Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
21	1/12/1995	NS	CTC			8031	Track Circuit	Devon, WV	N

Loss of Shunt - Possible Rust or Foreign Material on Rail

At approximately 8:00AM, train No. 946U1 was shoving a caboose and four (4) cars eastbound from #2 Storage Track onto the Buchanan Branch at Devon. The move was governed by dwarf signal 4L which displayed a SLOW APPROACH aspect. The move was stopped with three (3) cars past the 4L signal and inside the "OS" at Devon, in order to make a reverse movement. It was noticed by the train crew that 4L signal was still displaying SLOW APPROACH. Once the reverse movement started, 4L signal went to a STOP aspect.

Investigation by signal personnel showed that a 0.06 ohm shunt, when applied at the base of the rail in the "OS" track circuit would drop the "OS" track relay. However, when held to the top of the rail, the shunting was erratic. There were signs of rust on the wheels in this area. Further investigation led to the determination that rust on the top of the rail in #2 Storage Track had built up on the wheels of the cars being shoved, and that, along with the rust already on the "OS" rails, caused loss of shunt. A cut of cars was shoved back onto the "OS" to verify this finding. Intermittent shunting was evident on this cut, also. A car with brake applied was pulled over the affected tracks to clear the rust to the point where shunting was reliable.

Ground tests were performed and proper track relay current was verified. No other discrepancies were found, and the signal system was returned to service.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
22	1/24/1995	NS	CTC			5158	Foreign Current	Corinth (Blanchet), KY	N

Train No. 388 was stopped on Track #2 at Blanchet waiting on Train No. 108 to clear the block ahead. Meanwhile, Train No. 108 was running northbound, Track #2, on an APPROACH indication waiting for two southbounds to clear the single track ahead. The dispatcher had requested the northward signal for No. 388 at Blanchet so that it would come in once No. 108 could get a signal and clear the block. The crew on No. 388 reported observing that the signal at Blanchet displayed an APPROACH indication for about six (6) seconds and then went back to a STOP. At this point in time the crew knew that No. 108 was still in the block ahead and reported the false proceed signal they had observed.

Signal personnel investigated and determined that the cause was foreign current causing the coded track relay at Blanchet to chatter on the negative side, thus momentarily picking up the "H" relay for Track #2 while it was occupied. This occurrence was duplicated by observing signal equipment response whenever a northbound train passed a repeater cut section about two miles north of Blanchet. As the rear axle passed through the insulated joint stagger at the cut section, the track relay at Blanchet would chatter and very briefly pick the "H" relay. There was approximately 6.5 VAC foreign current present in the stagger at the cut section.

The problem was corrected by installing track reactors (in both tracks) at the Blanchet L-case in series with the respective track relays. Appropriate tests and inspections were performed to verify signal system integrity, and the signals were returned to service.

23	1/25/1995	NS	CTC			2540	Design	New Bohemia (Poe), VA	N

Human Error - Signal Circuit Design Error, Inadequate Service-Testing

Train No. 821, traveling westbound on the Eastbound Main reported a CLEAR signal indication at Milepost N-73.5 and then encountered a RESTRICTED indication at Milepost N-75.7.

Signal personnel investigated and determined that the RESTRICTED signal was due to a line wire wrap at Milepost N-77.1 which shorted out the coils of the ZTPA relay at the N-75.7 signal. A design deficiency was responsible for fact that the singular failure of the ZTPA relay did not result in an HD pole change to the signal at Milepost N-73.5.

The problem was corrected by circuit changes and by correcting the line wrap condition.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
24	1/29/1995	NS	AB			8575	Track Circuit	Ford, VA	N

Loss of Shunt - Possible Rust or Foreign Material on Rail

Train No. 235 had lead unit 8575 fail with a wheel slip alarm. The train was stopped and the rest of the units were used to move the train to the adjacent track. Mechanical shop employees then attempted to move the stalled engine which was by that time alone in the block. The protecting signal was being observed by Trainmaster and the crew of No. 235, and they noticed that it was flopping between a STOP and CLEAR indication while the attempt was being made to move the engine.

Signal personnel were called to investigate, and by the time they arrived, engine 8575 had been moved to a spur track. It was found that the track relay, a 2 ohm, 4 point, DN-11, could be shunted with a 0.06 ohm shunt at either end and at the point where the engine was being operated at the time the false clear was observed. The track relay was tested and found to be in spec. The Mechanical forces were questioned about the operation and condition of engine 8575, and they said it had been leaking grease profusely to the rail. Due to this grease and the icy conditions, they had operated the sanders while attempting to move the engine. The condition was duplicated as closely as possible with the engine heavily sanding the rail and loss of shunt did occur. The cause was determined to be the grease/sand combination on the rails that resulted in the intermittent loss of shunt.

Once the rails were determined to be sufficiently clean of the grease, the signals were fully returned to service.

25	2/12/1995	NS		Remote		4144	Signal	Chicago, IL	N

Phantom Signal - Due to Sun Angle

At approximately 5:30PM, Train No. LC29 was prepared to head off the Pullman Branch eastbound through Pullman Junction. Signal 16RF was the governing signal for this move, and the crew reported they observed it displaying SLOW APPROACH (Yellow over Red for this dwarf signal). The engineer proceeded on this signal indication into the plant at Pullman Junction, but stopped the move when he and the conductor observed the power switches were lined against the move. The move was stopped short of any switch. After reporting the incident to the operator at Cummings, the train received permission to make a reverse movement on the Pullman Branch to where they cleared the "OS." The operator had stated that he had never lined the signal for LC29's move. Once they cleared the "OS," the crew still observed the same signal aspect displayed on 16RF. They got off the engine and shaded the signal and observed that the signal was displaying STOP (a single Red).

Signal personnel were called to investigate. On arrival, the signal was properly displaying a STOP indication, however the sun had begun to set and was not affecting the signal. Other operational tests were performed with no exceptions taken. The signal was taken out of service until the phantom signal situation could be investigated with proper sunlight conditions.

The following day a complete locking test was performed at Pullman Junction along with ground tests and applicable meggering and relay tests. Again, no exceptions were found. With sunny conditions available, sight tests were performed between 5:00 PM and 6:00 PM and the presence of a phantom aspect was confirmed. 16RF is a 2 position colorlight dwarf signal designed to display a STOP or RESTRICTING aspect (Yellow on top, Red on bottom). The sun was shining directly into the signal and made it appear to display Yellow over Red when only the red unit was energized. It took the installation of three (3) phankill devices to remove the phanton aspect. The signal was returned to service in that condition.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
26	3/4/1995	NS	CTC			6598	Human Error	Stockbridge, GA	N

Human Error - Signal Personnel Introduced False Energy into Signal System During Testing

Train No. 230 was northbound at Milepost 169.811, the first intermediate signal north of Stockbridge control point, where they observed a CLEAR signal indication. Aware of the presence of another northbound train in the block ahead, they contacted the dispatcher and were instructed to take the 169.8H signal as displaying RESTRICTED PROCEED. The next signal, intermediate 166.8H, was displaying RESTRICTED PROCEED when they came in sight of it. The train ahead, No. 140, had been in the block just past this signal when No. 230 observed the CLEAR indication at 169.8H.

Signal personnel were in the process of repairing a severely vandalized signal bungalow at Pless, Milepost 164.5H. Because of damage to the signal system at Pless, northward signals were not available leaving the next control point south (Stockbridge). To expedite train movements, signal personnel were stationed at the 166.8 signal with an ElectroCode test set temporarily feeding signal codes into the location as if they were coming in from Pless. Through a lack of communication, the temporary arrangement was configured to give false proceed indications to northbound trains. The temporary arrangement was removed and the signal system returned to normal service after testing as required following the restoration of Pless bungalow.

27	4/25/1995	NS	AB			UP2532-4261-3151	Human Error	Rossville, TN	N

Human Error - Improper Equipment Installed

At approximately 2:00 PM, Train No. 391, running westbound, observed the westward signal at the east end of Rossville siding display CLEAR. The next signal which was at the west end of Rossville displayed STOP as it should have because an eastbound train, No. 364, was approaching on the single track ahead. Train No. 391 was expecting to stop short of the switch at the west end of Rossville in order to meet No. 364, so a normal stop was made.

The false proceed was reported to the dispatcher, and signal personnel were called to investigate. The incident was recreated and was discovered to be caused by the improper presence of a full wave rectifier between the polar output of the electronic track device and the polar HD relay for the involved signal. This device, an HP-1, caused the polar HD relay to be picked in the "normal" position with either positive or negative polarity feeding out of the ElectroCode HD terminals. The HP-1 was removed, proper testing performed, and the signal system was returned to service.

The HP-1 was intended to provide neutral polarity from a polar HD source on another ElectroCode cabinet. The HP-1 had been removed by the maintainer while troubleshooting a problem about two weeks prior to this incident. Following the troubleshooting the HP-1 was installed on the wrong Electrocode cabinet by mistake and the error was not detected until the incident in question.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
28	7/25/1995	NS		Remote		Unknown	Design	Spriggsboro, IN	N

Human Error - Signal Circuit Design Error, Inadequate Service-Testing

At approximately 4:00 PM, Train No. 308 received and took a DIVERGING CLEAR indication on the eastward signal from the Ft. Wayne District to the Chicago District at the West End Spriggsboro. Their route was lined onto the Chicago District Main Track and in the same plant into the siding. The crew had a STOP indication on the eastward signal at the east end of the siding. The train was stopped before passing the STOP signal, and the crew reported the improper signal they had received at the West End Spriggsboro. Signals at Spriggsboro were kept in STOP position for train movements until the signal system could be verified.

Signal personnel investigated, and found that with the mainline eastward signal cleared at the East End Spriggsboro, the eastward signal off the Ft. Wayne District would display DIVERGING CLEAR instead of the correct DIVERGING APPROACH on a route lined into the siding. The "D" relay for this signal was energized by circuitry for an alternate route.

Signal changes installed earlier in the year had a design error that was not found during cut-in tests on this untypical line-up of signals. The design error was corrected and the interlocking was completely tested before being returned to service.

29	8/22/1995	NS	CTC			8883	Resistor	Brandy Station, VA	N

Failed Equipment or Device - Track Resistor

Train No. 342, northbound, passed signal 60.8 which was displaying CLEAR. Conductor and Engineer Trainee looked back and observed that southward signal 60.9 displayed APPROACH while their train was still occupying the 60.9 track circuit.

Investigation revealed that the Trakode bleeder resistor, design value of 12.5 ohms, had a resistance of 96 ohms. This was a change in the value of the resistor itself rather than a connection. This high resistance value prevented the resistor from properly acting as a bleeder. With this resistor in place, the 60.9 signal would occasionally display APPROACH when a shunt was placed about 1000 feet south of the signal. Once duplicated, it was evident that the 60.9 track relay would pick up on the negative side with each pulse of the CP relay on the south track. The track currents were found to be normal. The false proceed was not easy to reproduce; several northbound trains were observed without recurrence. Several variable factors were obviously involved in reproducing this incident, presumably train speed, train shunt and track conditions.

A proper value resistor was installed to alleviate this situation.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
30	8/25/1995	NS		Remote		Unknown	Human Error	Columbus, OH	N

Human Error - Field Wiring Error, Inadequate Service Testing

At approximately 4:00 AM, Train No. 195 had set off five cars in the west end of the Middle Track at Bannon but did not return the derail to derailing position when they left. No. 195'2 crew asked Train No. L78's crew to replace the derail for them when they came west. No. L78 came out of the intermodal ramp and proceeded west on the Westbound Main. No. L78 had a CLEAR indication at the west end of the Middle Track which was the signal protecting the electric lock switch to the Middle Track. With the derail left off, this signal should not have cleared.

Signal personnel investigating the incident determined that the Middle Track derail was not setting signals to STOP when in the reverse position. The cause was found to be that during a recent construction project the "OS" track wires that had fed through the derail controller box had been replaced with new wires that went directly to the track. There was no evidence on the circuit plans that the track wires had gone through the derail, so the construction forces assumed that the derail was not involved in the work they were doing. The track wires were rerun and broke back through the derail circuit controller to correct the problem.

31	9/18/1995	NS	CTC			Unknown	Signal	Maxwell, MO	N

Phantom Signal - Due to Object in Foreground or Background

At approximately 7:40 AM, westbound SP Train CHRBM was in the BN siding east of Maxwell Control Point as eastbound BN Train 154 cleared them on the BN main track. Train CHRBM got a DIVERGING APPROACH indication on the leaving signal at the BN siding, and at the same time called out STOP indication which they saw on the next signal, the 48L signal at NS Control Point Maxwell. The 48L signal was about 1300' ahead of the train as it started to move out of the BN siding. The SP engineer stopped his train at a point about 780' from 48L signal to let vehicular traffic pass on highway crossing. At that location, the crew reported seeing 48L display Red over Yellow, DIVERGING APPROACH, and so the engineer started to move again toward Maxwell. When the train got within about six (6) car lengths from signal 48L, they noticed it was then Red over Red, STOP. The engineer was able to stop the train with only one truck of the lead engine past the 48L signal. The NS dispatcher had not lined a route for Train CHRBM, and this fact was verified later by reading data loggers.

Signal personnel were called to investigate and after making appropriate operational and FRA tests, were unable to duplicate the incident or find any problem with the signal system. A phantom signal was suspected and confirmed four days later under similar sunlight conditions. It seems that the rising sun was reflected partly by some aluminum signal cases on the north side of the track, and that contributed to the phantom. A 10-degree deflecting lens on the 48LB head was removed to lessen the chance of the phantom signal. The signal was realigned to account for track curvature. The 48L signal was also changed from approach to continuously lit due to the fact that a phantom has been seen on it, and a dark signal is more susceptable to a phantom aspect.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
32	11/12/1995	NS	CTC			8592-6520	Poleline	Bradshaw, WV	N

Maintenance - Pole Line (storm, excessive vegetation, rotting poles, excessive slack in wires, etc.)

At approximately 1:40 AM, Train No. Q16U710, traveling westbound on the Dry Fork Branch, reported they observed intermediate signal I-125 change from RESTRICTING to CLEAR for about a minute and a half then go to APPROACH. This occurred as light engines running as Train No. 960U7 were reportedly passing the controlled signal ahead at Bradshaw, MP I-11.5.

Signal personnel were called to investigate and upon arrival were unable to duplicate the problem. However, it was observed that the pole line was storm damaged at five locations between Mileposts I-11.5 and I-12.5. Line wires that controlled the aspect of signal I-125 were either shorted or broken. Five trees were then removed from the line, and the wires were repaired. All involved equipment was tested and an operational check was made on the signal. The signal system was found to be operating properly and was released for service.

Analysis of the line wires damaged by the fallen trees indicated that possibly leakage through the wet trees laying across the line could have conducted enough current to have picked the 125 HD relay. This condition would only have been a possibility while the OS circuit at Bradshaw was de-energized which it was for about a minute and a half while Train 960U7 was passing. It was concluded that the factors present could have caused signal I-125 to display a false proceed aspect.

33	11/15/1995	NS	CTC			3274	Poleline	Carbo, VA	N

Failed Equipment or Device - Object In/Through Slide Fence - Not Indicating

At Approximately 7:05 PM, Train No. S90U715, engineer and conductor unknown, was traveling eastbound when they saw a tree that had fallen over the top of a slide fence and was blocking the track near MP CV-435. The train was stopped short of the tree. The train had been running on a signal to PROCEED, observed at Carterton MP CV-436.2.

The signal maintainer and a track crew were called to remove the tree and check the slide fence. The maintainer observed that the slide fence trigger near the point where the tree fell was tripped. Once the tree had been removed and the train had left the block, the block light showed CLEAR, even though the trigger was still tripped.

The trigger that was tripped is one of several spaced along a quarter mile long slide fence. The slide fence circuit runs along the top of the slide fence poles mounted on insulators. The single break slide fence circuit loops through each trigger and then returns to the slide fence relay via the signal poleline which was on the opposite side of the track from this fence. The falling tree had broke the line wire at the top of the fence and then hit the fence tripping the trigger. Both ends of the line wire were shorted to the slide fence, thereby bypassing the tripped trigger. Insulation had been stripped from the line wire as it jerked through the insulators before the tie wires broke. This allowed the line wire ends to make electrical continuity with the steel fence material.

Repairs were made to the line wire, the trigger was reset and tests were made on the signal system before returning it to service.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
34	12/4/1995	NS		Automatic		Unknown ICG Engi	Design	Hattiesburg, MS	N

Human Error - Signal Circuit Design Error, Inadequate Service-Testing

At approximately 1:00 AM, northbound Train No. 294, Engine NS 6651, stopped short of its track warrant limits at the approach signal to Hattiesburg automatic interlocking. Train 294 was held to allow an ICG switching move to be completed in the vicinity of the interlocking. As the ICG switching movement progressed, it moved out onto the NS main track through a switch facing away from the interlocking. This was done under track warrant authority by NS dispatcher at Birmingham, and when the switch was reversed by ICG, a stick circuit was set which would normally have been used to allow a key stand clearing for ICG movement across the interlocking. However, the stick circuit was held up by Train 294's presence on the approach circuit at the time the stick was set. Once Train 294 received a track warrant to proceed and observed they had a CLEAR indication at the approach signal, the engineer started movement toward the interlocking. Meanwhile, the ICG switching movement that had completed their switching came up to the interlocking on their track and checked the indication on their key stand. Because the stick circuit was still up, the ICG crew had a CLEAR indication that meant that they could activate the pushbutton. When the button was pushed the ICG got a signal to proceed across the interlocking, which they did. When the ICG move occupied the "OS" it illuminated a holding signal for Train 294, and that train again stopped until the ICG movement cleared the interlocking.

The design problem that permitted this scenario was corrected, the signals were checked out and returned to service.

35	12/22/1995	NS	CTC			3920	Signal	Jacksonville, IL	N

Phantom Signal - Due to Sun Angle

At approximately 12:58 PM, Train No. D33D westbound was waiting in the siding at Arnold to meet an eastbound train. Train D33D was stopped about four (4) car lengths east of the westward signal, 56L. After the eastbound train passed on the Main Track, the crew on D33D observed signal 56L display Yellow over Yellow, ADVANCE APPROACH, for their move. The engineer started his train moving out of the siding. Just before reaching the power switch, the engineer observed that it was lined against his movement, made a normal stop but ran through the switch with his entire train. The dispatcher had not requested a route for D33D to leave the siding.

Signal 56L is a double mast bracket signal located to the right of the Main Track. Westbound movements on the main are governed by signal heads 56LA & 56LB on the right mast; the siding by signal heads 56LD & 56LE on the left mast. All heads are US&S H-2 with 9 volts (AC or DC) on the bulbs, and only the D & E heads (the siding signal) equipped with 30-degree deflecting lenses. A long sweeping right-hand curve is transversed approaching the west end of the siding. ADVANCE APPROACH is a valid signal to leave the siding.

The false Yellow over Yellow was observed on the 56L E&D heads by the investigating signal personnel. When compared to the Main Track signal Red over Red, the siding signal did appear Yellow over Yellow from an engine until it backed more than 150 feet back from the shunting joints. Tests revealed that this was a phantom signal, caused by sunlight reflecting off the snow covered ground in the early to mid-afternoon. Further experimentation showed where the removal of the deflecting lenses was the only sure way to prevent this phantom signal from occurring. The lenses were removed and the signals re-aligned to compensate. Signals were placed back in service.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
36	12/24/1995	NS	CTC			Unknown	Insulated Joint	Stearns, KY	N

At approximately 9:45 AM, Train No. 108 was moving northbound on track #2 at Stearns, KY when they observed an APPROACH DIVERGING signal for their movement. Knowing they were to meet opposing southbound traffic at the end of the double track (the next signal), they expected to get an APPROACH indication at Stearns. Engineer reported the incident to the dispatcher and proceeded on to the end of double track at Whitley where he had a STOP indication as expected.

The signal maintainer was arriving at Stearns to investigate a previously reported loss of train indication in the block where the false proceed signal was encountered. He was waiting on the traffic to clear before starting his investigation when Train 108 observed the false proceed. After Train 108 passed, the maintainer opened the signal case and observed the coded track relays chattering, indicating the presence of AC on the rails. The amount of AC on the rails diminished during the day, and so the relays never picked to the point of causing a repeat of the false APPROACH DIVERGING signal. However, one of the insulated joints at the signal read as having a four ohm short. The intermediate signal at Stearns is designed to receive only a minus code for an approach and a plus code for an approach diverging. The track was taken out of service pending resolution of the problem.

The next morning, there was more induced AC read on the rails than on the previous day, but the insulated joint that had been shorted the day before now read over 65 ohms. However, by manually shorting out the joint, the relays chattered to the point that the "BD" relay falsely picked when only an "H" code was received resulting in a false approach diverging signal. Discussion with the local power company revealed that their load on a power line that crossed the track in the block was much higher in the morning than at other times of the day.

To correct the problem, the intermittently shorting insulated joint was replaced, and reactors were installed in series with all coded track relays in the block. Tests were then run to verify that the problem could not be duplicated by shorting an insulated joint at the Stearns signal location. The signal system on track #2 was then returned to service.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
94	3/20/1996	NS	CTC			8534	Human Error	Wytheville, VA	N

Human Error - Field Wiring Error, Inadequate Service Testing

At approximately 8:45 AM, Train No. 111 was eastbound at the west end Wytheville siding and observed eastward signal 116R displaying CLEAR for their train. Train No. 227, at that time, was approaching and passing westward signal 118L at east end Wytheville siding. Signal 118L was displaying DIVERGING APPROACH for No. 227's move into Wytheville siding. Engineer on No. 111 was aware of his impending meet with No. 277 at Wytheville and knew he should have seen an APPROACH indication on signal 116L, therefore he stopped his train at the west end and reported the incident.

Signal personnel were called and on arrival were able to duplicate the reported situation. With eastward signal 118R at east end Wytheville displaying STOP the advance signal, 116R, at west end Wytheville did display CLEAR instead of APPROACH. The problem was traced to being caused by different AC power sources feeding the local and control coils on the signal control relay (116R BP), a three position AC vane relay, at west end Wytheville.

The signal circuits on this district are AC type, fed by a 4800 volt distribution line on the poleline. There are three substations between Bristol and Radford, Virginia which can all be feeding portions of the line if separated by sectionalizing switches which are spaced at about every seven miles along the poleline. One of these sectionalizing switches is located between the switches at Wytheville. That set of switches had been left open after storm trouble repairs the previous night, with the west end being fed up from Marion and the east end fed down from Radford. The original configuration had been that the W-BX110 which went through the 118R HR at east end to select control phasing on the 116R BP circuit was off the same (west) side of the switches that fed the local winding at the west end. When a transformer had burned up back in mid-1994, the W-BX110 line had been incorrectly tapped onto a transformer that came off the east side of the switches. Thus the condition was at that time set up to allow the two coils of the 116R BP relay to be fed from two separate sources if these sectionalizing switches were ever left open and fed from two different power companies. The fact that the two power feeds happened to be out of phase, led to the 116R BP relay receiving what looked like the proper control to display a CLEAR signal when the east end controlling relay was sending what was meant to be an APPROACH.

Since this territory is to be converted to electronic track circuits this year, the switches were removed from service, and locked in the closed position. The signals were returned to service after appropriate testing.

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Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
95	5/11/1996	NS	CTC			8951-8955	Human Error	Williamson, WV	N

Human Error - Field Wiring Error, Inadequate Service Testing

At approximately 7:10PM, Train No. 195U110 had uncoupled from its train on the Old Passenger Main and pulled west of the 82L signal on Main 2. The Bluefield dispatcher lined a route for No. 195 to move east toward the SV Main, and Signal 82L indicated DIVERGING APPROACH DIVERGING. Because the next signal in this route, 92L, was at STOP, the 82L signal should have displayed DIVERGING APPROACH. Train 195 was safely stopped before passing the 92L signal, and signal personnel were notified.

Signal 82L is a color position type. DIVERGING APPROACH is represented by Red-horizontal over Yellow-45 degrees. DIVERGING APPROACH DIVERGING is represented by Red-horizontal over Flashing Yellow-45 degrees. The incident was duplicated by signal personnel. It was evident that any time 82L was setup to display DIVERGING APPROACH, the bottom head would flash making the signal incorrectly indicate DIVERGING APPROACH DIVERGING. This was caused by the improper hookup of a flasher that had been replaced three days before. The flasher that was replaced was of a different manufacturer than the one that replaced it. Though either flasher was capable of flashing the aspect, the two had different terminal board arrangements and had to be hooked up differently. The hookup that was found caused the bottom head to flash improperly for the DIVERGING APPROACH DIVERGING as well as for the DIVERGING APPROACH DIVERGING aspect where it should have flashed. This condition was then corrected, the signals properly tested and returned to service.

97	7/8/1996	NS	CTC			8586-8755	Human Error	Beech Fork, WV	N

Human Error - Field Wiring Error, Inadequate Service Testing

At approximately 3:50 PM Train No. U34U708 pulled their train about one and one-half units past signal R48 and stopped to cut off their caboose. The crew noticed signal R48 was still displaying DIVERGING APPROACH instead of STOP as it should have with their units occupying the track beyond the signal.

Signal personnel were called to investigate and found that the track immediately beyond signal R48 was a shunt fouling that, when shunted, would bring the track voltage on the main track portion down to only 0.2 volts. This was not enough of a shunt to drop out the track relay. Further testing and inspection revealed that when the south rail track connections of the fouling wires were disturbed while the fouling was shunted, the track relay dropped and the R48 signal displayed stop. On close inspection it was found that the bondstrand in both connectors on the south rail had never been crimped. The effects of corrosion over a period of time and vibration resulted in the fouling wires becoming ineffective. No one could remember the last time these particular wires had been reworked/installed. There was documented evidence that shunt fouling tests were performed at this location in accordance with rule 236.104, but apparently the corrosion and vibration had at this point in time caused a high enough resistance to make the wires ineffective for shunting.

Two new rail connectors were installed and the track voltage again measured. With a shunt applied in the fouling section, the reading was 0 volts on the main track and the OS track relay dropped with less than one milliampere current. The signal system was returned to service.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
96	7/11/1996	NS	CTC			7025, CR6028	Resistor	Deal, VA	N
			Failed Equipment or Device - Track Resistor						
			At approximately 11:00 PM, Train No. 203 passed the southward signal at milepost 187.5 on a CLEAR indication. Looking back they noticed that the northward signal was displaying APPROACH while their train was still occupying the north track circuit. At approximately 11:40 PM, train No. 211 noticed the same problem. Investigation revealed that the Trakode bleeder resistor, design value of 12.5 ohms, had a resistance of 500 ohms. This high resistance value prevented the resistor from properly acting as a bleeder. With shunt on the 187.6 track, the 187.6 signal would display an approach indication. The high resistance was traced to a film that had developed in the bonds between the carbon and the metal tabs on the ends of the cartridge type resistor. The resistor ends were cleaned, and the resistance dropped to 14 ohms. A shunt on the 187.6 track then was found to cause the proper restricting indication.						
98	7/22/1996	NS	CTC			2822	N/A	Peru, IN	N
			Phantom Signal - Due to Object in Foreground or Background						
			At approximately 1:57 PM, Train No. 068 was traveling eastbound when each member of the crew called the eastward signal ahead at milepost D-197.3 CLEAR. About one minute later they saw that this signal was Red over Red and were able to stop short of the signal. They reported to the dispatcher that the signal fell in front of them. The dispatcher then lined the signal up for their move, and No. 068 proceeded on signal indication after inspecting their train. The dispatcher had not lined the signal for No. 068 at the time they reported they had first seen it (verified later with recordings) so he called signal personnel to report a possible false clear. Signal personnel arrived and could not duplicate the incident. All appropriate signal tests were performed with no exceptions taken and the signal itself appeared to have no physical defects. A phantom signal was suspected but could not be checked until the sun conditions were right. The signal was placed back in service with instructions that it not be cleared east until eastbound trains had reported they were stopped at the signal. The next day at the same time and with the same engine and road foreman engines, an attempt was made to recreate the incident. The engine approached the signal (at STOP) from the west with instructions to the crew to call out the signal indication as soon as they could interpret the aspect. Two crew members called a CLEAR two miles from the signal. The third crew member called a CLEAR 1.5 miles from the signal. The engine was stopped at the 1.5 mile point where all three were in agreement that it was a CLEAR indication. The signal maintainer right at the signal location confirmed that the signal was displaying Red over Red at this time and throughout the test. Signal personnel on the engine agreed that they saw glimmering green light. As the engine was moved toward the signal a red over red aspect was seen by all personnel at about one mile from the signal. The bright green had faded to become a dark green spot above the signal. As the engine neared the signal it was noticed that the green spot was the sun shining on the leafy limbs of a sumac tree located 40 yards behind the signal and about 15 yards off the south rail. Based on this test it was determined that the crew had seen a phantom signal produced by sun reflection off the tree leaves. The tree was cut down and the signal returned to normal service after confirming that the phantom no longer was seen.						

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
99	9/13/1996	NS	CTC			1639	Signal	Clemer, IN	N

Phantom Signal - Due to Unpainted Signal Hood or Background

Train No. 144 was traveling westbound and had been informed that they were to meet eastbound Train No. 206 at Clemer. At approximately 8:07 AM Train No. 144 called westward signal B-417.9 APPROACH DIVERGING. Approximately two minutes later Train No. 144 called an APPROACH for the westward signal at East End Clemer, which was the correct signal since they were lined to take and hold the main track. Train No. 144 should have seen an APPROACH at B-417.9 with a westward APPROACH displayed at the East End Clemer. A route had been lined for Train No. 206 to take the siding so the B-423.5 signal was correctly displaying APPROACH DIVERGING. TC logs at Ft. Wayne verified these routes were set up for the meet.

Signal personnel were called to investigate and were unable to duplicate the incident as reported. All appropriate tests and inspections were made with no exceptions taken. Numerous attempts to duplicate the problem were made with nothing out of the ordinary seen. The B-417.9 colorlight signal has a three-position head on top and a single Green head that is lit only for the Yellow-over-Green APPROACH DIVERGING indication. The bottom head was observed to be dark as intended unless a route was lined westward into the Clemer siding. A phantom aspect was then suspected but would have to be checked under the sunlight conditions encountered by Train No. 144.

The next morning, right after 8:00 AM, the same crew and engine were used to check for a phantom aspect. During the recreation, two separate occurrences of a phantom signal were observed. At MP 417.2 a faint Green could be seen that was found to be caused by reflection off the aluminum colored mast between the two signal heads. At MP B-417.7 the signal looked proper - Yellow over Dark. About 200 feet from the B-417.9 signal sunlight was seen to be reflecting through the bottom Green lens. The problems were corrected by painting the part of the mast between the heads flat black and by using an extended hood on the bottom head.

100	9/20/1996	NS	CTC			8880	Human Error	Silvercreek, NY	N

Human Error - Field Wiring Error, Inadequate Service Testing

At approximately 1:50 AM westbound train No. 548L119 called signal B-25.1 CLEAR. The engineer immediately notified the dispatcher on the radio that he believed he should have received an APPROACH aspect at the subject signal because he did not believe that the train No. 303 ahead had yet cleared the control point at Silver Creek, MP B-32.3. The control point at Silver Creek and the B-25.1 intermediate signal are separated by an intermediate signal at MP B-30.1.

Signal personnel were called to investigate and found two HD control circuit wires improperly rolled in a cut section case at MP B-26.7. It was verified that with these two wires rolled, signal B-25.1 would display a CLEAR instead of an APPROACH with the block between Silver Creek and B-30.1 occupied.

From the investigation, it was obvious that the rolling of the wires had been inadvertently done by C&S employees working at the location. Overtime and train delay records indicate that several signal failures had occurred in the area in the two days immediately preceding the subject incident. Interviewing of employees involved in these trouble calls and all other C&S employees who work on this district has thus far been unsuccessful in identifying the employee who left this defect in the system.

The wires were restored to their proper terminals, proper signal system checks made, and the system restored to normal operation.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
142	1/13/1997	NS	CTC			N/A	Insulation	Front Royal, VA	N
			Failed Equipment or Device - Aerial or Underground Cable, Shorted or Grounded (not due to vandalism or digging)						
			At approximately 7:30 AM Asst. Track Supervisor was driving southbound on a road adjacent to the track when he noticed southward intermediate signal 63.9 displaying a CLEAR aspect. Being aware of the fact that northbound train 460V612 was in the block ahead around milepost H-68, he knew the signal should have been displaying RESTRICTING so he reported the incident to the dispatcher. Signal personnel were called to investigate, and, upon arrival were able to duplicate the reported incident. Both the 63.9 and the 66.7 signals would display a CLEAR aspect when the next southward signal ahead was RESTRICTING and was not sending energy on the 667 BP line circuit. The problem was traced to a falsely energized 667 BP relay. Signals in this area are AC operated. The false energy was found to be caused by two grounds south of milepost H66.7. BX110 was found to be going to ground through the insulation holding a contact in the slide fence circuit controller at milepost H67.8. The grounded BX110 was getting to the 667 BP line wire from a guy wire that was touching it at milepost H 67.4. The guy wire had been damaged at some previous time, allowing it to come in contact with the 667 BP line wire. Both grounds were eliminated, the signals tested and then put back in service.						
143	3/22/1997	NS	CTC			8610, 7026	Wiring Error	Harriman, TN	N
			Human Error - Field Wiring Error, Inadequate Service Testing						
			At approximately 3:00 PM, Train No. 235 was running northbound approaching Harriman. The signal at milepost 47.1D, the approach to Harriman, was displaying a CLEAR aspect. Knowing the location of Train No. 196 ahead, the crew correctly assumed that their next signal (Signal 24-2N at Harriman, milepost 49.6D) would be displaying STOP and that they would have seen an APPROACH at 47.1D. Train No. 235 had no trouble complying with subsequent signal indications and reported the incident to the dispatcher. A following train, No. 302, reported a similar occurrence at about 3:30 PM. Signal personnel were called to investigate and were able to duplicate the reported incident. The problem was traced to a wiring error in the code out selection circuit for the Electrocode box connected to the south track at Harriman. The error allowed a "D" code (code 4) to be sent to 47.1D when a "H" code (code 2) should have gone out. The problem was corrected, the system was checked and the signals were returned to service. The wiring error was apparently made during a cut-in of a new code system the day before the incident. The modified prints called for the #5 contact group in the 24-2NAG relay to be used for an indication circuit. During cut-in, it was discovered that the Electrocode code selection circuit already used this group, and somehow as the conflict was corrected, the front contact selection wire got doubled in with the heel wire.						

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
144	3/22/1997	NS	CTC			8516-8558	Wiring Error	Poe, VA	N

Human Error - Field Wiring Error, Inadequate Service Testing

At approximately 12:10 AM, Train No. 184 eastbound received a CLEAR indication on #2 signal at Poe off the Beltline for movement onto Main No. 1. At the time, Train No. 676 was working the Car Lot track, having entered through the west end crossover off of Main No. 1. Though No. 676 was clear of the fouling circuit, both the mainline and inside hand throw switches were still in the reverse position, and since this was in the block immediately east of Poe, the #2 signal should not have cleared. The dispatcher had requested the route for Train No. 184 when the block light went off on Main No. 1 east of Poe, thinking that No. 676 had cleared up in the Car Lot track and restored his switches. The #2 signal went in time once No. 676's crew started to restore the switches. Train No. 184 did not move on the #2 CLEAR signal indication since they were aware of the reversed switches. The alertness of the involved train crews prevented an accident in this case.

Signal personnel were called to investigate and were able to duplicate the incident. They found that neither the mainline nor the inside switch were wired according to the print. The way they were wired caused the normal switch repeater relay for this crossover to be energized not only when both switches were normal, but also when both were lined reverse (for movement main to Car Lot track). When either switch was out of correspondence with the other, the relay dropped. This is why the condition was not detected during 236.103 tests.

The wiring errors were corrected, the signal system tested appropriately, and signals were returned to service. It is not known when or how this wiring error came about. Due to the "normal" nature of train operations involving this switch, it could have gone undetected for a long time.

145	3/24/1997	NS	CTC			8805-8893	Phantom Signal	Williamson	N

Phantom Signal - Due to Unpainted Signal Hood or Background

At approximately 12:00 noon, Train No. U06-581, running eastbound, called an ADVANCE APPROACH indication on signal N-471.2 shortly after emerging from Williamson Tunnel. The crew, consisting of Engineer and Conductor and accompanied by Trainmaster, all reported seeing this indication, but as they got nearer to the signal, they reported it "dropped" to an APPROACH. Facts later were used to determine that an APPROACH was the proper signal they should have received on N-471.2 as the next signal at Williamson had never been lined for their route.

Signal personnel were called to investigate and could not duplicate the reported incident. Appropriate signal tests were made at both Williamson and at signal N-471.2 with no exceptions taken. The signal system was returned to service with appropriate limitations until a test for a phantom aspect could be made.

At about the same time the next day, a reenactment was made with a similar lead locomotive configuration. Trainmaster accompanied the signal personnel. With his help, it was determined that the ADVANCE APPROACH had first been noted in a 6-degree curve leading to the signal at a point approximately 1270 feet from the signal. The APPROACH indication had been noticed at about 950 feet from the signal. Whereas there was bright sunlight on the day of the accident, this next day it was overcast. It was observed that the signal indication could not be seen until they got to about 950 feet from the signal. Trainmaster then acknowledged that what he had observed further out than 950 feet on the previous day could not have been the lighted aspects because of the signal alignment. At about 12:15 PM the sun did come out bright and a possible phantom ADVANCE APPROACH was observed from the sun reflecting off the tops of the signal hoods. The signal hoods are slightly faded with a lot of bird droppings on them. This was a very dim looking phantom, and should not have been construed as being a signal.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
146	5/3/1997	NS	CTC			7129	Relay	Powder Springs, GA	N

Failed Equipment or Device - Relay

At approximately 7:35 AM, Train No. 150G102 with Engineer, Engineer Trainee, and Conductor, was northbound north of Powder Springs when they called a CLEAR indication (G/R) at intermediate signal 128.2 and then had a STOP indication at the next location, Clark control point. Train No. 688 was occupying the block north of Clark. Train No. 150 was brought to a stop before passing the STOP signal at Clark.

The incident was reported, and signal personnel were called to investigate. They were able to recreate the problem and traced it to an intermittently sticking 180D relay. The signals are controlled by a GRS Ratecode system. Yellow code rate, which was seen being received during recreation, is 75 per minute. The 180D relay is supposed to be picked only by a 180 per minute code rate as selected through a 180 decoder. With the 180D relay stuck up, signal 128.2 would display a Green over Red instead of a Yellow over Red while a 75 rate was received. If no rate received, the signal would display stop since the H relay needs to be up in order to get any signal.

The relay, a GRS B type, was replaced; the signals were tested and then returned to service. The relay was sent to the Signal Repair Facility in Roanoke for further investigation, results of which are pending.

147	6/25/1997	NS	CTC			6594-8971	Human Error	Parrish, AL	Y

Human Error - Field Wiring Error, Inadequate Service Testing

At approximately 11:49 PM, Train No. 152, running east on signal indication, derailed on the west end of No. 2 power crossover at Parrish, MP NA-95.6.

The west end switch is a facing point move for eastbound trains. Though the route requested and the signal indication were for a straight move, the west end switch was found to be locked up in the reverse (crossover) position. TC logs showed a normal indication for this crossover since about 3:00 PM that day.

Investigation revealed that a combination of two wiring errors in the Parrish signal bungalow resulted in this accident. The first error, precipitated by an outsider cutting some of the underground cabling, resulted in the crossover correspondence relays being controlled only by the condition of the east end switch. The west end of the crossover had been erroneously patched out of the correspondence circuit. The crossover had apparently been operated this way without incident since June 10th. Then sometime presumably during the early afternoon of June 25th, the motor control straps (in the bungalow) were inadvertently removed from the west end switch while it was in the reverse position. Then when the Birmingham dispatcher requested the crossover normal at about 3:00 PM, the east end threw normal and, due to the first wiring error, picked up the normal switch correspondence relay in the bungalow. The west switch stayed locked up reverse since motor control was absent. With the crossover in this condition likely three trains, running on signal indication trailed through the west switch running westbound on the main track. The trains and approximate times were: No. W73 at about 4:01 PM, No. 319 at about 6:01 PM, and No. 191 at about 8:06 PM. Marks found on the switch point following the derailment indicated that the switch had been run through by at least one westbound move on the main while the switch was laying reverse. The point was probably bent open by this action, and this set up the condition for a derailment on the next eastbound train.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
148	8/14/1997	NS	CTC			6103	Track Circuit	Peter Cave, KY	N

At approximately 12:30 AM, Train No. 946 was picking up at the West End of Peter Cave. The crew noticed that with four cars past the westward signal (and occupying the OS), the signal was displaying a CLEAR indication.

Signal personnel were called to investigate and found that the two fouling wires in the OS were broken. This is a shunt fouling circuit, and, without the fouling wires connected, the OS track circuit did not extend back to the clearance joints in the siding. The wires had been broken by the leading end of T&S Gang 23 just before they stopped work on the day before. Signal maintainers working with this gang were unaware that the work had proceeded that far before quitting for the day and had therefore not checked on the condition of these wires. There effectively was a dead section about five car lengths long between the bracket signal and the fouling joints on the turnout side.

The wires were repaired and the track circuit tested for proper operation.

149	12/30/1997	NS	CTC			8808-8677	Phantom Signal	Pearisburg	N

Phantom Signal - Due to Object in Foreground or Background

At approximately 3:10 PM, Train No. 817 reported to the dispatcher that they had received an APPROACH DIVERGING westbound at signal 327.5, but when they arrived at the next signal, Control Point Pearisburg, the signal there was at STOP. The switch was lined normal (correct for their move), but the dispatcher had not yet requested a signal at Pearisburg for their move. Signal 327.5 should have been displaying APPROACH. No. 817 got stopped 35 cars lengths past the signal. No other trains were involved.

Signal personnel were called to investigate, but could not find a problem or duplicate the incident. The signal control on the single track approaching Pearisburg is by Electrocode 4. Signal 327.5 is a right hand ground mast colorlight. It has a three position head over a single green head which is illuminated only for APPROACH DIVERGING. All heads are phankill equipped. As the train crew said the bottom green appeared weak, a test was scheduled for the same time the following day for a possible phantom signal. That test did show a weak (whitish) phantom green on the normally dark head that was found to be caused by reflection from heavy snow on the ground in front of the signal. The sun at the time was about 40-degrees up and to the back of the signal in question. As the sun went down, the reflection got dimmed, disappearing altogether by 4:00 PM. The bottom head was turned to the field until the snow was gone.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
150	12/31/1997	NS	CTC			9004	Signal Lens	Cleveland, TN	N

Vandalism - Signal Damaged, Caused Phantom Aspect

At approximately 7:00 AM, Train No. Q26, while running eastbound on the siding between Control Points Bradley and Lyle, went by the eastward signal at Lyle while it was displaying STOP. The engineer was able to come to a stop one car length past the signal into the OS at Lyle. No other trains were in the area, and the signal had not been lined for No. Q26 to leave the siding onto single track. Both crew members reported they observed the signal to be displaying DIVERGING APPROACH when they were about 50 cars west of it. Once they were within 5 car lengths of the signal, they said they saw it drop to STOP so came to a safe stop. Signal personnel were called to investigate.

The signal system for Lyle is TC with the control station at Knoxville, TN. Lyle is the last control point when traveling east and eastbound moves must have both a permissible signal and a track warrant to proceed east. The signal system east of Lyle is APB with Electrocode II electronic track circuits. The signal system from Lyle west is TC with underground HD circuits. Q26 was in the siding which is a controlled siding so his approach to Lyle would have been RESTRICTING. Q26 did have track warrant to proceed, but no signal had been lined at Lyle for their movement. The signal is a ground mounted 3 aspect type "D" dwarf signal capable of displaying Red over Green (DIVERGING CLEAR), Red over Yellow (DIVERGING APPROACH) and Red (STOP). The three aspect signal had a red in top, green in the middle and yellow on the bottom.

All appropriate FRA and operational tests were performed with no exceptions. However, it was observed that the red inner lens was cracked and the lamp voltages were a little low. Believing that this could have contributed to a phantom signal, the dwarf signal was left out of service until sight tests could be performed the next day at 7:00 AM. Those tests were performed and it was found that the red dwarf signal did appear from 6-7.5 to 8.0-9.5 volts. Then the signal was rechecked and found to be displaying proper aspects at all distances where it could be seen.

192	3/10/1998	NS	CTC			UP 2961	Poleline	Sidney, IL	N

Maintenance - Pole Line (storm, excessive vegetation, rotting poles, excessive slack in wires, etc.)

At approximately 8:55 PM, westbound train No. 71 reported the distant signal to East Sidney, displayed ADVANCE APPROACH and the East Sidney home signal displayed STOP. The 325.8 signal should have displayed APPROACH because East Sidney had not been lined for No. 71's move due to train No. 409 working between the switches at Sidney.

Signal personnel called to investigate confirmed the ADVANCE APPROACH aspect into a STOP. This was caused by false energy on the 3258BH relay that controlled the bottom yellow. The false energy was the result of a line wrap between the 3258BH wire and the 32695TP wire at milepost B-327.1. Thougn the two line wires were tight and tied-in, we suspect the 50 MPH + wind gusts on the previous day had blown something into the line resulting in the wrap. The wrap was removed, the signal system verified to be working as intended, and signals were returned to service at 12:45 AM, 3/11.

To keep this from recurring, the ADVANCE APPROACH aspect has been elinimated on this signal. Instead of getting an ADVANCE APPROACH when East Sidney is APPROACH, signal 325.8 will repeat the yellow at East Sidney. This is a temporary fix since the poleline is to be eliminated and aspects will change in conjunction with a new NS/UP connecting track to be installed here in the near future.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
193	3/16/1998	NS	CTC			8945-6678	Poleline	Clymers, IN	N
			Maintenance - Pole Line (storm, excessive vegetation, rotting poles, excessive slack in wires, etc.)						
			At approximately 3:45 PM, train No. 183, running westbound, reported receiving a CLEAR signal at the East End Clymers and then a STOP signal at the West End Clymers. Being in radio contact with opposing train D93 west of Clymers, they were aware of the false signal and were able to stop before passing the STOP signal. Signal personnel were called to investigate and found from TC loggers that there was an indication of a westward signal lined at West End Clymers, not requested by the dispatcher, at the time that train 183 saw the CLEAR at East End Clymers. In the field, the same scenario was set up and proved that a westward CLEAR was displayed at East End Clymers while a STOP was displayed at West End Clymers. The cause was a falsely energized 500 ohm relay (LAYGP) at West End Clymers which resulted in the improper pole change back to East End Clymers. The relay was falsely energized by three volts caused by two separate line wraps in two different spans within the plant at West End Clymers. The LAYGP also tumbled down the eastward signals on train D93 and gave the false indication of a westward signal at West End Clymers. The wraps were corrected and the system retested to verify proper operation. The line wires involved were properly slacked and tied in. It was suspected, but never proved, that a truck hit a pole and caused at least one of the wraps. High winds in this area on previous days were suspected of causing the first wrap. Neither wrap on its own would have caused this problem.						
194	5/5/1998	NS	CTC			6626-8947	Arrestor	Carbo, VA	N
			Failed Equipment or Device - Lightning Arrestors, Shorted						
			Train No. J62U705, operating the two units as a pusher, had entered the CV main off the west leg of the wye at Carbo on signal indication. After he moved from unit 8947 to unit 6626 to change direction, the Engineer observed he had an APPROACH DIVERGING for his eastbound movement at Carbo. Shortly after he started his eastbound move, the CV dispatcher contacted him giving him permission to pass the next signal into the siding at Mill Creek and ciuple to train No. 572. When the Engineer told the Dispatcher that his last signal displayed APPROACH DIVERGING instead of APPROACH, the dispatcher had him stop his train and then called signal personnel to investigate. Signal personnel arrived and had train No. J62U705 back west of the signal at Carbo. They then had the dispatcher set up the same scenario and were able to see the false proceed about five minutes later. Investigation revealed that there were three badly burned lightning arrestors in a pole mounted junction box at Carbo. Each of these arrestors was partially grounding the circuit to which it was attached. One was on the BP circuit which had 12 VDC on it at the time. The positive side of the BD relay for the eastward signal was also grounded by one of these arrestors and had 5.2 volts on it which was found to be coming from the BP circuit ground. The arrestors were replaced and the signal system tested for proper operation before being returned to service. A recent lightning storm had likely caused the multiple ground condition by severly burning these three arrestors.						

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
195	5/25/1998	NS	AB			9057	Design	Hattiesburg, MS	N
			Human Error - Signal Circuit Design Error, Inadequate Service-Testing						
			At approximately 4:30 AM train No. 314 reported a CLEAR signal northward at Hattiesburg Interlocking and a STOP indication at the next signal, N.E. Hattiesburg. No. 314 had left part of its train on the main south of the interlocking and proceeded on signal indication north of the N.E. Hattiesburg. They then reversed the switch and made a reverse move into Hattiesburg Yard to make a pick up. After returning to the main and restoring the switch, No. 314 moved southward with the proper Red signals at N.E. Hattiesburg and Hattiesburg Interlocking to couple to their train. They then proceeded north with a CLEAR at the interlocking and found a STOP at the N.E. Hattiesburg. Investigation revealed that a southbound movement at N.E. Hattiesburg when cars were occupying the track south of Hattiesburg Interlocking enabled a circuit path at N.E. Hattiesburg permitting a CLEAR code back to the interlocking while a STOP was displayed at the N.E. Hattiesburg. The design was corrected and the signals were thoroughly tested.						
196	6/24/1998	NS	CTC			CR 6116	Vandalism	Westminster, SC	N
			Vandalism - Signal Damaged, Caused Unintended Signal Aspect						
			At approximately 8:15 AM, train No. 266 was northbound on Track #1 when the crew observed the signal on Track #2, signal 532.2, displaying what appeared to be an APPROACH DIVERGING, Yellow over Green. Since they had a CLEAR signal on their track, they knew they were lined onto single track at Jason, and the signal on Track #2 should not have been better than APPROACH. They reported this as a false proceed to the dispatcher. Signal personnel were called to investigate and found that the door was open for only the green aspect in the bottom color light unit. Sunlight was shining through the lens on this signal that was facing almost due west due to the track alignment at this point. Compounding the incident was the fact that the bottom red which should have been lit was burned out. Had the bottom red been lit, this would have been an improper signal. The screw-lock that secured the signal doors had been removed, apparently by an outsider. The signal was secured with a padlock to prevent recurrence.						

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
197	8/5/1998	NS	CTC			3537	Poleline	Leipsic, OH	N

Maintenance - Pole Line (storm, excessive vegetation, rotting poles, excessive slack in wires, etc.)

At approximately 11:10 PM, eastbound train No. X10 reported receiving an ADVANCE APPROACH indication at intermediate signal 3156 and then a STOP at Leipsic home signal, MP B-311.4, which is the I&O interlocking. The engineer was able to stop short of the home signal at Leipsic. They had been running at restricted speed due to a storm caused code line outage. Signal 3156 should have been displaying APPROACH since it was an automatic signal. The home signal was at STOP because of the code line outage.

Signal personnel called to investigate were able to duplicate the problem and determined that the B3156HR relay that controlled the bottom yellow aspect was falsely energized with 6 volts across the coil. The 6 volts was found to be coming from a combination of several line wire wraps and grounds that resulted from damage from a severe storm which was passing through the area at the time. The voltage ultimately came from the 3156NHD line wire that was normally separated from the B3156H wire by no fewer than two wires fed by different battery. It was only through such an unlikely combination of poleline faults that this problem could have occurred.

The bottom yellow on the 3156 signal has been disabled until the poleline gets configured to prevent a recurrence. Other signal aspects were returned to service by 8:00 AM following poleline repair and appropriate tests.

198	9/29/1998	NS	AB			UP-9247, NS-8736	Connection	Millard, MS	N

Failed Equipment or Device - Electrocode Module

At approximately 5:45 PM, train No. 131 was traveling southbound from Meridian, MS to New Orleans when the crew observed a CLEAR indication on signal 134.3. The crew knew they should have had an APPROACH indication because southbound train No. M30 was stopped in the second block ahead. They were aware of M30's location on account of radio conversation.

Signal personnel were called to investigate. The signals in this territory are controlled by Electrocode II electronic track circuits. Though the problem was not duplicated in the field, they did witness a more restrictive indication on the 134.3 signal under similar conditions. The code generator responsible for the 134.3 signal indication (at the next signal south) was found to be causing the false restricting when it was purposely vibrated in its socket. This code generator was never seen to cause a false clear in the field, even when vibrated. However, when the unit was bench tested at Birmingham with a code-two (APPROACH) continuously generated, it was able to get a receiver to decode a code-four (CLEAR) for about 9.5 seconds by wiggling the card. The unit was returned to the manufacturer for further analysis and their recommendations.

The manufacturer stated they were able to duplicate the problem and traced it to mechanical loosening of the connection at one end of a capacitor. This fault was found to only upgrade an APPROACH code to a CLEAR code or down grade to RESTRICTING, and then only sporatically and momentarily when the card was being vibrated. It would not upgrade from a red. It was not determined what could have been vibrating the case where the card unit was housed. Recommendations are to be provided by the manufacturer.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
199	11/4/1998	NS	CTC			8929-6659	Human Error	Bandy, VA	N

Human Error - Field Wiring Error, Inadequate Service Testing

At approximately 6:00 AM, train J69, a single unit helper, had traveled westbound on the Dry Fork Branch to the west end of Bandy, where he was to clear up in the siding. After lining himself into the siding and getting in the clear, the Engineer was in the process of tying his unit down when he heard the following train J60 call a CLEAR signal westward at the east end of Bandy. Since the engineer had not yet lined the handthrow mainline switch and derail back to normal, he reported the occurrence as a false proceed.

Signal personnel were called to investigate and were able to duplicate the problem. The normal switch detection relay for the handthrow switch is located at an ElectroLock cut section case about 700 feet west of the switch. Though this relay was properly down when the west end of Bandy switch was not normal, it was not affecting the electronic track code passing through the ElectroLock equipment. Investigation revealed that a handthrow switch adjacent to the ElectroLock had been removed from the track two days following the FRA 236.103 testing. When modifications were made for this removal, the maintainer erroneously cut out the circuit through the WP relay, too. Improper testing after disarrangement resulted in the wiring error going undetected at the time.

Corrections were made to the circuits, the signal system was properly tested and returned to normal service.

200	12/4/1998	NS	AB			9003	Poleline	Foristell, MO	N

Maintenance - Pole Line (storm, excessive vegetation, rotting poles, excessive slack in wires, etc.)

At approximately 12:10 AM, train #256 with crew consisting of Engineer, Student Engineer, and Conductor were eastbound at West End Foristell when they observed the eastward signal go from RESTRICTING to CLEAR. The next signal, at East End Foristell, was then observed to be displaying APPROACH. The preceding train, #282, was in the block ahead of East End Foristell and, hearing #256 call these signals over the radio, contacted #256 to confirm the calls. Train #256 then aware that the signals had malfunctioned, slowed in sufficient time to avoid #282 and reported the problem to the Berkeley Operator.

Signal personnel were advised of the situation, investigated and were able to duplicate the problem. The cause was traced to a line wire wrap at about milepost S-50. A three wire DC HD line wire signal control system is employed in this territory. The wrap was between the opposing signal HD wires and did not involve the common. The condition resulted in a more restricting signal for the first train, #282, but when that train occupied the second of two track circuits in the block, a path was set up by the wrap that gave a false APPROACH aspect on the East End Foristell eastward signal into the block that [unintelligible] was what #256 had observed.

The wrap was cleared and the signals were tested for normal operation. Though not confirmed, it is likely that brush clearing activities the previous day had caused the wrap.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
255	2/16/2000	NS	CTC			5469-5460	Phantom Signal	Cleveland, OH	N

Phantom Signal - Due to Sun Angle

At approximately 12:30 PM, Train No. 133 observed the 5WA signal at CP 190, Rockport Yard, displaying a SLOW APPROACH aspect. The dispatcher did not have the signal lined and the train was stopped as it took the signal. No other trains were involved.

Signal personnel arrived to investigate and first interviewed the train crew. The crew reported the signal they saw from about 150 feet had looked to be Yellow over Red. 5WA is a US&S dwarf signal consisting of four (4) light units each with an 18 watt bulb. The top unit is red, the second green, the third yellow and the fourth is a red unit. Initial inspection of the signal found it to be in excellent condition with no cracked or discolored lenses, no missing hoods. The signal was properly sealed, locked and aligned. The lighting voltage on the individual units, when lit, measured between 8.4 and 8.6 volts DC. The train was then backed to the point where the crew thought they saw the Yellow over Red. With the top and bottom red units lit, a STOP signal, the top red appeared to be washed out to the point that it could have been misinterpreted as a yellow. A contributing factor was the train crew's relative unfamiliarity with this location.

All appropriate signal tests were performed with no exceptions taken.

As the sun was above and slightly behind the 5WA signal, it was suspected that the sun reflecting back off the second hood could have caused the top unit, displaying red, to wash out somewhat. The signal bulbs were replaced with 20 watt bulbs, and the voltage was increased to 9.2 volts vefore returning the signal to service.

256	3/4/2000	NS	CTC			6681	Dwarf Signal	Norris Jct., AL	N

Phantom Signal - Due to Sun Angle

At approximately 2:50 p.m., Train No. 192A504 was leaving Norris Yard eastbound and called a DIVERGING CLEAR indication (R/G) at Home Signal 27L - Norris Jct., MP 790.7. The operator at Birmingham Division Control Center observed train 192 entering the plant at Norris Junction onto Main 1 and contacted the train crew to stop. The 27L signal was not requested and should have been displaying a STOP. Train 192 ran by signal approximately 1,250 ft.

Signal personnel investigated and took no exceptions of the signal system. Signal log reports at the Control Center and the field determined the 27L signal was not requested nor did it indicate lined.

Further tests determined that the color light dwarf signal was subject to reflection from sunlight depending on the viewing location and position of the sun.

Action was taken to replace the standard hood arrangement with 9 inch hoods that surround each colored lens and install phan screens to further direct sunlight reflection.

Report #	Date	Reporting Carrier	Block System / Cause / Narrative	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
257	3/9/2000	NS	AB			CR2898	Audio Frequency Overlay	Taylor, MI	N

At approximately 3:45 p.m., Train L60L59 was leaving Oakwood Jct. on the Detroit District, Lake Region on an APPROACH indication into single direction ABS territory. They were following train L64. As train L60 approached automatic signal D-10.2, they observed a CLEAR signal. Aware that train L64 was working ahead, they passed this signal prepared to stop.

They stopped short of an open hand throw trailing point switch at MP D-11.2 and notified the Ft. Wayne Dispatcher.

C&S personnel investigated and determined that the circuit used to indicate the switch point position would not deenergize when power was removed from the transmitter. The switch indication is transmitted from the switch location to the signal location by a 1.2 kHz Audio Frequency Overlay (AFO) circuit. This area has high voltage transmission lines parallel to the track that may be a factor in the failure of the receiver unit to deenergize. The equipment will be sent to our Signal Repair Facility for further analysis.

A Phase Selective Overlay (PSO) circuit was installed in the place of the AFO and the signal system was tested and returned to service.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
258	3/10/2000	NS	CTC			8373, 8792, 8051	Light Out Circuit	Reading, PA	N

Human Error - Signal Circuit Design Error, Inadequate Service-Testing

At approximately 5:30 AM on 3/10/00, train 11AH510 was proceeding west on Track #1 on the Harrisburg Line in Reading, PA. After having passed Intermediate Signal 591 displaying a CLEAR indication, the train encountered the next signal, Intermediate Signal 601 displaying a RESTRICTING indication.

The train was brought to a safe stop, and the problem was reported to the Harrisburg Dispatcher.

Investigation of the incident revealed a lamp failure on the Green aspect of Signal 601, and a design deficiency in the light out circuit at Signal 601. The signal design at this location would cause a Red aspect to be displayed when a lamp failure condition existed on the Green or Yellow aspect (as is proper), but failed to change the polarity feeding the approach signal, Signal 591. The result was Signal 591 displaying a CLEAR indication into a RESTRICTING indication at Signal 601 when a lamp failure condition was present on the Green or Yellow aspect at Signal 601.

After the incident, changes were made in the circuit design at Signal 601 such when a lamp failure occurs on the Green or Yellow aspects at Signal 601, in addition to causing Signal 601 to display RESTRICTING indication, a polarity change will be fed to Signal 591, causing it to display an APPROACH indication. Upon completion of these changes, the signal system was restored to normal service.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
259	6/2/2000	NS	CTC			AMT 57, AMT 37	Design Error	Elyria, OH	N

Human Error - Signal Circuit Design Error, Inadequate Service-Testing

At 4:45 a.m., June 2, 2000, Amtrak #29 was traveling west on track #2 at MP 203 on the Chicago Line when they received a STOP signal at CP-203. After receiving permission to pass the STOP signal, they progressed to intermediate signal 205 2W which was displaying a LIMITED CLEAR (Red/Flashing Green). At this time they notified the dispatcher concerning the improperly displayed signal.

Investigation: The signals were lined to replicate the conditions experienced by Amtrak 29, The crossover at CP 207 was lined and it displayed a LIMITED CLEAR aspect. At signal 205 2W a LIMITED CLEAR aspect was also displayed. At this time the NWLPPR relay was also still de-energized. Signal 2W at CP-203 was displaying a STOP aspect. Under these conditions Signal 205 2W should display a STOP AND PROCEED aspect (Red/Red), but was displaying an improper aspect of LIMITED CLEAR (Red/Flashing Green).

Review of the in service circuit plans revealed that aspect displayed was consistent with the designed circuit. The circuit design allowed the "B" head to continue to display a Flashing Green with the hand throw switch showing not lined for normal movement. With the cross-over at CP 207 lined from track #2 to track #1 the signal that would be displayed at 205 2W if the NWLPPR relay was energized would be APPROACH LIMITED (Yellow/Flashing Green). When the NWLPPR relay was de-energized the "A" head went to Red but the "B" head remained at Flashing Green.

Correction: Signal engineering was contacted and they developed a circuit modification to correct the problem. The circuit was modified and complete signal checks were performed. The signals were placed back in service at approximately 2:00 p.m.

260	6/4/2000	NS	CTC			NS 9316	Human Error	Bellwood, NJ	N

Human Error - Field Wiring Error, Inadequate Service Testing

At approximately 5:00 p.m., June 4, 2000, train #I62H403 was eastbound on the Lehigh Line, in the controlled siding between CP 67 and CP 64, when they observed the eastbound signal at CP 64 on the single track displaying a CLEAR aspect with the #1 switch at CP 64 in reverse position lined against them.

Investigation revealed switch junction box had been damaged earlier in the day (at approx. 9:00 a.m.) by what appears to be All Terrain vehicles. Repairs were made by Maintainer and Maintainer Test. They gave the switch back to the dispatcher at 2:06 p.m. The investigation by Fye and Renninger revealed four conductors of the switch cable had been placed in the wrong position which resulted in the switch points laying in the reverse position, yet indicating it was in the normal position. Wiring corrections were made and a complete breakdown of the switch indication circuits were done along with verification of switch correspondence with the dispatcher. Indication locking tests were made and the interlocking was restored to service at 9:55 p.m.

The false proceed signal at CP 64 was due to both maintainers' failure to make proper in-service tests after disarrangement of the signal system.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
261	6/24/2000	NS	CTC			8933, 2506, 8713	Human Error	Dorset, OH	N
			Human Error - Field Wiring Error, Inadequate Service Testing						
			At approximately 2:22 a.m., June 24, 2000, train #62V was southbound at MP 10.5 on the Youngstown Line when they observed signal 10S displaying APPROACH LIMITED (Yellow over Flashing Green) with signal at CP 13 MEDIUM APPROACH (Red over Flashing Yellow). The train crew knew that MP 10.5 should have been displaying Yellow over solid Green since they were lined to take the turnout at CP 13. The number 15 turnout at CP 13 is limited to 30 MPH, therefore, the signal observed by the train crew at 10S, Yellow over Flashing Green, was improper since it was a 40 MPH speed limit through the turnout at CP 13. Investigation determined that this improper signal was displayed due to our Signal Supervisor replacing the EC-4 box when it was in trouble on 6/1/00, at CP 13. He placed a control wire on the wrong terminal post of an EC-4 box which generated a Code 4 instead of a Code 3. He failed to make proper in-service tests after disarrangement of the signal system. The wiring on the EC-4 box was corrected, in-service tests were done and the signal system placed back in service 6/24/00.						
262	7/21/2000	NS	CTC			NS 7136	Pole Line	Milton, PA	N
			Maintenance - Pole Line (storm, excessive vegetation, rotting poles, excessive slack in wires, etc.)						
			At 9:30 a.m., July 21, 2000, southbound train #H46 received a CLEAR signal, southbound at CP South Fair into a STOP AND PROCEED aspect at automatic signal 247S. Dispatcher notified of incident. Investigation of this incident revealed three separate trouble areas. These three conditions were a grounded code line (L-) wire at MP 246.1, a grounded line drop at Cameron Street, Milton, PA on the negative EHD line wire, and a dead comm line wire that was making contact with both the positive EHD and code line (L+) wires at MP 246.6. The above conditions caused false code line voltage to be applied to the HD resulting in a CLEAR aspect at CP South Fair into a STOP AND PROCEED at signal 247S. The dead comm wires were removed from both code line wires and the signal control wires and the grounded line drop cable has been replaced.						

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
266	8/26/2000	NS	CTC			BN 9647, BN 9648	Relay	Hammond, IN	N
			Failed Equipment or Device - Relay						
			At approximately 6:40 p.m., Saturday, 8/26/00, the crew of eastbound CSX train #939 with Engineer, Conductor, and Engineer Trainee, was moving on track #2 and went by signal 2E at CP 507 which was displaying a STOP aspect. Crew reported they had a CLEAR aspect at CP 508, the approach to CP 507, and were unable to stop. Upon investigation, C&S personnel did observe the 508-2E signal display a CLEAR indication on track #2 EB with a train in the block immediately ahead. It was determined that the 1EHPR signal control relay was sticking up when no energy was being applied to the coil due to worn and pitted contacts. Relay was replaced and signals restored to service.						
263	9/3/2000	NS	CTC			NS 6189, MRL 030	Case Wire	Glenvar, VA	N
			Failed Equipment or Device - Electrical Ground (not in underground or aerial cable)						
			At 3:48 p.m., 9/3/00, train #185V402 was westbound on Track #1 east of Glenvar, VA when they observed the westbound signal L-102, Track #2, displaying an APPROACH aspect with train #755V403 in the block on Track #2 just west of the L-102 signal. L-102 should have been displaying a STOP aspect with the block occupied by #755V403. L-102 is a color position signal. C&S personnel arrived and were to duplicate the scenario observed by the train crew of #185V402. Investigation found that the "H" relay was being falsely energized and held up by a 14 mil ground on the C-16 battery and a 4 mil ground on the B-16 battery. Several deteriorated case wires were replaced and the location was tested and returned to service at 7:40 a.m., September 4, 2000. This location was last checked for grounds on June 27, 2000 with no exceptions taken.						
264	9/7/2000	NS	CTC			KCS6629	Wire	McConnell, AL	N
			Maintenance - Wiring Chewed by Rodents						
			At 11:34 a.m. CST, train 339A7 reported that the south home signal (7RA) at McConnell, AL, MP 269.7, Alabama Division was at STOP and then upgraded to APPROACH with southbound train 21KA7 occupying the block ahead. Train 339 notified the dispatcher and train movements were protected. Signal personnel arrived on the scene and also observed the south signal (7RA) at McConnell was at APPROACH with train 339 occupying the block ahead. It was discovered through ground testing that the wire insulation in the south signal had been removed by rodents causing battery to energize the search light signal, resulting in the false signal. Wires were replaced and signal tested and placed back in service.						

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
265	10/7/2000	NS	CTC			BNSF 9730	Relay	Pinola, IN	N
			Failed Equipment or Device - Relay						
			At approximately 8:30 a.m., October 7, 2000 the train crew of #41M were stopped at the 2W signal at CP 466 when they observed the signal upgrade to APPROACH with a train setting, and visible, in the block ahead. Investigation by C&S personnel confirmed what the train crew saw and it was confirmed that signal 2W improperly displayed an APPROACH aspect with track ahead occupied. From the tests and simulations we identified a failure of the 4661 WHPR relay, a GRS 194 ohm Slow Release Relay, which remained stuck "up" when the battery to its coils was removed. Relay was replaced and signal 2W was returned to service at 10:30 p.m., October 7, 2000.						
267	10/21/2000	NS	CTC			NS 6776, NS 8613,	Human Error	Cleveland, OH	N
			Maintenance - Improper Adjustment, Track Circuit						
			At 1:30 p.m. on 10/21/00, train #24Z on track one observed signal 2E at CP Twin go from RESTRICTING aspect to a CLEAR aspect and back to APPROACH with a train ahead passing the next intermediate signal at MP RD-100.4, 7.7 miles ahead. The CLEAR aspect was only displayed 14 seconds before dropping to APPROACH, the proper aspect. Upon investigation it was discovered that the working current on the 1004T relay was excessive, which resulted in the circuit failing to shunt for light engine 5096 moving in the block ahead of train 24Z.						

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
310	1/4/2001	NS	CTC			P42P3	Phantom Signal	Thicketty, NC	N
			Phantom Signal - Due to Sun Angle						
			At approximately 5:04 p.m. on 1/4/01, train P42P3 running northbound reported a signal problem with the 4354 northbound intermediate signal at MP 435.4. Train P42P3 was northbound on track two returning to a cut of 15 cars it had left on track two north of the 4354 intermediate signal. Upon approaching the 4354 signal northbound, the crew first observed a RESTRICTING Red over Red aspect. As they got closer to the signal, it appeared to them as an APPROACH, Yellow over Red aspect. The engineer called the dispatcher and reported that he thought there were signal problems at the location. The dispatcher called signal personnel to investigate. Investigation revealed no exceptions with signal circuits, grounds or relay operation. However, it was determined that the sun was shining directly into the signals at the time of the incident and the situation would be reenacted at 5:00 p.m. on 1/5/01, as a phantom aspect was suspected.						
			Conditions were almost identical to the previous day during the reconstruction. The same crew and train P42P3 were used, with signal officers on board to observe the signals. At a distance the RESTRICTING aspect was visible on signal 4354. When the train got within 600' of the signal, an APPROACH aspect could be distinguished and the top head green lens appeared dimly lit on signal 4354.						
			It was observed that the signal was affected by the sun's glare, and the top head appeared to have all three units (green, yellow, and red) burning dim and of equal intensity. Such an aspect would have been interpreted as an improperly displayed signal, rather than an APPROACH. However, the possibility of an APPROACH aspect could not be discounted.						
			Adjustments were made to make the signal aspects easier to discern in the afternoon sun. This involved bulb voltage adjustments, sighting alignment and installing long signal hood covers.						
311	5/8/2001	NS	AB			9571	Line Wire Circuit	Columbus, OH	N
			Vandalism - Pole Line						
			At approximately 10:18 a.m. on May 8, 2001 Train No. 615 southbound reported a CLEAR signal indication at automatic signal 134.1 with automatic signal 135.1 at STOP AND PROCEED and southbound train LY18 approximately 500 feet in advance of the signal 135.1. Crew of train 615 stopped approximately 1000 feet short of signal135.1 and notified the Dearborn dispatcher.						
			C&S personnel investigated and found a piece of line wire bridging the line wire circuit between the H and D wires. The wire was laying across the line wires at MP AM 134.9. The line wire was inspected and the signals were restored to service.						

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
312	6/16/2001	NS	CTC			NS 9360	Track Circuit	Briswold, GA	Y

Human Error - Signal Circuit Design Error, Inadequate Service-Testing

On 6/16/01 at 12:45 a.m. near Control Point East Griswold, GA at MP S181.1, Georgia Division Train # 191G515, lead unit 9360, struck the rear car JMHX 69090 of Georgia Division train # 119G514. Train #119 was at a stop waiting for train #192 going eastbound into the siding track at Control Point West Griswold at MP S182.7, train #191 was westbound following train #119.

The westbound signal at East Griswold displayed an APPROACH aspect for the main track and with the main track between east and west Griswold occupied by train #119. Train #119 was waiting for eastbound train #192 to enter the siding and then was to continue westbound. Train #191 was to follow train #119 westbound and occupy the main track between the switches at Griswold, clearing the way for train #192 to proceed through the siding to the main track at East Griswold. Train #191 had a CLEAR signal at the approach signal at MP S178.2 and then an APPROACH aspect at the westbound control signal at East Griswold. The approach signal should have displayed an APPROACH aspect at S178.2 and the control signal at East Griswold should have displayed a STOP aspect. The conditions were able to be recreated and the false clear aspect displayed numerous times during testing.

The circuitry involved is the track transmission and receive circuits of the Union Switch and Signal track code logic. This coded track circuitry was modified in January 2000 for a highway grade crossing upgrade installation at Henderson Road crossing at MP S181.1. The upgrade included the installation of a code isolation unit that is supposed to isolate the signal system track coming from the detection circuits of the highway grade crossing equipment. Testing showed that the code isolation unit was reflecting the coding information sent by the East Griswold location back into itself, through a capacitance effect generated by the isolation unit.

The application of this particular code isolation unit in the circuit was modified after consultation with the supply vendor to eliminate the fault condition. In addition, electronic track circuit equipment will be installed as this type circuitry would eliminate the need of the code isolation unit and the fault condition altogether.

313	8/16/2001	NS	CTC			9369	Signal "HD" Relay	Vansant, VA	N

Human Error - Field Wiring Error, Inadequate Service Testing

At approximately 7:00 p.m. on 8/16/01, train U70U616, running westbound on Big Prater Branch, observed a CLEAR aspect on the 391 eastbound operative approach signal at MP BP 0.4. Signal was displayed into a de-energized OS track repeater circuit and displayed a STOP aspect on the 98R signal at Control Point Vansant. Investigation revealed the 391HD relay positive and negative signal wires had been swapped during trouble on 8/15/01 by assigned Signal Maintainer for this territory. The swapped polarities caused the 391HD relay (250 ohm polar relay) to pole normal displaying a CLEAR aspect when it should display an APPROACH aspect. Corrections were made and signal restored to service 8/17/01.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
314	9/11/2001	NS	CTC			TR3529211	Phantom Signal	Leesville, VA	N

Phantom Signal - Due to Object in Foreground or Background

At approximately 9:54 a.m. on 9/11/2001, Train TR 3529211, running eastbound on the siding at Amos Branch, MP V-210.0 on the Altavista District, Virginia Division, reported they had a CLEAR signal to leave the Amos Branch siding. Train TR 3529211 entered the siding at Control Point Huddleston, approached the control point at Amos Branch and stopped short of the eastbound control signal at Amos Branch which was displaying a STOP signal. At 9:54:43, TR 3529211 reported they had a CLEAR signal to leave Amos Branch. All signals at Amos Branch indicated STOP with switch normal to the dispatcher. The dispatcher had not requested the signal clear nor had the switch been requested reverse. At 9:54:55 TR 3529211 reported the signal at Amos Branch had changed to STOP after moving approximately 1 and 1/2 car lengths.

Initial review indicated a phantom aspect. Conditions were identical the next day, 9/12/01 at 9:45 a.m., and a phantom aspect was observed by C&S and Transportation personnel from the previous day's engine position on the eastbound control signal for the siding at Amos Branch. The STOP aspect was not visible and a reflection in the clear position was observed. The sun was to the left approximately 22-25 degrees from top 90 degree. It reflected off the top signal mast pinnacle and a cable junction box located below the background to give the appearance of two spots in the same general position as a CLEAR aspect. Signals in question are color position light signals. Lamps were set at 6.9 volts with 25 watt bulbs.

To correct the situation, signals have been refocused, 20 watt bulbs installed and voltage raised to 8.0 - 9.2 VDC on all signals at CP Amos Branch. Cable junction box was rotated so sunlight would not reflect toward oncoming train.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
315	9/18/2001	NS	CTC			P83P918	Signal "HD" Circuits	Charlotte, NC	N

Human Error - Signal Circuit Design Error, Inadequate Service-Testing

At approximately 4:40 p.m. on 9/18/01, Train P83P918, running southbound on Track #1 approaching the control point at North Advance, MP 379.6 on the Piedmont Division observed a DIVERGING CLEAR aspect on the southbound control signal. This was after receiving a RESTRICTING aspect at the approach signal at Summitt Avenue, MP 378.4. They were anticipating a STOP signal at N. Advance due to an occupied block indication between N. Advance and Charlotte Jct., MP 380.6 for Track #1. Switch was requested and indicating normal at N. Advance.

Investigation revealed that the track circuit between N. Advance and Charlotte Jct. for Track #1 was a center fed DC track circuit with two track relays. One on the north end of the circuit and one on the south end. "HD" information for N. Advance is sent from Charlotte Jct. to N. Advance in a multiconductor cable between the two control points.

A track production gang had worked track between Charlotte Jct. and N. Advance earlier that day and caused track leads for the south track relay at Charlotte Jct. to open, de-energizing the relay. Contacts of the relay were in the indication circuits and indicated an occupied block. However, they were not in the 227LBHD circuit and did not de-energize this circuit. Dispatcher had requested a follow-up move at N. Advance. The 227LBHD relay was energized and allowed the DIVERGING CLEAR (Red/Green/Red) to display.

Circuits were corrected adding contacts of the 221RT track relay in the 227LBHD circuit to open the circuit with the track relay deenergized.

The corrections were implemented and tested on 9/19/01.

316	12/31/2001	NS	CTC			NS 6688	Insulated Joints	High Bridge, KY	N

Failed Equipment or Device - Insulated Joint(s)

On 12/31/01 at 2:10 a.m., Central Division Train #50VT830, lead unit NS 6688, proceeding southbound on Track #1 at High Bridge, KY, observed the home signal at High Bridge Control Point, MP-102.5, to display a CLEAR aspect for the train's movement. The signal should have displayed an APPROACH aspect due to the signal in advance, located on Track #1 at Control Point Brown MP-105.0, displaying STOP aspect. Train #50VT8 was aware of the dispatcher's plan for a meet with an opposing train at Brown and was able to stop the train short of the home signal at that location.

Investigation revealed that the track circuit on #1 track between High Bridge and Brown had the presence of foreign AC current on the rail. This allowed the track relay at High Bridge to intermittently pickup, and energize the decoder and associated relay pertaining to the CLEAR aspect. The presence of foreign current was attributed to two defective insulated joints on #1 track at High Bridge, one being shorted and one having low resistance.

As a corrective measure, both insulated joints were replaced. As an additional precaution, 60 cycle reactors were installed on the involved circuit at both High Bridge and Brown. The signal system was tested and returned to normal service at 4:15 p.m.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
357	1/17/2002	NS	CTC			NS 5512	Track Isolation Unit	Seneca, NY	N

Failed Equipment or Device - Track Isolation Unit

On January 17, 2002 at 3:15 a.m., Harrisburg Division train 17H, lead unit NS 5512, southbound on the Ebenezer Running Track at Seneca, New York, reported signal 39E at MP 3.9 display an APPROACH aspect for the train's movement. This signal should have displayed a RESTRICTING aspect due to a hand throw switch ahead in the block being in the reverse position.

Train 17H's crew was aware of the switch being left in the reverse position by the crew of a previous train movement, and therefore train 17H proceeded at Restricted Speed and stopped short of the hand throw switch lined against their movement.

Investigation revealed that the B1-1T track circuit in advance of the 39E signal had a track isolation unit with an open resistor and shorted diode. This condition allowed the track isolation unit to discharge its capacitor through the 39HR relay during the entire duration of its discharge time, which prevented the relay from dropping out while the hand throw switch was in the reverse position.

The track isolation unit was replaced and signal restored to normal service at 2:50 p.m.

358	2/17/2002	NS	CTC			NS 9003	Relay Circuit	Matewan, WV	N

Failed Equipment or Device - Interior Wiring

At 12:42 a.m. on 2/17/02, train U72U616 received a westbound APPROACH aspect on the 8LR signal at Control Point Ought-One, MP N445.5 on the Pocahontas Division, when the 8LR signal located at MP D0.6 should have displayed a STOP aspect.

The problem was duplicated during testing and found to be a foreign voltage on the LC08H relay, falsely energizing the relay which allowed the Yellow aspect to be displayed on the "A" signal head. Signal 8LR is a color light signal. The short was found in the LC08H circuit in the main shelter at CP Ought-One. This is a TC Green wired bungalow and a TC Green wire had shorted to local battery. The defective wire was replaced in the circuit, eliminating the foreign voltage. In addition, the location is scheduled to be upgraded to new electronic equipment in March, 2002.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
359	5/30/2002	NS	CTC			560C329	Human Error	CP-207, Elyria, OH	N

Human Error - Signal Personnel Introduced False Energy into Signal System During Testing

On Thursday, May 30, 2002 at 11:00 a.m., Dearborn Division train 560C329, lead unit NS 9451, westbound on track 2 at MP-CD205.7, reported intermediate signal 205-2W to display a CLEAR aspect for its movement. This signal should have displayed an APPROACH aspect due to the next signal, the 2W home signal at CP-207, displaying a STOP aspect account train 15JB129 ahead in the block.

Train 560C329 was aware of a train ahead in the block and therefore stopped short of the 2W signal at CP-207.

Investigation revealed that a signal testman was performing relay testing at CP-207 at the time of the incident. The maintainer performed testing on the 2WAHR relay during the time that train 15JB129 was in the block, which involved false battery being applied to this relay. Testing on this relay had been performed without obtaining the proper track time authority, and without appropriate measures taken to insure safety of train movements.

Dispatcher logs indicate that the 2W home signal displayed a permissive aspect without being requested, and remained in that state for 41 seconds. Tests after the incident proved that the 205-2W signal would display a CLEAR aspect when false battery was applied to the 2WAHR relay at CP-207.

The signal system was tested for proper operation and restored to normal service at 2:00 p.m.

360	9/19/2002	NS	CTC			NS 6645	Timer	Fayette, KY	N

Maintenance - Improper Adjustment on Non-Track Circuit Device

On Thursday, September 19, 2002 at 9:01 a.m., Central Division train #215, lead unit NS 6645, proceeding southbound on track 2 at Fayette, KY, observed the home signal at Fayette Control Point MP 79.6 changing aspects from APPROACH to CLEAR, to ADVANCE APPROACH and then to APPROACH DIVERGING. The correct sequence should have been from APPROACH to APPROACH DIVERGING.

Investigation of the above occurrence was duplicated and a defective timer relay was found at Fayette. The timer relay was designed to prevent undesirable upgrade of the signal at Fayette for 9 seconds during the time the code being received was in transition. Since the timer was only running for 5 seconds, the changing aspects were observed by the southbound train. The total time the signals flashed through the cycling aspects was 3 seconds.

The timer relay was readjusted to operate for 10 seconds and the signals returned to service.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
361	11/29/2002	NS	CTC			NS 9361	PSO Coupler	Bellevue, OH	N

Failed Equipment or Device - PSO Coupler

On November 29, 2002 at 9:15 p.m., train LB 28, lead unit NS 9361, while approaching the eastbound signal at Bragg Rd., MP B-246, observed signal to be RESTRICTING. When train LB 28 was seven (7) car lengths from the signal, it upgraded to an APPROACH for less than a second, then dropped to STOP. Train was stopped four (4) car lengths from the signal. Train 403 was proceeding east in the block ahead of LB 28.

C&S investigation determined that a Phase Shift Overlay (PSO) rail to line coupler was discharging enough voltage on the signal control line circuit to energize the R222 HD relay causing the signal to display an APPROACH signal for a second and cancelling the stick circuit causing signal to drop to STOP. The phase shift overlay is superimposed on the signal control line wire and the coupler discharged into the relay after the track circuit was energized. This overlay circuit was not in service at this time.

Manufacturer is testing coupler and their use in this application. The PSO will be moved to spare wires and vendor is reviewing its application.

362	12/5/2002	NS	CTC			NS 9515	Thermal Timer Relay	Reid, KY	N

Failed Equipment or Device - Relay

On Thursday, December 5, 2002 at 2:30 p.m., train #230, lead unit NS 9515, reported the northbound automatic signal at MP 356 changing from APPROACH to CLEAR prior to passing the signal. The next signal at Reid, Control Point MP 32.0 was a DIVERGING CLEAR into number two track. The correct aspect for the signal at 35.4 would have been APPROACH to APPROACH DIVERGING.

Investigation of the above occurrence was duplicated and found to be a thermal time relay at the 35.4 automatic signal. The time was designed to hold off the signal upgrade at 35.4 for 8 seconds. This allows the northbound signal to remain at APPROACH until the track code changes to positive and the minus codes for the approach is lost.

If the timer operates less than the required time the coding of a minus for the APPROACH and a plus for the APPROACH DIVERGING gets decoded as a minus plus (CLEAR).

The timer relay was replaced and the signals returned to service. The particular timer is a type B1 GRS LOS timer and is common on the first and second districts of the CNO&TP. All locations are being inspected for style of timer relay and operation is being checked.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
364	12/16/2002	NS	CTC			P40	Signal Circuits	Kannapolis, NC	N

Failed Equipment or Device - Track Isolation Unit

At 7:50 a.m., December 16, 2002, southbound train P40 observed the northbound 339.8 intermediate signal, as his southbound train passed the adjacent southbound proceed signal at the 339.9 intermediate signal location.

P40's train had passed the 339.9 southbound signal by approximately 3 - 4 car lengths, as Engineer observed an APPROACH DIVERGING (Y/G) signal at the adjacent northbound 339.8 intermediate signal. At this time, P40 still occupied the track circuit north of the 339.8 northbound signal with approximately 1/2 mile of train. The APPROACH DIVERGING signal was displayed for 3-4 seconds before displaying a RESTRICTING signal (R/R with number plate). The signal remained RESTRICTING until P40 Engineer could no longer observe the 339.8 signal.

C&S personnel investigated and were able to duplicate the signal as observed by Engineer. Investigation found shorted blocking diodes in a trackcode isolation unit located at the 339.8 signal location along with excessive current on the track circuit. The current limiting diodes shorted in the isolation unit allowed the track relay to pick up from the kick back circuit generated by the inductor magnetic field collapse. The track relay followed the code being generated for a following move due to the stick circuit being energized. The code following track relay allowed the BD relay to energize and display the northbound APPROACH DIVERGING aspect. Track circuit current levels were adjusted, the isolation unit was changed out and the signal system tested. Returned to service at 3:30 p.m. on 12/16/02.

363	12/17/2002	NS	CTC			908P217	Relay Circuit	Burlington, NC	N

Human Error - Field Wiring Error, Inadequate Service Testing

At 12:01 p.m. on 12/17/02, train 908P217 with engine 5196 handling 1 load 11 empties, passed the westbound STOP signal at control point Merrill, M.P. H23.5. Train passed the STOP signal by approximately 182 feet. Train crew reported to dispatcher that the non-automatic signal at Haw River, NC, M.P. H25.5 displayed a CLEAR aspect. The controlled holdout signal at MP H23.5 displayed a STOP aspect.

Investigation of the incident revealed the CLEAR signal indication at the non-automatic signal at MP H25.5 displayed account of improper temporary wiring made by signal personnel during a signal cutover on 12/13/02. The "H" and "D" output of the Electrocode unit were wired together to the coil of the relay used to light the CLEAR aspect, allowing either the "H" or "D" to display the CLEAR.

The wire was removed from the "H" output to the relay coil and the system was tested and returned to service at 2:00 p.m. on 12/17/02.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
399	1/17/2003	NS	CTC			NS 9077	Phantom Aspect, Color Position Light Sign	Hurt, VA	N

Phantom Signal - Due to Unpainted Signal Hood or Background

At 11:00 a.m. on January 17, 2003, train 3529217 with lead engine NS 9077 was eastbound on the Altavista District of the Virginia Division when the crew reported they observed an APPROACH DIVERGING aspect on signal 2026 at MP V 202.6 and received a STOP aspect at CP Hurt at MP V 200.2. The 2026 signal should display an APPROACH aspect with a STOP aspect at CP Hurt. This is electronic track territory with electronic interlockings and color position light signals. Cables were meggered, relays tested and grounds checked at both locations with no exceptions found. Logger cards were installed at both locations. The 2026 signal was returned to service on January 17, 2003.

On Saturday, January 18, 2003 the signal was observed at the same time as the eastbound move on the previous day from a test engine with C&S and Transportation personnel on board. Conditions were similar to that of the previous day and in approach of the 2026 signal there appeared to be two white lights on the bottom head of the signal in the 90 degree position. Further investigation found that the signal hoods over the bottom head lenses were faded on the top and sides of the hoods. The sun was to the right of the signal and sunlight was reflecting off of the signal heads giving the white light effect. The top head (45 degree yellow) was clearly visible. This could have been mistaken for an APPROACH DIVERGING aspect if the train crew did not watch the signal carefully.

The signal hoods in question were painted with a flat black paint and observed in like conditions on January 20, 2003 with no exceptions taken.

400	6/21/2003	NS					Track Circuit	Greensboro, NC	N

Maintenance - Improper Adjustment, Track Circuit

At approximately 7:20 p.m. on 6/21/03, train Amtrak 74 was running northbound on Track #1 when it received a Green over Red (G/R) CLEAR aspect at the intermediate signal at MP 285.6. Amtrak 74 should have received a Yellow over Green (Y/G) APPROACH DIVERGING aspect. The Control Point at Elm MP 284.5 was lined for a turnout move onto the H-Line and displayed a Red over Green (R/G) DIVERGING CLEAR aspect. This is Trackode territory with color light signals and GRS 5H power switch machines. The condition was reproduced during testing. An invalid Trackode pulse was being transmitted from CP Elm to the intermediate signal at MP 285.6. A (+ - +) was being transmitted and deciphered as a (- +) and displayed the CLEAR aspect. When the pulse was adjusted with the NPL adjustment pot to slow down the rate, a (+ -) was sent and deciphered at MP 285.6, displaying the proper aspect, Yellow over Green APPROACH DIVERGING. Current levels on the track were within specifications, all cables were meggered and relays tested with no exceptions found.

Track circuit was adjusted to proper rate and engineering change made in the AD & BD relays to prevent this type of signal aspect display in the future.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
401	8/9/2003	NS	CTC			9526	B1 Biased Relay	Flovilla, GA	N

Failed Equipment or Device - Relay

At approximately 12:56 p.m. on August 9, 2003, northbound train 264 ran through a power switch lined against them at Flovilla, Georgia, MP 203 H under a CLEAR aspect. The GRS 5H dual control machine was in the reverse position in hand throw operation. The machine indicated normal correspondence allowing the dispatcher to request and clear the northbound signal for the main track. Train 264 accepted the signal and ran through the switch stopping clear of the OS track. Signals at this location are color light signals, no exceptions were found with the signals, cable or switch machine.

Investigation revealed that the NWP switch correspondence relay had remained in the falsely energized position, after voltage had been removed from the relay coils. This allowed the switch to falsely indicate it was in the normal position.

The control point data logger showed the relay remained in the energized position with the switch machine in hand throw operation and laying in the reverse position. This allowed northbound signal to display Green over Red or CLEAR, and allowed the approach signal at CP Sandy to display a CLEAR aspect for train 264.

The fault and signal display was reproduced and verified during testing. The faulty relay is a 500 ohm biased relay and was removed from service on 8/9/2003.

402	8/12/2003	NS	CTC			8631	Track Circuit	Rockmart, GA	N

Human Error - Signal Circuit Design Error, Inadequate Service-Testing

At approximately 9:36 p.m. on August 12, 2003, southbound train 924 reported that the southbound signal on the mainline at Control Point Ollie, MP 101.5H went from STOP (Red over Red) to CLEAR (Green over Red) then to APPROACH (Yellow over Red), as train 924 was coming to a controlled stop in advance of the southbound signal at the Control Point.

Investigation revealed that the southbound signal did flash to CLEAR (Green over Red) for 2.5 to 4 seconds before displaying an APPROACH (Yellow over Red) aspect. A permissive signal displayed for such a short time interval should not be considered a viable signal to operate on.

Condition was caused when a single light pusher unit in the block south of Control Point Ollie transversed the insulated joints at the intermediate signal at MP 104.2H. The north track circuit picked up before the south track circuit was de-energized, permitting a single pulse of 180 code being sent to CP Ollie. The track code information was deciphered at Ollie and a CLEAR signal displayed for time interval noted. This is GRS Rate Code Track Circuitry.

This condition was reproduced and the CLEAR signal aspect displayed for 2.5 to 3 seconds repeatedly during testing. To correct the condition, the code selection circuit was modified adding a contact of the southbound (1041) directional stick relay in the circuit to eliminate the 180 code transmission into the oncoming train with the southbound directional stick relay energized.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
403	8/24/2003	NS	APB			8923	68H Relay	White Siding, TN	N
			Failed Equipment or Device - Relay						
			On August 24, 2003 at 3:30 p.m. CDT, eastbound train No. 334, while stopped in the East End of White Siding observed the eastbound mainline signal MP 540.2A display a CLEAR signal. Westbound train 391 was running on CLEAR signals in the automatic block territory between the West End of Rossville and the East End of White Siding. The eastbound signal at the E.E. White Siding displaying a CLEAR did not downgrade to STOP until westward train 391 passed the automatic signal at MP 538.8A. Trains operate under track warrant authority in the Automatic Block Signal territory. The failed condition was observed by C&S Supervisor while performing simulation tests. The failure was determined to be the 68H relay at automatic signal MP 536.8A. In attempt to duplicate the actual conditions a heat lamp was used to apply heat to the 68H relay. After applying heat for 30 minutes the relay remained energized without power for 4 minutes. The relay failed the field drop away test with a value of 1.8 milliamps. The last relay test was performed on September 9, 2002 with a drop away value of 4.7 milliamps. Required test interval is 4 years. The relay was manufactured by GRS with a tag date of March 27, 1971. It is a 900 ohm neutral relay. Relay is being shipped to Texas Transport Institute, College Station, TX for further testing.						
404	8/26/2003	NS	APB			3285	Incorrect Wiring	Leighton, AL	N
			Human Error - Field Wiring Error, Inadequate Service Testing						
			On August 26, 2003 at 11:30 a.m. CDT, eastbound train A80 left Sheffield Yard on an APPROACH signal at MP 399.0A. Another eastbound train Q36 had left Sheffield Yard prior to A80. Train A80 reported the next automatic signal at MP 396.2A, Leighton, AL to be a CLEAR signal but suspected that train Q36 had not traveled far enough east to permit the signal to clear. In addition they had heard the Town Creek defect detector reporting the passing of train Q36, indicating that the train ahead had just passed the next signal location at MP 393.2A. Train crew of A80 notified the signal maintainer. C&S personnel investigated and discovered the S-Code Electronic Track Circuit cabinet was improperly wired at the automatic signal location MP 396.2A. The wiring was corrected per the location signal plans and operational tests performed.						

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
405	8/27/2003	NS	CTC			8818	B-1 Biased Relay	Mansfield, OH	N
			Failed Equipment or Device - Relay						
			At 6:03 p.m. August 27, 2003, train 528, traveling from track #2 to track #1 westbound at CP Lucas, reported the home signal was LIMITED CLEAR (Red over Flashing Green). 528 reported his next signal, intermediate signal 1727-1W, displayed STOP AND PROCEED. Train 528 brought his train to a normal stop. No other trains were involved. Upon arrival the condition was reproduced and was determined to be caused by a melted contact in the 1727 AHP relay. This contact had battery B-12 on the front and the positive coil of the 1727 AHPP relay on the heel. This condition allowed the 1727 AHR and 1727 AHP relays to be energized and the 1727 to be de-energized when, under normal conditions, it would have been energized. Had the 1727 AHPP been energized, the 1727 signal would have been displaying an APPROACH aspect vs. STOP AND PROCEED. The HD circuits leaving the 1727 signal towards CP Lucas are controlled through the 1727 AHP relay. The aspects to be displayed on 1727 signals are controlled through the 1727 AHPP relay. This scenario allowed the HD circuits to upgrade back towards CP Lucas account the 1727 AHP relay being energized but, account the 1727 AHPP being de-energized held intermediate signal 1727 AHPP at STOP AND PROCEED. The cause of the relay contact melting in the 1727 AHP relay is suspected to have been caused by several severe thunder storms and lightning in the area earlier in the afternoon. The 1727 AHPPR relay is a GRS Part #298 B-1 biased 194 ohm slow drop. The relay was replaced in kind and the signal system tested and restored to service at 11:16 p.m., August 27, 2003.						
406	10/30/2003	NS	CTC			NS 5555	Vandalized SA Searchlight Mechanism	Johnson City, NY	N
			Vandalism - Signal Damaged, Caused Phantom Aspect						
			On 10/30/2003 at approximately 8:50 a.m., train H1GHA30, engine NS 5555, 25 loads, 37 empties with no hazmat, reported signal 4W on track 2 at CP Johnson appeared to display a RESTRICTING aspect. Upon stopping his train and walking up to observe the signal, Engineer reported the signal at STOP but the inner lens was broken. The sun was shining directly into the signal at this time. The phantom aspect was caused by an unknown party breaking the inner lens allowing the sun to be refracted in the outer lens. The inner lens was replaced, and all appropriate tests made prior to returning the signal to service.						

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
407	11/3/2003	NS		Automatic		F729729	Signal System	Durham, NC	N

Human Error - Improper Circuit Jumper in Place

At approximately 12:00 p.m. on November 3, 2003, CSX train F729729 approached the D&S Interlocking at MP H57.4 on the H-Line and MP D86.40 on the D-Line, westbound on the CSX track which intersects both the H-Line and D-Line at this interlocking. As F729729 approached the interlocking, the signal controlling CSX westbound movement across the diamond, displayed a PROCEED aspect, Green over Red. The crew then noticed NS train E22 had fouled the interlocking limits, attempting to make a northbound move on the D-Line through the interlocking.

Train E22 stopped at the 2R signal of the interlocking, the signal was dark and E22 acted in accordance with the time table special instructions for movements across the interlocking with signal outages or troubles. E22 had moved across the joints at the signals and fouled the interlocking 2T OS track but had not fouled the diamond when F729729 observed E22. E22 was waiting the prescribed 5 minutes before proceeding across the diamond. The CSX signal should have displayed a STOP, Red over Red aspect.

Investigation found that the 2T OS and 2L approach track circuit relays had been energized with temporary jumpers during new construction at this interlocking. The D-Line had been taken out of service during the new work. While out of service, the 2T OS and 2L track wires were destroyed during grading and temporary jumpers were applied to get the interlocking back in service for CSX train moves. The D-Line was then restored to service without the 2T OS and 2L approach track relay jumpers being removed.

The D-Line is currently out of service pending restoration of damaged interlocking cable and the 2T OS track circuit has been restored to service and tested.

408	11/12/2003	NS		Remote		NS 3425	10WB Dwarf P/L, Signal Man Failure	GP Works, Altoona, PA	N

Human Error - Field Wiring Error, Inadequate Service Testing

On 11/12/03 at approximately 6:40 p.m., Engineer and Conductor moving light engines NS 3425 and NS 3359 reported signal 10WB displaying a SLOW CLEAR with the next signal 12W at STOP. Investigation revealed that the internal wiring of signal 10WB was improperly wired, the green and yellow wires reversed causing 10WB to display a SLOW CLEAR instead of a SLOW APPROACH. Wiring error was made on 7/21/02 when 10WB was replaced and improperly tested. Corrections made along with proper tests and signal returned to service on 11/12/03.

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
409	12/22/2003	NS	AB	Remote		NS 9752	Signal	Van Loon, IN	N
			Vandalism - Signal Damaged, Caused Phantom Aspect						
			On Tuesday, December 22, 2003 at 8:49 a.m., train 20E was traveling east on the Chicago District westbound main track. Engineer and Conductor on engine NS 9752 called the home signal at Van Loon interlocking, MP B-497.9 a SLOW APPROACH (Yellow over Red). The crew was contacted by the Chicago District dispatcher in Ft. Wayne, IN, after proceeding past Van Loon. The dispatcher informed the crew to bring their train to a stop. The crew of 20E walked back to observe the dwarf signal and reported the signal had been painted orange. Investigation of the above incident verified that the 3 position color light dwarf signal had the top and bottom lenses painted orange and the can of spray paint was laying by the signal. The incident was also reported to railroad police for further investigation. The signal lenses were replaced and the signal was tested and placed back in service.						
431	1/14/2004	NS	CTC			NS 5578	None	Bryan, Ohio	N
			Loss of Shunt - Possible Rust or Foreign Material on Rail						
			On 1/14/04 at approximately 10:30 a.m. train B41, engine only, moving east on track 2, observed 2E signal change from Red (STOP) to Green for approximately 6 seconds then back to Red (STOP) while train B40, engine only, was in the block ahead. Office diagnostics revealed that train B40 lost shunt several times during his movement. Train B41 did not proceed on the Green aspect. All track circuits between CP 340 and intermediate signal at MP CD335.9 were tested with a .06 ohm shunt with no exceptions. Due to rain, no evidence of contamination was found. The prior movement to this incident was an empty grain train (bean meal). As a precaution an order for light engine to operate by absolute block has been placed in these limits.						

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
			Cause						
			Narrative						
432	1/22/2004	NS		Remote		CSX 3560	18L Signal Unit	Ironville Interlocking, Toledo, OH	N

Vandalism - Signal Damaged, Caused Phantom Aspect

On January 22, 2004 at 11:30 a.m., CSX train Y121 was shoving south and passed STOP signal 18L at Ironville Interlocking in Toledo, Ohio. CSX train crew was Engineer and Conductor. Conductor was on the caboose on the rear of train Y121. As they approached the 18L signal from seven car lengths they observed the signal display an APPROACH aspect, Yellow over Red. This signal was not requested by the Dearborn dispatcher nor requested in the field as verified by signal personnel at the site. In addition, the block ahead was occupied by signal construction forces working under Track and Time 23A authority. When train Y121 passed the signal the conductor was contacted by the signal personnel. The train was stopped two car lengths beyond the signal. Weather was clear, sunny, about 15 degrees with snow covered ground.

A reenactment of the incident indicated the signal was Red over Red (STOP) when viewed from 100 yards to the signal. Beyond this distance the top aspect of the signal appeared Yellow. The Yellow aspect improved at higher viewing angles.

The 18L signal is a 2 unit ground signal with 2 US&S searchlight mechanisms on the top unit. The lamp voltage was found to be low at 6.6 volts AC. The outer lens of the signal unit had been damaged by outside parties. The last inspection at this location was on November 25, 2003. The H-2 signal mechanism was last inspected on October 25, 2003. The voltage was raised for all the signals and the searchlight housing and operating unit was changed out to prevent a recurrence.

No. of Reports Shown in this Listing: **82**