

May 22, 2007

Bartly Coiley
Manager Environmental Affairs
Usibelli Coal Mine, Inc.
100 Cushman St, Suite 210
Fairbanks, Alaska 99701

Re: Dust Control Issues and Recommendations
Seward Port Site

Dear Bartley,

Thank you for the opportunity to work with you. I enjoyed our visit to the facility and hope that my suggestions are of value.

Issues

The dust issues that we discussed and observed in order of concern were as follows:

1. Rail Dump Operation
2. Stacker Reclaimer
3. Feeder Conveyor Transfers at Rail Dump
4. Stockpile
5. Ship loader

Summary

The rail dump may be benefited by the use of a fog system. We will recommend a trial. The feeder conveyors, stacker reclaimer, and ship loader are best served by upgrading and automating the existing water spray and water cannon systems.

I will describe fog and water spray technology and their application in more detail in the next sections of this document and will provide a quotation for the systems under separate cover.

Fog Based Dust Control Technology

Fog based dust control systems are technically in-situ fine particulate scrubbers. They are dust collectors, not dust suppressors in that they deal with dust that is airborne. They do little to prevent dust from becoming airborne. They work on the principal of agglomeration of like-sized droplets and particles causing larger, heavier agglomerates that are more easily captured on wetted surfaces and/or that settle back to the flow of product and loosely bind to the larger chunks of product due to their damp nature. Fog systems do not add

The elements of design of fog based dust control systems are containment, fog generation, retention time, and collection surface.

- **Containment:** It is essential that the dust collection volume be isolated from ambient effects to the greatest degree possible to create a climate in which agglomeration of fog and dust can occur easily and collection can happen through settling and impact with surfaces. Containment at transfer points is effected through the use of adequately sized sideboards and head boxes with covers, curtains, tight chutes, properly designed liners, and skirting.
- **Fog Generation:** Fog is defined as 0-30 micron water droplets. Sonic type air assist nozzles are used to generate fog. The nozzles are placed in the enclosures so that dense fog is projected to the areas of dust generation (chutes, impact zone) and also fills the entire containment enclosure.

12007 NE 95th St, Vancouver, WA 98682, USA

☎(360) 892-1659 ☎(360) 892-1624 e-mail: ads@raringcorp.com Web: www.raringcorp.com

The Raring Corporation

The number of nozzles depends on the size of the conveyor, the amount of displaced air, and the amount of dust generated.

- **Retention Time:** The retention time that is required for good dust capture depends on a number of factors, most of which are not measurable. Our "rule of thumb" design for the size of enclosures at transfer points (including loading zones under screens and crushers) is five times the width of the belt in length downstream of the chute, one times the width in length upstream of the chute, and one times the width in height to a maximum of 36" above the top of material. When belt width is small, belt speeds are "high", fines percentage is "high", surface moisture is "low", and impact is "high", we increase those dimensions (retention time). We rarely decrease the requirement.
- **Collection Surface:** Collection surface is any surface exposed to the fog/dust environment. The containment walls are the primary collection surface but we also add curtains, baffles, and other surface inside the containment to help collect the airborne agglomerates. The use of baffles in the transfer point enclosures is a patented feature of our ADS™ dust control systems.

Fog based dust collection differs from bag house dust collection in that there is no dust extraction system. It is in-situ. For that reason, there is no stack where cleaned air is emitted into the atmosphere. The only "source" is the "fugitive source" that is the transfer point or the equipment building doors and vents themselves. There is generally a "visible emissions" limit for fugitive sources. Since the same fugitive emission rules apply regardless of the dust collection technology, fog has the advantage of eliminating the "point source" emissions.

Fog based dust control is much less expensive than dust extraction with any sort of collector. It is also easier and less expensive to maintain and consumes less energy.

Fog works in cold weather but the extremes seen in Fairbanks may limit the use of any outdoor systems in wintertime. Freeze protecting a moveable spray system will be a challenge. Regardless, dust control during 90% of the year is better than no dust control.

Water Spray Dust Suppression Technology

Water based dust suppression systems are effective at reducing the amount of dust that becomes airborne at dust generation points after the application of the suppressant material. They work on the principal of wetting the mass of flowing material so as to bind the finer fraction of the material to the larger fraction.

The elements of design of water based dust suppression systems are droplet size selection, mixing, and containment.

- **Droplet Size Selection:** When some airborne dust control is desirable or required, the dust suppression system will be operated at higher pressure to produce finer droplets of suppressant that have a chance to agglomerate with the larger fraction of airborne dust particles. When the most effective dust suppression is all that is required, lower pressure water with larger droplets will be used to minimize the impact of wind and other environmental factors.
- **Mixing:** Mixing suppressant with the flow of material is critical to the effectiveness of the suppression system. If mixing is incomplete some portions of the material will be dry and dusty and others will be overly wet and sticky. Both conditions create problems. Achieving good mixing is a matter of nozzle placement and operation. The more points of suppressant addition and the more surfaces that are addressed, the better the mixing will be.
- **Containment:** If the suppressant is being applied at a dust source and no means of dust collection is present, containment becomes the most important factor in reducing dusting at the location. Containment will also stop overspray and splashing which can create housekeeping and other sorts of problems.

Recommended Dust Control Plan

Rail Dump

Fog is the best solution for the rail dump station but it's application is difficult due to the access requirements of operating the car doors and the visibility needed by the operators. A more modern facility would use hot

The Raring Corporation

shoes and electrically actuated car doors. In that case, the application of fog and its containment would be simple and has been successfully done at several plants.

In this case, we will recommend the temporary installation of one 20' section of fog spray bars along each side of the tracks that are manually operated by the folks that are attending to the train unloading.

We will require 40 total nozzles spraying at a water flow rate of 4 GPM at 30 PSIG supply pressure and consuming 320 SCFM of compressed air at 80 PSIG supply pressure. The fog will only operate during the first few seconds of a car dump so a large air receiver will reduce the average air and water use to a very small number.

Off/on control of the system will be done manually by the operator using a conveniently located ball valve.

Water System Upgrade and Automation

To resolve most of the remaining dust control issues we recommend that the plant water spray system be upgraded and automated. Your current system includes:

- Spray bar at rail dumper on conveyor 1 just following the last feeder conveyor.
- Spray bar on stacker head
- Spray bar for reclaim on Stacker/Reclaimer conveyor
- Stockpile water cannon system
- Spray bar on yard conveyor just prior to sampling station

There is no current measurement of water flow, volume, or operating pressure so that there is no way to tell how much moisture is being added to the coal.

It is observed that the water spray system can be effective at controlling dust at least when the temperature is above some reasonable value and the wind is less than severe.

The upgrades that I recommend are as follows:

- To partially control emissions during unloading, install a water spray system at the entrance to the rail unloading building above the rail cars. This system will be used to wet the top layer of coal in the rail cars when the coal is very dry. One or two high volume nozzles will be used at a flow rate of ~50 gpm. A magnetic sensor will be used to automate the system so that the spray is only on when a car is under it. A timer will limit the time that the spray can be on for an individual car. The control will include pressure regulation and a water meter so that water addition to the cars can be regulated.
- Install spray bars on each of the vibrating feeders leaving the rail dump hoppers. Automate the spray systems with paddle switches to insure that coal is on the feeder and interlock with the operation of the feeder. Use very low pressure full jet nozzles with pressure regulation to minimize splashing and overspray to avoid ice problems when temperatures are below freezing. Include water meters in the control package so that water flow rate can be determined. Freeze protect the nozzles, nozzle connection piping, and control panels. These systems should be able to operate at temperatures down to about 20F.
- Replace the conveyor 1, stacker/reclaimer reclaim, and sample tower water spray systems with new systems as described above. Replace the stacker/reclaimer stacking spray system with a system similar to that described above but reuse the existing nozzles and operate at the highest possible pressure.
- Add a water meter to the stockpile water cannon system so that the total water added to the pile can be monitored. Use the water cannon system to wet the area of the stockpile that is to be reclaimed prior to reclaiming during windy or very dry conditions. This is not a cold weather action.

The operation and monitoring of operating parameters can be wirelessly given to the control room so that people are not required to open valves manually in the field.

I believe that the upgrade and automation of the water spray system is the most important element of the port dust control improvement plan.

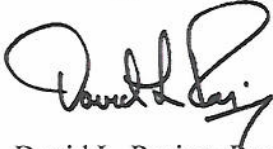
The Raring Corporation

Ship Loader

Dust control on the ship loader can only be improved through better moisture control prior to the sampler and improvements to belts, scrapers, seals, and operating procedures. I was not able to observe the operation and have no specific suggestions at this time.

Please see additional reports regarding the Aurora power plant in Fairbanks and the Healy mine site.

Sincerely,

A handwritten signature in black ink, appearing to read "David L. Raring". The signature is stylized with large, flowing loops and a prominent initial "D".

David L. Raring, President