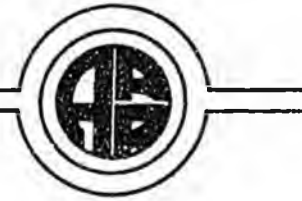


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**Derailment Report  
January 2000**

**Canyon Derailment**

The Alaska Railroad train 2802 South derailed shortly after 1 a.m., October 31, 1999, at MP 268, adjacent to Canyon siding. This train was made up of four locomotives and 46 loaded tank cars (holding roughly 1 million gallons of refined product).

**Cause**

Rail Sciences, Inc. the leading investigative and technical firm in the railroad industry, conducted the investigation. Work included review of tapes from the locomotives, computer simulations based on the data, and site investigation. The investigation concluded that the track was in good shape and that the train was being handled properly.

However, there were two yard switching engines being towed to Anchorage from Fairbanks. The switch engines were placed immediately behind the four working locomotives. The couplers on switch engines swing wider, side to side, than couplers on standard freight and road equipment. They are designed that way because these engines have to handle a variety of different cars in tight and varied track configurations of yards.

At track speeds, and with the usual forces of working locomotives in front of them and loaded cars behind them, the wider swing in the couplers of these yard locomotives generated strong lateral forces against the inside of the rails. This lateral force eventually spread the two rails apart. This began derailing equipment and rolled the rail over.

**Consequences**

Leaks from at least two cars caused a release of approximately 12,000 gallons of Jet-A aviation fuel. The fuel spilled into two small rivulets running on either side of the track. The fuel stayed primarily on the surface of the water (rather than spreading into streamside soils) because of the grade (about 2.5 percent) and strong constant water flow (probably from groundwater/spring sources). The fuel pooled behind a series of beaver dams on both sides of the track.

Water quality sampling that began on the second day of the response showed some dissolved benzene in the water column at the beaver ponds and at downstream sites. By Day 11, those levels had dropped below aquatic toxicity levels established by the

regulatory agencies. These data suggest the environmental impact was short-lived.

#### **Response actions**

The ARRC employed three contractors (Penco, CCI, CH2MHill). Technical assistance on response actions was guided by Rod Hoffman of CH2MHill, who came to the company from ARCO Alaska and Alaska CleanSeas. Lightering of the fuel was conducted with ARRC employees led by Jim Seeberger, the hazardous materials specialist for the corporation. Response efforts consisted of vacuum operations, hand scooping, skimming, and sorbent material placement. Dry streambank grasses that had absorbed fuel were burned with propane-fired torches.

Waterflow was diverted in two areas to minimize fuel migration and underflow dams were constructed to aid recovery and establish preventative structures before breakup.

Of 220,035 gallons of fuel in the 10 tank cars that derailed, the ARRC and contractors recovered 219,291 gallons through lightering and response efforts, leaving only 744 gallons total unaccounted for. Recovery amounts were gauged and verified by ARRC and state personnel, Williams Energy, and Alaska Pollution Control.

#### **Gold Creek Derailment**

Alaska Railroad train 130 South with four locomotives and 49 cars (41 loads of refined product and eight empty tank cars) derailed at Gold Creek siding, MP 262 of the Alaska Railroad, at 2 a.m. on December 22, 1999.

#### **Cause**

The train had been traveling southbound and went into Gold Creek siding to allow a northbound train to pass. Weather conditions at the time were extreme. Heavy, wet snow was turning to rain. Temperatures were at or near freezing. After the northbound train passed, the southbound returned to the main track and stopped so the switch controlling movement into the siding could be realigned. The 130 South then started again southbound on that main track. Shortly after it began moving southward, the rear, right wheel of the second locomotive in the consist climbed over the rail to the west of the rail. The train gradually began to pick up speed. At approximately 28 mph (12 mph slower than authorized track speed), the second locomotive derailed more forcefully, triggering the derailment and pile-up of 15 loaded tank cars.

Rail Sciences, Inc. was again called upon to investigate the accident. It found that excessive buildup of ice and snow in a short period of time caused the locomotive to derail.

#### **Current setting**

At least five tank cars were severely damaged during the wreck. Four lost all or nearly all of their loads. Estimated amount of fuel spilled is currently about 100,000 gallons of Jet-A aviation fuel.

On the west side of the track, the spilled fuel moved quickly through the snowpack (estimated at approximately 6-8 feet at the time). It does not appear to have spread laterally along the surface more than 60-75 feet from the track. It does appear to have saturated a small area of silty topsoil, then run relatively straight down, however, through well-drained gravel soils. Test pits and drilling results show that fuel has been soiled from the surface to the groundwater level of approximately 30 feet.

On the east side, the results were similar. A deeper drainage ditch did allow some spilled fuel to settle and freeze into a clearly defined layer near the bottom of the snowpack. However, as on the west side, the fuel quickly moved into the gravel soils and traveled to groundwater.

The area of the spill is a gravel terrace that was once the valley bottom. Trench cuts show gravel, sand, and rounded boulder/cobble layers that are typical of glacial outwash and streambeds all the way to current groundwater levels. The Susitna River itself is at approximately 465 feet above sea level. The spill site is approximately 500 above sea level, but groundwater is at or near current river level. This suggests a relatively flat gradient, which further suggests that fuel on top of groundwater is not on a rapid course towards the Susitna. There is free floating product in test wells ranging from 8 inches deep to a few inches deep.

#### **Response actions and plans**

The spill occurred immediately below the wrecked cars. To get at the contamination, crews transloaded fuel from 14 of the 15 cars (the 15<sup>th</sup> car was rerailed, full, and moved from the site). Approximately 200,000 to 220,000 gallons of fuel have been transloaded and removed from the site. The wrecked cars, each weighing 30 tons empty, were lifted or dragged off the contamination and set out for removal by wrecking crews at a later time.

Clean and contaminated snow was bulldozed and removed from the site using 50-yard hopper cars. A total of 48 carloads were taken to Alaska Pollution Control.

Two drilling rigs are working, drilling wells for recovery and doing borings to delineate lateral contamination from the wreck site. Ground penetrating radar has been used to get additional data on the location and possible movement of the fuel in the subsurface. Recovery is being conducted using a vacuum unit to pull fuel up from wells. Some soil will likely be removed; however, we are currently keeping the surface intact as much as possible so that we can effectively use heavy equipment and drilling rigs. Soil removal in the vicinity of the track itself will be subject to a detailed examination of roadbed stability by ARRC civil engineers.

Drilling and radar data will combine to produce a comprehensive map of groundwater flow in the area. Nothing in the data suggest rapid advancement to the Susitna. Water quality testing locations have been established at the Susitna itself and samples are currently being analyzed.

# ALASKA RAILROAD CORPORATION



Corporate Address: P.O. Box 107500, Anchorage, Alaska 99510  
327 W. Ship Creek Avenue, Anchorage, Alaska 99501

Executive Office  
Telephone: (907) 265-2403  
Facsimile: (907) 265-2312  
e-mail: [sheffieldw@akrr.com](mailto:sheffieldw@akrr.com)

January 17, 2000

The Honorable Andrew Halcro  
Chair, Transportation Committee  
State Capitol, Room 418  
Juneau, Alaska 99801-1182

Dear Representative Halcro:

Thank you for your invitation to appear before the House Transportation Committee. I look forward to explaining to the Transportation Committee the information you have requested.

I feel very bad about the derailment and spill as do all the Railroad employees. We are putting in changes to the procedures of running trains that we hope will minimize or eliminate this from happening in the future. Our wish is to regain the confidence of the Alaska people and the legislature.

Sincerely,

A handwritten signature in cursive script that reads "Bill Sheffield".

Governor Bill Sheffield  
President and Chief Executive Officer

 **RAIL SCIENCES INC.****CONFIDENTIAL**

3 North Clarendon Ave.  
Avondale Estates, GA 30002-1151  
(404) 294-5300  
(404) 294-5423 Fax  
Document

December 31, 1999

Ms. Phyllis Johnson  
General Counsel  
Alaska Railroad Corporation  
Anchorage Alaska

**Attorney-Client Work Product****RE: Preliminary Report, Derailment at Gold Creek Siding**

Rail Sciences has completed the initial phases of its investigation as to the cause of the derailment of Train 2806 South, Gold Creek, MP 263, December 22, 1999. This initial investigation consisted of three days on site including a trip to the derailment scene by G.P. Wolf, detailed inspections of the locomotive equipment involved in the initial derailment, and interviews and meetings with personnel involved in different phases of the investigation.

The major derailment and pile-up occurred at the south switch at Gold Creek, but it is clear that the initial derailment occurred north of the north switch at Gold Creek. Marks in the rail and in the snow/ice show that a single wheel derailed north of the north switch and rode in a derailed position until encountering the frog area at the south switch, which then precipitated the large jackknifing and pile-up.

From our preliminary assessment, we have determined that the initial point of derailment was at a location approximately 140 feet north of the north switch points at Gold Creek Siding. Evidence at this location shows that likely a single wheel climbed the west rail as evidenced by a very light climb mark across the top of rail extending approximately 24". At the same time, the opposite wheel dropped in the inside of the east rail. The point of derailment was approximately opposite a joint on the east rail. It also appears that the marks on the rail and joint bolts were made by a wheel moving in the southward direction. The track at this location is straight.

An accumulation of field evidence also points to the fact that most likely the second locomotive in the consist, Unit 3004, was the first vehicle to derail. From marks on the wheels and undercarriage, it is most likely that the R4 wheel was the first to derail in a climbing motion to the west.

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Our investigations, measurements, and calculations to date have not revealed any obvious defects with the track and roadbed, the vehicles, or the operation of the subject train. Detailed track measurements show no exceptions to Federal (FRA) track safety standards. The track was well spiked and appropriately supported in the area of the initial derailment. Detailed examinations of the trailing three locomotives did not show any out of tolerance conditions on the wheels, trucks, motors or braking systems. Nor were there any exceptions to Federal (FRA) locomotive safety standards.

The event recorders from the four locomotives on the subject train were analyzed both by Alaska Railroad personnel, and also the data was played out at Rail Sciences' event recorder analysis facility in Atlanta. The data from the event recorders comported with crew statements as to the actions and speeds on the train. In addition, RSI has completed initial computer simulations of the operation of the train to determine the forces and accelerations present in the train as it negotiated the north switch at Gold Creek. These simulations have not shown any unusually high forces which would have been directly causative in the derailment. Nor was speed of the train a causative factor. It is evident that the engineer used higher than normal starting effort leaving the north switch due to the heavy accumulation of snow and ice under the train. However, the coupler forces present in the train as it proceeded southward should not have directly caused a derailing action to the west rail as is evidenced at the scene.

In conclusion, at this stage of the investigation we can rule out any kind of out-of-tolerance track condition, mechanical condition of the locomotives, or crew actions as directly causative in this derailment. It appears that this derailment primarily resulted from a lifting action due to a sudden and heavier than expected accumulation of snow and ice under the locomotive wheels. As the train proceeded southward, the rear wheel on Unit 3004 rode up and over a solid block of snow/ice and derailed to the west.

To prevent immediate recurrence of this type derailment it is suggested that ARR:

1. Review policy on snow removal and snow inspection, especially at critical junction switches.
2. Review policy on which trains hold the main line at meets with adverse weather conditions and review policy of backing up trains under adverse weather conditions.
3. Alert all crews and inspectors as to the potential safety issues of ice and snow accumulation under train wheels and insure that all precautions are taken to avoid excessive accumulations.

We will continue our investigation and reserve the right to amend this report as more data becomes available.

*[Handwritten Signature]*  
Gary P. Wolf  
President

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Gold Creek Derailment Dec. 22, 1999

Crew Interviews conducted 22:00-22:30 Wed. Dec. 22, 1999

Conductor Steve Culver

Engineer Dana Godfrey

Brakeman Jamar Washington

#### Conductor Culver

Crew was on duty at 6:10pm in Healy. Crew didn't leave Healy until 9:40 pm because of low water level on the 4401, so they were delayed to take on water. Uneventful trip up to Gold Creek. They had had one meet at Broad Pass prior to their meet at Gold Creek. They arrived at the north switch at Gold Creek at midnight and proceeded to dig out the north siding switch to take the siding for a meet with the northbound freight. After extensive digging they took the siding shoving heavy wet snow the entire length of the siding. Conductor Culver and Brakeman Washington again cleaned the north siding switch to line it for the main for the meet. After the northbound freight went by, they again cleaned the switch. The 2806 South then backed out of the siding, and again Culver and Washington cleaned the switch. Each time they cleaned the switch the snow had gotten harder packed. As they backed out of the siding, Conductor Culver noticed large ice/snow boulders being shoved behind the wheels of each of the cars. When the switch was cleaned and they were ready to proceed south, Conductor Culver took a position on the lead locomotive (2806) and Brakeman Washington got on the 2nd unit (3004). As they began moving south, Steve noticed slack running out as if they were tugging on the train, something he thought unusual because of the grade and normally they begin floating south with very little slack action, but he attributed it to the snow and ice buildup between the wheels that he'd noticed while shoving out of the siding. As they passed over the south switch of Gold Creek Steve noted the time at 02:05. Moment later he felt slack action and looked at Engineer Godfrey and asked, "Are we in emergency?" Dana looked at Steve and then looked in his side view mirror and put the train into emergency. They came to a stop and Conductor Culver instructed Brakeman Washington that they were on the ground and get ready to go back and inspect. When Conductor Culver got out he immediately smelled fuel and knew there was leaking fuel. They then began their damage assesment.

#### Engineer Dana Godfrey

Engineer Godfrey reported nothing unusual prior to arriving at Gold Creek. He spoke of Darrel Kollander, the engineer he relieved at Healy, having had 3 ground relays on the 3001 from Fairbanks to Healy. Darrel also had to restart the 4401 at Healy after it had shut down. They also discovered the 4401 was out of water so they took on water at Healy. Arriving Gold Creek they pulled into the siding and were shoving alot of snow. After the northbound freight went by, they backed out of the siding. When Dana stopped at the north switch, they got bells on one of the locomotives. After Conductor Culver and Brakeman Washington lined the switch, Engineer Godfrey pulled forward on the main approximately 5 carlengths so he could walk back on the cleared siding to see which engine had shutdown. He discovered the 4401 had shutdown. He restarted the locomotive and got back on the head end and they proceeded south. Dana does not recall any slack action as they left. Near the south switch at Gold Creek, they began feeling slack action.

Gold Creek Derailment Dec. 22, 1999

Crew Interviews conducted 22:00-22:30 Wed. Dec. 22, 1999

Conductor Steve Culver

Engineer Dana Godfrey

Brakeman Jamar Washington

Dana looked at Conductor Culver, then looked in the side view mirror and noticed the 3004 (2nd unit) rear end begin to sway toward the west side. He immediately put the train into emergency. The stop was smooth and no major slack.

**Brakeman Washington**

Brakeman Jamar Washington assisted Conductor Culver in cleaning the north switch at Gold Creek. He didn't note anything unusual throughout the trip. Upon leaving Gold Creek he positioned himself in the 3004 (2nd unit) where he had been for much of the trip. Prior to derailing, Brakeman Washington did not see anything. He assisted Culver in the initial damage assesment.

ALASKA RAILROAD CORPORATION



CONTROL # 9-2 A  
 Class of Service YARD ROAD  
 (circle one)

TIMEKEEPER'S NO. \_\_\_\_\_

TIME RETURN 2806  
 TRAIN NO. 2806  
 NORTH  
 SOLID  
 (circle one) Date 12-21-99 Project # 88130

Length of time off duty from previous trip	ORDERED FOR DUTY			ARRIVED				ACTUAL HOURS WORKED	OCCUPATION	NAME	ID NUMBER	
	STATION	TIME	DATE	LEFT	STATION	TIME	DATE					RELEASED
12 " 25 "	358	1810	12-21	1940	227	0550	12-22	0740	13:30	COND	SD Cline	52056
12 " 25 "										ENG	JM Gaultney	51971
12 " 25 "										COND	JH Washington	1395

AT 10:00 AM ON DUTY RELEASED FROM TO

STATION NAME OR M.P.	DAYS			PROJECT NUMBER	ACTIVITY CODE	DESCRIPTION OF ACTIVITY OR CAUSE OF DELAY	THIS SPACE FOR TIMEKEEPER
	MO	TU	WED				
Healy	1810	1830	20"	88130	CC	RELIEVED HARRIS CROW -	
Healy	1830	1940	1'10"		EP	WATER ENG 4401 -	
Healy	1940				DF		
Antwell	2145				CD		
BROAD PASS	2210	2245	35"		MT	2801 North - CLEAR MAIN	
HURRICAN	2342				CD		
GOLD CREEK	0025	0200			MT		
GOLD CREEK	0210	0442	2'42"		DR		
IAKEETNA	0610	0610	20"		TD		
IAKEETNA	0610	0740	1'30"		UN	Told to EXCEED hours to dig switch out and get ENG in siding off the main	

EMPLOYEE REMARKS  
 2 MEALS

UA TEST AND  
 99 AT 1215

TOTAL TIME: 18 H. 05 M.

OUT WITH LOADS 41 EMPHES 8 TOTAL 49 TONS 4876  
 IN WITH LOADS \_\_\_\_\_ EMPHES \_\_\_\_\_ TOTAL \_\_\_\_\_ TONS \_\_\_\_\_

EMPLOYEE SIGNATURE  
 [Signature]



