

# Coal Dust Mitigation Update

Surface Transportation Board – RETAC  
September 10, 2009



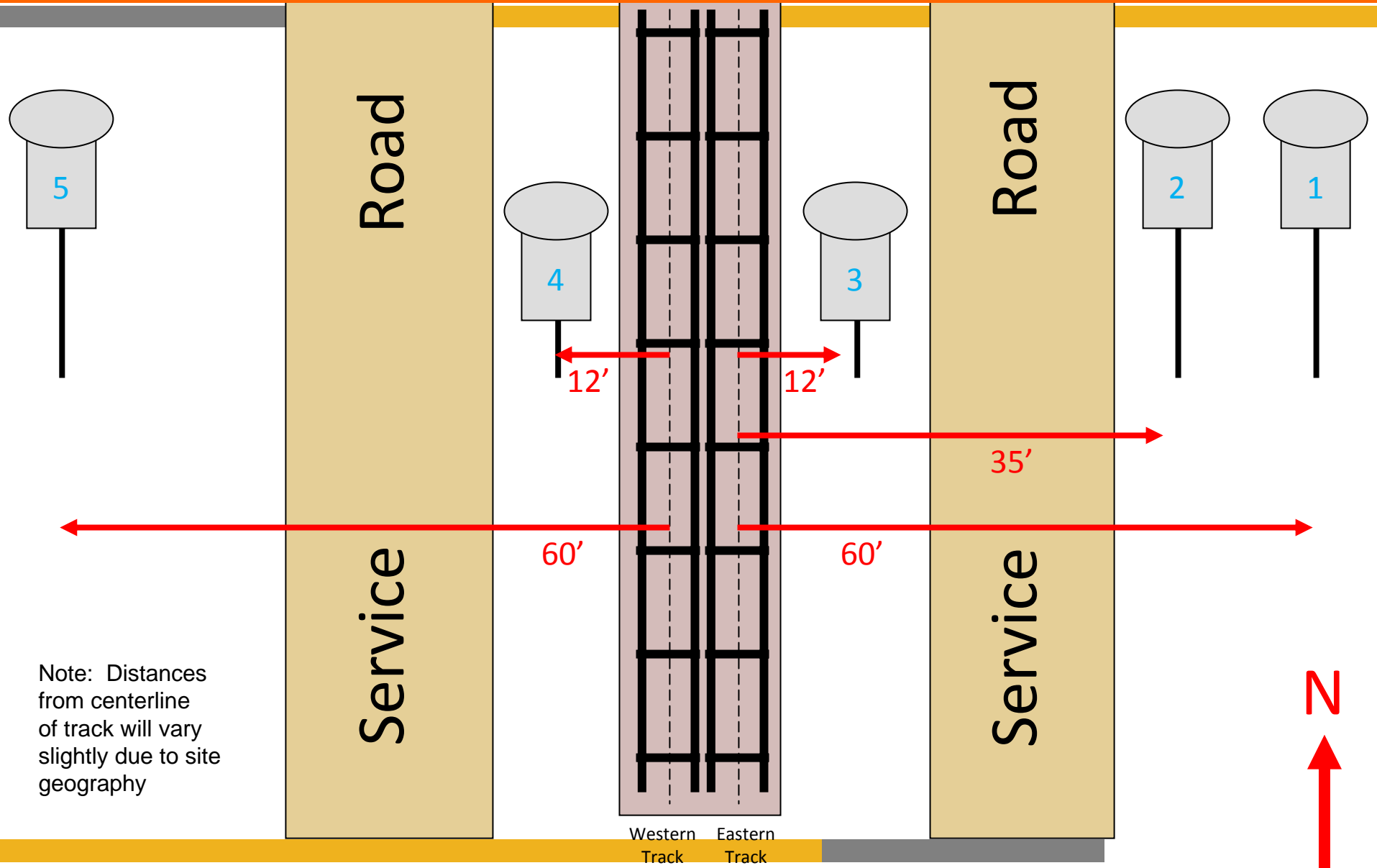
# Rain Impact on Ballast Contaminated with Coal Dust



# Undercutter Work – Normal Ballast is not Black



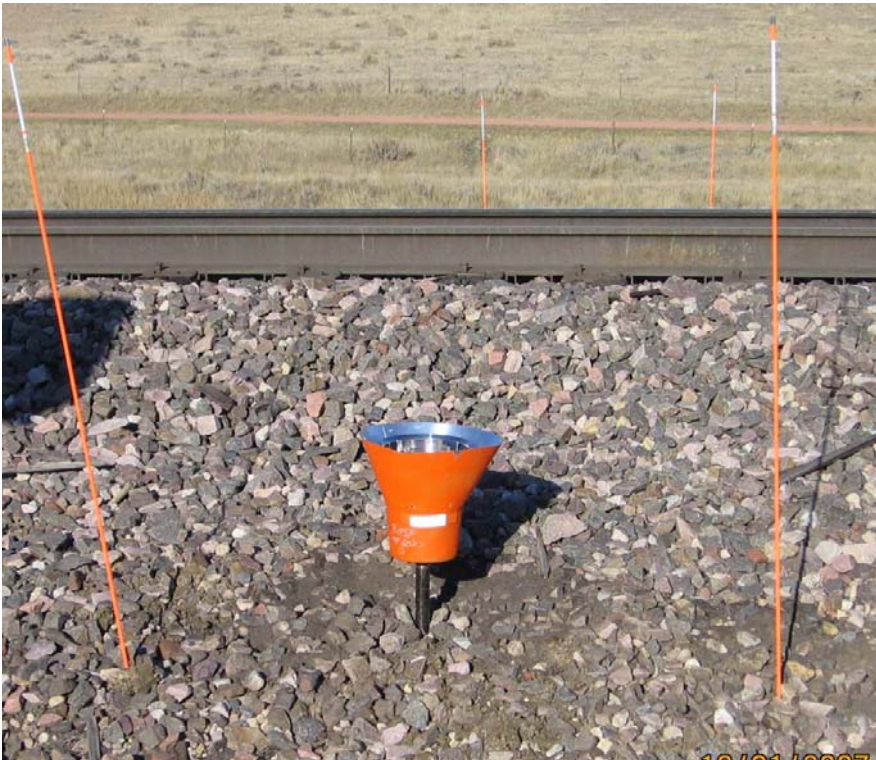
# Schematic of Typical BNSF/UP Dustfall Collector Orin Subdivision Site



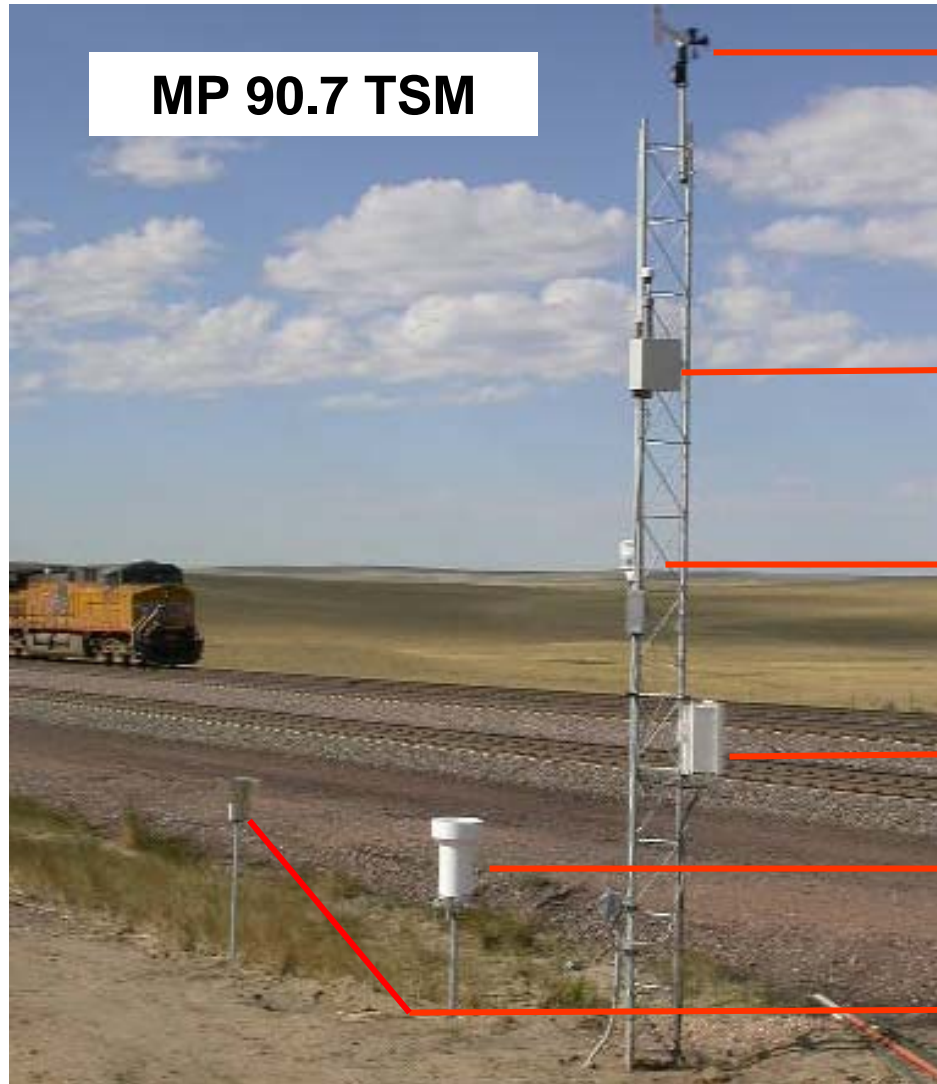
Note: Distances from centerline of track will vary slightly due to site geography

# Dustfall Collectors

- **Measure amount of dust deposited in the railroad right-of-way**



# Trackside Monitor (TSM)



**Propeller  
Anemometer**

**Dust Monitor**

**Temperature/  
Relative Humidity  
Sensor**

**Data Logger**

**Precipitation Gauge**

**Dustfall Collector**

# Trackside Monitors

- **Measures dust emission of each passing train**
- **Locations:**
  - **MP 90.7 on Orin Sub**
    - **Towers on East and West sides of tracks**
    - **Approximately 50% of trains useable**
  - **MP 558.2 on Black Hills Sub**
    - **Towers on North and South sides of tracks**
    - **Approximately 75% of trains useable**
  - **MP 693.4 on Big Horn Sub**
    - **Data collection only at this time**

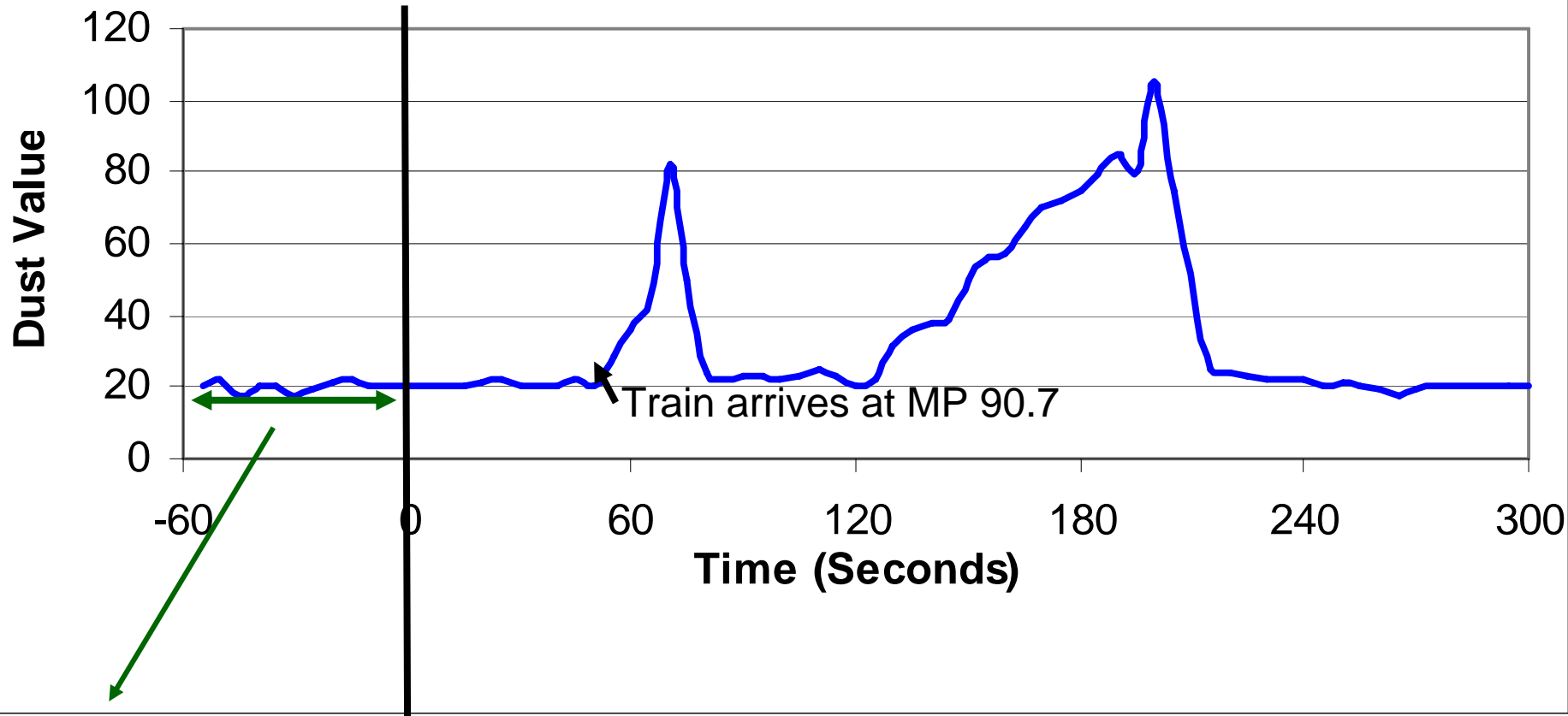
# Post-Processing of Train Data

- **Train Removal Criteria for Compliance Analysis**
  - **Additional train (loaded or empty) passing TSM site within 6 minutes**
  - **High/Erratic background dust**
  - **Bin data into proper wind components**
    - **e.g., East dust monitor uses data with westerly wind component**
    - **e.g., West dust monitor uses data with easterly wind component**



# Coal Dust Train Measurement

## Dust Values for Passing Train at TrackSide Monitor

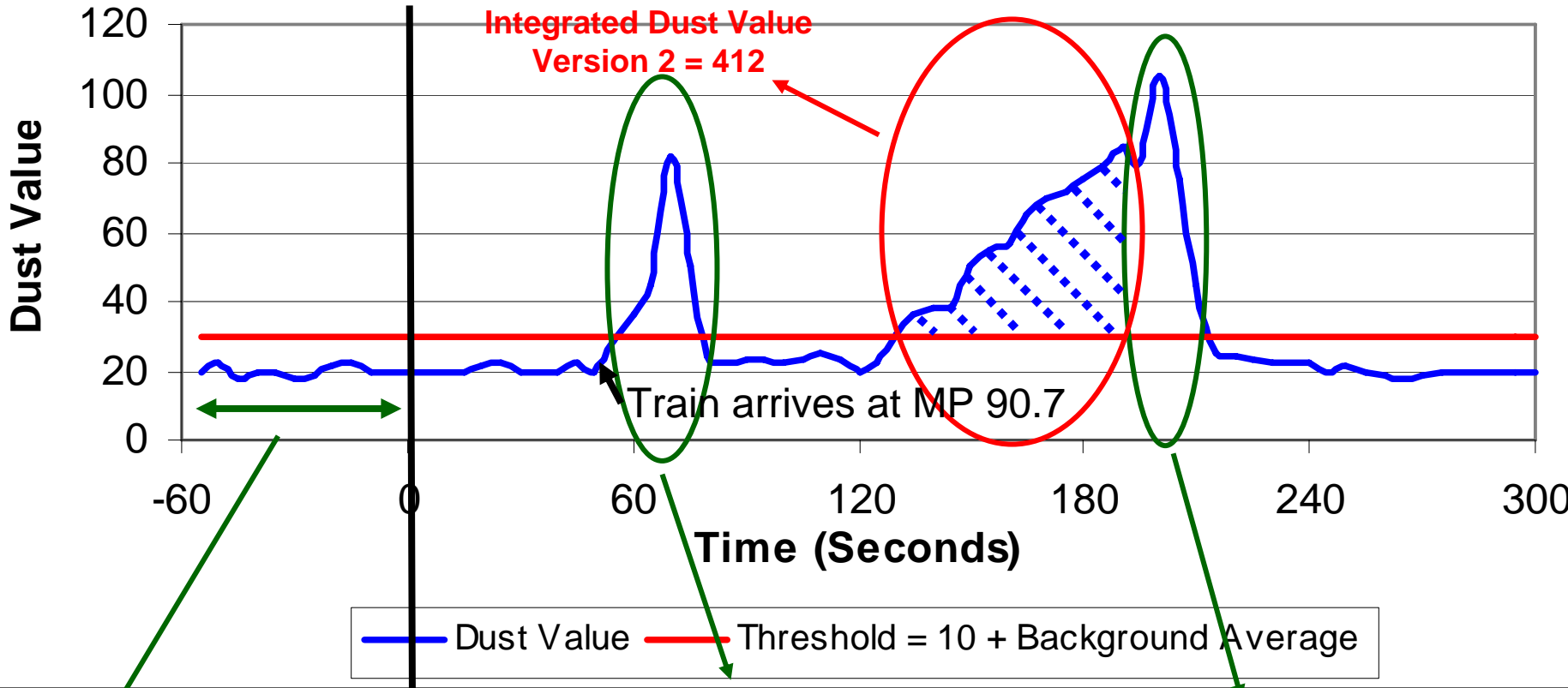


Environmental  
Background  
Dust

Train Passage at  
MP 90.5 According to  
BNSF Train Data

# Integrated Dust Value (IDV.2)

## Dust Values for Passing Train at TrackSide Monitor



Environmental Background Dust

Train Passage at MP 90.5 According to BNSF Train Data

Front Diesel: Ignore first 30 seconds of values once dust signal exceeds threshold

Rear Diesel: Ignore last 15 seconds of dust signal > threshold

# Improved Loading Profile



## Redesigned Chute

Flared to 7 ft. wide

Same height as normal chute

Promotes bread loaf shape

Limits height chute can be raised

## Normal Chute

5 ft. wide

Promotes center peaked load

Allows loading heights 3' to 4' above sill

# Impact of Modified Chutes



## BEFORE

**Note Peaked Loads, Sharp Lines, Steep Angle of Repose and other irregular surfaces which are susceptible to erosion**



## AFTER

**Note Rounded Contour, No Sharp Angles, Flatter Angle of Repose and few irregular surfaces which are susceptible to erosion**

# Field Profile Audits

- **Monthly unannounced audits**
- **Trains found not in compliance, provide mines**
  - **Written report**
  - **Photograph**
  - **Video of train**
- **Audited 225 trains year to date**

# RTEPS and Passive Collectors



**RTEPS typically applied on last car of train with Passive Collector to determine external forcings (Wind Speed/Direction, Precipitation, Ambient Temp/RH, Coal Surface Temp, and Airborne Dust)**

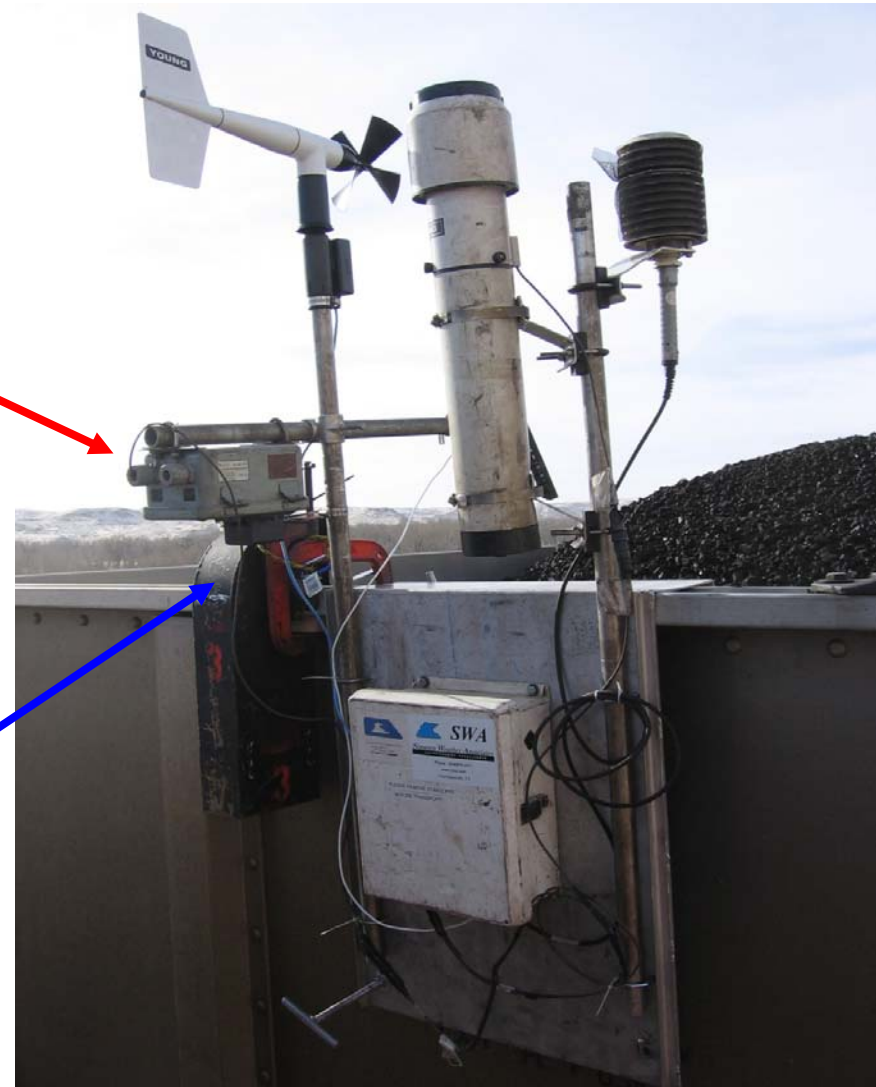
**Passive Collectors applied in sets of 5 – 10 to test effectiveness of dust suppression method compared to control technique**



# Instrumentation

- **Rail Transit Emission Profiling System (RTEPS)**

- Airborne Dust Monitor
- Precipitation Gauge
- Ambient Temperature/Relative Humidity Sensor
- Propeller Anemometer
- Infrared Sensor for Coal Surface Temperature
- Global Positioning System
- Passive Dust Collector (PC)



# Nacco Bridge – Undercut 2006



**Coal has filtered down to the top of the bridge deck**