BNSF Railway

Rail Capacity & Safety

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VP Network Strategy
BNSF Railway

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BNSF Overview

- A Berkshire Hathaway company
- 32,500 route miles with operations in 28 states and 3 Canadian provinces
- 47,000 employees
- Approximately 8,000 locomotives
- 13,000 bridges and 89 tunnels
- Moves over 1/4 of the U.S. rail freight each year
- Over 1,600 freight trains per day
- Serves over 40 ports
- Leads rail industry in technological innovation
- Unlike other forms of transportation, BNSF trains operate on an infrastructure financed almost entirely by BNSF
BNSF Freight Business Mix

2014 Total System Volume +1.8%
% change from 2013
Industrial Products

Food & Beverage
- Beer & Wine
- Canned Goods
- Perishables
- Vegetables

Building Products
- Paper, Pulp, Lumber
- Panel, Rail Equipment,
  Transformers,
- Generators, Roofing
- Materials, Waste

Construction Products
- Pipe, Sheet, Structural,
- Scrap, Taconite,
- Aluminum, Sand, Salt,
- Clays, Crushed Stone,
- Cement, Lime,
- Gypsum

Petroleum Products
- Crude Oil
- LPG
- Asphalt
- Alcohols & Solvents

Chemicals & Plastics
- Acids, Intermediates,
- Caustic Soda, PVC,
- Polypropylene,
- Polystyrene,
- Polyethylene
Capacity = Network Throughput (Trains per Day)

- Planning & Execution
  - Service Design
  - Communications

- Mobile Resources
  - Locomotives
  - People
  - Railcars

- Infrastructure
  - Rail
  - Terminals

Short term focus: velocity momentum
Long term: infrastructure expansion
BNSF’s Capital Commitments

- BNSF is committed to growth by ensuring future capability and reliability
- Goal is to build capacity above customer growth

$53.3 B in 16 years
Record Investment Continues in 2015

BNSF’s 2015 Capital Commitment $6B

- Core Network and Related Assets: $2.9 billion
- Loco, Freight Car, and Other Equip: $1.4 billion
- Expansion and Efficiency: $1.5 billion
- PTC: $200 million

Pies and pictures are showing the distribution of the investment:
- Core Network and Related Assets: 48%
- Loco, Freight Car, and Other Equip: 23%
- Expansion and Efficiency: 25%
- PTC: 4%
BNSF Northern Corridor Expansion

SEATTLE SUB:
2013: Longview bypass track
2015: 1 double-track project

BELLINGHAM SUB:
2013: 3 siding projects
2014: 55 new miles of double-track in service
2015: complete 3 double-track projects started in 2014

GLASGOW SUB:
2013: 3 siding projects
2014: 55 new miles of double-track in service
2015: complete 3 double-track projects started in 2014

DEVILS LAKE SUB:
2013: 3 siding projects
2014: 6 CTC islands
2015: CTC signaling

NOYES SUB:
2015: 2 new sidings
2014: 2 new sidings, 2 siding extensions
2015: CTC signaling and connection upgrade

HILLSBORO SUB:
2013: 1 siding project
2014: 2 new sidings, 2 siding extensions
2015: CTC signaling and connection upgrade

DICKINSON SUB:
2013: 1 siding project
2014: 1 new siding, 3 siding extensions
2015: one siding extension

MIDWAY SUB:
2015: 1 double-track project, Northtown connection to Canadian Pacific & track upgrades

STAPLES SUB:
2015: 1 CTC signaling project and 3 double-track projects

ST. PAUL SUB:
2015: 1 triple-track project

JAMESTOWN SUB:
2014: 1 new siding, CTC signaling
2015: completing CTC signaling project

ST. CROIX SUB:
2015: CTC signaling project with crossover plants

AURORA SUB:
2015: CTC signaling project with crossover plants

FALLBRIDGE SUB:
2014: 2 new sidings

LAKESIDE SUB:
2014: 17 new miles of double-track in service, 1 new siding

FORSYTH SUB:
2014: 2 new sidings, 4 siding extensions

JAMES TOWN SUB:
2015: 17 new miles of double-track in service, 1 new siding

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BNSF RAILWAY
Coalition’s Vision - “The Great Northern Corridor is a globally competitive multistate freight corridor consisting of a seamless road and rail network that promotes economic growth for neighboring communities and accommodates the demand for safe, efficient and environmentally sound transportation services.”

Coalition Members

- Montana DOT (Lead Agency)
- Washington DOT
- Oregon DOT
- Idaho DOT
- North Dakota DOT
- Minnesota DOT
- Wisconsin DOT
  - BNSF Railway

- Ports: Everett, Seattle, Grays Harbor, Tacoma, Longview, Vancouver USA, Portland, Quincy, Pasco, Northern Montana, Washington Public Ports Association
Great Northern Corridor

Multi-State Perspective

- Shared Corridor Vision
- Highlights the important role the Corridor and its stakeholders play
- Promotes regional cooperation, planning, and shared project implementation
- Supports trade prosperity and economic development
- Strengthens relationships between federal, state and local jurisdictions
Phase I - Findings & Conclusions

- Critical first step to identify and analyze the Corridor in a local, regional and national context
- Demonstrates the benefits the Corridor provides – nearly 25% of the GNC states’ economies are influenced by the Corridor
- Strategically positions the GNC Coalition to pursue critical actions, steps and initiatives
- Lays the foundation for productive near-term and long-term future for the Corridor
- Positions the Corridor for future funding opportunities
BNSF believes that every accident and injury is preventable

- BNSF’s safety vision is focused on preventing accidents in the first place
- BNSF partners with employees to create a culture that reinforces safety as the highest priority
- BNSF’s risk reduction program is designed to enable all commodities to be handled safely and arrive damage- and incident-free
ACHIEVED BEST-EVER SAFETY AND DERAILMENT PERFORMANCE IN 2014

**Employee Reportable Personal Injury Incidents per 200,000 Employee Hours**

- 2011: 1.30
- 2012: 1.11
- 2013: 1.08
- 2014: 0.99
- 2015 YTD: 0.81

**Public Crossing Accidents per Million Train Miles**

- 2011: 1.63
- 2012: 1.57
- 2013: 1.64
- 2014: 1.62
- 2015 YTD: 1.41

**Rail Equipment Reportable Derailment Incidents per Million Train Miles**

- 2011: 2.32
- 2012: 1.89
- 2013: 1.86
- 2014: 1.74
- 2015 YTD: [VALUE]

Source: BNSF internal data through April 30, 2015
By 2014, ethanol and crude oil traffic increased to almost 10 times the level in 2007

Source: BNSF internal data through Dec. 31, 2014
As crude oil and ethanol shipments have increased, the number of derailments have decreased by 78% *

Source: BNSF internal data through Dec. 31, 2014 *Decrease in crude and ethanol loaded cars from 2011-2014
BNSF Has a Broad-Based Risk Reduction Program

- Preventing rail equipment incidents
- Reducing the impact and consequences of an incident
- Strengthening emergency response capabilities
Layers of Safety Risk Reduction

- **Risk Identification**
  - Risk ID: Proactively determine and prioritize sources of risk
- **Incident & Injury Prevention**
  - Design-in Safety: Engineer out risk during equipment, facility and process design
  - Rules & Procedures: Set rules and procedures, culture of compliance and accountability
  - Safety Information: Align efforts and communicate key messages to all levels
- **Incident & Injury Response**
  - Approaching Others About Safety: Develop people to ID, address and respond to exposure
  - Emergency Planning & Response: Reduce severity and impact
  - Audits & Investigations: Reduce severity and impact

Sources of Risk → Incident
Leveraging Technology to Reduce Risk
Track Measurement and Analytics

**BNSF’s Track Measurement Fleet:**

- More than 150,000 miles tested per year
- Rail-Bound Geometry Cars
- Hi-Rail Geometry Vehicles
- Holland STAR Cars
- Ground-Penetrating Radar Vehicles
- Aurora Tie Inspection Vehicles
- EnSCO Joint Bar Inspection System
- Sasser Optical Inspection System
- Unmanned Geometry Test Car Pilot
**Prevention Technology**

- More than 2,000 trackside detectors
- Hot Box Detector (HBD)
- Wheel Load Impact Detector (WILD)
- Trackside Acoustical Detector (TADS)
- Sonic Cracked Wheel/Axle Detector (CWAD)
- Machine Vision Systems
- Magnetic Particle Inspection
- Warm Bearing Detection System (WBDS)
- Hot Wheel Detectors (HWD)
- Truck Performance Detectors (TPD)
Positive Train Control (PTC)

Challenges:
- System of systems reliability
- Interoperability
- Further technology integration
Data Analytics Help Proactively Identify Rail Equipment Issues

DETECTORS
- Thermal/Acoustics/Pressure/Vision
- Wheels/Axles/Bearings/Brakes/Trucks/Couplers

PREDICTIVE ANALYTICS
- Rules and Self Learning
- Composite Alarms

SAFETY & VELOCITY
- Prevent Derailments
Unmanned Aerial Systems (UAS)

**Supplemental track and structure inspection**
- Small multi-rotor aircraft
- Operations governed by FAA Section 333 Exemption
- Will enable service interruption support

**Track integrity flights for key train operation**
- Larger fixed wing aircraft
- Initially governed by FAA Research Agreement (CRDA)
Rail Technology