

NATIONAL TRANSPORTATION SAFETY BOARD

Virtual Meeting of December 5, 2023

(Information subject to editing)

Anchor Strike of Underwater Pipeline and Eventual Crude Oil Release

San Pedro Bay near Huntington Beach, California

October 1, 2021

DCA22FM001

This is a synopsis from the NTSB's report and does not include the Board's rationale for the findings, probable cause, and safety recommendations. NTSB staff is currently making final revisions to the report from which the attached findings and safety recommendations have been extracted. The final report and pertinent safety recommendation letters will be distributed to recommendation recipients as soon as possible. The attached information is subject to further review and editing to reflect changes adopted during the Board meeting.

Executive Summary

What Happened

On October 1, 2021, at 1610 local time, San Pedro Bay Pipeline controllers received the first of a series of leak detection system alarms for their underwater pipeline, which was located in San Pedro Bay, 4.75 nautical miles off the coast of Huntington Beach, California. Over the next 13 hours, the controllers conducted seven pipeline shutdowns and restarts during troubleshooting of the alarms. At 0604 on October 2, controllers shut down the pipeline for the eighth and final time. A pipeline contractor vessel crew visually confirmed a crude oil release at 0809, and Beta Offshore, the pipeline operator, then initiated an oil spill response. An estimated 588 barrels of oil leaked from the pipeline. Damage, including clean-up costs, was estimated at \$160 million. There were no injuries. A postaccident underwater examination of the pipeline found a crack along the top of the pipeline within a section of the pipeline that had been displaced from its originally installed location. Additionally, scarring consistent with anchor dragging was identified on the seafloor near the crack location. Postaccident investigation determined that the containerships *MSC Danit* and *Beijing* had dragged anchor near the pipeline months before the oil release, on January 25, 2021.

What We Found

We found that the release of crude oil occurred as a result of fatigue failure that manifested over a period of time in an area of local deformation to the San Pedro Bay Pipeline caused by an external force that resulted in progressive cracks initiating and growing through the pipe wall until the pipe wall ruptured.

Postaccident examination of vessel traffic in the area determined that on January 25, 2021, vessels anchored nearby were subjected to high winds and seas generated by a strong cold front. As a result, the containerhips *Beijing* and *MSC Danit* dragged anchor, and the anchors struck, displaced, and damaged the San Pedro Bay Pipeline. We determined that the *MSC Danit* anchor's contact with the pipeline was the initiating event that led to the eventual crude oil release.

We also found that, because of the proximity of the anchorage positions that the *Beijing* and *MSC Danit* were assigned to and the pipeline, the crews had insufficient time and space to heave in their dragging anchors in high winds and seas before the anchors contacted the pipeline. The southeast boundary of the anchorage and the location of contingency anchorage positions southwest of the anchorage did not leave a sufficient margin of safety between anchored vessels and the pipeline.

Following the anchor dragging events, the pipeline operator was not notified by either the vessels or the Vessel Traffic Service (VTS) Los Angeles-Long Beach. The VTS watchstanders did not recognize the danger presented to the San Pedro Bay Pipeline by the *Beijing* and *MSC Danit* dragging anchors because they lacked a visual indicator of the location of the pipeline and they were attending to exceptionally high vessel activity due to weather; a visual and audible alarm when an anchored vessel encroaches on a pipeline would increase their awareness. Had the pipeline operator been made aware of the *Beijing* and *MSC Danit* anchor dragging, the company could have conducted an underwater survey of the pipeline, identified the damage, and made repairs, preventing the eventual release of crude oil. Further, defined procedures for informing pipeline and other utility operators when possible pipeline incursions have occurred within the VTS area of responsibility would improve the pipeline or utility operator's ability to identify and respond to any damage.

We also explored the reasons for the pipeline controllers' delay in properly responding to the pipeline leak following the first alarm. We found that abnormal operating conditions contributed to the pipeline controllers' incorrect determination that the leak alarms were false. Had the controllers responded in accordance with company procedure for a leak by shutting down and isolating the pipeline, they would have significantly reduced the volume of crude oil released and the resulting environmental damage. We also concluded that the insufficient training of the pipeline controllers contributed to the 14-hour delay in stopping the pipeline's shipping pumps, which consequently increased the volume of crude oil released, following the first leak alarm.

Finally, as a result of this investigation, we found that Beta Offshore was not in compliance with regulations when the company did not drug-test the pipeline controllers following the accident.

Probable Cause

We determined that the probable cause of the damage to and subsequent crude oil release from the San Pedro Bay Pipeline was the proximity of established anchorage positions to the pipeline, which resulted in two containerhips' anchors striking the pipeline when the ships dragged anchor in high winds and seas. Contributing to the crude oil release was the

undetected damage to the pipeline, which allowed fatigue cracks to initiate and grow to a critical size and the pipeline to leak nearly 9 months later. Contributing to the amount of crude oil released was Beta Offshore's insufficient training of its pipeline controllers, which resulted in the failure of the controllers to appropriately respond to leak alarms by shutting down and isolating the pipeline. Contributing to the pipeline controllers' inappropriate response to the leak alarms was the water buildup in the pipeline, an incorrect leak location indicated by Beta Offshore's leak detection system, and frequent previous communication-loss alarms.

What We Recommended

We recommended that the US Coast Guard implement the proposed VTS Los Angeles-Long Beach restructuring of the San Pedro Bay federal anchorages to increase the margin of safety between anchored vessels and the pipeline. In addition, we recommended that the Marine Exchange of Southern California, which jointly operates VTS Los Angeles-Long Beach with the Coast Guard, work with its vessel monitoring system provider to add audible and visual alarms for the system that alerts the watchstander when an anchored vessel is encroaching on a pipeline. Further, we recommended that the Coast Guard implement this capability on all VTS vessel monitoring systems nationwide. Additionally, we recommended that the Coast Guard develop procedures for all VTSs to notify pipeline and utility operators following potential incursions on submerged pipelines within the VTSs' areas of responsibility.

We also recommended that owners and operators of pipelines regulated by the Pipeline and Hazardous Materials Safety Administration develop and implement pipeline safety management systems.

Finally, to address the lack of drug testing of the pipeline controllers following the crude oil release, we recommended that the Pipeline and Hazardous Materials Safety Administration audit Beta Offshore's drug-testing program to ensure compliance with postaccident drug-testing regulations.

Conclusions

Findings

- None of the following issues contributed to the pipeline leak: (1) pipeline as-manufactured material condition; (2) pipeline overpressurization; (3) experience and qualifications of the vessel crews and VTS personnel; or (4) fatigue of vessel crews and VTS watchstanders.
- Although there were no indications of alcohol or other drug use by the pipeline controllers on duty at the time of the crude oil release or *Beijing* and *MSC Danit* crewmembers on duty at the time of the anchor draggings, evidence was

insufficient to determine whether alcohol or other drug use contributed to the pipeline leak and severity of the accident.

- The release of crude oil occurred as a result of fatigue failure that manifested over a period of time in an area of local deformation to the San Pedro Bay Pipeline caused by an external force applied to the pipeline that resulted in progressive cracks initiating and growing through the pipe wall until the pipe wall ruptured.
- As a result of the winds and seas generated by a strong cold front, the container ships *Beijing* and *MSC Danit* dragged anchor, and the anchors struck, displaced, and damaged the San Pedro Bay Pipeline.
- Although both ships' anchors struck, damaged, and displaced the pipeline, the *MSC Danit* anchor's contact with the San Pedro Bay Pipeline was the initiating event that led to the eventual crude oil release.
- Because of the proximity of anchorage positions to the pipeline, the crews of the *Beijing* and *MSC Danit* had insufficient time and space to heave in their dragging anchors in high winds and seas before the anchors contacted the pipeline.
- The southeast boundary of Anchorage F and the location of contingency anchorage positions southwest of Anchorage F did not leave a sufficient margin of safety between anchored vessels and the San Pedro Bay Pipeline.
- Had the pipeline operator been made aware of the *Beijing* and *MSC Danit* anchor dragging, the company could have conducted an underwater survey of the pipeline, identified the damage, and made repairs, preventing the eventual release of crude oil.
- Due to the absence of a visual indicator of the San Pedro Bay Pipeline on the Vessel Traffic Service (VTS) Los Angeles-Long Beach vessel monitoring system and exceptionally high vessel activity occurring in the anchorage due to the weather, the VTS watchstanders did not recognize the danger presented to the San Pedro Bay Pipeline by the *Beijing* and *MSC Danit* dragging anchors.
- An audible and visual alarm on the Vessel Traffic Service Los Angeles-Long Beach vessel monitoring system that alerts when an anchored vessel is encroaching on a pipeline would improve watchstander awareness of the possibility of an anchor strike in the San Pedro Bay anchorages.
- Defined procedures for informing pipeline and other utility operators when possible incursions have occurred within the Vessel Traffic Service area of responsibility would improve the pipeline or utility operator's ability to identify and respond to any damage.

- Abnormal operating conditions such as water buildup in the pipeline, an incorrect leak location indicated by the leak detection system, and frequent previous communication-loss alarms contributed to the pipeline controllers' incorrect determination that the leak alarms were false.
- Had the San Pedro Bay Pipeline controllers responded in accordance with company procedure for a leak by shutting down and isolating their pipeline, they would have significantly reduced the volume of crude oil released and the resulting environmental damage.
- The insufficient training of the pipeline controllers contributed to the 14-hour delay in stopping the pipeline's shipping pumps and the increased volume of crude oil released following the first leak alarm.
- Although the dayshift pipeline controller was likely affected by the adverse performance effects of acute fatigue, the incorrect response and assessment of the leak alarms was due to insufficient training of the dayshift pipeline controller and nightshift pipeline controller.
- Beta Offshore was not in compliance with regulations when the company did not drug test the pipeline controllers following the accident.

Safety Recommendations

New Recommendations

As a result of this investigation, the National Transportation Safety Board makes the following new safety recommendations.

To the Pipeline and Hazardous Materials Safety Administration:

- Audit Beta Offshore's drug-testing program to ensure compliance with postaccident drug-testing regulations. (P-23-x)

To the US Coast Guard:

- Implement the proposed Vessel Traffic Service Los Angeles-Long Beach restructuring of the San Pedro Bay federal anchorages to increase the margin of safety between anchored vessels and pipelines in San Pedro Bay. (M-23-x)
- Develop and implement the capability on all Vessel Traffic Service (VTS) vessel monitoring systems nationwide to provide audible and visual alarms for VTS watchstanders when an anchored vessel is encroaching on a pipeline. (M-23-x)

- Develop procedures for Vessel Traffic Services (VTS) to notify pipeline and utility operators following potential incursions on submerged pipelines and utilities within the VTSS' areas of responsibility. (M-23-x)

To the Marine Exchange of Southern California:

- Work with your vessel monitoring system provider to add audible and visual alarms to the system that alert the Vessel Traffic Service watchstander when an anchored vessel is encroaching on a pipeline. (M-23-x)

To the Owners and Operators of Pipelines Regulated by the Pipeline and Hazardous Materials Safety Administration:

- Develop and implement a pipeline safety management system based on American Petroleum Institute Recommended Practice 1173. (P-23-x)