

Pro-Seal ECCO Mine Tailings Basin Site Soil Semi-Structural Stabilization Secondary
Containment with Primary Containment Seamless Membrane System
City of LA RR# 26015 (CSI # 07130)



Keeping it Green

Environmentally Sound, Green Secondary Containment
with Seamless,
Primary Containment for Mine Tailings

- o GO Green Certified Compliant
- o Red Line Certified Compliant
- o NSF Certified Compliant
- o US EPA Compliant
- o Contains RCRA 8 Metals
At Newest EPA ppb
Requirements
- o US FDA Compliant
- o USACE ASTM Compliant
- o LARR Compliant
- o CSI Compliant
- o LEED Compliant

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12995 N Oracle RD • Suite 362 • Tucson, Az 85739
TF USA/CND: 800.349.7325 • Int'l: +1 520 349 7325
information@prosealproducts.com
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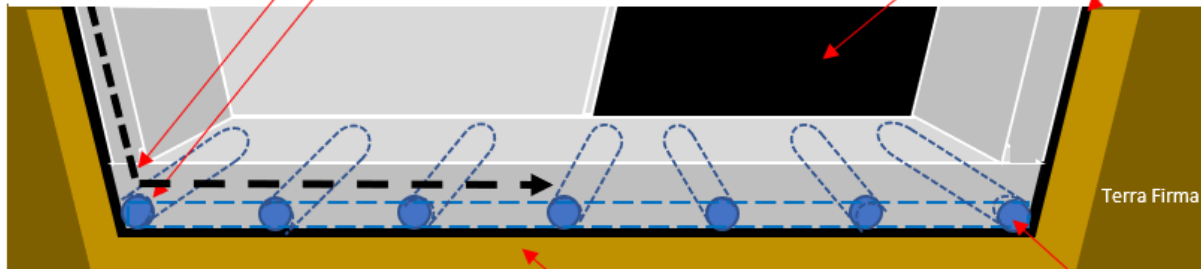
Build Up Schematic...

Mine Tailings Storage Secondary and Primary Containment Basin Construction

Gravel filter layer with drain tile grid for greywater or other fluids.

Geotextile filter fabric maybe placed over aggregate and covered with protective soil layer as required.

Pro-Seal FlexSystem II is sprayed directly onto semi-structurally stabilized site soil. This creates a seamless, monolithic, impermeable, and elastomeric primary containment liner.



Pro-SealECCO System is hydrophobic. It is in situ blended into site soil as a semi-structural stabilization material. The stabilized base performs as secondary containment once it is covered with the spray applied **Pro-Seal FlexSystem II** seamless, monolithic, and elastomeric primary containment liner.

Greywater contaminant fluids collection system. Fluids to be sent and/or pumped to treatment facility.

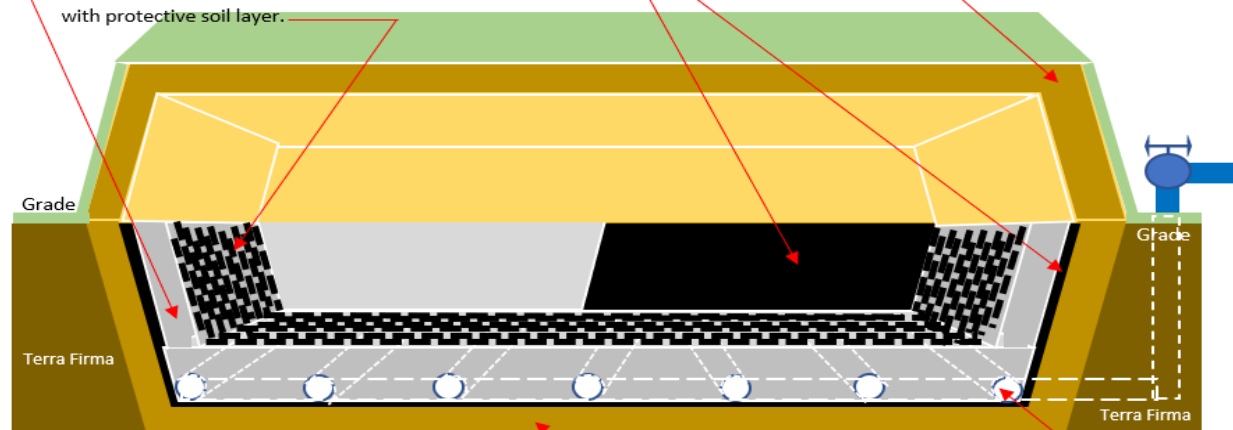
Mine Tailings Storage Covered or Capped and Parked Out at Close

3/8" gravel filter layer over Pro-SealECCO® Liner with drain tile grid for capture of grey water or other fluids, to be covered with protective soil layer.

Geo Filter Fabric to be covered with protective soil layer.

Pro-Seal FlexSystem II® impermeable liquid applied, monolithic, seamless, containment liner, applied directly to semi structurally stabilized site soil.

Cap/cover mine tailings at closing with **Pro-SealECCO**® semi-structural stabilization system and park out.



Pro-SealECCO® hydrophobic, semi-structurally stabilization system is in situ blended into site soil. The stabilized base performs as secondary containment once it is covered with Pro-Seal FlexSystem II® seamless, liquid applied, elastomeric, monolithic, liner material.

Greywater contaminant fluids collection systems. Fluids to be sent and/or pumped to treatment facility.

Pro-SealECCO Mine Tailings Basin Site Soil Semi-Structural Stabilization Secondary



Containment with Primary Containment Seamless Membrane System

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The tables (below) display the leach limits in ppm/ppb of materials after a thirty-day exposure to the pH 3.0 sulfuric acid leaching medium. Dr. J. Lee CO School of Mining, formerly U of A, modified the TCLP to more stringent leaching medium, more tumbling and longer exposure limits to reflect industrial site working conditions. These extreme modifications far exceed the 18 hour acetic acid pH 3.4 leaching exposure limits

parameters of the standard TCLP testing required by the EPA. The laboratory results are published here for review. Modified: All Soils specimens mixed with Pro-Seal additives, cured 30 days, tumbled 30 days, in 3.0 pH sulfuric acid, sampled, after initial 72 hours, every 24 hours and analyzed.

Results based on laboratory testing actual field result may vary.

Fe tailings and treated tailings tested for RCRA 8 metals content results **in parts per billion**.

Tailings Type	ICP-EOS Analysis Leach Results From Nanocrete, Nano technology polymerized Fe Tailings								
	In ppb	Ag	As	Ba	Cd	Cr	Hg	Pb	Se
Fe Raw Tailings		1.00	1.32	100.10	0.11	2.10	0.00	2.30	1.20
Fe w/ Nano meso inorganic polymerization		0.0140	0.0500	0.0330	0.0100	0.0068	0.0000	0.0150	0.0020
% Change		99%	96%	100%	91%	100%	N/A	99%	100%
Change +/-		+	+	+	+	+	N/A	+	+

Modified EPS TCLP Test: PFAS contaminated soil mixed with 24% additive, cured 30 days, tumbled, exposed in pH 3.0 sulfuric acid 30 days, samples drawn every 24 hours and analyzed, after initial 72 hour exposures.

Contaminant	PFOS	PFHxS	PFHxA	PFOxA
% of total PFAS by type in soil	74	15	3	2
Total PFAS ppb 3767	2738	555	111	74

Soil Type	Soil %	Additive %	Leached Results ppb			
Silty Sand	76	24	0.0110	0.0070	0.0001	0.0000
Sandy Clay	76	24	0.0107	0.0074	0.0001	0.0000
Fatty Clay	76	24	0.0105	0.0071	0.0001	0.0000

ICP-EOS Analysis Leach Results From Pro-SealECCO Stabilization Leachate Binding Technology.



Above, Tailings Soil mixed with Nano Novel Matrix additives to form Alternate Concrete. Cured material has high compressive strengths and other significant and applicable strength values.



Cover Pro-SealECCO leachate collection system, applied over Pro-SealECCO stabilization with protective soil layer.





ICP-EOS Analysis Leach Results From Pro-SealECCO Stabilization TCLP Leachate Binding testing

Leachate from Pro-SealECCO Tailing Soil	Description	ppm
Volatile Organic Compounds	V.O.C.	0.0000
Arsenic	AS	0.0005
Mercury	Hg	<.01
Zinc	Zn	0.0300
Copper	Cu	0.0300
Nickle	Ni	0.0300
Iron	Fe	0.0300
Manganese	Mn	0.0002
Chromium	Cr	0.0005
Vandium	V	0.0100
Calcium	Ca	0.3000
Potassium	K	45.3000
Aluminum	Al	0.0010
Magnesium	Mg	0.0002
Sodium	Na	0.3000
Argentum	Ag	0.1800
Aurum - Gold	Au	0.0100
Barium	Ba	<0.01
Beryllium	Be	<0.01
Bismuth	Bi	<0.01
Cadmium	Cd	<0.01
Cerium	Ce	<0.01
Cobalt	Co	<0.01
Dysprosium	Dy	<0.01
Erbium	Er	<0.01
Europium	Eu	<0.01
Gallium	Ga	<0.01
Gadolinium	Gd	<0.01

Leachate from Pro-SealECCO Tailing	Description	ppm
Hafnium	Hf	<0.01
Holmium	Ho	<0.01
Lanthanum	La	<0.01
Lutetium	Lu	<0.01
Molybdenum	Mo	<0.01
Niobium	Nb	<0.01
Neodymium	Nd	<0.01
Phosphorus	P	<0.05
Plumbum - Lead	Pb	<0.01
Praseodymium	Pr	<0.01
Rubidium	Rb	<0.01
Rhenium	Re	<0.01
Sulfate	S	0.03
Antimony	Sb	<0.01
Selenium	Se	<0.01
Samrium	Sm	<0.01
Stanum	Sn	<0.01
Strontium	Sr	1.1
Terbium	Tb	<0.01
Tellurium	Te	<0.01
Titanium	Ti	<0.01
Thallium	Tl	<0.01
Thulium	Tm	<0.01
Uranium	U	<0.01
Wolfram	W	<0.01
Ytterium	Y	<0.01
Ytterbium	Yb	<0.01
Zirconium	Zr	<0.01

Contacts:

Jim Griffin

Global Team Leader Business Development

Cell: 480 797 0123 Int'l +1
 Office TF US/CND: 800 349 7325
 International: +1 520 3497 325
 Email: jim.g@prosealproducts.com



Tim Lindor

Head of Technical

Cell: 206 434 1225 Int'l +1
 Office TF US/CND: 800 349 7325
 International: +1 520 3497 325
 Email: timl@prosealcorp.com

