Failure to Ignite - Oil Burner

Without data from an OnWatch Burner Monitor, an intermittent failure to ignite can be very challenging to diagnose. In one earlier case we published, the failure did not occur until the 1998th startup. Obviously not one you could sit around and wait for.

This On the Job will update users because the data is collected by an OnWatch Model 51 Burner Monitor. The failure to ignite occurred on the 21st startup.

NOTE: The Model 51 can record amperage with the addition of the Amp Clamp. For failures to ignite, amperage data will help pinpoint the cause of the problem because it provides data on the amperage draw of the transformer. We try to use actual data collected in the field and, in this case, amperage was not recorded.

Set 20 is the burner operation right before the faulty set. We will use it as our baseline.

SET: 20   Start Time: 19:13:12   Start Date: 09/20/01
Recording Mode: Oil

Elapsed	TT	VOLT	CAD	TEMP	PSI	VAC	PV	AMPS	Event
00:00:00	ON	118	6.2v	93	1	N/C			Sample
00:00:02	ON	120	1.8v	93	101	N/C			Sample
00:00:04	ON	120	1.7v	93	101	N/C			Sample
00:00:06	ON	120	1.6v	93	101	N/C			Sample
00:00:08	ON	120	1.5v	93	101	N/C			Sample
00:00:13	ON	120	1.6v	93	101	N/C			Sample
00:00:18	ON	120	1.5v	94	100	N/C			Sample
00:00:23	ON	118	1.5v	95	100	N/C			Sample
00:00:28	ON	120	1.3v	96	100	N/C			Sample
00:00:33	ON	120	1.3v	97	100	N/C			Sample
00:00:38	ON	120	1.3v	99	100	N/C			Sample
00:00:43	ON	120	1.4v	100	100	N/C			Sample
00:00:48	ON	120	1.3v	102	101	N/C			Sample
00:00:53	ON	120	1.3v	104	100	N/C			Sample
00:01:05	ON	120	1.2v	109	100	N/C			Stack Temp Change
00:01:15	ON	120	1.2v	114	100	N/C			Stack Temp Change
⋮	⋮	⋮	⋮	⋮	⋮	⋮			⋮
00:02:25	OFF	OFF	<1.0v	148	52	N/C			[End of call for heat]

[Continued on next page]

This is the burner operation where it failed:

SET: 21   Start Time: 20:58:26   Start Date: 09:20:01
Recording Mode: Oil

Elapsed	TT	VOLT	CAD	TEMP	PSI	VAC	PV	AMPS	Event
00:00:00	ON	118	6.2v	87	0	N/C			Sample
00:00:03	ON	120	6.3v	87	100	N/C			Sample
00:00:04	ON	120	6.3v	87	100	N/C			Sample
00:00:07	ON	120	6.3v	87	101	N/C			Sample
00:00:08	ON	120	6.3v	87	100	N/C			Sample
00:00:14	ON	120	6.3v	87	100	N/C			Sample
00:00:18	ON	120	6.3v	87	100	N/C			Sample
00:00:24	ON	120	6.3v	87	100	N/C			Sample
00:00:29	ON	120	6.3v	87	101	N/C			Sample
00:00:34	ON	120	6.3v	87	100	N/C			Sample
00:00:39	ON	OFF	6.3v	87	0	N/C			Sample [LOCKOUT]
00:00:44	ON	OFF	6.3v	87	0	N/C			Sample
⋮	⋮	⋮	⋮	⋮	⋮	⋮			⋮
⋮	⋮	⋮	⋮	⋮	⋮	⋮			⋮
00:05:39	FAULT DETECTED								

ANALYSIS

Our suggestion is to hold the two pages side by side and compare the data, line by line.

Set 20 is our "comparison set". This was a normal burner operation. Everything worked as intended. The burner motor started with a 2 volt "jump up", which tells us it was a capacitor start motor. With a conventional motor, the "jump up" is usually in the 8-16 volt range. So, the motor started. Pump pressure came right up to 101 psi. CAD voltage dropped to 1.8v, which tells us the cell saw light. At 18 seconds, the stack temperature started to increase. All of this is normal.

Now compare Set 20 with Set 21. The motor did start as shown by the same 2 volt "jump up" and the pump pressure built up to 100 psi. However, the CAD voltage did not drop. That tells us that either a) there was flame and the cell did not see it, or b) the CAD cell circuit was faulty. Now follow down to see if the stack temp increased. It did not. That confirms that there never was ignition. Alternatively, if the stack temperature had increased, it would have meant that there was flame and the cell did not see it. Diagnosis: Either a bad transformer or the electrodes are grounding out.

Our thanks to Michael SanAntonio (Walt's Burner Service, Pascoag RI) for this data.

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REQUEST FOR INTERESTING DATA

If you collect data that you think would be helpful to others, please forward it to us. Names will not be used without permission. In either case, it helps the industry.