Remediation: The Key to Land Reuse

The technology is ready and, with state and federal tax credits waiting, the economics look better than ever

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Air

By Isaac Ray, Ph.D.

Inhale.

Exhale.

Was that a breath of fresh air? This department discusses state and federal regulations as well as other environmental concerns that affect what is in the air.

Inhale.

Exhale.

department

New Jersey, one of the first states to be industrialized, finds itself plagued with the contaminated aftermath of pre-EPA industries: soil contamination. From superfund sites to the gas station whose underground storage tank has been oozing for the last 20 years, every industry has contributed its bit. More and more sites are now ineligible for new construction because of prior contamination.

Government is willing, almost eager, to help with remediation, but it has been difficult to establish the optimum technology to do the job.

At last, an appropriate and relatively cost-effective incineration/precipitation technology has been established for organic contamination. The best known pilot installation is presently completing the remediation of twenty-seven dioxin-contaminated sites in the state of Missouri, treating more than 41 tons per hour of contaminated soil.

Times Beach: A Classic Case

In the 1960s, a plant in eastern Missouri manufactured the herbicidal defoliant known as Agent Orange. Later, a firm making germicide leased portions of the same facility. Toxic dioxin, a byproduct of both processes, was stored in an on-site tank.

In 1969, a waste oil hauler was hired to remove the contents of the storage tank. He mixed the dioxin waste, which resembled used oil, with other oil he had collected — and later contracted to spray it on the streets of Times Beach and twenty-six other Missouri sites — for dust suppression.

What followed is a classic case of contamination, investigation and remediation. It took years to pinpoint all the areas of dioxin contamination that spread by one waste oil hauler. Eventually, Times Beach itself was abandoned and bought out by the government.

EPA began excavating contaminated soil at some of the sites and storing it in specially constructed buildings while an optimum remediation procedure was determined.

Selecting Thermal Incineration

Finally, EPA's Record of Decision selected thermal treatment because of its ability to destroy virtually all the dioxin.

The incinerator was designed, and a permit for construction and testing issued in 1994. The high-temperature incinerator would operate up to 5,000°F, heating the soil and destroying dioxin, furans and other organic contaminants. In its trial burn, the incinerator successfully destroyed more than 99.9999% of test chemicals. Particulate emission averaged 0.0060 gr/dscf. Soil feed rate averaged more than 41 tons per hour.

Controlling Air Pollution

When selecting a method of decontamination, it is always necessary to consider air pollution control downstream from the incinerator. Though thermal incineration was clearly capable of destroying virtually all organic contaminants in the treated soil, it might release harmful inorganics, such as mercury and heavy metals. The Missouri incinerator was, therefore, equipped with a prescrubber for large particle removal, followed by a 40,000 cfm wet vertical, tubular electrostatic precipitator removing submicron particles.

The emissions test successfully demonstrated that, equipped with the scrubber and precipitator, the incinerator could operate without adversely impacting human health or the environment. HCl emissions averaged only 0.014 lbs/hr; C_2 emissions averaged 0.00023 lbs/hr.

The Production Burn

In 1996, the incinerator began its production burn, processing about 100,000 cubic yards of contaminated material from all 27 sites.

After extended, non-stop operation, the incinerator was shut down for internal inspection. Its condition was excellent. The precipitator and scrubber had functioned well over months of operation; no precipitator voltage drop, signaling loss of function, had ever occurred, and performance was consistently above specification.

Thermal Remediation for New Jersey?

Including incinerator, air pollution and related control equipment, the Missouri thermal remediation system represented an investment of about $20 million. It was supplied and operated on a turn-key basis by a single contractor, with single-source responsibility.

This system is the first one of its kind. Its successful operation may well lead to emulation in other states where major contamination has occurred.

Is a system of this type (i.e., incinerators and associated air pollution abatement equipment) in the cards for New Jersey? At a remediation rate of 40-plus tons per hour, such a system could accomplish a great deal of soil remediation, accommodating contaminated soil trucked from many sites throughout the state. Ownership might be shared on a regional basis, and excess capacity, if any, might be sold.

In addition, with the assistance offered by the private sector and government, abandoned industrial sites (a.k.a. brownfields) are being recycled. The Voluntary Clean-up Program (VCP) is providing low interest loans and grants, consistent rules and regulations and protection from liability claims. The program spurs economic growth by, "fostering the reuse of deteriorated sites and, at the same time, ensuring protection of human health and the environment," explains Robert C. Shinn Jr., the New Jersey DEP Commissioner.

Combined with this straightforward state-of-the-art technology, we will be ready and able to safely remediate any contaminated sites. By recycling them and restoring them to their original clean condition, we can reclaim valuable construction space, which is already zoned for industrial or commercial use, throughout the state. ■

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Reprinted from New Jersey's Environment, March 1997 for Croll-Reynolds Co., Inc., Westfield, N.J.

CRAPC 97-4