# Product Evaluation Report

**Tech. Communicator:** ***Joe Bruni III***

**Customer Name:** ***Florida Marine***

**Engine Model:** ***3512***

**Engine Hours:** ***7701***

***Engine Delivery Date: Feb. 16, 2011***

**Application:** ***Tug/Push Boat***

**Date:** ***12-01-21***

**Vessel Name:** ***Capt. Kirby Dupuis***

**Serial #:** ***TTF00289***

***Engine Build Date: Aug. 18, 2008***

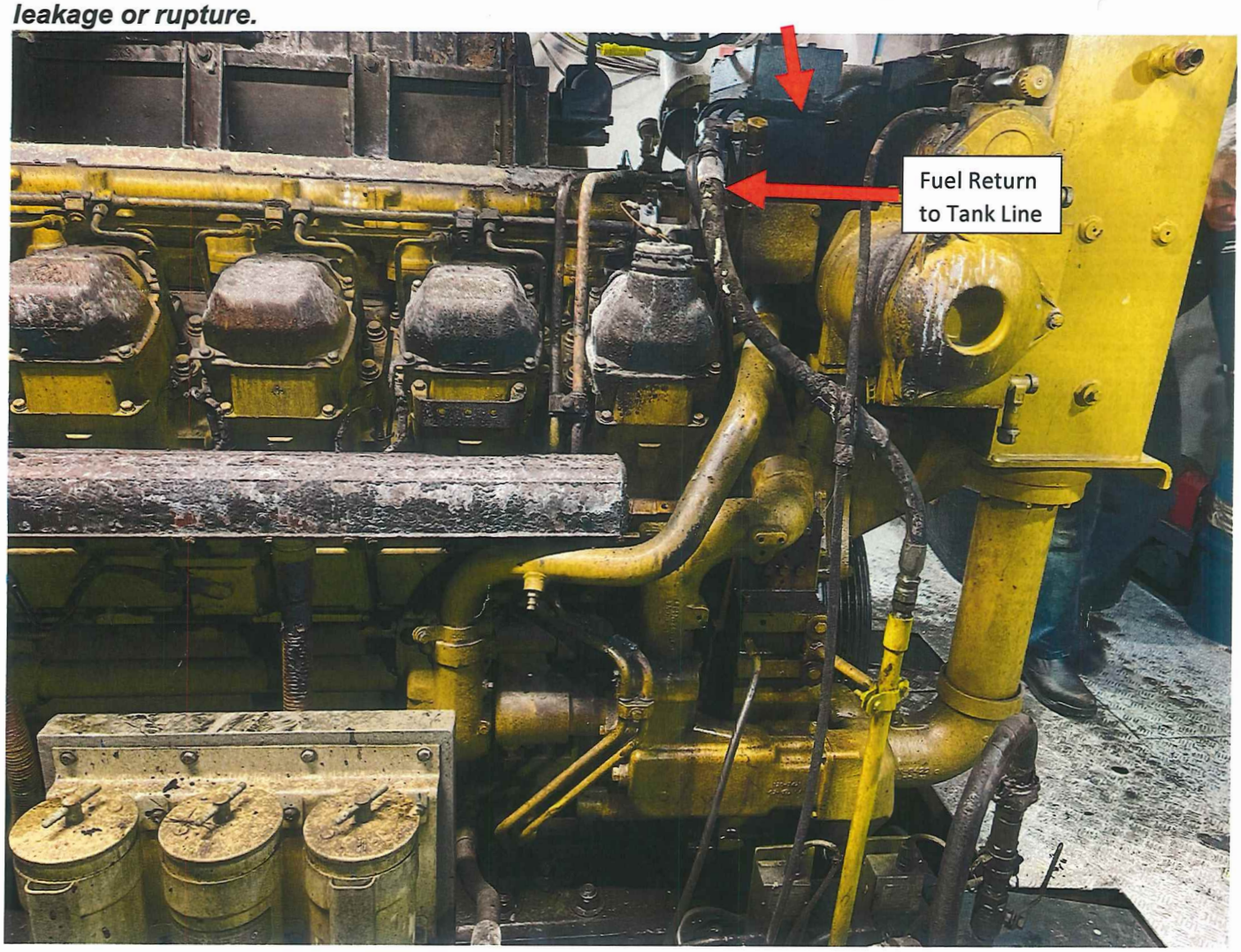
**Engine Location:** ***Port Engine***

**Facts Observed:**

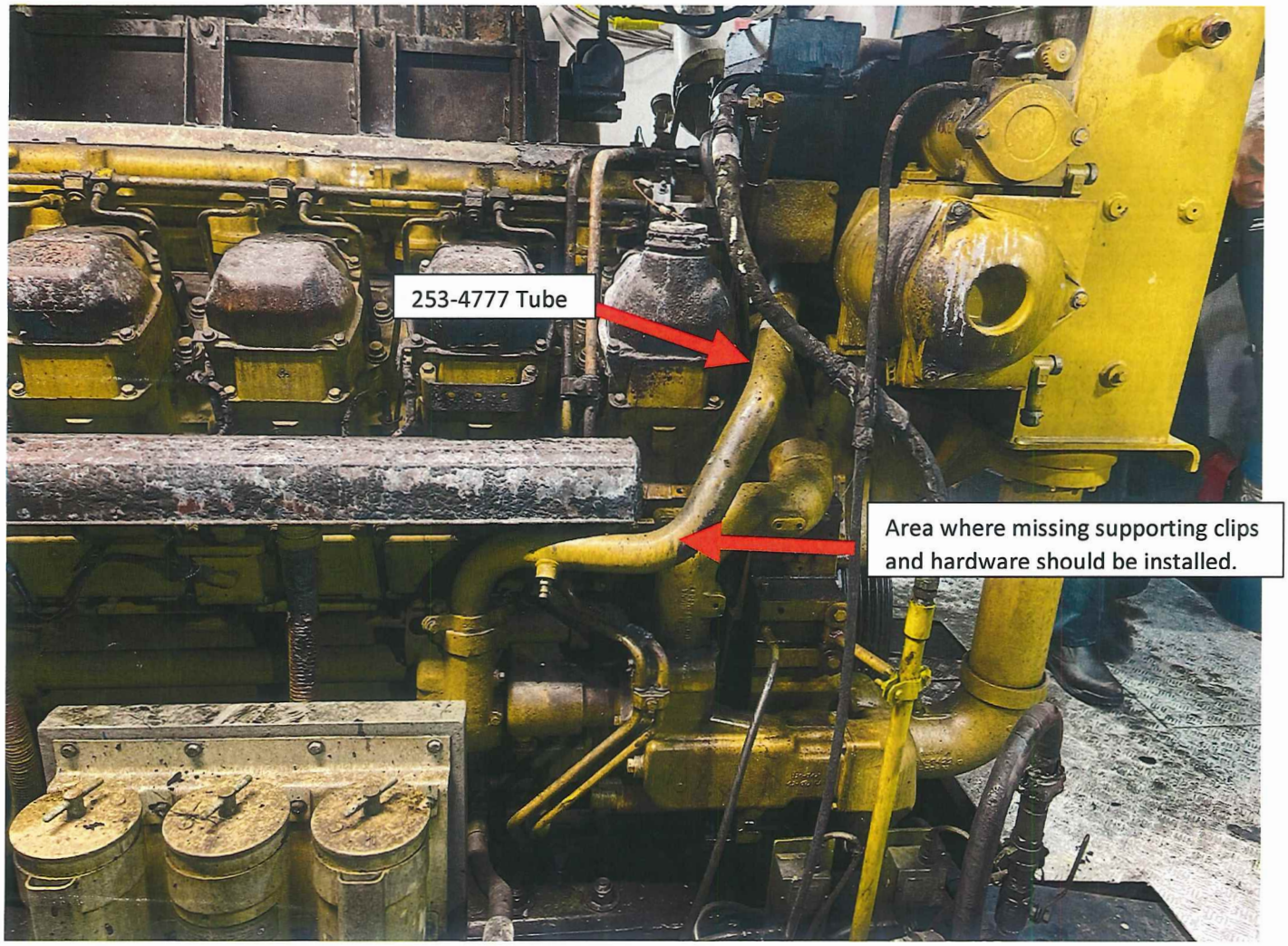
**This vessel experienced an engine room fire on 11-09-2021. The fire caused extensive damage to both main engines and the vessels upper and lower levels of the engine room. The fire seems to have started near the front of the port main engine. A video from the vessels camera system shows oil spraying on the floor in the center of the engine room moments before fire erupts on the top, front inboard area of the port main engine.**

***Summary of Analysis:***

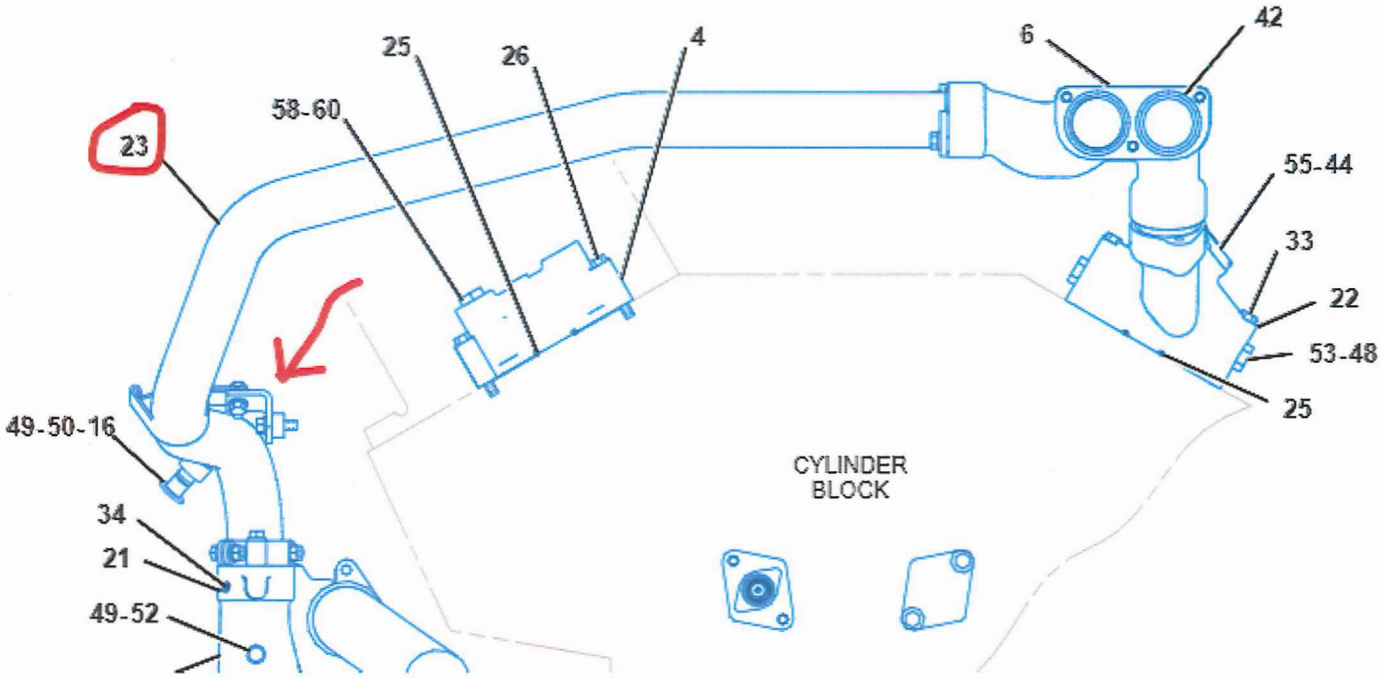
***Picture below is the port main engine (TTF00289). Notice ( top, red arrow ) black and dark coloration of engine parts at the rear, center of the oil filter housing and water temperature regulator housing area. The valve covers and aftercooler also have evidence that the paint has been discolored or burned. The fuel return hose is still intact and tight with no evidence of leakage or rupture.***



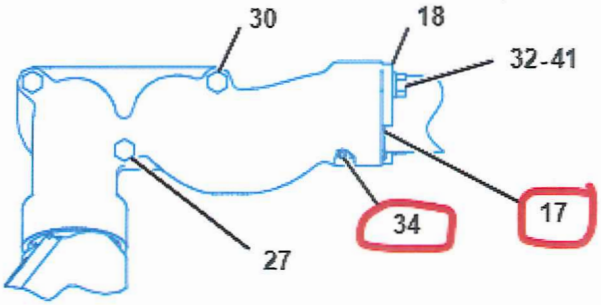
***During visual inspection of the engine, it was noticed that there was a piece of a seal-o-ring on top of the front cover. We determined that we should remove the 253-4777 Tube. The lower section of this tube is connected to the oil cooler and the upper part of the tube connects to the rear of the oil filter housing. It was noticed that some of the supporting clips and mounting hardware for the 253-4777 tube was missing from the engine. We also discovered that the 8N1991 retaining ring that should be installed in the upper joint area where this tube connects to the oil filter housing was missing from the joint.***



***Below is a diagram of the parts breakdown of the 242-6277 oil lines group. #23 is the 253-4777 Tube. The red arrow points to the supporting clips and hardware that were not on the tube when we inspected the engine.***



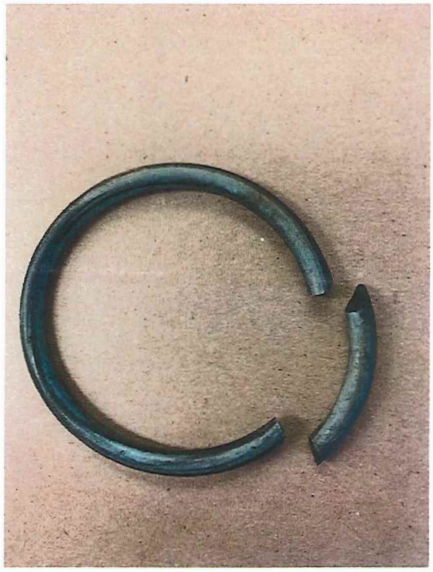

***Below is a view of the upper joint area where the 253-4777 tube attaches to the rear of the oil filter housing. During removal of the tube, it was discovered that the #17-8N1991 retaining ring was not present in the joint. #34 is the 109-3232 seal-o-ring in it's proper location when the tube is installed into the 4W4313 adapter.***



***Below, left. Once the tube was removed, it was discovered that the 109-2332 seal-o-ring was cut. Center picture is the 4W4313 adapter. The adapter is bolted to the rear of the oil filter housing. When properly assembled, the 253-4777 tube with the 109-2332 seal-o-ring is installed into the adapter. Once the tube and seal are properly installed in the adapter, a 8N1991 retaining ring plus clips and hardware are needed to properly seat the pipe all the way into the adapter. Before disassembly, we could see that the 8N1991 retaining ring was not present. Center picture shows wear on the interior of the adapter. Right, shows wear to the seal-o-ring groove lip of the 253-4777 pipe.***



***Below are both pieces of the 109-2332 seal-o-ring. The smaller piece was found on top of the front cover. The front cover is directly below the upper joint area where the tube is attached to the oil filter housing. The seal-o-ring doesn't show any flat area's that would indicate that this seal has a high amount of running hours on it.***



***There is a large ventilation duct just above the area of the fire. The ventilation air duct, directs the incoming ventilation air onto the port engine and also across the engine room (Right to left in picture) from the port to the stbd. engine.***

*Conclusion:*

*The cause of the engine room fire on the Capt. Kirby Dupuis was a severe oil leak. As the oil began to leak, oil sprayed or dripped onto the exhaust manifold near the #1 cylinder. Once the oil got on the exhaust manifold, the oil ignited, causing the fire. Ventilating air from the air duct above the engine supplied the fire with oxygen and blew the fire across the engine room damaging the stbd. main engine.*

*Road signs leads us to believe that the oil leak seems to have been coming from the seal joint area where the 253-4777 pipe-4W4313 adapter joint is located at the rear of the oil filter housing. Once we removed the tube, we discovered the 109-2332 seal-o-ring was found to be in 2 pieces. The damaged 109-2332 seal-o-ring is the cause of the oil leak and subsequent fire. The damaged seal-o-ring allowed oil to leak from the joint.*

*The 253-2477 tube was not properly secured to the engine because of the missing 8N1991 retaining ring at the upper joint along with some supporting clips and hardware which should have been installed around the midsection of the pipe. The bolt hole that is used to hold the pipe supporting clips on the side of the engine, has a broken bolt in it.*

*It is undetermined as to how the seal was cut into 2 pieces. Normally, when we see a seal cut in this manner, it is cut during installation of the pipe. If cut during installation, a major oil leak would appear shortly after any repair. The wear seen on the pipe and the adapter along with the missing retainer ring and supporting clips and hardware, could all have been contributing factors to the failure of the seal-o-ring.*

*Best Regards:*

*Joe Bruni III*

*La. Cat*

*Technical Services*