



Addendum to CA1323 9-8-05

This is to supplement and report our progress on this corrective action.

As previously committed, samples from A-1, C-4 and C-5 were sent to Wisconsin Centrifugal, our parent company, for independent analysis of all reported elements. The results indicated a discrepancy in the level of manganese in the results of the analyses performed by the two labs. Consistently, the Pevely lab measured Mn about 0.4 to 0.5% higher than WC measured. To confirm this information we sent three samples to an outside laboratory for wet chemistry analysis. The results correlated well with the results achieved at Wisconsin Centrifugal. See attached report.

In follow-up, samples from C-1, C-2 and C-3 were also sent for verification, with similar outcome. We then located and tested a sample from a test heat #21424 of CF8MNMNMOD made in January 2004. Testing indicated similar results.

It can be stated that, for at least the period of time comprising the Prototype and the Production to the repair of the Spectrometer, that our analysis of Manganese levels has been higher than the level actually present in the alloy. Typically, this deviation is on the order of 0.4-0.5%.

The spectrometer received the preventive maintenance on August 29, 2005. The report was submitted on September 2, 2005. The repair made to the optical card was determined to have rectified the previously reported issue with P and S reporting. No other mechanical or software problem that would affect Mn was determined at the time of the preventative maintenance.

In follow up to the Manganese discrepancy, the same samples were analyzed on the Pevely spectrometer. The levels reported after PM now correlate with the results from WC and the independent laboratory. Further investigation indicates that the BS180 standard used for type standardization may be sufficiently outside the range of Mn and inducing error. No other root cause has been determined, but the investigation continues.

In consideration of the erroneous Mn and other elemental readings, the following actions are proposed:

- Create a type standard that closely matches the Mn in CF8MNMNMOD. (In process)
- Request a revision to the chemistry range for Mn. (propose widening of Manganese since it has been proven to be effective at much lower concentrations than previously thought).
- Have each heat of CF8MNMNMOD verified independently for balance of program.

A handwritten signature in black ink, appearing to read "C. Ruud".

C. Ruud

CC: Jim Galaske, Barry Craig, Joe Edwards, E.J. Kubick

Chemistry Check with WISCO

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-5,-1	Button #1	0.05	0.3	2.6	18.1	13.4	2.4	0.26	0.023	0.011
CAF	C-5,-1	Button #2	0.05	0.4	2.6	18.0	13.4	2.6	0.26	0.026	0.013
WC	C-5,-1	Button #2	0.02	0.3	2.2	18.2	13.5	2.4	0.25	0.025	0.010
STL Wet	C-5,-1	Button #1			2.2						
CAF	C-5,-1	Button #1	*	0.3	2.3	18.3	13.4	2.4	*	0.029	0.012 re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-5,-3	Button #1	0.05	0.4	2.2	17.9	13.4	2.5	0.24	0.033	0.012
CAF	C-5,-3	Button #2	0.05	0.4	2.2	17.9	13.2	2.4	0.24	0.033	0.012
WC	C-5,-3	Button #2	0.05	0.4	1.8	18.2	13.4	2.5	0.23	0.034	0.018
STL Wet	C-5,-3	Button #1			1.8						
CAF	C-5,-3	Button #1	*	0.4	1.8	18.3	13.3	2.5	*	0.034	0.012 re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-5,-6	Button #1	0.05	0.3	2.4	18.1	13.2	2.4	0.25	0.030	0.012
CAF	C-5,-6	Button #2	0.05	0.3	2.4	18.1	13.2	2.4	0.25	0.029	0.011
WC	C-5,-6	Button #2	0.04	0.3	2	18.3	13.3	2.4	0.24	0.031	0.018
STL Wet	C-5,-6	Button #1			1.9						
CAF	C-5,-6	Button #1	*	0.3	2.0	18.4	13.3	2.4	*	0.033	0.012 re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	A-1	Reported	0.04	0.4	2.4	18.2	13.3	2.4	0.26	0.030**	0.014**
CAF	A-1	Cast on sample	*	0.5	2.1	18.0	13.4	2.4	*	0.034	0.009
WC	A-1	Cast on sample	0.06	0.6	1.6	18.1	13.7	2.4	0.25	0.027	0.009
CAF	A-1	Cast on sample	*	0.6	1.6	18.2	13.5	2.4	*	0.028	0.009 re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-4	Reported	0.04	0.4	2.5	18.2	13.2	2.2	0.26	0.030**	0.014**
CAF	C-4	Cast on sample	*	0.6	1.9	17.9	13.5	2.3	*	0.037	0.013
WC	C-4	Cast on sample	0.04	0.6	1.5	17.8	13.6	2.4	0.25	0.030	0.012
CAF	C-4	Cast on sample	*	0.6	1.4	18.2	13.6	2.4	*	0.031	0.009 re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-1	Reported	0.06	0.5	2.7	18.1	13.1	2.2	0.27	0.018**	0.014**
CAF	C-1	Cast on sample	*	0.7	2.2	18.1	13.1	2.2	*	0.021	0.010
WC	C-1	Cast on sample	0.06	0.7	1.8	18.3	13.4	2.4	0.24	0.021	0.014
CAF	C-1	Cast on sample	*	0.7	1.9	18.3	13.2	2.4	*	0.024	0.013 re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-2	Reported	0.06	0.5	2.8	18.0	13.2	2.3	0.26	0.023**	0.018**
CAF	C-2	Cast on sample	*	0.8	2.2	18.1	13.4	2.2	*	0.030	0.012
WC	C-2	Cast on sample	0.07	0.9	1.6	18.2	13.7	2.2	0.23	0.023	0.014
CAF	C-2	Cast on sample	*	0.8	1.6	18.2	13.5	2.3	*	0.024	0.012 re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-3	Reported	0.04	0.4	2.5	18.2	13.3	2.3	0.25	0.023**	0.013**
CAF	C-3	Cast on sample	*	0.6	1.9	18.0	13.3	2.4	*	0.027	0.010
WC	C-3	Cast on sample	0.06	0.6	1.6	18.3	13.7	2.4	0.24	0.029	0.009
CAF	C-3	Cast on sample	*	0.6	1.6	18.1	13.5	2.4	*	0.028	0.011 re-run after PM
Test Heat poured 1/14/04											
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	24424	Button	0.05	0.4	2.8	18.1	12.9	2.2	0.27	0.020	0.010
CAF	24424	Keel bar	*	0.4	2.2	18.2	13.2	2.2	*	0.018	0.010 re-run after PM

\* not analyzed by spectrometer.

\*\* analyzed by wet chemistry.

For C-5 C and N were analyzed at CAF and at WC by Leco Analyzer, P+S analyzed on spectrometer.