NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE of RAILROAD, PIPELINE &
HAZARDOUS MATERIALS INVESTIGATIONS
WASHINGTON, DC 20594

DCA 05 MR 008
HEAD ON COLLISION of
NS RAILROAD TRAINS at
GRANITEVILLE, SOUTH CAROLINA on JANUARY 6, 2005

Factual Report
Operations Group

ACCIDENT

Location:	Graniteville, South Carolina
Date:	January 6, 2005
Carrier:	Norfolk Southern Railway (NS)
Train Symbol:	NS 192P005 (Northbound Freight) NS P22005(Aiken Turnaround Local Freight)
Location:	Eastern Region - Piedmont Division - Line Segment Columbia, S. C. to Augusta, GA Mile Post R178.3
Industry:	Avondale Mills – Gregg Plant
NTSB Number:	DCA 05 FR 008

Graniteville - Operations Group

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SYNOPSIS

About 2:39 a.m., eastern standard time, on January 6, 2005, northbound Norfolk Southern Railway freight train 192P005 struck an unoccupied parked train and derailed after encountering an open switch in Graniteville, South Carolina. The train was northbound in non-signaled track warrant territory with a timetable speed of 49 mph. The 42-car train was powered by two locomotives and was made up of 25 loads and 17 empties.

About 7 hours before the accident, a local train, P22P005, had used the main line switch at MP R 178.3 to enter an industrial track at that location. After servicing a local industry, the crew secured their train and departed the area around 7:00 p.m. The crew was transported by a van to their home terminal, where they cleared their track warrant at 7:53 p.m. No trains had used the main track from the time the local train departed the area until the arrival of the accident train. The engineer of the accident train initiated an emergency application of the air brakes as his train neared the switch. While in emergency braking, the train was diverted onto the sidetrack and struck the local train locomotive. The two locomotives and the first 14 cars from train 192P005 derailed. Included in the derailment were three cars of chlorine and one car of sodium hydroxide. A breach of a tank car of chlorine, the 9th car behind the locomotives, prompted an evacuation of about 5,400 people. Due to the significant release of chlorine gas, the engineer received fatal injuries; eight other people were fatally injured by the chlorine gas inhalation. The conductor and 72 other people were hospitalized with inhalation injuries.

This accident received regional and national news media attention. Board Member Hersman accompanied the investigative team. Parties to the investigation include the Federal Railroad Administration, Norfolk Southern Railway, the Brotherhood of Locomotive Engineers, the United Transportation Union, General American Transportation, Union tank Car Company, Trinity Industries, and Olin Chemical.

Circumstances Prior to Accident

Prior to train 192P005's derailment, the last train known to occupy the main track at MP R178.3 was train P22005, on January 5, 2005. Train P22005 went on duty at the NS Aiken Yard Office in Aiken, South Carolina. The conductor and brakeman reported for duty at 7:00 a.m. and the locomotive engineer reported for duty at 8:32 a.m. The conductor received and copied Track Warrant number 00779 at 8:11 a.m., giving train P22005 authority from the train dispatcher to occupy and work between MP SA 51.0 and Warrenville, South Carolina, MP SA 63.4 on the main track. After the arrival of the locomotive engineer, the crew of train P22005 conducted a job briefing discussing the objectives of the workday and specific movements they were to make during the shift. The crew left the Aiken Yard Office and walked a short distance to their train where they performed an initial terminal air brake test on their train. Train P22005 consisted of one locomotive, NS 4622, and eight rail cars.

Train P22005 departed east by timetable direction towards Warrenville on the SA main track. They left the SA main track and entered onto the AB Industrial Lead. They proceeded on the AB Industrial Lead to W. R. Grace Company where they switched rail cars at the industry. After placing empty rail cars at W. R. Grace Company and completing the train air brake test, they returned to the SA main track. With Track Warrant number 00779 still in effect they operated west on the SA main track toward the Rock Track, MP SA51. Train P22005 left five cars on the SA main track then proceeded on the Rock Track to where they picked up seven cars and placed two. They returned to the SA main track and, after re-coupling to the five cars, they performed a train air brake test. Train P22005 operated east on the SA main track to the NS Aiken Yard Office where they stopped about 1:00 p.m. for their lunch break.

After their lunch break, the crew of train P22005 boarded their train. The conductor received and copied Track Warrant number 00861 at 2:10 p.m., which gave their train authority from the train dispatcher to occupy and operate on the R Line main track to work between MP R185.0 and MP R171.0. Train P22005 with locomotive NS 4622 and eight rail cars and, with Track Warrant number 00779 still in effect, operated east to the junction of the SA Line and R Line.

After entering the R Line, they operated south by timetable direction to the set off track at MP 180 at Warrenville. They detached locomotive NS 4622 from the eight rail cars at the south end of the set out track and operated the single locomotive south to MP R185.0 at Bath, South Carolina. After switching rail cars at Bath, the crew of train P22005 added four cars to the rear of their train, then operated north to Langley, South Carolina, MP R182.0. And switched cars. After departing Langley, they continued north to the Warrenville Siding where they added two cars to the rear of their train. After completing the train air brake test, they continued north to the Bridgestone Lead, MP R171.0, and performed switching operations. At 5:50 p.m. they completed their duties at Bridgestone and operated train P22005 south toward the Avondale Mills Gregg Industry Track with 12 cars.

About 6:10 p.m., train P22005 stopped on the main track about six car lengths north of the main track switch located at MP R178.3. We shoved into the mill with 12 cars. The conductor dismounted the train to open the gates and operate the derail and switches at the Avondale Mills Gregg Industry Track. Train P22005 pulled south stopping north of the switch where the brakeman dismounted the locomotive. The train continued south past the main track switch and stopped. The brakeman lined the switch to allow the train to move from the main track to the Avondale Mills Gregg Industry Track. After the conductor prepared the route, the brakeman protected the first highway-rail grade crossing north of the switch and the locomotive engineer to shove the train north. After the train occupied the crossing the brakeman instructed the engineer to stop. The brakeman mounted the leading end of the leading rail car and rode the shoving movement into the Avondale Mills Plant while the conductor protected the next highway-rail crossing.

The conductor had previously scheduled the Cimarron Taxi Service to transport the crew of train P22005 from Warrenville Siding to the NS Aiken Yard Office upon completion of their workday. At 6:20 p.m., the conductor contacted the taxi driver and told the driver to come to the

Avondale Mills Gregg Industry for their transport instead of the Warrenville Siding. Aware that the Hours of Service limitation of twelve hours for himself and the brakeman would occur at 7:00 p.m., the conductor informed the engineer and brakeman they would not be able to operate to the Warrenville Siding as previously planned. The crew completed switching the Avondale Mills Plant and after several unsuccessful attempts to clear the highway-rail grade crossing and mill gate, placing cars in two separate mill tracks finally cleared the crossing and gate.

Train P22005 was left about five car lengths north of the main track switch at MP R178.3. The train consisting of locomotive NS 4622 and two rail cars was left by the locomotive engineer on the Avondale Mills Gregg Industry Track.

The engineer applied the handbrake on locomotive NS 4622 and began shutting down and securing the locomotive. The brakeman, walking south from the mill, closed one of the two sides of the swinging gate as he passed through the gate. He proceeded to the rail car positioned next to the locomotive and applied the handbrake then boarded the locomotive to retrieve his luggage. He dismounted the locomotive and went directly to the Cimarron Taxi, which was parked, adjacent to the locomotive. The conductor walked from the mill closing the other side of the gate then securing it. After securing the mill gate the conductor looked at his watch and observed it was 6:57 p.m.

Shortly after the engineer parked train P22005, the Cimarron Taxi Service arrived about 6:50 p.m. and parked on the east side of the train, adjacent to locomotive NS 4622. The taxi driver observed the engineer inside the locomotive cab and the brakeman securing the locomotive hand brake which was located on the east side of the locomotive. Shortly after, he observed the brakeman dismount the locomotive, retrieve his luggage from the locomotive walkway and walk directly to the rear of the taxi. The taxi driver also observed the conductor walking from the rear of the train toward the locomotive where the engineer handed luggage down to the conductor. The engineer dismounted the locomotive and he and the conductor walked directly to the rear of the taxi, which was facing north. After placing their luggage in the taxi, the engineer and conductor walked around the taxi and got in.

Upon departing the area, the taxi driver and train crew traveled south over a highway-rail grade crossing located within 21 feet of the main track switch providing access to the Avondale Mills Gregg Industry. According to the train crew they did not look toward the switch nor did they have a conversation about if the main track switch had been restored to normal position.

At 7:15 p.m., the taxi arrived at the NS Aiken Yard Office. The train crew exited the taxi and retrieved their luggage. The engineer proceeded to his personal vehicle and departed the yard. The conductor and brakeman entered the Aiken yard office where the conductor began completing his paperwork. About 7:50 p.m., the conductor instructed the brakeman to contact the NS dispatch office at Greenville and cleared Track Warrant numbers 00779 and 00861. The brakeman contacted the NS dispatcher and cleared Track Warrant number 00861 at 7:53 p.m. Track Warrant number 00779 at 7:54 p.m.

Train No.192P005 originated in Macon, Georgia and was destined for Columbia, South

Carolina. NS records indicate that train 192P005 received a Class I initial terminal air brake inspection on January 05, 2005 at 10:50 a.m. in Macon, Georgia by Norfolk Southern mechanical personnel. The mixed freight train consist for train 192P005 consisted of two locomotives, 16 loads and 14 empties and departed Macon, GA. at 1:30 p.m. on January 05, 2005. While en-route, the head-end train telemetry device (HOTD) developed communication problems. The train crew switched the defective locomotive NS 6593 out of the lead position at McBeam, GA, reestablishing proper communication between the HOTD and the end of train telemetry device (EOTD). No other problems were encountered en-route. The train arrived at 10:50 p.m. at NS Nixon Yard in Augusta, GA. where the inbound train crew exited the train and turned control of the train over to the outbound train crew destined for Columbia, South Carolina.

Train No. 192P005 departed Augusta Yard at 2:05 a.m. on January 06, 2005. The outbound train crew consisted of a locomotive engineer and conductor. The train proceeded across town to the NS Augusta Yard where the crew performed switching duties and added cars to their outbound consist. Train 192P005 consisted of two locomotive units NS 6653 (lead unit) and NS 6593 pulling 42 rail cars consisting of 25 loads and 17 empties. Of the 25 loaded cars, 14 were designated dangerous containing hazardous material according to the NS train consist list. The train's trailing tonnage was 3,520 tons with a total train length of 2,553 feet.

At 2:13 a.m., January 6, 2005, Track Warrant number 00491 was issued to crew of NS freight train 192P005 to operate from Augusta, Georgia, and MP R191.4 to Summit, South Carolina, MP R132.8. No other stops were made and there were no problems reported or recorded until 2:39 a.m. at the collision site.

Weather at the time of the accident was dark, dry, and cloudy and 59° F. Actual damages have not been totaled, however preliminary estimates were over $2.8 million.

DETAILS OF THE ACCIDENT

At about 2:39 a.m. on January 6, 2005 NS freight train 192P005 northbound struck the stopped, off duty Aiken Local P22005 in the Avondale Mill track at Graniteville, South Carolina. The accident occurred, on the Columbia – Augusta Line at milepost R178.3 on the Avondale Mill industry lead, on the NS Piedmont Division. The northbound train was moving about 45 mph in a 45 mph curve speed restriction. The authorize time table speed was 49 mph in non-signalized track for the Track Warrant Control system territory.

The main track switch at the Avondale Mills Lead, milepost R178.3 was inspected and found to be in normal working condition after the collision. The switch and the lock were examined and no exceptions were noted with the condition of the equipment. The switch and the lock functioned as designed after the collision and there was no evidence of tampering after the Aiken Local crew had lined and locked the track for the mill on the evening prior to the collision.

The last crew to use the Avondale Mill switch reported that they lined and locked the switch for

the mill track when they arrived to switch the plant about 6:10 p.m. the evening before the collision. The Aiken Local crew described in detail how they worked the plant before going off duty on the mill lead. They describe all activities while switching the plant, including how they tied up the locomotive and set the hand brake on it before they departed the plant. They had called a taxi that was waiting on them when they finished work for the evening. They boarded the taxi that was waiting adjacent to their locomotive and headed to the train station at Aiken. There were no train movements on the Columbia - Augusta Line after the local left the Mill. According to the brakeman on the local, he lined and locked the switch open for the Avondale Mill track when they arrived to work the plant that evening. According to the Aiken Local crew none of them were aware that the switch had been relined and locked for the main track before they departed from the Avondale Mill track. According to the taxi driver and the crew, they passed within a few feet of the switch in the cab when they departed and no one looked to see how the switch was lined.

As train 192P005, northbound arrived in Graniteville it was operating within track speed on track warrant authority when they entered the Avondale Mill track. They struck the off duty local in the Avondale Mill and derailed, resulting released of chlorine from a tank car within the train.

When the accident occurred at 2:39 a.m. on 1/06/05, the Aiken Local crew was off duty and they were unaware that the collision had taken place until the next morning. Condition of the No. 192P-005 crew, after the collision was one dead and one injured. Evacuation of estimated 5400 residents with eight residents believed to have died from chlorine fumes.

As northbound NS train 192P005 approached milepost R178.3, the train was operating at a speed of approximately 47 mph, with the throttle in notch position eight (8). Throttle was then reduced to notch position six (6) and held at that position for approximately 30 seconds. Throttle was then reduced to notch position four (4) with the speed recorded at 48 mph. Train speed then decreased from 48 mph to 42 mph within 17 seconds while the throttle remained in notch 4. The locomotive engineer moved the throttle to the idle position approximately 2.9 seconds before leaving the main track. After the accident the switch target and the switch points were lined and locked for the Avondale Mill at MP R178.3. The engineer radioed the train dispatcher after the collision that the switch was incorrectly lined to cause movement of the train to occupy the Avondale Mills Gregg Industry Track. The locomotive engineer placed the throttle in the idle position and initiated the emergency application of train automatic air brake when he observed the switch open.

At about 2:39 a.m., train 192P005 entered onto the Avondale Mills Gregg Industry Track and impacted unattended train No. P2200, which was parked and secured at a location on the industry track about 200 feet north of the main track switch located at MP R178.3. The unattended local freight train P22005 consisted of locomotive NS 4622 with two empty covered hopper cars PPGX 12119 and WITX 4760. Train 192P005 traveled approximately 159 feet in 20 seconds while the speed decreased from 42 mph until the speed indicated 0 mph. At impact, train 192P005 was moving at and undetermined speed.

At 2:39 a.m., the locomotive engineer of train 192P005 initiated an emergency call over the

railroad radio channel to the NS Dispatcher located at Greenville, South Carolina and informed the dispatcher that the main track switch was lined for movement to the Avondale Industry track, told him they were derailed and needed an ambulance. After this conversation the NS dispatcher attempted to contact the crew but was unsuccessful. There were no additional conversations with either member of the train crew of train 192P005.

As a result of the accident, the locomotive and the two empty hoppers cars (non-hazardous) of the parked local freight train P22005 derailed. The two locomotives and the first sixteen railcars from the lead locomotive of train 192P005, also derailed.

Of the sixteen derailed railcars, five were described as containing hazardous material. Loaded tank cars SBLX 14146, GATX 17105, and UTLX 900270 were positioned as the 6th, 7th, and 9th cars, respectively. These loaded tank cars contained Chlorine, 2.3, UN1017, which is a Poison Inhalation Hazard, Zone B. Positioned as the 8th derailed tank car was GATX 58326. Contents of this loaded tank car was described as Sodium Hydroxide Solution, 8, UN1824, II, classified as a corrosive material. Positioned, as the 16th railcar was tank car GATX 31941 containing the residue of Elevated Temperature Liquid, classified as a class 9 material. This tank car had derailed, but was still in an upright position. The compromised hazardous material car contained 180,000 lbs of chlorine.

The collision resulted in the breech of a loaded chlorine tank car. The release resulted in approximately a 1-mile area evacuation of about 5,400 people. There were nine fatalities and an undetermined number of injured.

On January 6, 2005, at 2:39 a.m., Eastern Standard Time (EST), a 911 emergency call was made to the Aiken Country Sheriffs Dispatch Office stating there was a train accident at the Avondale Mill Industry located at Graniteville, South Carolina.

Location Of The Accident

The Norfolk Southern Piedmont Division R-line is a 190.52 mile track segment, originating at a junction to a mainline near Charlotte, NC, extending through Columbia, SC and ending in Augusta, GA. This track segment is owned and operated by Norfolk Southern Railway. The designation for direction is north and south. Numerous small towns and industries are located near this track segment. The R-line is designed and maintained to comply with The Code of Federal Regulations Class IV standards, which allow a maximum speed of 60 mph for freight trains. Timetable speed from Columbia to Augusta was 49mph with some restrictions along the way.

The segment of the R-line at Graniteville is a single main track. The closest curvature is a left hand, one-degree 45 mph curve beginning at MP R-178.45 and ending at MP R178.65. The closest turnout is at MP R178.3 and provides access to Avondale Mills. This number ten turnout is of similar construction and material to the main track and has a maximum authorized speed of 15 mph when used. A spring frog, switch points and a New Century 51B switch stand with a

high mast and red and white reflective targets were also used. The Avondale Mills track has a maximum speed limit of 10 mph.

Train Dispatcher and Train Crew Information

According to the 2nd shift train dispatcher on January 5, 2005--; When the Aiken Local went off duty I talked to the conductor. I don't remember having any contact with them until they cleared the track warrant. I talked to the conductor on a land line.

There was nothing out there on that line from the time he cleared his track warrant until 11:00 p.m. Because I didn't issue any track warrants out there. Nothing is done until a new train dispatcher comes on duty and no other trains out there. I wasn't the one that made the transfer. I was told that train No. P22 had two track warrants and where they were located.

There was a train that was ahead - - or southbound coming into Augusta. At that time there was only two out there at that - - there was another local that comes out of Columbia, the P-75. But he only comes down to the 150-mile post. So, I mean, - he was never in the area of Avondale.

I don't remember of anybody that would come out to Graniteville. No trains or person's authority on that portion of track from the time that the two track warrants were cleared by the local until I went off duty.

I don't remember any other conversations with P-22 other than, them clearing the track warrant. I don't remember them notifying me that they would be on the law at 7:00 p.m.

There was nothing out there on that line from the time he cleared his track warrant (at 7:54 p.m.) until 11:00 p.m. Because I didn't issue any track warrants out there. Nothing is done until a new train dispatcher comes on duty and no other trains out there.

The Aiken Local Crew--; According to the engineer, when they arrive at the Avondale Mill, we stopped at the church and I pulled down for the brakeman to line the switch. I was on the off side and could not see the switch. I never saw the switch while we were at Avondale Mills and I did not know how the brakeman handled it.

According to the brakeman on train P22005, when we arrived at the Avondale Mill, we stopped at the church. The conductor walked down to unlock all the gates, and he was going to meet me. We were going to spot two tank cars of Caustic Soda down in the mill. I went up to the main track switch, stopped, pulled the train by, and lined the switch for the Avondale Mills industrial track. Then I told the engineer that I had him lined into the plant. We shoved into the mill with 12 cars. After switching the mill we tied up on the lead with the locomotive and 2 empty cars.

The brakeman stated that it was never clarified that we would leave the train at Avondale Mills or try to get back to the SA main line". The brakeman stated, in order to lock the lock you have got to

take your key out, but I can lock the lock and take my key out and lay it right on the cross tie - there are a lot of people can get keys, I mean, that don't mean, you know, it was done by me.

The brakeman stated that after closing one side of the gate I looked at my watch, then it was about three minutes to 7:00 p.m. Coming from the gate, I was in a hurry to get everything done that I needed to do. I went toward the engine to tie the train down; when I looked at my watch it was about a minute to 7 p.m. when I got to the engine. I had no doubts in my mind when I left there, I thought that is what I knew, it was lined when we come in, and I knew that. And I knew it would be lined back to the main line. I am not totally 100 percent sure, did I line it back? In my mind when I got through with everything, everything was lined properly at the main line. When we finished switching the Avondale Mills plant, I was up in the track at the gate, two cars from the locomotive and left one side of the gate for the conductor. Then I went back to the locomotive and got on it, got my bags, and got in the taxi.

According to the brakeman, "I was not sure that I ever went back to the main track and lined the switch. I am not 100 percent sure." However, the brakeman stated that he was aware that whenever you tie up, that you have to have the main track lined and locked back for the main track.

The brakeman said, when we got back to the depot it was 53, 54 minutes after 7:00 p.m., when the conductor, who was doing some paperwork and he asked me to do him a favor, and clear the track warrants. I said, I would be glad to. When we tied up, everything in my mind was lined for the main line. Locked like it should have been for the main line movement.

The brakeman stated: " I had in it my mind, I was going to go do that, (Line the Main Track Switch Back for the Main Track) - but I am not 100 percent sure that I did. I would say I might have made a mistake, I mean, I am not positive, 100 percent".

According to the conductor, I had previously scheduled the Cimarron Taxi Service to transport the crew of train P22005 from Warrenville Siding to the NS Aiken Yard Office upon completion of their workday. At 6:20 p.m., the conductor contacted the taxi driver and told the driver to come to the Avondale Mills Gregg Industry for their transport instead of the Warrenville Siding. Aware that the Hours of Service limitation of twelve hours for himself and the brakeman would occur at 7:00 p.m., the conductor informed the engineer and brakeman they would not be able to operate to the Warrenville Siding as previously planned. The crew completed switching the Avondale Mills Plant and after several unsuccessful attempts to clear the highway-rail grade crossing and mill gate, placing cars in two separate mill tracks finally cleared the crossing and gate.

According to the conductor, when we finished, I went around and got up in the engine, the taxi was there parallel to it. I saw the brakeman at the engine. I never saw him at the switch and I never asked him about the switch. I got my bag, and my clipboard and put my stuff in the back of the taxi. Then I went to help the engineer get his stuff down. I got in front of the taxi and I know the brakeman was in the back. And I assumed that the engineer was in the middle seat. After we got in the taxi we told the driver to go to the depot. When we tied up, our engine stopped probably six car lengths from the switch.

The conductor stated that while we are working in the plant, I was off in the field and I never got near the switch. After we arrived at the plant, I never touched the switch. We usually have job briefings, but I never told my brakeman to make sure that that switch was lined and locked for the main line movement. I never told him, and I never touched the switch, myself. It was in my mind, when I arrived at the mill. I should you have done a briefing to insure that the switch was lined back. I probably should have. I didn't discuss this lock and the switch at all with the crew. The locomotive engineer didn't mention it either. We didn't have any conversation, between the engineer and the brakeman about the way the switch was lined or the way it was locked.

According to the conductor, under rule 104 and 104(a), you are required to know that the points are meeting up, properly and it is lined for movement. I know the track was lined for the movement. And with the Norfolk Southern lock, you have got to take the key out of the lock to lock it. The standard would be for that lock to be locked with the switch open while switching. It would be because we were away from the switch and you couldn't see it.

According to the conductor, he did not check to see if the switch was lined and locked for the main track when they tied up for the evening. I am a good railroad man. But, - I don't know (if the switch was lined).

I never asked him (the brakeman), I never viewed them (the switch), I never looked at them (the switch stand or lock). I got in the taxi, and they got in the taxi, nobody mentioned anything like that - (Checking the Switch to see if it were lined normal for the main track). We went on to the depot.

I was closing up the last gate, and our engine was coupled to two cars and the brakeman was up there tying those cars in.

You can see the switch from the taxi, it has got a target on it. The taxi came out on that road, and we went right by that switch. I didn't look at the switch and I did not observe it being red. I have to be truthful. When we got off of the locomotive unit and got in the taxi, that there was no discussion between any of the guys about the switch. No, I thought in my mind, well done. Hey, mission accomplished.

Taxi Driver--; I was the Cimarron Coach driver that picked the crew up from Graniteville that night and took them back to Aiken. Cimarron is a company that has a contract to shuttle the crews between the trains and the motel and things like that. And you know, we're dispatched to pick up a crew - - they work for Norfolk Southern to move and deadhead train crews around.

On January the 5th, when I was called to pick up a train Crew at Avondale Mills. I was dispatched at 3:45 p.m. to pick up train no. P-22's crew. And my pickup time was for 6:15 p.m. that night. I was supposed to pick them up in Warrenville, and I went to Warrenville in the normal way, I pick them up there quite often. We have radios in our van so we can talk to the engines. And I just sit there and monitor your radio. I was listening to the talk and waiting and

the next thing you know, I don't know exact time. Probably about 6:20, 6:30 p.m., somewhere in that neighborhood, I could tell just by the conversation that they were still over in the Graniteville area.

Then the conductor called me on the radio. I usually talk to him, because I've known him quite a while. I pick him up quite a bit and I know his voice. He called and he says, well, come over here to Graniteville; we're not going to make it over to Warrenville. So that's what I did. I went over to Graniteville. And I parked there by the Admin building, there where the sidetrack is. And I listened, to wait on them, because that's usually where I pick them up when I go over to the Avondale Plant.

It was getting dark. In fact, when I picked up that crew that night I made a comment about that. I said, I thought you said this was a day job. Because it had gotten dark.

I saw the two of them get off; I think it was the engineer and the brakeman that was with him. The engineer was inside the cab of the locomotive. The lights were on in there. And the other guy, he was on the outside there where that wheel's at. I guess that's a handbrake. That's how you lock the brake down - - but he was turning that wheel, cranking it down. And that was the brakeman. And the conductor came from behind the train as far as I can remember. There was the engine, and then there was a couple cars behind it, and he come from that direction.

Here would be the main track right here next to the road. Then the road that goes on both sides. These are two one-way roads. And then there's this track goes back off into the Stevens steam plant right over here, like that. There's a parking lot over here, and there's a parking lot back here. And there's a building here. I drove back up on the grass and the train was more or less right there. That's the locomotive and two cars. And I parked right along side them, on the grass. The local was backed in here. So he was pointing south. I was there less than ten minutes. I know that.

According to the train crew, they got to the Avondale plant about 6:10 p.m. And you picked them up about three minutes to seven. Yeah, cause my depart time was 7:00. So you figure giving them time to load their bags. Like I said, I was parked back over in here in the grass, and I was listening to the conversation of them jockeying the cars to get them all into position. I remember very distinctly that one of the cars was sticking out two or three feet over a road crossing, and they said something about they couldn't leave it like that, that was not safe, and they had to get them crunched together so it wasn't sticking out over the road crossing. That's the big thing I remember.

I departed there about seven after stopping about 6:55. I wasn't there more than five minutes. And when I got there, the engineer and the brakeman were on the locomotive. And I did not see them walk from the main track, or walk from the rear. They were there. One was in the cab and one was out there turning that wheel (Hand Brake).

We departed on the road that ran alongside the track. I was not paying attention where I would have been able to see that switch from the road whenever we went by there. I really wasn't

paying that close attention. I did not see the switch stand at all. I didn't pay attention - - I was watching the road. I wasn't looking for switches. And you know, I'm watching where I'm driving.

Whenever I got ready to leave, I could not see any markers of anything on the switch stands or anything like that. No. No. No. Not really. And half the time when I'm looking at them I don't know which way they're pointing.

I know that was kind of like a coveted job, the Aiken job or something. You had to have a lot of seniority. Just by listening to everybody talk, why it's such a good job is because it's a day job. Five days a week, it has Saturday and Sunday off. That's why everybody wants the job. At least, from what I gather, everybody sits there and says, well, you know. Cause I listen to the guys that were there as a temporary filling in for him while he was gone, saying, man, this is the job I want to have, but I ain't got enough seniority to get it.

I don't know if they make a lot of money. I know they make more than I do. But the idea, it's an easy job, whereas the other job you pick at 11:00 p.m. at night, and you pick this crew up at 7:00 a.m. in the morning. It's kind of a coveted job, I have never observed that they work them too hard, or that they are tired when they get off.

I was dispatched at 3:45 p.m. Pick up time, 6:15 p.m. Control number P-00601867. That's the, how Cimarron gets paid by the railroad. As far as I know. And then my ticket number is 903368. Pick up crew with P-22. I'm supposed to pick them up in Warrenville and take them to Aiken. I got to Warrenville at 6:00 p.m.

Of my own choosing, I was early because like I said, I wanted to get a lottery ticket. And I departed from Graniteville at 7:00p.m.and I arrived in Aiken at 7:15 p.m. I departed Aiken at 7:17 p.m. And I got home at 8:10 p.m. that night. And I drove 64 miles.

There was not anything that the crew said while we were driving from Avondale Mills to Aiken that stands out. Like I said, the only thing, you know, we talked about, I made the comment about I thought this was a day job and they said, yeah, we was running behind tonight and blah, blah, blah. You know, just general chitchat. There wasn't anything at all in their demeanor that would make you think that they were worried about any work that they hadn't done, or anything like that.

Or that they might have lined a switch, or didn't line a switch. Absolutely not. No. I mean, there was nothing, no comment about that. Like I said, it was just light talk, like I said, I've worked with each one of those guys, picked them up at various times, and they all know me.

I was there about maybe five to ten minutes prior to the crew getting in the taxi. Well, long enough for them to lock down, shut everything down and load their bags. When I first arrived at the location, I observed the two crew members on the locomotive. One was in the locomotive cab and the other was outside.

And the conductor was coming from the plant area. From behind the two cars that were connected to the locomotive. Behind the two cars. You know, that was my perspective of where he came from. He came from the rear. And he went up to where they were located, they were setting the bags on the steps where they could grab their bags. And put them in the back of the van. One of the other employees handed his bag down to the conductor and then the three employees came straight directly from the locomotive to your taxi.

There was no discussion between them that I recall about them being hurried or rushed or running out of time. Nothing other than that they were running behind.

Well, this isn't the first time I've picked them up. And they've given me time to pick them up at 6:00 p.m. and they leave at 6:30 p.m. I mean, they don't seem to get in a big hurry, they don't get excited about the fact that they're running an hour late, or 20 minutes late. I've dealt with them long enough to know that. They don't seem like they get excited about that. You know, it's not like a normal job where you see people that are inside, well, I was supposed to get off at 7:00 p.m. They don't ever seem to get upset about that.

I waited an hour. My waiting time for the crew was an hour. In other words, I got there at six, and I didn't leave at seven. On this form it has the train crew symbol, which is P-22. And the conductor signs it.

The only thing I can say that might have caused the accident is what everybody is saying. It's obvious. Somebody left the switch in the wrong position. And whether or not, because a guy asked me that one time before. What about this, you know, how can they do something? I said, have you ever walked out of a room and left the light switch on? No consequences, right? Everybody makes a mistake. I mean, unfortunately, this has caused a - - tragedy. But outside of that, I feel very, very sorry for the crew.

According to the 3rd shift train dispatcher--; I gave train 192P005 a track warrant from Augusta to Summit as far as I remember. I don't remember having any other contact until they called me about the incident. I was sitting at my desk and the emergency came in on the Madison tower and it also flashes on the screen. I immediately answered it. Something to the effect of NS, - - dispatcher answering emergency call in on the Madison tower. I think it was the engineer. He called and said this is train No. 192. We came through Graniteville, South Carolina, at 45 miles and hour, and the switch wasn't lined for the mainline or something. He said the switch wasn't aligned properly or something to that effect. And we struck a parked engine in that side track. And we need an ambulance. At that point I asked the crew - I said, how is the crew? And the engineer said he thought he was bleeding and I notified emergency personnel.

When the emergency call came in, it was approximately two, I think it was 2:39, 2:40 a.m., approximately somewhere around in there. I think I got up and went and told the chief dispatcher just to see if he was aware of it. And he heard the call on his radio next to his desk. He heard the call simultaneously as when I heard it. I answered it just a split second prior to him. As far as the train No. 192, is concerned, that's the only conversation I had with the train. No

conversation with the conductor at all.

There were no other trains in the area near the collision. From 11:00 until the track permit was issued for the train No. 192. There were no trains or persons authorized on that track section. I don't remember issuing any track warrants down there. I don't remember anybody down in that area, no. There was no discussion of any movements in that area with the train dispatcher when I came on duty.

Aiken Local's Work/Rest and Hours of Service

During the investigation it was determined that the locomotive engineer on the Aiken Local was called from the Columbia locomotive engineers extra board to report to Aiken, SC by deadheading from his home. The locomotive engineer had been off duty for at least 10 hours and rested when he received his call to deadhead to the Aiken Local. The engineer was called to report for duty at 8:32 a.m. on 1/5/05 for the 7:00 a.m. job.

According to the engineer, I worked Train No. 119 out of Augusta, Georgia, to Columbia, SC the day before working the local on 1/05/05. It is the same train that collided with our train. I made a full round trip on it on 1/04/05 and was off duty at 12:32 p.m. on 1/04/05.

I was in bed when they called me, and I just stayed in bed at 10:32 p.m., and I got up the next morning around 6:00 a.m., and I left my house around 7:15, 7:30 a.m. I was supposed to be at work at 8:32 a.m. at Aiken, SC. The engineer went on duty at 8:32 a.m. on 1/5/05 on the Aiken local, and worked until the crew got back to the depot about 7:20 p.m. that evening.

According to the conductor, the Aiken local has Saturday and Sunday off and, he and the brakeman rode to work together and reported to work at 7:00 a.m. on 1/5/05.

After work, according to the conductor, when we got to the depot, I had my paper with me, we got up there about 7:20 p.m., to 7:25 p.m., and I had the paperwork to do. I had my two track warrants to do (to clear). I put all that on the desk. I was sitting there doing my paperwork; I knew it was going to take me a few minutes. I asked the brakeman if he could do me a favor, how about taking these two track warrants and clearing them. Everything, I am going to clear no track warrants, with the switch – (Open)!!! The brakeman used the telephone and called the train dispatcher and released the track warrants at 7:53 and 7:54 p.m. The brakeman was in violation of excess service at 7:53 p.m.

According to the conductor we were back at the station before we gave up the track warrants. The conductor agreed that whenever he left Avondale Mills, they (track warrants) are suppose to be fulfilled because the switch should have been lined back for the main track.

When we walked off, got our stuff and got off that taxi, off that locomotive, it was after seven o'clock. I had to go to the depot.

The conductor stated that he could take a track warrant on the radio; and that you can give up a track warrant on the radio. The conductor also agreed that if you are going to be on the law on the radio, you are going to be on the law, when you call him on the telephone.

The conductor stated that he understood that the regulation require that you be off duty in 12 hours. However, he stated that he was off. That locomotive had stopped and we were not working more than 12 hours. He stated that he was not performing any physical work on that locomotive or with the cars in 12 hours.

According to the conductor, he understands NS Rule GR -8: It says: An employee subject to the Hours of Service Act, must give the proper office sufficient advance notice if it becomes apparent that he cannot complete the trip or tour of duty within the lawful period. An employee called to report for service, who will not have legal rest at the indicated time to go on duty, must so inform the caller before accepting the call."

The conductor stated that he understood that the regulation require that you be off duty in 12 hours. However, he stated that he was off. That locomotive had stopped and we were not working more than 12 hours. He stated that he was not performing any physical work on that locomotive or with the cars in 12 hours.

However, the conductor also stated that according to the hours of service regulations, that you are performing a duty whenever you take or give up a train order or a track warrant. And that at 7:54 p.m., whenever he gave it up his track warrants, that it was past the maximum hour of service of 12 hours. He stated that it was not until 8:11 p.m. before he finished his paperwork and faxed it in and completed his work for the evening. The conductor was in violation at 8:11 p.m. when he finished.

Crew P-22 Hours of Service --; The locomotive engineer on P22005 deadheaded to work on January 5, 2005, the morning prior to the accident. The deadhead time was a maximum of one hour, 17 minutes, which counted as hours of duty.

The conductor and brakeman on the local, P22005 went on duty at 7:00 a.m. and worked for a total of 12 hours and 54 minutes on January 5, 2005. The NS has a computerized timekeeping program and it showed that the conductor and brakeman had worked more than the authorized maximum 12 hours allowed by the hours of service act. The locomotive engineer had a records keeping violation, showing a deadhead to the job the evening before reporting for duty. When he had actually driven to work in the morning that he reported for duty.

The NS reported the excess service to the FRA and the NS was cited with excess service violations. The records showed no other violations for excess service on the crew of P22005 during this contract period for the Aiken local.

Aiken Local Crew Information

Engineer--; The P-22 engineer. Records revealed that the engineer was originally hired on July 25, 1979 as a CRT operator. On September 3, 1979 he was promoted to yard foreman and helper, Transportation Department (Piedmont Division), as well as trainman. On July 7, 1986 he was promoted to conductor. He became an engineer on September 12, 1990. His most recent engineer re-certification was issued on August 16, 2004.25

The engineer recalled that he was called to work at 1:30 P.M. Saturday, January 1, 2005 for a reporting time of 3:00 P.M. He worked from that time until 11:05 P.M. He retired at approximately 1:00 A.M. the following morning Sunday, January 2 and awoke later at about 7:00 A.M. He remained awake until about 7:00 P.M. when he went to bed. He received a call to go to work at 9:40 P.M. Unless otherwise indicated all times herein will be based upon Eastern Standard Time. 2 All references to the crew of the P22P005 are denoted as P-22. 11:10 P.M. start time. He worked from that time until 4:45 A.M. the following day, Monday January 3. He retired later at about 6:00 A.M. and awoke between 1:30 P.M. and 2:00 P.M. He remained awake until he went back to bed at about 9:00 P.M. He was called at 1:00 A.M. the following day, Tuesday, January 4 for a 2:30 A.M. report time. He worked from that time until 12:32 P.M. He went to bed later that day at about 7:00 P.M. and was called at 10:32 P.M. for a deadhead trip. The deadhead trip ended at 12:32 A.M. the following morning, Wednesday, January 5. He slept from that time until about 6:00 A.M. He departed his residence in Columbia, SC between 7:15 and 7:30 A.M. that day and reported for duty in Aiken, SC at 8:32 A.M. Per NS records, he went off duty at 8:11 P.M. At the time of the accident he had been off duty for just over six and one half hours.

Conductor--; The P-22 conductor. Records revealed that the conductor was originally hired as a trainman on April 4, 1978. On May 18, 1978 he was promoted to yard foreman, helper and trainman, transportation (Piedmont Division). On January 2, 1992 he was promoted to conductor.

The conductor recalled that he awoke at about 8:30 A.M. on Sunday, January 2, 2005, attended church and returned home. He retired for the evening at about 9:00 P.M. He awoke the following morning, Monday January 3 at about 5:30 A.M., traveled about 50 miles to work and went on duty at 7:00 A.M. He went off duty at about 7:40 P.M. He arrived home at about 8:45 P.M., had dinner and retired for the evening at about 9:50 P.M. He awoke the following morning, Tuesday, January 4 at about 5:15 A.M., drove to work and went off duty at approximately 8:00 P.M. He retired for the evening at about 9:45 P.M. He arose the following day, Wednesday, January 5 at about 5:00 A.M., drove to work, went on duty at 7:00 A.M. and went off duty at approximately 8:10 P.M. After arriving home he retired for the evening at about 9:40 P.M. At the time of the accident he had been off duty for about six and one half hours.

Brakeman--; The P-22 brakeman's records revealed that the he was originally hired on October 18, 1978. On November 26, 1978 he was promoted to yard foreman.

The brakeman recalled that he awoke at 8:30 A.M. on Saturday, January 1, 2005 and retired for the evening at 11:30 P.M. He awoke the following morning, Sunday, January 2 at 7:25 A.M.,

attended church and retired for the evening at 10:00 P.M. He did not work either day. On Monday, January 3 he awoke at 4:25 A.M., reported for duty in Newberry, SC at 7:00 A.M. and went off duty at 1:30 P.M. He retired later that evening at 9:45 P.M. He awoke the following morning, Tuesday January 4 at 4:24 A.M., reported for duty in Aiken, SC at 7:00 A.M. and went off duty at 7:31 P.M. He retired for the evening at 10:30 P.M. He awoke the following morning, Wednesday, January 5 at 4:25 A.M., went on duty in Aiken, SC at 7:00 A.M. and went off duty at 8:11 P.M. At the time of the accident he had been off duty for about six and one half hours.

Through Freight Train No. 192's Crew

Engineer--; The 192 engineer's records revealed that the engineer was originally hired on April 7, 1997. On August 25, 1997 he was simultaneously promoted to trainman (Piedmont Division), yard foreman and helper and conductor. On December 12, 2001 he was promoted to engineer. His most recent engineer re-certification, located among his possessions on January 11, 2005, was issued on March 20, 2002.

On Monday, January 3, 2005 he was called for duty at 1:24 A.M. for an on-duty 3:00 A.M. start time. He went off duty later that morning at 8:30 A.M. He was called later that day at 4:02 P.M. for an on-duty start time of 5:30 P.M. He went off duty the following morning, Tuesday, January 4 at 1:25 A.M. At 10:49 P.M. he was called for an on-duty start time of 11:59 P.M. He went off duty the following day, Wednesday, January 5 at 11:45 A.M. He was called at 11:07 P.M. later that evening for an on-duty start time of 12:30 A.M. Thursday, January 6. At the time of the accident he had been on duty for about two hours and ten minutes.

Conductor--; The 192 conductor's records revealed that the conductor was originally hired on February 22, 1999. On August 30, 1999 he was simultaneously promoted to trainman, conductor, yard foreman and helper, transportation (Piedmont Division).

On Sunday, January 2 he was called at 9:45 P.M. for an 11:10 P.M. on-duty start time. He went off duty the following day, Monday, January 3 at 4:34 A.M. He was called the following day, Tuesday, January 4 at 1:00 A.M. for an on-duty start time of 2:30 A.M. He went off duty later that day at 12:33 P.M. He was called later that evening at 10:49 P.M. for an on-duty start time of 11:59 P.M. He went off duty the following day, Wednesday, January 5 at 11:46 A.M. He was called at 11:07 P.M. later that evening for an on-duty report time of 12:30 A.M. Thursday, January 6. At the time of the accident he had been on duty for about two hours and ten minutes.

NS MANAGEMENT

Superintendent of Terminals (ST) Supervision and Operations Testing--; The ST is the NS supervisor in charge of the crew on the Aiken Local. He stated that he was familiar with all three of the P-22 crewmembers. When asked as to how often he has personal contact with them, he responded:

> "I try to see them at least once a month and I try to see everybody at least every two months that work for me. The last time I actually rode the Aiken local was on the December 31, 2004. Of the 180 yards crewmen that I am responsible for, I contact on a daily basis, average about 25 of them in person per day. I talk to all or my crews every day, if they are going on duty at the terminal or it the crew is on a local, I talk to the locals on the cell phone.
>
> It has been several weeks since I have seen the conductor on the local face to face. However I try to keep up with the personnel. I am kind of a hands on kind. I like to know what is going on. The NS requires that we have contact with everyone at least every quarter.
>
> I want to say I talked to the Aiken Local conductor about 8:30 in the morning on the day before the accident. I asked him what he had lined up and discussed some of the switching requirements for the day".

The Columbia Terminal Superintendent stated: We have thirty eight officers on the division, and all of them would have an opportunity to make rules compliance observations or efficiency tests on the local. Because we don't have any boundaries for managers as far as rule checks and efficiency checks go.

NS operations testing records covering the past 12 months from July 2004 through June 2005 show an average of 24685 operational tests per month were performed on the Piedmont Division.
The NS management team made 9100 tests to monitor switches to see that they were properly lined. They found violations of 12 main track switches procedures during the observations and took verbal handling.

The NS engineer was tested 412 times between January 26 and October 9, 2004. With no test failures.

The NS conductor that was working the Aiken Local was tested 365 times during the periods from January 5, 2004 and November 24, 2004 with one and was given a litter of caution.

The NS trainman that was working the Aiken Local was tested 398 times during the periods from January 16, 2004 and November 8, 2004 with no tests listed as failures.

Method of Operation

The accident occurred on the NS Columbia – Augusta Line on the Piedmont Division, a part of the Eastern Region of the Norfolk Southern Railway. The line at Graniteville, SC was a single main track controlled by a train dispatcher using non-signaled Track Warrant Control system from the NS office in Greenville, SC.

According to the Terminal Superintendent in charge of the territory, there are 5 trains operating over the track at Graniteville in a 24-hour period. There are two through freights in each direction operating between Augusta, GA and Columbia, SC in addition to the Aiken local.

The main track in the area where the accident occurred had a curve speed restriction of 45 MPH for trains on both sides of the Avondale Gregg Plant turnout. The plant turnout is near the point of collision at Mile Post R178.3 in Graniteville, SC. The maximum authorized track speed is 49 mph. The track is maintained to FRA Class 4 track standards. The maximum allowable operating speed for FRA Class 4 is 60 MPH for freight trains.

The NS, Piedmont Division Timetable No. 19 dated, Sunday, June 20, 1999, Eastern Standard Time, was in effect. The Norfolk Southern Railways Safety and General Conduct Rules – dated December 30, 2002, were in effect when the accident occurred. Pertinent rules that were in effect are listed in part as follows:

> GR-27 - Undivided attention to duty is required. While on duty, employees must not engage in any activity that will interfere with or distract their attention from their work.
>
> Rule: GR32. Safety Alertness – Fouling a Track

Fouling a track means the placement of an individual or equipment in such proximity to a track that the individual or equipment could be struck by a train, locomotive or other railroad equipment.

> Part: (3) Job Briefing - Communications with employees to review the planned itinerary, procedures, and necessary safeguards for the task to be performed. A job briefing must always precede the task at the work site, be clearly understood, and be updated or modified as conditions change. If an individual is performing the task, he must participate in a job briefing.

The NS has had job briefing rules for some time, and FRA has suggested all other railroads, as a result of their SOFA study on yard switching accidents, that they have a similar rule to the Job Briefing rule which NS has in GR 32-3 – Safety Briefings above.

The Norfolk Southern Corporation Operating Rules – dated December 15, 1999, were in effect when the accident occurred. Some other rules that were in effect are listed in part below:

B - Employees must be conversant with and obey the rules and special instructions. If in doubt as to their meaning, employees must apply to the proper authority for and explanation.

M - …Employees must not do any work in a manner that will jeopardize their own safety or the safety of others. They must know that appliances, tools, supplies and facilities used in performing their duties are in proper condition. If not, they must have them put in order before using them. It is the duty of employees to examine them to determine their condition.

GR-8 - An employee subject to the hour of service act must give the proper office sufficient advance notice if it becomes apparent that he cannot complete the trip or tour of duty within the lawful period.

GR-27 - Undivided attention to duty is required. While on duty, employees must not engage in any activity that will interfere with or distract their attention from their work.

34 - … in part requires that crews must maintain a vigilant lookout for signals and conditions along the track that affect the movement.

101 - Trains must be fully protected against any know condition that may interfere with safe passage…

104 - The normal position for a main track switch is lined and locked for movement on the main track…

104(a) …A main track switch must not be lined for the diverging movement of an approaching train or engine unless the employee attending the switch is assured of its identity and know the movement is to use the turnout.

…Where trains or engines are required to be reported clear of the main track, such report must not be made until witch and derail, if any, have been secured in the normal positions.

Track Warrant Control Rule 181

181 In Effect - A track warrant, once in effect, remains in effect until a crew member, or the operator or employee in charge of on – track equipment, reports clear of the limits or the track warrant is voided…. **A crewmember, or operator or employee in charge of on –track equipment, must report to the dispatcher when the train or equipment has cleared the limits. When clearing at a point where switch must be returned to normal position, "clear" must be not be given until switch has been locked in normal position"…**

191 Track Warrant Expiration: If expiration time is shown on a track warrant and limits have not been reported clear by that time, the track warrant must not be considered void until limits are reported clear.

Note: NS added the Rule -181 (a) as a response of the FRA Safety Bulletin No. 10, NS Rule 181 already existed.

FRA OVERSIGHT

Congress has authorized FRA, as the delegate of the Secretary of Transportation, to issue necessary regulations and orders for every area of railroad safety. Since FRA's inception in 1967, the agency has issued a wide range of standards on subjects such as track safety, signal inspection, freight car safety, passenger car safety, locomotive safety, power brakes, alcohol and drug testing, operating rules and practices, accident reporting, hours of service record keeping, railroad communications, roadway worker and bridge worker protection, engineer qualifications, grade crossing signal maintenance, and passenger train emergency preparedness. FRA also assists the Research and Special Programs Administration (RSPA), which issues hazardous materials standards for all modes of transportation, in developing standards for rail transportation of those materials.

The new FRA Administrator reported on July 21, 2005, that since June 1 of this year, that his responsibility has been to lead the Federal Railroad Administration (FRA), the agency charged with administering the Nation's railroad safety laws. He told the House of Representatives, as you know, FRA's safety mission is simple: we help prevent fatalities, injuries, and property damage related to railroad operations, and we support the Department of Homeland Security efforts to enhance the security of those operations. FRA has jurisdiction over all areas of railroad safety. FRA's inspection force of 441, supplemented by 155 State inspectors from 30 States, inspect railroad operations for compliance with Federal laws and regulations, and we use a variety of enforcement tools to encourage compliance. We help educate the public about safety at highway-rail grade crossings and the dangers of trespassing on railroad property. FRA investigates selected rail accidents, working closely with the National Transportation Safety Board (NTSB) where that agency also elects to investigate, and we closely track the railroad industry's safety performance. FRA also sponsors collaborative research with the railroad industry to introduce innovative technologies to improve railroad safety.

FRA's Rail Safety Inspections--; The FRA establishes safety standards concerning the design, maintenance, and inspection of many aspects of our Nation's railroad system, including track, motive power and equipment, signal and train control systems, operating practices, and transportation of hazardous material. Railroads are required to conduct their own inspections to ensure that these safety standards are being met. FRA 's Federal and State safety inspectors, excluding specialists, whose role is not to conduct safety inspections for the railroad companies, but rather to monitor the railroad companies' own inspection forces to ascertain whether or not the railroads are in compliance with applicable Federal safety standards. FRA and State

inspectors accomplish this task by conducting routine, random, and programmed focused inspections of railroad properties and comparing their findings to a railroad's own inspection records. While the primary responsibility for inspecting the railroad property and operations rests with the railroads themselves, FRA's inspection strategy is to ensure the integrity and effectiveness of the railroads' own inspection programs.

FRA - RESPONSIBILITIES OF OP INSPECTORS: The inspector is responsible for operating rules and practices, administration of Federal alcohol and drug control programs, hours of service for railroad employees involved with the movement of trains, Federal locomotive engineer certification standards, occupational safety conditions and reporting, and employee training and qualification. In this capacity, the inspector: Investigates serious railroad accidents, visits the accident site, makes inspections and tests of situations and objects to determine the operational condition of affected equipment. Questions employees and witnesses to develop the facts. Writes a narrative report, describing the accident, the cause or causes and recommends measures to prevent similar accidents in the future; Examines railroad records to determine that all reportable personal injuries and accidents have been properly reported; Examines railroad records to determine if employees connected with the movement of a train were permitted to be or remain on duty contrary to provisions of the law; Examines railroad records to determine if employees connected with the movement of a train are in compliance with Federal alcohol and drug regulations; Examines railroad records to determine if employees connected with the operation of locomotives or a train are in compliance with Federal regulations concerning locomotive engineer certification; Investigates complaints from railroad employees or the general public regarding unsafe practices involving train operations; Investigates individually or as part of a team, reportable accidents and incidents involving railroad operations to determine probable cause and if Federal regulations were violated; Observes railroad employees in the performance of operational duties related to the movement of trains for compliance with the law, including utility employees. Assists MP&E inspectors in the inspection of railroad yards, repair shops, and locomotive repair and servicing facilities for compliance with blue signal protection regulations; and When required, submits evidence for prosecution of violations, and enforces the provisions of the appropriate Federal laws. If a case goes to trial, the inspector must be prepared to appear in court as a witness for the prosecution to substantiate the Government's case; Receives, as necessary, additional classroom and on-the-job training in accident investigation, operating rules and practices, and railroad occupational safety and health; Performs other duties as assigned.

The FRA made 29 Railroad Operations and Rules Inspections on the NS Piedmont Division in South Carolina during 2004. Of those inspections they found 1 incident of an hours of service violation. They found 2 cases of accident/incident reporting violations and 6 defects of railroad operating rules violations. The FRA made one inspection at Aiken, SC and no defects were noted during the inspection.

In 2005 as a follow/up with the NTSB investigation the FRA has made an hours of service records inspection with the Aiken Local for 30 days in December of 2004. It was found that the crewmembers of the Aiken Local have 10 incidents of excess service in this time period. The hours of service regulations allow for a quick tie up when a crew works up to 12 hours. However

in these cases, the crew is showing off duty in the 12 hours. And then they are taking a lengthy period to finish the spotting records, timekeeping and finalizing their track warrants. This is clearly not within the intent of the quick tie up.

Hours of Service Law

The Federal Hours of Service Act of 1907, which regulates the US railroad industry, imposes both maximum work hours and minimum rest periods. However, this act does not limit employees' weekly or monthly work hours, restrict the irregularity or unpredictability of on-call work schedules, or restrict mandatory commuting distances without compensatory time off. Extensive night work, irregular work schedules, extended work periods with few or no days off, and the policies, procedures, and agreements that encompass these work scheduling practices, all evolved within the limited provisions of this act. It is not clear, though, that broad changes in the hours of service laws are the answer to these problems.

Limitations on Hours --; The Act establishes two limitations on hours of service**.** First, no employee engaged in train or engine service may be required or permitted to work in excess of twelve consecutive hours. After working a full twelve consecutive hours, an employee must be given at least ten consecutive hours off duty before being permitted to return to work.

Deadheading --; Under the Act time spent in deadhead transportation receives special treatment. Time spent in deadhead transportation to a duty assignment by a train or engine **service** employee is considered on-duty time. Time spent in deadhead transportation from the final duty assignment of the work tour to the point of final release is not computed as either time on duty or time off duty. Thus, the period of deadhead transportation to point of final release may not be included in the required 8- or 10-hour off-duty period. Time spent in deadhead transportation to a duty assignment is calculated from the time the employee reports for deadhead until he reaches his duty assignment.

FRA -Switching Operations Fatality Analysis Working Group (SOFA) --; In 2000, railroads, their operating unions, and the Federal Railroad Administration created the Switching Operations Fatality Analysis Working Group, which produced a report after dissecting 76 fatal yard accidents over seven years.

The SOFA Working Group's recommendations emphasize improved communication and are being adopted voluntarily by the industry. To emphasize the urgency of the effort, the FRA this month published a rare safety advisory in the Federal Register imploring every railroad to give yard safety a priority.

The SOFA Working Group developed five "lifesaver" recommendations: Secure equipment before action is taken, protect against moving equipment, **discuss safety at the beginning of the job and when the work changes**, communicate before action is taken, and coach less

experienced employees to perform service safety. Employees engaged in yard switching also are encouraged not to mix radio and hand-signal communication as the two in tandem may cause confusion.

FRA Operating Rules Testing --; Railroads are required to have a program of operational tests[1] and inspections by the Federal Railroad Safety Act of 1970. Regulations at Title 49 *Code of Federal Regulations* (CFR) Part 217, 9 (a) require, that railroads monitor and test operating employees on the carriers operating rules.

The carrier monitors the effectiveness of, and compliance with, the operating rules by their operations testing:

> Conduct operational tests and inspections to determine the extent of compliance with its operating rules, timetables, and timetable special instructions in accordance with a written program retained at its system headquarters and at the division headquarters for each division where the tests are conducted.
>
> The FRA enforces these regulations and the NS operations testing program was submitted and is in compliance with the requirements of the regulations. According to the NS operating officer in charge of the territory where the accident occurred, each NS manager average conducting 200 to 400 tests per month. The NS places emphasis on quality test, for speed, handling switches and train movement and not the number of tests. The Division Manager keeps a file on the efficiency-testing program and provides a copy to the operating rules vice president and FRA upon request.

FRA Accident Causes --; According to the Staff Director Operating Practices, from the FRA's office of Safety, the FRA's Operating Rules Working Group Spurs Action to Address Critical Safety Issues. As described in Safety Bulletin No. 9 for August 2005. The FRA reported that of the eight Top Human Factor Causes for Train Accidents in the period from January 2001 to December 2004. There were 751 switch improperly lined accidents; 508 shoving accidents with no one on the leading end; 190 where cars were left fouling a track; 192 failure to control shoving movements; 163 failure to secure hand brake; 163 failure to apply sufficient hand brakes; 129 failure to apply or remove derail and 74 where the switch was not latched or locked. Making a total of 47.6 percent of all accident fall under the human performance category.

Two of the cause codes or a totaled 18.1 per cent of the FRA reported accidents, were switches not being properly lined or locked. Those cause codes were as follows:

H702 Switch improperly lined 751 or 16.5 %

1 Efficiency testing involves NS management observations of employees for compliance with the carrier operating rules.

H703 Switch not latched or locked 74 or 1.6 %

They reported that despite continuous improvements in the railroad industry's overall safety record, serious train accidents still occur, and the train accident rate has not declined appreciably in recent years. The causes of train accidents are generally categorized into five areas: human factors, track and structures, equipment, signal and train control, and miscellaneous. Two categories of accident causes— defective track and human factors—comprise more than 70 percent of all reportable train accidents, and a very high percentage of serious train accidents. As a result, FRA is focusing significant resources on those areas, both to reduce the frequency and severity of such events, and to improve the industry's accident rate.

Human factors constitute the largest category of train accident causes, accounting for 38 percent of all train accidents over the last five years. FRA's analysis of train accident data has revealed that a small number of particular human errors account for an inordinate number of human factor-caused accidents. Even though the vast majority of these accidents occur on low speed tracks they always create the potential for serious injury and or death.

The top ten human factor causes accounted for 58 percent of all human factor accidents in the year 2004. The leading cause was improperly lined switches, which alone accounted for 16 percent of human factor accidents in the last four years. Other leading causes include shoving cars without a person on the front of the move to monitor conditions ahead; leaving cars in a position that obstructs (fouls) a track, and failure to secure a sufficient number of handbrakes.

These types of human factor accidents are addressed by each railroad's operating rules, which generally subject employees who violate them to disciplinary action, including possible dismissal. At present, only the failure to secure a sufficient number of handbrakes is covered by a Federal regulation. However, FRA's current regulations require railroads to train employees on their operating rules and to test them periodically for compliance with those rules. (See Safety Bulletin No. 9)

After the Graniteville accident the FRA also issued a Safety Advisory in January to strengthen procedures for manually operated switches in non-signalized territory to reduce accidents caused by misaligned switches. (See Safety Advisory 2005-01)

NS Piedmont Division- FRA Accident Reports

The FRA accident records were inspected for the Piedmont Division. There were 6 reportable accidents with human performance causes between January and December 2004. There was one main track derailment2 near Spartanburg, SC that resulted in a derailment. The main track

2. On Sep 24 2004, at 6:00 a.m. a Norfolk Southern Railway train No. 238P4-23 derailed at milepost 77.7 in Pacolet, SC, near Spartanburg. Train 238P4-23 moving east derailed all 3 locomotives and 23 rail cars at the Pacolet

switch points had previously been damaged. When the facing point train movement entered the switch, the train derailed.

In 2005 there have been no human performance main track reportable accidents except the Graniteville accident.

NS Management Oversight

After the Graniteville accident, NS established Switch Position Awareness Forms (SPAF) to be used in non-signaled territory. This was in compliance with the non-mandatory FRA Safety Advisory 2005-01. FRA issued Safety Advisory 2005-01 to advise all railroads to review their operating rules and take certain other action necessary to ensure that train crews who operate manual (hand-operated) main track switches in non-signaled territory restore the switches to their normal position after use. FRA published the Safety Advisory after the Graniteville accident in an effort to reduce the large number of improperly lined switch accident that has occurred in the United States. Each of the eight class one railroads3 has adopted the safety advisory.

The NS initiated a form that is issued daily by bulletin that the conductor and engineer must prepare to insure that switches on non-signaled track are lined back to normal position after use. The form must show the name and location of the switch. The initial time the switch was lined

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siding switch. The train was moving about 43 mph in non-signal track warrant territory when it derailed. Damage to track and equipment was approximately $1.4 million.

The NS/FRA investigation Report No. 018198 found that Pacolet Siding switch had been damaged earlier by another train. The circumstances of the Pacolet derailment differed from those of the Graniteville accident, in that a local freight left the switch lined and locked for the siding in error after leaving the siding. An employee retrieved his switch key while the train was on the main line and the locomotive occupied the switch the employee lined the switch under the train and left it. When a through freight later passed through the improperly lined main track switch in a trailing point movement the switch points sustained damage. When train No. 238P4-23 reached the damaged switch it derailed.

3 The current Class I are:

- **Amtrak (AMTK) - technically not a Class I, since it isn't a freight railroad, but it fits the rest of the definition**
- **Burlington Northern Santa Fe (BNSF)**
- **CSX Transportation (CSX)**
- **Grand Trunk Corporation (GTW)**
- **Kansas City Southern Railway (KCS)**
- **Norfolk Southern Railway (NS)**
- **Soo Line Railroad (SOO)**
- **Union Pacific Railroad (UP)**

reverse and locked. After use, the final time the switch was lined and locked back to normal for main track use. When the switch is lined normal, the conductor and locomotive engineer must sign a confirmation on the form that the switch is secured normal.

In addition, the NS add part (a) to operating rule 181 by issuing NS BULLETIN NO. 10. It states:

> "Effective immediately, Norfolk Southern Operating Rule 181 (a), reading as follows, is placed in effect:
>
> > 181 (a). MAIN TRACK SWITCH(ES) IN NON-SIGNALED TERRITORY
> >
> > Train and Engine Crews and Employees in Charge of Men or On-Track Equipment:
> >
> > When reporting "clear" of track authority limits in non-signaled territory and a hand-throw main track switch(es) has been operated, the employee who is reporting "clear" must advise the Train Dispatcher/Control Operator of the:
> >
> > - Total number of hand-throw main track switches operated within the track authority
> > - Name and Location of each main track switch operated
> > - Restoration and securement of main track switches in their normal position
>
> NOTE: The normal position for a main track switch is lined and locked for movement on the main track.
>
> > Train Dispatchers/Control Operators:
> >
> > Within non-signaled territory, Train Dispatcher/Control Operator must not clear a track authority to occupy the main track from a train crewmember or employee in charge of men or on-track equipment until notified that each hand-throw main track switch(es) that has been operated is locked in normal position.
> >
> > If the employee reporting "clear" fails to report the restoration of the main track switch(es) to the normal position, the Train /Dispatcher/Control Operator must not consider the track authority limits "clear" until he/she has obtained this information from the reporting employee.

The NS Operational Testing Program --; Federal Regulations 49 CFR 217.9 requires Norfolk Southern Efficiency Check Program. The program's intended purpose is to establish and maintain a safe and efficient work environment for all employees. Checks are to be conducted in a fair and impartial manner, and under no circumstances will the Efficiency Check Program be used as a tool for harassment. As a matter of practice, Officers involved in conducting efficiency checks should periodically commend employees when they consistently demonstrate proper knowledge and understanding of operating rules and instructions. On the other hand, an

employee found in violation of an operating test or inspection must be advised of the non-compliance and corrective action taken as soon as possible without compromising the efficiency check activity. The integrity of the program rests with each Officer. Officers are expected to maintain Norfolk Southern's policy for handling such matters in a fair but firm manner.

The guidelines in effect July 1, 2004, and are applicable to NORAC and Norfolk Southern Rules. The guidelines superceded rules that were in effective November 1, 1998.

A copy of the guidelines has been provided to each Officer whose duties include conducting efficiency checks.

This program provides basic guidelines and establishes minimum requirements for the quality and type of efficiency checks to be conducted when monitoring compliance with:

- Operating Rules
- Safety and General Conduct Rules
- Equipment Operation and Handling Rules
- Hazardous Materials Rules

Officers will be expected to conduct and record checks to ensure compliance with rules having application to their territory. Quality checks are of paramount importance. These Quality checks must be conducted:

- At various times
- On various dates
- At various locations
- On weekends and holidays
- On safety sensitive rules
- For procedural compliance with the rules

The monthly number of tests conducted on each Division in Categories 1, 2, and 3 must be equivalent to the average number of freight trains operated on the Division each day as reported in the NS Morning Report. An Officer will be required to conduct monthly efficiency checks in accordance with the following guidelines:

Categories:

1 • 60% of the total checks will be conducted on rules = signals
2 • 30% of the total checks will be conducted on rules = restricted speed
3 • 10% of the total checks will be conducted on rules = speed restrictions

Each Locomotive Engineer, Locomotive, Engineer Trainee, Remote Control Operator, and Remote Control Operator Trainee must be monitored on an Approach and Stop Signal Rule in

Category 1 and any rule in Category 2 and 3 at least once every 60 days. In addition, each Locomotive Engineer, Locomotive Engineer Trainee, Remote Control Operator, and Remote Control Operator Trainee must be tested once every six (6) months on a Stop Signal Rule.

Efficiency checks on a Control Operator must be entered with the appropriate control station zone code and the appropriate employee type.

A rule check must NOT be recorded unless the Officer personally observes the employee in the performance of his/her duty. (The Operational Testing Program is in the Docket).

Post Accident Tests, Observations and Research

On March 29, 2005 the NTSB conducted sight distance tests using similar locomotive equipment to that which was on Train 192P005 during the collision. The weather and lighting conditions were similar to those reported at the time of the accident. The tests were conducted to determine the track conditions that the crews faced prior to the collision.

The weather at the time of the test was dry, cloudy and 59 degrees, similar to the conditions when the accident occurred.

The sight tests were conducted between 2:00 and 3:00 a.m., about the same time that the collision occurred. It was dark, cool and overcast. During the tests, approaching the collision site at MP R178.3, the locomotive engineer was seated on the left side (West) of the operating cab of NS locomotive 6561, a locomotive similar to the leading locomotive of train P192P005. The UTU conductor was located on the lead NS locomotive NS6561, seated on right side (East) in the locomotive cab area.

The NS track supervisor and the operations supervisor were interviewed about the track and operations in the area. There had been no reports of accidents or incidents from train operations on this line. As the NS Supervisor's who was in charge of the track and train crews what worked on the Augusta - Columbia Line neither had reports from the train crews reporting any problems with the switch or track at the Avondale Mills.

After the accident, the NTSB called the FBI in to assist us with the investigation. Prior to going into the site at 2:30 p.m. on 1/07/05 the FBI haz/mat team arrived from Washington, DC and assisted the Track Group with the site inspection and documentation of the area. Before they entered the accident site, the NTSB Track Group Chair advised the FBI team what to look at and how to make the inspection of the switch and lock.

During the inspection, they observed the switch and lock positions, observing the switch was lined and locked for the Avondale Mills lead. It had not been touched and was just as it had been when the accident occurred. The switch points were lined for the industrial track and the banner was in the red position indicating that the switch was lined for the sidetrack. When the inspection

was completed and no defects were noted with the switch points, the stand or the lock on the switch.

After observing the switch position and documenting the condition of the switch, they checked to determine how secure the latch and lock were on the switch, and for tightness of the switch points. The cross ties in the switch were examined and they were in sound condition. The spikes were in the proper place and they were secure. The switch was normal and no unusual conditions were present. The switch stand, switch throw rods, switch lugs and the heel blocks were all inspected and each element was found to be in proper position, and all checked out as normal.

On March 28, 2005 at 2:30 p.m. the IIC and representatives of the NTSB track group met at the accident and made an additional inspection of the switch and found it was in FRA class IV or better condition.

While at the site, the track was walked and the group observed that sight distances from the curve at MP R-178.65 to the switch where the accident occurred. The curvature is a left hand, one-degree curve beginning at MP R-178.45 and ending at MP R178.65. During daylight hours there is an unobstructed line of sight from the curve to the turnout, which provides access to Avondale Mills at MP R178.3.

The Avondale Mills switch has a number ten turnout, it is of similar construction and material to the main track and has a maximum authorized speed of 15 mph when used. A spring frog, switch points and a New Century 51B switch stand with a high mast and red and white reflective targets were also used.

The switch is located in the city of Graniteville and a street is running along both sides of the main track. The street is 20 feet wide on each side of the track.

On March 29, 2005 the NTSB conducted sight distance tests using similar locomotive equipment to that which was on Train 192P005 during the collision. The weather and lighting conditions were similar to those reported at the time of the accident. The tests were conducted to determine the track conditions that the crews faced prior to the collision.

The weather at the time of the test was dry, cloudy and 59 degrees, similar to the conditions when the accident occurred.

The sight tests were conducted between 2:00 and 3:00 a.m., about the same time that the collision occurred. It was dark, cool and overcast. During the tests, approaching the collision site at MP R178.3, the locomotive engineer was seated on the left side (West) of the operating cab of NS locomotive 6561, a locomotive similar to the leading locomotive of train P192P005. The UTU conductor was located on the lead NS locomotive NS6561, seated on right side (East) in the locomotive cab area.

The switch stand banner at the Avondale Mills track is a 14-inch diameter banner that is attached to a 7-foot long banner shaft and mounted on top of the Avondale Mills Switch. From the seat of

a locomotive operating northbound in the 1-degree right curve, (left per the track chart).

During tests on the track the red reflection from the switch banner was visible on the locomotive from the engineers seat as the locomotive headed from the curve to the tangent track. The banner could be seen at a distance of 1461 feet north of the locomotive. The red reflection was fist visible to the conductor's side of the locomotive at 1339 feet.

However when the banner was first observed at the maximum distance where the crewmen could see the reflection of a red object, it could not be identified as the switch banner. It was not identified as a switch banner until the train reached a point 566 feet from the switch.

At 566 feet from the switch banner was the first point that it was obvious that the red marker was a switch banner. In the darkness, the bright head light of the locomotive lighted up the switch banner.

The switch points could not be seen until the locomotive was 220 feet from the switch stand. The crew could see the points, showing that the switch was not lined for the normal main track position at that location 220 feet away.

The street next to the Avondale Mills switch ran parallel to the main track. The street was measured to be 20 feet wide. Measurements from the centerline of the street to the switch stand, was 21 feet to the switch stand target. The view from a vehicle, such as a taxi passing next to the track was clear. The position of the switch was clearly visible from a vehicle passing the switch such as the taxi departing the mill when the local went off duty at Avondale Mills on the evening prior to the collision.

On March 29, 2005, the track group reformed at the accident site again inspected the track at the accident in Graniteville, and found that the switch was in excellent condition and it had not been damaged in the accident. The track group chair had discussion with the local track supervisor, roadmaster, roadforeman and trainmaster about the condition the switch at Avondale Mills. During these discussions it was determined that the there have been no reports of vandalism on or near the Avondale Mills switch. Records inspections revealed no defects reported by train crews at the switch over the past year. Additionally the railroad had no records to indicate that the switch had been damaged during switching. In addition there were no records of any train making a trailing movement through the switch when it was left improperly lined at any time prior to the accident.

The NS reported that the P-22 local crew was dismissed for failure to comply with operating rules after the NS investigation of the accident.

Graniteville Police Department

During the track and switch inspection, the Graniteville Police Department assisted the NTSB while the inspection and tests were being conducted. The track group chair checked with the police and no records were found indicating any cases of previous vandalism or cases reported to

the police where the switch at the Avondale Mills track had been left open or damaged during the past five years.

Norfolk Southern's History

Norfolk Southern Corporation is a Norfolk, Va. based company that controls a major freight railroad, Norfolk Southern Railway Company. The railway operates approximately 21,300 route miles in 22 eastern states (including Georgia and South Carolina), the District of Columbia and Ontario, Canada, serves all major eastern ports and connects with rail partners in the West and Canada, linking customers to markets around the world. Norfolk Southern provides comprehensive logistics services and offers the most extensive intermodal network in the East.

Today's Norfolk Southern Railway, a subsidiary of the NS Corporation, is the product of many railroad combinations, reorganizations and consolidations. The NS's three largest predecessors are Norfolk & Western Railway, and Southern Railway. After these mergers, the NW, & SR make up the majority of the Norfolk Southern Railway.

Operations Group Activities

The operations and track group was formed at the NTSB organizational meeting on January 6, 2005, and started planning the investigation in the Ramada Inn in Augusta on that evening.

On January 7, 2005 at 7:30 a.m. the operations and track group met at the Holiday Inn Express in Aiken, SC to plan the investigation and discussed how the track group would make the switch inspection. It was determined that the FBI would go into the site as the Operations and Track Groups representative and inspect the switch along with the NS local track inspector.

The Operations Group worked on scene until Monday, January 10, 2005 and field notes were provided to group. A follow up meeting of the Operations Group was held at the accident site on March 28 & 29, 2005 and conducted a sight distance tests.

On January 7, 2005, the Operations Group interviewed the NS area superintendent of terminals. The supervisor was the management representative for trains and crews operating in the Graniteville area. We interviewed the Columbia SC Superintendent of Terminals. The interview was conducted at the Ramada Inn in Augusta, GA.

The crew of the Aiken Switcher was interviewed at the Ramada Inn in Augusta, GA. The crew can be reached through the NS Supt of Terminals Office in Columbia, SC. Interview conducted by the operations and human performance group: interviewed the engineer, conductor, and brakeman on the Aiken Switcher. In addition, on January 8, 2005, the operations and human performance groups interviewed the train dispatchers that were on duty before the collision and when the collision occurred.

Also Interviewed was the taxi cab driver (Cimarron Coach Company) that picked of the crew of the Aiken Local when they got off duty. And in addition the NS Supervisor who was in charge of the train crews what worked on the Augusta - Columbia Line.

FBI haz/mat team arrived from Washington, DC. Prior to going into the site at 2:30 p.m. on 1/07/05, the FBI agents met at the command center with Russell Gober and Jim Ritter of the NTSB along with the NS track inspector at Graniteville, SC. The FBI was advised to take pictures of the switch and the switch lock and to do a complete inspection of the switch before they moved any thing at the site. At that time the NTSB Operations and Track Group Chair advised the team how the inspection of the switch and lock should be done at the switch at the Avondale Mills track.

During the inspection, they observed the switch and lock positions. On arrival at the site, they observed that the switch was lined and locked for the Avondale Mills lead. The switch banner was positioned in a red position for a switch lined for the sidetrack.

After observing the switch position and documenting the condition of the switch, it was determined that it was lined and locked. It was checked to determine how secure the latch and lock were on the switch and for tightness of the switch points The switch was securely lined and locked for the side track that leads into the mill. The cross ties in the switch were examined and they were in sound condition. The spikes were in place and secure. The switch was normal and no unusual conditions were present. The switch stand, switch throw rods, switch lugs and the heel blocks were inspected and found to be in proper position, and all checked out as normal.

On March 28, 2005 representatives of the operations & track group met at the accident site from 2:30 p.m. until 4:00 p.m. and inspected the switch and took sight distance measurements. In addition the width of the street running along side of the main track was measured to be 20 feet wide.

On March 29, 2005 the NTSB conducted sight distance tests using similar locomotive equipment to that which was on Train 192P005 during the collision. The weather and lighting conditions were similar to those reported at the time of the accident. Representatives from the Federal Railroad Administration (FRA), NS Railway (NS), United Transportation Union (UTU) and the Brotherhood of Locomotive Engineers and Trainmen (BLET) participated. The tests were conducted to determine the conditions that the crews faced prior to the collision.

The weather at the time of the test was dry, cloudy and 59 degrees, similar to the conditions when the accident occurred.

The sight tests were conducted between 2:00 and 3:00 a.m., about the same time that the collision occurred. It was dark, cool and overcast. During the tests, approaching the collision site at MP R178.3, the locomotive engineer was seated on the left side (West) of the operating cab of NS locomotive 6561, a locomotive similar to the leading locomotive of train P192P005. The UTU conductor was located on the lead NS locomotive NS6561, seated on right side (East) in the locomotive cab area.

The locomotive engineer was the first to see the switch stand banner. The 14-inch diameter banner was attached to the 7-foot long banner shaft mounted on top of the Avondale Mills Switch. The locomotive engineer was operating northbound in a 1-degree right curve, (left per the track chart). The test indicated that the red reflection from the switch banner was visible to the locomotive engineer as the locomotive headed from the curve to the tangent track at a distance of 1461 feet north of the locomotive. The red reflection was fist visible on the switch to the conductor at 1339 feet. However at the maximum distance where the crewmen could see the reflection of a red object, it could not be identified as the switch banner. It was not identified as a switch banner until the train reached a point 566 feet from the switch. At that point it was obvious that the red marker was a switch banner. In the darkness, the bright head light of the locomotive lighted up the switch banner. The switch points could not be seen until the locomotive was 220 feet from the switch stand. The crew could see the points, showing that the switch was not lined for the normal main track position at that location 220 feet away.

The street next to the Avondale Mills switch ran parallel to the main track. The street was measured to be 20 feet wide. Measurements from the centerline of the street to the switch stand, was 21 feet to the switch stand target. The view from a vehicle, such as a taxi passing next to the track was clear. The position of the switch was clearly visible from a vehicle passing the switch such as the taxi departing the mill when the local went off duty at Avondale Mills on the evening prior to the collision.

On March 29, 2005, during the sight distance tests at Graniteville, the operations group chair asked the local track supervisor, roadmaster, roadforeman of engines and the trainmaster about the condition the track and the switch at the Avondale Mills track. During our discussions, they stated that there have been no reports of vandalism to the Avondale Mills switch. Nor have there been any cases where the switch was left open or damaged in the past five years. In addition there were no records to indicate that the switch had been damaged during switching, nor any records of a train making a trailing movement through the switch at any time prior to the accident.

Attachments: 1. FRA Safety Advisory 2005-01
2. ASLRRA Safety Bulletin No. 9
3. NS OPERATIONS BULLETIN NO. 0-10

End OP Report

Attachment No. 1

FRA Safety Advisory 2005-01

After the Graniteville accident, FRA issued Safety Advisory 2005-01 to advise all railroads to review their operating rules and take certain other action necessary to ensure that train crews who operate manual (hand-operated) main track switches in non-signaled territory restore the switches to their normal position after use. Safety Advisory states as follows:

"[Federal Register: January 13, 2005 (Volume 70, Number 9)]
[Notices]
[Page 2455-2456]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr13ja05-119]

DEPARTMENT OF TRANSPORTATION
Federal Railroad Administration

Notice of Safety Advisory 2005-01; Position of Switches in Non-Signaled Territory
AGENCY: Federal Railroad Administration (FRA), Department of Transportation (DOT).

ACTION: Notice of safety advisory.

SUMMARY: FRA is issuing Safety Advisory 2005-01 to advise all railroads to review their operating rules and take certain other action necessary to ensure that train crews who operate manual (hand-operated) main track switches in non-signaled territory restore the switches to their normal position after use. FRA intends this advisory to reduce the risk of serious injury or death both to railroad employees and the general public due to not restoring such switches to their normal position after use.

FOR FURTHER INFORMATION CONTACT: Douglas H. Taylor, Staff Director, Operating Practices Division, Office of Safety Assurance and Compliance, FRA, 1120 Vermont Avenue, NW., RRS-11, Mail Stop 25, Washington, DC 20590 (telephone [redacted]

SUPPLEMENTARY INFORMATION:

Factual Background

A review of FRA's accident/incident data shows that, overall, the safety of rail transportation continues to improve. However, FRA has particular concern that recent accidents on Class I railroads in non-signaled territory were caused, or apparently caused, by the failure of railroad employees to return manual (hand-operated) main track switches to their normal position, i.e., lined for the main track, after use. As a result, rather than continuing their intended movement on the main track, trains approaching these switches in a facing-point direction were unexpectedly diverted from the main track onto the diverging route, and consequently derailed. Most recently:

On January 8, 2005, a Burlington Northern and Santa Fe Railway Company (BNSF) freight train was unexpectedly diverted onto an industrial track in Bieber, California. The BNSF train struck two loaded grain cars, derailing seven locomotives and 14 cars. Two railroad employees were injured. Initial damages to equipment and track are in excess of $970,000.

On January 6, 2005, a Norfolk Southern Railway Company (NS) freight train was apparently unexpectedly diverted from the main track onto an industrial lead in Graniteville, South Carolina. The NS train struck a standing train on the industrial lead, derailing three locomotives and 16 cars. One of the derailed cars that contained chlorine ruptured and released product. As a result, eight citizens and one railroad employee were killed, 5,400 local residents remain evacuated, and 234 people have sought medical treatment. The National Transportation Safety Board (NTSB) began its investigation immediately and will not make its findings of probable cause for some time. FRA has representatives at the site assisting in the investigation. By stating here its preliminary impression of what may have contributed to this tragic accident, FRA in no way intends to supersede the NTSB's thorough and painstaking efforts that will ultimately lead to its official findings of cause.

FRA's regulations (49 CFR part 217) require each railroad to instruct its employees on the meaning and application of its code of operating rules, and to periodically test its employees to determine their level of compliance. Railroad operating rules provide that the normal position for a main track switch is lined and locked for movement on the main track.

Another related rule provides that, where trains or engines are required to report clear of the main track, such a report must not be

made until the switch and derail, if any, have been secured in the normal position. Where no signal or other system is in service that indicates, through wayside or cab signals, or both, the possibility that a main track switch may be in other than its normal position, compliance with these railroad operating rules is the critical element in ensuring route integrity for main track movements.

Failure to comply with these important operating rules is the result of various causes. Difficulties may be especially likely to arise where a train crew has exclusive authority to occupy a specific track segment until they release it for other movements, but due to inattention to duty, their train does not return to a main track switch that they may have inadvertently left lined for movement to a secondary track before going off duty. Some railroads have very recently amended their operating rules to address this issue. Two recent examples are:

On October 1, 2004, Union Pacific Railroad Company (UP) adopted a requirement that before reporting clear of the limits of a track warrant, the crewmember releasing the track warrant must first advise the train dispatcher that main track switches have been restored to their normal position. The train dispatching system prompts the dispatcher to request this information if it has not been provided by the crew. The change was made because of a collision that occurred at Thomaston, Texas, on September 29, 2004. A Texas Mexican Railway Company (TM) crew released their main track authority, in this case a track warrant, without verifying that the north siding switch was properly lined for the main track. A southbound UP train entered the siding and collided with the unattended TM train. The change was issued by System General Order and was a change to General Code of Operating Rules, Rule 14.7, Reporting Clear of Limits.

On October 31, 2004, BNSF adopted a requirement that the train crew report to the train dispatcher the position of the switch that the train is using to clear the main track when releasing the limits of their track warrant. The dispatching system will not allow a track warrant to be cleared until the dispatcher confirms the switch position through a job briefing with the crew. The change was not made because of any specific incident, but rather as the result of a recommendation from BNSF's Northern California Division Safety Team. The BNSF Team had some concerns on a particular subdivision involving crews forgetting to line back main track switches and asked BNSF's System Rules Department to adopt a rule change to eliminate the potential for this oversight. The Rules Department then issued this change across BNSF's system.

Recommended Actions

The recent accidents have convinced FRA that, on an industry-wide basis, railroad operating rules need to be strengthened, clarified and re-emphasized so as to ensure that all main track switches are returned to their normal position after use, irrespective of whether or not the crew releases (clears) the track warrant at that time. Furthermore, it is essential that all crewmembers communicate to each other the fact that all main track switches have been properly restored after their use. Since this is strictly an issue of ensuring that employees remember to perform a simple but crucially important duty, FRA believes that additional procedures that serve as reminders of that duty may be of great value.

Accordingly, FRA strongly urges all railroads to immediately:

1. Ensure that their operating rules contain a provision, similar to that established on BNSF and UP, as described above, that clearly requires train crews who operate manual (hand-operated) main track switches in non-signaled territory to report to the dispatcher that the main track switches have been restored to normal position, before reporting clear of the limits of main track authority, such as a track warrant.

2. Require the conductor of a train crew operating in non-signaled territory to complete and sign a Switch Position Awareness Form (Form). FRA recommends that the Form be completed in ink and contain the train symbol, date, subdivision, conductor's and engineer's names, and a listing by name and location of each main track switch operated by any member of the crew. The listing should contain the switch location and name, the time the switch was reversed, the time the switch was returned to the normal position, and the initials of the conductor and the engineer. Entries made with respect to a specific main track switch must be completed by the conductor as soon as possible after the switch is reversed and as soon as possible after the switch is returned to its normal position. The engineer's initials on the Form are intended to serve as a cross-check measure to reflect that the engineer has been advised, through a job briefing with the conductor, that the main track switch or switches have been restored to their normal position. The engineer's initials should be affixed to the Form as soon as practicable after the main track switch has been restored to its normal position. All initials required on the Form must be entered before any member of the crew reports clear of the limits of the main track

authority.

3. Require that, at the completion of each trip or tour of duty, the original Form be submitted to the designated railroad official(s) as directed.

4. Require that railroad officers review the completed Forms for accuracy. The results of these reviews should be incorporated into the railroad's operational tests and inspections program as required by 49 CFR 217.9.

5. Ensure immediate dissemination of guidance on these revised rules and procedures and of the necessary Forms to all affected operating personnel.

FRA is considering the need for any additional action to address this situation, such as regulatory action or additional advisories. We are considering the form that any additional action might take, its specific content, and any necessary variations based on differing types of operations. FRA's operating practices inspectors will determine the extent to which railroads have taken action in accordance with the measures recommended in this advisory. These findings will be one important factor in determining FRA's future course of action. We are committed to taking whatever action appears necessary to prevent any further death or serious injury that might arise from additional failures to comply with the basic operating rules concerning the proper positioning of main track switches.

In the meantime, all railroads are strongly urged to immediately adopt and comply with the measures recommended in this advisory.

Issued in Washington, DC, on January 10, 2005.
Robert D. Jamison,
Acting Administrator, Federal Railroad Administration.
[FR Doc. 05-834 Filed 1-11-05; 2:37 pm]

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End of FRA Safety Bulletin.

Attachment No. 2 – ASLRRA Safety Bulletin No. 9

FRA Corner - ASLRRA Safety Bulletin in August, 2005, Bulletin No. 9

FRA's Operating Rules Working Group Spurs Action to Address Critical Safety Issues
by Staff Director Operating Practices, FRA Office of Safety.

Despite continuous improvements in the railroad industry's overall safety record, serious train accidents still occur, and the train accident rate has not declined appreciably in recent years. The causes of train accidents are generally categorized into five areas: human factors, track and structures, equipment, signal and train control, and miscellaneous. Two categories of accident causes— defective track and human factors— comprise more than 70 percent of all reportable train accidents, and a very high percentage of serious train accidents. As a result, FRA is focusing significant resources on those areas, both to reduce the frequency and severity of such events, and to improve the industry's accident rate.

FRA's safety program is increasingly guided by careful analysis of accident, inspection, and other safety data. Historically, FRA has sought to direct both its regulatory and compliance efforts toward areas involving the greatest safety risks. This proactive approach to managing risks is constantly being refined and improved upon. The National Rail Safety Action Plan, announced by Transportation Secretary Mineta in May, embodies that approach.

The Action Plan will:

• Target the most frequent, highest-risk causes of accidents,

• Focus FRA's oversight and inspection resources, and

• Accelerate research efforts that have the potential to mitigate the greatest risks.
Reducing Human Factor Accidents

Human factors constitute the largest category of train accident causes, accounting for 38 percent of all train accidents over the last five years. FRA's analysis of train accident data has revealed that a small number of particular human errors account for an inordinate number of human factor-caused accidents. Even though the vast majority of these accidents occur on low speed tracks they always create the potential for serious injury and or death.

The top ten human factor causes accounted for 58 percent of all human factor accidents in the year 2004. The leading cause was improperly lined switches, which alone accounted for 16 percent of human factor accidents in the last four years. Other leading causes include shoving cars without a person on the front of the move to monitor conditions ahead, leaving cars in a position that obstructs (fouls) a track, and failure to secure a sufficient number of handbrakes.

These types of human factor accidents are addressed by each railroad's operating rules, which generally subject employees who violate them to disciplinary action, including possible dismissal. At present, only the failure to secure a sufficient number of handbrakes is covered by a Federal regulation. However, FRA's current regulations require railroads to train employees on their operating rules and to test them periodically for compliance with those rules. FRA also issued a Safety Advisory in January to strengthen procedures for manually operated switches in non-signalized territory to reduce accidents caused by misaligned switches.

New FRA Action

The frequency with which these operating rule violations result in accidents requires a concerted effort to reduce and prevent them. FRA believes a new federal regulation prohibiting these common human factor errors will provide heightened visibility and operational focus leading to a reduction in their frequency.

Accordingly, last May FRA asked the Railroad Safety Advisory Committee (RSAC), of which ASLRRA is a member, to develop recommendations for a rule that would address these types of human errors. Working together, the RSAC committee has already reviewed the accident data and pertinent railroad operating rules relating to the primary accident causes as identified above. FRA has set a tight but reasonable timetable of September 2006 for receiving those recommendations. The result should be regulations (or, perhaps, a non-regulatory alternative) that go to the heart of preventing these leading causes of human factor accidents. With the input and assistance of ASLRRA, we will meet that deadline to improve safety over the entire national rail network.

Of the Top Human Factor Causes (Train Accidents) - January, 2001 - December 2004

Cause code Number Percent of human factor train accidents

H702 Switch improperly lined 751 16.5
H703 Switch not latched or locked 74 1.6

Total 18.1 per cent of the FRA reported accidents were caused by switches not being properly lined or locked.
From : ASLRRA Safety Bulletin No. 9 – August 2005.
Attachment No. 3 – NS Operationg Bulletin No. 0-10

NORFOLK SOUTHERN CORPORATION
OFFICE OF SUPERINTENDENT
PIEDMONT DIVISION
OPERATIONS BULLETIN
NO. 0-10

Greenville, S.C.

January 14, 2005

BULLETIN NO. 10

ALL CONCERNED:

Effective immediately, Norfolk Southern Operating Rule 181 (a), reading as follows, is placed in effect:

181 (a). MAIN TRACK SWITCH(ES) IN NON-SIGNALED TERRITORY

Train and Engine Crews and Employees in Charge of Men or On-Track Equipment:

When reporting "clear" of track authority limits in non-signaled territory and a hand-throw main track switch(es) has been operated, the employee who is reporting "clear" must advise the Train Dispatcher/Control Operator of the:

- Total number of hand-throw main track switches operated within the track authority
- Name and Location of each main track switch operated
- Restoration and securement of main track switches in their normal position

NOTE: The normal position for a main track switch is lined and locked for movement on the main track.

Train Dispatchers/Control Operators:

Within non-signaled territory, Train Dispatcher/Control Operator must not clear a track authority to occupy the main track from a train crewmember or employee in charge of men or on-track equipment until notified that each hand-throw main track switch(es) that has been operated is locked in normal position.

If the employee reporting "clear" fails to report the restoration of the main track switch(es) to the normal position, the Train /Dispatcher/Control Operator must not consider the track authority limits "clear" until he/she has obtained this information from the reporting employee.

S.C. Tobias
Vice Chairman and Chief Operating Officer