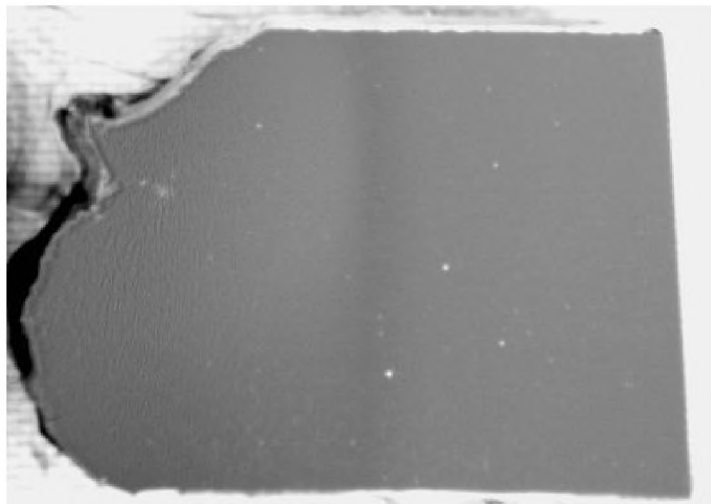
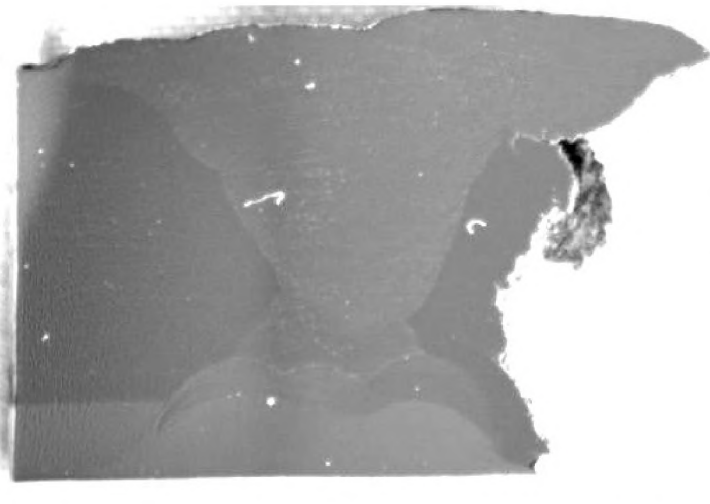
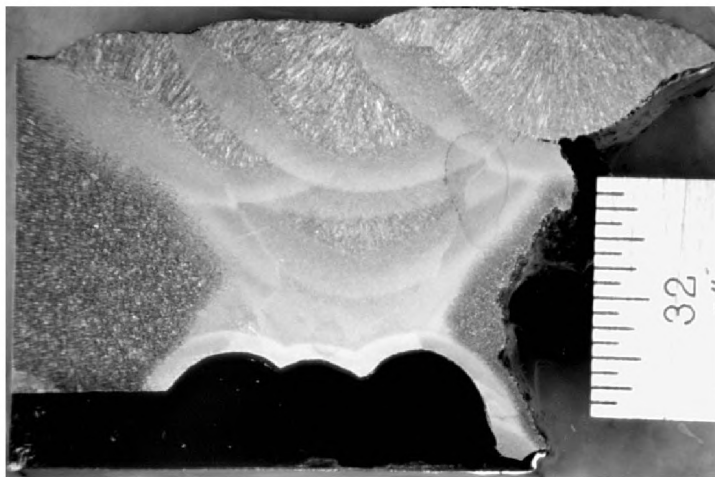


BETA LAB NO.M10198- CS4-01/ LS3 BOTTOM, REV. 1	TESORO REFINING AND MARKETING COMPANY ANACORTES REFINERY 10200 W. MARCH POINT ROAD T91WA4428 ANACORTES, WA 98221	CUSTOMER P.O. NO.: 4501667904
PART: 6600-E HEAT EXCHANGER CS4 01/BOTTOM PART 18/14		DATE: SEPTEMBER 20, 2010
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LABORATORY REPORT-CS4-01/ LS3 Bottom



Mounts of matching samples 19E-18-M3 (Can 4, left), and 18-M3 (Can 3, right), un-etched



Mounts of matching samples 19E-18-M3 (Can 4, left), and 18-M3 (Can 3, right), etched

Figure 6- OD on top

BETA LAB NO.M10198- CS4-01/ LS3 BOTTOM, REV. 1	TESORO REFINING AND MARKETING COMPANY ANACORTES REFINERY 10200 W. MARCH POINT ROAD T91WA4428 ANACORTES, WA 98221	CUSTOMER P.O. NO.: 4501667904
PART: 6600-E HEAT EXCHANGER CS4 01/BOTTOM PART 18/14		DATE: SEPTEMBER 20, 2010
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LABORATORY REPORT-CS4-01/ LS3 Bottom

SAMPLE 18-M1

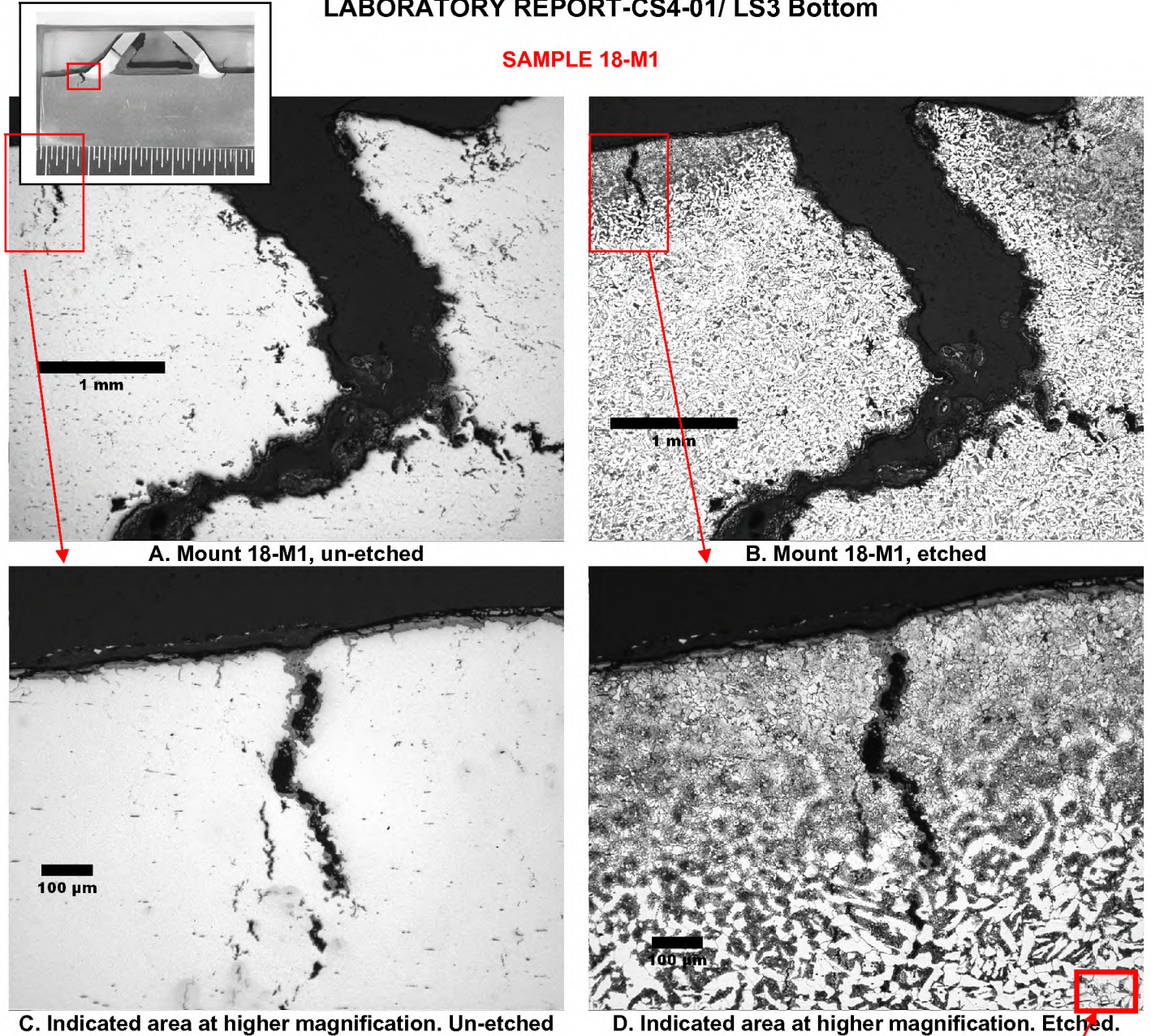


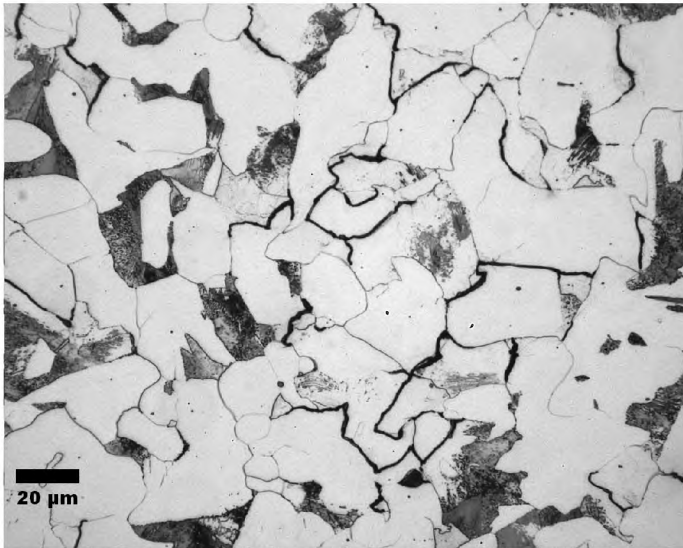
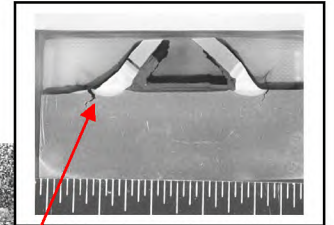
Figure 7- ID on top

See Fig. 8 next page

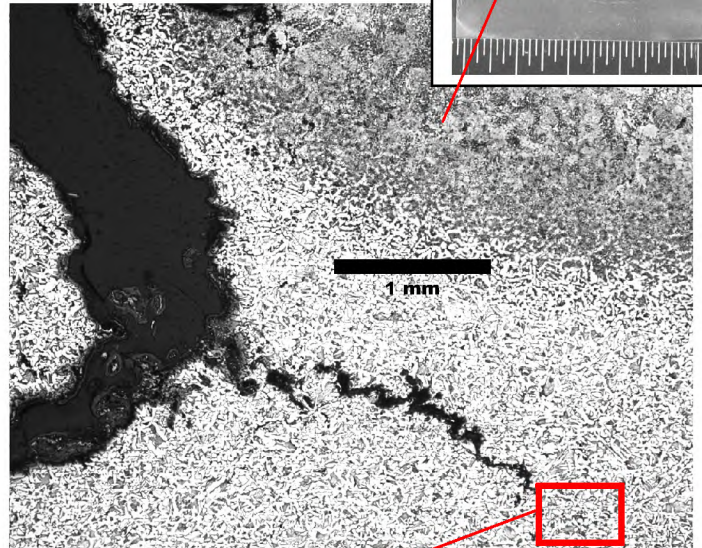
BETA LAB NO.M10198- CS4-01/ LS3 BOTTOM, REV. 1	TESORO REFINING AND MARKETING COMPANY ANACORTES REFINERY 10200 W. MARCH POINT ROAD T91WA4428 ANACORTES, WA 98221	CUSTOMER P.O. NO.: 4501667904
PART: 6600-E HEAT EXCHANGER CS4 01/BOTTOM PART 18/14		DATE: SEPTEMBER 20, 2010
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LABORATORY REPORT-CS4-01/ LS3 Bottom

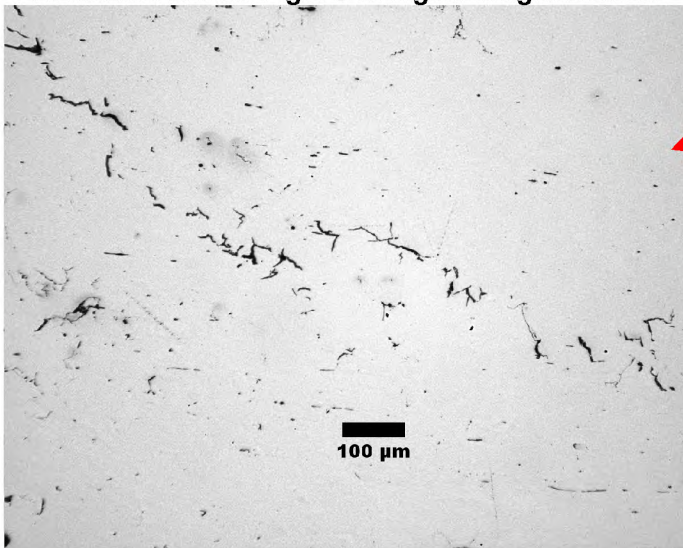
SAMPLE 18-M1



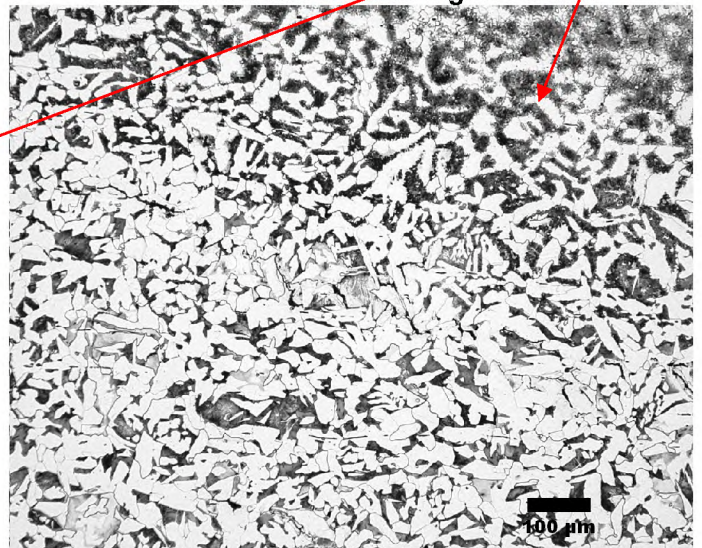
A. Marked area in Fig. 7C at higher magnification.



B. Area near the crack in Fig. 7B above



C. Enlarged area in the box. Un-etched



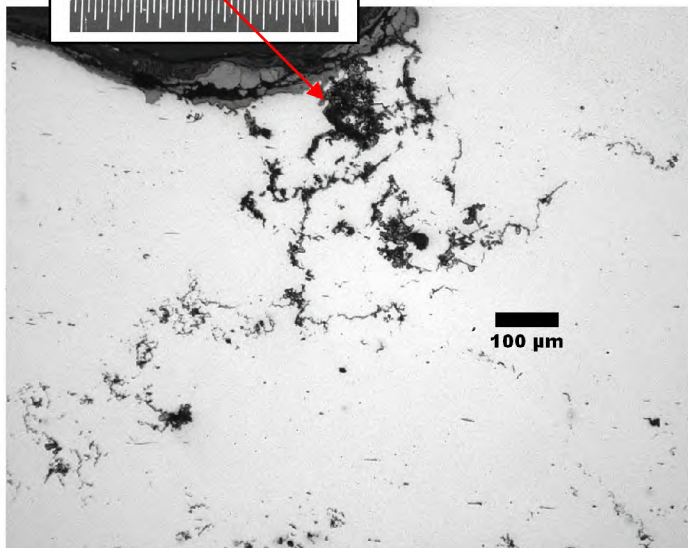
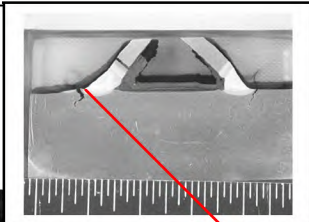
D. Enlarged area in the box. Etched

Figure 8 ID on top

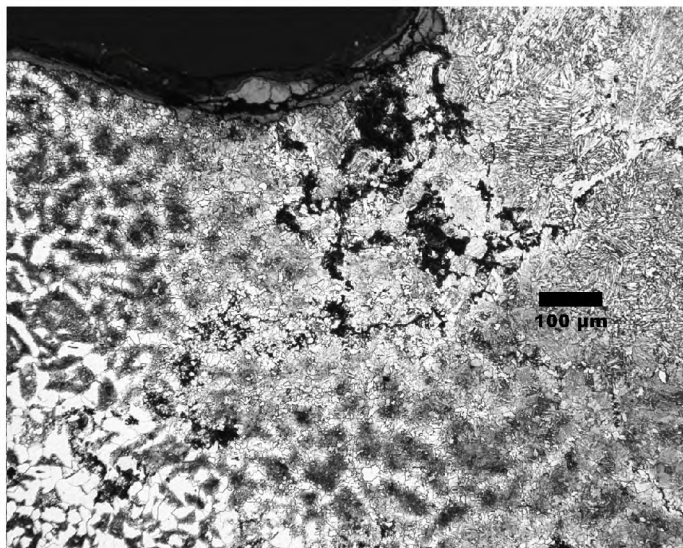
BETA LAB NO. M10198- CS4-01/ LS3 BOTTOM, REV. 1	TESORO REFINING AND MARKETING COMPANY ANACORTES REFINERY 10200 W. MARCH POINT ROAD T91WA4428 ANACORTES, WA 98221	CUSTOMER P.O. NO.: 4501667904
PART: 6600-E HEAT EXCHANGER CS4 01/BOTTOM PART 18/14		DATE: SEPTEMBER 20, 2010
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LABORATORY REPORT-CS4-01/ LS3 Bottom

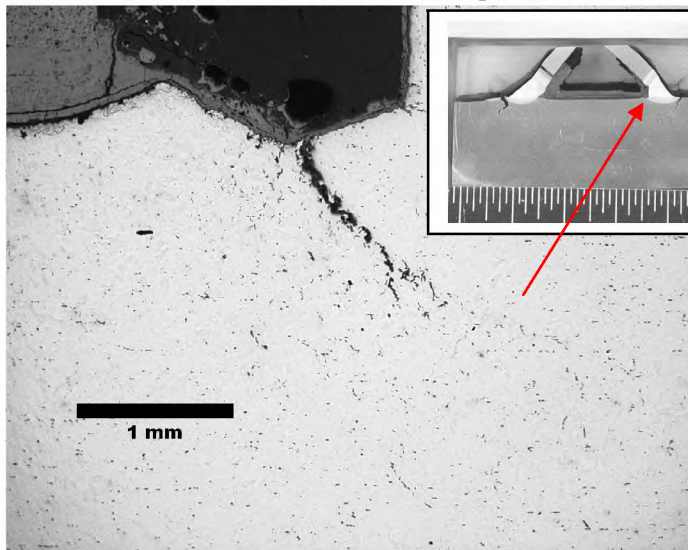
SAMPLE 18-M1



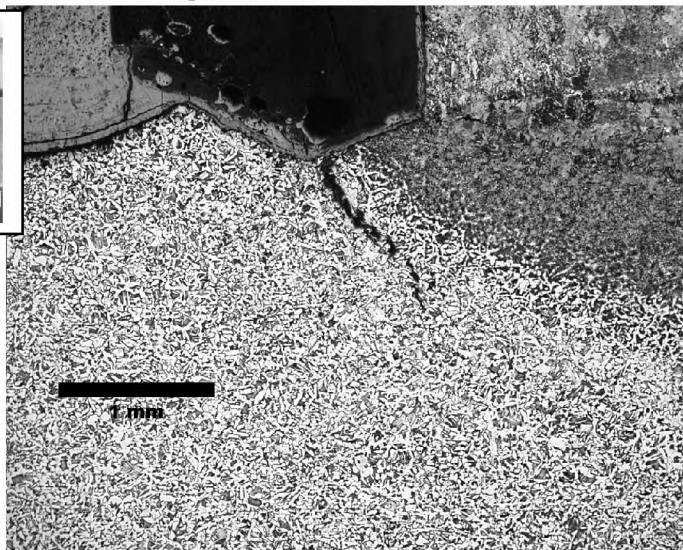
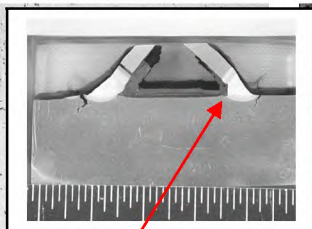
A. Area at the toe of the weld. Un-etched



B. Same as A at the left. Etched



C. Weld root inside the angle. Un-etched



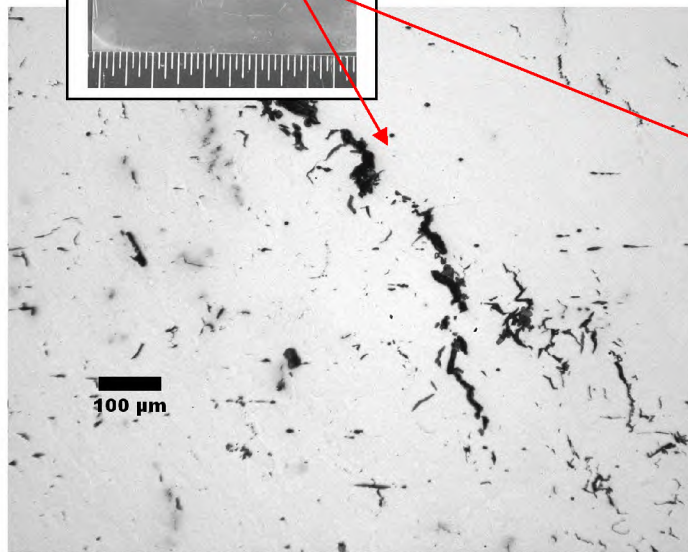
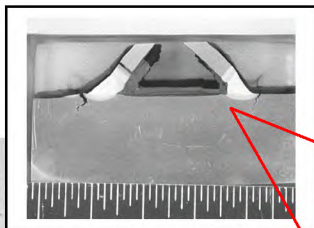
D. Same as C at left. Etched

Figure 9- ID on top

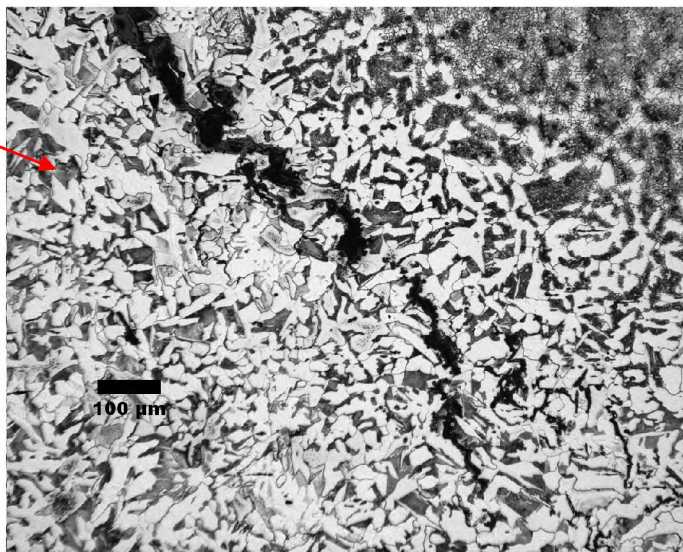
BETA LAB NO.M10198- CS4-01/ LS3 BOTTOM, REV. 1	TESORO REFINING AND MARKETING COMPANY ANACORTES REFINERY 10200 W. MARCH POINT ROAD T91WA4428 ANACORTES, WA 98221	CUSTOMER P.O. NO.: 4501667904
PART: 6600-E HEAT EXCHANGER CS4 01/BOTTOM PART 18/14		DATE: SEPTEMBER 20, 2010
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LABORATORY REPORT-CS4-01/ LS3 Bottom

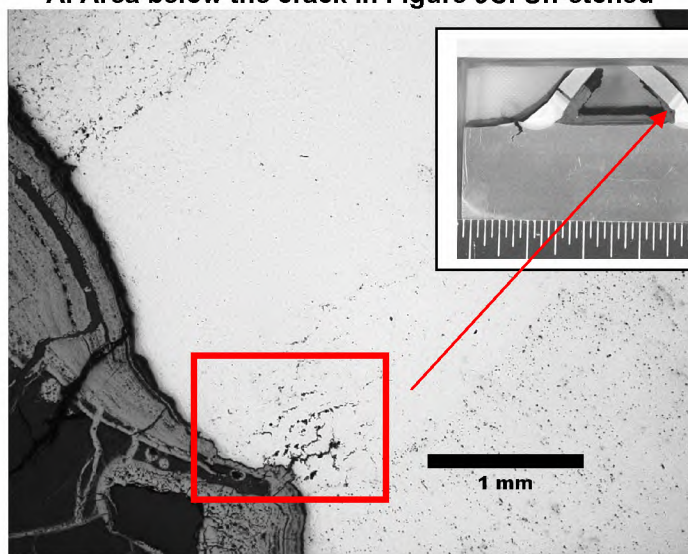
SAMPLE 18-M1



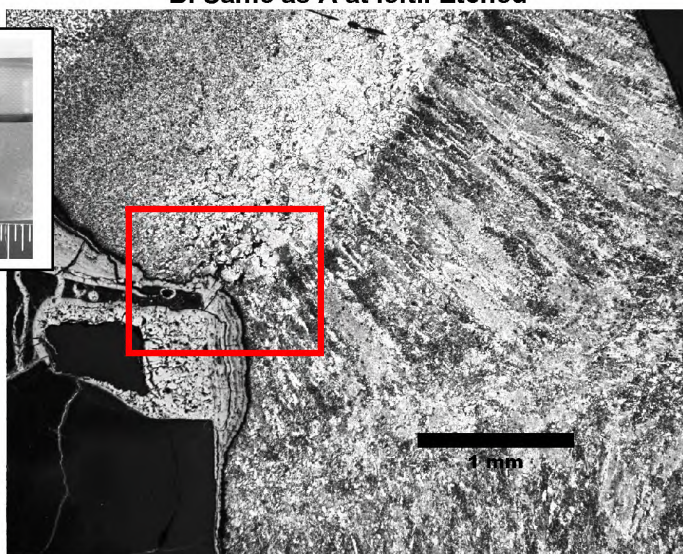
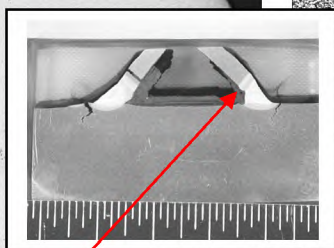
A. Area below the crack in Figure 9C. Un-etched



B. Same as A at left.. Etched



C. Root of the weld, angle side. Un-etched.

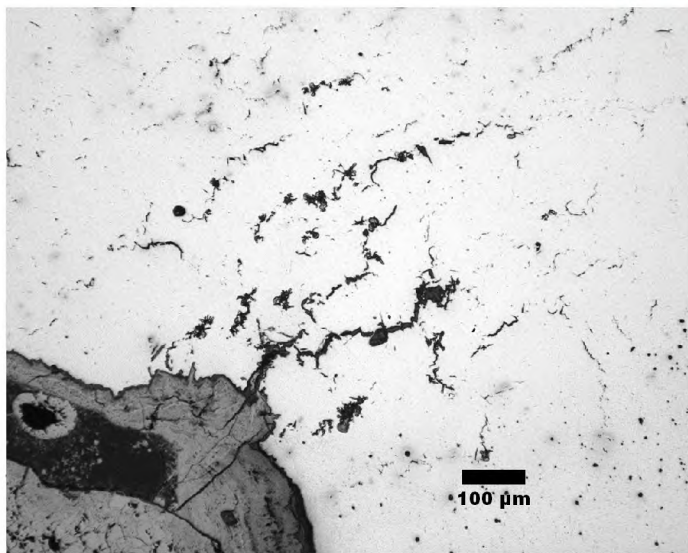


D. Same as C at left. See Fig. 11A for the details of marked area Etched.

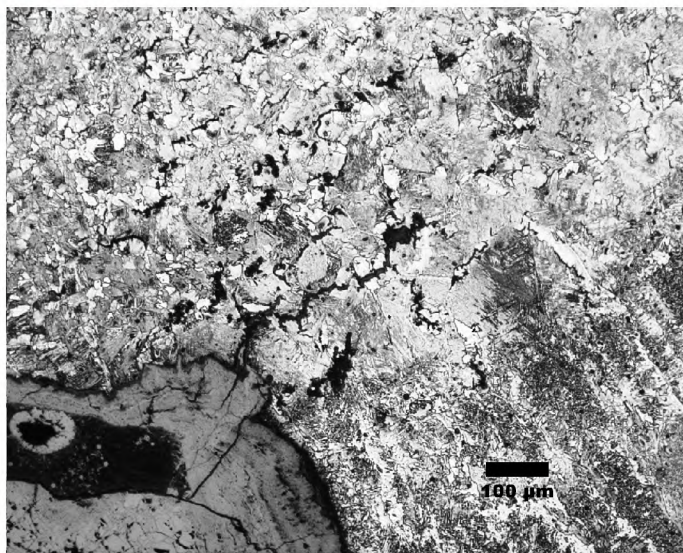
Figure 10 ID on top

BETA LAB No.M10198- CS4-01/ LS3 BOTTOM, REV. 1	TESORO REFINING AND MARKETING COMPANY ANACORTES REFINERY 10200 W. MARCH POINT ROAD T91WA4428 ANACORTES, WA 98221	CUSTOMER P.O. NO.: 4501667904
PART: 6600-E HEAT EXCHANGER CS4 01/BOTTOM PART 18/14		DATE: SEPTEMBER 20, 2010
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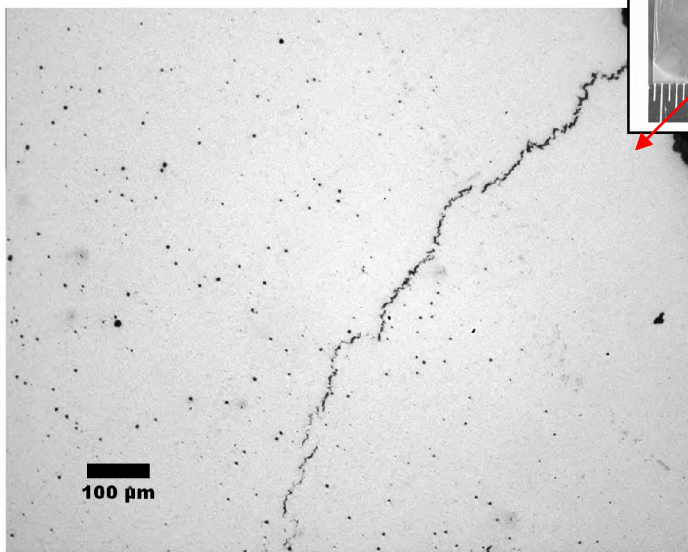
LABORATORY REPORT-CS4-01/ LS3 Bottom
SAMPLE 18-M1



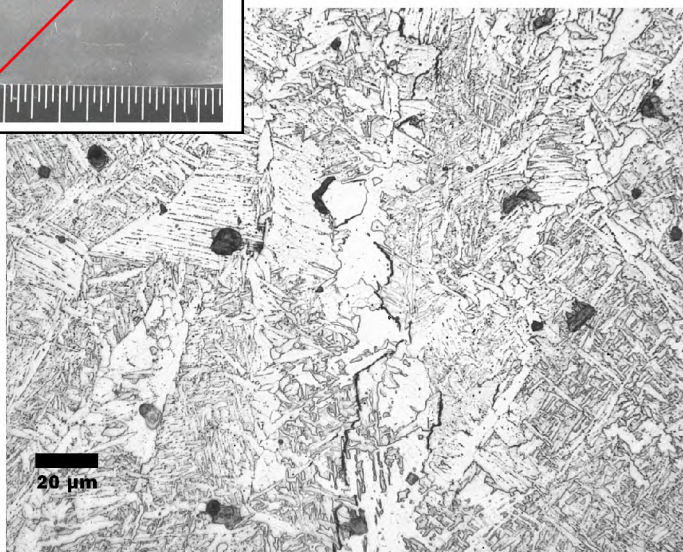
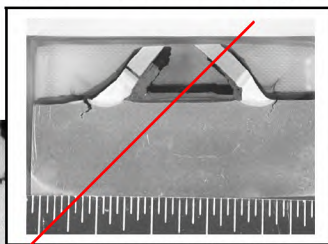
A. Area in Fig. 10C at higher magnification. Un-etched



B. Area in Fig. 10D at higher magnification. Etched



C. Crack in the cap of the weld. Un-etched



D. Area near the tip of the crack in C at left. Etched

Figure 11 ID on top.

BETA LAB NO. M10198- CS4-01/ LS3 BOTTOM, REV. 1	TESORO REFINING AND MARKETING COMPANY ANACORTES REFINERY 10200 W. MARCH POINT ROAD T91WA4428 ANACORTES, WA 98221	CUSTOMER P.O. NO.: 4501667904
PART: 6600-E HEAT EXCHANGER CS4 01/BOTTOM PART 18/14		DATE: SEPTEMBER 20, 2010
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LABORATORY REPORT-CS4-01/ LS3 Bottom

SAMPLE 18-M1

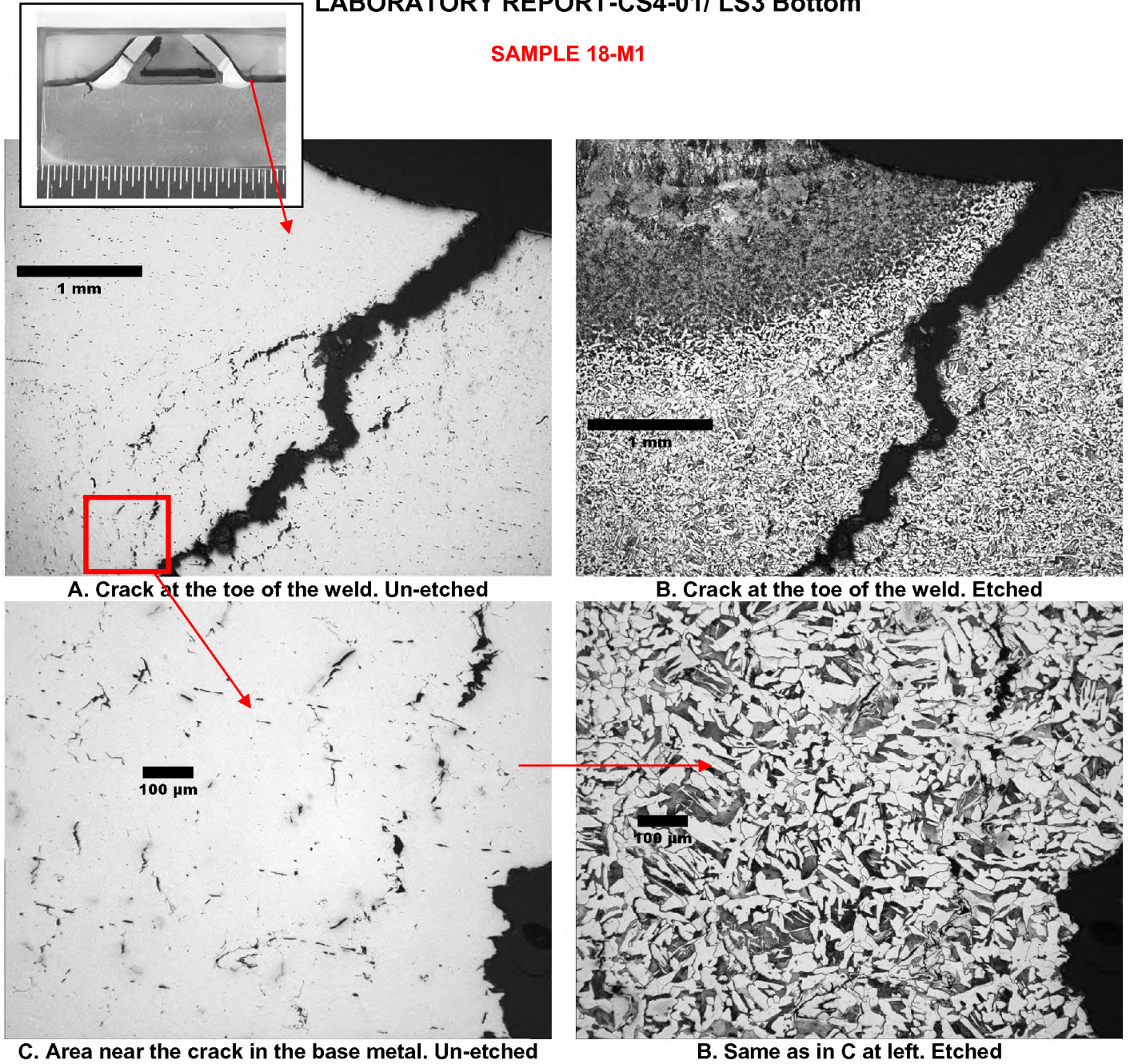
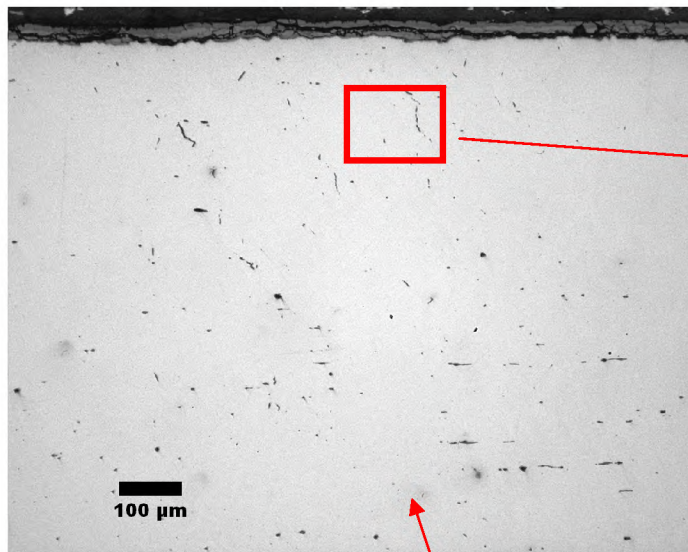


Figure 12.- ID on top

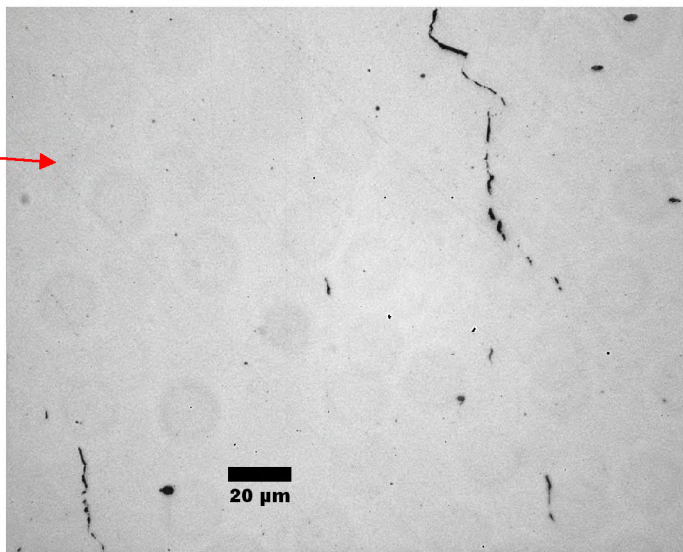
BETA LAB NO. M10198- CS4-01/ LS3 BOTTOM, REV. 1	TESORO REFINING AND MARKETING COMPANY ANACORTES REFINERY 10200 W. MARCH POINT ROAD T91WA4428 ANACORTES, WA 98221	CUSTOMER P.O. NO.: 4501667904
PART: 6600-E HEAT EXCHANGER CS4 01/BOTTOM PART 18/14		DATE: SEPTEMBER 20, 2010
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LABORATORY REPORT-CS4-01/ LS3 Bottom

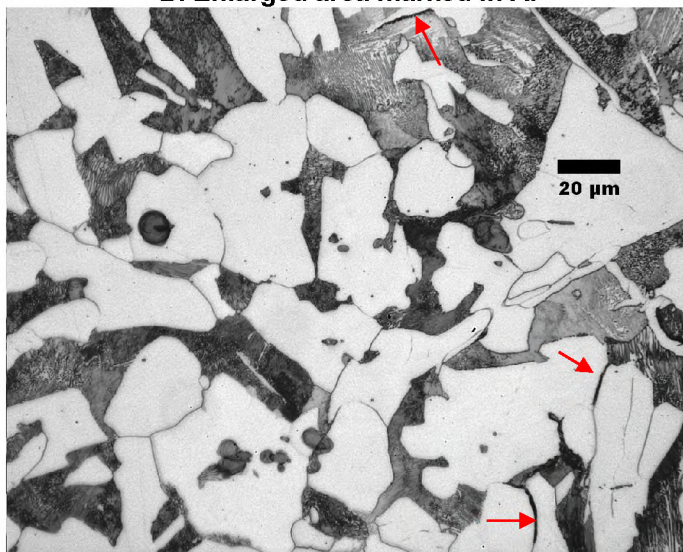
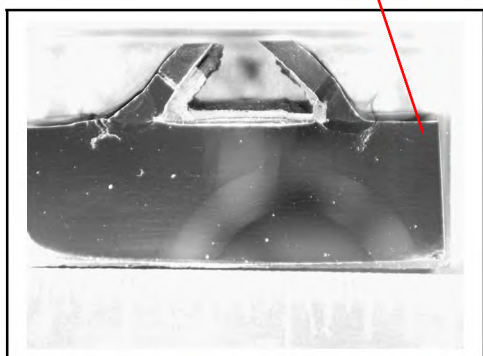
SAMPLE 18-M1



A. Base metal away from the weld and HAZ.



B. Enlarged area marked in A.



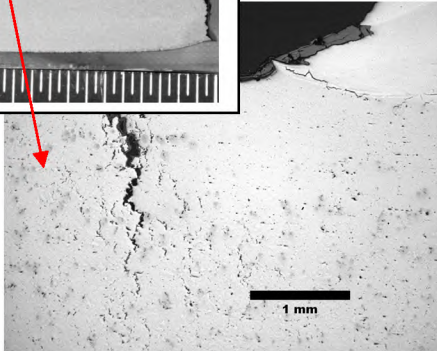
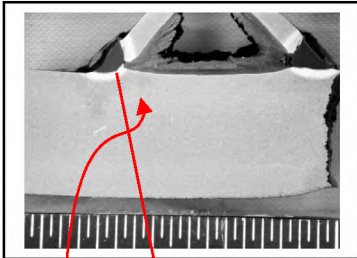
C. Base metal near the area in B above.

Figure 13- ID on top

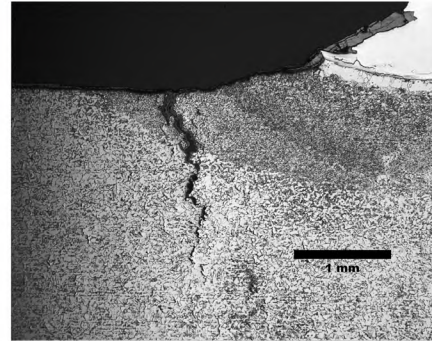
BETA LAB NO. M10198- CS4-01/ LS3 BOTTOM, REV. 1	TESORO REFINING AND MARKETING COMPANY ANACORTES REFINERY 10200 W. MARCH POINT ROAD T91WA4428 ANACORTES, WA 98221	CUSTOMER P.O. NO.: 4501667904
PART: 6600-E HEAT EXCHANGER CS4 01/BOTTOM PART 18/14		DATE: SEPTEMBER 20, 2010
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LABORATORY REPORT-CS4-01/ LS3 Bottom

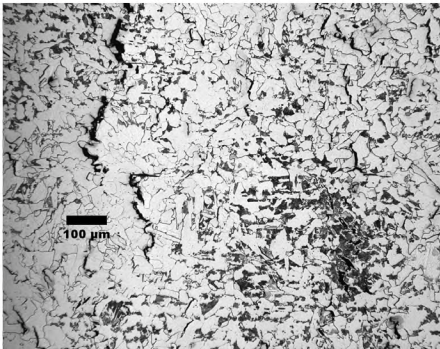
SAMPLE 18-M2



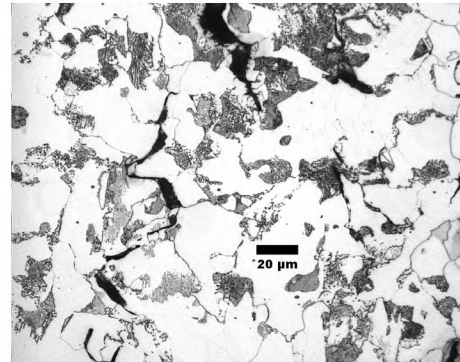
A. Left weld toe. Un-etched



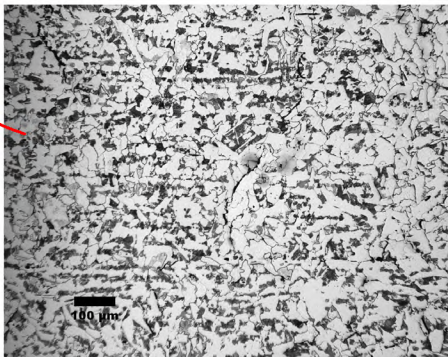
B. Left weld toe. Etched



C. Area near the tip of the crack in B



D. Area near the tip of the crack in B at higher magnification



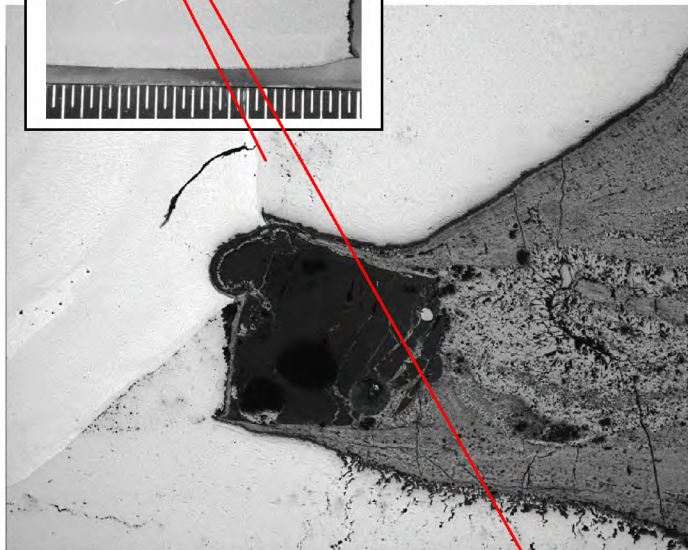
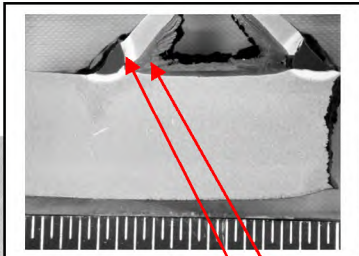
E. Area of the base metal three fields down under the weld toe. Etched

Figure 14- ID on top

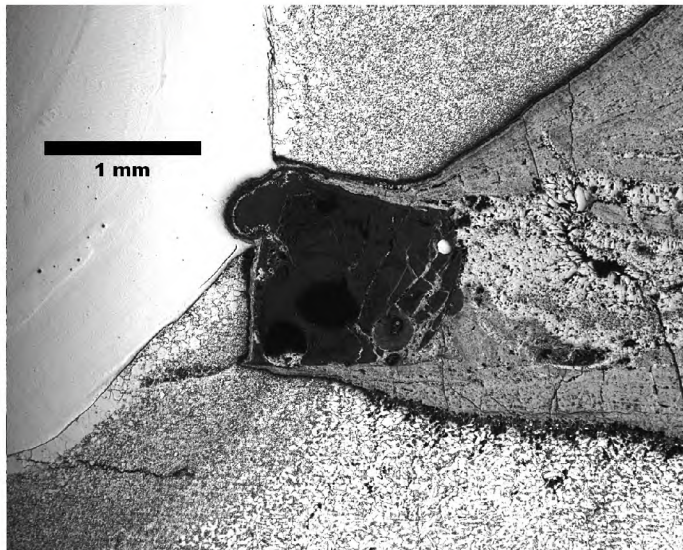
BETA LAB NO. M10198- CS4-01/ LS3 BOTTOM, REV. 1	TESORO REFINING AND MARKETING COMPANY ANACORTES REFINERY 10200 W. MARCH POINT ROAD T91WA4428 ANACORTES, WA 98221	CUSTOMER P.O. NO.: 4501667904
PART: 6600-E HEAT EXCHANGER CS4 01/BOTTOM PART 18/14		DATE: SEPTEMBER 20, 2010
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LABORATORY REPORT-CS4-01/ LS3 Bottom

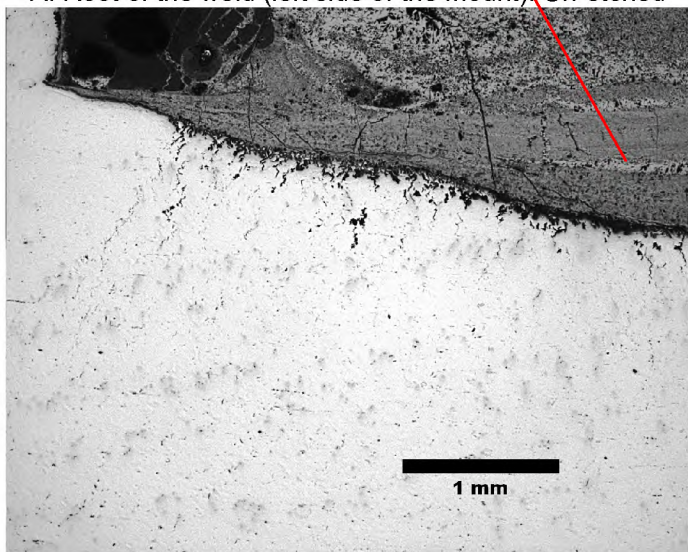
SAMPLE 18-M2



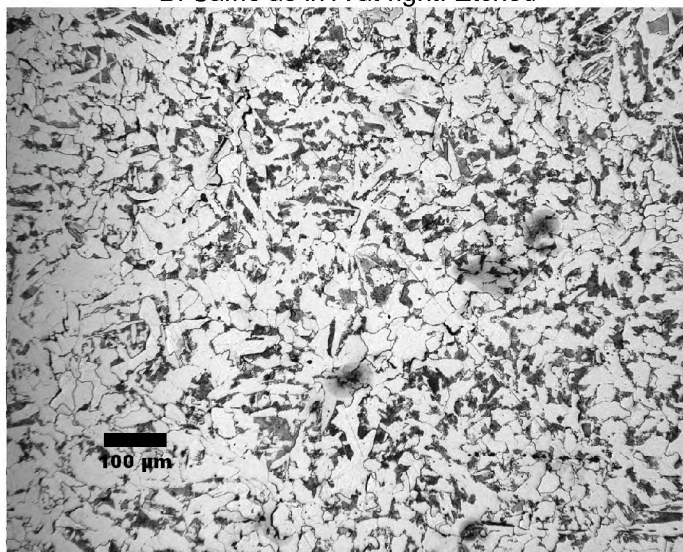
A. Root of the weld (left side of the mount). Un-etched



B. Same as in A at right. Etched



C. Base metal inside the angle, left side. Un-etched



D. Same as in C at left at higher magnification, etched

Figure 15- ID on top

BETA LAB NO. M10198- CS4-01/ LS3
 BOTTOM, REV. 1

PART: 6600-E HEAT EXCHANGER CS4
 01/BOTTOM PART 18/14

TESORO REFINING AND MARKETING COMPANY
 ANACORTES REFINERY
 10200 W. MARCH POINT ROAD T91WA4428
 ANACORTES, WA 98221

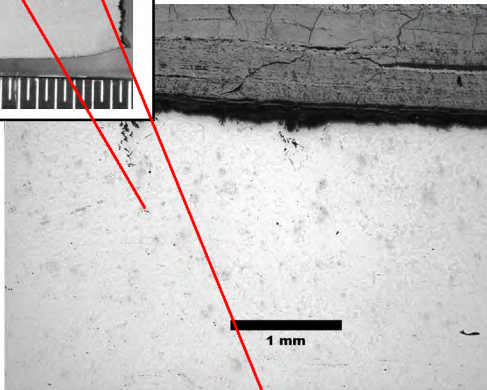
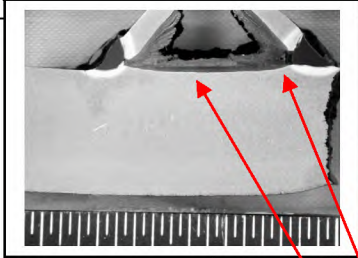
CUSTOMER P.O. NO.:
 4501667904

DATE: SEPTEMBER 20, 2010

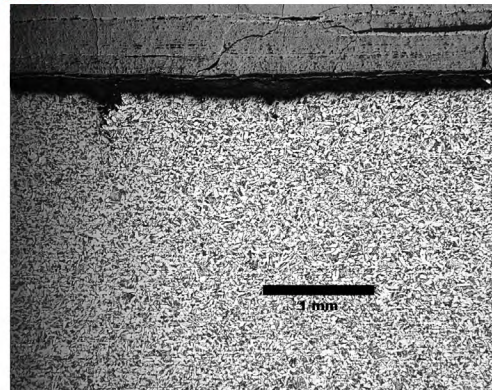
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LABORATORY REPORT-CS4-01/ LS3 Bottom

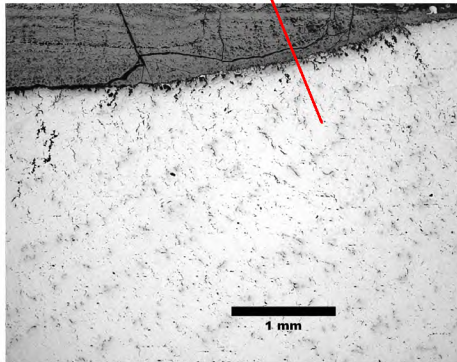
SAMPLE 18-M2



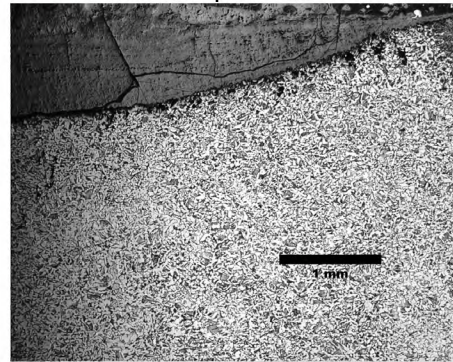
A. Base metal inside the angle, center of the sample. Un-etched



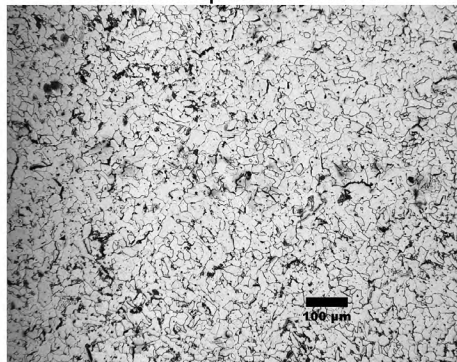
B. Base metal inside the angle, center of the sample. Etched



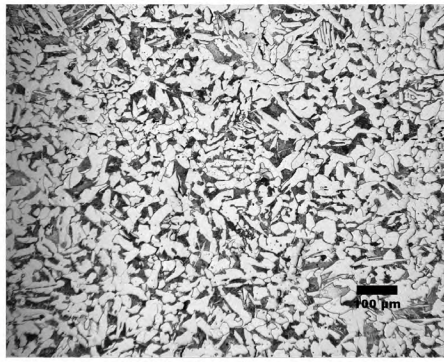
C. Base metal inside the angle, right area of the sample. Un-etched



D. Base metal inside the angle, right area of the sample. Etched



E. Base metal inside the angle, right area of the sample at higher magnification. Etched



F. Base metal inside the angle, right area of the sample at higher magnification. Etched

Figure 16- ID on top