



DRAGON PRODUCTS COMPANY, INC.

Cement Kiln Dust Fact Sheet

WHAT IS CKD?

Cement Kiln Dust is a by-product of the cement manufacturing process. The cement-making process begins with the raw feedstock including limestone, sand and iron ore. The rock is quarried, crushed, and blended to form the raw feed. The feed enters the sloping cement kiln where it is heated to temperatures that exceed 2500 degrees Fahrenheit. The heating process crystallizes the input materials into an interim product known as clinker. Granular material that is captured in the main kiln baghouse is known as cement kiln dust.

Cement Kiln Dust (CKD) is a gray fine-grained mixture of partially calcined and unreacted raw feedstock. It's a by-product of cement manufacturing.

REGULATORY HISTORY

Prior to 1970, CKD was released to the air. Dust collection equipment was incorporated in the plant rebuild that occurred in 1970. CKD removed from the dust filters was disposed of in the vicinity of a former schist quarry. An application for the renewal of the 1970 license for the CKD pile was submitted to DEP solid waste group in 1991.

The solid waste rules have evolved since Dragon's 1991 renewal application was submitted. We are actively working with the DEP to develop an appropriate regulatory framework for the pile. We have identified key issues to address. These include:

- Fugitive Dust Management
- Environmental Monitoring
- Run off Management

Fugitive Dust Control – CKD is a dry fine-grained material when it is captured in the air pollution control equipment (baghouse). To facilitate handling the material with minimal fugitive dust, Dragon processes the material with water in a pug mill prior to removing it from the system. The CKD is mixed such that it has a water content of 10 to 20%. The addition of water also agglomerates the dust particles such that they stick together.

Environmental Monitoring – Monitoring wells have been used to evaluate ground water quality around the pile since 1990. Shallow overburden, deep overburden and bedrock ground water samples are collected and analyzed for key parameters. In addition, we monitor several surface water locations weekly for pH and collect surface water samples twice a year for more detailed analysis.

Operation and Maintenance – We have initiated regrading work on the pile. The objective is to reduce the height of the pile as we remove material for beneficial reuse and to facilitate control of surface water run-off. Consistent with our agreement with the state, we must accomplish this without expanding the footprint of the pile.

MANAGEMENT OF CKD

Over the past decade, Dragon has not sat idle in addressing the CKD issue. Dragon's first priority was to reduce the generation of CKD. The Recovery Scrubber was expected to be a viable solution. This, unfortunately, was not the case. In 1996, Dragon installed a dust scoop system. This

AWARD WINNING SYSTEMS!

- ***Dust Scoops***
- ***Wastewater Recycling***

allows for the reintroduction of cement kiln dust back into the cement making process. The dust scoop system has been an extremely successful project and has reduced the amount of dust removed from the cement manufacturing process system by over 90% from pre dust scoop days. For this significant waste reduction achievement Dragon was awarded the Governor's Waste Reduction by the Maine Chamber and Governor King in 1998.

In collaboration with MEDEP, Dragon modified our management of septic wastewater and leachate from the CKD pile. These wastewaters were previously treated and discharged to a constructed wetland that eventually discharged to the St. George River Estuary. Dragon eliminated our treated wastewater discharges by reintroducing the water back into the process. For this creative solution, Dragon was presented the Award for Environmental Excellence in Pollution Prevention by Governor King and the Maine Department of Environmental Protection.

BENEFICIAL USE

Cement Kiln Dust is a valuable resource with many opportunities for reuse. Both Dragon and the portland cement industry are evaluating new ways to use the material.

CEMENT KILN DUST

Many uses in:

- *Agriculture*
- *Geotechnical applications*
- *Waste Management*

Traditional uses include using the material as an agricultural liming agent. In this use, CKD not only provides pH adjustment, but also provides potassium and other elements for plant growth.

Cement Kiln Dust has been applied to other uses in the state. CKD is used as a drying agent in the clean up of oily wastes and for the processing of oil contaminated soil. It has been used as a mineral binder in asphalt production. Its liming capabilities have been used in a patented process for pathogenic control in sewage treatment and for pH adjustment in the manufacturing of recycled soil products. One user used dry CKD as a cement-like binder in a spray cover system. This patented process used cement kiln dust, a fibrous material and a modified hydroseeder to apply a daily cover to a municipal solid waste landfill. One industry partner used CKD as a component of a flowable fill. Flowable fill is analogous to a low strength concrete that has an application as construction backfill. In this case, the resultant flowable fill is proposed to reconfigure wastewater lagoons.

Dragon is working with other industries and educational systems to evaluate new outlets for cement kiln dust. Dragon was a key member of a collaborative group that worked with the University of Maine to develop a web-based framework that collects information in a central database to facilitate beneficial use of industrial materials. Dragon also supported an award winning team from the University of New Hampshire that used CKD to develop a CO₂ sequestration strategy.

Dragon will continue to work with DEP to develop an appropriate regulatory framework and to develop new management systems for the CKD pile. We have achieved a significant goal of reducing the amount of CKD that is removed from the process. We are redirecting our energies towards new beneficial outlets and uses for CKD to put this valuable resource to use.