

# ORION ENVIRO MARINE SERVICE PROVIDES HAZARDOUS MATERIAL SERVICES USING COMPUTED RADIOGRAPHY

*Orion Enviro Marine Services (OEMS) in Freeport, Bahamas was founded in 2014 and they are a leading provider of hazardous material services for marine insurers, shipping lines, pharmaceutical manufacturers, industrial contractors, and ship repairs.*



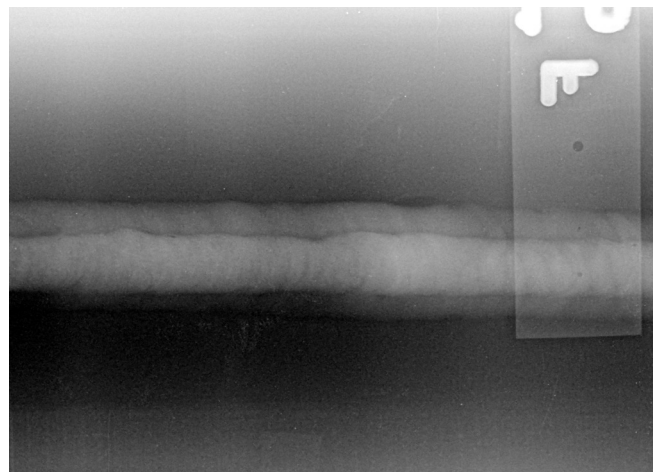
Orion Enviro Marine Services specializes in many different services from hazardous materials spill cleanup to health and safety training to shoreline demolition and recovery. Perhaps the most critical service they provide is non-destructive testing. They specialize in industrial radiography, ultrasonic testing, penetrant testing, and magnetic particle testing to evaluate materials, components, and assemblies without affecting their serviceability.

In the past Orion Enviro Marine Services performed radiographic inspection using conventional films. Due to rising cost of the film, the challenges, and the costs associated with disposing of chemicals and recovering the silver produced during film processing, Orion Enviro Marine Services decided to look into Computed Radiography (CR). After looking at several CR systems they acquired a Dürr NDT HD-CR 35 Computed Radiography system and D-Text X software to completely replace using film and their film processor.

The HD-CR 35 is the most flexible and advanced CR scanner on the market today, with the ability to provide the highest resolution images in the industry. In addition, because of its unique TreFoc technology which offers an adjustable laser spot size, it can also provide high-contrast images when necessary.

As an example of how CR has helped Orion Enviro Marine Services to provide hazardous material services was on a

project where they were asked to perform radiographic inspection on the primary containment welds on pressure vessels. The buildings at the factory where the pressure vessels reside took a direct hit when category 5 hurricane Dorian struck on August 24th, 2019. Wind speeds reached a maximum of 296 km/h and caused heavy damage to the buildings and some of the equipment inside. Before these pressure vessels could be used again 100% of the circumferential and attachment welds had to be visually and radiographically inspected to ensure their integrity.



The wall thickness of the tanks and attachments varied quite a bit creating differences in densities within the radiograph. The first image on the left was made on one of the tanks near a nozzle using an 80 Ci Ir-192 source. There were two separate regions of interest in this image. One was of the seam weld on the tank and the other was of the nozzle weld. Using the powerful image adjustment tools built into the software, it was possible to focus on the different density areas of the tank without using multiple exposures, as would typically be necessary with film radiography. There was also an area where some linear indications were present. Using the magnification tool it was possible to magnify the area to better evaluate the discontinuity which would not have been possible with film radiography.

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On a separate project the customer required that the radiographic images and test reports were reviewed and signed by an RT Level III. Using the D-Tect X software Orion Enviro Marine Services was easily able to generate customized test reports and share each image via email with an RT Level III technician. This would not have been they would have possible if they were still using film radiography. They would have been required to either bring in the Level III onsite to review the radiographs or they would have had to mail them to that person which would have caused the project to be delayed by days or even weeks.

**T3 6913F V1 96 inches to 102 inches H1 15 inches to 24 inches**

**DÜRR NDT**

Image		Device	
Dimensions	7058 x 8563 px	Name	HD-CR 35 NDT Plus
Bit Depth	16	Serial Number	1443889002
MPs		Firmware Version	1.6.0.2622 from 1.6
Pixel Spacing	50.51 x 50.47 µm/px	Driver Name	cr35plus
Attenuation Coefficient			
Exposure		Acquisition	
Isotope Type	Ir-192	Timestamp	17/10/2023 15:30:57
Isotope Activity	35,800 Ci	Scan Mode	50µm White IP
X-ray Tube Voltage		Binning Mode	None
X-ray Tube Current		Scan Resolution	50.00 µm
Source-to-Detector Distance	18.25 in	Penetration Speed	4000 rpm
Source-to-Object Distance	17.00 in	Laser Focus Size	50.0 µm
Source Focus Spot Size	2.900 mm	Laser Power	6
		PMT Gain	670 V

Software	D-Tect X v1.0.0.2923
Report Name	CR Image Report
Report Date	2023-10-18
Radiographer	Darren Rollins
Comments	Pass

Orion Enviro Marine Bahamas		Report No:	Radiographic Inspection Report Sheet
		6913F/009	
Project Information			
Client:	Bhacam Tampa Tank	OEM Job No.:	J00196
Project:	Uowhson SRP 6913F	Location:	Tank3
General Information			
Drawing No:	DS-5	WCSS:	ITP:
Spool No:	V1 96"-102", H1 15"-24"	Class:	
Specification:	Butt Weld	IQI Type:	Wire
Procedure:	SMAW	IQI Placement:	Parent Metal ROI
Material:	Carbon Steel	IQI:	ASTM 1B-11
General Radiography Details			
Radiation Source:	Ir-192	Source Size:	2mm
X-Ray Equipment:	N/A	Tube Voltage:	N/A
Film Type:	CR Durr Brand HR Imaging plate	Exposure:	mA mins
Intensifying Screens:	0.01	Thickness:	mm
		Density Required:	

Image report generated with D-Tect X

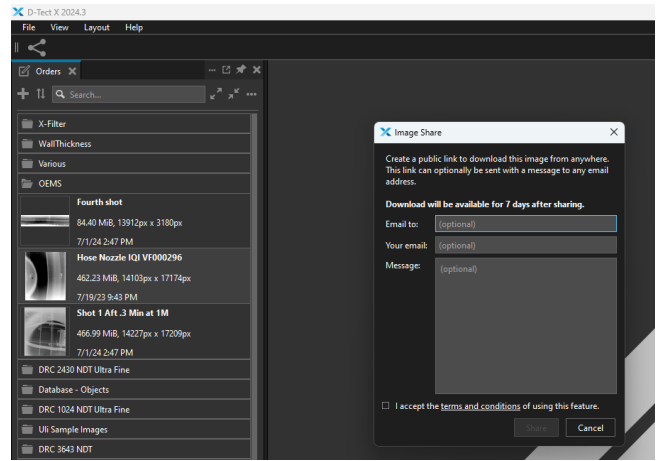


Image sharing function in D-Tect X

Future projects where Orion Enviro Marine Services plan to use the Dürr HD-CR 35 Scanner and the D-Tect X software is in the Aerospace MRO (maintenance, repair and overhaul) industry. MRO service providers in the Bahamas and throughout the Caribbean have reached out to Orion Enviro Marine Services to perform X-ray inspection of aging aircraft to inspect airframe structures and power plants for discontinuities and defects like cracks, corrosion, assess internal damage, and to detect foreign material in components.

Orion Enviro Marine Services managing partner and director Darren Rollins commented that he is extremely happy with the image quality and produced by the HD-CR 35 scanner and D-Tect X software. He added that he is also happy with the ease of creating image test reports and that sharing digital images has increased efficiency.

