BNSF's Thayer Blitz:
Meeting the Maintenance Challenge

By M.W. Franke
Vice President and Chief Engineer
Burlington Northern and Santa Fe Railway Co.

From June 15 to 27, 1998, Burlington Northern Santa Fe Railway Co. (BNSF) undertook one of the largest concentrated maintenance blitzes ever attempted by a railroad on a core, general merchandise route, We shut down a 250-mile stretch of our main line, the Thayer subdivision, between Memphis and Springfield, Mo. and, in 12 days, accomplished over $16 million in maintenance work.

In this presentation, I'll discuss the Thayer subdivision maintenance blitz in depth- I'll begin with an overview of the rationale, scope and planning process. Then I'll cover the operating plan and reroutes. Next the execution of the blitz from an engineering standpoint will be summarized and I'll end with a review of fatigue counter-measures, wrapping things up with lessons learned.

Rationale for the blitz

The Thayer subdivision rail line links Birmingham, Memphis and the rest of our Southeast corridor with the remainder of the BNSF rail system. The Thayer subdivision is about 250 miles long and runs through the heart of the Ozarks from Springfield in central Missouri to Memphis. The terrain is marked by rolling hills and many rivers and streams. It's a beautiful territory, but the nature of the terrain also takes a toll on our roadbed and our track. Consistent maintenance is absolutely necessary to ensure the safety and efficiency of this route.

On average, 26 trains traverse the Thayer subdivision each day, and that number continues to increase. Over 50 million gross ton miles move across the subdivision, including all commodity types. Approximately 1,500 BNSF employees live and work in this region; most are in train service.

Over the past several years, it had been increasingly difficult to get track windows on the Thayer subdivision for planned maintenance. Intentions were good, but the high volume of traffic took precedence. For instance, in 1997, our ballast cleaning programs on the Thayer sub fell short by 50 percent, our concrete tie programs fell short by 5,000 ties both in 1997 and 1996, and the rail grinder achieved an average of only four pass miles per day. Although our track on the Thayer line has been in adequate operating condition, we were getting to a point where very significant capital -- and substantial customer delays through extended track windows - would be necessary using conventional maintenance methods.

The blitz concept seemed like the best - and perhaps the only -- approach we could take that would allow us to achieve the maintenance we needed, while ensuring minimal disruption to our customers' shipments. We also recognized the tremendous safety and productivity benefits of working without interruption - not having to worry about constantly repositioning equipment and people to make room for through trains. Thayer was particularly conducive to a blitz concept because its track location and configuration lent itself to reroute opportunities on BNSF and connecting carriers.

Scope of the blitz

Of course, we knew we were attempting something that had never been tried before -- certainly not to this magnitude -and so we committed tremendous resources to a comprehensive planning process. The magnitude of work accomplished during the blitz was a full year's maintenance program on this line, and portions of the

bridge program represented what would have been two years worth of work using conventional means. The Thayer program included:

- 8 bridges renewed
- 41,000 concrete ties, 46,000 wood ties installed
- 32 miles of undercutting (including 20 miles behind the P811 concrete tie installation)
- 1,300 thermite welds
- 115 track miles of surfacing
- 115,000 lineal feet of rail relays
- 282 pass miles of rail grinding
- 177 grade crossings rebuilt

Achieving that level of productivity required tremendous planning. A team of 50 BNSF employees was assembled to plan the blitz with representatives from virtually all BNSF departments. Core leadership began planning in November -and the team met several times starting in late January to plot out every aspect of the blitz.

Not only did we identify work teams and project requirements, we had to orchestrate every detail, from positioning of 87,000 ties, 115,000 feet of rail and 1,100 carloads of ballast in advance to scheduling work trains during the blitz.

Over 800 BNSF MOW employees, supplemented by contractor personnel, were needed to complete the blitz. Some employees were already located on the Thayer line. Others were from system production gangs that work on major projects across BNSF. Still others were assigned to division work elsewhere, but were able to join in thanks to landmark agreements achieved with the assistance of Brotherhood of Maintenance of Way Employees (BMWE) General Chairman Richard Spears. Imagine, as well, the logistics of arranging food, lodging, and transportation for that size workforce months in advance. In all, BNSF spent over $1/2 million for food and lodging in Thayer line communities, including purchasing of 24,000 meals and 5,000 room nights. We also had two payroll/timekeeping employees on site to expedite processes of time claims.

Planning for the blitz

Safety planning was a huge part of our effort. The Safety Action Plan we developed included detailed work location maps for every work site along the mute, emergency response plans - especially for major bridge projects - and extensive listings of emergency numbers.

We also made safety training in advance a high priority. This included mandatory contractor safety training and drivers' training for Milepost Industries drivers, who handled distribution of meals. All BNSF managers and supervisors on the project were required to be CPR/first aid qualified.

Other safety planning included a focus on new hires, who represented about 5% of employees on the project. We provided them with additional training, set up a mentoring program, and identified new hires with a special hard hat marking.

Because the project was done under track warrant control, we created a computerized form that would allow us to monitor movement of people and equipment within each work zone's track warrant. It allowed our work zone managers and site foremen to work together to monitor the locations and movement of all workers and work equipment.

Another crucial aspect of our safety planning was a focus on fatigue countermeasures. The Thayer blitz was the first large-scale rail maintenance project to integrate fatigue and quality of life issues in the Safety Action Plan. Our efforts included a lodging facility review, where we worked with Corporate Lodging to contact each facility to review the darkness of the rooms, the location of rooms, screening of calls and staff training and awareness. We also looked at meals, and worked with Milepost Industries to review the timing and type of meals. For instance, night workers were fed two to three hours before getting off. We provided fatigue countermeasures training to all supervisors and encouraged a review of fatigue countermeasure techniques during job briefings. We also set up an alertness monitoring station at the Marked Tree, Arkansas bridge project, the only point in the project where we had shifts working around the clock.

Promoting community safety was also a key effort, which included extensive signage and flagging at the grade crossings which we rebuilt. Communities were informed well in advance of the timing of crossing closures by day and time, and we had mapped out alternate routes. This information was provided to every affected emergency service provider and was also posted on a special BNSF Thayer web site for access by the media and the general public.

BNSF also put tremendous effort into advance communication to all key constituencies customers on and off line, area communities, emergency personnel, and the media. For instance, well in advance we sent Customer Service Updates and sponsored a customer conference call to outline impacts on key customers on the line. Marketing representatives worked to contact each affected shipper personally with schedule and reroute plans.

In terms of community communication, in addition to the crossing closure information described above, Roadmaster Cotton Smith met with leaders in every community along the line to explain our plan and gather feedback - that involved 29 cities and agencies, in all.

Absolutely critical to our communication and safety efforts throughout the blitz was our zone manager plan. The Thayer line was divided into six zones - each with a zone manager headquarters. The zone manager was the "point person" for all work on the zone, coordinating work materials, meal, water and Gatorade® deliveries, available PPE, crossing closure questions, and track warrant information from the dispatcher. The Thayer zone headquarters was the command center for the entire project, It was manned 24 hours a day, equipped with 800 number for community and emergency services use. We held conference calls several times a day with all zone managers to track progress and coordinate other project details.

Our transportation and business unit people began the effort early to identify the impact of the blitz on every customer and shipment. Alternate routes were identified and, where necessary, temporary trackage rights and crew arrangements were made with connecting carriers.

These alternate routes involved BNSF track and six other railroads - Norfolk Southern, CSX, Union Pacific, Illinois Central, Kansas City Southern, and the Gateway Western. In all 248 trains were rerouted during the blitz. The reroutes went extremely well and connecting carriers met or exceeded commitments.

The use of alternate routes meant that our labor relations and transportation groups had to start early in negotiating contracts to allow us to temporarily relocate crews. For instance, we brought crews in from Enid and Tulsa, Okla., to Fort Worth and crews from the Pacific Northwest to Pine Bluff, Ark., and Longview, Texas, to run rerouted trains. A safety work train agreement allowed us to use the same crews consistently for work trains to ensure optimal safety, experience and consistency in work train operations. Training and qualifying of crews started in early March. Two additional dispatching territories were added to help with reroutes, and dispatchers received extra training on suspension of centralized traffic control (CTC). Extra crew management support was added in Topeka, Kansas.

When it comes to the actual execution of the blitz, I have to say things went smoothly thanks to the tremendous amount of advance planning. We kicked the blitz off with a day-long safety meeting. It was a tremendous site to see approximately 1,200 BNSF employees and contractors pour into the West Plains Civic Center in West Plains, Mo., on June 15 for an entire day set aside for job safety briefings, a review of the Safety Action Plan, discussion of emergency response and work team break out sessions.

Perhaps the biggest challenge our employees faced during the blitz had nothing to do with the railroad or planning - it was the temperatures near 100^0 F and the high humidity. During the blitz over 30,000 gallons of liquid were consumed - or about four gallons per day per person. It was a tribute to the quality of the job safety briefings and the involvement of medical department, personnel that our employees did not experience a single heat-related reportable injury during the blitz.

Execution of the blitz

Let me recap a few of the highlights in terms of execution of the blitz. Our P811 concrete tie installation was the project on the critical path. Due to the heat and the weather conditions, we slowed the pace down slightly, but the P811 still essentially achieved our productivity goals. Our conventional tie and steel gangs were also a good success story of the blitz. We had two tie gangs and four rail gangs completing 100 percent of the program on schedule.

Another success was the joint elimination plan. Overall we made over 1,300 welds with 27 crews. Given the warm temperature at the time, we adjusted the rail more often than anticipated to guard against future track buckles, resulting in about 100 welds over plan. The number and efficiency of our welding program was truly phenomenal.

The rail grinder achieved a remarkable 292 pass miles during the blitz. It achieved a rate of nearly 50 pass miles per day vs. the average of four pass miles per day the previous year using conventional maintenance methods.

Eight bridges were rebuilt or rehabilitated on the project. The largest bridge and the only job on the blitz where we worked 24 hours a day was the Marked Tree bridge over the St. Francis River in northern Arkansas. We entirely rebuilt two-thirds of this bridge. In preparation for the night work, we set several 75-foot light poles along the length of the bridge. We also began fogging the area a month in advance to cut down the insect problem, and we provided a mosquito tent so employees could take breaks and meals away from the insects.

Telecommunications also did an excellent job supporting the project. They programmed approximately 950 non-portable radios for on-and off-track equipment and programmed hundreds of portable radios. They also provided all phone, fax, data and radio connections for the Thayer command center and six zone centers.

On the railroad, you're not done until the "lights are on." Our signal crews checked circuits as the work progressed. We opened for traffic on June 27 ahead of schedule with no slow orders on new track work and a signal system that continues to function without exception.

Benefits and lessons learned

What did we learn? The blitz approach works. In terms of the quality and consistency of the job safety briefings and safety processes, the blitz approach helped to raise the standards to a consistently higher level. The quality of the work accomplished has also been exceptional. The track has held up extremely well under record breaking heat this summer.

We had many successes - and a few things we'd do differently. For instance, we would have done more to account for heat and schedule "down time." But on the whole we were very pleased with the outcome.

One benefit was that it was a good opportunity to build strong community relations. We received very positive press coverage locally, in addition to receiving some high visibility national coverage, including cover stories in Railway Age and Railway Track and Structures.

But even more significantly, we found that the blitz approach was successful in helping us achieve progress in a number of areas:

- Safety - We established even more rigorous processes in the consistency of job safety briefings, use of personal protective equipment and maintaining other high standards for safety practices.
- Productivity - The blitz approach allowed us to achieve strong momentum and focus that brought very high productivity.
- Quality - The quality of the engineering work achieved was among the best we've ever seen, and the track has held up extremely well.
- Customer Responsiveness - Our customers were extremely appreciative of the advance communication they received and the careful thought that went into handling rerouted traffic.
- Community Issues - The work at crossings and the influx of hundreds of additional employees was accomplished in a way that brought minimal disruptions to the community - and in fact brought tremendous economic benefit.

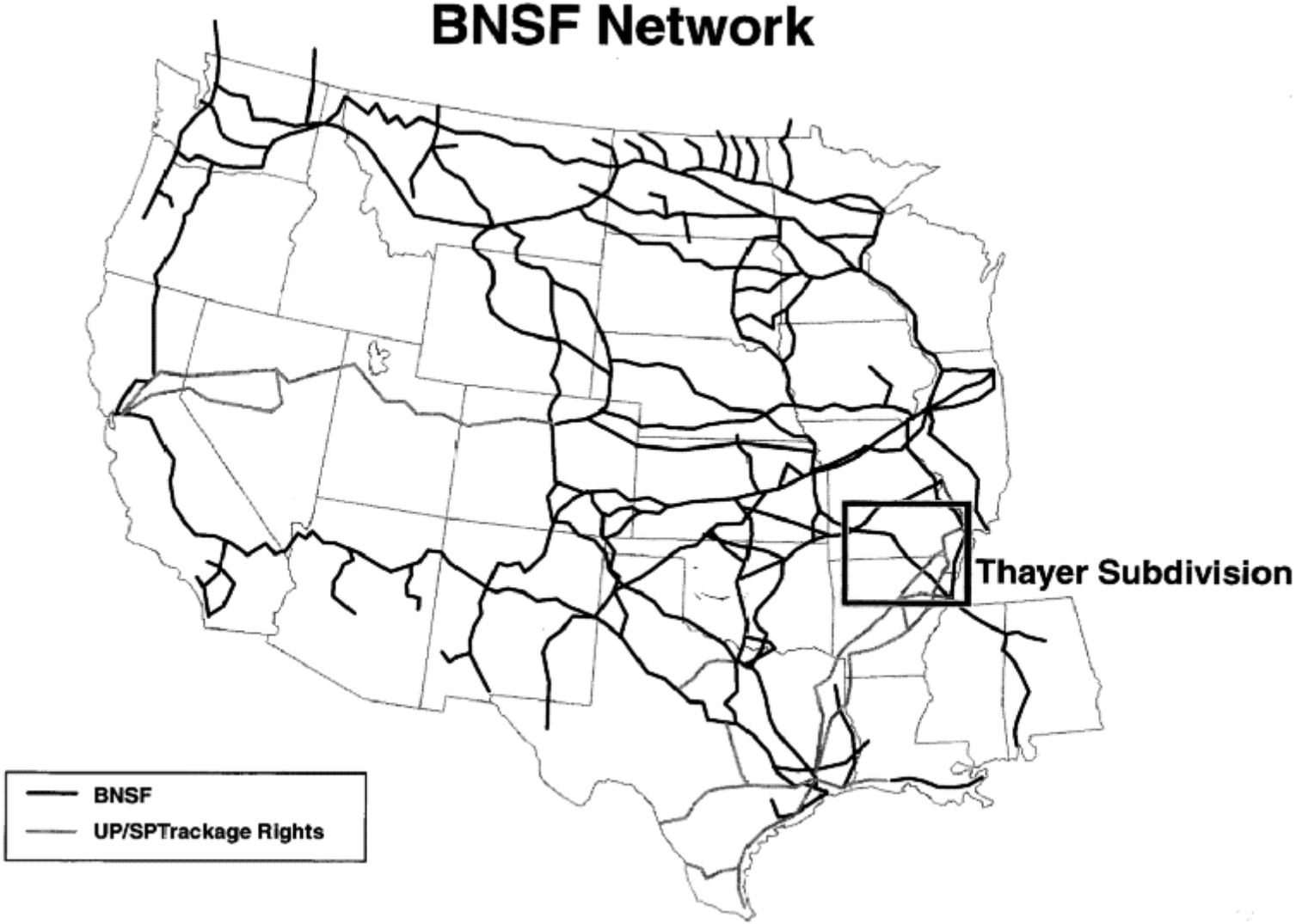
We also achieved some savings in engineering costs, although that was not the primary objective, Finally,
I would like to acknowledge the "out of the box" thinking in planning this project, and the contributions of many people in numerous departments who had a role in making this project a success.

The groundwork they laid assured the success not only of the Thayer subdivision maintenance blitz, but has established a foundation for future blitzes.

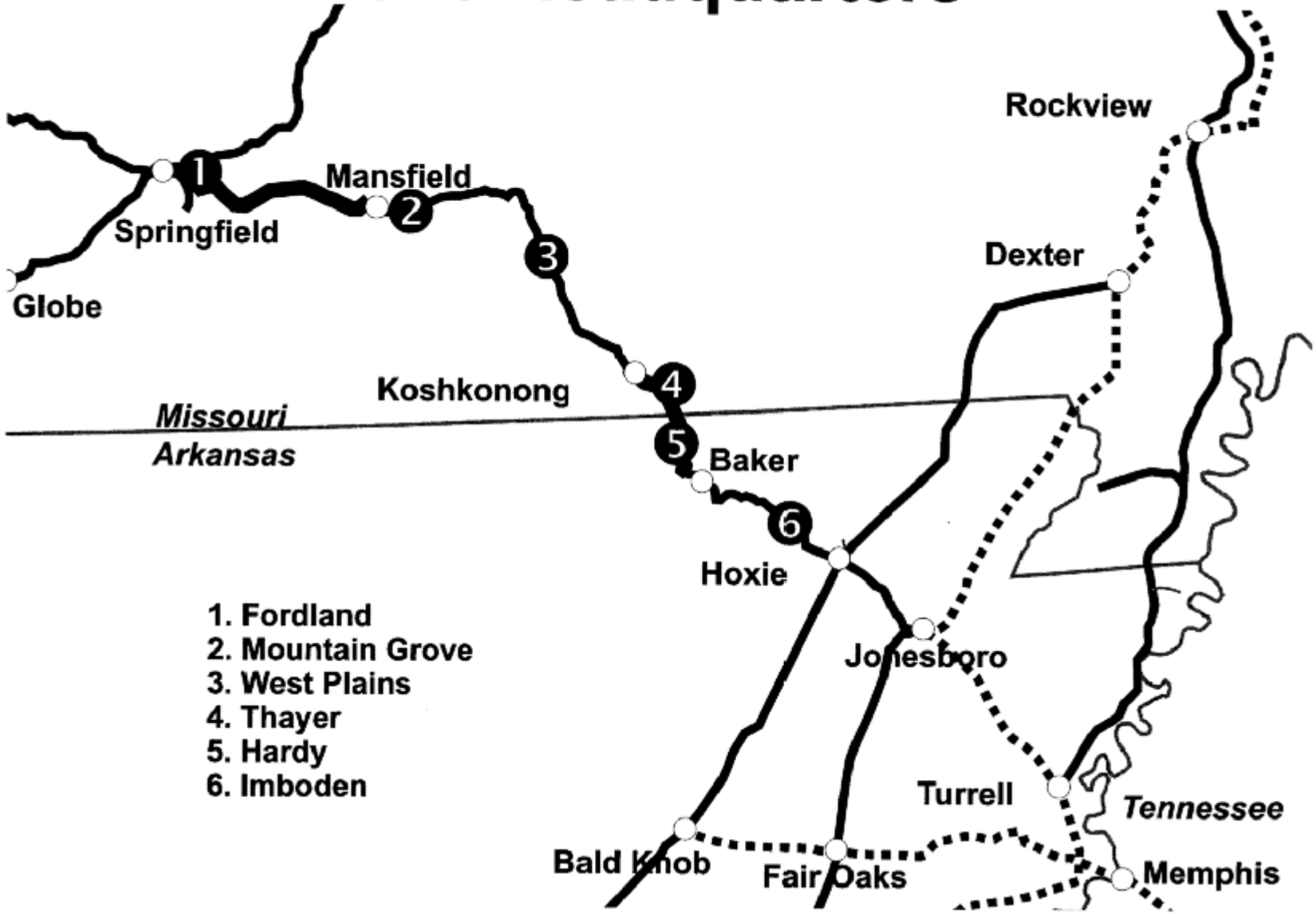
Thayer project - Figure and Photo captions

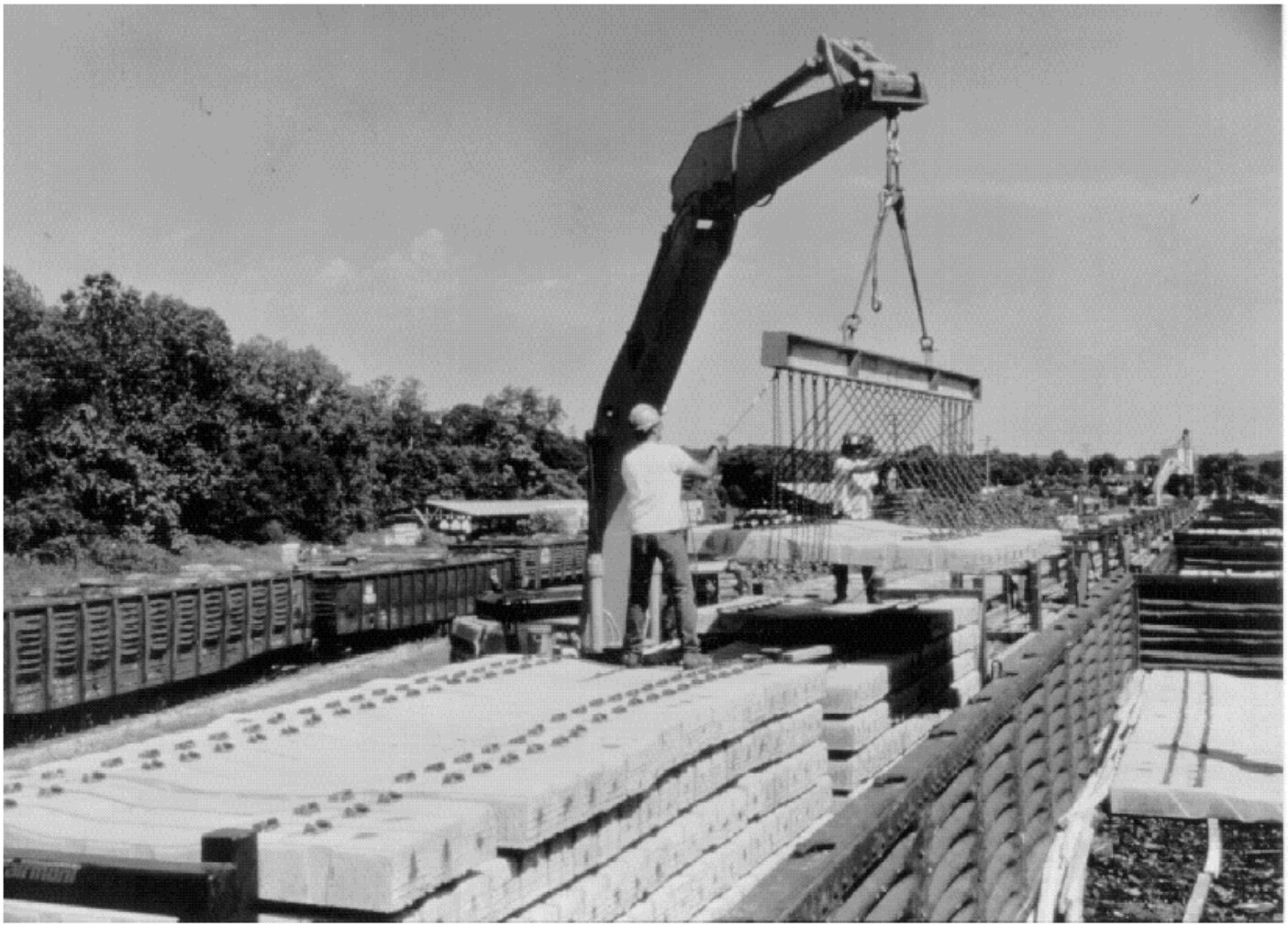
Figure 1. BNSF System map showing the location of the Thayer Subdivision
Figure 2. Locations of the 6 zone headquarters for the Thayer project
Picture 1. 1,200 BNSF employees and contractors attended the all day safety briefing in West Plains, Missouri
Picture 2. Loading concrete ties onto P-811 S flat cars from gondolas at Thayer, Missouri
Picture 3. Driving piling during night on bridge renewal near Marion, Missouri
Picture 4. Loram rail grinder near Hoxie, Arkansas

BNSF Network



Zone Headquarters



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