



# National Transportation Safety Board

Washington, D.C. 20594

## Pipeline Accident Brief

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Pipeline Accident Number:	DCA-98-MP-002
Type of System:	Refined products transmission
Accident Type:	Pipe failure and leak
Location:	Morgan Falls Landfill, Sandy Springs, Georgia
Date and Time:	Discovered March 30, 1998; 3:48 p.m.
Owner/Operator:	Colonial Pipeline Company
Fatalities/Injuries:	None
Damage/Clean Up Cost:	\$3.2 million
Material Released:	Gasoline
Pipeline Pressure:	384 psig at site of failure
Component Affected:	40-inch-diameter steel pipe

### The Accident

About 3:48 p.m. eastern standard time on March 30, 1998, a recycling company employee detected the odor of gasoline at the site of the closed Morgan Falls landfill at Sandy Springs, Georgia. He investigated and found gasoline flowing up through the ground in the vicinity of a Colonial Pipeline Company 40-inch-diameter steel pipeline that ran through the landfill. The employee called the 800 number shown on a nearby pipeline marker and reported gasoline on the ground. About 15 to 20 minutes later, a Colonial employee confirmed the leak by on-site inspection and requested that Colonial's pipeline control center shut down the line. The rupture resulted in the release of more than 30,000 gallons of gasoline, about 17,000 gallons of which were eventually recovered. No alarms were detected in the control center to signify that the line had failed. By September 1998, costs of cleanup efforts and repair to the pipeline exceeded \$3.2 million.

### Preaccident Activity at the Accident Site

The 0.344-inch-wall-thickness welded steel pipe<sup>1</sup> was constructed at a depth of 4 feet through the then-active, county-owned Morgan Falls landfill in 1978. The section of the landfill where the pipeline was located remained in use until about 1980, during which time additional debris was placed over the pipeline. The landfill was officially closed in 1987. At the time of the accident, about 8 to 10 feet of debris and earth covered the pipeline at the point of failure.

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<sup>1</sup> According to Colonial, the company's design specifications required that pipe installed within the Atlanta metropolitan area (which included the site of the landfill) have a wall thickness of 0.344-inches. Outside the metropolitan area, the company used pipe with a wall thickness of 0.312 inches.

Colonial construction specifications did not include special requirements for pipeline construction through landfills. The investigation found no evidence that Colonial, before or during construction of the pipeline, took measures different than it would for cross-country construction to ensure the stability or firm compaction of the soil and landfill material that lay underneath the pipeline. Landfill material consisting of trash and other materials was found to extend more than 10 feet deep at places under the pipeline. Colonial ran a pipeline internal inspection tool (referred to as a “smart pig”) through the pipeline in 1993 and found no significant anomalies.

When the accident occurred, a portion of the landfill site was being used by GreenCycle of Georgia as a recycling center for trees, shrubs, and other landscape debris. The debris was collected at a location away from the pipeline where GreenCycle employees ground the debris into mulch and compost and arranged for it to be trucked off site.

In the weeks leading up to the accident, the amount of incoming materials began to build up at the normal staging area (away from the pipeline) because GreenCycle could not process the debris as quickly as it was being received. Because of the backlog at the normal receiving area, GreenCycle began to temporarily accept and process debris at a landfill location that was in the vicinity of the Colonial pipeline. GreenCycle officials stated that they were aware of the pipeline and kept the tub grinder and conveyor away from it. About 2 weeks before the accident, GreenCycle workers began using an area over the pipeline to generate and stockpile mulch. At the time of the accident, the mulch pile had reached a height of 17 feet. The center of the mulch pile was over the pipeline and about 80 feet from the point of failure. A rubber-tired front-end loader occasionally traversed the pipeline right-of-way while moving equipment around the site. Crossing the pipeline right-of-way with heavy equipment and storing materials on or near the right-of-way were inconsistent with the agreement made between Colonial and GreenCycle for activities in the pipeline area.

A Colonial aerial pipeline patrol pilot noted the mulch stockpile on the right-of-way during his patrols, but he said he did not believe this to be of concern, and he further believed that the appropriate Colonial employees were aware of the mulch pile on the right-of-way. After the accident, Colonial expanded its aerial patrol procedures to require reporting of rubbish, sludge, dirt, or unknown substances on the right-of-way and to require written instructions from ground personnel before patrol pilots stop reporting any ongoing activity.

### **Leak Reporting and Response**

On March 30, 1998, an employee of GreenCycle was delivering equipment to the work location near the pipeline when he noted the smell of gasoline. He reported to investigators that he investigated and found a “small stream” of gasoline flowing out of the ground at the pipeline location. Using the 800 emergency response number from a nearby Colonial pipeline marker, he called Colonial to report the leak. The initial call was received

at a Colonial switchboard in Atlanta by a 5-year Colonial employee who was temporarily covering the switchboard for the regular operator. When the covering switchboard operator took the call on the 800 line and the caller identified himself, the operator asked the caller for his location. She did not inquire about the nature of his call. She said later that she assumed that he was requesting a line marking prior to an excavation, so she immediately referred him to the telephone number for a right-of-way inspector at the Atlanta field office. The written procedures to be used by the Colonial switchboard operator provide detailed guidance as to the actions to take once the purpose of a call to the switchboard has been determined, but, in this case, the operator did not accurately determine the nature of the call and therefore improperly referred to caller to the right-of-way inspector.

The GreenCycle employee called the second number and reached the right-of-way inspector, who was preparing to leave the office for the day. According to the GreenCycle employee, he told the inspector about the odor and reported seeing gasoline on the ground. The right-of-way inspector immediately called Colonial's pipeline control center and reported the call. The inspector told the control center he was on his way to the site and would call again after he had assessed the situation. The control center operator who took the call noted in the company's contemporaneous "time log" that the right-of-way inspector stated that "a property owner called in and reported gas on the ground" at the landfill location. After the call, a pipeline controller reduced the amount of gasoline flowing through the affected section of the pipeline. According to Colonial emergency procedures, any positive report of product on the ground should be treated as confirmed evidence of a leak and the pipeline should be shut down.

The right-of-way inspector was on site within 15 to 20 minutes and recognized immediately that a leak had occurred. He called the control center to report the leak and to have the pipeline shutdown. He then called 911 to request assistance. Firefighters and police arrived within about 5 minutes and remained on scene for several days until their assistance was no longer needed. Several State and Federal agencies, including the Office of Pipeline Safety (OPS) and the Environmental Protection Agency, were on site throughout the days following the accident.

After the accident, Colonial changed its telephone reporting system and eliminated the switchboard. Under the new system, all calls to the 800 line are routed to an automated response system. Callers are asked to press 1 if they are calling to report a leak or accident. These calls are directed to the pipeline control center. Callers who call for other, non-emergency, reasons are referred to another number and asked to call during regular business hours. Callers who call from a rotary phone or who hold the line without making a selection are automatically directed to the pipeline control center.

### **Examination of the Failed Pipe**

When the pipeline was excavated, it was found to be buckled and cracked. A 9-foot, 10-inch-long section was cut from the line and brought to the Safety Board for

examination. Visual examination of the pipe segment revealed circumferential buckle deformation on the upper side of the pipe. (See figure 1.) The deformed area contained a through-the-wall crack measuring 6 inches on the exterior surface. (See figure 2.) The outside diameter surface of the pipe also showed several diagonal and circumferential cracks. No damage such as dents, gouges, or corrosion was noted on the outside surface of the pipe in the area of these cracks.

The exposed through-the-wall crack contained a discolored region that measured 1.2 inches circumferentially and extended approximately one half the wall thickness. Crack arrest marks found within this region indicated that the crack had propagated in several phases over time. The remaining through-the-wall crack was more consistent with a rapid failure of the remaining pipe wall. Cracking in the pipe was consistent with stress damage due to soil settlement underneath the pipe.

### **Federal Regulations Regarding Minimizing Stress on Installed Pipe**

Title 49 *Code of Federal Regulations* (CFR) Part 195 pertains to support of pipelines and installation of the pipeline so as to minimize stresses. Section 195.110(b) states, in part, that “the pipe and other components must be supported in such a way that the support does not cause excess localized stresses.” Section 195.246(a) states that “all pipe installed in a ditch must be installed in a manner that minimizes the introduction of secondary stresses and the possibility of damage to the pipe.”

### **Previous Federal Interest and Inspections**

About 6 months prior to the pipeline failure, a concerned citizen living in the community wrote her congressman and expressed concerns about the safety and vulnerability of the pipeline in the landfill. Shortly after being contacted, the congressman wrote to the regional director of the OPS in Atlanta asking that the agency address the concerns raised by his constituent.

The regional director dispatched an engineer, who interviewed Colonial personnel and spent time in the field at the landfill site. No code violations were noted by the engineer. On February 11, 1998, the acting administrator of the U.S. Department of Transportation’s Research and Special Programs Administration (RSPA) wrote the congressman to inform him that no violations of 49 CFR Part 195 were discovered during the investigation.



Figure 1. Buckle (raised area) in 40-inch-diameter steel pipe



Figure 2. Close-up view of buckled area showing through-the-wall crack.

The depth of the pipeline and the unstable fill that the line was resting on could not be seen during the inspector's site visit and were not revealed during the review.

Also, the visit by the engineer was made prior to the activities of GreenCycle in the vicinity of the pipeline and the mulch being placed on the line.

As a result of the accident, the OPS has issued a Proposed Compliance Order to Colonial that requires the company to perform the following actions:

- Remove any biodegradable landfill material under the pipeline crossing at the Morgan Falls landfill access road and support the pipe to ensure that no movement or settlement can occur.
- Utilizing a third-party consultant, perform a review of the pipeline through the Morgan Falls landfill, considering the effect of stresses that may be imposed on the pipeline because of the depth of the pipeline, soil characteristics, supporting materials, etc., and provide a report of the review to the OPS along with an action plan to correct any problems that could affect pipeline integrity.
- Identify other pipeline segments on the company's system that traverse landfills and, by use of a third party acceptable to the OPS, determine the risk of landfill material movement or settlement and provide an action plan to the OPS to address the risk.

### **Probable Cause**

The National Transportation Safety Board determines that the probable cause of the pipeline rupture at the Morgan Falls landfill was settlement of soil and compacted trash underneath the pipeline, which resulted from the failure of Colonial Pipeline Company to take effective steps during construction to adequately support the pipeline. Contributing to the pipeline failure were the activities of the GreenCycle Recycling Center, which subjected the pipeline to additional stresses at and near the site of the rupture, and the failure of the aerial patrols to report to Colonial that recycling activities were ongoing on the pipeline right-of-way.

Adopted: March 22, 1999