The below results were collected from a "bucket test" performed at a site contaminated with chromite ore processing residue (COPR) in New Jersey. Historically these sites have had the COPR excavated and transported, off-site, for disposal at a RCRA Part B permitted hazardous waste treatment facility. The excavation is then backfilled and compacted with clean fill materials.

Upon completion of these types of projects, any remaining chromium contaminated ground water still needs to be addressed. Traditionally, this has been accomplished by:

- Cut off / slurry walls
- Pump and treat systems
- Chemical injections
- Any combinations of the above

In addition to the *initial capital costs* required for the above mentioned alternatives, the associated and *on-going operational and maintenance costs* (e.g. labor, chemicals, and laboratory analysis) may last for 50-100years.

This study was conducted to address the problem of “contamination” by the infiltration of chromium-contaminated ground water into the newly backfilled and compacted areas.

Clean backfill is augmented with FerroBlack-H *prior* to permanent placement and compaction thereby creating a large reactive “barrier”. Since the augmented backfill contains a sufficient quantity of FerroBlack-H, it possesses the treatment and/or reductive capacity to manage the chromium-contaminated ground water that will infiltrates into the backfill area. Implementation of this methodology is effect over the long-term at a greatly reduced life-cycle cost when compared to traditional treatment regimens.

FerroBlack-H is the preferred reagent because of its proprietary blend of both soluble and insoluble sulfides with the ability to provide both immediate reduction of the Cr+6 and the long-term treatment capacity while remaining where it was initially placed. If reagents containing only soluble sulfides are used, over time they would migrate downstream with the groundwater and not have the residual, long-term treatment capacity as insoluble sulfide reagents.

To simulate this reactive barrier concept, FerroBlack-H was blended with clean fill material at a 2.5% dose rate, by weight, and placed into 5-gallon buckets. Chromium-contaminated ground water from the COPR site in New Jersey was then introduced.

After a 7-10 day residence time, the pore water was drained through valves installed at the base of the buckets and tested. Four (4) pore volumes of chromium-contaminated ground water from the site were introduced and removed and tested. Reported above are the analytical results of the four (4) pore volumes.

FerroBlack-H COPR Backfill Study

Raw COPR Ground Water

Constituent	Raw Water Before added to Buckets
Hex Cr (ug/l)	267,000
Total Cr (ug/l)	350,000
ORP	284
pH	10.4

Control - No Reagent

Constituent	Week - 1	Week- 2	Week-3	Week-4
Hex Cr (ug/l)	195,000	299,000	243,000	277,000
Total Cr (ug/l)	265,000	220,000	223,000	249,000
ORP	237	169	76	142
pH	10.2	10	10.9	9.71

FerroBlack-Hybird 2.5% Dose

Constituent	Week-1	Week-1	Week-3	Week-4
Hex Cr (ug/l)	<10	1.9	5.2	7.7
Total Cr (ug/l)	211	38.9	38.2	50.7
ORP	-23	75	11	-9
pH	11.8	11.2	11.7	12.2
% Removal Hex Cr	99.997%	99.999%	99.998%	99.997%
% Removal Total Cr	99.920%	99.982%	99.983%	99.980%