Passive Enclosure Containment System (PECS)

The following is a description of the development of the Passive enclosure containment system and of the results acquired.

Customer Needs:

To transfer material through their material handling facility, safely, and effectively, minimizing down time and extending the life of their equipment, all at the lowest cost possible.

Prior technology:

Dust Containment

Advantages

- initial cost
- minimizes airborne dust
- minimizes spillage
- minimizes need of collection or suppression

Disadvantages

- does not deal with natural pressure created

Dust Collection

Advantages

- can minimize natural pressure created

Disadvantages

- maintenance costs
- does not help spillage
- retainment of collected dust
- initial cost

Dust Suppression

Advantages

- can decrease airborne dust
- can reduce dust on stack out facility

Disadvantages

- initial cost
- cost per ton treated
- moisture to product
- does not help eliminate spillage
- extended maintenance

Concept:

This concept is a derivative of our pressure relief system. DCI took a step backwards from just trying to relieve pressure to coming up with a way to deal with pressure at its creation point. This pressure is what we now call induced air. DCI did a study to find out what and where induced air was created. DCI found that induced air was created at the head pulley of a conveyor feeding the transfer chute. DCI also found that the determining factor of the induced air was the speed at which the coal would travel through the transfer chute. This study proved that if somehow DCI could not allow the coal to free fall through the transfer chute, but maintain the speed it was traveling on the feed conveyor, we could significantly reduce the amount of induced air. This explains the use of the "hood" and "spoon". Now DCI had to find a way to deal with the induced air present at the load point. Increasing the volume size of the entire chute enclosure did this. Next, a way of decreasing the energy of the air leaving the chute extension needed to be found. The same measure used on reservoir dams to decrease the energy in the water moving over the dam would be put in effect. By doing this DCI would also cause the dust particles in the induced air to agglomerate. This new concept combined with effective dust containment measures would allow us to transfer material without the need for dust collection and / or suppression.

Standards:

Hood:	This will typically be made out of Astralloy triple tuff. Several different types of wear material are available.
Spoon:	Same as hood.
Chute Enclosure:	This will typically be made of ¼" mild steel with a primer coat finish. Stainless Steel may be used as an option.
Stilling Curtains:	Typically these will be made of ¼" 70 Durometer sbr rubber with other rubber types available.
Flange Bolting:	This will typically be done with 5/8" x 2-1/2" grade five bolts, nuts, and washers.
Testing Results:	DCI established a testing protocol for before and after testing. This was done to satisfy the permitting requirements of the Department of Environmental Quality. These tests would be done before with the dust collector in service and after without the dust collector in service. These tests would reveal a five fold decrease in airborne dust.
Permitting Language:	The permit obtained by PRCC would read that this Technology would be covered under the BACT by lowe best available control technology.