

The petroleum pipeline industry has undertaken a voluntary environmental performance tracking initiative, recording detailed information about spills and releases, their causes and consequences.

The pipeline members of the American Petroleum Institute and the Association of Oil Pipe Lines believe that tracking and learning from spills will improve performance, thus demonstrating the industry's firm commitment to safety and environmental protection by its results.

This is one of a series of fact sheets about the Pipeline Performance Tracking System, "PPTS," its evolution and its lessons.

PPTS OPERATOR ADVISORY: Environmental Impacts of Crude and Refined Product Pipeline Releases

Protection of the environment through release prevention is the strategy of choice for the pipeline industry and a key objective of the Office of Pipeline Safety regulation regarding integrity management in high consequence areas, usually called the Integrity Management Program or IMP rule. In addition to prevention, operators also employ strategies to mitigate the environmental impacts when releases do occur. This advisory reviews both the impacts and corrective actions taken based on a review of crude and refined product Long Form¹ releases from 2000-2003.² An environmental impact is defined to have occurred when the release results in an impact to water, soil, vegetation or animals. The following table summarizes the incidents that involved environmental impacts. Note that "Total Barrels Released" includes all the volume involved in the *incident*, even volumes that were not involved in the *impact*. An example would be a 10-barrel gasoline spill, one gallon of which reached water.

Environmental Impacts of Crude Oil and Refined Product Releases from Pipeline Systems, 2000-2003

	Number of Incidents	Percentage of Incidents	Total Barrels Released	Percentage of Total Volume
Ecology Only	4	1%	195	0.1%
Ecology + Soil	56	8%	15,567	7.4%
Ecology + Soil + Water	29	4%	49,657	23.6%
Ecology + Water	12	2%	6,484	3.1%
Soil Only	382	58%	92,369	43.9%
Soil + Water	71	11%	18,906	9.0%
Water Only	13	2%	1,439	1%
Subtotal, Incidents with Impact	567	86%	184,617	88%
No Impact	93	14%	25,658	12.2%
Total Incidents	660	100%	210,275	100%

"Ecology" is an impact to vegetation or animals; table includes only "Long Form" releases.

¹ "Long Form" releases: 5 barrels or more, or involving a death, injury, fire or explosion.

² This advisory excludes 86 highly volatile liquid (HVL) Long Form releases between 2000 and 2003. These releases were excluded because the environmental impacts of HVL's are fundamentally different than the impacts of liquid releases. Of those releases, 75 releases were recorded as having no environmental impacts since the primary potential impacts would be to air and public safety, which are not addressed in this advisory. The remaining releases recorded impacts to soil, ecology, and/or water.

Although 86% of pipeline incidents have some type of effect on the environment initially, operators aggressively manage these impacts with clean-up and other corrective actions, and where necessary, with remediation, thus minimizing the long term impact.

Among releases with an impact, large releases more frequently impact water

Over the 2000-2003 period, 38% of the crude oil and refined product releases reported on the Long Form had a release size of 50 barrels or larger; these spills accounted for 97% of the non-HVL volume spilled. For “large” releases (50 barrels or more) versus “small” releases (less than 50 barrels), the data show a similar share of the spills have no environmental impact: 13% for releases of 50 barrels and more, and 15% for releases of less than 50 barrels. Larger spills, however, have the potential for more significant impacts on the environment based on sheer volume. Among releases with an environmental impact, the results show a different distribution of impacts for the large versus the small spills. For example, 29% of the large releases had some water impact, versus 13% for the small releases. In addition, 8% of the large releases had an impact on all three measures – water, soil and ecology – versus 2% of the smaller releases. The large releases also show a smaller share that impact soil only.

Most pipeline releases affect *only* soil

Soil was impacted in 82% of the Long Form releases from 2000-2003. About two-thirds of all spills with any impacts were soil only, making this the most frequent environmental impact. Of those with soil impacts, 44% were contained on company property. As noted above, the releases of 50 barrels and more listed a soil-only impact less frequently, but even for these larger spills, almost one-half affected only soil.

15% of pipeline system releases impact the ecology, with less than 1% impacting threatened and endangered species

In PPTS, ecological impacts are defined as impacts to plants and animals (fish, birds, mammals, reptiles). Impacts to air, water, or soil are not classified as “ecological” impacts. Of all crude and refined product Long Form releases from 2000-2003, only 15% had ecological impacts and approximately one-third of those were contained on company property. Of those with impacts, the most frequent ecological impact was vegetation/plants (75%), followed by fish, birds, and animals. Less than 1% of the releases occurring over the 2000-2003 period impacted threatened or endangered species.

Less than 1% of pipeline system releases affect drinking water

Only 19% of Long Form crude and refined product pipeline system releases from 2000-2003 (total of 660 releases) had any type of water impact:

- 14% impacted Surface Water
- 5% impacted Ground Water
- less than 1% impacted Drinking Water
- less than 1% impacted Ocean Water.

Corrective actions include excavation and haul off

For Long Form releases, PPTS requests information on all corrective actions taken. A summary of corrective action data for Long Form releases from 2000-2003 is provided below. Corrective

actions can range from excavation and haul off to long-term onsite remediation activities such as pump and treat systems.

Number of Incidents, 2000-03	No Corrective Action	Corrective Action	Total
Any Impact	28	539	567
No Impact	90	3	93
Grand Total	118	542	660

Corrective actions were taken in 95% of the releases with any reported impact. Of the 118 releases where no corrective action or remediation was reported, 90 were also reported as not having any impacts to the designated classifications: water, soil, vegetation or animals. Most of these releases remained on company property. Among the 28 incidents that reported an impact but no corrective action, 18 were reported as contained on company property. A sampling of the operators reporting incidents with impacts but no corrective actions was asked to verify the information submitted. Upon verification, most reported that corrective actions had been taken but not recorded correctly in their PPTS submittals due to a lack of universal understanding of what the term corrective action includes.

Considerations for Operators:

- Operators are encouraged to provide complete data on all releases reported to PPTS. One particular way operators are asked to ensure consistent PPTS data collection is by ensuring that all corrective actions are properly identified and reported.
- A corrective action, as defined for PPTS data collection purposes, should be identified as having been taken anytime an operator recovers contaminated media (soil or water), even when this recovery is of limited duration, or a one-time event. For instance, removal of contaminated soil (no matter what quantity) from a release site for offsite disposal would be considered a corrective action.
- Monitoring industry-wide capability in minimizing total volume released and the ultimate environmental consequences of releases will increase over the years of accumulating good quality data in PPTS.