

# OPERATION ON THE



ABOVE: This view of Verryl Fosnight's Union Pacific, Wyoming Division gives a good idea of the size of the railroad. This shows down the Evanston aisle; Sherman Hill far left; crowded Laramie upper level on left; Sinclair Oil and Rawlins on right, more of Wyoming to far right beyond hanging mezzanine (no posts); and the Cheyenne steam yard across extreme distant end of room. VERRYL FOSNIGHT

This appeared in the Fall 2015 issue. It has been corrected and updated some. See later articles on this site.

This article describes the Wyoming Division, a very large HO layout near Sedona, Ariz. The layout is designed and built specifically to have operating sessions that simulate prototypical movements of the 485 miles from Cheyenne, Wyo., to Ogden, Utah, on the Union Pacific in 1957.

The layout is housed in a 50 x 75-foot building built especially for the layout. The building has no internal posts. As of yet there are about half the structures completed, but little scenery. The benchwork is a mushroom, two-level design on nine connected benches that are not attached to the walls, so the design is a true mushroom with access to all sides of all benches.

The double-track main line is 859 feet long and, including the main, through staging, and the staging helix, the length is 1,006 feet for each main or 2,012 feet total. Nine two-level benches

## by Verryl Fosnight

13.5

are connected by a three-turn, main helix of 7 x ~~1~~-foot double-track ovals with minimum radii of 36 inches in the center of the layout. Another 7 x 9-foot oval helix of five turns connects the other two ends of the string of nine benches.

The two ends of the layout connected by the smaller helix are Cheyenne on the upper level and staging on the lower level. Ogden is on the other end of staging opposite the small helix on the lower bench between aisles 8 and 9 (see figs. 1 and 2). Thus beyond both Cheyenne to the east and Ogden to the west, the large staging yard imitates east of Cheyenne (Chicago, Kansas City, St. Louis, and beyond) and west of Ogden (Los Angeles and Oakland).

There is also a separate staging yard for Portland, Ore., under the lower level

bench at the end of the Oregon Short Line, and it can be seen in Fig. 3. The OSL is hidden track from its junction with the UP main at Granger, Wyo., to the Portland staging yard and is the hidden orange track of fig. 3.

The first three drawings show the track plan for the two levels plus the hidden level for the OSL.

The layout has over 100 classic UP locomotives with eight Big Boys, eleven Challengers, two 2-12-4s, and numerous FEF 4-8-4s and other late steam engines, as well as many early diesels and the gas-turbine-electrics. There are nearly 2,300 cars, and we run long trains of 25 to 30 freight cars or 12 passenger cars including the *City* trains—*City of St. Louis*, *City of Portland*, *City of Los Angeles*, and *City of San Francisco*, plus the heavyweight *Challenger*, and mail-and-express mixed trains.

# WYOMING DIVISION



*Operations on this impressive layout in Arizona bring operators back to the 1950s on Union Pacific's Overland Route main line in western Wyoming*

ABOVE: Union Pacific gas-turbine No. 70, along with a GP9B, lead a train from Cheyenne, Wyo., in August 1959. Verryl Fosnight captures this look on his 1957-era UP Wyoming Division layout. DON SWANSON, MIKE SCHAFFER COLLECTION

## Staging Design

Referring to fig. 2, on the lower level of the bench between aisles 8 and 9—bench 8/9—is the main staging yard. It has about 680 feet of track in 15 tracks. It also has a center through-track. The half near the wall has one section for classification—left half—and one section for passenger train storage—right half.

The other half are for arrival/departure—bottom right—and the stub tracks on the bottom left are for storage. A fifth part is 5 tracks under the Cheyenne bench—0/10—which represents North Platte, Neb., our code name for all points east of Cheyenne.

After westbound trains are made up in classification, they may be stored in NP for later transport up the smaller helix to Cheyenne by the Nebraska Job crew. Eastbound trains arriving in Cheyenne are taken down to NP by this crew also.

The OSL from Granger, Wyo., runs to a separate staging yard which represents Portland. It is shown in fig. 3 as the orange tracks, a 168-foot branch line that leaves the sceniced part of the layout through a mouse hole and makes a broad 180-degree turn as hidden track at the edge of several benches to the nine-track Portland staging.

There is a turning loop under the main helix and back into the yard from the far side. This arrangement allows whole passenger trains to turn so they may return back east without being uncoupled.

There are also two turning passenger train loops as a third track on the upper and lower turns of the small helix for passenger trains. The upper loop connects to a three-track staging area on the upper bench behind the Cheyenne classification yard on the bench between aisles 8 and 9—bench 8/9.

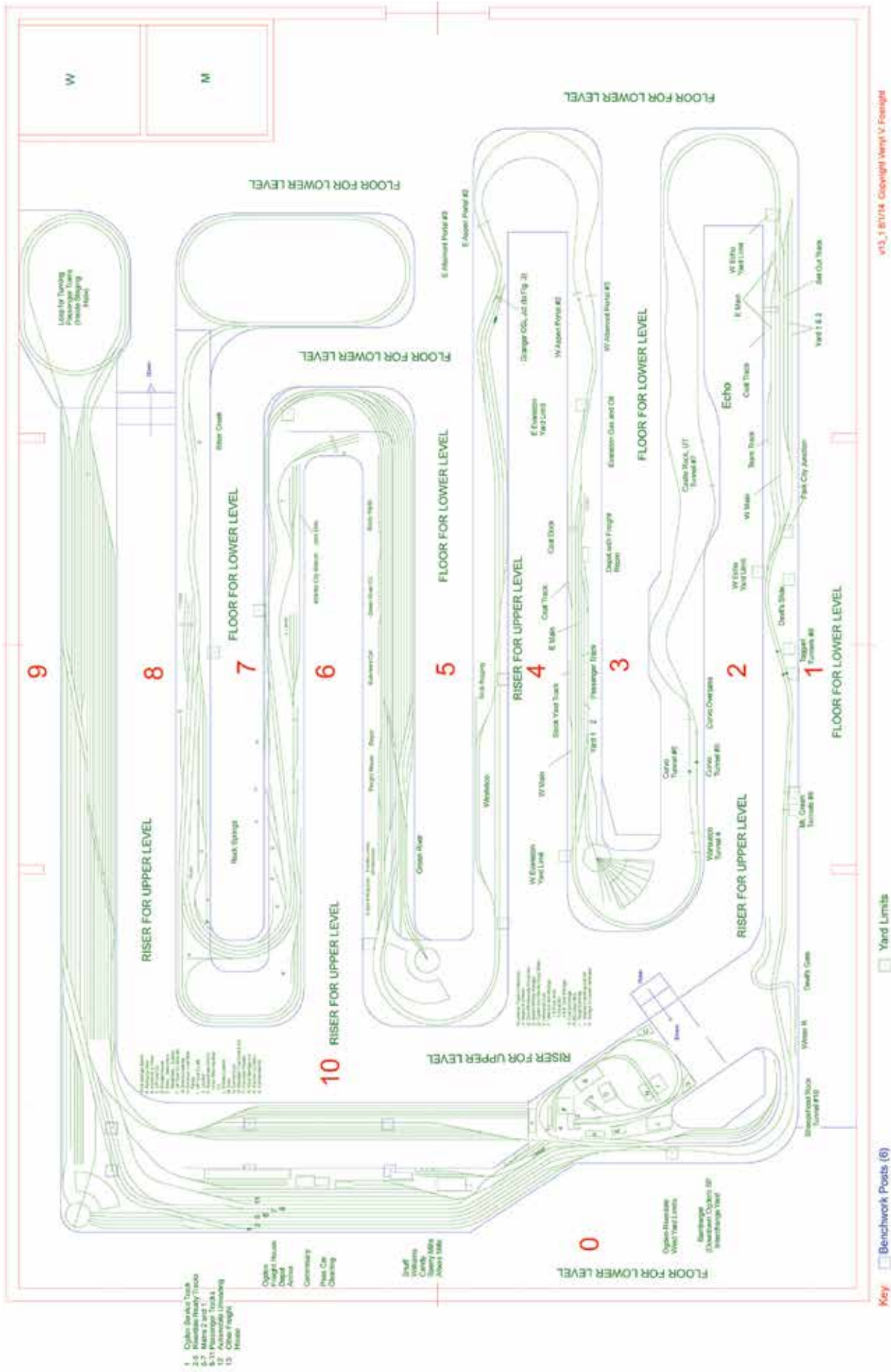
Altogether there are about 5,300 feet

of code 83 flex track counting all yards, staging, and leads. The nine two-level benches were built in three phases and connected to the main helix at the end of the then current benches following each phase of construction.

These two locations were first at the left end of bench 2/3, and later at the left end of 4/5. At the end of each phase we invited modelers from all of Arizona to run many trains simultaneously as a test of track and the DCC system. At the end of phase II we held three initial formal operating sessions with 28 to 36 operators to test the layout at that point and the operating system. Those test sessions were remarkably successful.

Finally, phase III was completed with the rest of the benches connected to the main helix in its final position. That helix was built on a sturdy 4 x 4-inch dolly with casters, so it could be jacked up and set down on the casters





LEFT: Fig. 2—The track plan of the middle level of the Wyoming Division.



for the two moves. In position the helix is permanently blocked up firmly with the casters about ¼-inch off the floor to be immovable.

## Prototype UP coast-to-coast operations in Wyoming

With a layout this large, I was able to plan operations with a lot of features not normally seen on other layouts. The Wyoming Division models real railroading on a coast to coast main line with a balance of passenger trains, locals, drags, and long runs on the main. I also have block switching, and a lot of switching on many freight trains, locals, less-than-carload operations, unit trains, and some on passenger trains. All of the operations described below are prototypical for UP.

Wyoming is sparsely populated and has no major industries other than mining of coal and soda, so there is not as much need for local switching as would be expected for a layout modeling 485 miles. This was even more the case in 1957, the era I chose to model to include the Challengers, 4-6-6-4s; Big Boys, 4-8-8-4s, and other huge steam locomotives, the early diesels, and the first two generations of gas turbine electrics.

Thus most trains in Wyoming were through trains, and a lot of local service was carried out by those trains on a few head-end cars in front of long blocks from and to distant places. This prompted me to plan for head-end car switching on some through trains, as well as blocks of cars on all trans-continental trains.

There were two places in Wyoming where blocks were separated to follow separate routes. Some westbound blocks were switched in Green River, Wyo., to be routed straight through to Ogden and on to California, while other blocks were placed on trains bound for the Pacific Northwest via the OSL, off the layout in the staging yard of Portland. We label all such OSL traffic as Portland as our conventional or code destination name.

Eastbound blocks were likewise switched in Laramie, Wyo., and routed in one of two directions, the first of which was straight on to Cheyenne and through to points east in staging—

down the smaller helix—which represents North Plate, Neb., Council Bluffs, Iowa, Chicago or through Marysville, Kan., to Kansas City or St. Louis.

A second direction beyond Cheyenne, but not through it, is east out of Laramie bypassing Cheyenne to its south to Denver. This route leaves Laramie and goes east on the Harriman Cutoff at Dale Junction. This is track 3 to and from Cheyenne, but if a train takes the wye at Speer, Wyo., directly to Denver, it bypasses Cheyenne to go to the small helix and directly to staging which then mimics Denver.

The bypassing track on the model should be hidden from Speer to the helix, but because of space and other constraints we had to hide it as the track nearest the riser aisle along Cheyenne to sneak trains to the small helix (see fig. 1). As can be seen it is separated from Cheyenne on bench 0/10 except near its access to the small helix on bench 8/9.

In imagining these two destinations, NP or Denver can mean anywhere east or south. Likewise either through Ogden on the lower level directly to staging—the end of staging opposite the small helix—or to Portland on the OSL hidden-branch can be imagined to be anywhere west of Ogden or northwest of Ogden. Thus the Wyoming Division is in effect a coast-to-coast layout.

The two main features of UP opera-

tions—head end switching and block switching with split destinations at each end of the layout—plus the additional UP locals, unit soda, gravel, and coal trains, and, of course, passenger trains—it is 1957—must be provided by the car-forwarding system. We also have a switching puzzle area and even occasionally run a work train.

Two coal trains require their crews to start the job as coal agents to plan how many coal hopper loads to deliver from the number of empty hoppers out on the layout. In other words, we have a little of everything to manage with a car-forwarding system.

## General consideration for model operations

My two primary tasks in support of making a good operating layout were to operate on other railroads and to read all I could about operation. I was fortunate to operate on Bob Burke's N-scale Santa Fe Southern Division, 1st and 2nd Subdivisions, railroad in a nearby small town in Arizona. Bob started out using four-cycle car cards. They were new, and clear and easy to read. He had good signs and track plans of industrial areas on the fascia and car card boxes. He supplied picks for uncoupling and pencils, although there was little need to write anything with the four-cycle car cards.

Recently, Bob switched to JMRI op-

BELOW: The UP's *Challenger* is staged at Ogden, Utah in July 1957. The train and time period are represented on Verryl's UP. DON SWANSON, MIKE SCHAFFER COLLECTION



erations, so we now operate with switch lists, and it feels more prototypical than carrying the waybills around. I realize like all other modelers that no real railroad would allow the waybills out in the open for them to get blown away or otherwise lost, torn, or soiled, because the waybills are probably the proof of payment due for the railroad. They probably all stayed in the caboose bundled up and safe.

My complaint with the computer-generated switchlist is that first I have to imagine that it was made up by hand by some office worker somewhere, and I understand that the switching crews usually made up their own from a list of cars with destinations. Second, I had gotten used to sorting the car card/envelope-waybill pairs, sometimes laying them out in stacks or putting them into separate fascia boxes to organize my work at any one moment. With the switch list on one or two sheets of paper, I have to draw in columns and make notes for my own organization system, and it soon gets messy.

Previously, I had visited other railroads that used the RailOp computer program and was impressed with it, but it seems to have been left to wither and die. It is no longer available and support is nonexistent.

I also read the ProTrak Yahoo Group. Both programs seemed difficult in a

sense of being long and involved in the initial setup with a lot of details to ferret out, and that was not attractive. But the promise of automatic—or nearly so setup—was very attractive. On the other hand, the prospect of setting up a conventional 4 cycle car card system for 2,300 cars was daunting, even terrifying. In short, I was not enamored with switch lists, computers, or four-cycle cards.

My own Yahoo group attracted many modelers nationwide. Doug Stuart of Virginia came out to help me plan my DCC system and we talked about operations for the few days he stayed with us. John Goodrich flew his plane in with Jim Betz from the Palo Alto, Calif., area for a short weekend to see my layout in its early stages.

John is planning to build a giant O-scale model of The Los Angeles harbor railroad, so he was interested in visiting my large layout, because I had also bought a lot and built a building for it. Jim turned out to be a mentor for operations and in many timely and detailed early emails guided me through the maze of operations.

I also drove to the Bay area to visit them and took a tour of Rick Fortrin's famous Santa Fe layout and David Park's Cumberland West. David's layout is a dual model of the Baltimore and Ohio and Western Maryland railroads in the

vicinity of Cumberland, Md., in 1953.

Rick's railroad is famous for its excellent track work and good arrangement for operations. He is said to re-stage his four-cycle operations by running his trains full speed backwards on the hand laid track and turnouts to return to their original positions.

David's layout is an electronic marvel with computer dispatching, video viewing of hidden staging under the layout, many computer assisted towers, and a 1960s—or earlier—phone communication system, so yelling or walking across the room is not needed.

Later in the year I also took my key Wyoming Division members—Allen Montgomery and Lenny Wyatt—to Desert Rails in Phoenix in the 2011 and to Bay Rails in the San Francisco Bay area. At each of these we operated on four or more layouts in intense three-day weekends. We intentionally chose to operate on railroads with a variety of operating systems, but all used the four-cycle car cards of one make or another.

In Phoenix we operated together on David Doiron's fine and very large HO Southern Pacific-Lost Dutchman 1967-era layout, the Pebble Creek Club's Great Lakes Western early 60s-era layout, Ron Mei's Southern Pacific Sunset Route, a transition era layout, Steve Chapman's Stevensville, Eastport &

Scenes like this 1957 view of the UP in Green River, Wyo., are long gone. But similar views in HO scale can still be seen on Verry's UP. DON SWANSON, COURTESY MIKE SCHAFFER



Central Valley 1952 N-scale layout, and Roger Brendecke's Riverside Chicago & Baltimore modern HO-railroad. All of these used four-cycle car cards and waybill car forwarding with a variety of control systems.

At Bay Rails we operated on David Parks' B&O half of his 1953 HO layout, Jim Providenza's Santa Cruz Northern part of SP, and Rick Fortrin's early 1970s AT&SF Valley Division, 4th District HO model. Those railroads also used four-cycle car cards and waybills, but the B&O and the Santa Cruz Northern used Time Table and Ttrain Order), and the AT&SF used Track Warrant Control with verbal authority.

I also bought all the available past copies of the *DISPATCHER'S OFFICE* and read them. I also studied several books on operations that are in the model railroad literature. With this reading and the operating experience I was able to formalize my list of requirements, and I stress that these are my preferences, not a criticism of other systems.

## Operating system requirements

The system must be fairly prototypical, but not necessarily rigorously prototypical. Besides, I decided my overall rule was for my guests to have fun, and not to be stressed.

Jim Betz researched the UP and pointed out that UP was double-tracked and used rule 251D for double track and current of running operations with track warrants to grant permission to leave yards and spurs to go onto the main. That became the system I wanted to model, but of course, I realized it had to be simplified.

Ideally at least some of the Wyoming Division should have automatic block signals, because portions of the prototype had them in 1957. I have such an ABS system designed but not yet installed.

Simple setup is a must. This implies simple initial set up of the layout.

Second, the setup required between operating sessions should be as simple as possible. Restaging of trains is to be avoided as much as possible. This requirement led to my double-ended staging to simulate both ends of a point-to-point route.

I had already decided I preferred the



ABOVE: UP's Ogden yard as viewed from a dome car. On Verrill's UP layout, Ogden is represented by a staging yard. DON SWANSON, MIKE SCHAFER COLLECTION

the western most location on the layout just before staging.

ability to sort car cards versus scribbling on switchlists to manage them, despite the slightly more prototypical-flavor of switch lists. But I disliked the tiny size of the four-cycle cards that are so hard to read, the artificiality of planning four-moves in advance, and the care required in handling them.

Because the waybills seemed to be unprototypical carried with the individual car cards and they could also easily slip out of the car-card envelope, especially if dropped, those factors also mitigated the attractiveness of four-cycle cards. So I chose to make car cards, but to not make the car cards so prototypical containing so much data as to be cluttered and hard to read. My feeling was no trainman cared what was in the car unless it was hazardous material.

I also imposed on myself the requirement to settle on one design, because I had operated on some railroads that had probably been forced to change card styles when one type became unavailable or other reasons. That meant I should probably print my own.

Ted Ferkenhoff, my head dispatcher from Flagstaff, Az., suggested that there was little switching of individual cars across Wyoming and eastern Utah, but that blocks of cars were the rule. Furthermore, that the blocks were classified at Laramie—to and from either Denver or North Platte—and at Green River—to and from either the west coast or the Pacific Northwest via the

OSL. What little switching was done in Wyoming was either by a few locals or some through trains that stopped to be switched by local yard crews along the way.

This led me to adopt car cards for locals and for head end cars for a certain class of through trains. Other through trains would only stop for fuel, water, sand, or to dump ashes.

Allen Montgomery suggested block cards for the blocks, because there was no sense in having a car card for every car if a great percentage of cars transverse the whole layout.

This in turn implied that I would have to have either a few cars dedicated to head-end work with cards and many more cars dedicated to blocks, with only one card for each block. Having cars so dedicated was unattractive, so I made the car and block cards semi-disposable, that is used for a few sessions or until a car was taken into a block from head end work, or vice versa.

I decided that quarter-page would be a nice size for the head end car cards, and that given that there would be even fewer block cards than individual cards, I should make the block cards of a different color or size to distinguish the two. I settled on half-page for a block card and quarter-page for a car card, because the block cards, last on the train, would be visible as a group under the quarter-page car cards.

Quarter-page car cards would require about one and a half reams of





I wanted my operating system to have the same ability without embarrassing anyone. The cure with four-cycle car cards is usually to add a “go back” card to the envelope or somehow mark it so. But while this is probably unprototypical, I did not want to have to bother. I wanted this to be automatic. As will be seen, my designs of the head end and block cards makes this possible.

## Other requirements

On every railroad I operated on there were many good points. On Rick Fortrin’s I really appreciated the spacious yards and long yard leads that made it easy to operate, and the track work was flawless, and I shamelessly stole the electric switch in a fascia hole idea to reach in with one finger to operate a Tortoise machine.

Rick used slide switches, but I found inexpensive rocker switches before I came across slide switches. Mounting the switches behind the fascia keeps them out of the way so they can’t be accidentally actuated. I also stole the idea of 9x12-inch white boards available at the yards for yardmasters to make notes from Rick, to draw a sketch of part of the yard or make a list to organize an operator in using the yard tracks.

Most of the layouts I operated on had good maps and identification of locations locally about a given area. I thank Bob Burke for it specifically, because I first saw good maps on his layout. As for the overall plan, I often was lost on other layouts.

Sometimes a layout uses made-up names, because it does not follow a prototype road, or the names are real but obscure to a visitor. For example, Hanna, Wyo. makes sense to me, but I have been there specifically to take photos of the coal mines and yard and the small and old town. I did not want guests asking or muttering, “Where the heck is Hanna?” Consequently, I have taken pains to label the fascia with numerous ways in numerous places to help operators find their way around the layout.

Overall the layout is situated in the building with the northerly model direction actually being geographic north on the first east-west bench. Therefore,

as one looks across the tracks at any point of the layout left is always west just like a map.

Most layouts furnish a layout map or track plan with the initial operating rules and paperwork, but I never can discipline myself to use these, because it always involves opening a booklet or unfolding a paper. This is a fault of mine rather than a criticism of other layouts, but my hopes are that the fascia information will suffice as well as being more readily available. The bullet list gives specifics below.

I appreciated clean fascia that were uncluttered, and we tried to keep ours so. At Lenny’s insistence we use Velcro strips on the fascia with mating strips on the backs of all clipboards, so no hooks can snag clothing or arms.

I wanted to make sure my aisles were wide enough. I started my design with 48-inch aisles, but as it progressed they shrunk to 41-inches except for one place where it is 36-inches for less than four feet. I expanded the Cheyenne aisle 10, an upper level aisle, to 50 inches wide, because it is naturally crowded—being a natural point for operators to move through while others have to work there.

Other physical requirements were to have good track and turnout work with solid and smooth roadbed so that derailments were minimized and reliable electrical performance. We did the standard suggested things, soldering or welding all electrical connections except the screw terminals on DCC components, and used No. 10 AWG wire for the main power bus with No. 14 AWG sub buses for lengths of eight feet or less at the end of power lines, and No. 18 AWG feeders of reasonably short lengths of generally no more than six or seven inches. We used feeders every four to six feet.

We TIG (tungsten inert gas—argon gas) spot welded every copper feeder to the bottom of the nickel-silver track to avoid soldering. It was expensive to buy the jewelers’ spot welder. Also time consuming for Greg White to learn the settings of power and duration of the pulse of gas and power required. They depend on the thermal conductivity of the metals and the pressure of the tip on the metal, which affects the contact electrical resistance between the two

parts and the top part and the tip.

Since copper has a much higher thermal conductivity than nickel-silver, and their melting points are fairly different, the learning curve was steep. We used an Orion unit that had adjustable features that could be replicated automatically, and even the pressure of the tungsten tip pressing the two parts together governed the firing of the gas/electrical pulse to make each weld repeatable. Naturally the size and characteristics of the copper wire and the track were constant, so they were not variables. After Greg learned the process, he became quite proficient at welding the feeders to the track. We have no unsightly globs of solder or melted ties with welding.

## Signs on the fascia

I believe that next to good track, wiring, and running locomotives and cars, the most important element of a model railroad for operations is the fascia. It should be the signposts for the operator to give him all the information he needs to navigate around the layout without a handful of maps and charts. This is especially true for new to the layout operators who are most often befuddled by a layout they have never seen before that models an area they are not intimately familiar with. I express all this very natural and understandable befuddlement by the phrase, “Where the heck is Hanna?”

I certainly cannot expect operators, especially ones new to the Wyoming Division, to know the geography of the layout or the prototype. On my fascia you can find: compass star signs—on sun yellow paper—with north always up, across the bench away from you; west to your left no matter which bench or level you are on; east to your right no matter which bench or level you are on. These are all like a regular map.

Also to the left of each compass star is a list of the next three or four locations west of that spot on the fascia, and to the right is a list of the next three or four locations east.

“OS” (on hot pink paper to get attention)—These are very close to where operators should report to the dispatcher on a phone to give him their train number and current location. This is how the dispatcher knows where all the

trains are. It is 1957 and station agents or UP operators had this job, and they used phones or telegraph, so we do also.

The OS signs are in three parts: The left side is a triangle and inside it is the notice to report to the dispatcher here. The bottom right least used rectangular section tells what to say to report the first time and each subsequent time thereafter. The upper right section tells how to report at a depot, leaving the main on a junction or siding, or returning to the main on a junction or siding

Yard and town maps tell operators where to pick up cars and make setouts— (on sun yellow paper)

These are sections of track plans copied out of figs. 1 and 2 which were made with the drawing program “3PlanIt.”

Operators need the maps to find the spots for setouts per the card cards on their clipboards and for those pickups mandated by car cards they find in the fascia pockets.

Yard limit signs (on white paper) where a train enters a yard or leaves one. Inside yard limits an operator must run slowly to be able to avoid accidents, and he or she should follow the directions of the yard master.

Current of running signs (on sun yellow paper): Generally the current of running is right handed on the double-track mains. But at three places trains must take a crossover to the opposite track, and at a fourth place there is an overpass where the westbound track crosses over the eastbound track.

Yard instructions (on blue paper in sheet protectors or laminated): detailed, if you need it, or to be skimmed only the bold type if you are familiar with yard operations in general.

You do not need to memorize or carry any of these items around as you operate. The fascia signs plus the four sets of cards on your clipboard are all the information you need to operate on the Wyoming Division.

## Specifics of the Wyoming Division operating system

Operations on the Wyoming Division are controlled by a car-card and block-card forwarding system combined with a train-order sheet for each train and a set of locomotive cards to determine train length; fuel and water stops, and helper and engine change locations.

Thus it is a four-card car-forwarding system.

Single-trick car cards—the car cards are single move cards, that is, one move per line. They are printed out four to a page in portrait orientation on card stock from an Excel spreadsheet page as shown in fig. 3. Note that a single card may be used for a single move, or for a sequence of any number of pre planned moves, or as a second single move following the last move, such subsequent moves being planned move by move, line by line.

These are the ways real-railroad cars are used: For a single move, in planned sequential moves (e.g. less-than-carload lot cars), or from A to C via B for a single move, then followed by other single moves, each single move independent of the rest—i.e., “this boxcar is needed over there next” without artificial pre-planning.

And any of the legs of these combinations of moves may be empty, loaded or with LCL freight.

The single move nature of each line of these car cards on one of many lines gives them the needed flexibility for my prototypical operation. For the car designated at the top of the card, each line below the “From-To-Loading” heading is a single move, but any combination of other moves may follow that line.

This is how my single move car cards work. Below the headings on the first blank line is the car identification. The next blank line below the “From-To-Loading” heading is for one move. Usually a car only moves once per session, but there is no reason why it cannot move multiple times by filling out the next empty line whenever desired.

“Whenever desired” can mean many things. It may not move for several sessions, or that type of car may be needed elsewhere, because there is a shortage of the type, so it would move in the same session again. Or it may be in the way in a yard which are typically far too small to hold all the cars that our operations bring to them, so a yard overwhelmed by cars may slow down a whole operating session.

With single-move cards any local yardmaster may initiate car moves to clean out his yard, if that is allowed by the operating rules of the layout. Such rules can be easily added. All

that is required is an extra locomotive, throttle, engineer, and permission from authority to form and move a new train out onto the main.

There may be other reasons for such special or extraordinary trains, and all can add flexibility and realism to a session. But most commonly, there is no realistic reason to move all cars along at the same pace of one-move-per-session. Some should stay to be loaded or unloaded a day or few days. Others may move to and away from a given loading dock in a fraction of a day.

On the Wyoming Division I encourage my road crews to mark up cards and move them along on their own. This may shock some, but consider—viewed from a satellite, real car moves probably resemble ants scurrying about apparently randomly. In truth, like ants, each car has a destination and purpose to its move, but viewed globally on a layout, stays at locations, are helter-skelter, because customer needs are random on the scale of the whole layout.

It is not realistic to require that cars only (usually) move once per session, and (usually) always once each session. Ideally, a real railroad moves its cars as soon as possible to put it back to work and to avoid demurrage charges. And customers want the car emptied quickly and moved out of their way, and to avoid charges.

No one in the real world wants cars to sit until the next work session. So I tell my road crews to sensibly move cars along by marking the cards for the next move either for that crew to take it, or for the next crew to take it soon. And as always, wherever the car moves the card stays with the car in a fascia pocket or on a road crew’s clipboard.

With a single move car card, the car stays or moves according to the bottom line that is partially filled out. Partially means that the move is not complete until the “loaded” or “unloaded” space is filled in. When it is filled in, the next line or move begins, either when it is filled in later, or if desired as a string of pre-set moves planned in advance. Thus the single move card can and should move the car often during a session, and furthermore a card may contain multiple moves if desired.

The last two columns keep track of



Caboose. A single move per session or multiple moves may be made for any or all cars, and in setup you do not have to plan several or 4 moves ahead of time, although you can if you want. Therefore, initial setup is a breeze. With 4 cycle cards you turn the cards between sessions. With single trick car cards, you write the next move on the card between the sessions, or not. If you have few operators for the next session you may not want to pick up all cars or from all spots that session, so you do not add a move to a few cards. And if you have dated them in the "Unloaded" column, you can track their history. There are 18 lines on the card. After 18 lines, the cheap cards are so worn that it is a relief to make a new card by filling out the identity line, and that is very easy to do.

The single move car cards are especially useful for LCL cars. In the following example, rather than marking the card as full in the "Full" column, it is checked in the "LCL" box were checked. There is no need to check the "Full" box, but it can be checked both "Full" and "LCL." Therefore, for either the "Full" or "LCL" case, a check later applied to the "Loaded" or "Unloaded" column means the car is ready for other duty.

For an LCL car and card, a check applied to the "Loaded" column with no check on the same line in the "MT" column would indicate the partial unloading had been done, because the "LCL" column would be still checked. Thus the car card can easily be adapted to make LCL cars and cards by simply filling out a whole string of "To" locations running down the card and marking the corresponding "LCL" boxes in that column with a check. Such an LCL card is shown in Fig. 7 above.

In this LCL car card example, the car has been moved along to several freight houses (FH) and after only a short time that same day has been unloaded partially, and perhaps some freight added to it at each stop, and the "Loaded" column is checked to indicate that that part of its move had been completed. At the last location filled in, a check is placed in the "Unloaded" column if that car's moves are done. To keep a record of when the activity was completed, use dates in the "Loaded" and "Unloaded" columns instead of

check marks. On the Wyoming Division I have LCL cars and cards at nearly every freight house or team track with the cards directing the cars to be moved both east and west, and road crews are expected to bump them along in the correct direction, and then to mark the car to cause the next move!

For non-LCL cars when the "MT" space is checked the "Unloaded" box may be dated as a confirmation of the end of that move, but it is not absolutely necessary. Such dating does, however, provide a convenient place to date the end of the last move, and thus the date of the last session this car was moved. If no date has been entered during the session, and it is desirable to record it to note the date that the car was last used, it can be entered after the session.

Likewise, a car that was last moved with its card checked "MT" and left in the proper destination should be checked "Full" after being in the new location in a long enough time for that work to be done. Road crews can and should do so, but with discretion, to make the stay at the new location is reasonable. To repeat, there is no realistic reason for all cars to be marked at the same time, i.e., in setup as in turning four cycle car cards.

The cards are also the intentionally large size of quarter-page of card stock, and this makes them easy to write on and to handle. No envelope means they lay flat and are easy to put on a clipboard or in an apron. The drawback is that the fascia boxes are also large to handle them, but they can be stacked as shown below.

A final point is that while flexibility is gained, care must be taken to keep the railroad balanced, so that cars flow both directions in approximate equal numbers or as otherwise required, so as to not run out of cars at some location in a future session.

But this can be done pretty much visually on most layouts, if the movements are not constrained by pre planning. If unbalance occurs, and if the car forwarding system is flexible enough it may be easily corrected on the fly. This makes for more realistic and reasonable movements.

Real railroads often have to move empties to needed places, so if you

also have to, it is good. I have never had the need to plan ahead to balance the Wyoming Division, and that may be because of its size and the fact that staging is double ended. It does seem that the single trick plus block cards tend to automatically balance the road.

## Block cards

Most freight traffic on the prototype Wyoming Division was in blocks of cars from east of Cheyenne to west of Ogden or west to east. Blocks were switched, and we follow prototype practice these ways.

For blocks headed east from Ogden to either points east of Cheyenne or points south of Cheyenne we use the convention on the layout that North Platte or NP is the destination off the layout east of Cheyenne (staging), and NP can mean Chicago, Marysville, Kan., on to Kansas City or St. Louis or any other eastern destination or origin. Likewise, south of Cheyenne is "Denver" by our convention, and that word means Denver, or Texas, or New Orleans, Miami, or anywhere else we want it to mean.

For destinations or origins of blocks of cars west of Ogden we similarly conventionally use "LA," "Colton" (Pacific Fruit Express loading), "Oakland," and "Roseville" as code names. We also use "Portland" as a conventional name for destinations or origins of blocks of cars northwest of Ogden that go that direction via the OSL. This branch line becomes hidden track at Granger, Wyoming, just west of Green River and leads to a separate "Portland Staging." Diagrammatically the situation looks like this.

Inside the rectangle is the layout proper. Outside the rectangle are staging areas and the imaginary locations in the staging areas. We use these imaginary locations as code names to name trains. Thus an east bound train might be Roseville-NP PFE special east. Roseville, Calif. and Portland, Ore., were important PFE loading places. The designation of "special" is a type of train which came from the following list.

**Passenger:** highest priority that stop only at depots or for fuel.

**Special:** PFE and stock trains or other high priority or remarkable

trains

**Forwarder:** through trains that only stop for coal (or fuel), water, sand, and ashes or to get helpers on or off, or for engine changes

**Manifest:** Through trains with a few—typically on—six—head end cars that should be set out in Wyoming or Utah (in the rectangle above); can also pick up cars at those stops

**Extra (non-scheduled):** a train that can be used to clear out an overwhelmed yard or to sweep up cars needed elsewhere during a session

**Local (or drag):** entire trains of cars to be set out and to make pickups, lowest priority

Using the above code names, there are, for examples, “NP-LA Forwarder West” and an “Oakland-Denver Manifest East” trains, and any number of other combinations. The code is “From-To-Type-Direction.”

Considering the diagram above, you will notice that according to the arrow, some east bound blocks of cars seem to leave the layout before they get to Cheyenne. In fact they go directly from Laramie (50 miles west of Cheyenne) to Denver, bypassing Cheyenne on track three, the Harriman Cutoff and the wye at Speer as can be seen on the up-

per level track plan in fig. 1. Therefore, blocks from west of Laramie, have to be classified at Laramie. Some continue on the original train through Cheyenne to NP, via track No. 2 paralleling track No. 1.

Other blocks change trains onto a Denver bound train via track No. 3, the Harriman Cutoff. Or the original train may continue to Denver, with some of its blocks waiting in Laramie for a NP bound train. As trains can lose blocks in Laramie for a destination different from their own, the Laramie yardmaster can add blocks to fill out the train for its destination.

The same situation happens at Green River where westbound blocks are sorted for either straight on to Ogden and through to L.A. or Oakland, or, alternately, northwest at Granger on the OSL for Portland. Therefore, Green River is a block classification yard for west bound blocks like Laramie is such a yard for east bound blocks. The Green River yardmaster also fills out westbound trains with blocks he previously took off other trains.

These two splitting’s of destinations for blocks makes for block switching and classification, and a concurrent need for block cards, so what we lack

in switching across Wyoming we gain back in switching blocks in either Laramie (east bound blocks to NP or Denver) or Green River (west to LA or Oakland or NW bound blocks to Portland. Now it is evident why my system uses both car cards and block cards, and one is shown below in fig. 9.

The block card is easy to fill out following the instruction at the top. First, circle the proper “From/To” combination from either the eastbound array of them on the left or those on the right for westbound blocks. Second, enter the total number of cars in the block in the cell at the bottom. Third, enter the reporting marks of the first car in the block and the last car in the block. And finally fourth, number the blocks 1, 2, 3,... in the order that they appear on the train, usually front to rear.

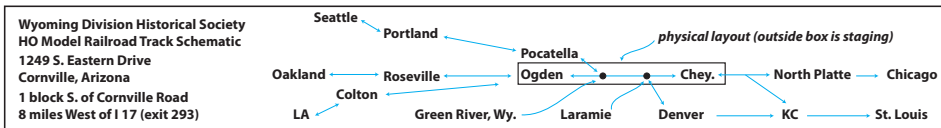
Since the block stays together as a unit, only the beginning and the end of the block need be identified. For speed and simplicity not all of the four designations of “road,” “car number,” “color,” and “type” are needed. If the road crew finds them important, he can add them to the card whenever he wants.

When the block is broken up, with one exception, the block is no longer a block, or at least the same block, so this card is no longer needed and can be discarded or kept for analysis of traffic on the layout. The single exception is if a car is added or taken from a block for any reason. You could make a new block card, but you do not have to, if you remove or add the car to the middle of the block and change the “Total Cars in Block” by the number of cars in the change.

If you have blocks with non-standard origins and destinations, it can be added to the “Special Instructions” of the card. Additional moves may be added to the initial moves here also if it is acceptable to keep the block intact.

To identify a train previously made up by someone else, the block cards are invaluable. Simply read the identity of the last car in the train, match it to the last car on the last block of the stack of block cards, and count up the train the number of cars the card says should be there. If that car matches the first car noted on the block card, you have identified your train.

Note that to use this method you



ABOVE: Fig. 8—Routes for car blocks. This leads to a natural method of naming trains.

BELOW: Fig. 9—A sample Wyoming Division block card.

WYOMING DIVISION BLOCK CARD									
Instructions for filling in the <b>Block Card</b> (One Block per Card)									
<b>1. Blocks of cars</b>		All possible combinations of Origins and destinations are given. Circle the proper combination.							
<b>2. Total Cars in Blocks</b>		Enter the total number of cars in the block.							
<b>3. layout Destination</b>		Take all blocks at least as far as Laramie (eastbound) or Green River (westbound) Laramie or Green River Yardmaster will help you decide which blocks to leave or pick up.							
<b>4. Breaking this bolck</b>		Correct this card, make new block Card for cars removed and/or a Car Card(s) for single car(s) taken.							
Special Instructions:									
Enter special origin and destinations and/or special breakup destinations for the block									
Number Block on train 1, 2, 3, ...									
Eastbound			Enter Designation First and Last Car of Each Block				Westbound		
Block #	From	To	First Car		Last Car		To	From	Block #
	Portland	NP					Portland	NP	
	Portland	Den	UP	Road	ATSF		Oakland	NP	
	Oakland	NP	1357	Car #	2468		(Roseville)	NP	
	Oakland	Den	Black	Color	Red		LA	NP	
	Roseville	NP	Tank	Type	Gon		Portland	Den	
	Roseville	Den					Oakland	Den	
	LA	NP					Roseville	Den	
	LA	Den					LA	Den	
Total Cars in Blocks:								14	

start at the rear of a train, which is the last car next to the caboose, but if it has no caboose yet, it should be safe to determine the end of the train furthest from the destination of the train. You start at the caboose end, because head end cars with individual cards are there, or should be.

## Size of cards and stacking on the clipboard

The block cards are a full half-sheet of card stock printed in portrait mode. I make the car cards quarter sheet of card stock, and later it will be seen I make the train orders and the locomotive cards as full sheets. These sizes are convenient for a normal clipboard available from Amazon for less than \$1 each, but more important, when all are on the clipboard they can be stacked staggered to keep them organized but still easy to see the different types as is shown in fig. 10.

Like the car cards it is nice to have the block cards large, but you may not have room on your fascia for such large fascia pockets or boxes. Furthermore, now you have two sizes of cards, so you need an extra set of boxes for the new cards. On the other hand all cards are single page thickness, so the boxes do not have to be very deep. We made boxes out of 0.093-inch polycarbonate sheet held on the fascia by screws through quarter-inch diameter plastic tubing. With longer screws and multiple spacers the boxes can be stacked. A double-stacked box stands out only three-quarters inch from the fascia and holds more than enough cards.

I have received some criticism that the different sizes of car and block cards make is difficult to handle them, and that is true if they are mixed in together. But if head end cards are scrupulously put on the head end where they are easier to switch first, then the car cards will be all together on top of the block cards. If a train is made up with single cars between or after blocks, then to keep the cards in order, the different sizes may be awkward mixed up in the order of the cars on a train.

## Locomotive cards

We also have a fourth card on the Wyoming Division. Locomotive cards

are to regulate the number of cars a given locomotive can pull up the grades of Sherman Hill (Cheyenne to Laramie), or up the Wasatch (Ogden to Green River), or on the prairie. Out on the flat between Laramie and Evanston any locomotive is rated to pull more cars than on the grades. We make up our trains or modify them or add helpers to get near but not exceed those limits just like the prototype did to balance profits and on-time deliveries.

This means on the Wyoming Division we change locomotives at those two yards. Like car cards, locomotive cards stay with their locomotives, so when a train gets a new locomotive the engineer trades in its locomotive card. I have laminated the locomotive cards printed on colored paper to make them easy to find.

The locomotive cards also tell where each locomotive must stop for coal (or fuel), water, sand, and to dump ashes. Using them we maximize fun while making complexity manageable for near prototype operation.

The car cards are all identical, as are the block cards. But there are unique locomotive cards for each type of locomotive. Full 8½-by 11-inch sheet locomotive cards for a Big Boy and for a diesel are shown slightly reduced in size on the next pages.

The top half of the car is mostly

blank, because it is covered by the block cards and the car cards stacked directly above it when all are held by the clipboard clip. The boxes are filled in by hand (printed in italics), so one blank suffices for all Big Boys, and other blanks are for each other type of locomotives, steam and diesel. The right hand box is preprinted for “tonnage rating” in cars for the two areas of the railroad, up a grade and on the largely level “bowl” of Wyoming.

The array of dots under the identity line show selected stations where the locomotive has to stop for fuel, water, and sand, and where ashes must be dumped while coal is taken on.

These are available at many more places than are shown on an individual locomotive card, but the card shows where a given locomotive must stop. One blank form works for all steam engines, but the preprinted array of dots varies for the different types of steamer.

To make them all, I used a different tab on the Excel Workbook for each locomotive type, each type being unique and only requiring to be filled out by hand as to locomotive number. This system of using tabs at the bottom of the Excel Workbook allows diesel tabs by type also, and for the UP of 1957, tabs for the various gas turbine electrics used.

A diesel card is reproduced on the

BELOW: Fig. 10—A Wyoming Division clipboard. It holds several different forms. Also shown are various forms in fascia pockets.



Locomotive Card						4004	
Red Paper Stock							
Locomotive Card						Big Boy 4004	
Locomotive:	4004	Big Boy	Type:	4-8-8-4	Tonnage Rating:	30 Cars	
Speed Limit		Change Speed at Next Station				Speed Limit	
Helper Req'd		West Bound		East Bound		Helper Req'd	
Stop for		Fuel	Water	Sand	Ashes	Fuel	Water
Cheyenne	25+	30	•	•	•	•	•
Laramie			•	•	•	•	•
Medicine Bow							
Hanna							
Rawlins		60	•	•	•	•	•
Wamsutter							
Bitter Creek		25				•	
Green River			•	•	•	•	•
Evanston							
Echo		40				•	•
Ogden			•	•	•	•	•
Function		Action		Function		Action	
0	Headlight	5	dim headlight				
1	Bell	6	?				
2	Whistle	7	injectors				
3	Short Whistle	8	Brake Squeal				
4	Steam Release	9	Water Stop				

ABOVE: Fig. 11—A sample steam locomotive card, preprinted and laminated.

Locomotive Card						1408-1445	
Lt Yellow Paper Stock							
Locomotive Card						F-3's 1408-1445	
Address:	1408-1445	F-3's	Type:	B-B	Tonnage Rating:	30 Cars	
Speed Limit		Change Speed at Next Station				Speed Limit	
Helper Req'd		West Bound		East Bound		Helper Req'd	
Stop for		Fuel	Water	Sand	Ashes	Fuel	Water
Cheyenne	25+	25	•	•	•	•	•
Laramie							
Medicine Bow							
Hanna							
Rawlins		60				•	•
Wamsutter							
Bitter Creek		25					
Green River							
Evanston							
Echo		40					•
Ogden			•	•	•	•	•
Function		Action		Function		Action	
0	Headlight	5	Mars Light				
1	No Sound	6					
2		7					
3		8					
4		9					

ABOVE: Fig. 12—A diesel locomotive card; it is nearly identical to a turbine

last page, and it is identical to a turbine card except for the preprinted identity of diesel versus turbine and the differing tonnage ratings. The diesel card shown is for an F-unit ABB set, so multiple numbers are given to completely ID the set which we never break into individual units.

For all locomotive cards the fueling locations are listed on the left side down for east-to-west travel and up on the right for the west-to-east direction. The speed-limit columns are for indication only, being in practice at this stage relative for the different grades. Helper cut-in and cut-out locations are also listed. On the bottom is a key to certain CV functions on our NCE throttles.

The locomotive cards strictly govern the locomotive stops and tonnage ratings, helpers needed, and speeds. Fuel, sand, water, and ash dump possible locations are shown on the train orders described next, but as “available,” not as required. So if a locomotive requires these services per the locomotive card,

the TO described below tells where they are available.

## Train orders

I use a single 8 1/2 x 11 sheet train order for each train. They are largely preprinted, two for each type of train—one for east and one for west—and can be filled out in less than a minute for a particular train. The preprinted instructions are in the form of a table or array showing in columns in this order: the stops a train makes, instructions for that location, direction of running (left or right track), where coal, water, sand, and ash dumps are available (but not necessary stops—those are shown by the locomotive card), where to get helpers and cut them off, and where to change locomotives. There are a few general instructions and a key above the array to explain the terms in the array.

It sounds complicated—and it is a bit—in the conglomeration of car cards, block cards, locomotive cards, and train

orders. But each of these four elements are simple taken alone. The same is true for the complicated looking train order, but if you look at it one line at a time, it becomes simple. At the next location you follow the instructions at that location, given in both a line of text or repeated in the array of boxes. The single line taken alone is in effect a written track warrant to that location.

The next page shows a blank train order in fig. 13. In my operating system a call boy may be used to call the next person as engineer/conductor or pair of operators as an engineer plus conductor crew, and he takes that crew to where the train is ready. Trains may be ready in staging or any other yard, but usually they have been prepared by staging during the session or the pre-staging crew before the session and then taken to a set of arrival/departure tracks in a yard.

To start the session and to have trains all across the layout, we pre-stage some trains in the yards at either



Locomotive Number:	4001	NP-Portland Manifest West	Date:		Clock In:						
Train Order (p 1 of 1)	Engineer:	Conductor:	Train No:		# In Session						
Key: <b>Coal/Fuel/Water/Sand</b>	Available = Stop only if required to do so by Locomotive Card not available, you should continue without stopping ✓ = Check Pencil Boxes at location for cars you can pick up (going your way) and take them with you when you leave ✓ = Check your own Car Cards for cars to be left here, but move off spot cars on to spots first. Set out number written in. In yards with YM do work with him. With no YM do your own Car and Block Card work with switcher at that yard Yes = Do get helper from YM, Hostler, or Helper Engineer, receive instructions on how to run with him pushing, then leave—you do OS Yes = Stop per YM instructions to allow helper to leave your train Yes = Stop to change locomotive(s) per YM and/or hostler instructions In case of a problem or question, call Dispatcher. ALWAYS answer any phone to take orders for you or others.										
<b>Pick Ups</b> <b>Set Outs</b> <b>YM or Host?</b> <b>Get Helper</b> <b>Release Helper</b> <b>Engine Change</b> <b>Phones</b>											
SEE ABOVE EXPLANATIONS TO ENTRIES IN ARRAY BELOW											
#	Stops	Road Crew Instructions for Each Location (Verbal Listing of Array of # Columns to Right)	Direction	Engine No.	Coal/Fuel	Water/Sand	Pick Ups	Set Outs	Get Helper	Release Helper	Engine Change
Start	East Staging Yard	Get train and clipboard with all cards from staging									
1	Cheyenne A/D (Depot)	Hostler gets Loco and gives new Loco & Card to Road Crew	R				✓	✓	Yes		
2	Tower A	Tower A Operator (TM) will help to Leave Yard	R			Available					
3	Harriman Siding	Take only when directed by DS and Tower A Operator TM	R								
4	Dale Junction	Change to left hand track per yellow switch panel in aisle	R->L								
5	Laramie	Change R->L track inside E Limit as enter yard Work at Ice Dock or Stock Yard as needed	L->R			Available	✓	✓		Yes	Yes
6	Medicine Bow	No YM/Do your own work and Stock Yard as needed	R			Available	✓	✓			
7	Hanna	No YM/Do your own work and Stock Yard as needed	R			Available	✓	✓			
8	Rawlins-Sinclair	No YM/Do your own work and Stock Yard as needed	R			Available	✓	✓			
9	Wamsutter	No YM/Do own work PH & Stock Yard/Take siding per DS	R				✓	✓			
10	Table Rock	Leave Siding as directed by DS	R				✓	✓			
11	Rock Springs	Continue to Green River to make pick ups and set outs	R			Available	✓	✓			
12	Green River	Pick up and leave cars for RS, GR, Westvaco in GR	R				✓	✓			Yes
13	Westvaco	All Pickups and setouts done by Green River YM	R				✓	✓			
14	Granger	PORTLAND TRAINS TURN OFF ON OSL JUST PAST WESTVACO	R			Available					
15	Evanston	No YM/Do your own work and Stock Yard as needed	R->L				✓	✓			
16	Curvo Overpass	Change L->R track	L			Available					
17	Echo	No YM/Do your own work per Cards Change R->L track at E Yard Limit	L->R				✓	✓			
18	Ogden E Yard Limit	Change R->L track at E Yard Limit	R				✓	✓			
19	West Staging Yard	Deliver train to Ogden YM for him to talk to staging OgdenA/D-Staging by Ogden YM & Staging YM	R								
Staging Yardmaster: When this train arrives at your yard, you may use any cars from it for any other train.							Clock Out:				
Locomotive Number:		Manifest East	Date:		Clock In:						

ABOVE: Fig. 13—A blank Wyoming Division train order.

end of the layout, Cheyenne in the east or Ogden in the west, and others across the layout at Laramie, Hanna, Green River, etc. These train out on the layout are usually trains left from the last session.

After finding the train, the call boy and crew verify it: together they match each of the blocks by the car numbers/road names of the last and first cars of each block. After the rear end of a block at the end of the train is identified, they count up the block, the number of cars that the block card tells them the block should have, and if the last car is the same as shown on the block card, that block is verified. This is done for all blocks from the caboose back up the train to the head end cars. Then they match each head end car and cards, if any.

There are a few practical variations of this process that are actually used. First, the train may not have a locomotive yet, because with my system, the locomotives are chosen and coupled to the train by the hostler of that yard. This is prototypical. The owner of a real railroad, at least a sizeable one, never assigns power to individual trains. In Cheyenne—on the UP—this was the job of the roundhouse foreman. The

hostler under him moved the locomotive out of the roundhouse to the coal tower, to top off the coal and water, and then on to the departure track to attach it to the train. Then the crew climbed on board. I combine the jobs of roundhouse foreman and hostler into the hostler's role. A short pause under the coal tower suffices for the coal and water top off.

Second, the train usually has a caboose, but it may not. Staging should put a caboose on the train, but may not have had one available. ut there may be one in the yard (Cheyenne or Ogden—which each border staging) that just came off an arriving train. Alternately cabooses may be kept on a caboose track, and a yard crewman brings it to the train.

Third, the verification of car and block cards versus cars on a train may be accomplished by starting at either end of the train, but starting from the rear is faster. If the train has no caboose yet, to verify from the rear of the train that end will still be the end furthest from the destination of the train.

During the last regular operating sessions in January 2015 and in the winter invitational in February 2015 we did not have a call boy. We drew cards from a deck of playing cards to deter-

mine crew jobs and the order of road crews assigned to trains. The road crews got trains directly from staging which made trains up on the fly—only a few trains were pre-staged to kick off the session with some trains distributed across the 1,000 foot main line.

This dynamic staging in real time may have led to the mixing of head-end cars and cards in with blocks and block cards. The two guest yardmasters had difficulty with this procedure and complained the different card sizes were hard to sort. If the head-end cars were required to be put on the front of the train, their cards will naturally be on top of the larger block cards. But it was hard to fault staging for not doing so.

The two crews did send out 51 and 57 trains for the two days of the winter invitational meet. The different crews both days are to be congratulated for those totals. Those totals count about four to five trains that were pre-staged and on the layout to start each day, but the average was one train every 7.2 minutes.

A blank train order is shown fig. 13. To fill out the blank train order, the call boy should direct the crew to add the session date, the time they “clock in,” and their name(s). As soon as the locomotive shows up its number should be added. This is the train number for OSing.

The following blanks on the train-order heading should have been hand written in by the staging crew:

“Name of the train.” The last part of the name (type) is preprinted on the blank, and the direction (east or west) is also preprinted. The train order shown has the first part of the train name added in script. The form shown is for a manifest west (see the six types of trains on the Wyoming Division in the block card section).

“Train Number” is the train number that would be on a timetable, but I do not use one yet. For now this is the locomotive number.

“Number in Session” is for the trains that are pre-staged, a number I assign to the trains in the order I choose to run them. I alternate east and west trains to spread them out. From these pre-staged train orders on clipboards with car and block cards, I can then make an Excel list based on this column of

new numbers. That gives me a lineup to pass out to yardmasters and the dispatcher, so they know what is coming their way. The call boy and staging also get copies.

It is very important to write in the top margin of the train order the starting location of all pre staged trains, otherwise it is very hard on a large layout to find the train from just the car cards. My Excel header contains a blank for this information, but it is not shown in fig. 13.

If no call boy and pre-staged trains are used, then the yardmasters are pretty much in the dark unless they watch closely for approaching trains. The dispatcher knows about the train as soon as it starts on the main because the road crew should report, so a yardmaster can call the dispatcher to inquire about what is coming his way.

“Locomotive Number” is the train number identification purposes to report to the dispatcher. When trains are made up during a session, a locomotive usually will be assigned to a train by the roundhouse hostler after the staging hostler has taken the train from staging to the arrival/departure tracks and only then is the train number known.

All the information required to OS is together in a line: “Train Number”, “Train Type,” “From,” “To,” and “Direction.” OSing is quick and simple from the top of the sheet.

Note that the train name should be written in two places, on the top and on the right hand edge, which becomes the end of the form on the clipboard, so it can be seen in the call boy’s pigeon hole box of clipboards.

When the train reaches its destination, the lower right box should be filled out, mainly to provide data to determine the average time that a certain type of train takes to negotiate certain trips. This is also on the train sheet the dispatcher keeps if crews OS as they get off the train.

The second column is an ordered list of locations the train will pass through, and some are stops.

The actions at each of the locations or stops are indicated in both the wide next column that gives a brief line of instructions on what to do at each location. The next nine columns are an array that repeat much of the same information shown in the third column. If all the cells on a location line are blank for these nice far right array columns, there is no stop necessary. For the columns that have an “available” there are those services available, but a stop is necessary only if the train’s locomotive card indicates this as a stop by a dot in that cell of that location line. That is, available means a stop is optional. A stop is required only by the locomotive card. The example locomotive cards are shown in figs. 11 and 12.

The other marks in the following

columns farther right are “✓” which means there is the possibility for work picking up or setting out head end cars or blocks here. Road crews should check for work at these places as shown by the car or block cards on the clipboard and on the fascia at those places.

“Yes” indicates locations to get a helper locomotive or the release it, and finally where to change locomotives (Laramie and Green River) are also indicated with a “Yes”.

As I wrote earlier, the train order is simple taken one line at a time, and let’s face it, a train is only in one place at a time.

For a long time I had three columns for OS instructions plus a fourth larger one for notes in place of the instructions, but I found that it was better to put these detailed OS’ing instructions on the bright hot pink colored signs on the fascia at the OS locations so they were harder to miss.

The train orders add several interesting complexities of realistic operations to the Wyoming Division that many other layouts do not have. These extra requirements are exactly what prototypical steam and early diesel operations were like on the real railroad, assuming perfect, breakdown free operations. Actually, we have breakdowns to the model locomotives and cars, and we deal with them pretty much like the real railroads do.

After panicking, the engineer or crew reports to dispatcher or to me, Allen, Lenny, or Greg or anyone else in charge. Together we work out a solution, from fixing it on the spot or removing the bad car, or sending a replacement locomotive. And sometimes traffic piles up behind the stopped train.

That is pretty much what happens on a real railroad, but our terminology is different. We have “bad cars” with a “bad” coupler or truck, but not hot journals or fires, and so on.

## Putting it all together

Combining head-end car cards for a single move, block cards, locomotive cards, and train orders has been a definite challenge for our operators and for us. Each element is reasonably simple taken alone. All together it appears to be a larger challenge to operators than it proves to be once they start.

BELOW: Fig. 14—An example of a color-coded spot list for part of the Wyoming Division.

		Spots in Stations and Other Stops														Spots			
Ind's UP Ind's	Industries and Stops	Spots at Location Doors, Dock, Spouts, etc.									Off Spot Car Room					Spots			
		EM	EC	GB	HM	LQ	SC	TM	XM	EM	EC	GB	HM	LQ	SC		TM	XM	
13	A Kellogg Lumber	Yes																	2
14	B Furniture & Feed																		2
20	C UP Coal Company		Yes	Yes															6
21	D Freight House																		3
15	E Beer-Machinery-Phone Supply																		4
22	F UP Coal Company Mine #4	Yes	Yes																18
23	G Sheep Loading	See Bitter Creek above																	
24	H Reliance Coal Mine	See Reliance Mine below																	
25	I UP Coal Mine #9	Yes	Yes																20
16	J Lionkol Coal Mine	Yes	Yes																20
17	K Sweetwater Oil/Union Merch Co.									3	3								6
18	L Tristate Lumber Co.	Yes																	3
19	M Beer																		2
20	N Colony Corp Track #1 (Mine Supp)	Yes	Yes																2
21	Colony Corp Track #2 (Mine Supp)	Yes	Yes																2
22	O Mountain Fuel Coal & Oil Co.		2 Total	Yes	Yes														2
23	P Concrete Plaster Supply		2 Total	Yes	Yes														2
24	Q Rock Springs Ice																		3
25	R Superior Lumber	Yes																	2
26	S Continental Oil																		3

# Fosnight Wyoming Division meet—February 2015

by Seth Neumann

It's not often that a 5,000-square-foot layout that can handle 50 operators comes on line, but Verryl Fosnight's Union Pacific Wyoming Division hosted its first invitational meet. A total of 35 guests and 15 locals spent two days and ran about 100 trains on this HO model of UP's double-track main line from Cheyenne, Wyo., to Ogden, Utah.

A little bit about this remarkable layout for background. It is located in Cornville, Ariz., about 10 miles from Sedona, in the Red Rock Canyon, about 100 miles north of Phoenix. Verryl had a 5,000-square-foot modern steel industrial building constructed to house the layout. The layout itself is a mushroom design with a second-story gallery providing quick access from one side to the other. The dispatcher's office is on the gallery along with workshop facilities used by Verryl's regular crew. The layout was constructed over a period of four years beginning in 2011 by Verryl and his regular crew: Alan Montgomery, Lenny Wyatt and Greg White. At present the layout is about 20 percent scenicked which is just enough to give the visitor a sense of place.

I have found many extremely large layouts to be "talking dogs" that is: "It's not that they speak well, it's that they speak at all." The sheer size and number of items to maintain often render these layouts less than optimal due to the amount of maintenance required and the physical space covered. In addition large crew size often leads to difficulty in coordination and issues with crew calling and assignments. Often, these layouts are constructed such that a very large

amount of track and electronics needs to be in before any operations can be conducted at all, leading to a protracted break-in period. This was not the case with Wyoming Division. One of the real delights with this session was the generally high degree of completion and reliability of track work after such a short time. (My own layout of only 360 square feet first operated after seven years). My impression was that operational reliability was well within the range I expect of any large layout that I might run during an operating meet. Given the skills of the folks working on it and how much they've achieved to date, I expect the Wyoming Division to only get better at future meets.

An area where I feel that Verryl and the crew did an outstanding job was with crew management. This is often an issue on larger layouts, with more than 20 operators, as it becomes difficult to manage the pool of road crews and there is often some contention for desirable jobs such as locals, yards and switch jobs. Given that few visitors are familiar with the layout, especially a young layout such as the Wyoming Division, all it takes is a few mistakes, as visitors come up to speed, or minor mechanical issues to bring the layout to its knees with, in this case, dozens of operators standing around. I must admit to having had concerns about crew management when the meet was first announced, but I was pleasantly surprised to find that these issues had been anticipated and were well-managed during the two-day meet. A draw system was used each day and the draw order reversed each afternoon as the meet was divided into four tricks. Thus everyone

I now use Google Sheets (an Excel-like interactive spreadsheet for operators to mark themselves up for specific jobs. It is a first-come first-choice system.

When I completed my operating system as a concept, we had our first formal operating session on Oct. 26, 2013, with 27 operators. For an inaugural operation session, it was a great success. There were very few track and DCC problems, and the operating system worked well even though its complexity led to some oversight-type errors by our new operators.

But no serious corrections were needed in either the layout or the car forwarding system. On Nov. 30, we operated again with 28 people and followed on Dec. 26, with 35 operators to our third session. We had these three sessions with only a month between each, to reinforce the learning required.

Few changes in the car card system were made then or have been made to this date from the original design. After those three sessions we stopped operations for about six months to do the construction for phase III described in the section "staging design."

After phase III was completed we have had 13 more sessions at monthly intervals plus two training sessions for new operators. Arizona is not heavily populated so there are not many operators available, and we need 35 or so for each session. So we draw from all over the state as well as a few non-Arizona operators who have heard of the Wyoming Division.

Late last year, I sent out invitation to

key expert operators that Allen, Lenny, and I had met at Bay Rails, Southern California Ops, the La Mesa Club in San Diego, and to other polished operators who had either visited the layout or operated on it during visits to Sedona. In particular we had contact with the active model railroaders in Albuquerque who had invited me to give a talk about the layout and my four-card car forwarding system.

Enough of those invited had visited the layout and some had operated with us. They had confidence to recommend us to the others invited. On Feb. 5, 6, and 7, 2015 we had our first Wyoming Division winter invitational consisting of:

With the Google Sheets system, I number the sign-ups for two day sessions, and we choose in reverse order the second day. This is fast and efficient for both days, so we can get right to operating.

had a reasonable number of opportunities to bid for the jobs they wanted. There was minimal restaging between days except for some judicious rebuilding of yards which had gotten behind.

While the group had done a fine job on the basics of providing a well-running layout and managing the crew, they really shined when it came to hospitality! On the Thursday preceding the Friday/Saturday meet they held an open house and pre-briefing followed by a barbecue at Verryl's magnificent home in Sedona. This meal was worth the trip itself! Not only was the fare excellent but the setting provided an opportunity to reacquaint oneself with old friends and make new ones, which is one of the great pleasures of operating and is what I think keeps us all coming back. On Friday, a pizza lunch was provided and we took a general break between tricks. We were on our own for dinner Friday night and various groups sampled many of the fine restaurants in Sedona and had another opportunity to mix and share experiences. Saturday morning we were back at it but we operated through lunch and everyone was free to get lunch on their own schedule between runs. Turns out there's an excellent café across the street and groups of four or five could be seen moving back and forth between the café and the layout during the lunch period. Saturday night Verryl subsidized a very fine dinner at a local restaurant.

There were good accommodations reasonably nearby and most of us stayed in one the many hotels in Sedona.

The host team was well organized in their planning. A goal was to take a group of 15 local operators, most of whom are not regulars on the operating circuit, but are familiar with the layout and 35 boomers most of whom are very experienced,

and have them educate one another. They were very successful in this: locals were available to help but willing to see what the visitors had to offer. For certain key positions, such as handling the volume of trains needing to be turned and rebuilt (we ran about four times the normal number of trains that a regular monthly session would have), they sought out experts, such as members of the La Mesa club (Model Tehachapi Pass in Balboa Park, San Diego) who handle this function at La Mesa's frequent "24 Hours" meets.

I also noted that maintenance-of-way and steel gangs were available when the inevitable gremlins struck and what issues arose were cleared quickly.

The operating style of the layout follows the prototype in being rule 251 current of traffic operation. There are no signals at present, but they are planned. In rule 251, trains move with the current of traffic, right-hand running here, without regard to schedule except that there is a serious effort to keep first-class trains moving on the public time table. A number of locals and switch jobs work out of the major towns and provide a good balance of jobs.

If you have any interest in UP's operations over Sherman Hill and across Wyoming and into Utah I would strongly recommend attending a future Wyoming Division meet:

- Great concept of heavy mainline railroading in the west

- Well executed railroad that runs well

- Well organized meet

- Really nice people

- Great location with lots of activities for your significant other

Sharon manages a full program for wives.

- Located in beautiful country and can be part of Great Southwest road trip

we now have ABS signals

Thursday—open house to inspect the layout, followed by a barbecue at Sharon's and my home in Sedona.

Friday—9AM to 4PM operating session, with pizza delivered for lunch.

Saturday—9AM to 4PM operating session, followed by a prime rib banquet at a local restaurant.

So there were at least six hours of operations each day excluding lunch.

Thirty-five notable guest operators attended from the Bay Area of California, Los Angeles-Orange County area, San Diego area, Albuquerque, and one person each from Texas and Portland, Ore.

In our regular sessions we run about 22 trains in four hours, or one every 15

minutes and those are all pre-staged. In six and a half hours in the winter invitational we ran 51 trains on Friday, and not having a slow start getting organized on Saturday we ran 57 trains. On Friday we only had about six pre-staged trains to start the session, and on Saturday there were about four to six that were left over from Friday in place on the layout to start.

All other trains were dynamically staged by two staging yardmasters, both of which were new to the layout and card system. Allen worked with them only a few minutes to train them and then they did the rest of both sessions. The rest of the operators had no problems with my four-card car

forwarding system, as can be seen by the number of trains run and the few problems encountered.

These are the problems we encountered for the two day session. There were three instances of the less-experienced Wyoming Division hosts acting as operators slowing things up; three or four locomotive failures; a few car failures (couplers fell off); two track or turnout instances; and a situation with the phones.

The details are: I overlooked that a copy of my list of all 827 spots on the layout was not available at each yard to guide the remarking of cards to forward blocks and cars continually throughout the session.

One important advantage of my system is that they can send cars along for multiple uses during a session. It is not necessary to wait the arbitrary period of time until the start of the next session after the car cards have been turned. But for new operators to the layout, a list of where to send them is essential. A portion of this spot list is shown in fig. 14.

Without the spot list, most cars were sent staging to staging, that is LA (or Oakland or Portland) to NP (Chicago, etc.) or vice versa. This may have contributed to the head end cars and cards being mixed up with the blocks, so the different card sizes mattered. That difference in card size as a problem was new to me, and this is may be the reason.

Three or four locomotives failed—one B unit lost its consisting or decoder, one or two lost the traction goo on the drivers, and other minor problems were seen, couplers, etc. A few bad cars were pulled, perhaps four or five, but were fixed on the spot.

A pair of double slip switches in Green River we used in that yard design to follow the UP in Green River gave trouble by not staying locked in position. We are going to try Tam Valley controllers, which several folks recommended.

There has always been a pair of tracks in Rock Springs that we knew have too close of spacing, so trains on both of them at the same time will interfere. Allen and I knew this, but we had never had enough trains running there at once to make it a problem.

These guys did.

The four-card car forwarding system was well received, and was immediately mastered. Cars were accurately picked up and set out, and the operators forwarded cars themselves like planned. No one said they longed for switch lists or four-cycle cards. I think this proves that experienced operators can pick it up very quickly, as I expected, because our less experienced operators in our first few sessions also learned it fairly easily.

A few comments by email afterwards were about operator error or misunderstanding of the rule book. Nearly all of these were made about my relatively unseasoned operators, but like all operating sessions such comments were reserved for me and sent to me in private. I hope to use this session as inspiration for my relatively less experienced crew.

There was quite a backup to get into Green River for a period due to the less-experienced-yard help of my regular crew, and the double slip switches. This was exacerbated by crowding of the 41-inch-wide aisle in front of Green River. I intend to insert a rule in each yardmaster's-instruction book that not only does he "own" the yard, and it is his to control, but he "owns" the aisle also. He can ask operators who are not immediately busy in his aisle to step back and watch at a distance.

It was suggested that multiple phones be added to the two systems of eight phones on the layout to one master phone at DS, making two nine-phone systems. There are 18 phones

in all, but this new system I bought is limited to those 16 on the floor, and like so many recent electronic items, it has been discontinued. So even one extra phone would start out at \$2,000 plus wiring up all the new ones. I have decided I need the exercise of a few extra steps to a distant phone.

There has always been a problem getting operators down on the floor to answer the phones when the dispatchers call to transmit instructions. The winter invitational was the same.

A week later I visited Ron Varnell in Torrance, Calif., and he has installed a light and bell system for the dispatcher to alert the other operators at specific locations to call back to the dispatcher. I plan on installing a similar system at each of the major yards plus staging that have permanent yardmaster, and to make them or their helpers responsible for relaying messages to the required person. Each of these yards has a yardmaster, a classification foreman, and a hostler, so together they should get the message delivered to whomever it is intended.

I did a brief analysis of run times for a few of the 108 trains run in the winter invitational. My train sheet does not list the type of train being reported. It only heads a train's column with the locomotive number. Some train types would be expected to take longer than others because of required work along the way. PFE and stock specials only have to stop for fuel, etc. and for ice or animal rest. *City* passenger trains, (cities of San Francisco, Los Angeles, St. Louis, and Portland) stop at all major depots (Cheyenne, Laramie, Green River, Evanston, and Ogden) and there is switching of one or two cars along the way. Forwarders only stop for fuel and helpers and engine changes (Laramie and Green River). Manifests have typically one to six head-end cars to switch. Those setout cars leave room on the manifests for pickups to be made. Locals stop everywhere for all reasons. Basically, from the data limited by lack of train type on the dispatcher's train sheets, complete runs across the layout took from 1 hour to 2 ½ hours.

Reflecting that staging and Ogden take two men each, Cheyenne and Green River need three men each, there were two dispatchers, and two men in

**BELOW:** This view show the east end of the Green River yard with Seth Neumann, yardmaster, and Granger, Wyo. across the aisle to the left with the Oregon Short Line junction on the lower level. The OLS hidden track is at the first siding about eight inches under the lower level bench. OSL runs back under Green River and ends in Portland staging to the right out of photo.



the switching puzzle job of downtown Ogden (see the 13 industries on the Lower Level track plan of fig. 2), and three or four other locals which were run which took long times, the number of road crew of one or two men each was less than half of the guests, so our 35 guests, plus a few of our hosts operating, really ran a lot of trains.

In all, the sessions of about 13 hours of actual operations over two days were a fine success. After the session there was a unanimous outpouring of admiration, gratitude, and respect for the layout, the system, and the weekend in general. The laudatory remarks far exceeded anything I expected, and Allen, Lenny, Greg, and I were overwhelmed by the enthusiasm for the layout and the experience of operating on it.

We all had so much fun that I plan on doing it annually and perhaps if there is interest I will expand to a spring and a fall invitational, with rotating targeting of different areas of the country for preferential invitations for the first few invitees and then opening the invitations up to all areas after a certain period.

During the second ever session in November 2013, an experienced operator told me after about two hours as the Laramie yardmaster, "I'm going to cancel my club's session next month and bring everyone here." Later he wrote me and said, "Congratulations, you have managed to have prototypical operations with a minimum of paperwork." Those two compliments were the highlight of that session for me, especially since it was one of the three preliminary sessions meant as trials of the whole system.

After the winter invitational, a very experienced and wellknown operator put his arm around me and in a fatherly way asked me, "Verryl, how did you get so far beyond the curve in just three years?" I fumbled for an answer, but very much of the credit goes to Allen Montgomery, and Greg White, who have worked tirelessly on the layout since we started after Thanksgiving 2011, and to Lenny Wyatt who worked full time the first 2 years and has been on call since then.

There were 35 invited out-of-state operators at this first annual Wyoming Division winter invitational meet and



**ABOVE: Dave Turner—in the foreground— led the Albuquerque contingent of five operators at the east end of Rock Springs, Wyo. It runs the entire length of this aisle. It has 19 mines and industries to work. There is no room for a yard, so all traffic goes into and out of Green River, which is around the bend. A road crew works Rock Springs to Green River. The Portland ten-staging tracks is hidden below the lower level on the right.**

one from Arizona. We also had ten of our Arizona crew from all over the state as docents in addition to Allen, Lenny, Greg and me. They were rarely needed as instructors for the 35, so about six of them operated a few trains during the two days of sessions. There are photos of the layout and the operations with descriptive captions at <http://verrylvfosnightjr.slickpic.com/> in an album with the photo of the cute I-made-it-myself steam locomotive mailbox on the cover. There are some photos of the other sessions in sub-albums.

Lorne Noyes of Prescott has photos of the winter international op session(s)

on his SlickPic site at <http://arizonalorne.slickpic.com/albums/1stAnnualWinterInvitational/photo#9919804>.

For general information I have a Yahoo group at [http://groups.yahoo.com/neo/groups/wyoming\\_division/](http://groups.yahoo.com/neo/groups/wyoming_division/) (the space between "wyoming" and "division" is an underscore "\_"). I have recently been posting all progress reports on the SlickPic site in captions under the photos rather than the Yahoo group. The Yahoo group is good for ancient history and the nuts and bolts of construction if you cannot find some detail in a SlickPic photo caption.

**RIGHT: The weekend operating session wound up on Saturday evening with a prime-rib dinner at Relics Restaurant in Sedona. The operations were about seven hours on both Friday and Saturday.**

