Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2006-58

Norfolk Southern
Keating, PA
June 30, 2006

Note that 49 U.S.C. §20903 provides that no part of an accident or incident report made by the Secretary of Transportation/Federal Railroad Administration under 49 U.S.C. §20902 may be used in a civil action for damages resulting from a matter mentioned in the report.

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2006-58

1.Name of Railroad Operating Train #1: Norfolk Southern Corp. [NS]	1a. Alphabetic Code: NS	1b. Railroad Accident/Incident No.: 25689
2.Name of Railroad Operating Train #2: N/A	2a. Alphabetic Code: N/A	2b. Railroad Accident/Incident: N/A
3.Name of Railroad Responsible for Track Maintenance: Norfolk Southern Corp. [NS]	3a. Alphabetic Code: NS	3b. Railroad Accident/Incident No.: N/A
4. U.S. DOT_AAR Grade Crossing Identification Number:	5. Date of Accident/Incident: Month 06 / Day 30 / Year 2006	6. Time of Accident/Incident: 08:36:00 ☑ AM ☐ PM

7. Type of Accident/Indicent (single entry in code box): 1. Derailment; 2. Head on collision; 3. Rear end collision; 4. Side collision; 5. Raking collision; 6. Broken Train collision; 7. Hwy-rail crossing; 8. RR grade crossing; 9. Obstruction; 10. Explosion-detonation; 11. Fire/violent rupture; 12. Other impacts; 13. Other (describe in narrative): 01

8. Cars Carrying HAZMAT	9. HAZMAT Cars Damaged/Derailed	10. Cars Releasing HAZMAT	11. People Evacuated	12. Division
5	5	3	20	Harrisburg

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Emporium	BR 110.5	N/A	PA	MCKEAN

17. Temperature (F) (specify if minus)	18. Visibility (single entry) 1. Dawn 2. Day 3.Dusk 4.Dark	Code	19. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5.Sleet 6.Snow	Code	20. Type of Track 1. Main 2. Yard 3. Siding 4. Industry	Code
58 F		2		1		1

21. Track Name/Number	22. FRA Track Class (1-9, X)	Code	23. Annual Track Density (gross tons in millions)	24. Time Table Direction 1. North 3. East	Code
Single Main Track		3	1		2

OPERATING TRAIN #1

25. Type of Equipment Consist (single entry)	A. Spec. MoW Equip.	Code	26. Was Equipment Attended? 1. Yes 2. No	Code	27. Train Number/Symbol
1. Freight train; 2. Passenger train; 3. Commuter train; 4. Work train; 5. Single car; 6. Cut of cars; 7. Yard/switching; 8. Light loco(s).; 9. Maint./inspect.car		1		1	30/Z

28. Speed (recorded speed, if available) R - Recorded / E - Estimated: 76 MPH — Code: R

29. Trailing Tons (gross tonnage, excluding power units): 5519

30. Method(s) of Operation (enter code(s) that apply): a. ATCS; b. Auto train control; c. Auto train stop; d. Cab; e. Traffic; f. Interlocking; g. Automatic block; h. Current of traffic; i. Time table/train orders; j.Track warrant control; k. Direct traffic control; l.Yard limits; m.Special instructions; n. Other than main track; o. Positive train control; p. Other (Specify in narrative)

Code(s)				
e	N/A	N/A	N/A	N/A

30a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter: 0

31. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	N/A	17	yes
(2) Causing (if mechanical cause reported)	N/A	N/A	N/A

32. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.

Alcohol	Drugs
0	1

33. Was this consist transporting passengers? (Y/N): N

34. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	3	0	0	0	0
(2) Total Derailed	0	0	0	0	0

35. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	47	0	0	0	0
(2) Total Derailed	32	0	0	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
934000	80000	H604	H101

Number of Crew Members

40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen
N/A	N/A	1	N/A

Length of Time on Duty

44. Engineer/Operator	45. Conductor
Hrs 8 Mi 6	Hrs 8 Mi 6

Casualties to:	46. Railroad Employees	47. Train Passengers	48. Other
Fatal	0	0	0
Nonfatal	N/A	0	0

49. EOT Device? 1. Yes 2. No	50. Was EOT Device Properly Armed? 1. Yes 2. No
1	1

51. Caboose Occupied by Crew? 1. Yes 2. No: N/A

OPERATING TRAIN #2

52. Type of Equipment Consist (single entry)	A. Spec. MoW Equip.	Code	53. Was Equipment Attended? 1. Yes 2. No	Code	54. Train Number/Symbol
1. Freight train; 2. Passenger train; 3. Commuter train; 4. Work train; 5. Single car; 6. Cut of cars; 7. Yard/switching; 8. Light loco(s).; 9. Maint./inspect.car		N/A		N/A	N/A

55. Speed (recorded speed, if available) R - Recorded / E - Estimated: 0 MPH — Code: N/A

57. Method(s) of Operation (enter code(s) that apply): a. ATCS; b. Auto train control; g. Automatic block; h. Current of traffic; m.Special instructions; n. Other than main track

57a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable

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56. Trailing Tons (gross tonnage, excluding power units): N/A

c. Auto train stop; d. Cab; e. Traffic; f. Interlocking; i. Time table/train orders; j.Track warrant control; k. Direct traffic control; l.Yard limits; o. Positive train control; p. Other (Specify in narrative)

Code(s): N/A | N/A | N/A | N/A | N/A

2 = Remote control tower
3 = Remote control transmitter - more than one remote control transmitter: N/A

58. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	0	N/A	N/A
(2) Causing (if mechanical cause reported)	0	N/A	N/A

59. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.

Alcohol	Drugs
N/A	N/A

60. Was this consist transporting passengers? (Y/N): N/A

61. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

62. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

63. Equipment Damage This Consist: 0

64. Track, Signal, Way, & Structure Damage: 0

65. Primary Cause Code: N/A

66. Contributing Cause Code: N/A

Number of Crew Members

67. Engineer/ Operators	68. Firemen	69. Conductors	70. Brakemen
N/A	N/A	N/A	N/A

Length of Time on Duty

71. Engineer/Operator: Hrs 0 Mi 0

72. Conductor: Hrs 0 Mi 0

Casualties to:	73. Railroad Employees	74. Train Passengers	75. Other
Fatal	0	0	0
Nonfatal	0	0	0

76. EOT Device? 1. Yes 2. No: N/A

77. Was EOT Device Properly Armed? 1. Yes 2. No: N/A

78. Caboose Occupied by Crew? 1. Yes 2. No: N/A

Highway User Involved

79. Type: A. Auto; B. Truck; C. Truck-Trailer.; D. Pick-Up Truck; E. Van; F. Bus; G. School Bus; H. Motorcycle; J. Other Motor Vehicle; K. Pedestrian; M. Other (spec. in narrative) — Code: N/A

80. Vehicle Speed (est. MPH at impact): N/A

81. Direction geographical) 1.North 2.South 3.East 4.West — Code: N/A

82. Position: 1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped — Code: N/A

86a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: N/A

Rail Equipment Involved

83. Equipment: 1.Train(units pulling); 2.Train(units pushing); 3.Train (standing); 4.Car(s) (moving); 5.Car(s) (standing); 6.Light Loco(s) (moving); 7.Light(s) (standing); 8.Other (specify in narrative) — Code: N/A

84. Position of Car Unit in Train: N/A

85. Circumstance: 1. Rail Equipment Struck Highway User; 2. Rail Equipment Struck by Highway User — Code: N/A

86b. Was there a hazardous materials release by 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: N/A

86c. State here the name and quantity of the hazardous materials released, if any.
N/A

87. Type of Crossing Warning: 1.Gates; 2.Cantilever FLS; 3.Standard FLS; 4.Wig Wags; 5.Hwy. traffic signals; 6.Audible; 7.Crossbucks; 8.Stop signs; 9.Watchman; 10.Flagged by crew; 11.Other (spec. in narr.); 12.None

Code(s)							
	N/A	N/A	N/A	N/A	N/A	N/A	N/A

88. Signaled Crossing Warning (See instructions for codes) — Code: N/A

89. Whistle Ban 1. Yes 2. No 3. Unknown — Code: N/A

90. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach — Code: N/A

91. Crossing Warning Interconnected with Highway Signals 1. Yes 2. No 3. Unknown — Code: N/A

92. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown — Code: N/A

93. Driver's Age: 0

94. Driver's Gender 1. Male 2. Female — Code: N/A

95. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown — Code: N/A

96. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other (specify in narrative) — Code: N/A

97. Driver Passed Standing Highway Vehicle 1. Yes 2. No 3. Unknown — Code: N/A

98. View of Track Obscured by (primary obstruction) 1. Permanent Structure 2. Standing Railroad Equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicle 7. Other (specify in narrative) 8. Not obstructed — Code: N/A

101. Casulties to Highway-Rail Crossing Users	Killed	Injured
	0	0

99. Driver Was 1. Killed 2.Injured 3. Uninjured — Code: N/A

100. Was Driver in the Vehicle? 1. Yes 2. No — Code: N/A

102. Highway Vehicle Property Damage (est. dollar damage): 0

103. Total Number of Highway-Rail Crossing Users (include driver): 0

104. Locomotive Auxiliary Lights? 1. Yes 2. No — Code: N/A

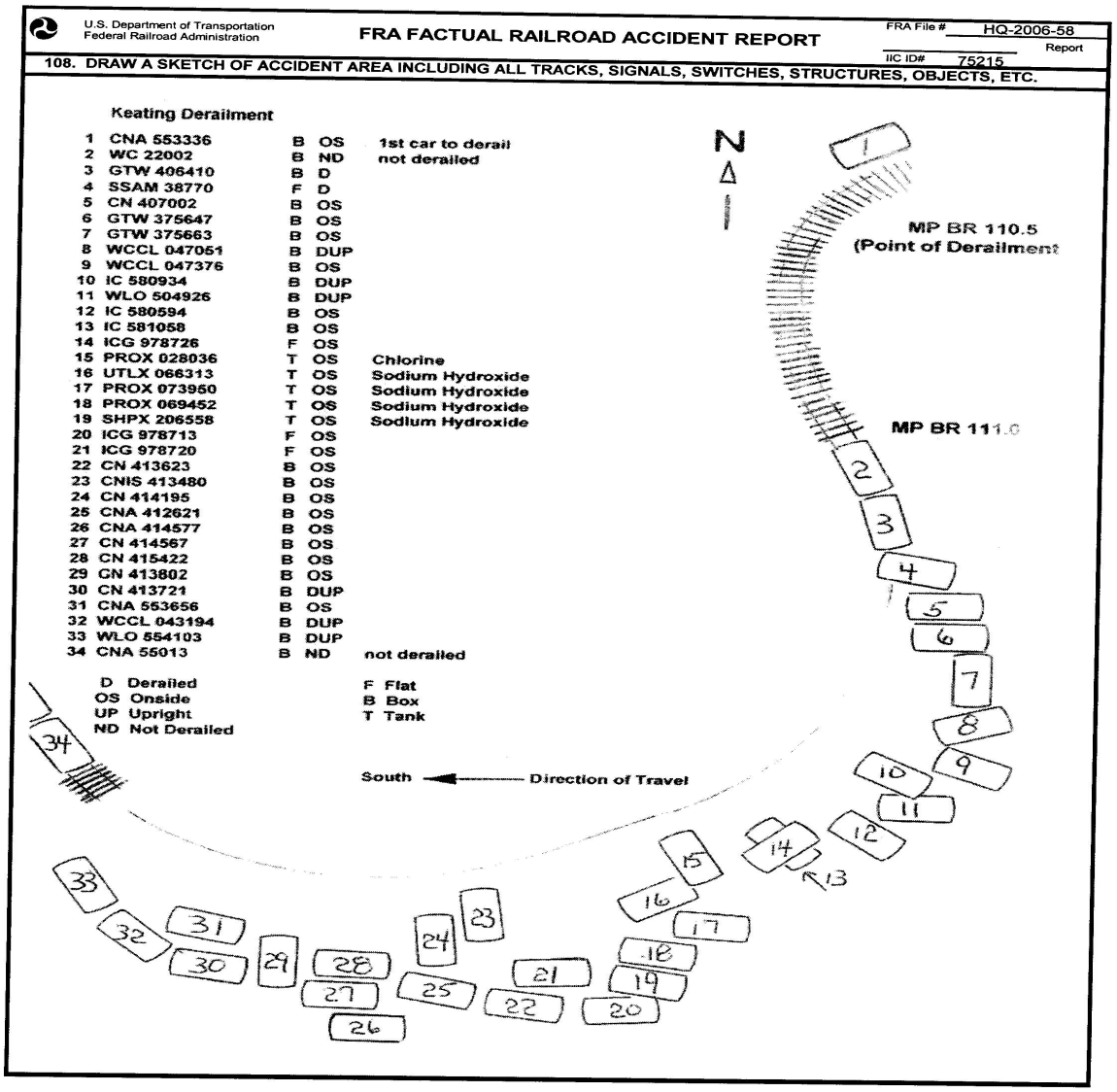
105. Locomotive Auxiliary Lights Operational? 1. Yes 2. No — Code: N/A

106. Locomotive Headlight Illuminated? 1. Yes 2. No — Code: N/A

107. Locomotive Audible Warning Sounded? 1. Yes 2. No — Code: N/A

108. DRAW A SKETCH OF ACCIDENT AREA INCLUDING ALL TRACKS, SIGNALS, SWITCHES, STRUCTURES, OBJECTS, ETC., INVOLVED.

HQ-2006-58.jpg



109. SYNOPSIS OF THE ACCIDENT

SYNOPSIS OF THE ACCIDENT

Thirty-two (32) cars of a southbound Norfolk Southern (NS) freight train derailed with three hazardous material cars leaking about 42,000 gallons of sodium hydroxide, causing an evacuation of 20 to 40 residents on June 30, 2006. The derailment occurred at 8:36 a.m., while the train was descending a heavy mountain grade (Keating Summit) in a remote area on the Harrisburg Division of the Buffalo Line Subdivision at milepost (MP) BR 110.5 in McKean County, Pennsylvania north of Emporium. The general pile-up occurred at MP BR 111.0.

There were no injuries to the train crew or to the evacuated residents but the sodium hydroxide lost from three tank cars has been blamed for a major environmental event that caused a large fish kill and extensive aquatic damage in the Sinnemahoning-Portage Creek, Driftwood Branch and Sinnemahoning Creeks. The Department of Environmental Protection has issued a notice of violation to NS Railway.

Equipment damage has been estimated at $ 934,000 with track and structure damage set at $ 80,000. Loss of lading was estimated at $ 1,215,000.

At the time of the accident it was daylight, conditions were clear, the temperature was 58 degrees F with winds from the west at 5 to 10 MPH.

The accident was caused by the failure of the train crew to follow published carrier train handling and airbrake instructions combined with excessive speed while operating down a 2.6 % grade. The engineer's recent or chronic use of unauthorized opiates and benzodiazepines may have contributed to the cause of the accident.

110. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

The crew of NS freight train 30ZH830 (30Z) included a locomotive engineer who had 6 years of engine service experience with NS and a recently promoted conductor with 8 months service. The crew first went on duty at 12:30 a.m., at SK Yard in Buffalo, New York. The crew was originally called for train 30TH828 but the call was changed to train 30Z. (same start time) Buffalo is the home terminal for both crew members and each employee had received more than the statutory off-duty period prior to reporting for duty.

The assigned train consisted of three locomotives NS 8429, NS 8934 & NS 3201 and 46 loaded cars. Five of the cars contained hazardous materials. The train was designated as a "Key Train" with one Poison Inhalation Hazard (PIH) car and 4 other hazmat cars. Train 30Z was 2,880 feet in length with 5,519 trailing tons. Train 30Z was equipped with end of train device (EOT) # CTWQ 021801. Forty-seven (47) loaded cars were listed on the consist but the crew was required to set out one "hold customs" car (CN 382697) to track 30 before leaving Buffallo. The train departed the yard at 3 a.m., with 46 loaded cars and two locomotives stopping to pick-up the third locomotive (NS 3201) at GJ Spur on the Ebenezer Running Track just outside of Buffalo Terminal. The crew performed a brake test after adding the locomotive. The dynamic brakes of locomotive NS 3201 were cut out per timetable instructions. The train departed south from Control Point (CP) Gravity on the Buffalo Line at 4:13 a.m. Timetable direction is also south. No additional work was performed by the crew.

Train 30Z was a Canadian National (CN) train destined for Scranton/Allentown Pennsylvania and was being detoured over the NS Buffalo Line because of flooding in northeastern Pennsylvania. The crew operating the train was a NS crew. The conductor said he had an air brake inspection slip prior to leaving Buffalo but the carrier was unable to produce the air brake certificate following the derailment. The train consisted of its three locomotives and 46 loaded cars at the time of derailment. A scan of the train following departure reported an extra car but NS and AAR traces show the car was not on line.

The crew received Dispatcher Bulletin #B01 3782 prior to departing Buffalo. The Buffalo Line had a 25 MPH speed restriction from MP BR 8.4 (CP Gravity) to MP BR 96.8 except where 10 MPH was already in effect by Bulletin Order. The restriction was issued 9/27/04. The maximum allowable speed listed in the timetable for the subdivision (if no restrictions) in the same locations was 30 to 50 MPH.

The train exceeded the 25 MPH speed restriction at numerous locations between MP BR 8.4 and MP BR 96.8.

The locations were:

30 MPH departing CP Gravity at MP BR 8.5:
40 MPH and higher between MP BR 38 and MP BR 39,
30 MPH to 40 MPH between MP BR 58 to MP BR 67
30 MPH between MP BR 81 and MP BR 82
30 MPH or greater between MP BR 85 and MP BR 88
40 MPH between MP BR 92 and MP BR 94.

The train was operated at 20 MPH through a 10 MPH speed restriction between
MP BR 80.2 and MP BR 80.7.

The train was operated in accordance with allowable speeds while climbing southward ascending grades of up to 1.6 degrees between MP BR 103 and Keating Summit MP BR 107.6.

The engineer was seated at the controls on the right front (west) side of the leading locomotive. The conductor was seated on the left front (east) side of the leading locomotive.

THE ACCIDENT

Train 30Z approached Keating Summit MP BR 107.6 at 9 to 10 MPH as required by timetable special instructions and as indicated by the event recorder of the leading locomotive NS 8429. The throttle was increased to Run 8 as the last and 46th car of the train was pulled over the crest of the summit. The train accelerated to 18 MPH when the throttle was reduced to Run 6. The throttle was further reduced to the idle position by MP BR 109.4 as the speed increased to 40 MPH. The dynamic brakes were engaged by MP BR 109.6 with the speed at 48 MPH. The train continued down the grade in dynamic braking, with no use of the automatic brake until MP BR 111.1 when a 18 pound brake reduction was made at 73 MPH. The train went into emergency by MP BR 111.8 at a speed of 76 MPH when the rear of the train derailed with the locomotives and head 13 cars continuing down the grade stopping about 2.6 miles further south at MP BR 114.4. Total stopping distance for the head-end portion of the train was 29,820 feet. The engine brakes were kept in the 'bailed off' position after the train went into emergency which allowed only the brakes of the lead 13 cars to apply.

The 30Z Crew, after stopping, closed the brake valve of the last car, recovered the air, and backed the head-end of train northward up the mountain to the derailment location. A total of 32 cars derailed including the train's five loaded cars of hazardous material. One tank car load of chlorine gas and four loaded tank cars of sodium hydroxide were among those derailed.

Timetable Instructions

The timetable authorized speed for southward freight trains while descending Keating Summit between MP BR 108 and MP BR 113 is 15 MPH for the head-end of the train. Southward trains are further restricted to 10 MPH as the head end of the train begins to crest the summit.

Timetable instructions, in part, further require southward trains to make a minimum brake pipe reduction when cresting Keating Summit at milepost BR 107.6 to determine there is sufficient braking forces being applied. If the engineer determines there is insufficient braking forces an additional brake application will be made to stop the train.

The southward descending grade at the crest of the summit is 1.83 % and increases to a downhill grade of 2.6 % at the point of derailment.

The Buffalo Line has a series of nine curves ranging from 1-degree 4-minutes to 4-degree with short sections of tangent track between the crest of Keating Summit (milepost BR 107.6) and the location where the first car derailed at milepost BR 110.5. The majority of the train derailed between milepost BR 111 and milepost BR 111.2. Fourteen Hundred feet of track was destroyed.

The first car derailed as it moved through a 3-degree 30-minute left (compound curve) with 1 ½ inches of elevation. The high rail was 136 pound RE continuously welded rail (CWR) dated 1999 with 18 inch high common tie plates. The low rail was 140 pound PS CWR dated 1948 with 18 inch regular tie plates.

The first car to derail was CNA 553336 a box car loaded with wall board. As the train was traveling at a recorded speed of 76 MPH the car (CNA 553336) jumped abruptly 21 ½ inches over the high side of the rail and went down a 50 foot embankment landing on its side. There were no marks on the rail or ties and no sign of disturbed track at or prior to the car lifting out of the train.

The majority of the remaining cars, starting with the 15th car, derailed to the east side of the right of way over a steep fill. The tank car load of chlorine, PROX 028036, though heavily damaged by the force of the derailment, did not leak. Two tank car loads of sodium hydroxide, SHPX 206558 and PROX 069452, lost their entire loads while a third tank car load of sodium hydroxide, PROX 073950, leaked all but 800 gallons of its load. A fourth heavily damaged tank car of sodium hydroxide, UTLX 066313, did not leak. 42,000 gallons of sodium hydroxide was lost.

The lading in the derailed cars included paper products, various types of lumber and aluminum billets. The last car of the train, WC 22002, did not derail.

The 11th car listed in the train consist, CN 382697, was not in the train. The car was set out at Buffalo.

The physical layout of this portion of the Buffalo Line is as follows:

3 to 5-degree right hand curve beginning at MP BR 107.5
3-degree 30-minute right curve MP BR 108
2-degree 15-minute left curve at MP BR 108.5
3-degree 30-minute right curve at MP BR 108.9
2-degree to 1-degree 39-minute left curve at MP BR 109.1
1-degree 45-minute left curve at MP BR 109.8
1-degree 45-minute to 1-degree 22-minute right curve at MP BR 110
3-degree 30-minute left curve decreasing to 2-degree 15-minute and back to 3-degree
30-minute left curve between MP BR 110.5 and MP BR 110.9
4-degree right curve beginning at MP BR 111.

The train crew was not injured and no injuries were reported by some 20 to 40 evacuated residents of the sparsely populated mountain area. The residents were allowed to return to their homes by 4 p.m. on the day of the accident.

The 42,000 gallons of sodium hydroxide lost from three tank cars has been blamed for a major environmental event that caused a large fish kill and extensive aquatic damage in the Sinnemahoning-Portage Creek, Driftwood Branch and Sinnemahoning Creeks. The Department of Environmental Protection has issued a notice of violation to NS Railway. A large portion of the local economy is based on recreational activities such as fishing, camping and hunting.

A majority of the railcars were a total loss. Equipment damage has been estimated at $ 934,000 with track and structure damage set at $ 80,000. Loss of lading was estimated at $ 1,215,000.

The wreckage was cleared by Hulcher Services. Numerous contractors were utilized including CTEH, SPSI and React Environmental along with a large contingent of state and local police and fire department personnel.

The last car was rerailed at 4:55 p.m., on July 2nd with the main track restored to service at 5:00 a.m., on July 3rd. Twenty-four track panels were installed along with 30 cross ties, and six sections of 132 pound RE rail. Sixteen car loads of ballast were used.

The 4 sodium hydroxide cars were cleaned and purged, insulation removed, and finally cut up and hauled away from the site. The chlorine car was loaded onto a flat car and transported to the NS rail yard in Buffalo. The chlorine was transferred to another tank car by Olin Chemical Company in Niagara Falls. The extensively damaged car was cleaned and purged.

ANALYSIS AND CONCLUSIONS

The authorized speed for southward freight trains while descending Keating Summit between milepost BR 108 and milepost BR 113 is 15 MPH for the head-end of the train. Southward trains are further restricted to 10 MPH as the head-end of the train begins to crest the summit.

Timetable instructions require southward trains to make a minimum brake pipe reduction when cresting Keating Summit at milepost BR 107.6 to determine there is sufficient braking forces being applied. If the engineer determines there is insufficient braking forces an additional brake application will be made to stop the train. If the engineer determines there is sufficient braking force, an additional brake application may be made in addition to using the dynamic brake to control train speed while descending Keating Summit between milepost BR 107.6 and milepost BR 113. Instructions also state when the speed of the train cannot be controlled properly from the use of the dynamic brake and/or service brake application, an emergency brake application must be made without hesitation. NS Equipment Rules also require trains to be placed into emergency when speed cannot be controlled properly and movement exceeds maximum authorized speed by more than 5 MPH.

A computer simulation of the derailment shows that braking ability diminishes both for dynamic braking and automatic brake applications as speed increases. Dynamic brake forces drop off quickly above 25 MPH and brake shoe adhesion (coefficient of friction) decreases.

The simulation shows that to balance the 5,500 ton 30Z train on a 2.6 % descending grade a minimum of 288,000 pounds of retarding force would be needed. The dynamic brakes alone from the first and second locomotives would provide a maximum of only 157,000 pounds of retarding force at 25 MPH, approximately 100,000 pounds of force at 40 MPH and only 80,000 pounds of retarding force at 48 MPH. The bulk of the braking effort required to descend the very heavy (steep) Keating grade needed to have been provided by the train's automatic (train line) brakes.

This derailment did meet the criteria for 49 CFR Part 219 Subpart C Post Accident Toxicological Testing. Both crew members were tested under this authority and the test results were positive for the locomotive engineer (drugs), and negative for the conductor.

PROBABLE CAUSE AND CONTRIBUTING FACTORS

The crew of Train 30Z failed to comply with carrier train handling and air brake instructions requiring the train's air brakes to be applied at a speed of 10 MPH while starting to crest Keating Summit which allowed train speed to increase rapidly beyond safe and posted track speeds. Train speed reached 76 MPH prior to the derailment.

The engineer's recent or chronic use of unauthorized opiates and benzodiazepines may have contributed to the cause of the accident.