Pro-Seal*ECCO* Landfill Basin Site Soil Semi-Structural Stabilization as Secondary Containment with Primary Containment Seamless Methane Barrier Membrane System City of LA RR# 26015 (CSI # 07130)

Environmentally Sound, Seamless,

Green Primary and Secondary Containment for Leachates and Methane in Landfills

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

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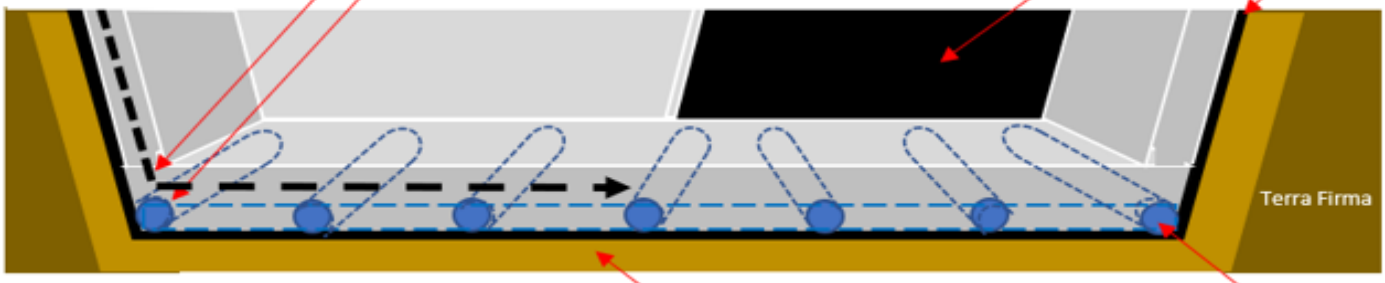
Basic Build Schematics: landfill basin and monolithic spray applied methane barrier.

Landfill 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-Seal*ECCO* 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.

Closing Landfill Storage Secondary and Primary Containment Construction

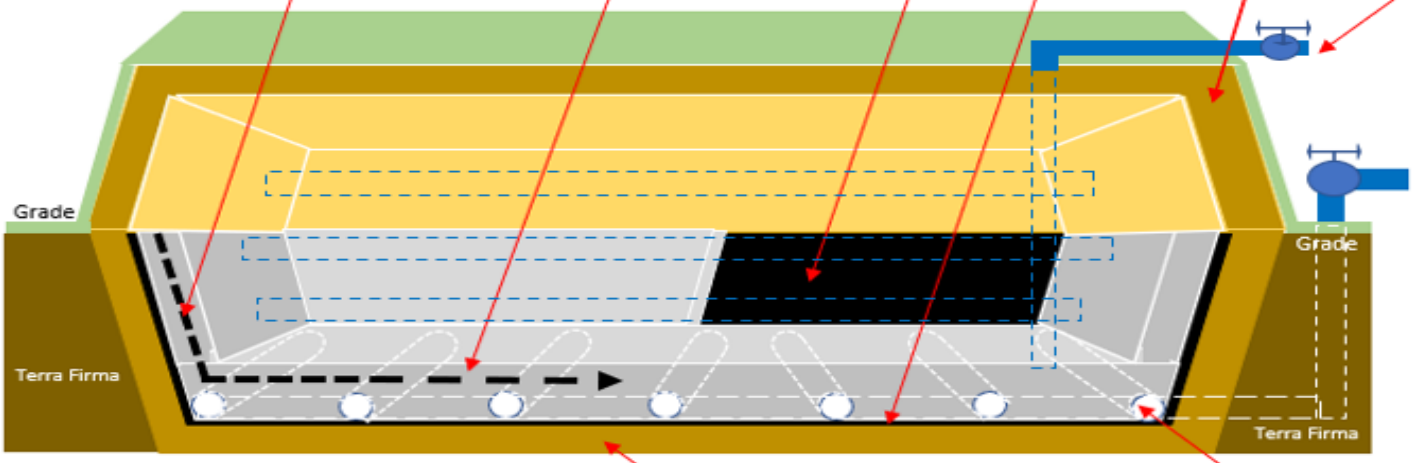
Geotextile filter fabric maybe placed over aggregate and coverd with protective soil layer as required.

3/8" gravel filter layer over Pro-Seal*ECCO* Liner with drain tile grid for capture of greywater or other fluids, to be covered with protective soil layer.

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

Cap/cover landfill with **Pro-Seal*ECCO*** semi-structural stabilization system and parked out.

Captured methane for clean energy.



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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 million.**

Tailings Type		ICP-EOS Analysis Leach Results From Nanocrete, Nano technology polymerized Fe Tailings							
	In ppm	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	<.10	<.50	<.10	<.10	0.50	0.00	<.10	<.10
% Change		90%	62%	100%	9%	76%	N/A	96%	92%
Change +/-		+	+	+	+	+	N/A	+	+

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	Additive All Specimens' 24% NanoCrete System	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-Seal*ECCO* Stabilization Leachate Binding Technology, all above tests.

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Rapid Basic Instillation Process

1. Excavate Site

2. Grade To Slope and Drain

3. Wet To Specified Moisture Content

3. Spread Pro-Seal*ECCO* NanoCrete

5. In Situ mix into soil with reclaimer or equivalent. Pro-Seal*ECCO* NanoCrete & Pro-Seal*ECCO* Bed-R.O.C. the Pro-SealECCO Secondary Containment barrier.

6. Re-grade To Slope and Drain as needed

7. Back Drag or Box Blade for Initial Compression

8. Drum Roll Flats and Slopes for Deep Compression

9. Pneumatic Roll for Surface Densifying Compression

10. Spread Pro-SealECCO TopR.O.C.

11. Spread Pro-SealECCO FlexSystem II Primary Containment Barrier

12. Cover and place recovery systems in and over cover soils and rock

Above, Landfill Basin Soil Semi-Structurally Stabilized with type I cement characteristics.

PRO-SEAL® ECCO Division of Pro-SealCorp

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