

Clean Dirt, No Doubt! (Eh?)...Canada's Nelson Environmental Remediation Treats its Business with Heat and Home Grown Values...

Clean Dirt, No Doubt! Indeed. With a distinctive Northern Canadian accent and a complimentary penchant for hard work, these words resound in the minds of brothers Darryl and Warren Nelson, President and Vice-President respectively, of their contaminated soil-cleaning business, Nelson Environmental Remediation Ltd. (NER). Clean Dirt, No Doubt! is, after all, the Company's tagline and guiding mission for this Edmonton, Canada-based environmental solutions business, one that has been using mobile, thermal desorption equipment for over 15 years (with great success, one might add but, you'd never hear those words out of the brothers' mouths). Today, NER owns and operates the largest fleet of Mobile, Thermal Soil Remediation (MTSR) equipment in North America and, sees nothing but growth in its future.

In 1991, Darryl and Warren Nelson changed the focus of their father's earthmoving business that served the Western Canadian oil and gas industry for 25 years prior, moving the operation from Vermillion, Alberta (in the Province's northeast area) to a location closer to Edmonton, Alberta. "Edmonton serves as our seat of Provincial government and is a manufacturing and transportation hub", says Darryl Nelson. "We were of the opinion that setting up shop in Spruce Grove, Alberta (just 25 minutes west of Canada's largest northern city) would be beneficial in serving the Western Canadian market we're so active in". Active, without doubt: after 15 full years of MTSR equipment operations, NER has completed over 50 projects both domestically and overseas, treating in excess of 1 million tonnes of toxic soil.

"Taking the family business in a new direction was certainly risky", muses an industry-wizened Darryl, "and we knew we were slowly being lost in the sea of oil and gas general contractors, particularly with the ups-and-downs of the business. Investing in a



Fig 1. Creating Clean Dirt, No Doubt! at a refinery soil remediation project, Honolulu, Hawaii

new environmental field service to augment our dirt moving and handling knowledge seemed to make good sense at the time". Then-new regulations born from the Alberta government, respecting the need for oil and gas companies to clean up thousands of sites around the Province, appeared to be a boon for the well-positioned NER: however, aggressively-priced fees for tipping at landfills in the Province was pushing higher-cost, on-site environmental remediation operators nearly out of business. "These were trying times", says Darryl, "but we persisted, believed in our product and learned some extremely valuable business lessons". Today's Western Canadian environmental services market still sees more contaminated material landfills opening than closing but, that's no longer a primary concern for NER. The Company's full-service know-how to excavate, clean and backfill contaminated soil has given them the edge in staying ahead of the "dig-and-dump" facilities and it also keeps the more environmentally conscious clientele at their doorstep.

On a day not so unlike many of late, John Tucker, Director of Technical Business Operations for NER, finds his phone literally ringing off the hook. A 14-year veteran of the Company and expert in operating thermal soil equipment, John finds his days at work now busier than ever. "We field global calls on a weekly basis", says John. "It's truly amazing how our message and reputation has reached both our North American market and the World. This, of course, has presented both operational and customer service challenges but, we pride ourselves in employing the best front-end and project personnel that we can find". John has been through the thick-and-thin with NER, a transplanted Province of Ontario youth looking for career advancement in the land of western opportunities. "When I first came to NER and the

Edmonton area, I was nervous about the future success available to the Company and my own role in achieving that". With several operational generations of the MTSR systems under his belt, there's little doubt John can feel pride in his efforts, expanding and improving the capabilities of a technology first offered in the United States, some 20 years ago.



Fig 2. Loading contaminated soil into MTSR system, Honolulu, Hawaii

The basic premise of MTSR is one that NER has enhanced year-after-year: contaminated soil is first excavated from the ground and prepared for insertion into the thermal units (a long-standing advantage that NER still maintains is their ability to homogenize dirt prior to treatment – an edge that was born from the many years of earthmoving through John Nelson's original business, inherited by his sons). Using shredder/screener machines and attachments to excavators (e.g., 'Allu'© buckets out of Finland), NER provides for the best-prepared soil possible before beginning thermal soil remediation. Contaminated soil is then fed into the Primary Kiln or, Desorption Vessel, where the feedstock is heated to target the boiling points of the contaminants-of-concern (a common mis-

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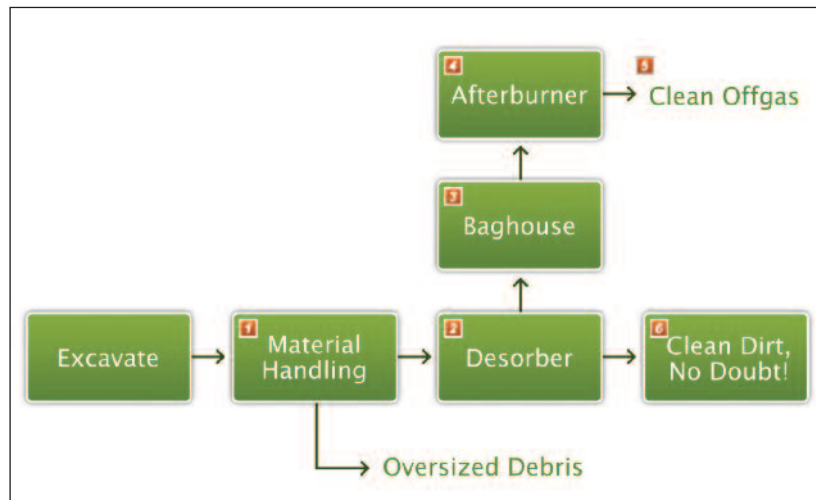


Fig 3. (a) & (b) Stages of the MTSR system (90,000 tonne soil remediation in Pincher Creek, Alberta, Canada)

conception in the industry is that the soil is being incinerated – in reality, the flame from burners in NER's systems, do NOT touch the actual soil, only heat the material as you might do with seed sterilization in your oven). The carefully-planned speed of rotation and angle of the kiln provides the perfect setting for contamination to be volatilized, as a gas stream from the soil, when urged by a heat source.

Next, with Clean Dirt already exiting the kiln and rehydration occurring, the contaminated gas stream is pushed through a filter baghouse, in an effort to collect "fines" and dust. This scrubbed, contaminated gas then enters the destruction stage of remediation, pushed further into a Secondary or, Oxidation Vessel (sometimes referred to as an, 'afterburner'). At this stage, intense heat and oxygen is applied to the gas, effectively breaking the molecular bonds of the contaminants and re-forming them into harmless CO₂ and water vapour along with lesser amounts of NO_x and SO_x. After 15 years of operating the equipment, NER has been proven time-and-time again to be an insubstantial contributor to GHG emissions and has procured successful air permits for operation in such districts as California and Hawaii.

Lastly, with a certainty of 99.99% removal efficiency and associated lab work to verify, NER can replace treated soil into the original excavation area right on site. This, "4-Nines" scenario is a boon for liability

associated with a particular soil job, allowing NER's clientele to de-list their contamination responsibility and take the cost associated of it, 'off the books'. To NER, this is the greatest reward: customers that know well-enough to treat their contamination, not relocate their liability to what amounts to a holding cell for future consideration. "We have all witnessed what took place over the last 25 years in the United States", says Darryl. "A Superfund program that produced thousands of contaminated sites with nobody but the taxpayer to foot the bill. Our approach to proponents in Canada is different, encouraging them to spend the money now, protecting the human health requirements in areas where these sites could become a problem. We are a similarly-priced (to landfill) option for them, so this is not a very difficult sell. To me, landfilling what could be clean and re-useable soil is a very tough pill to swallow; we do our best to educate our market on this less-than-responsible action".

To service the needs of both its local and international markets, NER has endeavoured to capture ancillary technologies, those complimentary to the Company's skills and current service offerings. Of late, the Men of Many Talents (AKA, NER's trusted and experienced field crews) have been retrofitting an older, one-trailer thermal setup, in an effort to produce the industry's first, "Ambient Desorption Unit" or, ADU. "I won't give away the emerging trade secrets of the system", says Wade

Sehlstrom, NER's General Manager, "but, we see a niche in environmental business where light end-contaminated soil needs not be given a great deal of energy to release the toxins. Previously a great bit of aeration of contamination, where fugitive emissions have been released to atmosphere, has taken place in this Province. We've figured out a closed system where these fugitives can be treated and captured, without having to employ the full thermal system". This is but one of the new, innovative systems of treatment NER has developed and where it is quickly finding customers across the West and, around the World.

The sun rises and casts its light on the East-facing wall of rock that is the Rocky Mountains of Western Canada. Through this light rises a small plume of steam, an indicator to locals of Pincher Creek, Alberta, that NER is at it again: cleaning up a massive hydrocarbon-contaminated site that has been a thorn in a local landowner's side, a sore on his property for 14 years. "At first, the local people and government were wary of our technology, the little column of smoke that rises and, the bump and whirl of the kiln as we fed dirt", says Darryl. "After a couple of months though, the community has come to see us as both a business partner and a company that is determined to clean dirty-dirt". As NER completes this 90,000 tonne job near the end of summer, 2009, there is no doubt of their success. Clean Dirt, No Doubt!, in fact.