

The ALLEGIANCE

This bulletin was prepared to share lessons learned with industry and the interested public, and to make recommendations to prevent similar occurrences. The company operating the M/V THE ALLEGIANCE has provided comment.

OVERVIEW

On Wednesday, November 16, 2005, at about 1040 (local time), two engineering crew aboard the ALLEGIANCE began pumping slops (accumulated water and oil) from the ship's engine room bilge to a slop tank adjacent to the ship's cargo tanks forward of the engine room. The ALLEGIANCE was moored with its starboard side facing a grain terminal at Vancouver, Washington (see Figure 1). At about 1053 a high level alarm for the ship's engine room bilge slop tank sounded, and minutes later the ship's gangway watch reported an oil sheen on the ship's starboard side. About 50 gallons of waste oil was spilled to waters of Washington State.

VESSEL INFORMATION

General

The ALLEGIANCE was a 25-year-old tank ship that was approximately 187 meters in length. The vessel's gross tonnage was 20,139. Though a tank ship, the ALLEGIANCE was loading grain destined for Asia.



Figure 1. ALLEGIANCE alongside a grain terminal at Vancouver, Washington on November 16, 2005.

Bilge Slops Arrangement

The ALLEGIANCE had two slop tanks in the cargo area of the ship arranged as port and starboard wing tanks just forward of the deck house and designated as No. 7 port and No. 7 starboard. These slop tanks were typically used for holding tank-washing slops from the ship's cargo tanks (when the ship was carrying oil as cargo). The piping could be cross-connected with the engine room piping so engine room slops, including bilge slops, could also be pumped into the tanks. These cargo slop tanks aboard the ALLEGIANCE had a capacity of 3,807 barrels each.

The engine room was equipped with its own slop tank. The engine room slop tank was located on the lower starboard side in the engine space. This cylindrical tank's dimensions were approximately 6.75 feet in diameter by 11 feet in length, and arranged with the cylinder's axis oriented fore and aft. The capacity of the tank was 3,000 gallons. The tank was fitted with a 3-inch vent line that vented to the main deck on the ship's starboard side. The engine room slop tank was fitted with high and low level alarms. The tank vent had permanently installed containment around it on the main deck with a capacity of 52 gallons.

The intent of the transfer that resulted in the spill was to pump the contents of the engine room bilge, directly to the No. 7 port cargo slop tank. Because a valve was left open, bilge slops intended for the large capacity No. 7 port cargo slop tank, were partially diverted to the much smaller 3,000-gallon engine room slop tank, which overflowed from its original level of 1,800 gallons.

Slop System Transfer Procedure

Information submitted by the vessel operating company regarding the spill provided details of the engine room slops transfer process aboard the ALLEGIANCE.

- The pumping of engine room slops was normally carried out by a Qualified Member of the Engine Department (QMED). A QMED is an unlicensed member of the ship's engineering department.
- The engine room slop tank was transferred to No. 7 port cargo slop tank using either the main bilge pumps or an air-powered pump.
- The sludge and drain tanks were transferred to the engine room slop tank with the ship's sludge pumps.
- The engine room bilges could be transferred to the engine room slop tank by using the main bilge pumps, an air-powered pump, or the auxiliary bilge pump.
- The engine room bilges were transferred to No. 7 port cargo slop tank using the main bilge pumps or the air-powered pump.

The ship's oil transfer procedures indicated their purpose was, "To provide procedures for transferring oil or hazardous materials to or from the Allegiance or from tank to tank within the Allegiance. (33 CFR 155.720 and 155.750)." Although the procedures specifically addressed cargo and bunkering operations, they did not address slops transfers.

ENVIRONMENT

The ship was moored with its starboard side facing a grain terminal at Vancouver, Washington. The terminal is on the North (Washington) side of the Columbia River (the right hand bank facing downstream), upstream of the confluence of the Columbia and Willamette rivers near river mile 105. The terminal is in a largely industrial district, although there is public access to the Columbia River in the vicinity and downstream.

The weather at the time of the spill was clear with East winds at 12 knots. The visibility was good.

The river current was estimated as 3 knots, setting to the northwest.

CHRONOLOGY

Monday, November 7, 2005

The Cargo Oil Record Book of the ALLEGIANCE indicated that 117 barrels of slops (92 barrels of “oil water” and 25 barrels of sludge) were transferred to the No. 7 port cargo slop tank from the engine room slop tank, leaving the engine room slop tank empty and the No. 7 port cargo slop tank with a volume of 1,139 barrels.

Wednesday, November 9, 2005

The Third Engineer joined the ship.

Monday, November 14, 2005

The Third Engineer completed his vessel orientation checklist.

Tuesday, November 15, 2005

The Chief Engineer met with the Master and notified him of the planned transfer of bilge slops to the cargo slop tanks. They met in the evening and discussed the effects of the prolonged port stay in Portland on the ship’s engine room bilge water holding capacity.

Wednesday, November 16, 2005

0600 A 10-minute engine room maintenance meeting was held.

0800 An engine room log entry recorded an engine room slop tank innage (liquid depth) of 3 feet 11 inches. This entry corresponded to an innage of 1,800 gallons (60 percent) of the 3,000-gallon slop tank capacity.

1040 The engine room began transferring slops to the No. 7 port (cargo) slop tank, but the QMEDs conducting the operation failed to notice that the discharge valve to the engine room slop tank was also open, simultaneously filling both the engine room and No. 7 port slop tanks.

1053 The engine room slop tank high level alarm sounded when it reached 2,875 gallons (96 percent of capacity). The Third Assistant Engineer was in the engine control room when the alarm sounded. He acknowledged the alarm and immediately made his way to the lower engine room, where the pumps were located, and directed the QMEDs to stop the transfer operation. Before the operation could be stopped the engine room slop tank filled and overflowed through the slop tank’s vent line located on the starboard side of the ship’s main deck.

1055 The gangway watch noticed an oil sheen on the water on the starboard quarter of the ship. The engine room and ship’s Master were notified.

1100 The ship notified their contingency plan providers of the spill.

1105 The ship’s crew deployed absorbent boom.

ANALYSIS

Misaligned Piping System

Information gathered indicated that a valve to the engine room slop tank was left open during an internal transfer. The intent of the transfer was to pump the contents of the engine room bilge, directly to the No. 7 port cargo slop tank. Because the valve was left open, bilge slops intended for the large capacity No. 7 port cargo slop tank, were partially diverted to the much smaller 3,000-gallon engine room slop tank, which overflowed from its starting level of 1,800 gallons.

Transfer Procedures

The company had written oil transfer procedures (OTPs) that covered transfers of cargo oil and chemicals to, from, and within, the vessel. The OTPs also covered bunkering and transfers of fuel within the ship. These OTPs are required by 33 CFR 155.720, which specifies that internal oil transfer procedures are to be described in the OTPs. Internal transfers of engine room slops, within the engine space or to the cargo slop tanks from the engine space, were not addressed within the OTPs.

COMPLIANCE WITH PROCEDURES

The company cited the following failures in their analysis:

- Failure to obey #11 Engine Room Standing Orders which states “Extra care shall be taken when pumping bilges to the Deck Slop Tank...”.
- Failure to follow the posted Slop Pumping Procedure, step #4 which states “Pump out completely the Engine Room Slop Tank.”.
- Failure to follow the posted Safety message on Daily Work List for November 16, 2005 (“...Be sure to check, and double check valve alignment and tank levels to ensure not one drop is spilled.”)
- Failure to follow the oral instructions of the First Assistant Engineer as stated during the morning Maintenance Meeting concerning the Safety message on the Daily Work List for November 16, 2005. (“...Be sure to check and double check valve alignment and tank levels to ensure not one drop spilled.”)

In addition, the Third Engineer, new to the vessel, was on watch at the time of the bilge slops transfer, and was to observe the QMEDs conducting the operation. However, the Third Engineer’s location in the Engine Control Room when the engine room bilge slop tank high level alarm sounded, suggests an absence of oversight in the transfer process in which the QMEDs were engaged.

Timeliness of Transfer Shutdown

Based on tank capacities, the volume of oil retained on the ship, and the timing of events, the rate of filling of the engine room slop tank was about 83 gallons per minute. The time between the engine room slop tank high level alarm activation and the shutdown of the transfer was about two and one-half to three minutes.

This two and one-half to three minute interval is reasonably consistent with the gangway watch aboard the ALLEGIANCE noting the spill at about 1055.

Watchstander Experience

The Third Engineer on watch at the time of the spill “...was new to the vessel...” and was therefore to “...shadow the QMEDs...” Though he did react to the high level alarm on the engine room slop tank, the estimated two and one-half to three minute interval between the high level alarm and the pump shutdown suggests he did not have the knowledge and familiarity with the ALLEGIANCE’s slops systems to grasp the immediacy of the situation and so did not rapidly shutdown the transfer of slops.

CAUSAL INFORMATION

Based on the information gathered, the immediate cause of the spill was inadequate monitoring of the liquid level in the engine room slop tank, that allowed the filling of what should have been a static tank to progress to the point of overflow, despite an operating audible overfill alarm. Factors contributing to the spill included:

- Inadequate implementation of the written company procedures and directives for transferring bilge slops to the cargo slop tank, which resulted in a valve being open that should have been closed.
- Oil transfer procedures incorporated into the ship's Vessel Specific Manual (part of the Company's Safety Management System), that do not address the transfers of engine room slops or wastes.
- Inadequate oversight by the Third Engineer of the bilge slops transfer process that allowed the improperly open valve to go uncorrected.
- The Third Engineer's inadequate familiarity with the bilge slop transfer system and procedures that left him ill-equipped to supervise the oil transfer operation. His lack of familiarity also left him ill-equipped to understand the need to rapidly begin a shutdown once the high level alarm sounded.
- A Safety Management System that allowed a watch engineer new to the vessel to be placed in the situation of supervising a transfer of engine room slop oil wastes without sufficient vessel-specific experience.

LESSONS LEARNED

- Checklists can be an important aid in safely completing (internal and external) oil transfers, but they must be understood and used consistently to be effective.
- Procedures and checklists addressing oil transfers should be incorporated into the ship's Safety Management Manual so they receive adequate review, and so crew members fully appreciate their importance.
- All oil transfers should receive adequate supervision.
- Crew members supervising oil transfers should have sufficient experience to catch and correct missteps in the process.
- New crew members should receive adequate ship-specific familiarization training.

PREVENTION RECOMMENDATIONS

To ship owners and operators:

- Ensure that a procedural checklist is completed, signed, and logged prior to the start of an engine room slops transfer. Ensure that compliance with the requirement is included in Safety Management System audits.
- Ensure that all procedures that have a significant chance to impact safety or the environment are identified and incorporated into the familiarization process for new crew members. Until crew members receiving familiarization training have performed such procedures under the supervision of an experienced crewmember, their familiarization checklist should not be deemed complete.
- Ensure that there is adequate overlap between departing crew members and arriving crew members during crew rotations. Special attention should be given to arriving crew members who have not previously sailed on the vessel.

As a result of the oil spill, the company operating the ALLEGIANCE at the time implemented a number of changes to prevent recurrence. They:

- Incorporated recommendations from Ecology's publication, "Internal Oil Transfers" into their company procedures.
- Implemented a slop transfer procedure checklist on board the ship and verified compliance with it during Safety Management System audits.
- Revised the procedure for transferring engine room bilge slops to include a requirement that the engineer of the watch check the valve alignment before an engine room slops transfer starts.
- Lowered the engine room slop tank high level alarm set point to 79 percent of capacity.
- Revised the company's Vessel Orientation Checklist to include familiarization with the Oil Transfer Procedures as well as participation in a supervised transfer operation.

More Prevention Bulletins

- PB 07-01: The SEA SYNERGY (WDOE #07-08-009)
- PB 06-01: The PACIFIC EXPLORER (WDOE #06-08-018)
- PB 06-02: The NOHO HELE (WDOE #06-08-037)
- PB 05-01: The TAI SHAN HAI (WDOE #05-08-004)
- PB 03-01: The OVERSEAS WASHINGTON (WDOE#03-08-001)
- PB 01-02: The ARCO TEXAS (WDOE#01-08-006)
- PB 01-01: The SUPER RUBIN (WDOE#01-08-002)
- PB 99-02: The MONCHEGORSK (WDOE#99-261)
- PB 99-01: The ANADYR (WDOE#99-250)
- PB 98-01: The ARCADIA (WDOE#98-253)
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- PB 96-01: The KEYSTONE CANYON
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