record the pH. If the pH is <5.0, use extraction fluid #1. Proceed to Section 7.2.

7.1.4.3 If the pH from Section 7.1.4.2 is >5.0, add 3.5 mL 1N HCl, slurry briefly, cover with a watchglass, heat to 50 °C, and hold at 50 °C for 10 minutes.

7.1.4.4 Let the solution cool to room temperature and record the pH. If the pH is <5.0, use extraction fluid #1. If the pH is >5.0, use extraction fluid #2. Proceed to Section 7.2.

7.1.5 If the aliquot of the waste used for the preliminary evaluation (Sections 7.1.1 - 7.1.4) was determined to be 100% solid at Section 7.1.1.1, then it can be used for the Section 7.2 extraction (assuming at least 100 grams remain), and the Section 7.3 extraction (assuming at least 25 grams remain). If the aliquot was subjected to the procedure in Section 7.1.1.7, then another aliquot shall be used for the volatile extraction procedure in Section 7.3. The aliquot of the waste subjected to the procedure in Section 7.1.1.7 might be appropriate for use for the Section 7.2 extraction if an adequate amount of solid (as determined by Section 7.1.1.9) was obtained. The amount of solid necessary is dependent upon whether a sufficient amount of extract will be produced to support the analyses. If an adequate amount of solid remains, proceed to Section 7.2.10 of the nonvolatile TCLP extraction.

7.2 Procedure When Volatiles are not Involved

A minimum sample size of 100 grams (solid and liquid phases) is recommended. In some cases, a larger sample size may be appropriate, depending on the solids content of the waste sample (percent solids, See Section 7.1.1), whether the initial liquid phase of the waste will be miscible with the aqueous extract of the solid, and whether inorganics, semivolatile organics, pesticides, and herbicides are all analytes of concern. Enough solids should be generated for extraction such that the volume of TCLP extract will be sufficient to support all of the analyses required. If the amount of extract generated by a single TCLP extraction will not be sufficient to perform all of the analyses, more than one extraction may be performed and the extracts from each combined and aliquoted for analysis.

7.2.1 If the waste will obviously yield no liquid when subjected to pressure filtration (i.e., is 100% solid, see Section 7.1.1), weigh out a subsample of the waste (100 gram minimum) and proceed to Section 7.2.9.

7.2.2 If the sample is liquid or multiphasic, liquid/solid separation is required. This involves the filtration device described in Section 4.3.2 and is outlined in Sections 7.2.3 to 7.2.8.

7.2.3 Pre-weigh the container that will receive the filtrate.

7.2.4 Assemble the filter holder and filter following the manufacturer's instructions. Place the filter on the support screen and secure. Acid wash the filter if evaluating the mobility of metals (see Section 4.4).

NOTE: Acid washed filters may be used for all nonvolatile extractions even when metals are not of concern.

7.2.5 Weigh out a subsample of the waste (100 gram minimum) and record the weight. If the waste contains <0.5% dry solids (Section 7.1.2), the liquid portion of the waste, after filtration, is defined as the TCLP extract. Therefore, enough of the sample should be filtered so that the amount of filtered liquid will support all of the analyses required of the TCLP extract. For wastes containing >0.5% dry solids (Sections 7.1.1 or 7.1.2), use the percent solids information obtained in Section 7.1.1 to determine the optimum sample size (100 gram minimum) for filtration. Enough solids should be generated by filtration to support the analyses to be performed on the TCLP extract.

7.2.6 Allow slurries to stand to permit the solid phase to settle. Wastes that settle slowly may be centrifuged prior to filtration. Use centrifugation only as an aid to filtration. If the waste is centrifuged, the liquid should be decanted and filtered followed by filtration of the solid portion of the waste through the same filtration system.

7.2.7 Quantitatively transfer the waste sample (liquid and solid phases) to the filter holder (see Section 4.3.2). Spread the waste sample evenly over the surface of the filter. If filtration of the waste at 4 °C reduces the amount of expressed liquid over what would be expressed at room temperature, then allow the sample to warm up to room temperature in the device before filtering.

NOTE: If waste material (>1% of the original sample weight) has obviously adhered to the container used to transfer the sample to the filtration apparatus, determine the weight of this residue and subtract it from the sample weight determined in Section 7.2.5, to determine the weight of the waste sample that will be filtered.

Gradually apply vacuum or gentle pressure of 1-10 psi, until air or pressurizing gas moves through the filter. If this point is not reached under 10 psi, and if no additional liquid has passed through the filter in any 2 minute interval, slowly increase the pressure in 10 psi increments to a maximum of 50 psi. After each incremental increase of 10 psi, if the pressurizing gas has not moved through the filter, and if no additional liquid has passed through the filter in any 2 minute interval, proceed to the next 10 psi increment. When the pressurizing gas begins to move through the filter, or when the liquid flow has ceased at 50 psi (i.e., filtration does not result in any additional filtrate within a 2 minute period), stop the filtration.

NOTE: Instantaneous application of high pressure can degrade the glass fiber filter and may cause premature plugging.

7.2.8 The material in the filter holder is defined as the solid phase of the waste, and the filtrate is defined as the liquid phase. Weigh the filtrate. The liquid phase may now be either analyzed (See Section 7.2.12) or stored at 4 °C until time of analysis.

NOTE: Some wastes, such as oily wastes and some paint wastes, will obviously contain some material that appears to be a liquid. Even after applying vacuum or pressure filtration, as outlined in Section 7.2.7, this material may not filter. If this is the case, the material within the filtration device is defined as a solid and is carried through the extraction as a solid. Do not replace the original filter with a fresh filter under any circumstances. Use only one filter.

7.2.9 If the waste contains <0.5% dry solids (see Section 7.1.2), proceed to Section 7.2.13. If the waste contains >0.5% dry solids (see Section 7.1.1 or 7.1.2), and if particle size reduction of the solid was needed in Section 7.1.3, proceed to Section 7.2.10. If the waste as received passes a 9.5 mm sieve, quantitatively transfer the solid material into the extractor bottle along with the filter used to separate the initial liquid from the solid phase, and proceed to Section 7.2.11.

7.2.10 Prepare the solid portion of the waste for extraction by crushing, cutting, or grinding the waste to a surface area or particle size as described in Section 7.1.3. When the surface area or particle size has been appropriately altered, quantitatively transfer the solid material into an extractor bottle. Include the filter used to separate the initial liquid from the solid phase.

NOTE: Sieving of the waste is not normally required. Surface area requirements are meant for filamentous (e.g., paper, cloth) and similar waste materials. Actual measurement of surface area is not recommended. If sieving is necessary, a Teflon coated sieve should be used to avoid contamination of the sample.

7.2.11 Determine the amount of extraction fluid to add to the extractor vessel as follows:

$$\text{Weight of extraction fluid} = \frac{20 \times \text{percent solids (Section 7.1.1)} \times \text{weight of waste filtered (Section 7.2.5 or 7.2.7)}}{100}$$

Slowly add this amount of appropriate extraction fluid (see Section 7.1.4) to the extractor vessel. Close the extractor bottle tightly (it is recommended that Teflon tape be used to ensure a tight seal), secure in rotary agitation device, and rotate at 30 $\pm$ 2 rpm for 18 $\pm$ 2 hours. Ambient temperature (i.e., temperature of room in which extraction takes place) shall be maintained at 23 $\pm$ 2 °C during the extraction period.

NOTE: As agitation continues, pressure may build up within the extractor bottle for some types of wastes (e.g., limed or calcium carbonate containing waste may evolve gases such as carbon dioxide). To relieve excess pressure, the extractor bottle may be periodically opened (e.g., after 15 minutes, 30 minutes, and 1 hour) and vented into a hood.

7.2.12 Following the 18 $\pm$ 2 hour extraction, separate the material in the extractor vessel into its component liquid and solid phases by filtering through a new glass fiber filter, as outlined in Section 7.2.7. For final filtration of the TCLP extract, the glass fiber filter may be changed, if necessary, to facilitate filtration. Filter(s) shall be acid-washed (see Section 4.4) if evaluating the mobility of metals.

7.2.13 Prepare the TCLP extract as follows:

7.2.13.1 If the waste contained no initial liquid phase, the filtered liquid material obtained from Section 7.2.12 is defined as the TCLP extract. Proceed to Section 7.2.14.

7.2.13.2 If compatible (e.g., multiple phases will not result on combination), combine the filtered liquid resulting from Section 7.2.12 with the initial liquid phase of the waste obtained in Section 7.2.7. This combined liquid is defined as the TCLP extract. Proceed to Section 7.2.14.

7.2.13.3 If the initial liquid phase of the waste, as obtained from Section 7.2.7, is not or may not be compatible with the filtered liquid resulting from Section 7.2.12, do not combine these liquids. Analyze these liquids, collectively defined as the TCLP extract, and combine the results mathematically, as described in Section 7.2.14.

7.2.14 Following collection of the TCLP extract, the pH of the extract should be recorded. Immediately aliquot and preserve the extract for analysis. Metals aliquots must be acidified with nitric acid to pH <2. If precipitation is observed upon addition of nitric acid to a small aliquot of the extract, then the remaining portion of the extract for metals analyses shall not be acidified and the extract shall be analyzed as soon as possible. All other aliquots must be stored under refrigeration (4 °C) until analyzed. The TCLP extract shall be prepared and analyzed according to appropriate analytical methods. TCLP extracts to be analyzed for metals shall be acid digested except in those instances where digestion causes loss of metallic analytes. If an analysis of the undigested extract shows that the concentration of any regulated metallic analyte exceeds the regulatory level, then the waste is hazardous and digestion of the extract is not necessary. However, data on undigested extracts alone cannot be used to demonstrate that the waste is not hazardous. If the individual phases are to be analyzed separately, determine the volume of the individual phases (to $\pm$ 0.5%), conduct the appropriate analyses, and combine the results mathematically by using a simple volume-weighted average:

$$\text{Final Analyte Concentration} = \frac{(V_1)\ (C_1) + (V_2)\ (C_2)}{V_1 + V_2}$$

where:

V_1 = The volume of the first phase (L).
C_1 = The concentration of the analyte of concern in the first phase (mg/L).
V_2 = The volume of the second phase (L).
C_2 = The concentration of the analyte of concern in the second phase (mg/L).

7.2.15 Compare the analyte concentrations in the TCLP extract with the levels identified in the appropriate regulations. Refer to Section 8.0 for quality assurance requirements.

7.3 Procedure When Volatiles are Involved

Use the ZHE device to obtain TCLP extract for analysis of volatile compounds only. Extract resulting from the use of the ZHE shall not be used to evaluate the mobility of nonvolatile analytes (e.g., metals, pesticides, etc.).

The ZHE device has approximately a 500 mL internal capacity. The ZHE can thus accommodate a maximum of 25 grams of solid (defined as that fraction of a sample from which no additional liquid may be forced out by an applied pressure of 50 psi), due to the need to add an amount of extraction fluid equal to 20 times the weight of the solid phase.

Charge the ZHE with sample only once and do not open the device until the final extract (of the solid) has been collected. Repeated filling of the ZHE to obtain 25 grams of solid is not permitted.

Do not allow the waste, the initial liquid phase, or the extract to be exposed to the atmosphere for any more time than is absolutely necessary. Any manipulation of these materials should be done when cold (4 °C) to minimize loss of volatiles.

7.3.1 Pre-weigh the (evacuated) filtrate collection container (See Section 4.6) and set aside. If using a TEDLAR® bag, express all liquid from the ZHE device into the bag, whether for the initial or final liquid/solid separation, and take an aliquot from the liquid in the bag for analysis. The containers listed in Section 4.6 are recommended for use under the conditions stated in Sections 4.6.1 - 4.6.3.

7.3.2 Place the ZHE piston within the body of the ZHE (it may be helpful first to moisten the piston O-rings slightly with extraction fluid). Adjust the piston within the ZHE body to a height that will minimize the distance the piston will have to move once the ZHE is charged with sample (based upon sample size requirements determined from Section 7.3, Section 7.1.1 and/or 7.1.2). Secure the gas inlet/outlet flange (bottom flange) onto the ZHE body in accordance with the manufacturer's instructions. Secure the glass fiber filter between the support screens and set aside. Set liquid inlet/outlet flange (top flange) aside.

7.3.3 If the waste is 100% solid (see Section 7.1.1), weigh out a subsample (25 gram maximum) of the waste, record weight, and proceed to Section 7.3.5.

7.3.4 If the waste contains < 0.5% dry solids (Section 7.1.2), the liquid portion of waste, after filtration, is defined as the TCLP extract. Filter enough of the sample so that the amount of filtered liquid will support all of the volatile analyses required. For wastes containing $\geq$ 0.5% dry solids (Sections 7.1.1 and/or 7.1.2), use the percent solids information obtained in Section 7.1.1 to determine the optimum sample size to charge into the ZHE. The recommended sample size is as follows:

7.3.4.1 For wastes containing < 5% solids (see Section 7.1.1), weigh out a 500 gram subsample of waste and record the weight.

7.3.4.2 For wastes containing $\geq$ 5% solids (see Section 7.1.1), determine the amount of waste to charge into the ZHE as follows:

$$\text{Weight of waste to charge ZHE} = \frac{25}{\text{percent solids (Section 7.1.1)}} \times 100$$

Weigh out a subsample of the waste of the appropriate size and record the weight.

7.3.5 If particle size reduction of the solid portion of the waste was required in Section 7.1.3, proceed to Section 7.3.6. If particle size reduction was not required in Section 7.1.3, proceed to Section 7.3.7.

7.3.6 Prepare the waste for extraction by crushing, cutting, or grinding the solid portion of the waste to a surface area or particle size as described in Section 7.1.3. Wastes and appropriate reduction equipment should be refrigerated, if possible, to 4 °C prior to particle size reduction. The means used to effect particle size reduction must not generate heat in and of itself. If reduction of the solid phase of the waste is necessary, exposure of the waste to the atmosphere should be avoided to the extent possible.

NOTE: Sieving of the waste is not recommended due to the possibility that volatiles may be lost. The use of an appropriately graduated ruler is recommended as an acceptable alternative. Surface area requirements are meant for filamentous (e.g., paper, cloth) and similar waste materials. Actual measurement of surface area is not recommended.

When the surface area or particle size has been appropriately altered, proceed to Section 7.3.7.

7.3.7 Waste slurries need not be allowed to stand to permit the solid phase to settle. Do not centrifuge wastes prior to filtration.

7.3.8 Quantitatively transfer the entire sample (liquid and solid phases) quickly to the ZHE. Secure the filter and support screens onto the top flange of the device and secure the top flange to the ZHE body in accordance with the manufacturer's instructions. Tighten all ZHE fittings and place the device in the vertical position (gas inlet/outlet flange on the bottom). Do not attach the extract collection device to the top plate.

NOTE: If waste material (>1% of original sample weight) has obviously adhered to the container used to transfer the sample to the ZHE, determine the weight of this residue and subtract it from the sample weight determined in Section 7.3.4 to determine the weight of the waste sample that will be filtered.

Attach a gas line to the gas inlet/outlet valve (bottom flange) and, with the liquid inlet/outlet valve (top flange) open, begin applying gentle pressure of 1-10 psi (or more if necessary) to force all headspace slowly out of the ZHE device into a hood. At the first appearance of liquid from the liquid inlet/outlet valve, quickly close the valve and discontinue pressure. If filtration of the waste at 4 °C reduces the amount of expressed liquid over what would be expressed at room temperature, then allow the sample to warm up to room temperature in the device before filtering. If the waste is 100% solid (see Section 7.1.1), slowly increase the pressure to a maximum of 50 psi to force most of the headspace out of the device and proceed to Section 7.3.12.

7.3.9 Attach the evacuated pre-weighed filtrate collection container to the liquid inlet/outlet valve and open the valve. Begin applying gentle pressure of 1-10 psi to force the liquid phase of the sample into the filtrate collection container. If no additional liquid has passed through the filter in any 2 minute interval, slowly increase the pressure in 10 psi increments to a maximum of 50 psi. After each incremental increase of 10 psi, if no additional liquid has passed through the filter in any 2 minute interval, proceed to the next 10 psi increment. When liquid flow has ceased such that continued pressure filtration at 50 psi does not result in any additional filtrate within a 2 minute period, stop the filtration. Close the liquid inlet/outlet valve, discontinue pressure to the piston, and disconnect and weigh the filtrate collection container.

NOTE: Instantaneous application of high pressure can degrade the glass fiber filter and may cause premature plugging.

7.3.10 The material in the ZHE is defined as the solid phase of the waste and the filtrate is defined as the liquid phase.

NOTE: Some wastes, such as oily wastes and some paint wastes, will obviously contain some material that appears to be a liquid. Even after applying pressure filtration, this material will not filter. If this is the case, the material within the filtration device is defined as a solid and is carried through the TCLP extraction as a solid.

If the original waste contained <0.5% dry solids (see Section 7.1.2), this filtrate is defined as the TCLP extract and is analyzed directly. Proceed to Section 7.3.15.

7.3.11 The liquid phase may now be either analyzed immediately (See Sections 7.3.13 through 7.3.15) or stored at 4 °C under minimal headspace conditions until time of analysis. Determine the weight of extraction fluid #1 to add to the ZHE as follows:

$$\text{Weight of extraction fluid} = \frac{20 \times \text{percent solids (Section 7.1.1)} \times \text{weight of waste filtered (Section 7.3.4 or 7.3.8)}}{100}$$

7.3.12 The following Sections detail how to add the appropriate amount of extraction fluid to the solid material within the ZHE and agitation of the ZHE vessel. Extraction fluid #1 is used in all cases (See Section 5.7).

7.3.12.1 With the ZHE in the vertical position, attach a line from the extraction fluid reservoir to the liquid inlet/outlet valve. The line used shall contain fresh extraction fluid and should be preflushed with fluid to eliminate any air pockets in the line. Release gas pressure on the ZHE piston (from the gas inlet/outlet valve), open the liquid inlet/outlet valve, and begin transferring extraction fluid (by pumping or similar means) into the ZHE. Continue pumping extraction fluid into the ZHE until the appropriate amount of fluid has been introduced into the device.

7.3.12.2 After the extraction fluid has been added, immediately close the liquid inlet/outlet valve and disconnect the extraction fluid line. Check the ZHE to ensure that all valves are in their closed positions. Manually rotate the device in an end-over-end fashion 2 or 3 times. Reposition the ZHE in the vertical position with the liquid inlet/outlet valve on top. Pressurize the ZHE to 5-10 psi (if necessary) and slowly open the liquid inlet/outlet valve to bleed out any headspace (into a hood) that may have been introduced due to the addition of extraction fluid. This bleeding shall be done quickly and shall be stopped at the first appearance of liquid from the valve. Re-pressurize the ZHE with 5-10 psi and check all ZHE fittings to ensure that they are closed.

7.3.12.3 Place the ZHE in the rotary agitation apparatus (if it is not already there) and rotate at 30 $\pm$ 2 rpm for 18 $\pm$ 2 hours. Ambient temperature (i.e., temperature of room in which extraction occurs) shall be maintained at 23 $\pm$ 2 °C during agitation.

7.3.13 Following the 18 $\pm$ 2 hour agitation period, check the pressure behind the ZHE piston by quickly opening and closing the gas inlet/outlet valve and noting the escape of gas. If the pressure has not been maintained (i.e., no gas release observed), the device is leaking. Check the ZHE for leaking as specified in Section 4.2.1, and perform the extraction again with a new sample of waste. If the pressure within the device has been maintained, the material in the extractor vessel is once again separated into its component liquid and solid phases. If the waste contained an initial liquid phase, the liquid may be filtered directly into the same filtrate collection container (i.e., TEDLAR® bag) holding the initial liquid phase of the waste. A separate filtrate collection container must be used if combining would create multiple phases, or there is not enough volume left within the filtrate collection container. Filter through the glass fiber filter, using the ZHE device as discussed in Section 7.3.9. All extract shall be filtered and collected if the

TEDLAR® bag is used, if the extract is multiphasic, or if the waste contained an initial liquid phase (see Sections 4.6 and 7.3.1).

NOTE: An in-line glass fiber filter may be used to filter the material within the ZHE if it is suspected that the glass fiber filter has been ruptured.

7.3.14 If the original waste contained no initial liquid phase, the filtered liquid material obtained from Section 7.3.13 is defined as the TCLP extract. If the waste contained an initial liquid phase, the filtered liquid material obtained from Section 7.3.13 and the initial liquid phase (Section 7.3.9) are collectively defined as the TCLP extract.

7.3.15 Following collection of the TCLP extract, immediately prepare the extract for analysis and store with minimal headspace at 4 °C until analyzed. Analyze the TCLP extract according to the appropriate analytical methods. If the individual phases are to be analyzed separately (i.e., are not miscible), determine the volume of the individual phases (to 0.5%), conduct the appropriate analyses, and combine the results mathematically by using a simple volume-weighted average:

$$\text{Final Analyte Concentration} = \frac{(V_1)\ (C_1) + (V_2)\ (C_2)}{V_1 + V_2}$$

where:

V_1 = The volume of the first phases (L).
C_1 = The concentration of the analyte of concern in the first phase (mg/L).
V_2 = The volume of the second phase (L).
C_2 = The concentration of the analyte of concern in the second phase (mg/L).

7.3.16 Compare the analyte concentrations in the TCLP extract with the levels identified in the appropriate regulations. Refer to Section 8.0 for quality assurance requirements.

8.0 QUALITY ASSURANCE

8.1 A minimum of one blank (using the same extraction fluid as used for the samples) must be analyzed for every 20 extractions that have been conducted in an extraction vessel.

8.2 A matrix spike shall be performed for each waste type (e.g., wastewater treatment sludge, contaminated soil, etc.) unless the result exceeds the regulatory level and the data are being used solely to demonstrate that the waste property exceeds the regulatory level. A minimum of one matrix spike must be analyzed for each analytical batch. As a minimum, follow the matrix spike addition guidance provided in each analytical method.

8.2.1 Matrix spikes are to be added after filtration of the TCLP extract and before preservation. Matrix spikes should not be added prior to TCLP extraction of the sample.

8.2.2 In most cases, matrix spikes should be added at a concentration equivalent to the corresponding regulatory level. If the analyte concentration is less than one half the regulatory level, the spike concentration may be as low as one half of the analyte concentration, but may not be not less than five times the method detection limit. In order to avoid differences in matrix effects, the matrix spikes must be added to the same nominal volume of TCLP extract as that which was analyzed for the unspiked sample.

8.2.3 The purpose of the matrix spike is to monitor the performance of the analytical methods used, and to determine whether matrix interferences exist. Use of other internal calibration methods, modification of the analytical methods, or use of alternate analytical methods may be needed to accurately measure the analyte concentration in the TCLP extract when the recovery of the matrix spike is below the expected analytical method performance.

8.2.4 Matrix spike recoveries are calculated by the following formula:

$$\%R\ (\%Recovery) = 100\ (X_s - X_u)/K$$

where:
X_s = measured value for the spiked sample,
X_u = measured value for the unspiked sample, and
K = known value of the spike in the sample.

8.3 All quality control measures described in the appropriate analytical methods shall be followed.

8.4 The use of internal calibration quantitation methods shall be employed for a metallic contaminant if: (1) Recovery of the contaminant from the TCLP extract is not at least 50% and the concentration does not exceed the regulatory level, and (2) The concentration of the contaminant measured in the extract is within 20% of the appropriate regulatory level.

8.4.1. The method of standard additions shall be employed as the internal calibration quantitation method for each metallic contaminant.

8.4.2 The method of standard additions requires preparing calibration standards in the sample matrix rather than reagent water or blank solution. It requires taking four identical aliquots of the solution and adding known amounts of standard to three of these aliquots. The forth aliquot is the unknown. Preferably, the first addition should be prepared so that the resulting concentration is approximately 50% of the expected concentration of the sample. The second and third additions should be prepared so that the concentrations are approximately 100% and

150% of the expected concentration of the sample. All four aliquots are maintained at the same final volume by adding reagent water or a blank solution, and may need dilution adjustment to maintain the signals in the linear range of the instrument technique. All four aliquots are analyzed.

8.4.3 Prepare a plot, or subject data to linear regression, of instrument signals or external-calibration-derived concentrations as the dependant variable (y-axis) versus concentrations of the additions of standard as the independent variable (x-axis). Solve for the intercept of the abscissa (the independent variable, x-axis) which is the concentration in the unknown.

8.4.4 Alternately, subtract the instrumental signal or external-calibration-derived concentration of the unknown (unspiked) sample from the instrumental signals or external-calibration-derived concentrations of the standard additions. Plot or subject to linear regression of the corrected instrument signals or external-calibration-derived concentrations as the dependant variable versus the independent variable. Derive concentrations for unknowns using the internal calibration curve as if it were an external calibration curve.

8.5 Samples must undergo TCLP extraction within the following time periods:

SAMPLE MAXIMUM HOLDING TIMES [DAYS]				
	From: Field collection To: TCLP extraction	From: TCLP extraction To: Preparative extraction	From: Preparative extraction To: Determinative analysis	Total elapsed time
Volatiles	14	NA	14	28
Semi-volatiles	14	7	40	61
Mercury	28	NA	28	56
Metals, except mercury	180	NA	180	360

NA = Not applicable

If sample holding times are exceeded, the values obtained will be considered minimal concentrations. Exceeding the holding time is not acceptable in establishing that a waste does not exceed the regulatory level. Exceeding the holding time will not invalidate characterization if the waste exceeds the regulatory level.

9.0 METHOD PERFORMANCE

9.1 Ruggedness. Two ruggedness studies have been performed to determine the effect of various perturbations on specific elements of the TCLP protocol. Ruggedness testing determines the sensitivity of small procedural variations which might be expected to occur during routine laboratory application.

9.1.1 Metals - The following conditions were used when leaching a waste for metals analysis:

Varying Conditions	
Liquid/Solid ratio	19:1 vs. 21:1
Extraction time	16 hours vs. 18 hours
Headspace	20% vs. 60%
Buffer #2 acidity	190 meq vs. 210 meq
Acid-washed filters	yes vs. no
Filter type	0.7 µm glass fiber vs. 0.45 µm vs. polycarbonate
Bottle type	borosilicate vs. flint glass

Of the seven method variations examined, acidity of the extraction fluid had the greatest impact on the results. Four of 13 metals from an API separator sludge/electroplating waste (API/EW) mixture and two of three metals from an ammonia lime still bottom waste were extracted at higher levels by the more acidic buffer. Because of the sensitivity to pH changes, the method requires that the extraction fluids be prepared so that the final pH is within ± 0.05 units as specified.

9.1.2 Volatile Organic Compounds - The following conditions were used when leaching a waste for VOC analysis:

Varying Conditions	
Liquid/Solid ratio	19:1 vs. 21:1
Headspace	0% vs. 5%
Buffer #1 acidity	60 meq vs. 80 meq
Method of storing extract	Syringe vs. Tedlar® bag
Aliquotting	yes vs. no
Pressure behind piston	0 psi vs. 20 psi

None of the parameters had a significant effect on the results of the ruggedness test.

9.2 Precision. Many TCLP precision (reproducibility) studies have been performed, and have shown that, in general, the precision of the TCLP is comparable to or exceeds that of the EP toxicity test and that method precision is adequate. One of the more significant contributions to poor precision appears to be related to sample homogeneity and inter-laboratory variation (due to the nature of waste materials).

9.2.1 Metals - The results of a multi-laboratory study are shown in Table 6, and indicate that a single analysis of a waste may not be adequate for waste characterization and identification requirements.

9.2.2 Semi-Volatile Organic Compounds - The results of two studies are shown in Tables 7 and 8. Single laboratory precision was excellent with greater than 90 percent of the results exhibiting an RSD less than 25 percent. Over 85 percent of all individual compounds in the multi-laboratory study fell in the RSD range of 20 - 120 percent. Both studies concluded that the TCLP provides adequate precision. It was also determined that the high acetate content of the extraction fluid did not present problems (i.e., column degradation of the gas chromatograph) for the analytical conditions used.

9.2.3 Volatile Organic Compounds - Eleven laboratories participated in a collaborative study of the use of the ZHE with two waste types which were fortified with a mixture of VOCs. The results of the collaborative study are shown in Table 9. Precision results for VOCs tend to occur over a considerable range. However, the range and mean RSD compared very closely to the same collaborative study metals results in Table 6. Blackburn and Show concluded that at the 95% level of significance: 1) recoveries among laboratories were statistically similar, 2) recoveries did not vary significantly between the two sample types, and 3) each laboratory showed the same pattern of recovery for each of the two samples.

10.0 REFERENCES

1. Blackburn, W.B. and Show, I. "Collaborative Study of the Toxicity Characteristics Leaching Procedure (TCLP)." Draft Final Report, Contract No. 68-03-1958, S-Cubed, November 1986.

2. Newcomer, L.R., Blackburn, W.B., Kimmell, T.A. "Performance of the Toxicity Characteristic Leaching Procedure." Wilson Laboratories, S-Cubed, U.S. EPA, December 1986.

3. Williams, L.R., Francis, C.W.; Maskarinec, M.P., Taylor D.R., and Rothman, N. "Single-Laboratory Evaluation of Mobility Procedure for Solid Waste." EMSL, ORNL, S-Cubed, ENSECO.

Table 1.
Volatile Analytes[1,2]

Compound	CAS No.
Acetone	67-64-1
Benzene	71-43-2
n-Butyl alcohol	71-36-3
Carbon disulfide	75-15-0
Carbon tetrachloride	56-23-5
Chlorobenzene	108-90-7
Chloroform	67-66-3
1,2-Dichloroethane	107-06-2
1,1-Dichloroethylene	75-35-4
Ethyl acetate	141-78-6
Ethyl benzene	100-41-4
Ethyl ether	60-29-7
Isobutanol	78-83-1
Methanol	67-56-1
Methylene chloride	75-09-2
Methyl ethyl ketone	78-93-3
Methyl isobutyl ketone	108-10-1
Tetrachloroethylene	127-18-4
Toluene	108-88-3
1,1,1,-Trichloroethane	71-55-6
Trichloroethylene	79-01-6
Trichlorofluoromethane	75-69-4
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1
Vinyl chloride	75-01-4
Xylene	1330-20-7

[1] When testing for any or all of these analytes, the zero-headspace extractor vessel shall be used instead of the bottle extractor.

[2] Benzene, carbon tetrachloride, chlorobenzene, chloroform, 1,2-dichloroethane, 1,1-dichloroethylene, methyl ethyl ketone, tetrachloroethylene, and vinyl chloride are toxicity characteristic constituents.

Table 2.
Suitable Rotary Agitation Apparatus[1]

Company	Location	Model No.
Analytical Testing and Consulting Services, Inc.	Warrington, PA (215) 343-4490	4-vessel extractor (DC20S) 8-vessel extractor (DC20) 12-vessel extractor (DC20B) 24-vessel extractor (DC24C)
Associated Design and Manufacturing Company	Alexandria, VA (703) 549-5999	2-vessel (3740-2-BRE) 4-vessel (3740-4-BRE) 6-vessel (3740-6-BRE) 8-vessel (3740-8-BRE) 12-vessel (3740-12-BRE) 24-vessel (3740-24-BRE)
Environmental Machine and Design, Inc.	Lynchburg, VA (804) 845-6424	8-vessel (08-00-00) 4-vessel (04-00-00)
IRA Machine Shop and Laboratory	Santurce, PR (809) 752-4004	8-vessel (011001)
Lars Lande Manufacturing	Whitmore Lake, MI (313) 449-4116	10-vessel (10VRE) 5-vessel (5VRE) 6-vessel (6VRE)
Millipore Corp.	Bedford, MA (800) 225-3384	4-ZHE or 4 2-liter bottle extractor (YT31ORAHW)

[1] Any device that rotates the extraction vessel in an end-over-end fashion at 30 ± 2 rpm is acceptable.

Table 3.
Suitable Zero-Headspace Extractor Vessels[1]

Company	Location	Model No.
Analytical Testing & Consulting Services, Inc.	Warrington, PA (215) 343-4490	C102, Mechanical Pressure Device
Associated Design and Manufacturing Company	Alexandria, VA (703) 549-5999	3745-ZHE, Gas Pressure Device
Lars Lande Manufacturing[2]	Whitmore Lake, MI (313) 449-4116	ZHE-11, Gas Pressure Device
Millipore Corporation	Bedford, MA (800) 225-3384	YT30090HW, Gas Pressure Device
Environmental Machine and Design, Inc.	Lynchburg, VA (804) 845-6424	VOLA-TOX1, Gas Pressure Device
Gelman Science	Ann Arbor, MI (800) 521-1520	15400 Gas Pressure Device

[1] Any device that meets the specifications listed in Section 4.2.1 of the method is suitable.

[2] This device uses a 110 mm filter.

Table 4.
Suitable Filter Holders[1]

Company	Location	Model/ Catalogue No.	Size
Nucleopore Corporation	Pleasanton, CA (800) 882-7711	425910 410400	142 mm 47 mm
Micro Filtration Systems	Dublin, CA (800) 334-7132 (415) 828-6010	302400 311400	142 mm 47 mm
Millipore Corporation	Bedford, MA (800) 225-3384	YT30142HW XX1004700	142 mm 47 mm

[1] Any device capable of separating the liquid from the solid phase of the waste is suitable, providing that it is chemically compatible with the waste and the constituents to be analyzed. Plastic devices (not listed above) may be used when only inorganic analytes are of concern. The 142 mm size filter holder is recommended.

Table 5.
Suitable Filter Media[1]

Company	Location	Model	Pore Size (μm)
Millipore Corporation	Bedford, MA (800) 225-3384	AP40	0.7
Nucleopore Corporation	Pleasanton, CA (415) 463-2530	211625	0.7
Whatman Laboratory Products, Inc.	Clifton, NJ (201) 773-5800	GFF	0.7
Micro Filtration Systems	Dublin, CA (800) 334-7132 (415) 828-6010	GF75	0.7
Gelman Science	Ann Arbor, MI (800) 521-1520	66256 (90mm) 66257 (142mm)	0.7

[1] Any filter that meets the specifications in Section 4.4 of the Method is suitable.

Table 6. Multi-Laboratory TCLP Metals, Precision

Waste	Extraction Fluid	Metal	$\bar{X}$	S	%RSD
Ammonia	#1	Cadmium	0.053	0.031	60
Lime Still	#2		0.023	0.017	76
Bottoms	#1	Chromium	0.015	0.0014	93
	#2		0.0032	0.0037	118
	#1	Lead	0.0030	0.0027	90
	#2		0.0032	0.0028	87
API/EW	#1	Cadmium	0.0046	0.0028	61
Mixture	#2		0.0005	0.0004	77
	#1	Chromium	0.0561	0.0227	40
	#2		0.105	0.018	17
	#1	Lead	0.0031	0.0031	100
	#2		0.0124	0.0136	110
Fossil	#1	Cadmium	0.080	0.069	86
Fuel Fly	#2		0.093	0.067	72
Ash	#1	Chromium	0.017	0.014	85
	#2		0.070	0.040	57
	#1	Lead	0.0087	0.0074	85
	#2		0.0457	0.0083	18
				%RSD Range = 17 - 118 Mean %RSD = 74	

NOTE: $\bar{X}$ = Mean results from 6 - 12 different laboratories
Units = mg/L
Extraction Fluid #1 = pH 4.9
#2 = pH 2.9

Table 7. Single-Laboratory Semi-Volatiles, Precision

Waste	Compound	Extraction Fluid	$\bar{X}$	S	%RSD
Ammonia Lime Still Bottoms	Phenol	#1	19000	2230	11.6
		#2	19400	929	4.8
	2-Methylphenol	#1	2000	297	14.9
		#2	1860	52.9	2.8
	4-Methylphenol	#1	7940	1380	17.4
		#2	7490	200	2.7
	2,4-Dimethylphenol	#1	321	46.8	14.6
		#2	307	45.8	14.9
	Naphthalene	#1	3920	413	10.5
		#2	3827	176	4.6
	2-Methylnaphthalene	#1	290	44.8	15.5
		#2	273	19.3	7.1
	Dibenzofuran	#1	187	22.7	12.1
		#2	187	7.2	3.9
	Acenaphthylene	#1	703	89.2	12.7
		#2	663	20.1	3.0
	Fluorene	#1	151	17.6	11.7
		#2	156	2.1	1.3
	Phenanthrene	#1	241	22.7	9.4
		#2	243	7.9	3.3
	Anthracene	#1	33.2	6.19	18.6
		#2	34.6	1.55	4.5
	Fluoranthrene	#1	25.3	1.8	7.1
		#2	26.0	1.8	7.1
API/EW Mixture	Phenol	#1	40.7	13.5	33.0
		#2	19.0	1.76	9.3
	2,4-Dimethylphenol	#1	33.0	9.35	28.3
		#2	43.3	8.61	19.9
	Naphthalene	#1	185	29.4	15.8
		#2	165	24.8	15.0
	2-Methylnaphthalene	#1	265	61.2	23.1
		#2	200	18.9	9.5
				%RSD Range = 1 - 33 Mean %RSD = 12	

NOTE: Units = μg/L
Extractions were performed in triplicate
All results were at least 2x the detection limit
Extraction Fluid #1 = pH 4.9
#2 = pH 2.9

Table 8. Multi-Laboratory Semi-Volatiles, Precision

Waste	Compound	Extraction Fluid	$\bar{X}$	S	%RSD
Ammonia Lime	BNAs	#1	10043	7680	76.5
Still Bottoms (A)		#2	10376	6552	63.1
API/EW	BNAs	#1	1624	675	41.6
Mixture (B)		#2	2074	1463	70.5
Fossil Fuel	BNAs	#1	750	175	23.4
Fly Ash (C)		#2	739	342	46.3
					Mean %RSD = 54

NOTE: Units = μg/L
X = Mean results from 3 - 10 labs
Extraction Fluid #1 = pH 4.9
#2 = pH 2.9

%RSD Range for Individual Compounds

A, #1	0 - 113
A, #2	28 - 108
B, #1	20 - 156
B, #2	49 - 128
C, #1	36 - 143
C, #2	61 - 164

Table 9. Multi-Laboratory (11 Labs) VOCs, Precision

Waste	Compound	$\bar{X}$	S	%RSD
Mine Tailings	Vinyl chloride	6.36	6.36	100
	Methylene chloride	12.1	11.8	98
	Carbon disulfide	5.57	2.83	51
	1,1-Dichloroethene	21.9	27.7	127
	1,1-Dichloroethane	31.4	25.4	81
	Chloroform	46.6	29.2	63
	1,2-Dichloroethane	47.8	33.6	70
	2-Butanone	43.5	36.9	85
	1,1,1-Trichloroethane	20.9	20.9	100
	Carbon tetrachloride	12.0	8.2	68
	Trichloroethene	24.7	21.2	86
	1,1,2-Trichloroethene	19.6	10.9	56
	Benzene	37.9	28.7	76
	1,1,2,2-Tetrachloroethane	34.9	25.6	73
	Toluene	29.3	11.2	38
	Chlorobenzene	35.6	19.3	54
	Ethylbenzene	4.27	2.80	66
	Trichlorofluoromethane	3.82	4.40	115
	Acrylonitrile	76.7	110.8	144
Ammonia Lime Still Bottoms	Vinyl chloride	5.00	4.71	94
	Methylene chloride	14.3	13.1	92
	Carbon disulfide	3.37	2.07	61
	1,1-Dichloroethene	52.1	38.8	75
	1,1-Dichloroethane	52.8	25.6	49
	Chloroform	64.7	28.4	44
	1,2-Dichloroethane	43.1	31.5	73
	2-Butanone	59.0	39.6	67
	1,1,1-Trichloroethane	53.6	40.9	76
	Carbon tetrachloride	7.10	6.1	86
	Trichloroethene	57.3	34.2	60
	1,1,2-Trichloroethene	6.7	4.7	70
	Benzene	61.3	26.8	44
	1,1,2,2-Tetrachloroethane	3.16	2.1	66
	Toluene	69.0	18.5	27
	Chlorobenzene	71.8	12.0	17
	Ethylbenzene	3.70	2.2	58
	Trichlorofluoromethane	4.05	4.8	119
	Acrylonitrile	29.4	34.8	118
		%RSD Range = 17 - 144 Mean %RSD = 75		

NOTE: Units = µg/L

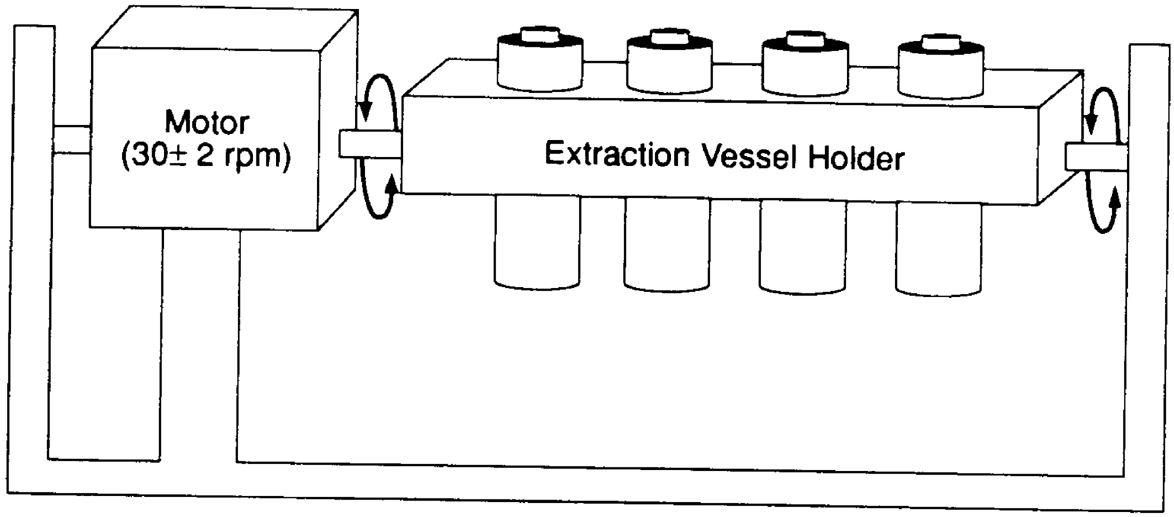


Figure 1. Rotary Agitation Apparatus

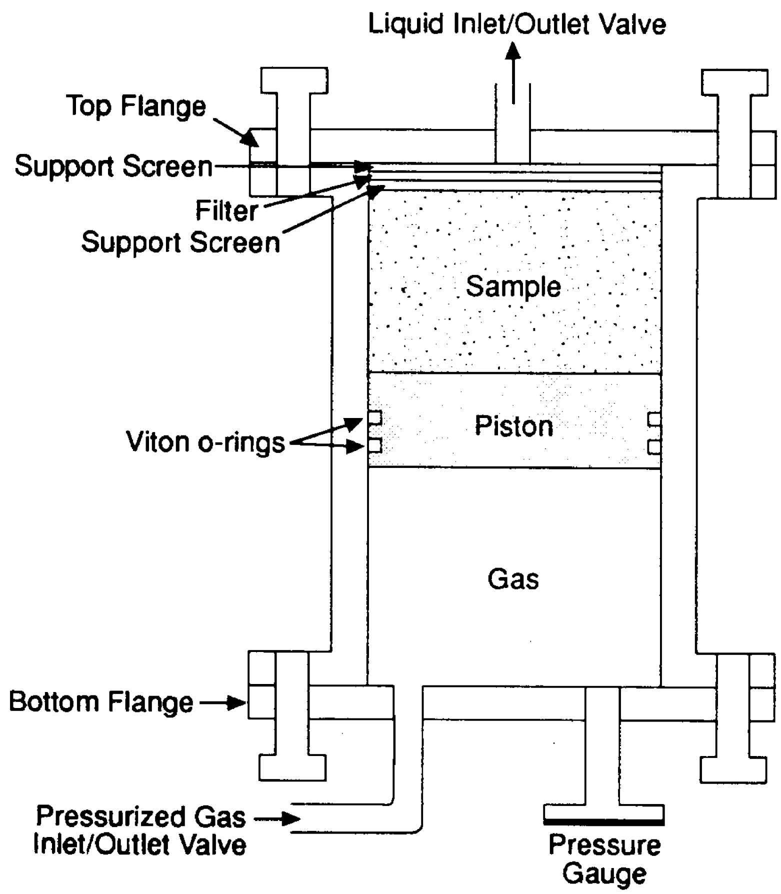
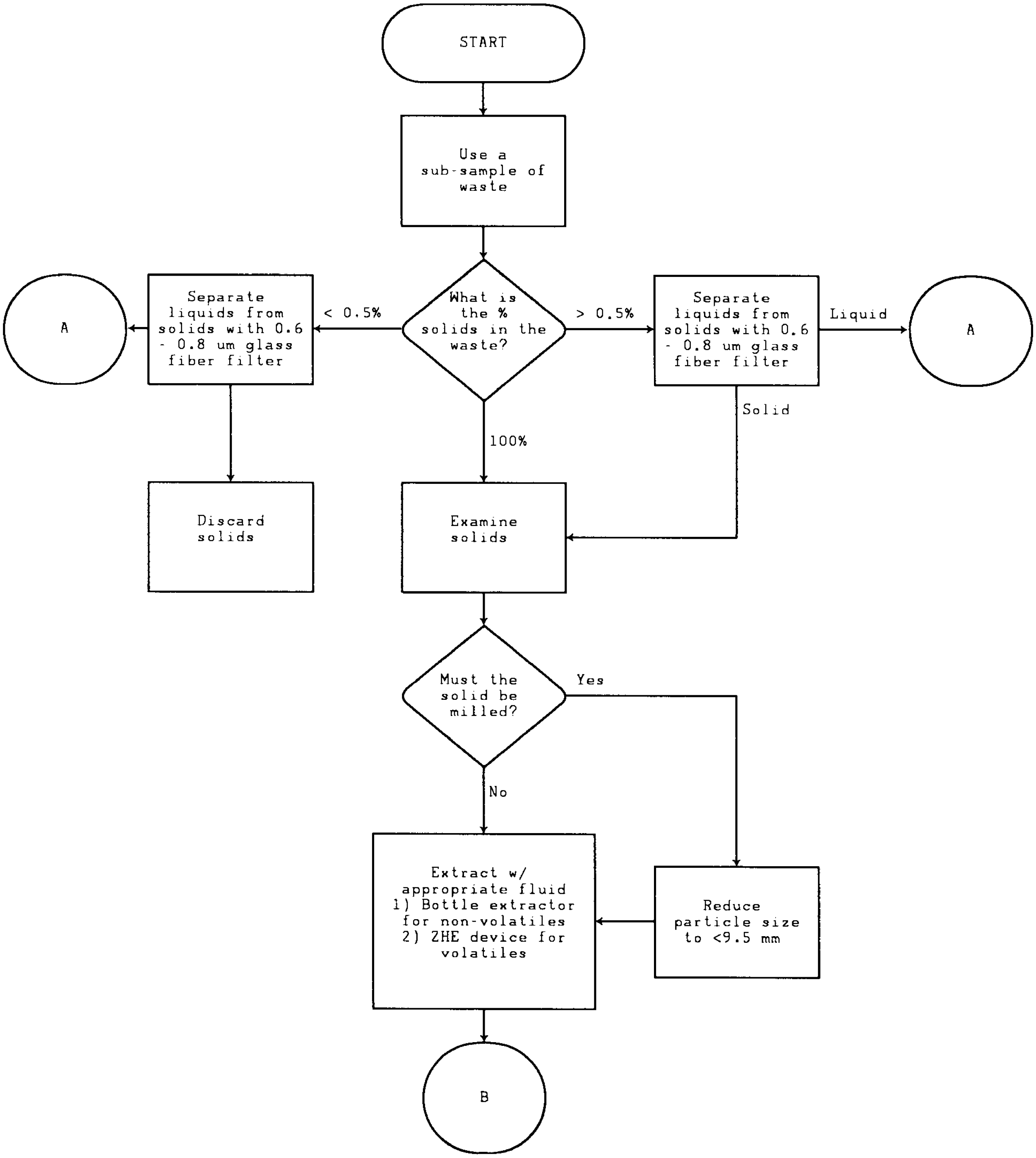


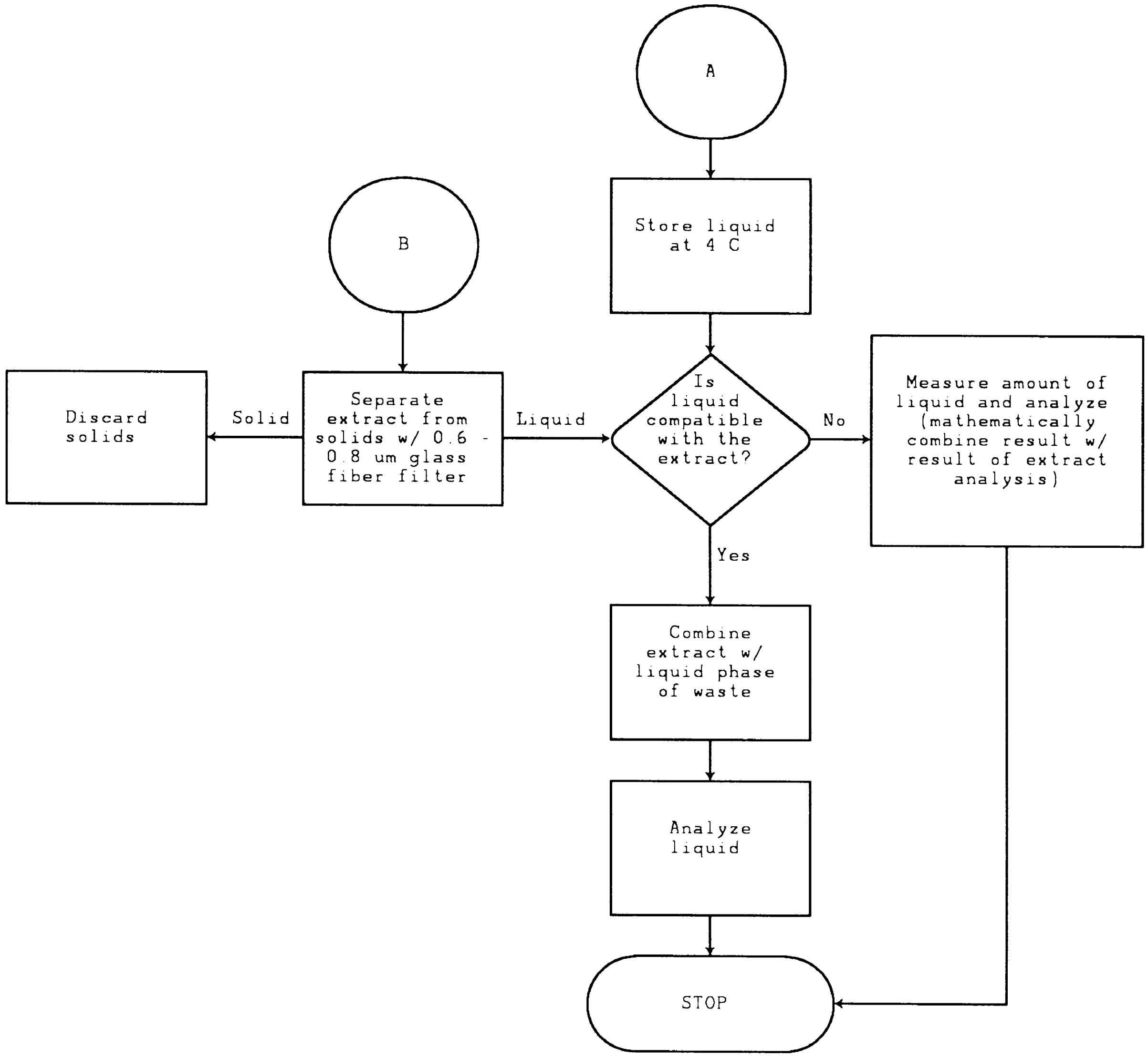
Figure 2. Zero-Headspace Extractor (ZHE)

METHOD 1311

TOXICITY CHARACTERISTIC LEACHATE PROCEDURE



TOXICITY CHARACTERISTIC LEACHATE PROCEDURE



APPENDIX 2-D

Selected ASTM Methods

Designation: D4979 – 08

Standard Test Method for Physical Description Screening Analysis in Waste[1]

This standard is issued under the fixed designation D4979; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method is used to identify wastes by describing certain physical properties. It has been developed as a rapid but effective means for visually screening wastes when received in the laboratory or during collection at the sampling site.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific hazard and warning information is given in 8.1.6.

2. Terminology

2.1 *Definitions of Terms Specific to This Standard:*

2.1.1 *screening analysis*—a preliminary qualitative or semi-quantitative test that is designed to efficiently give the user specific information about a waste that will aid in determining waste identification, process compatibility, and safety in handling.

3. Summary of Test Method

3.1 Samples are inspected and the physical appearance is recorded, including color, turbidity, viscosity, physical state, layering, and any other observable attribute (for example, texture).

4. Significance and Use

4.1 This test method is intended for use by those in the waste management industries to aid in describing the physical characteristics of waste.

4.2 This test method has two uses. One is to visually screen wastes being received at the laboratory to identifying discrepancies between the waste, manifest, and historical descriptions. The other use is to visually examine soil and water samples while they are being collected. This information, along with professional judgment during sample collection, can be used to increase the knowledge of the site contamination by increasing or reducing the number of samples collected based on visible indication of contamination or lack of visible indication of contamination. For example, if a soil or groundwater sample is collected "up gradient" of the area of known or suspected contamination to obtain site background concentrations, and the sample appears contaminated, the up gradient area can be relocated during that sampling event. Visual observation could also show that the sampling parameters need to be increased or decreased. This may reduce or eliminate the need for additional sampling trips to the field.

5. Interferences

5.1 Opaque sample containers require removal of a representative sample sufficient for complete observation. It is recommended that a representative portion be transferred to a clean, dry, clear container.

6. Apparatus

6.1 *Disposable Spatula or Eye Dropper.*

6.2 *Clear Glass Sample Containers.*

7. Sampling

7.1 Samples should be obtained in clear glass containers.

7.2 Liquid samples may require time to stabilize (that is, until layers reform).

7.3 It may be helpful to pick up the sample container and tilt, rotate, swirl, invert it or to manipulate the sample with a clean, disposable spatula or eye dropper.

7.4 In the laboratory, if necessary, allow the sample to come to room temperature in a sealed container. For example, frozen material should be allowed to thaw completely.

8. Procedures

8.1 Inspect the waste sample and describe the physical attributes noting the following areas.

8.1.1 *Color*—Describe the visual color of the sample. If more than one color is present, list colors in decreasing order of prominence. Additional descriptive terms may be useful (for example, purple with swirls of blue and flecks of yellow).

8.1.2 *Turbidity*—Describe liquid samples or liquid portions of samples in terms of clear (transparent), cloudy (translucent), or opaque.

[1] This test method is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.01.05 on Screening Methods.

Current edition approved Sept. 1, 2008. Published October 2008. Originally approved in 1989. Last previous edition approved in 2003 as D4979 – 95(2003). DOI: 10.1520/D4979-08.

8.1.3 *Viscosity*—Describe the viscosity of liquids and sludges. Describe viscosity in reference to viscosity like water, medium viscosity like syrup or motor oil, or high viscosity like molasses or warm tar. Tip the container sideways or invert to note the viscosity. If a sample is tipped 90° for 5 s and has no visible flow, report it as such.

8.1.4 *Physical State*—Describe as liquid, solid, sludge, powder, granular, etc. Note any unusual physical attributes. Note the general range of particle size, (fine to coarse) and the presence of larger chunks. The presence of any free liquids must be noted, as must the presence of (or for stabilized wastes, the absence of) sorbants (absorbants and adsorbents) as a sole treatment. Such sorbants might include sawdust, ground or whole corn cobs, or vermiculite.

8.1.5 *Layering*—Describe any layering in terms of rough percentages of the total sample. Record the color, turbidity, and physical state of each layer. Describe multilayered samples by listing the layers and their percentages from the top downward (that is, 5 % golden transparent medium-viscosity liquid over 90 % black opaque low-viscosity liquid over 5 % blue translucent low-viscosity liquid).

NOTE 1—The presence of oil, water, or heavier fractions such as halogenated solvents can be confirmed by noting the solubility or insolubility of each phase and, if insoluble, noting if it is heavier or lighter than water.

8.1.6 *Odor*—Note only obvious incidental odors noticed during sample handling. (**Warning—**Intentional smelling of samples must *not* be performed under any circumstances!)

8.2 All descriptions must be recorded in a complete and concise manner.

9. Precision and Bias

9.1 No statement is made about either the precision or bias of this test method since the results of the test are based on visual observations only.

10. Keywords

10.1 color; physical description; screening analysis; turbidity; viscosity

Designation: D4978 – 95 (Reapproved 2007)

Standard Test Methods for Screening of Reactive Sulfides in Waste[1]

This standard is issued under the fixed designation D4978; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 These test methods are applicable to the screening of reactive sulfides in wastes, liquids, sludges, semisolids, and solids by using the following methods:

	Sections
Test Method A—Lead Acetate Paper	9-14
Test Method B—Gas Detector Tube	15-19

1.2 These test methods are not applicable in determining the type and concentration of reactive sulfides.

1.3 These test methods are designed and intended as a preliminary test to complement the more sophisticated quantitative analytical techniques that may be used to determine sulfide concentration. These test methods offer, to the user, the option and the ability to screen waste for potentially hazardous levels of reactive sulfide when the sophisticated techniques are not available and the total waste composition is unknown.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific hazard information is given in Section 7 and 11.3.

2. Referenced Documents

2.1 *ASTM Standards:*[2]
D1193 Specification for Reagent Water

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *reactive sulfide*—a compound containing sulfide that readily forms hydrogen sulfide gas upon reaction with acid.

3.1.2 *screening analysis*—a *preliminary* qualitative or semi-quantitative test developed from classical qualitative and quantitative techniques that is designed to efficiently give the user parameters about a waste that will aid in determining waste identification, process compatibility, and safety in handling.

4. Summary of Test Methods

4.1 *Method A: Lead Acetate Paper*—A sample of waste material is acidified. If sulfides are present in the waste, hydrogen sulfide (H_2S) is evolved. In the presence of hydrogen sulfide, lead acetate paper changes color to silvery brown or black.

4.2 *Method B: Gas Detector Tube*—A portion of the sample is acidified in a beaker to release sulfide as hydrogen sulfide gas. The gas is funneled through a detector tube creating a color stain in the tube proportionate to the concentration of sulfide gas in the vapor. A definite color change in the detector tube indicates a positive presence of sulfide.

5. Significance and Use

5.1 These test methods are intended for use by waste treatment, storage, disposal, and remedial facilities, in order to show the presence of potentially hazardous sulfide.

5.2 *Method B: Gas Detector Tube*—This proposed test method was designed to measure gases migrating into an air space at a height of 10 units (for example, 10 ft) from a receiving or mixing pit of 10 units square (for example, 100 ft^2). In essence, the total volume of the atmosphere is approximately 10 times the surface area of the sample and test solution.

6. Reagents

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society where such specifications are available.[3] Other grades may be used

[1] These test methods are under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.01.05 on Screening Methods.

Current edition approved Feb. 1, 2007. Published March 2007. Originally approved in 1989. Last previous edition approved in 2001 as D4978 – 95(2001). DOI: 10.1520/D4978-95R07.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.

provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

6.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type III of Specification D1193.

7. Hazards

7.1 These tests should be conducted under a fume hood.

7.2 Avoid inhalation and skin or eye contact, or both, with all hazardous material.

8. Sampling

8.1 Collect a representative sample of the waste in a sealed container.

8.2 Store the sample in an operating fume hood.

8.3 The sample should be analyzed as soon as possible.

TEST METHOD A—LEAD ACETATE PAPER

9. Interferences

9.1 Compounds evolving gases or vapors upon acidification that react with lead may interfere causing false positives.

NOTE 1—All positives should be followed up by a more detailed method, that is, distillation for total sulfides.

10. Reagents and Materials

10.1 *Beakers or Test Tubes.*

10.2 *Stirring Rod.*

10.3 *Hydrochloric Acid* (1 + 1)—Add 1 volume of hydrochloric acid (HCl, sp gr 1.19) to 1 volume water.

10.4 *Lead Acetate Paper.*

10.5 *Sodium Sulfide, Standard Solution* (1 mL = 1 mg Na_2S)—Dissolve 1.00 g sodium sulfide (Na_2S) in water and dilute to 1 L. Make this solution fresh daily.

10.6 *Quality Control Check Standard*—Dilute an appropriate volume of sodium sufide standard solution with water to produce a solution with the desired action level. Make this solution fresh daily.

11. Procedure

11.1 Place 5 to 10 g of sample into the beaker (slurry with approximately 15 mL water if the material is solid).

11.2 Wet a strip of lead acetate paper and let it adhere to the side of beaker above the sample.

11.3 Slowly and carefully adjust the pH to less than 2.0 with HCl solution 1 + 1.

NOTE 2—**Warning:** The addition of HCl to waste materials may cause violent reaction or highly toxic vapors, or both.

11.4 Stir the solution.

11.5 A silvery brown to black color on the lead acetate paper indicates the presence of sulfides and shall be recorded as positive. Compare the color observed to a blank and standard solution.

11.6 No color change to the lead acetate paper will be reported as negative.

12. Report

12.1 Report the following information:

12.1.1 Sample identification,

12.1.2 Date of test,

12.1.3 Test procedure performed, and

12.1.4 Sample classification: positive or negative.

13. Quality Control

13.1 A quality control check sample shall be tested with each batch of samples. The concentration of this sample should reflect the action level required by the laboratory. Method or reagent blanks, duplications, and fortification (spikes), should be performed at an action level specified by the laboratory at an appropriate frequency.

13.2 Method detection limits should be determined by each laboratory using the standard and at the appropriate action level.

14. Precision and Bias

14.1 No statement is made about either the precision or bias of Test Method A for measuring sulfides in wastes since the result merely states whether there is conformance to the criteria for success specified in the procedure.

TEST METHOD B—GAS DETECTOR TUBE

15. Reagents and Materials

15.1 *Buffer Solution*—Dissolve 740 g trisodium phosphate (Na_3PO_4) in 3.5 L of water. Add carefully 500 mL of phosphoric acid (H_3PO_4, 85 %) and mix. Adjust the pH to 2 with H_3PO_4 if necessary.

15.2 *pH Indicator Paper,* range: 0 to 14.

15.3 *Disposable Beaker,* 400-mL.

15.4 *Plastic Funnel,* 8-cm.

15.5 *Jack Stand.*

15.6 *Ring Stand and Clamps.*

15.7 *Gas Detector Pump* with a volume range of 0 to 100 cc.

15.8 *Gas Detector Tube* for hydrogen sulfide.

15.9 *Magnetic Stirrer.*

15.10 *Magnetic Stirring Bar.*

15.11 See Fig. 1 for suggested equipment setup.

16. Procedure

16.1 Place approximately 20 g of the material to be tested into a beaker with a magnetic stirring bar. Solid samples shall be crushed into small particles <9.5 mm in size (3⁄8-in. mesh screen).

16.2 Add approximately 50 mL of the buffer solution to the sample.

16.3 With a lab jack, raise the beaker and magnetic stirrer to a point at which the funnel fits down inside the beaker opening.

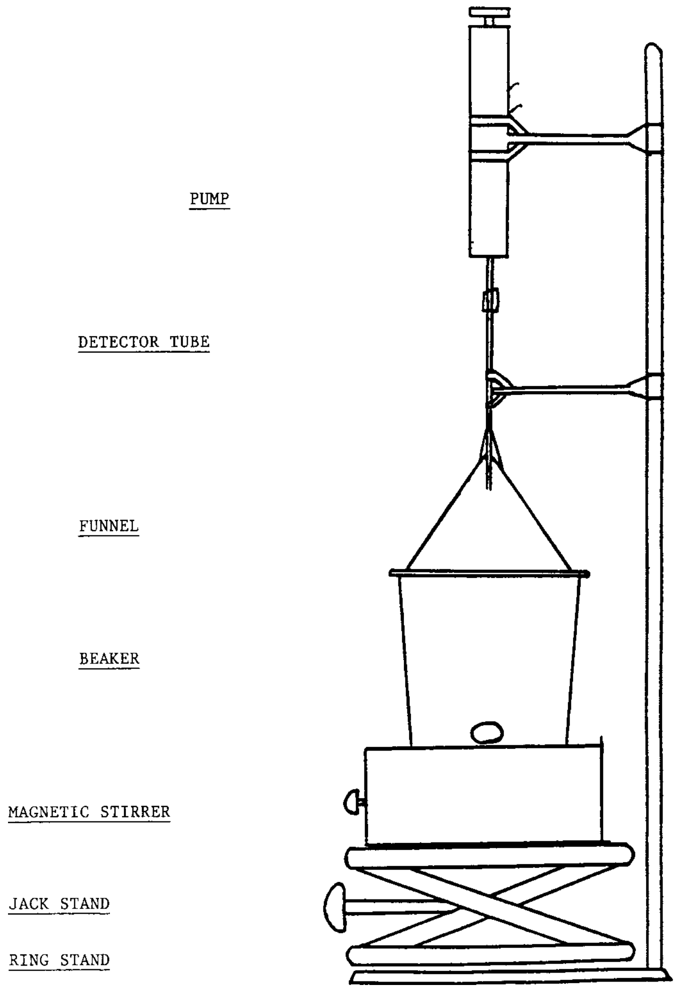


FIG. 1 Method B, Sulfide Test Apparatus

16.4 The gas detector tube with the pump attached should be directly positioned through the small opening of the funnel, with the tip of the tube about midway in the funnel area.

16.5 Begin stirring the sample.

16.6 Activate the pump by pulling out the handle to draw in 100 cm^3 of atmosphere from the apparatus.

16.7 A positive sulfide is determined by a color stain in the detector tube.

16.8 Allow at least a 1-min reaction time before reading results.

17. Report

17.1 Report the following information:
17.1.1 Sample identification,
17.1.2 Date of test,
17.1.3 Test procedure performed, and
17.1.4 Sample classification: positive or negative.

18. Quality Control

18.1 A quality control check sample shall be tested with each batch of samples. The concentration of this sample should reflect the action level required by the laboratory. Method or reagent blanks, duplications, and fortification (spikes), should be performed at an action level specified by the laboratory at an appropriate frequency.

18.2 Method detection limits should be determined by each laboratory using the standard and at the appropriate action level.

19. Precision and Bias

19.1 No statement is made about either the precision orbias of Method B for measuring sulfides in wastes since the result merely states whether there is conformance to the criteria for success specified in the procedure.

Designation: D1429 – 08

Standard Test Methods for Specific Gravity of Water and Brine[1]

1. Scope

1.1 These test methods cover the determination of the specific gravity of water and brine free of separable oil, as follows:

	Sections
Test Method A—Pycnometer	7 to 11, 21
Test Method B—Balance	12 to 16, 21
Test Method C—Erlenmeyer Flask	17 to 21
Test Method D—Hydrometer	22 to 27

1.2 Test Methods A and B are applicable to clear waters or those containing only a moderate amount of particulate matter. Test Method B is preferred for samples of sea water or brines and is more sensitive than Test Method D which has the same general application. Test Method C is intended for samples of water containing mud or sludge.

1.3 It is the user's responsibility to ensure the validity of these test methods for waters of untested matrices.

1.4 The test method was tested at 22°C over a range, shown in Tables 1-4, of 1.0252 through 1.2299; all data were corrected to 15.6°C (60°F).

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1066 Practice for Sampling Steam
D1129 Terminology Relating to Water
D1193 Specification for Reagent Water
D2777 Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D19 on Water
D3370 Practices for Sampling Water from Closed Conduits
D5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis
E1 Specification for ASTM Liquid-in-Glass Thermometers

3. Terminology

3.1 *Definitions:*

3.1.1 *brine*—water that contains dissolved matter at an approximate concentration of more than 30 000 mg/L.

3.1.2 For definitions of terms used in these test methods, refer to Terminology D1129.

4. Significance and Use

4.1 Specific gravity is an important property of fluids being related to density and viscosity. Knowing the specific gravity will allow determination of a fluid's characteristics compared to a standard, usually water, at a specified temperature. This will allow the user to determine if the test fluid will be heavier or lighter than the standard fluid.

5. Reagents

5.1 *Purity of Water*— Unless otherwise indicated, reference to water shall be understood to mean reagent water conforming to Specification D1193, Type I. Other reagent water types may be used provided it is first ascertained that the water is of sufficiently high purity to permit its use without adversely affecting the precision and bias of the test method. Type III water was specified at the time of round robin testing of this test method.

6. Sampling

6.1 Collect the samples in accordance with Practices D3370 and Practice D1066.

6.2 In view of the lack of a standard test method for sampling mud or sludge, no instructions are given for sampling this type of material.

TEST METHOD A—PYCNOMETER

7. Summary of Test Method

7.1 The sample is introduced into a pycnometer, stabilized at the desired temperature, and weighed. The specific gravity is calculated from this weight and the previously determined

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[1] These test methods are under the jurisdiction of ASTM Committee D19 on Water and are the direct responsibility of Subcommittee D19.05 on Inorganic Constituents in Water.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

TABLE 1 Determination of Bias, Pycnometer Method

Calculated Specific Gravity	Specific Gravity Experimentally Determined	± %Bias	Statistically Significant (95 % Confidence Level)
1.0247	1.0262	–0.049	yes
1.0648	1.0665	+ 0.16	yes
1.1100	1.1119	+ 0.17	yes
1.2299	1.2235	–0.52	yes

TABLE 2 Determination of Bias, Balance Method

Calculated Specific Gravity	Specific Gravity Experimentally Determined	± %Bias	Statistically Significant (95 % Confidence Level)
1.0247	1.0264	–0.166	yes
1.0648	1.0657	+ 0.084	yes
1.1100	1.1126	+ 0.234	yes
1.2299	1.2233	–0.539	yes

TABLE 3 Determination of Bias, Erlenmeyer Flask Method

Calculated Specific Gravity	Specific Gravity Experimentally Determined	± %Bias	Statistically Significant (95 % Confidence Level)
1.0247	1.026	+ 0.126	yes
1.0648	1.066	+ 0.169	yes
1.1100	1.1121	+ 0.74	no
1.2299	1.2225	–0.60	yes

TABLE 4 Determination of Bias, Hydrometer Method

Calculated Specific Gravity	Specific Gravity Experimentally Determined	± %Bias	Statistically Significant (95 % Confidence Level)
1.0247	1.0256	+ 0.088	no
1.0648	1.0647	–0.099	no
1.1100	1.1106	+ 0.054	no
1.2299	1.2207	–0.74	yes

weight of reagent water that is required to fill the pycnometer at the same temperature.

8. Apparatus

8.1 *Bath*—Constant-temperature bath designed to maintain a temperature of 15.6 ± 1°C (60 ± 1.8°F). If any other temperature must be used due to local conditions, appropriate corrections shall be made.

8.2 *Pycnometer*—Cylindrical or conical glass vessel carefully ground to receive an accurately fitting 24/12 standard taper glass stopper provided with a hole approximately 1.0 to 2.0 mm in diameter, centrally located in reference to the vertical axis. The top surface of the stopper shall be smooth and substantially plane, and the lower surface shall be concave in order to allow all air to escape through the bore. The height of the concave section shall be approximately 5 mm at the center. The stoppered pycnometer shall have a capacity of about 24 to 30 mL, and shall weigh not more than 40 g. Suitable pycnometers are shown in Fig. 1.

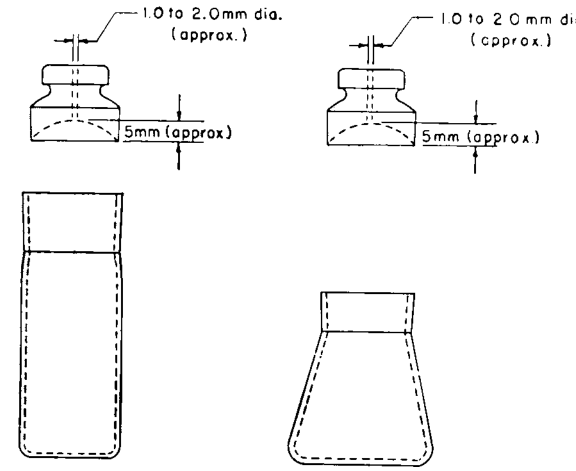

FIG. 1 Suitable Pycnometers

8.3 *Thermometer*— An ASTM Gravity Thermometer having a range from − 20 to + 102°C or − 5 to + 215°F, as specified, and conforming to the requirements for Thermometer 12C or 12F, respectively, as prescribed in Specification E1.

9. Procedure

9.1 Weigh a clean, dry, calibrated pycnometer, complete with stopper, on an analytical balance, and record this weight to the nearest 0.1 mg, as *P*.

9.2 Remove the stopper and fill the pycnometer with recently boiled reagent water that has been cooled to room temperature, to within several millimetres of the top. Remove the air bubbles. Immerse the unstoppered pycnometer up to the neck in a constant-temperature bath maintained at 15.6 ± 1°C (60 ± 1.8°F). Allow the pycnometer to remain in the bath for a period of time sufficient to establish temperature equilibrium. Twenty minutes is usually sufficient.

9.3 After temperature equilibrium has been established, and before removing from the bath, firmly insert the stopper and remove the excess water from the top of the stopper, taking care to leave the capillary filled. Remove the stoppered pycnometer from the bath and wipe it dry. Immediately weigh the pycnometer, and record this weight to the nearest 0.1 mg, as *W*.

9.4 Empty the reagent water from the pycnometer and dry, or rinse with the sample to be tested.

9.5 Using the sample to be tested, repeat the procedure in accordance with 9.2 and 9.3, recording the weight of the pycnometer containing the sample under test as *S*.

10. Calculation

10.1 Calculate the specific gravity of the sample as follows:

$$\text{Specific gravity} = (S - P)/(W - P)$$

where:

P = weight of the empty pycnometer,
S = weight of the pycnometer and contained sample, and

W = weight of the pycnometer and contained reagent water.

11. Precision and Bias

11.1 The overall precision (S_t) and single operator precision (S_o) of this test method within their designated ranges vary with quantity being tested in accordance with Fig. 2.

11.2 The bias for this test method, shown in Table 1, was determined from the measurement of a known specific gravity in prepared standards by six laboratories in triplicate for four known specific gravity levels. The known specific gravity range covered was 1.0247 to 1.2299.

11.3 Precision and bias for this test method conforms to Practice D2777 – 77, which was in place at the time of collaborative testing. Under the allowances made in 1.4 of Practice D2777 – 06, these precision and bias data do meet existing requirements for interlaboratory studies of Committee D19 test methods.

TEST METHOD B—BALANCE

12. Summary of Test Method

12.1 The specific gravity balance is essentially an analytical balance which uses a plummet to determine the weight of a liquid by displacement. The plummet is calibrated in a standard liquid, usually reagent water, before the determination is made. Any oil present in the sample will interfere with this determination; therefore, only freshly filtered samples should be used.

13. Apparatus

13.1 *Specific Gravity Balance*—A Westphal-type balance or any of several accurate specific gravity balances may be used.

14. Procedure

14.1 Locate the specific gravity balance in a draft-free enclosure. Clean the plummet by immersion in distilled water followed by acetone. Dry with air or a lint-free tissue. Calibrate the plummet by determining its difference in weight in air and in reagent water at 15.6 ± 1°C (60 ± 1.8°F); record this displacement as d_1.

14.2 Immerse the plummet in the sample, which has a stabilized temperature of 15.6 ± 1°C (60 ± 1.8°F). Make certain that the plummet does not touch the bottom or the sides of the container. The liquid displacement, d_2, is the difference between the weight necessary to counterpoise the dry plummet in air and that necessary when the plummet is immersed in the liquid samples.

15. Calculation

15.1 Calculate the specific gravity of the sample as follows:

$$\text{Specific gravity} = \frac{d_2}{d_1}$$

where:

d_1 = difference in weight in air and in reagent water, and
d_2 = difference in weight in air and in the sample.

16. Precision and Bias

16.1 The overall precision (S_t) and single operator precision (S_o) of this test method within their designated ranges vary with quantity being tested in accordance with Fig. 3.

16.2 The bias data for this test method, shown in Table 2, was determined from the measurement of a known specific gravity in prepared standards by five laboratories in triplicate

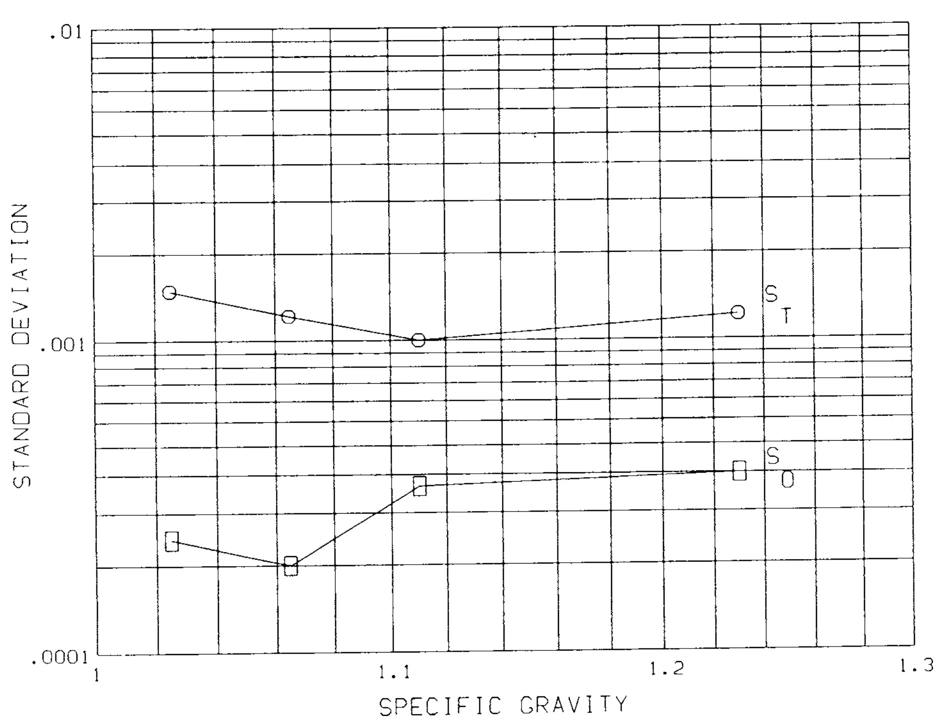

FIG. 2 Interlaboratory Precision for Specific Gravity of Brines by Pycnometer Method

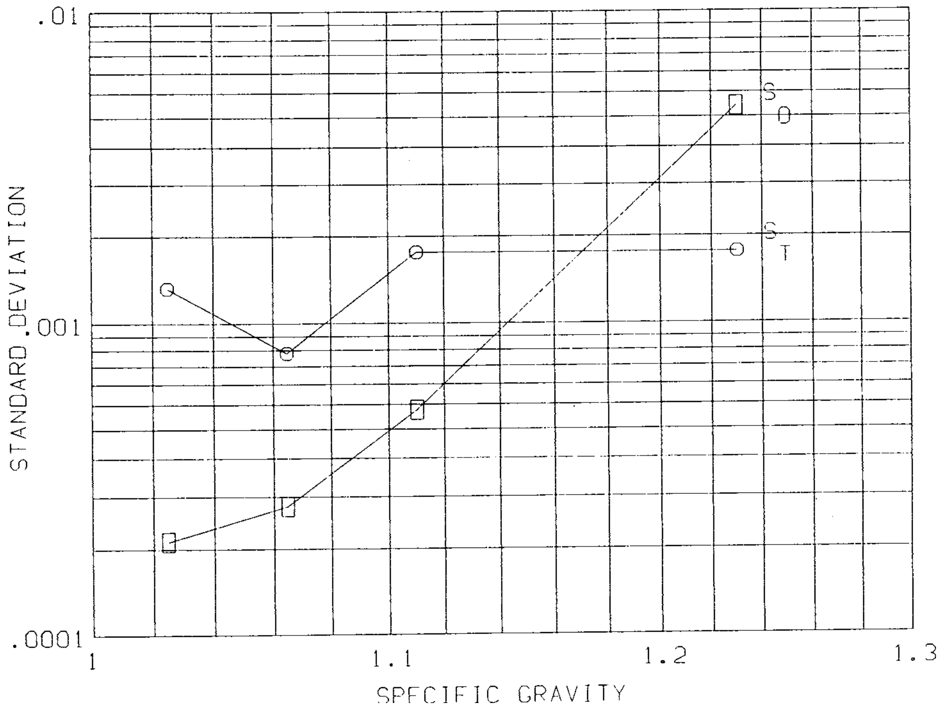

FIG. 3 Interlaboratory Precision for Specific Gravity of Brines by Balance Method

for four known specific gravity levels. The known specific gravity range covered was 1.0247 to 1.2299.

16.3 Precision and bias for this test method conforms to Practice D2777 – 77, which was in place at the time of collaborative testing. Under the allowances made in 1.4 of Practice D2777 – 06, these precision and bias data do meet existing requirements for interlaboratory studies of Committee D19 test methods.

TEST METHOD C—ERLENMEYER FLASK

17. Summary of Test Method

17.1 The sample of mud or sludge is thoroughly stirred and poured into a wide-mouth Erlenmeyer flask until it is somewhat more than level full, the excess being struck off with a spatula blade. The specific gravity is calculated from this weight and the previously determined weight of water required to fill the flask completely.

17.2 If the sample is of a plastic solid consistency, the flask is partly filled with the sample and weighed. Water is then added to fill the flask completely, and the total weight is taken. The specific gravity is calculated from the weight of the volume of water displaced by the sample.

18. Procedure

18.1 Clean, dry, and weigh the Erlenmeyer flask to the nearest 0.1 g, and record this weight as *F*.

18.2 Fill the flask with reagent water or tap water. Both flask and water shall be at temperature equilibrium. Weigh the filled flask and record this weight as *W*. Empty and dry the flask.

18.3 If the sample flows readily, fill the flask completely with the sample, leveling the upper surface with a flat-bladed spatula held at an angle of 45° with the rim of the flask. Weigh, and record this weight as *S*.

18.4 Mix the sample thoroughly by stirring, but do not shake. If the sample does not flow readily, add sufficient sample to approximately half fill the flask, without exerting pressure, and weigh. Record the weight of the flask and sample as *R*. Fill the flask containing the sample completely with reagent water or tap water, whichever was used in accordance with 18.2, taking care to remove all entrained air bubbles, and weigh again. Record this weight at *T*.

19. Calculation

19.1 In the case of free-flowing samples, calculate the specific gravity of the sample as follows:

$$\text{Specific gravity} = \frac{(S - F)}{(W - F)}$$

where:

F = weight of the empty flask,
S = weight of the flask completely filled with sample, and
W = weight of the flask and contained water.

19.2 In the case of samples that do not flow readily, calculate the specific gravity of the sample as follows:

$$\text{Specific gravity} = \frac{(R - F)}{(W - F) - (T - R)}$$

where:

F = weight of the empty flask,
R = weight of the flask partly filled with sample,
T = weight of the flask partly filled with sample, plus water added to fill remaining volume, and

W = weight of the flask and contained water.

20. Precision and Bias

20.1 The overall precision (S_t) and single operator precision (S_o) of this test method within their designated ranges vary with quantity being tested in accordance with Fig. 4.

20.2 The bias data for this test method, shown in Table 3, was determined from the measurement of a known specific gravity in prepared standards by six laboratories in triplicate for four known specific gravity levels. The known specific gravity range covered was 1.0247 to 1.2299.

20.3 Precision and bias for this test method conforms to Practice D2777 – 77, which was in place at the time of collaborative testing. Under the allowances made in 1.4 of Practice D2777 – 06, these precision and bias data do meet existing requirements for interlaboratory studies of Committee D19 test methods.

21. Quality Control

21.1 In order to be certain that analytical values obtained using these test methods are valid and accurate within the confidence limits of the test, the following QC procedures must be followed when analyzing specific gravity.

21.2 *Calibration and Calibration Verification*

21.2.1 Verify the balance calibration by weighing a weight at several weight limits.

21.3 *Initial Demonstration of Laboratory Capability*

21.3.1 If a laboratory has not performed the test before, or if there has been a major change in the measurement system, for example, new analyst, and so forth, a precision and bias study must be performed to demonstrate laboratory capability.

21.3.2 Analyze seven replicates of a solution with a known specific gravity. Each replicate must be taken through the complete analytical test method. The replicates may be interspersed with samples.

21.3.3 Calculate the mean and standard deviation of the seven values and compare to the acceptable ranges of bias in sections 11.1, 16.1, and 20.1. This study should be repeated until the recoveries are within the limits given in sections 11.1, 16.1, and 20.1. If an amount other than the recommended amount is used, refer to Practice D5847 for information on applying the F test and t test in evaluating the acceptability of the mean and standard deviation.

21.4 *Laboratory Control Sample (LCS)*

21.4.1 To ensure that the test method is in control, analyze a LCS having a known specific gravity with each batch or ten samples. If large numbers of samples are analyzed in the batch, analyze the LCS after every ten samples. The LCS must be taken through all of the steps of the analytical method. The result obtained for the LCS shall fall within ±15 % of the known specific gravity.

21.4.2 If the result is not within these limits, analysis of samples is halted until the problem is corrected, and either all the samples in the batch must be reanalyzed, or the results must be qualified with an indication that they do not fall within the performance criteria of the test method.

21.5 *Method Blank*

21.5.1 Analyze a reagent water blank with each batch.

21.6 *Matrix Spike (MS)*

21.6.1 Specific gravity is not an analyte that can be feasibly spiked into samples.

21.7 *Duplicate*

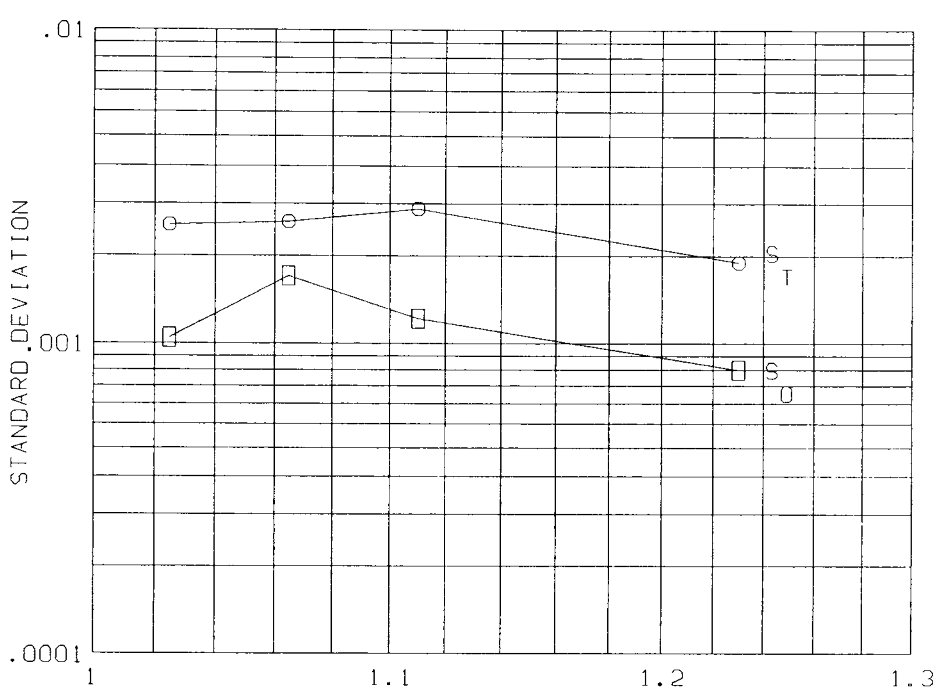

FIG. 4 Interlaboratory Precision for Specific Gravity of Brines by Erlenmeyer Flask Method

21.7.1 To check the precision of sample analyses, analyze a sample in duplicate with each batch. The value obtained must fall within the control limits established by the laboratory.

21.7.2 Calculate the standard deviation of the duplicate values and compare to the precision in the collaborative study using an F test. Refer to 6.4.4 of Practice D5847 for information on applying the F test.

21.7.3 If the result exceeds the precision limit, the batch must be reanalyzed or the results must be qualified with an indication that they do not fall within the performance criteria of the test method.

21.8 Independent Reference Material (IRM)

21.8.1 In order to verify the quantitative value produced by the test method, analyze an Independent Reference Material (IRM) submitted as a regular sample (if practical) to the laboratory at least once per quarter. The specific gravity of the IRM should be within the control limits established by the laboratory.

TEST METHOD D—HYDROMETER

22. Summary of Test Method

22.1 The hydrometer is a weighted bulb with a graduated stem. The depth to which the hydrometer sinks in a fluid is determined by the density of the fluid. The specific gravity is read directly from the graduated stem. Any oil present in the sample will interfere with the determination; therefore, only freshly filtered samples should be used.

23. Apparatus

23.1 *Hydrometer*—A set of glass hydrometers (equipped with built-in thermometers) covering the range of specific gravities encountered in water and brine analyses. Graduations should not be greater than 0.002.

23.2 *Hydrometer Cylinder* of clear glass, or plastic. For convenience in pouring, the cylinder may have a lip on the rim. The inside diameter of the cylinder shall be at least 25 mm greater than the outside diameter of the hydrometer used. The height of the cylinder shall be such that the hydrometer floats in the sample with at least 25-mm clearance between the bottom of the hydrometer and the bottom of the cylinder.

24. Procedure

24.1 Fill the cylinder with the sample and carefully immerse the hydrometer. The hydrometer must float freely and not touch the sides of the cylinder. Allow the hydrometer to remain in the sample 5 min or until the thermometer establishes equilibrium. Read and record the specific gravity and temperature directly from the hydrometer.

25. Calculation for Correction to 60°F

25.1 The specific gravity may be corrected to 60/60°F by adding 0.0002 for each degree above 60°F. An example is as follows:

Specific gravity at 79°F	1.1225
Correction = (79– 60) 0.0002 =	+ 0.0038
Specific gravity at 60°F	1.1263

26. Precision and Bias

26.1 The overall precision (S_t) and single operator precision (S_o) of this test method within their designated ranges vary with quantity being tested in accordance with Fig. 5.

26.2 The bias data for this test method, shown in Table 4, was determined from the measurement of a known specific

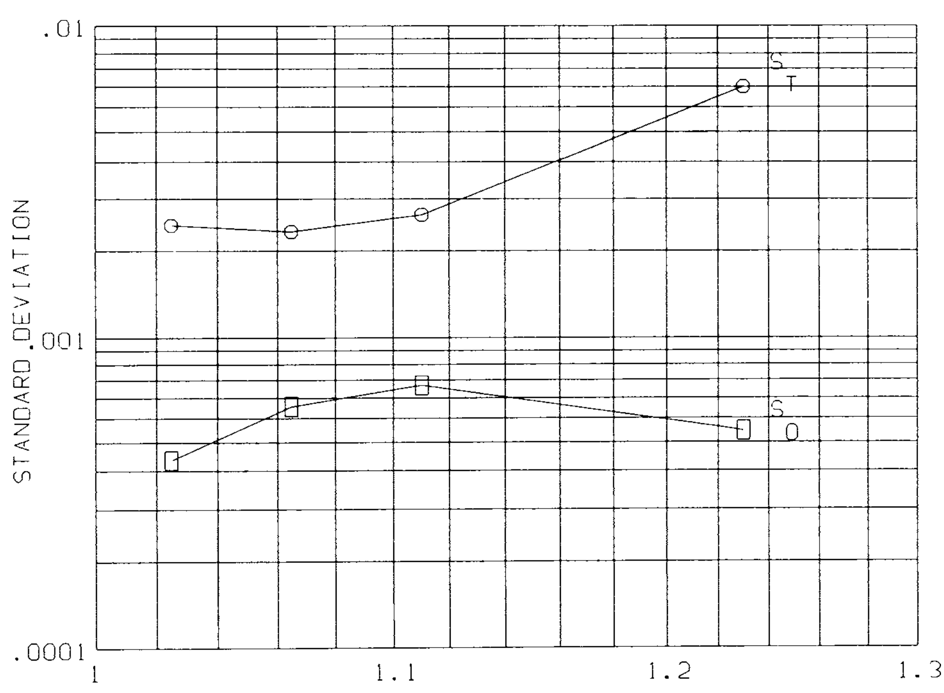

FIG. 5 Interlaboratory Precision for Specific Gravity of Brines by Hydrometer Method

gravity in prepared standards by six laboratories in triplicate for four known specific gravity levels. The known specific gravity range covered was 1.0247 to 1.2299.

26.3 Precision and bias for this test method conforms to Practice D2777 – 77, which was in place at the time of collaborative testing. Under the allowances made in 1.4 of Practice D2777 – 06, these precision and bias data do meet existing requirements for interlaboratory studies of Committee D19 test methods.

27. Quality Control

27.1 In order to be certain that analytical values obtained using these test methods are valid and accurate within the confidence limits of the test, the following QC procedures must be followed when analyzing specific gravity.

27.2 *Calibration and Calibration Verification*

27.2.1 Verify the hydrometer by determining the specific gravity on a sample with a known specific gravity.

27.3 *Initial Demonstration of Laboratory Capability*

27.3.1 If a laboratory has not performed the test before, or if there has been a major change in the measurement system, for example, new analyst, and so forth, a precision and bias study must be performed to demonstrate laboratory capability.

27.3.2 Analyze seven replicates of a solution with a known specific gravity. Each replicate must be taken through the complete analytical test method. The replicates may be interspersed with samples.

27.3.3 Calculate the mean and standard deviation of the seven values and compare to the acceptable ranges of bias in section 26.1. This study should be repeated until the recoveries are within the limits given in section 26.1. If an amount other than the recommended amount is used, refer to Practice D5847 for information on applying the F test and t test in evaluating the acceptability of the mean and standard deviation.

27.4 *Laboratory Control Sample (LCS)*

27.4.1 To ensure that the test method is in control, analyze a LCS having a known specific gravity with each batch or ten samples. If large numbers of samples are analyzed in the batch, analyze the LCS after every ten samples. The LCS must be taken through all of the steps of the analytical method. The result obtained for the LCS shall fall within ± 15 % of the known specific gravity.

27.4.2 If the result is not within these limits, analysis of samples is halted until the problem is corrected, and either all the samples in the batch must be reanalyzed, or the results must be qualified with an indication that they do not fall within the performance criteria of the test method.

27.5 *Method Blank*

27.5.1 Analyze a reagent water blank with each batch.

27.6 *Matrix Spike (MS)*

27.6.1 Specific gravity is not an analyte that can be feasibly spiked into samples.

27.7 Duplicate

27.7.1 To check the precision of sample analyses, analyze a sample in duplicate with each batch. The value obtained must fall within the control limits established by the laboratory.

27.7.2 Calculate the standard deviation of the duplicate values and compare to the precision in the collaborative study using an F test. Refer to 6.4.4 of Practice D5847 for information on applying the F test.

27.7.3 If the result exceeds the precision limit, the batch must be reanalyzed or the results must be qualified with an indication that they do not fall within the performance criteria of the test method.

27.8 *Independent Reference Material (IRM)*

27.8.1 In order to verify the quantitative value produced by the test method, analyze an Independent Reference Material (IRM) submitted as a regular sample (if practical) to the laboratory at least once per quarter. The specific gravity of the IRM should be within the control limits established by the laboratory.

28. Keywords

28.1 brine; hydrometer; pycnometer; specific gravity

Designation: D4981 – 08

Standard Test Method for Screening of Oxidizers in Waste[1]

This standard is issued under the fixed designation D4981; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method is intended for use prior to preparation of waste samples for organic analysis. Waste samples that have oxidizing compounds may react with certain reagents in the laboratory (for example, organic solvents).

1.2 This test method is applicable to the analysis of waste liquids, sludges, and solids.

1.3 This test method can neither identify specific oxidizing compounds nor measure concentrations. Since no acid or base is added in this test method, potential oxidizers that require the presence of acid or base will not be detected by this test method.

1.4 It is recommended that, prior to this test, waste samples be screened for water compatibility; see Test Methods D5058.

1.5 This test method is designed and intended as a preliminary test to complement quantitative analytical techniques that may be used to determine the presence of oxidizers in wastes. This test method offers the ability to screen waste for potentially hazardous reactions due to oxidizer content when the more sophisticated techniques are not available or the total waste composition is unknown.

1.6 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1193 Specification for Reagent Water

D5058 Practices for Compatibility of Screening Analysis of Waste

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *screening analysis*—A preliminary qualitative or semi-quantitative test that is designed to efficiently give the user specific information about a waste that will aid in determining waste identification, process compatibility, and safety in handling.

4. Summary of Test Method

4.1 A small portion of the sample is placed onto a strip of potassium iodide (KI) starch paper. The blue color which is the result of oxidizing the potassium iodide to iodine (I_2) in the presence of starch, indicates a positive test for oxidizers.

5. Significance and Use

5.1 This test method is intended for use by those in waste management industries to avoid potentially harmful reactions due to oxidizing compounds in wastes.

6. Interferences

6.1 Materials that mask the KI starch paper, (for example, oils, syrups, etc.) prevent reaction with the test paper or visual detection of a color change.

6.2 Samples or slurries of samples that are already dark colored prior to applying a test portion to the KI starch paper can give false results.

6.3 Oxidizers such as ferric salts may not oxidize organics; however, they may show positive reactions with KI.

6.4 Oxidizers that require the presence of acid or base will give a false negative result. To overcome this problem, run the oxidizer test at acid, base, and neutral pH conditions.

7. Reagents and Materials

7.1 *Purity of Reagents*—Reagent-grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to specifications of the Committee on Analytical Reagents of the American Chemical Society where

[1] This test method is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.01.05 on Screening Methods.

Current edition approved Sept. 1, 2008. Published October 2008. Originally approved in 1989. Last previous edition approved in 2003 as D4981 – 95(2003). DOI: 10.1520/D4981-08.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

such specifications are available.[3] Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

7.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type III of Specification D1193.

7.3 *Potassium Iodide (KI) Starch Paper Strips.*

7.4 *Beakers.*

7.5 *Pipet or Droppers.*

7.6 *Hydrogen Peroxide Solution (3 % H_2O_2),* commercial grade.

7.7 *Nitric Acid* (1 + 9)—Add 1 volume of nitric acid (HNO_3, sp. gr 1.42) to 9 volumes of water.

8. Sampling

8.1 Collect a representative sample of the waste in a container with a sealed lid.

8.2 The sample should be analyzed as soon as possible.

8.3 Allow the samples to stabilize to room temperature.

9. Procedure

9.1 *Aqueous Samples*—Using a clean pipet or dropper, place a drop sample on a strip of KI starch paper and note color change.

9.2 *Non-Aqueous Samples (for example, solid, oil, or solvents):*

9.2.1 In a beaker, prepare a slurry by adding 1 to 5 g of sample to an equal amount of reagent water.

9.2.2 Using a clean pipet or dropper, place a drop of slurry on a strip of KI starch paper.

9.2.3 Note any color change.

9.3 All sample results shall be checked against the quality control and blank test strips to verify positive/negative readings (see Section 10).

9.4 All positive results (a blue color) shall be reported immediately to prevent potential hazardous reactions that may occur.

NOTE 1— Analyst should be aware that the blue color on the reference strip and any positive sample test strip will slowly fade with time.

10. Quality Control

10.1 Quality control check samples, reference blanks and duplicates should be performed at an action level specified by the laboratory and at an appropriate frequency.

10.1.1 Place a drop of reagent water on a KI starch test strip to serve as a reference blank.

10.1.2 Place a drop of 3 % H_2O_2 solution (or 10 % HNO_3) on a KI starch test strip to obtain a dark blue reference color.

10.2 Method detection limits should be determined by each laboratory by using a test oxidizer (7.6 or 7.7).

11. Precision and Bias

11.1 *Precision and Bias*—No information is presented about either the precision or bias of Test Method D4981 for measuring oxidizers since the test result is nonquantitative.

12. Keywords

12.1 oxidizers; screening analysis; starch-iodide paper

[3] *Reagent Chemicals, American Chemical Society Specifications* , American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.

Designation: D5058 – 12

Standard Practices for Compatibility of Screening Analysis of Waste[1]

This standard is issued under the fixed designation D5058; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 These practices cover assessment of the compatibility/reactivity of waste. The individual practices are as follows:

	Sections
Practice A—Commingled Waste Compatibility	8-12
Practice B—Polymerization Potential (Reaction with Triethylamine)	13-18
Practice C—Water Compatibility	19-25

1.2 These practices are applicable to waste liquids, sludges, semi-solids, and solids.

1.3 These practices are designed and intended as a preliminary or supplementary test to complement the more sophisticated quantitative analytical techniques that should be used to determine waste composition and compatibilities. This standard offers the user the option and the ability to screen wastes for potentially hazardous reactions when the more sophisticated techniques are not available and the total waste composition is unknown and to screen compatibility when the composition is known. (**Warning**—Delayed or slow reactions of wastes may go unnoticed.)

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4.1 *Exception*—The values given in parentheses are for information only.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific hazard and warning statements, see Sections 1.3, 6.1, 10, 11.2.3, 11.5.2, 16 and 23.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1193 Specification for Reagent Water
D5681 Terminology for Waste and Waste Management
E1 Specification for ASTM Liquid-in-Glass Thermometers
E200 Practice for Preparation, Standardization, and Storage of Standard and Reagent Solutions for Chemical Analysis

3. Terminology

3.1 *Definitions*—For definitions of terms used in this screening practice, refer to Terminology D5681.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *screening*—a *preliminary* qualitative or semi-quantitative test, developed from classical qualitative and quantitative techniques, that is designed to efficiently give the user specific information about a waste that will aid in determining waste identification, process compatibility, and safety in handling.

4. Summary of Practices

4.1 *Practice A*—Representative samples of waste are added to each other. The generation of heat or violent reaction is noted. In addition, the production of mists, fumes, dusts, gases, layering, polymerization, precipitation, emulsification or increase in viscosity and other chemical or physical changes are noted.

4.2 *Practice B*—Reactivity of wastes is determined by adding an aliquot of a sample to an equal volume of reagent and observing any characteristic reaction, such as temperature increase, gas evolution, gelling, or polymerization.

4.3 *Practice C*—Water and the waste are mixed in an approximate 10 + 1 ratio to test for compatibility. A thermometer is used to measure heat generation when applicable. Qualitative solubility and relative apparent density are observed concurrently.

[1] These practices are under the jurisdiction of ASTM Committee D34 on Waste Management and are the direct responsibility of Subcommittee D34.01.05 on Screening Methods.

Current edition approved Jan. 1, 2012. Published February 2012. Originally approved in 1990. Last previous edition approved in 2007 as D5058-90 (2007). DOI: 10.1520/D5058-12.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

5. Purity of Reagents

5.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[3] Other grades may be used provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination (see Practice E200).

5.2 *Purity of Water*— Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type III of Specification D1193.

6. Sampling

6.1 **Warning—**Avoid inhalation of or skin contact with any hazardous waste.

6.2 Obtain representative samples of waste. If composite samples are taken, report any generation of heat, gases or solids during compositing. If reactions are observed during compositing, then individual samples should be taken. If the waste is suspected of containing varying proportions of reactive compounds, take individual samples and conduct tests on each sample.

6.3 Allow all samples to stabilize to room temperature and analyze as soon as possible.

6.4 Always perform this procedure in a hood with the sash down as far as possible.

7. Quality Assurance

7.1 Thermometers are evaluated and verified at a frequency specified by the laboratory (see Specification E1).

7.2 Care is taken to ensure that samples are representative of the total wastes involved.

PRACTICE A—COMMINGLED WASTE COMPATIBILITY

8. Significance and Use

8.1 This practice is intended for use by those in the waste management industries to aid in determining the compatibility of hazardous wastes before they are commingled.

9. Apparatus

9.1 *Graduated Cylinders,* 100 mL.

9.2 *Thermometer,* 20 to 110°C or equivalent with 0.5°C divisions.

9.3 *Disposable Pipet.*

9.4 *Spatula.*

9.5 *Beakers,* 500 mL.

9.6 *Funnels.*

9.7 *Vortex Mixer* (optional).

10. Hazards

10.1 **Warning—**Avoid inhalation of and skin and eye contact with any hazardous material.

10.2 **Warning—**This procedure must be performed within a laboratory fume hood with the sash down as far as possible.

10.3 **Warning—**By keeping the sample size small and by first screening for very reactive wastes, the overall hazard is small. The small hazard is justified due to the much larger hazard of mishandling reactive waste at plant scale.

11. Procedure

11.1 Determine the total quantity *A* of the incoming waste to be added to the storage or treatment unit.

11.2 Determine the total quantity *B* of the waste in the storage tank or treatment unit.

11.2.1 Both quantities *A* and *B* must be stated in the same units of measure; pounds or gallons are typically used.

11.2.2 The waste in a tank can be estimated from the design volume of the tank. The volume of a tank truck can be determined from the contents' net weight and an estimate of the density. A value of 3.75 kg/L (8.34 lb/gal) can be used as an approximate density for a wide range of aqueous wastes.

11.2.3 The total volume of *A* and *B*, upon mixing, should not exceed 300 mL. The initial volume *A* (150 mL) may be adjusted proportionally to accommodate total volume specification. (**Warning—**Perform a pre-test using 1 or 2 mL of each sample to reduce the risk when mixing potentially highly reactive wastes.)

11.3 Place in a 500-mL beaker 150 mL of a representative sample from the storage tank or treatment unit.

11.3.1 Measure the temperature, when applicable, of the test sample and remove the thermometer.

NOTE 1—High precision thermometers may be employed to provide higher sensitivity in temperature readings.

11.4 Use the ratio A + B of wastes to determine the aliquot, *V*, in milliliters, of incoming waste to now be added. Use the following equation:

$$V = V\,(A/B) \tag{1}$$

where *V* is the volume in milliliters used in step 11.3 (150 mL), and *A* and *B* are as defined in 11.1 and 11.2 respectively.

11.5 Slowly and very carefully add the aliquot *V* of incoming waste to the test sample volume *V* already in the beaker.

11.5.1 The recommended rate of addition is approximately 1 mL/s.

11.5.2 While the addition is in progress, watch for adverse reactions. (**Warning—**If a reaction is observed, stop the addition immediately and report the observation.)

11.6 If after adding the aliquot *V* of incoming waste no adverse reaction is observed, mix well and immediately measure the temperature.

[3] Reagent Chemicals, American Chemical Society Specifications, Am. Chemical Soc., Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Reagent Chemicals and Standards, by Joseph Rosin*, D. Van Nostrand Co., Inc., New York, NY, and the *United States Pharmacopeia.*

11.6.1 Compare the temperature here with the temperature measured in step 11.3.1. Record the difference, using (+) to indicate an increase and (−) to indicate a decrease in temperature (see Note 1).

NOTE 2—Mixing the representative waste samples at equal proportions can increase the sensitivity of reactivity and may be used as a substitute or in addition to the test based on actual proportions.

11.7 Record any generation of heat or violent reaction. Record the production of any mists, fumes, dust, or gases. Any layering, polymerization, precipitation, emulsification, increase in viscosity, bubbling, foaming, solidification, spattering, or other interaction of the commingled wastes must be observed and recorded.

11.8 If no reaction is observed, the waste passes the compatibility test. If any reaction or temperature rise is observed, the incoming waste has failed the compatibility test and is reported.

12. Precision and Bias

12.1 No statement is made about either the precision or bias of this practice since the result merely states whether there is conformance to the criteria for success specified in the procedure.

PRACTICE B—POLYMERIZATION POTENTIAL (REACTION WITH TRIETHYLAMINE)

13. Significance and Use

13.1 This practice is significant to those in the waste management industries.

13.2 It is designed to screen wastes that have the potential of undergoing hazardous polymerization when mixed with incompatible waste streams.

13.3 This practice can be used to detect potential hazardous polymerization of waste containing or suspected of containing isocyanates such as methylene bis-phenyl isocyanate, methylene diisocyanate (MDI), or toluene diisocyanates (TDI).

14. Apparatus

14.1 *White Ceramic Spotplate.*

14.2 *Disposable Transfer Pipets.*

14.3 *Spatula.*

14.4 *10-mL Graduated Cylinder,* with stopper.

14.5 *Thermometer,* 20 to 110°C or equivalent with 0.5°C divisions.

15. Reagents and Materials

15.1 *Triethylamine* $(CH_2CH_3)_3N$.

16. Hazards

16.1 Use triethylamine in the hood and avoid exposure.

16.2 With samples that do not contain any reactive compounds, this test procedure does not present any other special hazards. However, samples that are reactive will fail this test and some reaction will result. The reaction could be severe.

16.3 **Warning**—By keeping the sample size small and by first screening for very reactive wastes, the overall hazard is small. The small hazard is justified due to the much larger hazard of mishandling reactive waste at plant scale.

17. Procedure

17.1 Conduct the following procedure in a fume hood:

17.1.1 Place approximately 1 mL of triethylamine reagent in the cavity of a ceramic spotplate.

17.1.2 Place approximately 1 mL of sample in the spotplate cavity with reagent. Immediately lower hood sash as protection against violent reactions.

17.1.3 Observe mixture for about 1 min and record any reaction characteristics, such as gas evolution, fuming, charring, precipitation, gelling, polymerization, or burning.

17.1.4 If any reaction characteristics are observed, then material is reactive and fails this test. Material which fails this test should not be tested using 17.2 or 17.3.

17.2 Conduct the following procedure with special care in a fume hood:

17.2.1 Add about 5 mL of reagent to a 10-mL graduated cylinder or disposable test tube.

17.2.2 Carefully add 5 mL of sample to the cylinder, stopper, and invert several times or vortex to mix well. Immediately remove stopper, insert the thermometer, and record temperature of mixture (see Note 1).

17.2.3 Continue to monitor temperature of mixture for several minutes. Observe and record any reaction characteristics, such as temperature increase, gas evolution or gelling. Note that gas evolution may be observed as tiny bubbles that consistently rise to surface (see 17.3).

17.2.4 If temperature increases significantly or any reaction characteristics are observed, then material is reactive and fails this test. Material which fails this test should not be tested using 17.3.

17.3 If gas evolution is difficult to observe during 17.2, conduct the following procedure with special care in a fume hood:

17.3.1 Add about 5 mL of reagent to 10-mL graduated cylinder or disposable test tube.

17.3.2 Carefully add 5 mL of sample to the cylinder, stopper, and invert several times or vortex to mix well. Immediately remove stopper and restopper. Lower hood sash as protection against violent reaction.

17.3.3 After several minutes, carefully remove stopper and observe mixture for gas evolution. Gas evolution will be observed as immediate venting or bubbles at surface, similar to opening a carbonated drink.

17.3.4 If gas evolution is observed, then material is reactive and fails this test. If no gas evolution or other signs of reaction are observed, the material has passed the test.

17.3.5 Record observations.

18. Precision and Bias

18.1 No statement is made about either the precision or bias of this practice since the result merely states whether there is conformance to the criteria for success specified in the procedure.

PRACTICE C—WATER COMPATIBILITY

19. Significance and Use

19.1 This practice is intended for use by those in the waste management industries.

19.2 This practice is used to determine whether a waste has the potential to generate extreme heat or violent reactions, and produce fumes, dusts, gases, or other products when mixed with water.

19.3 This practice is designed to determine water compatibility of a waste.

19.4 This practice can be used to qualitatively judge the solubility and apparent density of waste (if immiscible) relative to water.

20. Interferences

20.1 The generation of colorless fumes or gases, pressure buildup without visible bubbling, mild effervescence, or heat may go undetected.

21. Apparatus

21.1 *Disposable Beakers,* test tubes, or similar equipment.

21.2 *Disposable Pipet* (5-mL capacity).

21.3 *Spatula.*

21.4 *Thermometer,* 20 to 110°C or equivalent with 0.5°C divisions.

21.5 *Vortex Mixer* (optional).

22. Reagents and Materials

22.1 *Reagent Water.*

23. Hazards

23.1 Avoid inhalation of and skin and eye contact with any hazardous waste.

23.2 This procedure must be performed within a laboratory fume hood with the sash down as far as possible.

23.3 **Warning**—By keeping the sample size small and by first screening for very reactive wastes, the overall hazard is small. The small hazard is justified due to the much larger hazard of mishandling reactive waste at plant scale.

24. Procedure

24.1 Keep thermometer in water at room temperature until ready for use. Note temperature of water in degrees Celsius or Fahrenheit.

24.2 Bring sample to room temperature, if necessary.

24.3 Place a small amount (approximately 10 mL) of water into a disposable beaker or test tube.

24.4 Introduce approximately 1 mL of waste into the beaker or test tube and mix well. Note any violent reactions, fumes, dusts or gases, and any precipitates or emulsions, and record observations.

24.5 If any such reactions are noted, the waste fails the water compatibility test.

24.6 Once it has been determined that no violent reaction is occurring, and as soon as possible after 24.4, place the thermometer into the beaker or test tube and note any temperature change (increase (+) or decrease (−)), recording the change in temperature in degrees Celsius or Fahrenheit (see Note 1).

24.7 Some reactions may have a latent period or accelerate as they proceed. Retain the mixed sample for 5 or 10 min, then observe it and record its temperature again.

24.8 If no reactions were observed and no significant temperature change is noted, the waste has passed the water compatibility test.

24.9 Report the miscibility and apparent density of the sample as immiscible or miscible and lighter or heavier than water.

25. Precision and Bias

25.1 No statement is made about either the precision or bias of this practice since the result merely states whether there is conformance to the criteria for success specified in the procedure.

26. Keywords

26.1 compatibility; waste screening

APPENDIX 2-E

Characterization Data

1. Identification

Material Name: Calomel (Mercurous Chloride) with Sulfuric Acid

CAS Nos. 10112-91-1 (Mercurous Chloride), 7664-93-9 (Concentrated Sulfuric Acid)

Chemical Formula(s): Mercurous Chloride (Hg_2Cl_2), Sulfuric Acid (H_2SO_4)

Description: The calomel produced in the Barrick Goldstrike Roasting process is mercurous chloride (very low solubility) with sulfuric acid. The material is a corrosive, toxic material that separates into two distinct phases when allowed to settle. Sulfuric acid (specific gravity = 1.841), containing a small amount of mercury, will rise to the top in a container. The mercurous chloride (specific gravity = 7.15), containing some sulfuric acid, will settle to the bottom.

2. Hazard identification

3. Composition/information on ingredient

CAS#	Chemical Name	Percent	EINECS/ELINCS
10112-91-1	Mercurous chloride	>99.5	231-430-9

4. First-aid measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

Ingestion: Call a poison control center. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation: Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Notes to Physician: Treat symptomatically and supportively.

Antidote: The use of Dimercaprol of BAL (British Anti-Lewisite) as a chelating agent should be determined by qualified medical personnel.

5. Fire-fighting measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.

Flash point: Not applicable

Autoignition Temperature: Not applicable.

Explosion Limits- **Lower:** Not available. **Upper:** Not available.

NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

6. Accidental release measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

7. Handling and storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Do not get on skin and clothing. Do not ingest or inhale.

Storage: Keep away from sources of ignition. Do not store in direct sunlight. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

8. Exposure controls/personal protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.

Exposure Limits:

Chemical Name	ACGIH	NIOSH	OSHA- Final PELs
Mercury(I) chloride	0.025 mg/m3 TWA (as Hg) (listed under Mercuty inorganic compounds). Skin- potential significant contribution to overall exposure by the cutaneous route (listed under Mercury inorganic compounds).	0.05 mg/m3 TWA (vapor, except organo alkyls, as Hg) (listed under Mercury compounds). 10 mg/m3 IDLH (as Hg, except organo(alkyl) compounds) (listed under Mercury compounds).	none listed

OSHA Vacated PELs: Mercury (I) chloride: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

9. Physical and chemical properties

White, odorless powder. Irritating to eyes/skin/respiratory tract.

Physical State: Solid

Appearance: White

Odor: None reported

pH: Not available

Vapor Pressure: Not available

Vapor Density: Not available

Evaporation Rate: Not available

Viscosity: Not available

Boiling Point: Not available

Freezing/Melting Point: Not available

Decomposition Temperature: >400 degree C

Solubility: Insoluble in water

Specific Gravity/Density: 7.1500

Molecular Formula: $Cl2Hg2$

Molecular Weight: 472.086

10. Stability and reactivity

Chemical Stability: Stable under normal temperatures and pressures. May decompose when exposed to light.

Conditions to Avoid: High temperatures, incompatible materials, light, moisture

Incompatibilities with Other Materials: Substance may react with acacia, ammonia, alkali chlorides, bromides, carbonates, cocaine, copper salts, cyanides, hydroxides, iodine, iodoform, lead salts, silver salts, soap, sulfates, and sulfites.

Hazardous Decomposition Products: Hydrogen chloride, mercury/mercury oxides

Hazardous Polymerization: Has not been reported

11. Toxicological information

Toxic: Chronic effects- disturbances of the central nervous system, neuropsychiatric disorders and tremors.

CAS#: 10112-91-1

LD50/LC50: Not available.

Carcinogenicity: CAS# 10112-91-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65
Epidemiology: No information available.
Teratogenicity: Inorganic Mercury substances have not been shown to be human teratogens.
Reproductive Effects: Inorganic mercury substances should be HANDLED WITH CAUTION since related mercury compounds affect fertility in males and females.
Mutagenicity: Mutagenic effects have occurred in experimental animals.
Neurotoxicity: Neurotoxic effects have occurred in humans.

12. Ecological information

Eco-toxicity: No data available. No information available.
Environmental: No information reported.
Physical: No information available.

13. Disposal considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

14. Transport information

US DOT-
Shipping Name: Mercuric Chloride
Hazard Class: 6.1
UN Number: UN1624
Packing Group: II
Canada TDG- No information available.

15. Regulatory information

TSCA: CAS# 10112-91-1 is listed on the TSCA inventory
Health and Safety Reporting List: None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules: None of the chemicals in this product are under a Chemical Test Rule.
Section 12b: None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule: None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs: None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances: None of the chemicals in this product have a TPQ.
Section 313: This material contains Mercury(I) chloride (listed as Mercury compounds), >99.5%, (CAS# 10112-91-1) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act: CAS# 10112-91-1 (listed as Mercury compounds) is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act: None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. CAS# 10112-91-1 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA: None of the chemicals in this product are considered highly hazardous by OSHA.
State: CAS# 10112-91-1 can be found on the following state right to know lists- California (listed as Mercury compounds), New Jersey, Pennsylvania (listed as Mercury compounds).
California Prop 65: WARNING: This product contains Mercury(I) chloride, listed as 'Mercury compounds', a chemical known to the state of California to cause developmental reproductive toxicity.
California No Significant Risk Level: None of the chemicals in this product are listed.
European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols:
XN N
Risk Phrases:
R 22 Harmful if swallowed.
R 36/37/38 Irritating to eyes, respiratory system, and skin.
Safety Phrases:
S 13 Keep away from food, drink, and animal feeding stuffs.
S 24/25 Avoid contact with skin and eyes.
S 46 If swallowed, seek medical advice immediately and show this container or label.
WGK (Water Danger/Protection)
CAS# 10112-91-1: No information available.
Canada- DSL/NDSL
CAS# 10112-91-1 is listed on Canada's DSL list.
Canada- WHMIS
This product has a WHMIS classification of D1B, D2B. This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List
CAS# 10112-91-1 is listed on the Canadian Ingredient Disclosure List.

16. Other information

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Work Order: **W801777**
Reported: 25-Apr-08 14:33

Client Sample ID: **SCRUBBER CARBON #1**
SVL Sample ID: **W801777-01 (Solid)**

Sample Report Page 1 of 1

Sampled: 21-Apr-08
Received: 22-Apr-08
Sampled By: LB

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Mercury by SW846 Methods										
EPA 7471A	Mercury	10500	mg/kg	1650	140	50000	W817128	JAA	24-Apr-08	D2
Classical Chemistry Parameters										
SW846 1010	Flashpoint	>140	°F	40			W817131	BJF	24-Apr-08	
TCLP Extraction Parameters										
EPA 1311	Final pH	4.83	pH Units				W817095	TW	24-Apr-08	
TCLP Leachates (Metals by 6000/7000 Series)										
EPA 6010B	Arsenic	< 0.05	mg/L Extract	0.05	0.009		W817177	DG	25-Apr-08	
EPA 6010B	Barium	< 1.00	mg/L Extract	1.00	0.0005		W817177	DG	25-Apr-08	
EPA 6010B	Cadmium	0.396	mg/L Extract	0.010	0.0006		W817177	DG	25-Apr-08	
EPA 6010B	Chromium	< 0.050	mg/L Extract	0.050	0.001		W817177	DG	25-Apr-08	
EPA 6010B	Lead	< 0.0500	mg/L Extract	0.0500	0.0027		W817177	DG	25-Apr-08	
EPA 6010B	Selenium	0.24	mg/L Extract	0.05	0.01		W817177	DG	25-Apr-08	
EPA 6010B	Silver	< 0.050	mg/L Extract	0.050	0.0008		W817177	DG	25-Apr-08	
EPA 7470A	Mercury	7.21	mg/L Extract	0.200	0.0640	1000	W817173	JAA	24-Apr-08	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern

John Kern
Laboratory Director

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:
Address:

Attn:

Batch #: 080425009
Project Name: SVL #W801777

Analytical Results Report

Sample Number	080425009-001	**Sampling Date**	4/21/2008	**Date/Time Received**	4/25/2008	10:30 AM
Client Sample ID	SCRUBBER CARBON #1	**Sampling Time**	10:30 AM			
Matrix:	Solid	**Sample Location**	W801777-01			

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,1,1-Trichloroethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,1,2-Trichloroethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,1-Dichloroethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,1-Dichloroethene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,1-dichloropropene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,2,3-Trichlorobenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,2,3-Trichloropropane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,2,4-Trichlorobenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,2,4-Trimethylbenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,2-Dibromo-3-chloropropane(DBCP)	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,2-Dibromoethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,2-Dichlorobenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,2-Dichloroethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,2-Dichloropropane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,3,5-Trimethylbenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,3-Dichlorobenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,3-Dichloropropane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
1,4-Dichlorobenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
2,2-Dichloropropane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
2-Chlorotoluene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
2-hexanone	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
4-Chlorotoluene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Acetone	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Acrylonitrile	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Benzene	140	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Bromobenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	

Comments:

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Client:
Address:

Attn:

Batch #: 080425009
Project Name: SVL #W801777

Analytical Results Report

Sample Number	080425009-001	**Sampling Date**	4/21/2008	**Date/Time Received**	4/25/2008	10:30 AM	
Client Sample ID	SCRUBBER CARBON #1	**Sampling Time**	10:30 AM				
Matrix:	Solid	**Sample Location**	W801777-01				

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Bromochloromethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Bromodichloromethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Bromoform	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Bromomethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Carbon disulfide	12.5	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Carbon Tetrachloride	0.0298	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Chlorobenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Chloroethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Chloroform	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Chloromethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
cis-1,2-dichloroethene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
cis-1,3-Dichloropropene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Dibromochloromethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Dibromomethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Dichlorodifluoromethane	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Ethylbenzene	0.253	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Hexachlorobutadiene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Isopropylbenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
m+p-Xylene	0.180	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Methyl ethyl ketone (MEK)	0.147	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Methyl isobutyl ketone (MIBK)	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Methylene chloride	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
methyl-t-butyl ether (MTBE)	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Naphthalene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
n-Butylbenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
n-Propylbenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
o-Xylene	0.0410	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
p-isopropyltoluene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
sec-Butylbenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	

Comments:

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Client:
Address:

Batch #: 080425009
Project Name: SVL #W801777

Attn:

Analytical Results Report

Sample Number	080425009-001	**Sampling Date**	4/21/2008	**Date/Time Received**	4/25/2008 10:30 AM
Client Sample ID	SCRUBBER CARBON #1	**Sampling Time**	10:30 AM		
Matrix:	Solid	**Sample Location**	W801777-01		

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Styrene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
tert-Butylbenzene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Tetrachloroethene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Toluene	5.80	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
trans-1,2-Dichloroethene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
trans-1,3-Dichloropropene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Trichloroethene	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Trichloroflouromethane	0.0307	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
Vinyl Chloride	ND	mg/kg	0.025	4/25/2008	TGT	EPA 8260B	
%moisture	18.6	Percent				%moisture	

Surrogate Data

Sample Number 080425009-001

Surrogate Standard	Method	Percent Recovery	Control Limits
1,2-Dichlorobenzene-d4	EPA 8260B	89.2	70-130
4-Bromofluorobenzene	EPA 8260B	94.4	70-130
Toluene-d8	EPA 8260B	92.4	70-130

Authorized Signature John W. Coll

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

Comments:

Combined Hazen Solution

Analysis	pH	ORP	TMT 15	F	SO_4	S^{2-}	Cl	Ag	Al	As	Ba	Be
UNITS		mV	mg/L	mg/L	mg/L		mg/L	μg/L	μg/L	μg/L	μg/L	μg/L
Maxxam				0.850	21800		80000	<= 2.0	<= 300	<= 100	<= 100	<= 10
BTC	5.1	63						<= 100	1400	1300	<= 100	
BTC- Repeat								<= 100	3700	<= 100	<= 100	
Kemetco			1263									
ALS-Env												
Maxxam Method			UV Analysis at 285nm/1cm cells	ISE (ion selective electrode)	Colorimetry		Colorimetry	ICPMS (Maxxam, ALS-Env), ICP (BTC)				
Maxxam RDL				0.010	500		500	2	300	100	100	10
ALS-Env Method				IC								

Analysis	Bi	B	Ca	Cd	Co	Cr	Cu	Fe	Hg_ICP	Hg_DMA	Hg_CV	K	Mg
UNITS	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
Maxxam	<= 100	<= 5000		<= 1.3	<= 50	149	<= 20	<= 500			23.6		
BTC	<= 100		16500	<= 100	<= 100	200	<= 100	<= 100	120			45500	200
BTC- Repeat	100		18400	<= 100	<= 100	100	<= 100	<= 100	<= 50	27		55800	200
Kemetco													
ALS-Env													
Maxxam Method													
Maxxam RDL	100	5000		1.3	50	100	20	500					
ALS-Env Method													

Analysis	Mn	Mo	Na	Ni	P	Pb	S	Sb	Se	Si	Sr	Tl	Sn	Ti	U	V	W	Zn	Zr
UNITS	μg/L	μg/L	mg/L	μg/L	μg/L	μg/L	mg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
Maxxam	<= 100	146		<= 100		<= 20		<= 50	<= 500	**17100**	191	<= 5.0	<500	<= 500	<= 10	<= 500		52300	<= 50
BTC	<= 100	100	59900	<= 100	<= 100	<= 100	6944	<= 100	400					<= 100			<= 100	54900	
BTC- Repeat	<= 100	200		<= 100	300	<= 100	7147	<= 100	300					<= 100			<= 100	56500	
Kemetco																			
ALS-Env																			
Maxxam Method																			
Maxxam RDL	100	100		100		20		50	500	10000	100	5	500	500	10	500		500	50
ALS-Env Method																			

Material Safety Data Sheet

Mercury, 99.999%

ACC# 96252

Section 1 - Chemical Product and Company Identification

MSDS Name: Mercury, 99.999%
Catalog Numbers: AC193480000, AC193480500
Synonyms: Colloidal mercury; Hydrargyrum; Metallic mercury; Quick silver; Liquid silver
Company Identification:
Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410
For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7439-97-6	Mercury	99.999	231-106-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: silver liquid.
Danger! Corrosive. Harmful if inhaled. May be absorbed through intact skin. Causes eye and skin irritation and possible burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. May cause liver and kidney damage. May cause central nervous system effects. This substance has caused adverse reproductive and fetal effects in animals. Inhalation of fumes may cause metal-fume fever. Possible sensitizer.
Target Organs: Blood, kidneys, central nervous system, liver, brain.

Potential Health Effects
Eye: Exposure to mercury or mercury compounds can cause discoloration on the front surface of the lens, which does not interfere with vision. Causes eye irritation and possible burns. Contact with mercury or mercury compounds can cause ulceration of the conjunctiva and cornea.
Skin: May be absorbed through the skin in harmful amounts. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Causes skin

irritation and possible burns. May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color.
Ingestion: May cause severe and permanent damage to the digestive tract. May cause perforation of the digestive tract. May cause effects similar to those for inhalation exposure. May cause systemic effects.
Inhalation: Causes chemical burns to the respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability. Aspiration may lead to pulmonary edema. May cause systemic effects. May cause respiratory sensitization.
Chronic: May cause liver and kidney damage. May cause reproductive and fetal effects. Effects may be delayed. Chronic exposure to mercury may cause permanent central nervous system damage, fatigue, weight loss, tremors, personality changes. Chronic ingestion may cause accumulation of mercury in body tissues. Prolonged or repeated exposure may cause inflammation of the mouth and gums, excessive salivation, and loosening of the teeth.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. Wash mouth out with water.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: The concentration of mercury in whole blood is a reasonable measure of the body-burden of mercury and thus is used for monitoring purposes. Treat symptomatically and supportively. Persons with kidney disease, chronic respiratory disease, liver disease, or skin disease may be at increased risk from exposure to this substance.
Antidote: The use of d-Penicillamine as a chelating agent should be determined by qualified medical personnel. The use of Dimercaprol or BAL (British Anti-Lewisite) as a chelating agent should be determined by qualified medical personnel.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or

combustion.
Extinguishing Media: Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Keep container tightly closed. Do not get on skin or in eyes. Do not ingest or inhale. Use only in a chemical fume hood. Discard contaminated shoes. Do not breathe vapor.
Storage: Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from metals. Store protected from azides.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Mercury	0.025 mg/m3 TWA; Skin - potential significant contribution to overall exposure by the cutaneous r oute	0.05 mg/m3 TWA (vapor) 10 mg/m3 IDLH	0.1 mg/m3 Ceiling

OSHA Vacated PELs: Mercury: 0.05 mg/m3 TWA (vapor)
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: silver
Odor: odorless
pH: Not available.
Vapor Pressure: 0.002 mm Hg @ 25C
Vapor Density: 7.0
Evaporation Rate: Not available.
Viscosity: 15.5 mP @ 25 deg C
Boiling Point: 356.72 deg C
Freezing/Melting Point:-38.87 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density:13.59 (water=1)
Molecular Formula: Hg
Molecular Weight:200.59

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures, incompatible materials.
Incompatibilities with Other Materials: Metals, aluminum, ammonia, chlorates, copper, copper alloys, ethylene oxide, halogens, iron, nitrates, sulfur, sulfuric acid, oxygen, acetylene, lithium, rubidium, sodium carbide, lead, nitromethane, peroxyformic acid, calcium, chlorine dioxide, metal oxides, azides, 3-bromopropyne, alkynes + silver perchlorate, methylsilane + oxygen, tetracarbonylnickel + oxygen, boron diiodophosphide.
Hazardous Decomposition Products: Mercury/mercury oxides.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7439-97-6: OV4550000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 7439-97-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: Intraperitoneal, rat: TDLo = 400 mg/kg/14D-I (Tumorigenic - equivocal tumorigenic agent by RTECS criteria - tumors at site of application).
Teratogenicity: Inhalation, rat: TCLo = 1 mg/m3/24H (female 1-20 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).
Reproductive Effects: Inhalation, rat: TCLo = 890 ng/m3/24H (male 16 week(s) pre-mating) Paternal Effects - spermatogenesis (incl. genetic material, sperm morphology, motility, and count).; Inhalation, rat: TCLo = 7440 ng/m3/24H (male 16 week(s) pre-mating) Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).
Mutagenicity: Cytogenetic Analysis: Unreported, man = 150 ug/m3.
Neurotoxicity: The brain is the critical organ in humans for chronic vapor exposure; in severe cases, spontaneous degeneration of the brain cortex can occur as a late sequela to past exposure.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 0.16-0.90 mg/L; 96 Hr; UnspecifiedFish: Bluegill/Sunfish: LC50 = 0.16-0.90 mg/L; 96 Hr; UnspecifiedFish: Channel catfish: LC50 = 0.35 mg/L; 96 Hr; UnspecifiedWater flea Daphnia: EC50 = 0.01 mg/L; 48 Hr; Unspecified In aquatic systems, mercury appears to bind to dissolved matter or fine particulates, while the transport of mercury bound to dust particles in the atmosphere or bed sediment particles in rivers and lakes is generally less substantial. The conversion, in aquatic environments, of inorganic mercury cmpd to methyl mercury implies that recycling of mercury from sediment to water to air and back could be a rapid process.
Environmental: Mercury bioaccumulates and concentrates in food chain (concentration may be as much as 10,000 times that of water). Bioconcentration factors of 63,000 for freshwater fish and 10,000 for salt water fish have been found. Much of the mercury deposited on land, appears to revaporize within a day or two, at least in areas substantially heated by sunlight.
Physical: All forms of mercury (Hg) (metal, vapor, inorganic, or organic) are converted to methyl mercury. Inorganic forms are converted by microbial action in the atmosphere to methyl mercury.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 7439-97-6: waste number U151.

Section 14 - Transport Information

	US DOT	**Canada TDG**
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)	MERCURY
Hazard Class:		8
UN Number:		UN2809
Packing Group:		III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7439-97-6 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
CAS# 7439-97-6: Section 5
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 7439-97-6: 1 lb final RQ; 0.454 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 7439-97-6: immediate, delayed.
Section 313
This material contains Mercury (CAS# 7439-97-6, 99.999%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:

CAS# 7439-97-6 (listed as Mercury compounds) is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
CAS# 7439-97-6 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7439-97-6 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 7439-97-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65
WARNING: This product contains Mercury, a chemical known to the state of California to cause developmental reproductive toxicity.
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols:
T
Risk Phrases:
R 23 Toxic by inhalation.
R 33 Danger of cumulative effects.

Safety Phrases:
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 7 Keep container tightly closed.

WGK (Water Danger/Protection)
CAS# 7439-97-6: 3
Canada - DSL/NDSL
CAS# 7439-97-6 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2A, E.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List
CAS# 7439-97-6 is listed on the Canadian Ingredient Disclosure List.

APPENDIX 4-A

Inspection Plan

TABLE OF CONTENTS

1 INSPECTION PLAN

This Inspection Plan outlines the schedule for inspection of monitoring equipment, safety, and emergency equipment, security devices, and operating and structural equipment that prevent, detect, or respond to environmental or human health hazards in accordance with 40 CFR 270.14(b)(5) and 264.15 and 264.33. This section also addresses specific inspection areas in detail and contains examples of the inspection forms used at the facility.

2 INSPECTION SCHEDULE

The inspection schedule was developed based on applicable regulatory requirements, estimated potential equipment deterioration and the probability of an environmental or human health incident if any equipment deterioration, malfunction, or operator error were to go undetected between inspections. Table 4.0-1 identifies the inspection frequency for each of the various facility units or areas. The inspection frequency is intended to minimize the need to implement the Contingency Plan. In addition to the daily inspections, all permitted units are inspected weekly by facility management or their designee and documented on a weekly inspection form. Daily, weekly, and monthly inspections forms are included in Appendix 4-B.

All TSF units in which waste is actively being handled are under surveillance for spills, malfunctions, and operator error during operations. In all active waste handling areas, a daily inspection is performed when the area is in use (i.e. each operating day).

In accordance with 40 CFR 264.15 any deterioration or malfunction of equipment or structures that could cause or lead to the release of hazardous waste constituents or threaten the environment or human health will be corrected utilizing interim and final corrective measures. Where a hazard is imminent or has already occurred, action is taken expeditiously. Response actions for contingency procedures are provided in detail in the Contingency Plan.

Table 4.0-1 Inspection Frequencies

Area or Equipment	Frequency	Record Form
Fire Extinguishers	Monthly	Inspection Form #4
Fire Suppression Equipment	Tested Monthly	Inspection Form #4
Fire Suppressions Flow	Tested Annually	Inspection Form #4
Security Fence and Gate	Monthly	Inspection Form #4
Safety and Emergency Response Equipment	Monthly	Inspection Form #4
Structural Condition of Tanks	Monthly	Inspection Form #4
Associated Piping	Monthly	Inspection Form #4

Table 4.0-1 Inspection Frequencies		
Area or Equipment	**Frequency**	**Record Form**
Containers (pigs)	Daily	Daily Inspection Form #1
Tank Levels, Content, and Leak Detection	Daily	Daily Inspection Form #2
Shelving for Elemental Mercury	Daily	Daily Inspection Form #1
Spill Trays	Daily	Daily Inspection Form #1
Storage Area (Floor and Epoxy Coating)	Daily	Daily Inspection Form #1
Retort Circuit	Weekly	Daily Inspection Form #2 & #3
Filter Press	Weekly	Daily Inspection Form #2 & #3
Equipment and Inventory Supply	Monthly	Inspection Form #4
On-Site Lab	Daily	Daily Inspection Form #1
Parking Areas (Run-on/Run-off)	Monthly	Inspection Form #4
Load/Unload Docks	Monthly	Inspection Form #4
Safety Showers/Eyewash Stations	Weekly	Weekly Inspection Form #3
Monitoring Wells	Quarterly	Inspection Form #4
Communication System	Daily	Daily Inspection Form #1

3 GENERAL INSPECTION REQUIREMENTS

The following subsections identify facility equipment and operating areas, identify potential problems, and outlines measures to prevent the occurrence of these problems. A copy of the Daily, weekly, and monthly inspection forms are found in Appendix 4-B. Completed inspections forms and the inspection schedule are kept at the facility at least three (3) years from date of inspection.

The format of the inspection forms may be modified from time to time to address ongoing inspection assignments. Changes to the inspection format do not require NDEP notification or a permit modification since the content of the inspection forms/procedures or the minimum inspection frequency will not be altered. Content of inspection forms may be changed through a Class 1 permit modification. Additionally, non-RCRA required inspections might be added and removed as appropriate to improve facility performance.

4 INSPECTION PURPOSE

Regular inspections are conducted to identify equipment malfunctions, structural deterioration, operator errors, uncontrolled run-off, or other discharges that could cause or lead to release of hazardous waste constituents or that would threaten human health or the environment.

Inspections are intended to detect potential problems in time to correct them before they result in a release of hazardous waste constituents and/or cause harm to human health or the environment.

Units critical to the proper operation of the facility, specific inspection items, and potential problems associated with each inspection area are referenced in the following subsections as well as on each individual inspection form.

5 UNIT SPECIFIC INSPECTION REQUIREMENTS

Container Inspections - 40 CFR 264.174

Areas where containers are stored are inspected daily for leaking containers and for deterioration of containers and the containment system caused by corrosion or other factors. If any of these conditions exist, corrective activities are instituted to clean up and limit the spread of material, and/or restore the integrity of the container or containment system. The containers and containment system is also visually inspected for the presence of cracks and gaps that could result in loss of containment effectiveness where appropriate. Should structural problems occur that would allow leakage out of the unit or between compatibility segregation areas or that may develop into a major failure, repair activity will be initiated. These findings will be documented on the inspection form and reported to the TSF manager.

During scheduled inspections of the containment area a determination is made whether adequate aisle space is being maintained. Individual containers are also randomly inspected to ensure proper segregation is being maintained.

Secondary containment trays are inspected for the presence of liquids and evidence of leaks. Spilled material is removed and the residues are managed in accordance with the Waste Analysis Plan. Liquids discovered in the containment system are removed within 48 hours of discovery. If necessary, amalgam or absorbent materials are utilized to absorb standing liquid for proper disposal.

Tank System - 40 CFR 264.195

The structural condition of the tanks and their associated piping are visually inspected daily. Tank areas and skids are inspected for indications of a leak. Inspection findings are recorded on the inspection form along with the observed tank level. The functionalities of tank system instruments are observed.

Surface Impoundment Inspection - 40 CFR 264.226

Not Applicable. The facility does not have any hazardous waste surface impoundments.

Waste Pile Inspection - 40 CFR 264.254

Not Applicable. The facility does not have any hazardous waste surface impoundments.

Land Treatment Inspection - 40 CFR 264.278

Not Applicable. The facility does not have any hazardous waste surface impoundments.

Landfill Inspection - 40 CFR 264.303

Not Applicable. The facility does not have any hazardous waste surface impoundments.

Incinerator Inspection - 40 CFR 264.347

Not Applicable. The facility does not have any hazardous waste surface impoundments.

Run-On and Run-Off

Not applicable because this TSF is an enclosed facility. No run-on/run-off control systems are present.

Security, Safety, and Emergency Response Equipment

Security fences and gates and safety and emergency response equipment listed in the Contingency Plan are inspected monthly to ensure the equipment is operable and available, as appropriate.

Monitoring Well Inspections

Wells are inspected to verify they are locked, undamaged, and free from apparent tampering on a quarterly basis.

Miscellaneous Unit Inspections – 40 CFR 264.602

Retort Circuit

The retort skid is visually inspected daily. Operating units (two domes, condenser, and air cooling unit) are inspected for indications of a leak or malfunction. Inspection findings are recorded on the inspection form. The functionality of retort circuit controller is observed.

Filter Press

The filter press skid is visually inspected daily. The unit is inspected for indications of leaks or malfunction. The area surrounding the filter cake collection containers is inspected for indications of spills and cleaned, as necessary. Inspection findings are recorded on the inspection form. The functionality of the filter press instrumentation is observed.

Boilers and Industrial Furnaces Inspection – 40 CFR 264.15, 266102, and 266.11

Not Applicable. The facility does not have any hazardous boilers or industrial furnaces.

Containment Building Inspection – 40 CFR 270.14 and 264.1101

Not Applicable. The facility does not have containment buildings as defined.

APPENDIX 4-B

Inspection Forms

PMR

Daily Inspection Form #1

Date: ____________________ Time: ____________________

Inspector: ____________________

Storage Facility		
	Sat.	Unsat.
Elemental Mercury Containers (pigs) – Ensure that all containers are closed and no leaks or spills. Check for proper labeling and identification.		
Fabricated Shelving System for Elemental Mercury Containers – Ensure adequate aisle space and check for signs of deterioration		
Spill Trays – Check for leaks or spills and signs of corrosion		
Calomel Containers – Check acceptance date.		
Carbon Containers – Check acceptance date.		
Storage Area – Ensure Good Housekeeping		
Floor – Check for expansion cracks, corrosion, or other signs of deterioration.		
Fire Extinguishers – Ensure proper functioning, that inspections and tests have been performed and ensure that they are readily available.		
Safety and Emergency Response Equipment – Ensure proper working condition and properly stored.		
Ensure proper labeling, tanks are marked and identified.		
Ensure proper functioning of overfill control equipment.		
Inspect secondary containment for presence of liquids or materials.		

Storage Facility		
	Sat.	Unsat.
Communication System – Ensure that emergency response radios are operational and available		

Any items that have been determined to be “unsatisfactory” will be noted below. If corrective action is performed, include the type of action taken, the date completed, and the individual performing the action. Corrective action will be tracked on this form.

PMR

Daily Inspection Form #2

Date: ______________________ Time: ______________________

Inspector:

Process Area Tanks		
	Sat.	Unsat.
Decomposition Tank – check overfill controls, leak detection, evidence of corrosion, evidence of leak, ancillary equipment		
Waste Solution Treatment Tank – check overfill controls, leak detection, evidence of corrosion, evidence of leak, ancillary equipment		
Waste Solution Settling Tank – check overfill controls, leak detection, evidence of corrosion, evidence of leak, ancillary equipment		
Waste Solution Collection Tank – check overfill controls, leak detection, evidence of corrosion, evidence of leak, ancillary equipment		
Waste Solution Storage Tank – check overfill controls, leak detection, evidence of corrosion, evidence of leak, ancillary equipment		
Carbon Columns - check evidence of corrosion, ancillary equipment		

Daily Inspection Form #2 (continued)

Non-RCRA Tanks These tanks do not contain RCRA hazardous waste, but are inspected daily.		
	Sat.	Unsat.
Caustic Soda Storage Tank – check overfill controls, evidence of leak, ancillary equipment		
Hydrochloric Acid Storage Tank – check overfill controls, evidence of leak, ancillary equipment		
Sanitary Wastewater Collection Tank – check overfill controls, evidence of leak, ancillary equipment		
Water Storage Tank – check overfill controls, evidence of leak, ancillary equipment		
Diesel Storage Tank – check overfill controls, evidence of leak, ancillary equipment		
Waste Storage Tank – check overfill controls, evidence of leak, ancillary equipment		
Fire Water Storage Tank – ensure it is available for fire control, check tank level is full, evidence of leak, ancillary equipment		
Liquid Nitrogen Tank – check evidence of corrosion, ancillary equipment		
Liquid Oxygen Tank – check evidence of corrosion, ancillary equipment		

Any items that have been determined to be “unsatisfactory” on Daily Inspection Form #2 will be noted below. If corrective action is performed, include the type of action taken, the date completed, and the individual performing the action. Corrective action will be tracked on this form.

PMR

Weekly Inspection Form #3

Date: ____________________________ Time: _____________________________

Inspector:

Miscellaneous Treatment		
	Sat.	Unsat.
Caustic Leach Circuit		
Retort Circuit – check controls and gauges, operating temperature, corrosion, evidence of spill or tampering, ancillary equipment		
Sulphur Dioxide Scrubber – check controls, corrosion, ancillary equipment		
Oxidation Reactor– check controls and gauges, operating temperature, corrosion, evidence of spill or tampering, ancillary equipment		
Filter Press – check corrosion, evidence of spill or tampering, ancillary equipment		
Unloading Area – inspect seals on roll up doors for signs of damage.		
Perimeter Fencing – inspect fence and barriers surrounding the facility for damage or vandalism. Inspect the outside perimeter for indication of unauthorized entry.		
Gates – inspect for damage or vandalism		
Warning Signs – inspect for damage or vandalism		
Safety Showers/Eyewash Stations – Perform eyewash alarm test, ensure proper operation		

Note: Ensure that good housekeeping is maintained.

Any items that have been determined to be “unsatisfactory” will be noted below. If corrective action is performed, include the type of action taken, the date completed, and the individual performing the action. Corrective action will be tracked on this form.

PMR

Monthly, Quarterly, and Annually Inspection Form #4

Date: ______________________ Time: ______________________

Inspector: ______________________

Other Inspections		
	Sat.	Unsat.
Warning Signs – Inspect for damage or vandalism		
Fire Extinguishers – Ensure proper functioning, that inspections and tests have been performed and ensure that they are readily available.		
Testing Fire Suppression Equipment		
Annual Testing Fire Suppression Flow		
Safety and Emergency Response Equipment – Ensure that they are readily available.		
Structural Condition of Tanks – Inspect for excessive damage that might cause unit failure.		
Associated Piping – Inspect all piping for evidence of damage or leakage. Ensure that they are all structurally sound.		
Equipment and Inventory Supply		
Parking Areas		
Load/Unload Docks – Ensure that safety rails are secure. Inspect for signs of spillage or litter. Ensure good housekeeping is maintained.		

Other Inspections		
	Sat.	Unsat.
Quarterly Check Monitoring Wells – Ensure the structural integrity of the well casings, seals, and well cap. Inspect for damage or vandalism.		

Any items that have been determined to be "unsatisfactory" will be noted below. If corrective action is performed, include the type of action taken, the date completed, and the individual performing the action. Corrective action will be tracked on this form.

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APPENDIX 6-A

Contingency Plan

TABLE OF CONTENTS

1 CONTINGENCY PLAN

The purpose of this Contingency Plan is to establish procedures to minimize hazards to human health and the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or constituents to air, soil, or surface water. This Contingency Plan has been prepared in compliance with the requirements of the Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities found in 40 CFR Part 264. This Plan is consistent with the Emergency Response Plan as required by the Nevada Chemical Accident Prevention Program (CAPP).

This Contingency Plan is for a proposed Treatment and Storage Facility (TSF), to be owned by Precious Metals Recovery LLC (PMR), which will treat, store, and manage mercury and mercury-bearing materials as describe in Section 1 of the Part B RCRA Permit Application.

PMR will maintain this Contingency Plan on-site at all times and carry out this plan in the event of an actual emergency. There will be a primary emergency coordinator available at all times who will be responsible for implementing and coordinating all emergency response measures and making response decisions. This qualified person will either be the proposed TSF's Manager or a designated operator. The emergency coordinator will either be present at the facility or on call and able to respond within a short amount of time. The emergency coordinator will be thoroughly familiar with the contents of this Contingency Plan and will have absolute authority to commit all available company resources as necessary to respond to an emergency situation. The emergency coordinator will be the designated point-of-contact for local, county, and state authorities. The list of personnel authorized to be an emergency coordinator is found in Appendix 6-B.

In accordance with 40 CFR 264.54, the Contingency Plan will be reviewed and amended when the applicable regulations or facility permits are revised: to improve responses to an emergency; if there are changes to the facility; if the list of emergency coordinators changes; or the list of emergency equipment changes.

2 POTENTIAL HAZARDS

Potential emergency situations have been identified in Table 1. Mitigating steps that have been identified are listed along with each potential emergency.

Although mercury is not a flammable material and will be treated and stored in a facility that will be constructed of non-flammable concrete blocks, the volatility of mercury during a fire is of concern. For this reason, the proposed TSF is designed to minimize a fire hazard by limiting fuel sources and isolating ignition sources. The potential for fire will be mitigated through the engineered design of the facility to the highest level practical.

Table 1: Contingency Provisions		
Potential Emergency Condition	**Hazards**	**Contingency Provision**
Fire, general building hazards	Volatilize mercury	Concrete block building, separated storage areas, fire suppression system. On-site emergency response team. Area around building bermed to contain fire and potential emissions.
Mercury spill or release from container	Contact or volatilize mercury	Spill response team trained to evacuate as needed and to contain and collect released material for proper management. Spill response materials and personnel protective equipment (PPE) located in high risk areas. Minimal traffic and deliveries scheduled for day shift only.
Calomel spill or release from container	Contact mercury; contact sulfur	Spill response team trained to evacuate as needed and to contain and collect released material for proper management. Spill response materials and PPE located in high risk areas. Minimal traffic and deliveries scheduled for day shift only.
Release of material to air		Operations occur inside concrete building. Building under negative pressure relative Ventilation system filters all air from inside the proposed TSF prior to exhausting to atmosphere. Cleanup procedures minimize volatilization. All operations personnel trained as hazardous waste operator (HAZWOPER) responders and mercury handlers.

Alternate Procedures

In the event the emergency coordinator is not available or is en-route to the proposed TSF, the following procedures along with this Contingency Plan will be implemented.

Personnel arriving first at the scene of the incident will communicate with the security office at the Cortez mine (775-468-4000) and will help restrict access to the area until the emergency coordinator arrives at the scene of the incident. The emergency coordinator will terminate the incident and initiate recovery operations, which include those short term and long-term activities that return all systems to normal conditions. Facility operators will be qualified to act in this capacity due to their training and familiarity with the following:

- Types of hazardous materials and hazardous wastes on-site.
- Locations and characteristics of all hazardous materials and hazardous wastes handled on-site.

- Locations of all records regarding hazardous materials and hazardous wastes on-site (Material Safety Data Sheets (MSDSs), shipping documents, inventory logs, etc.).
- Layout of facility including all emergency equipment, supplies and manpower, levels of response training of the various personnel.
- Appropriate evacuation procedures.
- Safe and appropriate emergency response procedures.
- Proper handling procedures, including PPE, for all hazardous materials and hazardous wastes in response actions.
- Selection and implementation of proper decontamination procedures and solutions used in response to hazardous conditions.

When the security office at the Cortez mine is contacted, the Cortez Emergency Operations Center (EOC) will become an active participant in the response team. The Cortez EOC will assist in determining the level of response required and in executing the response effort.

During an emergency, measures will be taken to ensure that fires, explosions, and releases do not occur, recur, or spread. The emergency coordinator will monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment.

3 EMERGENCY COORDINATOR ACTIONS

Imminent Danger Situations

If there is an imminent danger or an emergency situation involving hazardous materials and/or hazardous wastes at the proposed TSF, the emergency coordinator will assure that the outlined provisions are followed during both the emergency activities as well as the recovery activities, dictated by the conditions. The emergency coordinator will:

- Respond when called, and will contact the security office at the Cortez mine.
- Activate internal building alarms (site fire alarms) to notify all personnel in affected areas and evacuation/fire drill procedures are followed.

The emergency coordinator will determine the appropriate response activities and gather all qualified personnel to assist with the various tasks. The emergency coordinator will assess the initial response activities and determine the next steps for the response activities.

If external resources are required, the emergency coordinator will begin the communication process for engaging external resources. External resources are listed in this Contingency Plan.

Other duties of the emergency coordinator are to:

- Establish security at the immediate site of the incident to prevent injury and entry of unauthorized personnel into the affected area.
- Determine the character, source, amount, and extent of any released hazardous waste or hazardous waste constituents by:
    1. Observing, from a safe distance, the physical character of the released waste or hazardous material (vapor, liquid, solid).
    2. Obtaining weather conditions and wind direction at the time of the release by calling the security office at the Cortez mine.
    3. Determining the source of the release through visual inspection or from first hand reports of observers.
    4. Estimating the amount of material released by noting the size of the container or tank and the location of the release point on the container or tank.
    5. Noting the lateral extent of the obvious release by actual presence of the material or from indirect evidence (smoke, stains, wetted surfaces, etc.).
- Assess the potential human health and/or environmental hazards resulting from the incident.
- Determine if the incident response warrants assistance from a hazardous waste spill response contractor.

The emergency coordinator will use available information to evaluate emergency conditions. MSDSs provide essential facts about the hazardous materials brought into the facility. Documents produced by the proposed TSF will describe the materials produced in the process.

Hazard assessments will be conducted through identifying the released materials by their locations within the facility or reading markings, labels, or truck placards. After identifying the released material, the associated hazardous characteristics will be identified by reviewing documentation, using health and safety monitoring equipment, and using waste generator knowledge.

Evacuation

The emergency coordinator will determine if there is a need to evacuate non-essential personnel during incidents involving hazardous materials and or hazardous wastes at the proposed TSF, and then proceed with the following actions:

- Cease work and proceed directly to the designated assembly point.
- Evacuate after considering the effects of downwind transport of airborne constituents, downhill transport of liquid materials, and tracking through solids and liquids.
- Gather personnel at emergency assembly area and escort to a point of safety.
- Report any missing persons.
- When necessary due to site conditions, instruct evacuated personnel to re-gather at another emergency assembly area where all personnel will be accounted for again.
- Prevent personnel from re-entering the evacuation areas until "all clear" is communicated and directions are issued to do so.

Emergency Shutdown

The emergency coordinator will determine if shutdown of certain processes or operations is necessary to reduce hazards of release. If a shutdown is warranted, the emergency coordinator will monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, wherever this is appropriate. The emergency coordinator will also direct reasonable measures necessary to ensure that fires, explosions, and releases of hazardous waste do not occur, recur, or spread. These measures may include:

- Stopping, controlling, or containing the source of the release.
- Containing the released materials to minimize spreading.
- Eliminating or controlling health and safety hazards.
- Collecting and containerizing released material.
- Cleaning up and/or treating residual contamination in-place.

After the imminent danger has been mitigated, the emergency coordinator will direct the proper handling of any hazardous wastes produced during the incident and during any response actions taken.

Proper Material Handling

The emergency coordinator will provide direction for proper handling of any hazardous materials or hazardous wastes produced during the incident and the response including the following:

- Determine proper storage and placement of hazardous materials or hazardous wastes, and prevent placing any incompatible materials in contact with released materials.
- Determine proper containers and secondary containment for materials gathered during incident response.
- Determine proper final disposition for the materials involved in the incident and any waste materials generated during the incident.
- Determine appropriate equipment, supplies, and PPE required.

After an emergency, any residue from the release, fire, or other event will be treated, stored, and disposed of according to all applicable RCRA regulations.

Return Equipment to Proper Location and Working Order

The emergency coordinator will ensure that emergency equipment and supplies are returned to a state of repair and readiness in proper working condition, decontaminated, and resupplied as necessary to be prepared for the next potential incident.

4 INCIDENT LOG

The emergency coordinator will conduct an investigation or evaluation addressing the following items:

- Root cause of the incident.
- Factors contributing to the conditions of the incident.
- Modifications necessary to prevent such an incident from occurring again.
- Effectiveness of the response activities, improvements, changes.
- Changes to this Contingency Plan when necessary to improve the response effort and the quality of the proposed TSF's emergency preparedness.

The emergency coordinator will record the date, time, activities, samples collected, and other details describing the response at the completion of the response activities. The record will include the internal and external notification dates and times and details requiring follow up to the response activities.

The notification will include at least the following information:

- Name and phone number of the emergency coordinator.
- Name and address of the proposed TSF.
- Date, time, and type of the incident (spill, fire, etc.).
- Causes of the incident or emergency.
- Description of corrective actions taken to prevent recurrence of such incident or emergency.
- Name, identification, and quantity of chemicals involved in the incident.
- Report of damages to human health and the environment, including harm to others and the extent of damage outside the proposed TSF.
- An estimate of the amount of the chemicals, chemical wastes, and materials that require disposal as a result of the incident or emergency.
- A plan for disposal of the chemical wastes and materials resulting from the incident or emergency.

Events that require implementation of the Contingency Plan will be documented in the proposed TSF operating record. Within 15 days of the accident, PMR will submit a written report describing the incident to the Administrator of NDEP (40 CFR 264.56(g)-(j)).

5 EMERGENCY RESPONSE EQUIPMENT AND MATERIALS

Emergency response equipment will be available in the immediate work area. Emergency equipment will be located in close proximity to each of the eye wash stations. The emergency equipment storage will be well identified and located in plain sight. An updated drawing will be provided to NDEP with the specific location of each item identified after the facility has been constructed.

The proposed TSF personnel will be trained in the response actions required for a release of hazardous material. The ready access to response materials is key to an effective response effort. All response activities will consider the potential migration of the hazardous waste and minimize the potential impact to human health and the environment.

The equipment and materials to be used to respond to an incident involving hazardous waste are located in process areas. This equipment and materials include the following:

- Dry chemical fire extinguishers - extinguish chemical fires.
- Splash goggles - protect eyes.
- Butyl or neoprene gloves - protect hands.
- Neoprene boots - protect feet.
- Respirators with replaceable cartridges - protect against inhalation of hazardous substances.
- Shovels - clean up solid material.
- Brooms - clean up solid material.
- Duct tape - seal PPE, hold plastic sheeting, provide temporary repairs of containers or equipment.

Other response items stocked at the proposed TSF for use during an incident response include:

- Containers - contain spill cleanup wastes.
- Disposable PPE suits - protection against hazardous wastes.
- Paper towels - clean up liquids, assist with decontamination.
- Plastic garbage bags - contain spent spill cleanup materials.
- Noncombustible absorbent material - clean up liquid spills.
- Face shields - full-face splash protection.
- Plastic sheeting - control evaporation of volatile chemicals, cover contaminated surfaces.
- Transport containers - contain spilled materials.

An emergency response vehicle (ERV) will be located at the site. The ERV will be dispatched during emergency situations involving mercury and mercury-bearing materials in transit to or from the proposed TSF. The ERV will only be dispatched when the proposed TSF manager or the Cortez EOC determines external first responders will have insufficient means to address the specific nature of the emergency, or if it is determined that external first responders will not be able to reach the scene of the emergency before the ERV. The ERV will be staged to respond to an accident or emergency either on-site or off-site.

At a minimum, the ERV will be stocked with the following materials:

- Fire extinguishers.
- Tarps.
- Protective clothing.
- Gloves.
- Shoe covers / boots.
- Safety goggles.
- Respirators with replaceable cartridges.
- Tools (non-sparking).
- Shovels.
- Clean containers.
- Suitable absorbents and sponges for mercury.
- Wipes.
- Eye droppers.
- Stiff cards or cardboard.
- Duct tape.
- Spill cleanup equipment/materials typically include suitable absorbents (e.g., vermiculite, clay, sulfur powder, zinc or copper flakes, pads and/or booms).
- Specialized mercury vacuum.
- Traffic control devices (e.g., pylons, reflectors).

The vehicles transporting the mercury and mercury-bearing materials will also carry spill response equipment and communication equipment to facilitate prompt attention to spills or releases. These materials include but are not limited to the following:

- Fire Extinguishers.
- Absorbent pads, socks, and material.
- PPE.
- Shovel.
- Plastic bags.
- Containers suitable for encasing transported damaged containers.
- Communication device to contact the emergency coordinator.

Management of Wastes Produced During an Incident Response

The following procedures will be followed to manage wastes generated during the response to an incident:

- Wastes that are potentially hazardous only because of their mercury content will generally be treated in-place. Every effort will be made to minimize volatilization of mercury.
- Wastes which are potentially hazardous due to their caustic soda content will generally be treated in place according to MSDS directions or will be introduced into the caustic leach circuit as appropriate. Caustic wastes will be kept separate from acid wastes to prevent the generation of heat.
- Other wastes will be containerized and analyzed for hazardous characteristics as appropriate. Wastes determined to be hazardous will be managed in accordance with applicable requirements at a licensed facility.

If the integrity of a secondary containment area was damaged during the incident or release, either sufficient secondary containment will be provided for the area while the containment is being repaired; or the repair will be completed before the proposed TSF resumes operation.

Hazardous materials resulting from spills, releases, and incidents will be contained as appropriate in containers compatible with the materials. Containers will be labeled and managed appropriately. Records of the material containers will be tracked and entered in the proposed TSF's operating record. After such an event has occurred, PMR will notify NDEP of the following:

- The emergency coordinator ensured waste incompatible with released material was managed (treated, stored, or disposed) properly.
- Cleanup was complete.
- Response equipment was returned to service before operations were resumed in affected areas.

Coordination with Local Authorities

In compliance with 40 CFR 264.37 and 264.52(c), a copy of the Contingency Plan and an invitation to visit the proposed TSF will be sent to the following local entities:

Table 2: Coordinating Agency Contact Numbers

Coordinating Agency	Contact Number
Ambulance	
Battle Mountain Ambulance Service	775-635-5102 775-635-2190
Barrick Cortez Ambulance service	775-468-4686
EMS Coordinator Eureka County - Crescent Valley, NV	775-468-4686 775-468-0241
Carlin Ambulance Service	Elko county dispatch
Summit Air Ambulance	775-237-5252
Hospitals	
North Eastern Nevada Regional Hospital	775-738-5151
Battle Mountain General Hospital	775-635-2550
Police Departments	
Eureka County Sheriff	775-237-5252
Lander County Sheriff	775-635-5161
Nevada Highway Patrol Central Command HQ	775-753-2352
Battle Mountain Substation	775-635-2253
Elko Substation	775-751-2352
Eureka Substation	775-237-7465
Fire Departments	
Beowawe Volunteer Fire Department	775-468-2033

Coordinating Agency	**Contact Number**
Crescent Valley Fire Department	775-468-0238
Carlin City Fire Department	775-754-6710
Carlin Fire Station	775-754-6969
Golconda Fire District, Battle Mountain NV	775-635-8381
Lander County Fire Dep., Battle Mountain Volunteer FD	775-635-5102
Dunphy Volunteer FD	775-468-0800
24-Hour Reporting Cortez Mine Security Office	775-468-4400
Clean Harbors 24-Hour Hotline	1-800-645-8265
CHEMTREC	1-800-424-9300
National Response Center 24 Hour Hotline	1-800-424-8802

Effective Date: January 1, 2013

The proposed TSF will meet with the agencies listed to familiarize agency personnel with the types of hazardous waste handled at the proposed TSF and the possible need for their services. Two hospitals, North Eastern Nevada Regional Hospital (Elko, NV) and Battle Mountain General Hospital, will be notified of the potential hazards associated with an emergency situation at the proposed TSF. Each of the coordinating agencies will be provided a copy of this Contingency Plan.

Copies of letters sent to the emergency response agencies requesting their coordination in response assistance to emergency situations will be located in the proposed TSF manager's files.

Emergency Fire Response Actions

Any person noticing a fire will:

- Activate the internal fire alarm system.
- Alert the TSF personnel.
- Walk to the nearest exit choosing a path away from the fire.

- Stay low in smoke filled areas.
- Contact the security office at the Cortez mine.

If the fire involves hazardous materials or hazardous waste, the following actions will be taken:

- Activate emergency shutdown in the fire area.
- Notify the emergency coordinator by alarm, radio or phone. The reporting individual will identify his/her name and describe the location of the fire.
- Use an appropriate fire extinguisher if the fire is small and there is an open escape route.
- Direct others away from the fire area.

If evacuation is indicated, all personnel will proceed to the nearest safe assembly area.

Personnel Assisting During the Emergency Response

The proposed TSF personnel who may be present in an area involved in a fire should aid emergency response crews as follows and as directed by the emergency coordinator:

- Shut down equipment near the incident site.
- Listen for evacuation information and specific instructions.
- Report to the safe assembly area.
- Provide unobstructed access to and from the emergency scene.
- Provide additional support as requested.
- Aid in accounting for all personnel.
- Not to return to the area until directed to do so.

Explosion Emergency Response Actions

Follow the above response actions in the event of an explosion. If the potential for an explosion exists during an emergency incident, the emergency coordinator will:

- Evacuate all personnel to a safe assembly area.
- Be aware of secondary hazards from explosive incidents.
- Re-evaluate the necessary response actions considering the potential risk to safety and health of personnel and to property.

If the potential for an explosion exists, site personnel will not attempt to fight the fire.

Personnel Response Actions

The proposed TSF personnel will be trained to take the following response and reporting actions:

- Report spills to the emergency coordinator.
- Contact the security office at the Cortez mine.
- Respond to spills if trained and it is safe to do so.
- Assess accident site for chemical and safety hazards.
- Report any injuries to emergency coordinator.
- Respond to injury if safe to approach victim.
- Administer first aid.
- Not to move victims unless there is acute danger.
- Transport victim to health care.
- Secure the area for investigation.

6 NOTIFICATION

In the event of an imminent or emergency situation, the emergency coordinator will activate internal facility alarms and/or communication systems and notify appropriate personnel. They will identify the character, exact source, amount, and extent of any released materials as prudence allows. At the same time, the emergency coordinator will assess possible hazards to human health or the environment.

If the emergency coordinator determines that the emergency threatens human health or the environment outside of the RCRA area and finds that evacuation of local areas may be advisable, the manager will notify appropriate authorities and either the designated government official for the area or the National Response Center. The Notification procedures are described below, and the contact information is included in Appendix 6-B.

Notification Instructions

Emergencies involving hazardous materials including hazardous waste will be communicated using the following procedures:

- Persons who discover a release or potential release of hazardous materials including hazardous waste will notify their supervisor.
- The security office at the Cortez mine will be notified.

Emergency Notification and Reporting

The emergency coordinator will determine if there has been a reportable incident or spill and will notify or report to the applicable agencies. The notification to the outside agencies will occur no later than the end of the first working day after the release.

Table 3: Emergency Notification Agency Contact Numbers

Incident Description	Agency	Notification Number
Reportable quantity release of hazardous material outside the proposed TSF property	NDEP Bureau of Corrective Actions	1-888-331-6337 or 1-775-687-9485 (immediate)
Reportable quantity release of hazardous material outside the proposed TSF property	Sheriff Dispatches: Lander County Eureka County	1-775-635-5161 (immediate) 1-775-237-5252
Reportable quantity release in excess of CERCLA Nevada SERC	State Emergency Response Commission	1-775-684-7511
Reportable quantity release in excess of EPCRA EHS Eureka County LEPC	State Emergency Response Commission	1-775-237-5330
Any release on public land	Bureau of Land Management (BLM) through the Nevada Division of Forestry Dispatch	1-775-738-5137
Mercury release of one pound (approximately two tablespoons) or more	National Response Center (NRC)	1-800-424-8802
DOT reportable quantity	Department of Transportation Dispatch	1-775-777-2700 1-775-888-7000

The emergency coordinator will provide the following information when reporting a spill or release to a required agency:

- Name, phone number, and location of the proposed TSF.
- Name, title, and phone number of the individual reporting.

- Date, time, and type of incident.
- Specification description of location of the incident.
- Description of the spilled material.
- Estimated quantity and disposition of hazardous waste or recovered materials.
- Cause of spill/release.
- Action taken to minimize the threat to human health and the environment.
- Extent of injuries or fatalities, if any.
- Evacuations necessary.
- Environmental media the material was released to, if any.
- Cleanup procedures taken.
- Description of equipment damage and evacuation status.
- Identities of other agencies to which spill reports will be made.

Hazardous Materials Spill Response Contractor

The emergency coordinator will determine if the incident requires the assistance of a hazardous waste spill response contractor. If the proposed TSF requires outside contractor assistance, the request will be made upon determination.

7 REVIEW OF THE CONTINGENCY PLAN

The Contingency Plan must be reviewed and amended if necessary whenever:

- Applicable regulations are revised.
- The Plan is modified to improve response.
- The proposed TSF changes in its design, construction, operation, maintenance, or other circumstances – in a way that materially increases the potential for incidents.
- The list of personnel changes.
- The list of emergency equipment changes.

The amended Contingency Plan will be provided to the original agencies and outside support services in a timely fashion.

8 BEST MANAGEMENT PRACTICES

Please refer to Appendix 6-C for reference to the Department of Energy Best Management Practices. http://www.ecos.org/files/720_file_QSC_BMP_Oct_03.pdf. This document was used as a reference for writing this Plan.

APPENDIX 6-B
Emergency Coordinators and Alternates

EMERGENCY COORDINATORS AND ALTERNATES

Name	Title	Contact Information
	Manager	
	Supervisor	
	Alternate	
	Security office at Cortez mine	775-468-4400

Effective Date: January 1, 2014

EXTERNAL CONTACTS

Name	Title	Contact Information
Ambulance	Battle Mountain Ambulance Service Barrick Cortez Ambulance service	775-635-5102 or 775-635-1111 775-468-4686
EMS Coordinator Eureka County Crescent Valley		775-468-4686 775-468-0241
Police and Fire Department(s)	Crescent Valley Volunteer Fire Department Eureka County Sheriff (LEPC/CEM) Lander County Sheriff (LEPC) Nevada Highway Patrol Central Command HQ Battle Mountain Substation Elko Substation Eureka Substation Winnemucca Substation Beowawe Volunteer Fire Dept Carlin City Fire Department Carlin Fire Station Golcanda Fire District, Battle Mountain NV Lander County Fire Dept, Battle Mountain Volunteer FD	775-468-0238 775-237-5252 775-635-5161 775-753-1111 775-635-2253 775-751-1111 775-237-7465 775-623-6511 775-468-2033 775-754-6710 775-754-6969 775-635-8381 775-635-5102
Area Hospitals	North Eastern Nevada Regional Hospital (Elko) Battle Mountain General Hospital	775-738-5151 775-635-2550
NDEP Bureau of Corrective Actions		888-331-6337 or 775-687-9485
NDEP Water Pollution Control		775-687-9404
Lander County Sheriff Dispatch		775-635-5161
National Response Center		800-424-8802
Bureau of Land Management (BLM) through the Nevada Division of Forestry Dispatch (Includes BLM and/or Forest Service)		775-738-5137

Effective Date: January 1, 2014