



## VESSEL SHEAR WAVE REPORT

<b>CLIENT</b>	CNRL	<b>Equip Ident:</b>	A0191662
<b>CLIENT REP</b>	Carson Petersen Ralston 5-14	<b>Inspec Date m/d/y</b>	09/16/2015
		<b>Facility</b>	Ralston 5-14 Battery
		<b>LSD</b>	05-14-018-10W4MW4M

NDE Examiner: <u>Dale Toews</u>	Helper: _____
Equip Ident: <u>A0191662</u>	Equip Descrip: <u>Treater Firetube</u>
UT Equipment: <u>USMGO SN: 12105417</u>	Cal Due: <u>June 26, 2016</u>
Work: Complete shear wave UT on steel blisters on firetube. Determine if blister has caused cracks within the metal.	

### General Comments

60 degree scan from the tubesheet was limited because of the bolt holes in the tubesheet. Scanning was mostly done from between the bolt holes.

70 degree scan from the tubesheet was impossible, because horizontal distance to the firetube was too short.

Scanning of the small blister was limited:

1. The surface of the metal (inside firetube) was too rough (general corrosion) to get a consistent signal.
2. Scanning from outside the tube, there was not enough space between the tubes.
3. Firetube gusset between tubes. Tubes not flipped to scan other side.



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### 45 Degree Scan

#### Scan from position A and B, large and small blister, small blister scan area limited

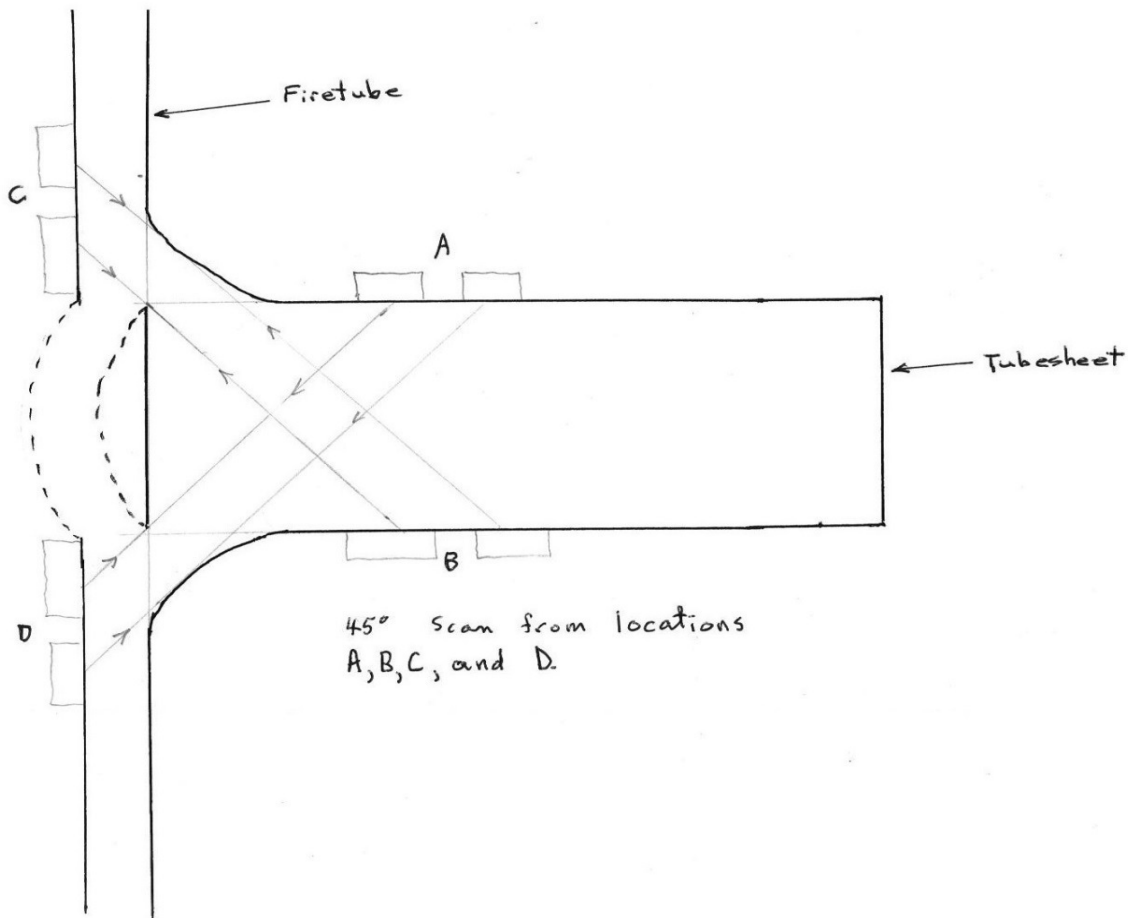
Ref Level: 47.2 dB Probe: Krautkramer, 45 degree, 3.5 MHz, 0.5 inch Scan Sens: 47.2 dB + 12 dB  
Calibration: IW metric, 1 inch carbon steel plate, 6 mm side drilled hole, ASME 5 Article 5 (UT)  
Sound path to hole: 80 mm Screen Height: 80% FSH  
Acceptance Standard: Indications greater than 20% examined to determine if they are cracks.

Results: No cracks discovered.

#### Scan from position C and D, large blister only, surface too rough for small blister

Ref Level: 37.6 db Probe: Krautkramer, 45 degree, 5 MHz, 0.25 inch Scan Sens: 37.6 db + 12 dB  
Calibration: IW metric, 1 inch carbon steel plate, 6 mm side drilled hole, ASME 5 Article 5 (UT)  
Sound path to hole: 19 mm Screen Height: 80% FSH  
Acceptance Standard: Indications greater than 20% examined to determine if they are cracks.

Results: No cracks discovered.





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## 60 Degree Scan

### Scan from position A and B, large blister complete, small blister scan area limited

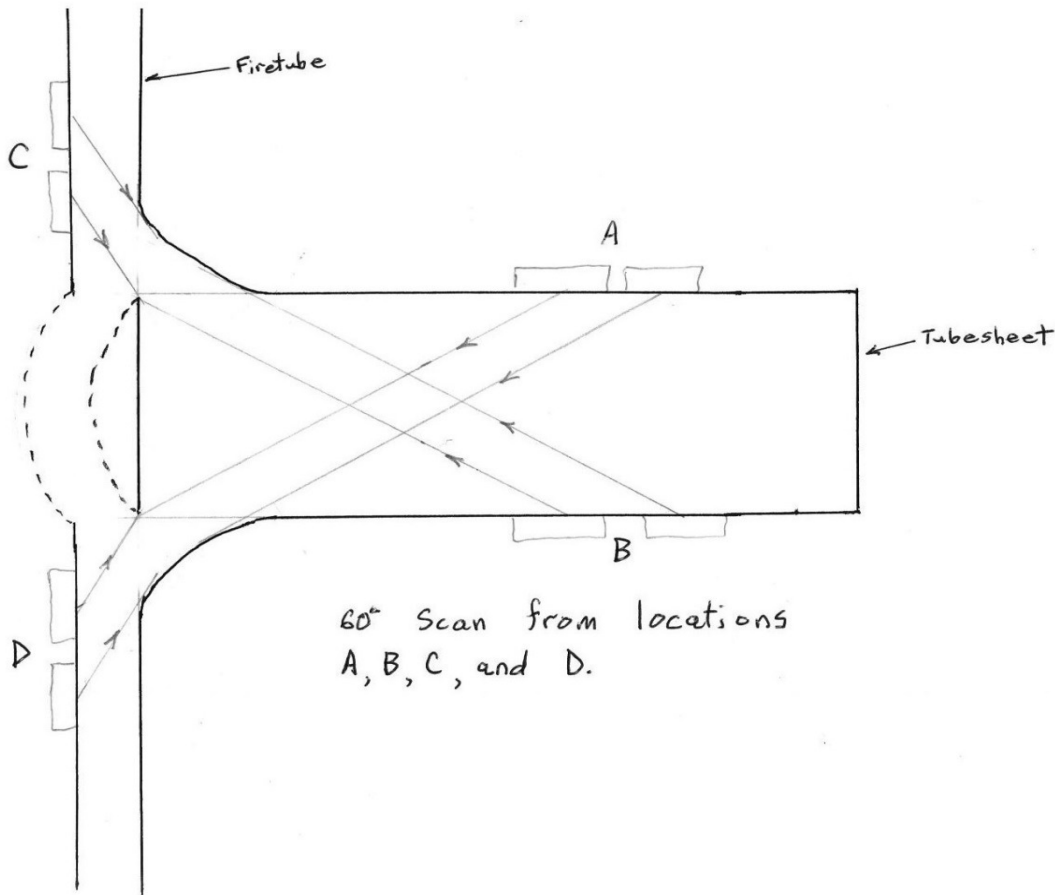
Ref Level: 54.6 dB Probe: Krautkramer, 60 degree, 3.5 MHz, 0.5 inch Scan Sens: 54.6 dB + 12 dB  
Calibration: IW metric, 1 inch carbon steel plate, 6 mm side drilled hole, ASME 5 Article 5 (UT)  
Sound path to hole: 85 mm Screen Height: 80% FSH  
Acceptance Standard: Indications greater than 20% examined to determine if they are cracks.

Results: No cracks discovered.

### Scan from position C and D, large blister only, surface too rough for small blister

Ref Level: 55 dB Probe: Krautkramer, 60 degree, 5 MHz, 0.25 inch Scan Sens: 55 dB + 12 dB  
Calibration: IW metric, 1 inch carbon steel plate, 6 mm side drilled hole, ASME 5 Article 5 (UT)  
Sound path to hole: 35 mm Screen Height: 80% FSH  
Acceptance Standard: Indications greater than 20% examined to determine if they are cracks.

Results: No cracks discovered.





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### 70 Degree Scan

Scan from position A and B Not possible.

Scan from position C and D, large blister only, surface too rough for small blister

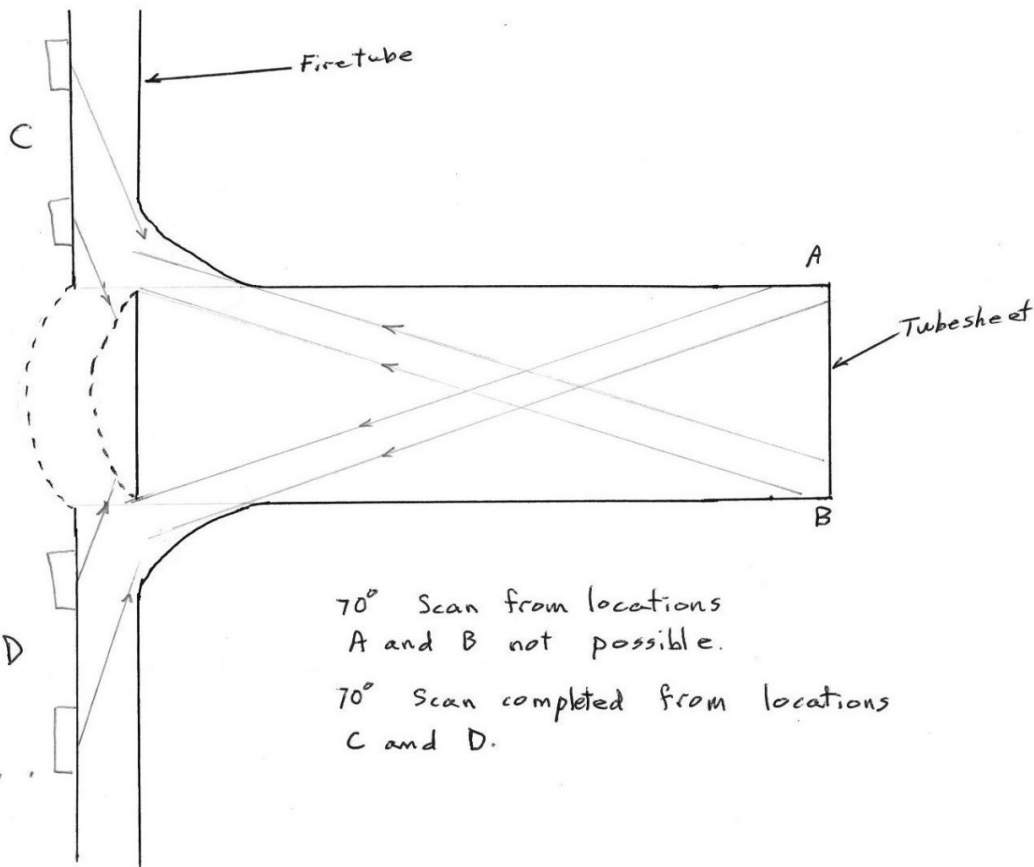
Ref Level: 59.4 dB Probe: Krautkramer, 70 degree, 5 MHz, 0.25 inch Scan Sens: 59.4 dB + 12 dB

Calibration: IIW metric, 1 inch carbon steel plate, 6 mm side drilled hole, ASME 5 Article 5 (UT)

Sound path to hole: 48 mm Screen Height: 80% FSH

Acceptance Standard: Indications greater than 20% examined to determine if they are cracks.

Results: No cracks discovered.

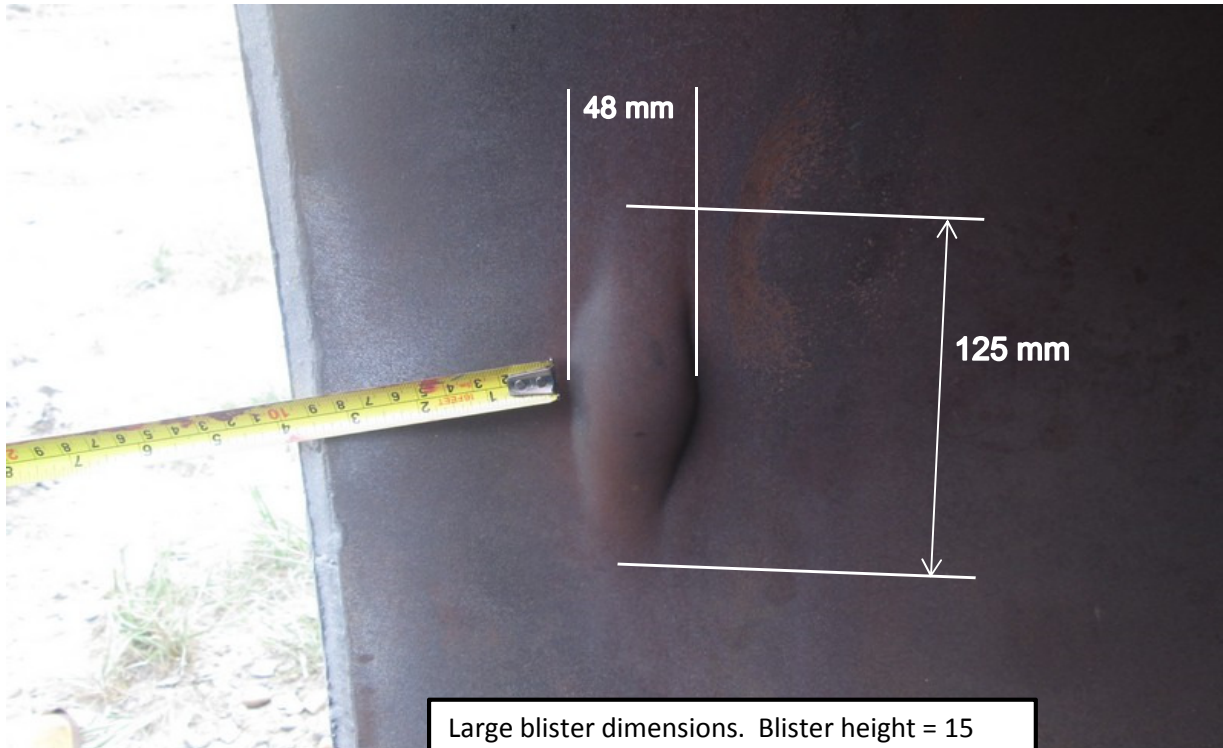


### Inspector Information

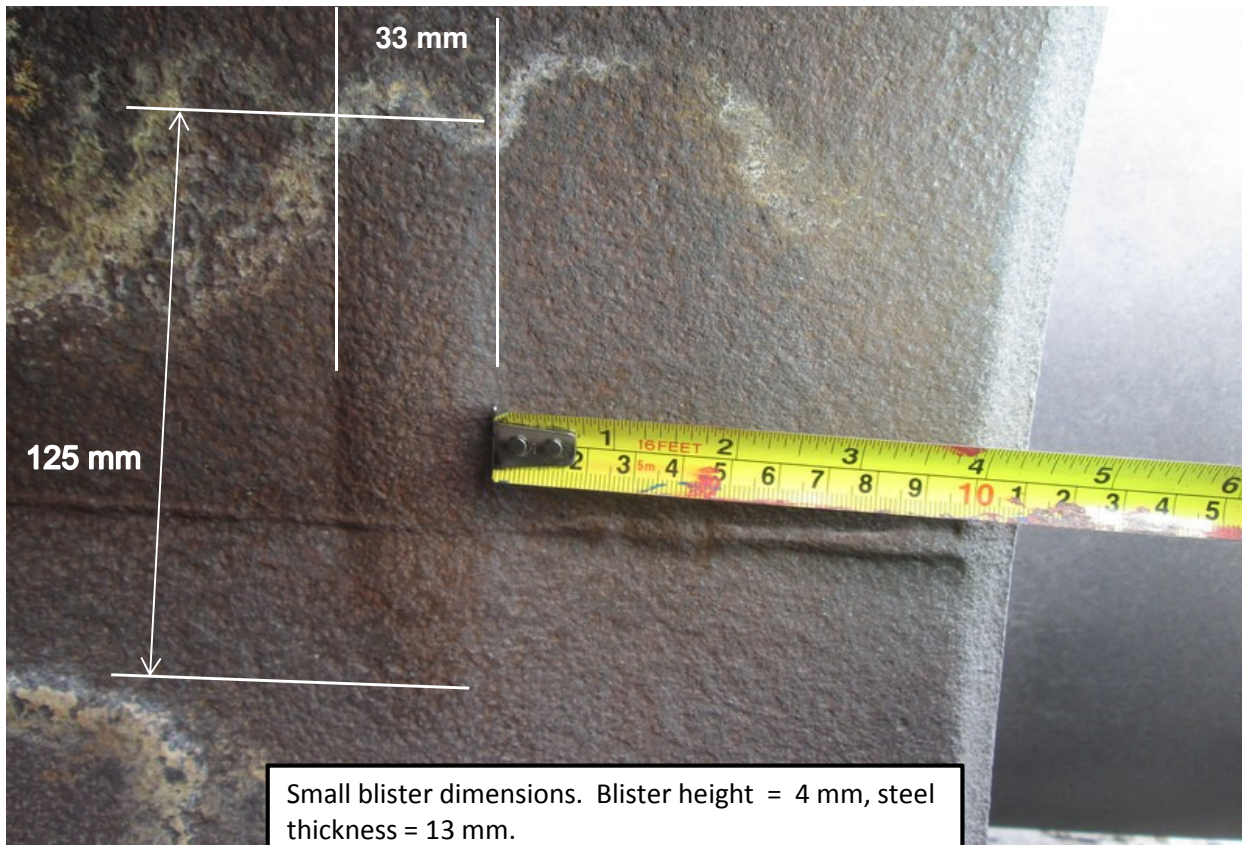
<b>Inspector</b>	Dale Toews	<b>PESL Reg Number</b>	000036
<b>Signature</b>		<b>API 510 Number</b>	23064
		<b>CGSB Lev 2 UT, MT Reg Number</b>	10498



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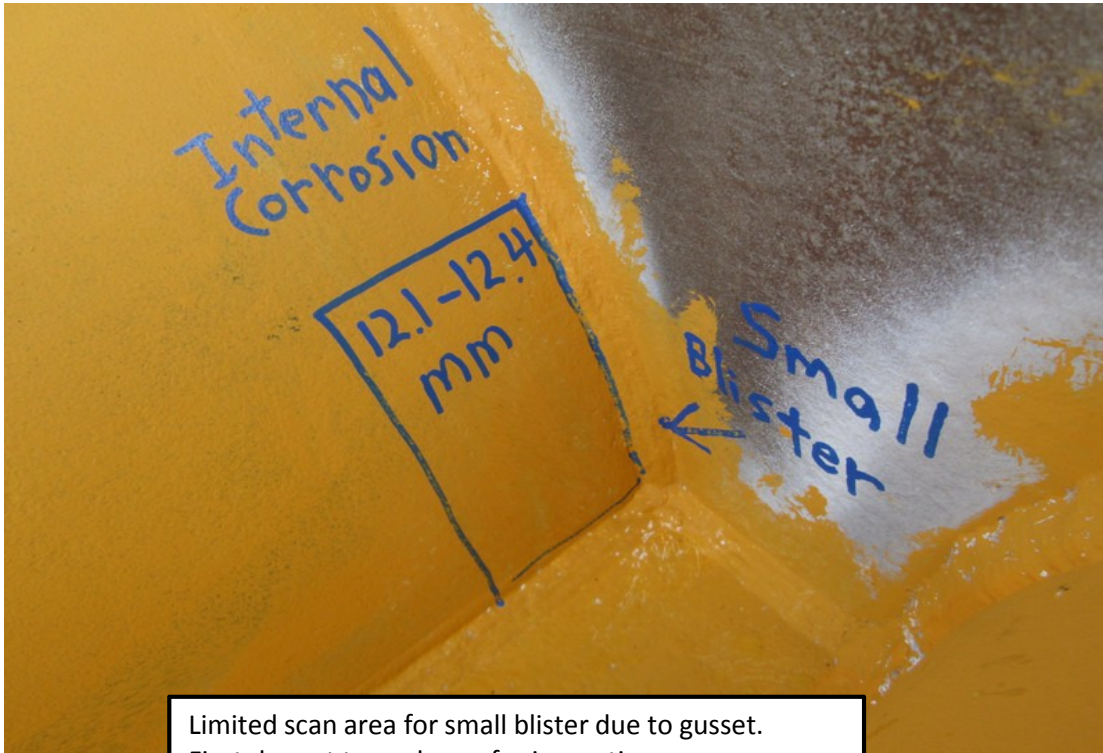
Large blister dimensions. Blister height = 15 mm, steel thickness = 13 mm.



Small blister dimensions. Blister height = 4 mm, steel thickness = 13 mm.



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Limited scan area for small blister due to gusset. Firetube not turned over for inspection.



Limited scan area for small blister between tubes.