2007 Polaris IQ600 EFI

This is HTG's first IQ600 EFI that Rob Schooping is planning to dragrace in the grass this fall. It already had a few hours on the engine in Rob's test field. Rob had complained about a lean bog on takeoff, even with high engagement speed but that didn't show here. If anything at WOT low RPM it was piggly rich—could that be a rich bog on takeoff? Turns out it was a lean bog, caused according to some Polaris engineers who read this stuff and communicate with me, by gas vaporizing in the return line and finding its way back into the rail causing temporary leanout. This summertime phenomenon was recently encountered by Polaris engineers, testing in the grass, who wisely included a vapor-eliminating device in the fuel lines on sleds manufactured after Rob's early one.

To obtain accurate fuel flow numbers I had to reconfigure the two dyno fuel flowmeters so that one meter measures the flow from pump to rail, then the other meter measured the bypassed fuel as it returned to the tank, then that number subtracted from the first, giving us net fuel flow lb/hr.

As we can see from the fuel flow numbers, the IQ600 becomes increasingly lean as revs climb. What we saw happen was, on short runs with moderate temp pipe the HP peak was nearly 700 revs lower that with the smoking hot pipe. Because the time of the run was short, the pipe was cool, and since the power dropped long before the fuel leans out, power was further compromised. The cool pipe is also handicapped because the relatively cool, dense exhaust couldn't be restricted as much as with the hot pipe, leading to excessive power robbing short circuiting of airfuel mixture. Instead of the tight, hot pipe helping pack fresh charge back into the exhaust port just as it closes, that supercharging effect is diminished by the reduced pipe backpressure in the cooler pipe. One other benefit of the hot pipe is possible the pipe center section temp is measured by the ECU, ostensibly to allow it to retard timing to increase pipe temp which might also cost HP in a short run unless pipe temp was high.

Dragracers could surely use the 440 Dragonfire button that Sean Ray and I invented here a few years ago on this model as well. That button retards the ignition timing severely, burning most of the mixture inside the pipe instead of in the combustion chamber. So with the Dragonfire button depressed, throttle can be wide open, the plugs fire just before exhaust port opens, and the engine doesn't have enough HP to raise revs to clutch engagement! All the heat goes into the pipes, then engine stays ice cold. Without it IQ600 racers have to resort to wailing away on the jack stand adding power-robbing heat to engine coolant to get the pipe to be happiest in the first 100 feet.

The airbox baffle appears new, with three closely spaced horns in the baffle plate. Judging by the IQ600's airflow it appears as though it's as high as our carbed stock Fusion 600 with gutted airbox.

While this sled is on the dyno (through Sat) we're hoping to get a production DynoPort single and a stock pipe modded by Bikeman to try here.

Here is typical dyno run with hot pipe, probably a total of nearly 30 seconds at WOT (about three seconds at WOT as engine stabilizes prior to start of the run). Though BSFC is in the mid .50's at hot pipe peak, it was happy with 89 octane unleaded gas. Also note that with the hot pipe, ExValve opening is a bit early causing HP to drop at valve opening—it's easier to note on the graph immediately following that compares output of hot and cool pipe.

2007 Polaris IQ600 stock tested on long 27 second run with hot pipe

EngSpd	STPTrq	STPPwr	FulA-B	BSFA-B	A/FA-B	AirTmp	FuelP	Air1+2	BaroP
RPM	Clb-ft	CHp	lb/hr	lb/hph	Ratio	degF	psig	scfm	in/Hg
5000	48.1	45.7	45.1	0.94	9.61	73	62.6	94	28.89
5100	49.2	47.8	43.3	0.96	10.28	73	62.6	97	28.89
5200	50.3	49.8	42.2	0.91	10.73	73	62.6	99	28.89
5300	50.9	51.4	43.3	0.89	10.56	73	62.6	100	28.89
5400	52.9	54.3	43.3	0.85	10.72	73	62.5	101	28.89
5500	54.3	56.9	45.5	0.85	10.37	73	62.5	103	28.89
5600	55.6	59.3	46.9	0.84	10.31	73	62.4	105	28.89
5700	58.1	63.1	42.4	0.72	11.73	72	62.4	109	28.89
5800	57.8	63.8	41.9	0.69	11.95	72	62.4	109	28.89
5900	60.1	67.5	45.1	0.71	11.52	73	62.4	113	28.89
6000	60.3	68.9	42.4	0.66	12.36	73	62.4	114	28.89
6100	61.3	71.2	43.7	0.65	12.27	72	62.4	117	28.89
6200	61.6	72.8	46.4	0.68	11.66	72	62.4	118	28.89
6300	62.8	75.3	45.2	0.64	12.22	73	62.5	121	28.89
6400	64.1	78.2	46.3	0.63	12.15	73	62.4	123	28.89
6500	63.7	78.9	48.9	0.66	11.61	73	62.4	124	28.89
6600	64.9	81.5	52.9	0.69	10.93	74	62.3	126	28.89
6700	59.4	75.8	54.1	0.76	10.89	72	62.2	129	28.89
6800	59.5	77.1	53.4	0.74	11.05	73	62.1	129	28.89
6900	59.8	78.6	54.4	0.74	10.91	73	61.9	129	28.89
7000	62.1	82.7	56.9	0.74	10.64	73	61.9	132	28.89
7100	68.9	93.2	64.9	0.74	10.59	74	61.9	150	28.89
7200	70.1	95.9	65.6	0.73	10.64	74	61.9	152	28.89
7300	72.5	100.7	69.4	0.73	10.34	73	61.9	157	28.89
7400	75.7	106.7	73.9	0.74	10.17	73	61.8	164	28.89
7500	76.2	108.8	72.7	0.71	10.43	72	61.8	166	28.89
7600	79.2	114.6	74.3	0.69	10.59	71	61.4	172	28.89
7700	80.7	118.3	78.3	0.71	10.17	72	61.6	174	28.89
7800	80.8	120.1	78.4	0.69	10.27	71	61.6	176	28.89
7900	82.2	123.6	80.5	0.69	10.11	71	61.6	178	28.89
8000	82.1	125.1	79.7	0.68	10.26	72	61.6	179	28.89
8100	82.1	126.4	78.2	0.66	10.53	72	61.6	180	28.89
8200	82.1	128.1	71.4	0.59	11.57	72	61.8	180	28.89
8300	81.5	128.7	67.1	0.55	12.37	71	61.9	181	28.89
8400	79.9	127.9	70.5	0.58	11.72	73	62.1	180	28.89
8500	77.8	126.1	66.8	0.56	12.37	73	62.1	180	28.89

8600	75.1	122.8	64.1	0.55	12.91	72	62.1	181	28.89
8700	70.4	116.7	62.4	0.57	13.18	73	62.1	180	28.89

Here's the aforementioned graph. Comparing fuel flow numbers (they are identical on short and long runs) we can see that the cool pipe causes HP peak to be in the fat part of the IQ600 fuel curve, further sacrificing HP.