



## **Norfolk Southern Pier 6 Terminal (NSP6)**

Coal is transported in railcars to the Pier 6 terminal by the *Norfolk Southern Corporation* railroad. The railcars are held until the vessel is ready to load, at which time they are directed to either or both dual-car rotary dumpers. Coal is dumped onto either of two conveyors designated as A and A1, then onto either of two main conveyors designated as B and B1, and to subsequent conveyors to the vessel or barge or a silo.

As coal travels to the vessel or barge, it can be sampled by the **B** and **B1 As-Shipped Mechanical Sampling Systems** or the **B** and **B1 Mechanical Part-stream Samplers**. All are located on the B and B1 main conveyors, respectively, which are both 2400 mm (96 in.).

All systems were manufactured by *Precision Samplers Inc.* (PSI). The As-Shipped Mechanical Sampling Systems were installed in 2011; the Mechanical Part-stream Samplers were installed in 2014. The designs and operating programs for all sampling systems are described below.

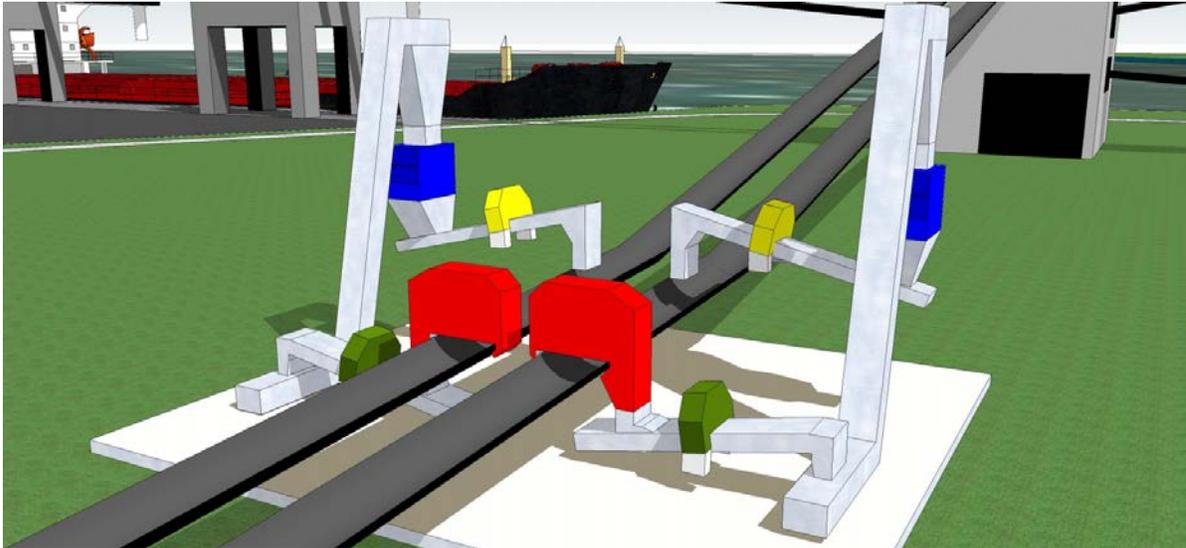
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## **B & B1 Mechanical Sampling Systems**



*(Measurements and weights provided herein are approximate and for general reference only.)*

The system's key components are listed below and operate to meet or exceed ASTM standards when accepting a product of 75 mm x 0 (3 in. x 0) or less. The operating programs for both systems remain constant to accommodate cargoes that are typically sampled in 5,000 or 10,000-ton Lots.



**Primary Sampler** - This cross-belt component (red) operates at a minimum 1.5 times the speed of the main conveyor (B or B1) (dark gray) as it collects a 90 kg (200 lb.) increment every 40 seconds. The cutter width is 225 mm (9 in.) in width. Each increment is gravity fed to the Primary Feeder Conveyor. A plugged-chute indicator and a vibrator are installed on the transfer chute of this component to facilitate material flow.

**Primary Feeder Conveyor** - This 600 mm (24 in.) wide, enclosed conveyor operates at 0.1 m/s (28 fpm) as it delivers sample material from the Primary Sampler passed the Size-Bulk Sampler to the Feeder Flex-Wall Conveyor. A plugged-chute indicator and vibrator are installed on the transfer chute to facilitate material flow.

**Size-Bulk Sampler** - This component is utilized for collecting an uncrushed sample - for a size analysis or other special testing - which is separate from the sample collected for the standard chemical analyses. This cross-belt component (green) operates at a minimum 1.5 times the Primary Feeder Conveyor speed as it extracts 5.0 kg (11 lb.) with each increment. It is bi-directional in operation by means of a dual-head cutter with each opening being 225 mm (9 in.) in width. Increments are gravity-fed into heavy-duty bags affixed to collection chutes.

**Feeder Flex-Wall Conveyor** - This "S"-configured conveyor, with 100 mm (4 in.) sidewalls and 88 mm (3.5 in.) cleats, delivers Primary Sampler increments up a 75-degree incline at 1.1 m/s (233 fpm) to the Crusher. Material is dislodged from the conveyor head by means of a mechanical beater rapper device.

**Hammer Mill Crusher** - The Jeffrey-Rader 34FTE crusher (blue) is comprised of a motor, a rotor with fixed hammers and a combined set of round-holed screens. The screens have 16 mm (5/8 in.) holes. A plugged-chute indicator and vibrator are installed at both the inlet and outlet chutes of this component to facilitate material flow. Sample material is crushed down to a top size of 4-mesh, then gravity-fed through a chute to the Secondary Feeder / Reject Conveyor.

**Secondary Feeder / Reject Conveyor** - This 450 mm (18 in.) wide, enclosed conveyor travels at 0.4 m/s (84 fpm) to move crushed material toward and passed the Secondary Sampler. Material not retained in the final save sample is deposited back to the main flow on the associated conveyor.

**Secondary Sampler** - This cross-belt component (yellow) travels at a minimum 1.5 times the speed of the Secondary Feeder / Reject Conveyor as it extracts 0.3 kg (0.6 lb.) increment every 30 seconds. The component is designed with a bi-directional cutter with each cutter opening having a width of 50 mm (2.0 in.). Increments are gravity-fed into heavy-duty bags affixed to collection chutes.

**Save Sample Ratio** – The sampling systems are designed to collect 5.8 kg (12.8 lb.) of final-save sample per each 1,000 gross tons of coal.

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## **B & B1 Mechanical Part-stream Samplers (MPS)**



The two Mechanical Part-stream Samplers (MPS) are primarily alternate mechanized sampling devices that can be placed into service in the event the corresponding B or B1 mechanical sampling system is inoperable. Having these back-up sampling devices available eliminates the need for personnel to manual sample off the conveyor, and therefore avoids the potential safety hazards associated with that sampling method. The MPS can also be used with the associated MSS to collect extra uncrushed sample material for a size analysis or other special test.

Each MPS' collection equipment is comprised of two scoops (bottom, right photo), which normally are designed to operate in conjunction with one another. However, if one of the scoops fails the other scoop can continue to operate. Sample increments are gravity-fed through two independent collection tubes, located on opposite sides of each MPS, down to heavy-duty bags located at ground level. The increments are a minimum weight of 3.0 kg (6.9 lbs.) each, depending on the type of material and flow rate of the main conveyor. The sampling frequency is adjustable per the type of sampling required.



## Additional Services

SAI offers additional services at the Norfolk Southern facility and the Hampton Roads region, directly or through our partnerships. Examples are: sampling system assessments and audits, truck auger sampling, temperature monitoring surveys, cargo inspections, and draft surveys.



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