Investigation Report
With Post Investigation Update: March 1, 2011

Main Track Train Derailment
Ontario Northland
Freight Train No. 308
Mile 10 Ramore Subdivision
Englehart, Ontario
March 30, 2007

EXECUTIVE SUMMARY

On March 30, 2007, Ontario Northland Railway (ON; Ontario Northland) southward freight train No. 308 travelling south to Englehart, Ontario derailed 22 cars at Mile 10 of the Ramore Subdivision near Englehart, Ontario; 15 derailed tank cars contained sulphuric acid, and 7 derailed boxcars contained copper and zinc metal.

There were no injuries.

Approximately 220 tons or 13,800 gallons of sulphuric acid was spilled onto the ground in the surrounding area. An amount of this spilled sulphuric acid migrated to an adjacent beaver pond and into Miller Creek. A trace of sulphuric acid is thought to have traveled through Miller Creek entering the Blanche River approximately 2.5 kilometers downstream of the derailment site. There was minimal mortality to fish in Miller Creek.

Impact
Officials from Environment Canada, and the Ontario Ministries of the Environment and Natural Resources were on hand to monitor with clean-up efforts. Ontario Northland promptly engaged environmental experts at the time of the derailment and took extensive measures to ensure that any effects of the derailment on fish and plant life were minimized.

By June 1, 2007, Ontario Northland and its consultants determined that impairment of biological communities was not detectable in the area and re-colonization of the aquatic environment was virtually complete. By continuing to monitor conditions in the derailment area, Ontario Northland has confirmed that there have been no residual impacts on soil, the pond, Miller Creek and no impacts at all on the Blanche River.

Ontario Ministry of the Environment personnel are of the view that there is likely full recovery of fish species richness and density.

Cause
The derailment occurred on a curved section of track. The track structure appears to have failed to hold gauge as train 308 traveled around the curve. The gauge spread sufficiently to allow a wheel set on a car drop between the rails, forcing them apart.

During annual track geometry car testing which took place on this section of track on May 23, 2006, a priority gauge defect was identified at this section of track that measured at the threshold of the Transport Canada minimum standard (Track Safety Rules require that immediate corrective measures be initiated when the defect measurement exceeds the defined threshold limit).

Tie and rail work had been scheduled for this curve during the 2006 work season however, was delayed as the result of a delay in the delivery in materials and the 2006 work season being behind schedule. Both tie and rail replacements at this curve had been postponed and no repairs were made at this section of track between May 23, 2006, and the date of the derailment to address these concerns. Work programs had been rescheduled and were to have occurred in early spring 2007. These programs would have addressed any deterioration in track conditions that had occurred.

In the interim, track inspections were conducted to confirm track conditions.

At the time of the incident, there were no inclement weather conditions. However, it is important to note that up until a few days prior to the incident the track was snow covered, making it more difficult to visually detect any track conditions. As well, as snow cover was just melting at the time of the incident, walking inspections of the curves had not commenced for the spring season.

Recommendations

A review of Ontario Northland's Manual of Track Requirements (MTR), which outlines track inspection policies and maintenance practices, is recommended to ensure that Ontario Northland's systems are compliant with all industry standards, including Transport Canada's Rule Respecting Track Safety (RRTS). Appropriate training should accompany any revisions to the MTR. Further, it is recommended that a central electronic database for inspection schedules, reports and repair work be created.

Cost

The total cost of the derailment is approximately $2.6 million, which included general and environmental clean-up, restoration of track, and replacement of rail cars.

Post-Investigation Update

Third Party Audit

Following the preparation of the draft revised Manual of Track Requirements (MTR) and training of its track inspectors, track maintenance foremen and track maintainers, Ontario Northland engaged an independent consulting firm, AECOM, recognized within Canada and internationally as experts in transportation engineering and management to audit Ontario Northland's track inspection and maintenance practices. This audit proceeded over a 14 month period and included a review of Ontario Northland's revisions to its Manual of Track Requirements as well as the implementation of these changes, personnel interviews and track inspections. The audit confirmed many aspects of Ontario Northland's track inspection, training and repair standards and practices; it also identified opportunities for improvement.

The auditor compared Ontario Northland's Manual of Track Requirements (MTR) with similar standards of two of Canada's Class 1 railways as well as the American Railway Engineering and Maintenance of Way Association's Manual for Railway Engineering. Where the MTR was less restrictive, the auditor made recommendations for revisions which would make the MTR comparable or better than the standards in place at Canada's Class 1 railways. For example, while inspection standards in the MTR were found to be thorough, improvements were recommended in some instances.

As well, the auditor confirmed that Ontario Northland's capital plan was comparable to other railways with similar network, tonnage and speeds. Rail and tie replacement were found to be appropriate to ensure compliance with the RRTS and MTR.

The auditor approved of the training in respect of the MTR but recommended ongoing refresher training and certification of foremen as track inspectors. Inspection tracking documentation was to be aligned with MTR requirements with respect to frequency.

Ontario Northland has instituted increased oversight and training with the introduction of a technical services group responsible for overseeing quality assurance as well as a full-time trainer.

In addition, we have introduced improved reporting systems to provide more accurate and timely access to oversight information.

Ontario Northland has undertaken to satisfy all of the recommendations made by AECOM in the course of its audit and is committed to meeting all regulatory requirements and industry standards applicable to its track inspection and maintenance system.

Environment Canada Investigation

Ontario Northland has fully co-operated in the conduct of an investigation by Environment Canada. Ontario Northland and the Crown, representing Environment Canada, have established an agreed statement of facts relating to the incident. On March 1, 2011, Ontario Northland pleaded guilty to an offence in contravention of the federal Fisheries Act. The derailment and the subsequent deposit of sulphuric acid into Miller Creek constitutes an offence for depositing a deleterious substance in water frequented by fish, a prohibition under subsection 36(3) of the federal *Fisheries Act*.

Conclusion/Ongoing Commitments

Ontario Northland takes responsibility for the derailment which occurred on March 30, 2007 and sincerely regrets this incident and the concerns it raised within our community.

We are committed to meeting regulatory standards and have since made significant effort to not only ensure compliance with industry requirements but to incorporate best management practices in order to prevent future incidents.

Ontario Northland confirms that we will ensure full compliance with the recommendations set forth by AECOM in its audit of our track maintenance and inspection procedures. Many of the improvements set forth in the AECOM report have been completed, with others being ongoing.

In addition, Ontario Northland commits to implementing an audit program of management, systems, policies and quality assurance within our Rail Infrastructure Department, in which we will engage a third party audit every two years. This will assist us in ensuring that our standards continue to meet industry requirements.

INVESTIGATION REPORT

Accident Overview

On March 30, 2007 at approximately 11:22 hours Eastern Standard Time (EST) Ontario Northland's (ON) southward freight train No. 308 departed the Shipper destined for Englehart, Ontario. The train consisted of 2 locomotives, 38 loads, 2 empties, and an end of train unit. 29 of the loaded cars contained sulphuric acid. The train was 1,849 feet long and weighed 4,935 tons.

The operating crew consisted of a conductor and a locomotive engineer. They were familiar with the physical characteristics of this subdivision. The maximum permissible speed on this subdivision is 40 mph for freight trains and 60 mph for passenger trains.

Train No. 308 was made up at the Shipper's location. A pre-departure inspection and brake test on the cars was carried out by mechanical personnel at that location. En route to Englehart, the train set off one loaded box car and one empty tank car at Porquis Junction. Departing Porquis, the train consisted of two locomotives, 37 loads, 1 empty, and an end of train unit. The train was then 1,751 feet long and weighed 4,823 tons.

Wayside hot wheel/bearing and dragging equipment detection systems located at Mile 95.9, Mile 79.3, Mile 56.5 and Mile 29.6 on the Ramore Subdivision did not register any defects.

At approximately 14:02 hours, while the train was traveling through the left-hand curve at Mile 10, a train initiated emergency brake application occurred. The event recorder transcript indicated that the train speed was 40.7 mph at that time. Prior to the emergency brake application the brakes were fully released and the throttle was in dynamic braking mode. The event recorder transcript also indicates that dynamic braking had been in use for approximately 2 minutes 31 seconds or for a distance of 1.67 miles prior to the emergency brake application.

With the train stopped in emergency, and after notifying the Rail Traffic Controller, the conductor inspected the train and determined twenty-two cars had derailed commencing with the ninth car behind the locomotive consist, extending to and including the thirtieth car.

Fifteen tank cars of sulphuric acid were involved in the derailment; five of those cars lost product in varying amounts. Two of the cars had their tank shells breached as a result of impact with rail, bolsters and/or couplers from preceding derailed cars. Three cars lost product through the dome or fill cover. Two of the cars located at the south end of the derailment, while still in a forward momentum state actually rolled down an embankment. Both cars settled with the dome covers upright. There was no product loss in either of these two cars.

The loss of sulphuric acid is estimated at 220 tons or 13,800 gallons, ranging from minimal amounts from cars leaking at the dome cover to nearly total product loss for others with compromised tank shells.

Approximately 13,800 gallons of acid spilled on the ground above a small pond which formed part of the Miller Creek waterway. The spilled product migrated down slope to the pond into Miller Creek and eventually traces showed in the Blanche River approximately 2.5 kilometers downstream.

Eighteen of the derailed cars were damaged. Approximately 690 feet of track was completely destroyed and another 620 feet heavily damaged.

Weather

At the time of the derailment air temperature was 3°C with clear skies.

Emergency Response

Immediately following the derailment, the train crew contacted the Rail Traffic Control (RTC) Centre. Using the procedures established for emergencies involving dangerous goods, the RTC Centre began contacting the appropriate Ontario Northland personnel.

Once Ontario Northland emergency responders assessed the derailment site, calls were placed to provincial and federal agencies as well as the shipper of the commodities.

Priority to protect the waterway was established in order to minimize the effects of the sulphuric acid spill.

Emergency response teams from the Shipper's regional sites responded in accordance with established emergency response plans.

Ontario Northland established its command centre at its Englehart office complex approximately 10 miles from the derailment site. At the access points to the derailment area security personnel set up a sign in-sign out monitoring program restricting access to emergency personnel.

Site access was controlled by Ontario Northland officials.

To assist in dealing with the spilled acid, Ontario Northland retained the services of several companies including consultants and environmental clean-up and remediation specialists. An outside contractor was retained to assist with wrecking operations and clearing of the track grade.

By 12:00 hours (noon) on April 1, 2007 all acid discharges from the derailed cars had been abated. The roadbed was cleared of derailed cars by 15:30 hours on April 2, 2007 and transshipping of sulphuric acid from derailed tank cars was completed early in the afternoon on April 4, 2007. The track was restored and line opened at 21:00 hours on April 4, 2007.

Environmental Response

Representatives of the Ontario Ministry of the Environment (MOE) and the Ministry of Natural Resources (MNR) were present at the derailment site acting as a resource for Ontario Northland and monitoring that the spill clean-up proceeded in accordance with ministry guidelines. Environment Canada emergency officers were also present during the initial stages of the emergency response. Their role was to monitor and provide advice on environmental issues, particularly as they related to fish and habitat protection.

The pond at the site that forms part of the Miller Creek waterway is formed by a beaver dam that limits water flow through a culvert under the main track at the derailment site. As an initial response to

neutralize spilled acid and control PH levels in the creek, immediate arrangements were made to truck in lime slurry and add it on a continuous basis to the creek upstream of the derailment site. To better control PH levels in Miller Creek following the initial response, several monitoring stations were set up. Initial monitoring was done hourly on a 24 hour, 7 day per week basis.

A more refined dosing station was set up over the track culvert which, if required, could introduce liquid lime to Miller Creek in order to raise water PH levels should any of the sulphuric acid migrate out of the pond area into Miller Creek. A second dosing station was set up as a safety precaution at the Krugerdorf Bridge in the event PH levels needed to be adjusted downstream. PH levels in Miller Creek and in the Blanche River returned to normal very quickly following the derailment and there was little dosing required from either of these dosing stations.

Ontario Northland commenced final clean up of the derailment site on April 8, 2007. By April 15, 2007 all transshipping of the copper and zinc lading and removal of derailed cars and wreckage from the site was complete. Neutralization of the soils in the area was then undertaken and completed by April 29, 2007. Contaminated soil was treated onsite, transported by rail car into Englehart, then moved by highway vehicle to a local landfill site, all under the direction of the provincial environmental authorities.

Final treatment of the water in the adjacent beaver pond at the derailment site was completed on June 22, 2007. This treatment consisted of introducing amounts of magnesium hydroxide to the pond water in order to return PH levels to within the Ontario Provincial Water Quality Objective. There were no locations downstream that required any treatment.

Ontario Northland and its consultants have conducted surveys and studies in order to determine the short and long term effects on the fish and plant life of the pond, Miller Creek and the Blanche River. The results indicate there was a slight impact on the fish and plant life in the pond area. This is not expected to be long term. There was also a slight impact on fish in Miller Creek; however, this too was only short term since water quality returned to normal levels very quickly following the spill. There was no impact on the Blanche River system.

Cost

It is estimated that total costs of the derailment is estimated at approximately $2.6 million, which includes general and environmental clean-up, restoration of track, and replacement of rail cars.

Investigative Findings

The Originating Train

Train 308 is a regularly scheduled Ontario Northland freight train that travels approximately 104.0 miles between the Shipper's location and Englehart, Ontario (MP 0.0 Ramore Subdivision). The train operates Monday to Friday and is scheduled to depart the Shipper's at 10:30 and arrive in Englehart at 14:20. The train generally handles outbound copper, zinc, sulphuric acid, and forest products. The copper, zinc, and acid originate from the Shipper's location and the forest products originate at the facility of another Ontario Northland customer. Train 308 of March 30, 2007 was made up at the Shipper's location and consisted of 2 locomotives, 38 loads, 2 empties, and an end of train unit. The length of the train was 1,849 feet and it had a gross tonnage of 4,935 tons. 29 of the 38 loaded cars contained sulphuric acid. The locomotives consisted of one 4,400 hp SD75i equipped with dynamic brake and one 3,000 hp SD40 equipped with standard 26L air brakes. There were no marshalling violations in the train and a tonnage profile was included as part of the train journal in possession of the crew at the time of departure.

Pre Departure

Prior to departure and in accordance with Ontario Northland requirements, train 308 was given a pre-departure inspection and #1 brake test by the Shipper's certified car inspector. The train consist included two bad order cars, one with a defective truck spring 6 cars behind the locomotives, and one with brakes cut out located 8 cars behind the locomotives. Both cars were authorized to move under Bad Order Car Movement Authorization forms which were provided to the train crew along with the Form 838 (Schedule A #1 Brake Test). On departure, the train complied with the Transport Canada Freight Car Inspection and Safety Rules, Transport Canada Freight and Passenger Train Brake rules, and provisions of Ontario Northland's General Operating Instructions with 97% of the cars in the train having operative brakes on departure from the Shipper's location.

The Crew

The operating personnel on train 308 of March 30, 2007 consisted of a locomotive engineer and a conductor. Both crew members were fully qualified locomotive engineers with current Canadian Rail Operating Rules (CROR) and Transportation of Dangerous Goods training certificates. The locomotive engineer had 21 years of service and had been a qualified locomotive engineer for 12 years. The conductor had 19 years of service and had been a qualified locomotive engineer for 3 years. Both were familiar with the territory and properly rested prior to being called for duty on March 30, 2007.

Train Operation

Train operation on the Ramore Subdivision is governed by the Occupancy Control System (OCS) rules of the CROR. Train 308 of March 30, 2007 had been properly authorized to proceed from the Shipper's location to Englehart under OCS Clearance #30 and left the Shipper's location at 11:22 hours. Maximum freight train speed on the Ramore Subdivision is 40 mph. En route to Englehart, the train set off one loaded car and one empty car at Porquis Junction. On departure from Porquis, the train consisted of two locomotives, 37 loads, one empty, and an end of train unit. The train was 1,751 feet in length and weighed 4,823 tons. There were no speed restrictions affecting the train on the approach to the point of derailment. The track in this area lies on an undulating downward grade averaging approximately 0.4% when traveling in a southward direction. The track geometry includes moderate curvature. The derailment occurred immediately south of the mileage 10 mileboard in the body of a four degree left hand curve on a 0.48% downward grade.

Following the derailment, the locomotive event recorder from the lead SD-75i locomotive 2104 was successfully downloaded. An analysis of this download indicates normal train operation on approach to the derailment site. To control train speed on the downward grade, the locomotive engineer made a minimum brake application (10 pound reduction in brake pipe pressure) at 13:58:17. This brake was then released at 13:58:45. At 13:59:31, the locomotive engineer began to utilize dynamic brake to control train speed. With the train on a downgrade, and in dynamic braking mode, the slack in the train would have been compressed and the train bunched up in the 2 minutes and 31 seconds that the train had been in dynamic braking mode.

The train crew did not recall any abnormal buff action in the train, either when initiating the dynamic braking or at any time prior to the derailment. They also did not notice any abnormal track conditions while traveling through the curve at mileage 10. At 14:02:37, while the train was in the curve, and while traveling at 40.7 mph, a train initiated emergency brake application was experienced. On looking back at the train, the crew recognized immediately that a derailment was occurring. The train came to a stop at 14:03:17, some 40 seconds following the emergency brake application. 22 cars had derailed starting from the 9th car behind the locomotives and including 15 cars of sulphuric acid. Cars were down the embankment and had jackknifed across the grade.

On initial inspection, the crew recognized that sulphuric acid had leaked and was continuing to leak from several tank cars. They contacted the Englehart RTC (Rail Traffic Control) office and communicated the severity of the incident. With this communication, the RTC Center initiated Ontario Northland's emergency response procedures.

The analysis of the locomotive event recorder download reveals no factors in the train operation that would have directly caused the accident. It is important to note, however, that with the train in dynamic braking and all braking effort coming from the lead locomotive, there would have been in-train compressive forces resulting in outward lateral forces on the track structure as the train traveled through the four degree curve. This stated, the track is designed to withstand these forces. It was also noted from track measurements taken following the derailment that the curve was properly elevated for freight train speed.

Equipment Operation

Train 308 was properly inspected on departure from the Shipper's location. It traveled over four hot wheel/bearing and dragging equipment detectors with no defects detected en route. The last detector was located 19.6 miles north of the derailment site and the train passed this detector 33 minutes prior to the derailment. Although it is possible that an equipment related problem could have developed in the 19.6 miles of travel, there was no evidence identified which would suggest that a hot wheel, bearing, or dragging equipment caused the derailment.

In a post accident interview, the train crew reported that they had experienced an undesired emergency (UDE) brake application around mileage 99 while traveling southwards. This UDE occurred at the time of an airbrake application, indicating that there may have been a car with a defective brake valve, or what is commonly referred to as a "kicker" in the train. However, no further undesired emergency brake applications were experienced and the train responded normally to all brake applications for the

remainder of the trip. Further, because there was no application of the airbrakes at the time of the accident, a potential "kicker" was not a factor in the derailment.

Site Assessment

The initial assessment of the site revealed that the derailed equipment included 15 loaded tank cars of sulphuric acid, 5 box cars of copper ingots, and 2 boxcars of zinc anode. At least 18 cars were damaged beyond repair, 690 feet of track destroyed and another 620 feet of track damaged with the rail rolled out of the tie plates. 5 sulphuric acid tank cars ended up down the embankment on the east side of the track, 14 cars came to rest jackknifed across the grade, and 3 derailed cars remained upright and parallel to the grade.

With the spillage of sulphuric acid, much of the wreckage area was cordoned off to all but the Shipper's emergency response personnel until such time that the area was neutralized. This made inspection of the damaged equipment and track components very difficult immediately following the derailment. The damaged track started immediately south of the milepost 10 mileboard sign. On initial inspection, it was discovered that the high rail was rolled outwards and wheels had traveled in the web of the high rail for some distance. The high rail was found rolled both immediately preceding the portion of track that had been destroyed and beyond the destroyed track through the remainder of the curve. Several of the leading derailed cars had traveled a fairly significant distance around the curve, likely riding in the web of the high rail before tumbling down the embankment. Subsequent analysis of the locomotive event recorder download revealed that the head end of the train had traveled 1,083 feet following the emergency brake application before coming to a stop.

Inspection of rail and mechanical components at the site did not reveal any suspect broken rails or defective equipment that would have caused the accident. At a location immediately preceding the location where the main pile up of cars occurred, a four foot section of the head of the high rail was found that had been sheared off from the web of the rail. When this shear occurred, it then allowed wheel sets to exit the web of the rail resulting in train separation, an emergency brake application, and the subsequent pile up of cars immediately beyond this location.

When the emergency brake application occurred, the leading derailed tank cars that had been traveling in the web of the rail were then projected outwards and tumbled down the embankment. Post accident inspection of the trucks of the derailed cars indicated that the trucks on PROX 15267 (second derailed car) had scuff and tear markings on the bottom of the truck side frames indicating that these side frames had struck and were riding on the top of the rails for some distance.

- **Track**

  Ontario Northland's Ramore Subdivision carries approximately 6.5 million gross tons of rail traffic annually. In terms of frequency of train movement, it is the busiest line segment on the Ontario Northland rail line, typically carrying 6 freight train and 2 passenger train movements each weekday. The subdivision is inspected 3 times per week by a track inspector who reports directly to a Maintenance of Way District Manager in Englehart. The track structure on the subdivision consists of 8 foot hardwood ties on curves and 8 foot softwood ties on tangent track laid in crushed rock ballast. Rail is a mixture of 115# RE jointed and continuous welded rail placed on 14 inch tie plates on curves and 11 inch tie plates on tangents. The rail in the derailment area was 39 foot jointed rail

laid on 14 inch double shoulder tie plates with 8 spikes per tie and box anchored in an irregular pattern at an average rate of one in three ties, sufficient to prevent rail movement.

- **Weather Considerations**
  Temperature at the time of the accident was 3 degrees Celsius with clear skies. There were no inclement weather conditions that would have contributed to a track failure. However it is important to note that up until a few days prior to the accident, the track was still snow covered and many of the track conditions that are more difficult to visually detect under snow cover conditions had just become visible in the few days prior to the accident.

- **Track Inspector and Track Inspection**
  The last track inspection prior to the derailment was performed by the Ramore Subdivision Track Inspector on the morning of March 30, 2007. This inspector is an Ontario Northland employee with 29 years of track maintenance experience. He is a qualified track inspector that was trained in the Federal Track Safety Rules in April of 2002. He last qualified in the Canadian Rail Operating Rules on August 11, 2006.

  A review of the Track Inspector's Daily Log forms revealed that the Ramore Subdivision was being inspected with frequencies as required by the Federal Track Safety Rules. The track in the derailment area had been inspected six times in the two weeks prior to the derailment with no deficiencies noted in the curve at MP 10. It should also be noted that the Englehart North section crew had also been over the track on the morning of the accident.

- **Ultrasonic Rail Flaw Detection**
  Ontario Northland currently conducts ultrasonic rail flaw detection at least once annually on all of its main lines. The last rail flaw detection test on the Ramore Subdivision prior to the derailment was performed by Sperry Rail Services on August 14, 2006. There were no defective rails detected between mileage 18.78 and 0.00 on that test.

- **Track Geometry Car Inspection**
  Ontario Northland currently utilizes Canadian Pacific Railway to perform track geometry car testing over all of its main rail lines at least once annually. Prior to the derailment, the last run of the track geometry car on the Ramore Subdivision occurred on May 23, 2006. Surface conditions were found to be in good condition in this curve. Defects detected during that run included an urgent gauge spot at mileage 10.17 (mileage 10.10 in relation to the actual field location of the mileboard). Urgent defects exceed defined minimum standards of the Transport Canada Track Safety Rules and require either immediate repair or protection by means of a slow order. Records show that a 10 mph slow order was placed between mileage 10.1 and 10.2 on May 23rd, 2006 and that a repair was performed and the slow order removed on May 25th, 2006.

  While it is Ontario Northland practice to deal with urgent defects immediately following the geometry car test through either repair or slow order, track geometry defects not exceeding the minimum standards (priority defects) are to be monitored as part of the regular track inspection and repair process. In addition to the urgent gauge spot identified at mileage 10.17 (10.10 in relation to the actual field location of the mileboard), there was a priority gauge defect identified at mileage 10.04 (9.97 in relation to the actual field location of the mileboard) that was measured at 1-1/4"

wide, right at the threshold of the Transport Canada minimum standard (Track Safety Rules require that immediate corrective measures be initiated when the defect measurement exceeds the defined threshold limit). There are no records of any repair being performed at this spot subsequent to the geometry car run in May of 2006 and prior to the derailment.

In addition to the actual gauge spots measured by the geometry car, CP's gauge restraint measurement system on this car identified PLG24 gauge defects through the curve at mileage 10. PLG24 defects estimate the gauge holding capability of the track under lateral forces of 24,000 lbs. While PLG24 priority defects were identified, none were classed as urgent.

- **Track Renewal and Repair Programs**
  Each year, Ontario Northland conducts capital track renewal and repair programs as part of its annual business plan. The curve at mile 10 of the Ramore Subdivision had been identified for both rail work and light tie replacement during the 2006 work season. The high rail around the entire curve was scheduled for replacement and also 148 defective track ties had been identified for renewal. These programs were both approved by Ontario Northland management.

  Due to various circumstances, neither of the programs was completed during the 2006 work season. First, Ontario Northland's tie gang 92 ran behind schedule and the Ontario Northland tie work had to be reprioritized. On reviewing the programs for the Ramore Subdivision, a decision was made in July of 2006 that the tie work on only those curves that were restricted by slow orders would be completed. All other curves would be deferred for a year and monitored for condition. As the curve at mile 10 had been identified for replacement of only 148 ties (representing approximately 14% of the ties in the curve) this work was not deemed essential for 2006. Track Safety Rules require a minimum of 10 non defective ties per 39 foot length of rail. This curve had approximately 19 non defective ties per 39 foot rail, well in excess of the Track Safety Rule requirements, when the program was deferred.

  In addition, although Ontario Northland had placed orders for new rail in March of 2006 for a July delivery, difficulties were experienced with the supplier and delivery did not occur until early winter of 2006. This resulted in the cancellation of the rail program, again with those curves that were deferred to be closely monitored for condition. The rail wear on the curve at the derailment location did not exceed CP's "Line B" extended wear limits for 115# rail.

- **Post Derailment Track Measurements**
  As part of the derailment investigation, track was visually inspected and measurements were manually recorded on the 341 feet of track leading up to the derailment site (22 stations at 15' 6" spacing). The surface conditions in this curve were found to be good.

  In terms of measurements, rail wear did not exceed CP extended wear criteria, although there were three joints showing some signs of batter and splice bars that indicated wheel flange contact. There were locations where ballast was fouled with mud, particularly in a cut area just north of the derailment site. Track geometry and tie conditions did not measure to exceed minimum criteria as defined by the Track Safety Rules.

Since the snow cover was just melting, walking inspection of the curves had not commenced at the time of the derailment.

This curve was scheduled for both tie replacement and rail replacement in early spring and these programs would have addressed any deterioration in track conditions that had occurred.

Conclusion

Based on the above, the track structure appears to have failed to hold gauge as train 308 traveled around the curve. The gauge spread sufficiently to allow a wheel set on PROX 15267 to wedge into gauge and force the rails apart. As the car continued in forward movement, it rolled the high rail outward as it traveled around the curve. The trailing trucks of the car ahead (UTLX 11265) were dragged off of the track by PROX 15267. The car behind (PROX 16732) traveled in the web of the rolled rail until such time that the train went into emergency, at which time it tumbled down the embankment and came to rest in the beaver pond. Shear failure in the web of the rolled rail appears to have allowed the wheels of PROX 15135 to exit the rolled rail and continue forward in a straight line trajectory down the embankment, resulting in train separation and the subsequent emergency brake application. Two cars followed and then the remaining cars began to dig in and jackknife across the grade.

Recommendations

It is recommended that a review of the Manual of Track Requirements (MTR) be undertaken in order to review compliance with all industry requirements pertaining to track inspections and maintenance.

As well, training should accompany any changes to the MTR to ensure that all associated personnel are aware and adhering to MTR requirements.

A central database for inspection schedules, reports and repair work should be created to allow for increased oversight.

ADDENDUM – POST INVESTIGATION UPATE
Updated as of March 1, 2011

Recommendations/Preventative Measures

Ontario Northland's internal investigation into the derailment of Ontario Northland freight train No. 308 on March 30, 2007 and presented a determination of cause and as well, recommendations to review internal procedures and ensure that industry standards were being met.

A review of Ontario Northland's Manual of Track Requirements (MTR) was subsequently completed, a revised MTR was drafted and associated training for track inspectors, track maintenance foremen and track maintainers was undertaken. In addition, improved electronic maintenance tracking systems were introduced to allow for enhanced oversight.

As well, Ontario Northland proceeded to engage an independent consulting firm, AECOM, recognized within Canada and internationally as experts in transportation engineering and management, to audit Ontario Northland's track inspection and maintenance practices. This audit proceeded over a 14 month period and included a review of Ontario Northland's revisions to its Manual of Track Requirements as well as the implementation of these changes, personnel interviews and track inspections. The audit confirmed many aspects of Ontario Northland's track inspection, training and repair standards and practices; it also identified opportunities for improvement.

As a result of these initiatives, improvements to Ontario Northland's track inspection and maintenance program have been implemented in order to satisfy all of the recommendations made by AECOM in the course of its audit and to ensure compliance with all regulatory requirements and applicable industry standards (refer to Appendix A).

In addition to the recommendations by AECOM, Ontario Northland has committed to undertaking a third party audit of management, systems, policies and quality assurance within our Rail Infrastructure Department every two years.

Environmental Impact

Ontario Northland immediately worked to contain the spill and remediate the area.

By June 1, 2007, impairment of biological communities was not detectable in these areas and re-colonization of the creek was virtually complete. There was no physical alteration of fish habitat, no residual pollution; there were ready sources of colonizers in the damaged parts of Miller Creek. These were ideal conditions for full recovery of the Miller Creek fish population. Ontario Ministry of the Environment personnel are of the view that there is likely full recovery of fish species richness and density.

Environment Canada Investigation
Ontario Northland has fully co-operated in the conduct of an investigation by Environment Canada.

Ontario Northland and the Crown, representing Environment Canada, have established an agreed statement of facts relating to the incident. On March 1, 2011, Ontario Northland pleaded guilty to an offence in contravention of the federal Fisheries Act. The derailment and the subsequent deposit of sulphuric acid into Miller Creek constitutes an offence for depositing a deleterious substance in water frequented by fish, a prohibition under subsection 36(3) of the federal *Fisheries Act*.

Ongoing Commitments and Conclusion
Ontario Northland takes responsibility for the derailment which occurred on March 30, 2007 and sincerely regrets this incident and the concerns it raised within our community.

We are committed to meeting regulatory standards and have since made significant effort to ensure compliance with industry requirements and standards in order to prevent future incidents.

Ontario Northland confirms that we will ensure full compliance with the recommendations set forth by AECOM in its audit of our track maintenance and inspection procedures. Many of the improvements set forth in the AECOM report have been completed, with others being ongoing (refer to Appendix A).

In addition, Ontario Northland commits to implementing an audit program of management, systems, policies and quality assurance within our Rail Infrastructure Department, in which we will engage a third party audit every two years. This will assist us in ensuring that our standards continue to meet industry requirements.

APPENDIX A

Ontario Northland is committed to meeting all regulatory requirements and industry standards applicable to its track inspection and maintenance system. In particular, Ontario Northland has undertaken to satisfy all of the recommendations made by AECOM in the course of its audit, summarized as follows:

AECOM Recommendation	Status (as of March 1, 2011)
Continue rail and tie replacement program.	Ongoing. AECOM audit has indicated that the rail and tie replacement program is compliant with industry standards. Will continue to monitor to ensure that industry standards continue to be met.
Enhance rail wear and tie inspection.	Inspections and monitoring are subject to enhanced oversight and reporting to ensure compliance. Rail wear measurement data is being recorded and evaluated twice yearly.
Continue ballast program to ensure appropriate distribution.	Ongoing. AECOM audit has indicated that the ballast program is compliant with industry standards. Will continue to monitor to ensure that industry standards continue to be met.
Reinforce training with respect to track speed over turn outs during inspections.	Complete. Bulletin issued to employees reinforcing track speed requirements. Greater emphasis with respect to this issue has been made in training and is ongoing. Field audits confirm compliance.

Enhance response to geometry car analysis.	Complete. Near urgent defects are now being repaired or protected by temporary slow order. Improved electronic maintenance tracking systems to allow for enhanced oversight.
Enhance inspector training and certification.	Ongoing. Full-time trainer is now in place. Ontario Northland maintains an electronic database identifying training and certification of all employees.
Compliance with Transport Canada's regulation on siding inspections.	Complete. Criteria for siding inspections were established and implemented. Electronic data system has been expanded to include monthly siding inspections. Improved oversight of monthly reports and improved access to data as a result of enhance electronic data system. Monthly audits implemented to ensure compliance.
Training re: temporary slow orders.	Complete. Ontario Northland has emphasized the need for an appropriate speed limit and prompt action to address detected conditions.

Implementation of and ongoing adherence to central inspection tracking system to ensure appropriate frequency and response.	Ongoing. Monthly inspection forms have been enhanced. Ontario Northland has implemented standard forms for all inspections set forth in the Manual of Track Requirements. Enhanced auditing system on inspection reports.
Ensure compliance re: inspection frequency.	Ongoing. Manual of Track Requirements has been updated, with changes to minimum track inspection frequency to ensure the same requirements as the Transport Canada Rules Respecting Track Safety (RRTS), and that minimum inspection frequencies meet or exceed both the requirements of the RRTS and the standards used by the Canadian Class I Railways. Improved electronic maintenance tracking systems to allow for enhanced oversight.
Continue to ensure appropriate management structure is in place.	Ongoing. Ontario Northland has instituted increased oversight and training with the introduction of a technical services group responsible for overseeing quality assurance as well as a full-time trainer. Improved reporting systems have been introduced to provide management with more accurate and timely access to oversight information. External engineering services are being engaged as appropriate.
Supplemental and refresher training regarding field assessment.	Ongoing. Training scheduled for completion in March 2011. Training will then continue on an ongoing basis.