Sheldon, Lee H NWP

From:	Ramirez, Dan E NWP
Sent:	Tuesday, February 21, 2006 4:47 PM
To:	Wittinger, Rodney J NWP; Freeman, Thomas A NWP; Sheldon, Lee H NWP; Ebner, David A NWP
Subject:	RE: T1 test at Ice
Attachments:	WG: To Do list becomes a Been Done list

Rod,

Ice Harbor Unit 3 test was conducted 6-8 Feb. IH Unit 6 testing was conducted 10-12 Feb. Both tests wo screens installed. Test schedule for w/ screens testing tbd, but likely late-April or early May. Testing was conducted using traditional methods, i.e. initial on-cam pass followed by off-cam fixed blade angles at incremental gate openings (6 blade angles tested for Unit 3 , 7 blade angles for unit 6).

ITB was run in parallel with HDC data acq equipment for Unit 3 test only (using lastest version of program --- ITB Rev 1 ver 43). ATEC provided W-K xducer and manifold was used in paralled to our Statham diff press transducer. (I had stopped by McNary and picked up x-ducer, buggy, crate and all). ITB installation and initial setup took longer than anticipated due to an old version of the interface between ITB and signal conditioner being used. Once the proper interface was located and installed, proceeded to calibrate W-K xducer without any difficulty. The previously observed computational problems and system crashes observed when balancing valve is opened have been corrected.

Attempted to use ITB during Unit 6 test also, but Murphy showed up and was unable to get W-K x-ducer output read into ITB. Attempts to isolate problem (i.e. to identify whether transducer/signal conditioner/ power suppply within signal conditioner/interface between ITB and signal conditioner or the cabling between each of these was the source of problem) to correct proved unsuccessful. Unfortunately, also could not figure how to feed 0.5-2.5 V output from our Statham (4-20 mA with 127 ohm scaling resistor) directly into ITB.

Unit 3 testing went very well. Repeatability was very good, on average +/- 0.1% or better in terms of relative efficiency, based on HDC data acq methods. Well defined blade angle profiles and overall unit performance profile obtained. Results indicate performance improvements on the order of 0.5% -1 .0% obtainable. Tom Freeman on-site for Unit 3 test and reduced data near real-time (i.e. as near real-time as our acquisition methods allow). I established test points for 6-7 Feb testing. I pretty much let Tom run the show on 8 Feb. He did very well as Chief of Test for the day (conducting test, i.e establishing gate blade positions to be tested, directing unit movements with operator/mechanic, data reduction). Tom also calibrated W-K x-ducers and results were superb --- we can discuss further, but suffice to say his eyeball is far more calibrated than mine.

For each test day, ITB was started-up at the beginning of each day and after limits defined, data collection initiated. ITB essentially ran in the background, collecting it's data, throughout each test day. No program crashes experienced on any test day. To obtain values from GDACS addresses, the ITB OPC was "connected" during testing, but blade perturbation routine was not initiated at any time.

During the first day of testing, the ITB logged data using "RECORD STEADY STATE" option, resulting in the same "rolling average" routine for data logging as before (McNary U9 test), i.e. large volumes of data

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being logged with each data point logged based on largely duplicated data. After discussing with Doug Albright the following morning, discovered I needed to toggle to the correct data logging option. As result of our McNary comments, "RECORD DATA POINT" option had been added and included in version 43. Data on 7 & 8 Feb was collected using "RECORD DATA POINT" option, reducing data set logged to discreet points as we had requested.

On return to office, I provided all raw data logged to Doug. In looking at the ITB data set here in the office (and discussing same with Doug) discovered the number of first and second pass points were left at default values. I should have increased 1st and 2nd pass points from default values of 5 points to 200 (forgot that this values were increased at McNary). If I had done so, each data point logged would have been representative of 2-3 minutes of steady state operation. With default settings, each point logged, although discreet, is representative of 5 seconds of steady state operation.

Attempted using MathCad for data analysis, using similar methods used to evaluate McNary ITB data set. However, due to 5 sec sampling, noise is too large and MathCad cannot interpolate 3-D contours. Have had better success using EXCEL to process Ice Harbor data, using more traditional 2-D methods. I've begun comparing results from data collected using our data acq to ITB data set and so far both are yielding the same results. Once completed, I can forward graphs showing results w/ comparisons, if you like.

As far as proof of concept, it's clear ITB is capable of collecting the data necessary to develop cam information. The major deficiencies identified from McNary test of ITB (system crashes and streamlining of data logged) have been addressed.

Regarding "ToDo List" generated from McNary testing (copy attached): Except for item's #1, #2, #10 and possibly #12, remaining items have been corrected.

Items #1 and #2 both require blade perturbation, the code for which was not installed in Ice Harbor Unit 2. Further, Item #1 was not critical to system functionality and Item#2 is a GDACS issue rather than an ITB issue.

Item #10 is in regards to the piping for exisitng W-K manifold being too large, permitting air into system. Existing manifold used as is with flushing methods modified to prevent air from entering. Large diameter hoses to tubine put were eliminated, short hose used to maintain water column/back pressure on downstream side of flushing valves, eliminating possibility of air entering system when flushing.

Item #12 is in regards to constants used to convert flow transducer voltage ouput to an engineering value (feet of deflection or cfs). These constants still revert to default values when system is shutdown. However, this may have been user error in that constants were never stored, which may have to be done manually, and then reloaded on start up. I need to clear this up with Doug.

More to come
Dan

From: Wittinger, Rodney J NWP
Sent: Sunday, February 19, 2006 11:54 AM
To: Ramirez, Dan E NWP; Freeman, Thomas A NWP
Subject: T1 test at Ice

Tom/Dan—please give myself, Ebner and Lee an update of what transpired during the testing. Rod

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