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Dragon's cement waste piles will take 'centuries' to recycle

DEP pushes for final closure

By Jordan Bailey | May 12, 2016



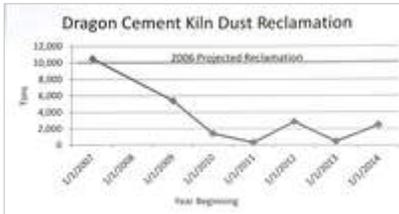
The waste kiln dust pile, partially covered in clay, soil and grass, fills an old quarry at the southeast corner of Dragon's property and is bordered by a wetland.

Photo by: Jordan Bailey



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THOMASTON — *For this story, we reviewed hundreds of documents at the Maine Department of Environmental Protection Bureau of Waste Management's file room in Augusta, 125 spill reports available online, as well as more documents supplied by Dragon and DEP. The two-month investigation was helped by a 2005 Freedom of Access request Portland attorney Peggy McGehee made while working for Neighbors of a Safe Dragon, former members of*



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which lent us the files. We also interviewed Dragon and DEP staff, neighbors of the plant, and geologists.

Many are concerned about the eventual closure of Dragon Product Co.'s cement plant, but perhaps none so much as the Department of Environmental Protection.

For 25 years, DEP has been trying to bend the reality of the plant's cement waste piles to legal standards. Dragon had been sitting on these unlicensed, uncovered waste piles — one since the 1940s, another since 1970 — until it was ordered to cap them in 2006 with areas left open for recycling the material.

DEP's assumption was that the piles would eventually disappear, but that now seems unlikely. The department has found that at the current rate, complete removal would take “on the order of several centuries,” according to a 2015 memo. In the meantime, water seeping from the piles is affecting ground and surface water. Systems in place to capture the contaminated water need upgrades and frequent maintenance and it is unclear who will do this

when the plant closes. For this reason, DEP wants the piles completely covered, but Dragon argues it can get its recycling rate back up.

The larger of the two piles spans 15 acres, extending 80 feet down into an abandoned quarry and rising 80 feet above ground level. It is made up solely of cement kiln dust, a fine powder that rises from the materials during kilning. Kiln dust is inert when dry, but corrosive when wet, and contains toxins including arsenic, cadmium, chromium, lead and dioxins.

Before the 1970 Clean Air Act, the dust poured from cement plants' smokestacks and settled wherever the wind took it. In 1970, Dragon installed dust collectors, fabric bags to catch the dust on its way up the stack — to the tune of 250 tons per day. This was stockpiled in an unlined quarry at the southwest corner of the property. In the late 1990s, Dragon added dust scoops, which recycle the caught dust back into the process, dramatically reducing the rate of stockpiling. Today it uses all dust generated and is no longer adding to the pile. But the pile remains: a 710,000-ton mound equivalent in height to a 14-story building from its depths to its peak.

The second pile, covering 12 acres, contains, among other things, waste “clinker,” the product of kilning which is ground down to make cement powder. Dragon has been reusing some of the clinker, but separating it from the

other wastes in the pile is proving difficult. As of 2014, this pile contained 650,000 tons of material.

Regulatory gray area

Dragon applied for landfill licenses for its two piles in 1991, but they didn't fit neatly into DEP rules. Maine had recently established new regulations for landfills, but only for those opened after 1973; the Dragon piles were older than that. Both piles met Maine's definition of "special wastes," but there were a lot of unknowns at that point, including the depth of the piles and their environmental impacts. DEP began discussions with Dragon in 1992 about the complex issues involved and the appropriate regulatory approach for the site.

Complicating these early efforts was the expectation that the Environmental Protection Agency would soon issue rules for the management of waste cement kiln dust. Eventually, after submitting a report on kiln dust to Congress 10 years after the deadline, EPA recommended banning new stockpiles of the material in areas below the natural water table, in wetlands — Dragon's pile meets both those characteristics, but was not a new pile — near recently active faults, and in areas with porous bedrock. An official at EPA's New England regional office said the agency has not been involved in the management of Dragon's waste piles; it is being handled solely by DEP.

In 1998, Ann Thayer, then environmental manager for Dragon, told DEP that the company hoped to recycle all the waste material in the piles for such uses as roadbed material and agricultural amendments, so the department considered licensing the piles as temporary storage facilities instead of landfills. Thayer also wrote in a letter that year that Dragon staff were working on a method for reusing the materials in the cement-making process.

But later in 1998, Carolyn Bergeron, then DEP's project manager for the site, wrote in an email that Dragon was "unable, or unwilling," to show it was recycling the waste at a rate that would "make the piles go away any time this century or early into the next."

Dragon's amended applications for solid waste storage facility licenses were left pending.

We spoke with Richard Heath, senior environmental hydrologist with DEP's Bureau of Solid Waste Management, who has been involved with the site since the late 1990s.

"When I first became involved," he said, "nothing had been done relative to controlling anything."

As a result, he said, water was flowing freely between the piles and surrounding surface water. Dragon did develop a closed-loop wastewater recycling system in which water from the piles was reused in the cement-making process, but this system was not capturing all the contaminated water.

Heath reviewed Dragon's past water-monitoring data, and analyzed its new testing results. In 2002 he wrote in a memo to DEP's next project manager for the site, Carla Hopkins, that he found that liquid leaching from the piles, which generally hovers around the alkalinity threshold for hazardous waste, was reaching some surrounding surface water and two water-filled quarries on site. In addition, two groundwater monitoring wells showed "elevated inorganic parameter levels."

Hopkins wrote to Heath in an email, "So are you saying that groundwater at the site is not contaminated?"

"No," Heath wrote. He went on to reiterate his point about the wells' parameter levels and said those wells had been deteriorating since 1998. He ended the message with "(i.e. they are contaminated.)"

DEP officials then surveyed surrounding neighborhoods to look for evidence of private wells, and concluded that all nearby homes were on public water and no wells were being affected.

Hopkins wrote in a 2004 memo, "Based on the water-quality monitoring information, it is clear that the Department could not issue Dragon any type of license at this time."

So, rather than licensing the piles as landfills or as storage facilities, she recommended using a tool called a "schedule of compliance" to regulate them.

In June 2005, Dragon signed DEP's schedule of compliance, which had been in the works since at least 1994. It required Dragon to develop a water-monitoring program and a system to capture water leaching from the piles, study the feasibility of reusing material from the piles in the cement-making process, and then submit a schedule for recycling all of the cement kiln dust. If recycling clinker was found not to be feasible, Dragon would be expected to close that pile.

Outside intervention

But at this point, residents were fed up with how long it was taking DEP to control the piles, which were constantly billowing dust all over the town. Neighbors of the plant had to wash the dust from their homes and cars frequently, and some were experiencing respiratory problems, possibly from breathing the dust, which has been described as 10 times finer than baking flour.

Concerned residents banded together to form Neighbors for a Safe Dragon, and petitioned the Board of Environmental Protection to get involved. In public hearings to the board, the Neighbors argued that DEP's schedule of compliance was not enough; the piles should be licensed as landfills and actually held to the standards of the license.

Leading the charge was attorney Patty McGehee of the Portland firm Perkins, Thompson, Hinckley and Keddy, who worked for free on behalf of the Neighbors.

“I don’t know why we had her, but she was brilliant,” said Debbie Atwell, former NSD member. “I just succumbed to the power of her strategy. She’d say ‘write a letter’ and we’d do it; ‘show up and say this’ and we’d do it. We all subordinated to her strategy.”

In early 2006, the BEP ordered Dragon to cap the piles, and went a step further than the schedule of compliance, requiring that Dragon install a specific collection system for water leaching from the piles and spelling out a required water monitoring program.

McGehee told The Courier-Gazette in 2007: “The BEP did something rare and remarkable in taking on this order. There have been some dramatic changes at Dragon since 2005. There has been more attention paid by Dragon, the DEP and the community about contaminants. What we now have is a well-engineered design to contain leachate [water that leaches from the piles] that Dragon must install.”

In addition to covering the piles with low permeability soil and grass — solving the dust problem — Dragon installed trenches around each pile and built a detention pond lined with impermeable plastic next to the clinker pile.

"Then they tied all of these systems together so they could control the leachate migration away from these piles," Heath said. The collection systems would pipe the water to tanks to be used in the cement-making process.

But even these collection systems were not enough.

Still affecting surface water

Dragon received a notice of violation in 2009 after the collection pond at the clinker pile overflowed. The notice stated that there had been multiple discharges to surface waters from the system and that it was "not adequate to manage the volume of leachate generated on site." A 2011 inspection memo noted that leachate had commingled with storm water at the kiln dust pile. Dragon Environmental Manager Michael Martunas said upgrades were made to the systems after these violations.

And in December 2014, a catastrophic pump failure resulted in the “substantial” release of leachate during a storm, according to an October 2015 DEP memo. The memo said that a stream to the west of the pile was contaminated to beyond the hazardous waste threshold on the day of the release, but when The Courier-Gazette requested the sampling test results from that incident, Dragon said that because the monitoring was voluntary, it did not maintain a written record of the results.

In fact, Dragon's stormwater permit requires surface water monitoring only four times per year. DEP wrote in its October 2015 memo that because those locations are sampled so infrequently, the results only show baseline conditions and not what occurs during storms.

“The release of leachate resulting from large precipitation events presents the greatest risk to surface water quality at this time,” the memo read. It also noted that the systems need “constant and continuous oversight.”

Dragon and the St. George

Regarding groundwater, Heath said some of the wells around the kiln dust pile show contamination from the piles and that it is likely that groundwater is discharging into the St. George River Estuary.

The potential for contamination reaching the St. George River worries town of St. George Harbormaster David Schmenka.

“Basically, my concerns are not knowing much about the product that’s going into the water,” he said. “I don’t know what they’re putting into the [St. George] river, if they’re putting anything into the river. If they are, we ought to know what it is. I have no dog in this fight, as it were, but my sympathies go to the guys that are clamming and worming for a living.”

But determining how groundwater flows through bedrock is difficult. The limestone Dragon is quarrying on site is marble, not the porous sedimentary type, so water flowing through it travels through fractures which are arranged in a disorderly way, said Sid Quarrier, a local geologist who worked for the Connecticut Geological Survey.

“The rocks in this area have had a complex and tortuous history,” he said. “In building the Appalachian Mountains, they were folded and broken up. Likely there are many layers and fractures that cannot be predicted in which the water moves.”

Heath said the fractures in that area generally align in a northeast to southwest direction, and that the water levels in wells he monitors suggest the groundwater is flowing to the southwest.

Sevee & Maher Engineers Inc., Dragon’s environmental consultant, has a slightly different interpretation. SME estimates 300,000 gallons of groundwater per year are moving away from the kiln dust pile to the northwest, west and south, according to DEP’s October 2015 memo.

Wherever it is flowing, Heath said the groundwater contamination is not a threat to human health. Of the metals found in the surface water coming from the piles, not many make it into the groundwater. Dragon tested groundwater for metals beginning in 2004. Heath said aluminum, antimony and zinc show up in low concentrations that do not pose any health risks, but chromium,

copper, nickel or lead were not present. Dragon was permitted to stop monitoring groundwater for metals that did not show up in the samples through 2006.

The most contaminated well at the site is on the west of the kiln dust pile about 160 feet below ground. Heath said the primary contaminant there is sulfate, which does not pose a health risk according to federal standards. However, he said the elevated sulfate gives the groundwater a high specific conductance, the measure of how well it can conduct an electric current, and for that reason DEP considers the groundwater at that well to be contaminated by the kiln dust.

Because salt water typically has sulfate concentrations higher than those found in the well, Heath said the groundwater is not negatively affecting the estuary.

A number of other naturally occurring substances were also detected in the well samples, but Heath said of those, only arsenic exceeded the federal standards, and this only slightly. However, other wells in the area consistently report higher arsenic levels than the affected well, he said, suggesting the arsenic is naturally occurring.

So, returning to Hopkins' question in 2002, "are the wells contaminated?" The answer seems to be yes, but only technically.

Regarding private wells in the area, John Fancy, superintendent of the Thomaston wastewater treatment plant, said, "Virtually everyone in Thomaston is on public water, but there are people out behind Dragon with wells on Thomaston Street."

We spoke to two residents on Thomaston Street who said their wells have been tested recently and no problems were found.

Possible solutions

DEP and Dragon will be meeting May 12 to discuss ways to control releases to surface waters, protect groundwater and lessen needed maintenance. Dragon's consultant, SME, has suggested options ranging from the ridiculous — sealing fractures in the bedrock with grout, to the Sisyphean — pumping out the contaminated wells, to more practical measures. DEP says not to consider grouting because the "practicality and effectiveness ... is doubtful given the random nature of fracture locations and orientations."

"Since 2006 [Dragon has] invested a lot in corrective actions out there," Heath said. "So we want to make sure from this point on they spend their money wisely in terms of the effectiveness of what we want for additional corrective actions."

When asked about how much the company has spent on compliance, Plant Manager Ray DeGrass said, "I don't even want to know the number," but added, "It is a part of doing business."

In the short term, DEP recommends adding alarms to the system around the kiln dust pile, increasing pumping capacity, eliminating the cause of clogging in a trench that currently must be cleaned several times per year, and creating a barrier wall to prevent clean groundwater from being pulled into the trenches.

The long-term option DEP is recommending most strongly is final closure of the piles. This would involve covering them with an impermeable geomembrane, then clay, soil and seed, and would reduce liquid leaching from the kiln dust pile alone by an estimated 5.1 million gallons per year. DEP argues that this is the best option because, considering that the piles will outlast Dragon's operations, it will require little to no maintenance long term.

However, closing the piles would prevent future removal and recycling of the materials, leaving the piles to remain where they are in perpetuity. This would not be ideal for the town of Thomaston. Its 2005 comprehensive plan reads:

"The ultimate closure of the plant and quarries, and the disposition of waste rock and kiln dust piles is a major land use concern for the town."

Reclamation

Martunas, the plant's environmental manager, argues against closing the piles and believes there is still hope for recycling the material.

"If we close the thing, then it is closed, it's sealed and we don't have the ability to remove it anymore," he said. "We'd like to continue to work to get rid of the material."

Martunas explained that when the 2006 board order was issued, Dragon had made assumptions about how much dust could be recycled. That document stated it would take 60 years to completely remove the kiln dust pile, and six years to recycle all the clinker in the other pile.

"In practice it's proven to be more difficult than we expected," Martunas said.

Dragon's reclamation rate for kiln dust, peaking at 10,000 tons in 2007, has dropped sharply since then. Martunas confirmed that at the current rate, eliminating the piles would take centuries.

Part of the problem is the production rate at the plant, which has been at about half its capacity for several years due to a slow construction market. Another is that adding the highly alkaline waste dust to the process means other ingredients need to be adjusted in the clinker mixing phase.

"We can put it in at a very defined rate," DeGrass said, "and that rate is very, very small."

In addition, the material is difficult to work with.

"It's sticky, wet and clay-like," Martunas explained. "It causes problems with conveyors and screens and hoppers. In the winter it can freeze. Those are the types of things we're trying to overcome."

Though reusing the material in the kiln is problematic, there are other ways it can be recycled, and developing new products and markets for the material could help the company profit from what has until now only been a compliance problem. However, Martunas said the company is no longer pursuing that option.

DEP documents from 2005 stated that Dragon was “diversifying the beneficial use outlets” for the dust. The company was reusing it as “a drying agent in processing oil contaminated soil, a mineral binder in asphalt production, a component of flowable fill, and as an agricultural liming agent.” In fact Dragon holds licenses for distribution of kiln dust for use as an agricultural amendment, compost ingredient, acidity adjustment for sewage, and as a soil blending material.

Of those uses, Martunas said it is now producing only the agricultural amendment, which it calls K-lime. A mere 210 tons of K-lime was sold last year, and Dragon was basically giving it away, charging only a \$2 per ton loading fee.

Instead, the company is focused on reintroducing the material back into the kiln.

"We're looking at fixing the operational issues so we can increase the reclamation rate. If we could get back on track with our original assumptions, then we could remove it in 50 to 60 years," Martunas said.

DeGrass projects the plant will continue to operate for another 50 years.

Martunas said the company as a whole has become more environmentally aware over the years.

"Culturally, there's an improvement," he said, "Generationally speaking, kids coming up today and my generation are more aware of the environment. As Ray [DeGrass] said, [compliance] is a part of doing business. We understand the environmental regulations, not just me and my department, but all the employees. When it comes to [environmental equipment] maintenance, employees know if we have a problem, so we'll immediately jump on it."

The question remains though, what will happen to the piles when employees are no longer there? Assuring the department that the dust can be recycled in a timeframe that will prevent it from becoming someone else's problem may only be possible if Dragon commits to developing other products with the material.

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