RAIL ENERGY TRANSPORTATION ADVISORY COMMITTEE

Best Practices White Paper
September 15, 2010

RETAC was formed to provide advice and guidance to the Board, and to serve as a forum for discussion of emerging issues regarding the transportation by rail of energy resources, particularly, but not necessarily limited to, coal, ethanol, and other biofuels. The purpose is to continue discussions regarding issues such as rail performance, capacity constraints, infrastructure planning and development, and effective coordination among suppliers, carriers, and users of energy resources.

The Best Practices Sub-Committee is one of three sub-committees formed by RETAC. The goal of the Best Practices Sub-Committee is to identify best practices in the energy supply chain that promote the efficient and reliable delivery of energy resources. The goal and scope of this subcommittee falls within the RETAC mission statement.
Best Practices Sub-committee members:

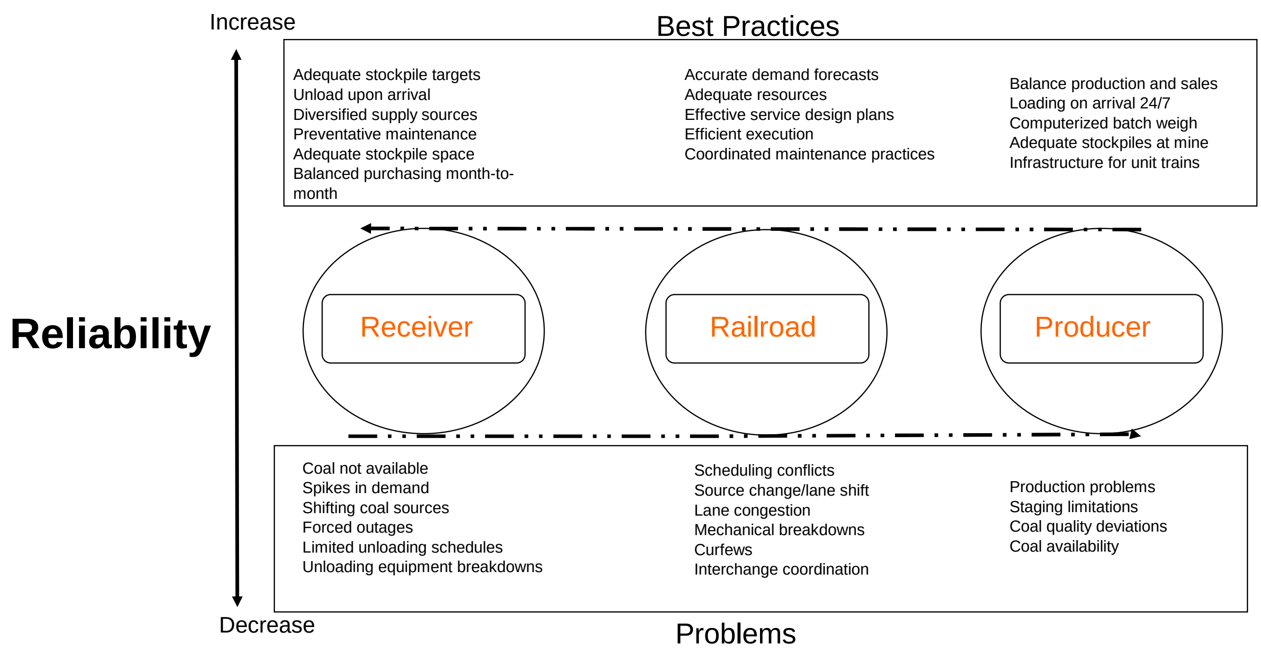
Susan Arigoni, Xcel Energy, Inc.
Kent Smith, Arch Coal
Henry Rupert, CSX Transportation Inc.
Joseph Osborne, Norfolk Southern Railway Company

The Best Practices Sub-Committee focused on determining how the entire energy supply chain could be improved by identifying and analyzing best practices among the participants. Discussions of best practices were limited to operations, general infrastructure, and communication among parties in the supply chain. There was a general recognition that commercial concerns and terms of contracts individually negotiated between two parties in the supply chain could affect the energy supply chain, but such conversations were restricted for legal reasons, and participants therefore did not discuss rates and commercial terms that might have an impact. The sub-committee found that the condition of the supply chain is sub-optimal because a common understanding of business practices between participants is not shared, and the benefits across the supply chain are not recognized.

The Best Practices Sub-Committee began its work by first agreeing that members would work in a consensus building mode. The objective was defined as focusing on best practices that optimize the entire supply chain rather than individual participants' results. It is, of course, understood that each individual participant in the supply chain must act primarily in its own economic interests and that all participants in the marketplace compete actively with other participants in the same markets.

The sub-committee first developed a common understanding of the scope of the energy supply chain and a common understanding of terminology. Then representatives articulated the current perspectives of producers, railroads, and receivers on those practices that are important to an efficient supply chain. A model that portrays the best practices and the sub-optimal practices of each participant in the supply chain that improve or diminish overall reliability was developed and utilized to communicate with other RETAC committee members.

Energy Supply Chain Model



Productivity improvement and alignment opportunities among the supply chain participants were identified and categorized as Physical Infrastructure, Communications & Tactical Execution, Strategic Practices and Operating Practices. With a focus on productivity improvement and alignment opportunities, the sub-committee identified the strengths, weaknesses, opportunities, and challenges of the current situation. See Attachment 1

The sub-committee progressed to identify the actions that could improve the efficiency and reliability of the rail energy supply chain. These actions were defined precisely and debated at length with the objective to identify truly best practices of the participants of the supply chain. The best practices were grouped by supply chain participant: receiver, railroad, producer, and then the best practices were attributed to one of the four categories defined by the sub-committee. Sixteen best practices were identified. Five are railroad best practices, five are producer and six are receiver best practices. The Best Practices Alignment Matrix represents the best practice of the participant, characterized as operational, infrastructure, communication and/or strategic practices. Best Practices can function in more than one category.

Best Practices Alignment Matrix

	Best Practice	***Operating Practices***	***Physical Infrastructure***	***Communication & Tactical Execution***	***Strategic Practices***
Receiver	**Adequate receiver stockpile targets**				■
Receiver	**Receiver unloads upon arrival**	■	■		
Receiver	**Diversified supply sources**	■	■		■
Receiver	**Preventive maintenance on coal handling equipment**	■	■		
Receiver	**Adequate space for stockpile**		■		
Receiver	**Balanced purchasing month-to-month**				■
Railroad	**Accurate demand forecasts**			■	■
Railroad	**Effective service design plans**	■	■	■	■
Railroad	**Adequate resources**	■	■	■	■
Railroad	**Efficient execution**	■		■	
Railroad	**Coordinated maintenance practices**	■	■	■	
Mine	**Mines load on arrival 24/7**	■	■		
Mine	**Adequate pile or uncovered coal at mine**	■	■		
Mine	**Mine computerized batch weigh**		■		
Mine	**Coal marketing balances production and sales**			■	■
Mine	**Infrastructure for unit trains**	■	■		

Consensus

Throughout the process of working on the subject of best practices in the energy supply chain, the subcommittee openly shared information, discussed member perspectives on issues and arrived at a common understanding of terminology. The sub-committee invited other RETAC members to review and comment on the work product, which provided an opportunity to explain our results to those who had not participated in the process and from which we gained valuable input. The sub-committee members represent all roles in the supply chain, and there is consensus that the practices identified are in fact best.

Consensus achieved on the following-

- Best practices that impact reliability can be identified for each of the participants within the energy supply chain
- Optimization occurs when individual participants work together to improve reliability of the overall supply chain
- Implementation of best practices should lead to lower direct or indirect costs for participants

- Identification of best practices is easier than practical application – this will take commitment from participants ushered through forums like RETAC and other industry-wide groups to the extent permissible by law.

Overall, reliability of energy products through the supply chain will improve with implementation of Best Practices, and direct costs for the supply chain should decrease. The sub-committee agrees that those best practices that may be easiest to implement are those categorized under Communication and Tactical Execution.

Best Practices benefits typically accrue to all parties of the supply chain; however individual participants may fund specific projects/practices. Sometimes, implementation of a participant's best practice may be at that party's expense with most of the benefit flowing to another supply chain participant. Costs and benefits are unaligned under that scenario and create a disincentive to the implementation of a best practice. Also, sub-optimization of the supply chain can occur when individual participants attempt to optimize their own cost/risk structure without regard for the impact on the overall supply chain. Thus, while it is one thing to identify best practices, when costs and benefits are considered, implementation can be problematic.

The decision by any party not to invest in Best Practices will manifest itself into sub-optimization of the supply chain. The magnitude of this impact will be dependent upon a number of factors, including the degree to which the different participants are not investing in the Best Practices. With sufficient scale, a likely output will be reduced transportation performance with subsequent increased costs and decreased efficiency for all components of the supply chain.

The railroad, producer and receiver perspectives on their respective best practices are summarized as follows:

Railroad Perspective

The five railroad best practices and implementation difficulties are:

Accurate Demand Forecasts

The ability of transportation providers to meet customer demand is significantly enhanced by frequent and robust demand forecasts that provide guidance on overall traffic levels and shifts between sourcing regions. Unplanned shifts in fuel sources may result in inefficient rail operations or stranded assets. Long term forecasts are important because of the lengthy lead times associated with railroad construction. Recent advances in order management systems have improved visibility, tactical management and load fulfillment. Forecasting is integral to railroad planning and relatively easy to implement.

Effective Service Design Plans

Service design is a planning activity that translates future customer demand into operating and resource plans. Service design is a key element of railroad planning and requires input and, sometimes, commitments from customers. The scope of the service design plan is related to the size and complexity of the opportunity.

Adequate Resources

Railroads do not adapt readily to rapid unplanned changes in volume. Long lead times are required for adding rail infrastructure, freight cars, locomotives and personnel. This puts railroads at risk by not being able to respond as quickly as the market dictates. Reserve capacity is expensive and must be paid for. Spikes in demand can create periods of resources shortages leading to service problems.

Efficient Execution

Railroads operate effectively when properly resourced within the designed capacity of the routes of movement. Efficiency is improved when sufficient resources exist to support planned business levels. Efficiency is impaired when business levels increase rapidly over the designed capacity, or during periods of high volatility. Recovery to normal operations after a disruption can take considerable time. Service quality can be impaired when demand spikes and resources are not readily available.

Coordinated Maintenance Practices

Railroads perform maintenance on their rail infrastructure on an ongoing basis. Normal maintenance is planned, but the extent and duration can impact service to individual customers or groups of customers. Railroads can minimize these disruptions by communicating planned maintenance activities to customers well in advance.

Producer Perspective

The five producer best practices and implementation difficulties are:

Mines load on arrival 24/7

For larger mining operations this can be accomplished fairly easily, however smaller operations can be constrained by manpower or budget issues.

Adequate pile or uncovered coal at mine

This is usually directly related to the region the mine is located. In the Powder River Basin adequate amounts of pit inventory are fairly simple to maintain. In other regions topography can severely limit the amount of inventory space available. Increasing the storage capacity can require major capital investments. The predictable, ratable deliveries of rail equipment can assist mining operations in maintaining adequate levels of inventory.

Mine computerized batch weigh

This is typically simple to implement however some operations may have difficulty obtaining an adequate return on the capital required to install a system. Topography can also have a major impact on the capital required.

Coal marketing balances production
From a planning perspective this is fairly easy to accomplish however, even mines with extensive exploratory drilling often encounter geological issues that can alter production ratability.

Infrastructure for unit trains
As in some of the other areas mentioned above, the size and topography of a mine will determine the degree of difficulty required to implement this.

Receiver Perspective
The six receiver best practices and implementation difficulties are:

Adequate stockpile targets
Stockpile targets can be modeled fairly easily to include input variables such as planned generation level, outage rates, rail cycle time.

Receiver unloads upon arrival
This can be difficult where unloading is impacted by permit limits and/or crew availability.

Diversified supply source
Having several qualified fuel supply sources provides options to route train sets to alternative mines. This may not be cost effective and is highly dependant on individual plant coal quality requirements. Newer plants are somewhat more capable of utilizing diversified supply sources.

Preventive maintenance
Budget constraints sometimes hamper coal handling equipment maintenance, making this of medium difficulty to implement.

Adequate stockpile space
Metro area facilities often are restricted in the space available for the coal pile. For those facilities, delivery interruptions are of greater concern. Medium – depends on plant location.

Balanced purchasing month-to-month
Balanced purchasing is easy to plan, sometimes difficult to implement due to power generation uncertainty and seasonal barging limitations.

It is the recommendation of the Best Practices sub-committee that the information contained in this report be discussed in as many forums as possible. Open discussion of these practices not only may help an individual part of the supply chain identify an area in which they can improve upon, but it can also help form an appreciation of the issues the other parties face. In addition to a more detailed discussion within RETAC itself, it is recommended that a standard presentation be developed for use at various industry trade functions.

Next Steps

All parties of the supply chain have strong reputations of continuously improving their processes. This means something labeled as a 'best practice' today may be obsolete in the future. Future RETAC Committee members may desire to review this report periodically and update it as necessary. Beyond this there are no additional steps recommended.

Attachment 1

Physical Infrastructure

	Helpful	Harmful
	Strengths:	**Weaknesses:**
Internal	Shared focus on reliability Sourcing flexibility afforded by rail network US coal reserves	Older inefficient operations Fixed Assets limit ability to quickly respond Topography limitations Coal reserve degradation
	Opportunities:	**Threats:**
External	Long term plans for generation/sourcing Define reserve capacity requirements Mechanism to ensure capacity investments Funding for reliable energy supply chain infrastructure Technology advancement for CCS	Regulatory constraints Uncertainty in the future demand for coal Uncertainty of the sourcing regions in the future

Communication & Tactical Execution

	Helpful	Harmful
	Strengths:	**Weaknesses:**
Internal	Railroad Web Based Communication Platform Resources dedicated to efficient supply chain execution Business relationships Strong industry trade groups	Reluctance to share operational problems Inappropriate reaction to operational information Untrained personnel Ineffective internal communications
	Opportunities:	**Threats:**
External	RETAC structure, processes & output Trade associations with common goals Long term plans for generation/sourcing	Attracting qualified people Ineffective communication with government entities Regulatory constraints

Strategic Practices

	Helpful	Harmful
	Strengths:	**Weaknesses:**
Internal	Long Standing Relationships Demand/Sourcing Consistency Well developed supply chain infrastructure	Orders don't match supply chain capability Not having sufficient buffer for supply volatility Rigid contract terms Over the Counter Trades (linkage to physical) Increasing need for source flexibility
	Opportunities:	**Threats:**
External	More transparent information about operations & supply chain	Commodity Price Volatility

Operating Practices

	Helpful	Harmful
	Strengths:	**Weaknesses:**
Internal	Focus on Safety Technical competence	Rigid labor rules Internally focused Lack of universal scheduled maintenance Weak coordination within the supply chain Lack of understanding of counterparty impact
	Opportunities:	**Threats:**
External	Improve operations planning & forecasting Improve consistency in loading Equipment standardazation	Declining labor force Equipment availability Economic cycles More restrictive environmental permitting requirements