THE CONSULTANT

The Newsletter of the IEEE Consultants Network of Long Island

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Editorial – ***Dr. Richard LaRosa, sealevelcontrol.com***

This space is available to members, and possibly others, with opinions, comments, observations, theories, etc. If you would rather be less conspicuous, we can put your contribution at the tail end of the newsletter. I got the feeling that contributing a Chairman's Corner each month became a bit burdensome.

You would not believe what Vista and Word 2007 did to the Imprint MT Shadow font that Murray Kleiner carefully selected years ago for the newsletter headings. I changed to Times New Roman Bold Italic, which Word 2007 seems to understand.

Announcements and descriptions of the forthcoming meeting by email, LICN and LI Section websites make meeting announcements in the newsletter superfluous. It may be more useful to list recent past meetings, details about the upcoming meeting, and what we know about future meetings on page 2.

CONNECT THE DOTS, PLEASE

Air passing over mountains is supposed to rise, expand, and cool. Moisture is supposed to condense and precipitate. Snowpack is supposed to melt over the summer and supply water gradually to lower altitudes. This has failed in the last several years, so we have worldwide drought and hunger now, and it's worsening. Don't be fooled by flooding in coastal areas, or along rivers due to rapid melting.

An Israeli researcher noted the similarity between the droughts in Israel and our west coast, and a series of measurements has shown that increased aerosols may be supplying too many condensation nuclei, resulting in particles too small to coalesce and precipitate.

Now we have proposals to disperse sulfate aerosols in the upper atmosphere to reflect sunlight and cool the Earth. In discussions of these proposals, I see no mention of the possibility that these added aerosols will exacerbate the drought. And what about acid rain and other problems that forced us to use low-sulfur fuels and remove pollution from smokestacks? It seems as if we need to play an adult version of an old kid's amusement:-- connect up the dots and look at the whole picture.

Meetings, Past, Present, Future

August 6, 2008
Topic: "The Difference that Industrial Design Can Make in Engineering Projects"
Speaker: Eric Seger, Design Resources USA Inc.

September 3, 2008
Topic: "Embedded Linux Development for Power Architecture"
Speaker: Alex Peck, FAE, Freescale Semiconductor, Inc.

October 7, 2008
Topic: "Ways to Succeed as an Engineering Consultant"
Panel Discussion by some of our Experienced Members.

November 5, 2008
Topic: "Is LICN meeting the needs if its members?"
Open Discussion led by Peter Buitenkant

December 3, 2008
Topic: "Ultrasound Imaging in Medical Application: Fundamantals and Current Technology"
Speaker: Howard Fidel, Senior Engineer, Schick Technologies

January 7, 2009
Topic: Some History of the Electronics Component Business On Long Island
Speaker: Barry Yonenson, CEO, KRP Electronics

February 4, 2009
Topic: "I'm a Consultant!... NOT a Salesperson!" Sales and Sales Management Process Improvement
Speaker: Richard Isaac, President, Legend Development Services, Inc.
Times: 6:45 PM refreshments available.
7:00 PM LICN business meeting begins.
7:30 PM Presentation begins.
Place: Briarcliffe College, Great Room
1055 Stewart Avenue, Bethpage, NY.
Guests are welcome. No charge. No preregistration, but email jlbrown@essexsys.com so we can order refreshments.
Directions: See our website www.consult-li.com.

Other Meetings
Consult the Events Calendars on the Section website: www.ieee.li and the LICN site: www.consult-li.com
Remember to inform the members about seminars and other items that might be of interest. E-mail them at members@consult-li.com.

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Home Heating Oil-to-Gas Conversion—What's Involved?

—— Carl E. Schwab

Part A

Starting about one year ago, I became interested in determining how I could convert heating of our home from #2 domestic oil to natural gas. I was well aware that most of the new construction homes on Long Island were being heated with NG, natural gas. But as a fact some 60% of the homes on LI are still heated with #2 domestic.

Our situation on the street was similar for my neighbors; our homes were built 1959-1960. At that time the builder made the decision to offer only oil heat – no gas option. So now many like myself were facing the prospect of needing to replace an old underground, 550-gallon oil tank because of leakage concerns. Not Cheap.

Further when the next street north paralleling our street was installed 4 years later, it had a natural gas main put in and the houses offered only with NG.

So I became a "committee-of-one" to approach National Grid to see how we could get NG on our street. My first query was how to get NG to my house. The answer was that it would cost me $39,000. After telling them, "Thanks, but no thanks", I came in touch with a very helpful person in marketing that explained that if I could get 7 of my neighbors to commit to sign-on with National Grid, National Grid would install the street main and service connections to the 8 houses at no charge. BTW the Public Service Commission rule he used was National Grid must provide 100 feet of street main, plus one service connection from the street main to one house foundation for each committed customer. SO that's where we started; eventually a total of 10 of us signed on.

The first task was to get the "commitment" paper signed. But to do this National Grid required each potential customer to have selected a "licensed plumber" and have a valid quotation. Towards this end I asked 3 licensed plumbers to quote my house. One immediately declined claiming the press of current business. The remaining 2 provided nearly identical quotes and I verified with National Grid that both had done satisfactory conversion jobs and National Grid felt them qualified. Subsequently of the 2, one dropped out and seemed too busy even to quote. Strange.

Eventually 7 were done by the remaining plumber, 2 by another plumber, and the last by the homeowner and a friend who was a certified plumber.

The next task was to "mark out" the street to locate storm drain tubes and water mains. This task was performed by Huntington Township Engineers.

After the street was "marked", a National Grid representative and the selected plumbers surveyed the 8 customers (later increased to 10) and determined the curb location for the "curb cut-off valve" and the location adjacent to the customer foundation for each customer's "meter bar". The "meter bar" location is connected to the "curb valve" by 1" plastic line ran nominally 30" below the surface, usually lawn.

An Aside

The water mains run below the frost line and on LI at 48" depth. The service connection line is run at 30". Most service connection lines pass under lawns that frequently have sprinkler systems. These sprinkler lines mostly are 6"-12" depth. Soil conditions permitting, National Grid prefers to use a pneumatic hammer "torpedo or missile" that makes a hole about 2-3" in diameter. If soil conditions don't permit the missile, then a trenching

machine is used but cuts any lawn sprinkler line in its path. Our street was a mixed bag; about ½ could be done with the missile, but the other ½ required a trenching plow. Once the "marking" was done, running the service connection from the "curb valve" to the associated meter bar could proceed and National Grid provided 2 crews to install these service connections.

Ditch-Witch Operation

The major effort was boring a 6" diameter hole some 36" below the street surface. Two-way traffic was allowed on the street throughout the entire procedure. The route for the new gas main was purposely run on the opposite street side from the existing water main. The machine used for this job was a "Ditch-Witch" that could bore horizontally about 500' before having to be re-setup. For our street, 3 setups were required. The operation of this machine was interesting and I will next describe its sequenced operation.

To start the boring operation, first a "start-end hole" is dug using a backhoe. The size is about 3' x 8' and about 4' deep. The location is selected to miss water mains and drainage tubes, etc. Also it has to be situated to be at one end of a 500' (approx) run. A second "start-end hole" is dug where the 500' run will end or be joined to a continuation run.

The Ditch-Witch is positioned at one end of the appropriate "start-end hole" and secured with powered "auger screws". The drill tube sections are stored in a "rack & stack" inclined rack on the D-W machine. The inclination is such that the drill tube passes into the top edge of the near side of the "start-end hole" and meets the far end of the hole about a foot above the intended bore depth. The bore-shovel is about 4' long and threads directly to the first drill tube. In its length it carries a battery driven UHF transponder with integral slot antenna, a drilling fluid passageway and the shovel head with fluid port holes ONLY ON ONE SIDE. This last feature is used to steer the direction of the bore hole i.e. left-right, up-down. Control of the direction of the bore is by pausing the rotation in correct positions. The position of the shovel on the shovel-head is tracked by hand held surface package that interrogates the transponder in the bore shovel. This locates it left-right, its vertical depth and its rotational position. A person positions the surface tracker unit along a painted line laid out for the intended path. The operator on the D-W machine listens to the surface tracker via another UHF radio and has displays of its data. Using this data the D-W operator paused the shovel rotation to hydraulically remove the desired material for the direction change. The D-W machine pumps a "slurry" through the drill tube, out through the holes in the shovel head and returns to the "start-end hole" at the D-W end. This "slurry" cements and seals the 6" diameter bore hole as well as carrying the borings back to the D-W machine.

As each 500' segment is bored to the 6" diameter, before the last retrieval the bore-shovel is removed and a "pull head" threaded on in its place. A separate crew has been thermally joining 40' sections of high pressure, 4"I.D., 1/2" wall thickness, into 120' runs. The first 120' run is connected to the "pull head" so that as the D-W operator retrieves the drill tubes, the 4"I.D. high density plastic is pulled back through the 6" bored hole. As the first 120' length is near the edge of the "start-end hole", the operation is paused and the next 120' length thermally joined. This process continues until the entire 500' length has 4"I.D. high density plastic pipe in place.
The successive 500' sections are thermally joined until the entire street run is connected.

Next step is to cap the far end and prepare to connect the near end to the 8" steel main under Pidgeon Hill Rd. National Grid has a unique connection design that allow bonding the walls before the I.D. are connected. Before this last step the entire street run is pressure-leak tested. In our case the street is pressure-leak tested about 25% over operational pressure. The test consists of monitoring the pressure drop over at least 20 minutes for the capped volume.

The next step is to complete the service connections from the "curb valves" to the street main. Remember we had connected from the "meter barr(s)" to the "curb valves" The remaining distance (the width of the street

about) had to have a plastic 1" line ran this distance and the ends had to be thermally joined. Again the pneumatic missile was used. For each service connection a "start-end hole, this time 2'x3' to the 4' depth, was dug to the just installed 4"I.D. street main. A combination of backhoe, Bob Cat, jack hammer were used to open the blacktop surface and dug down to just above the new 4" I.D. street main. At this point hand digging was necessary to clear around the 4"I.D. main and its surface was cleaned and prepared for thermal joining of the 1" line from the "curb valve" . The pneumatic missile was used to go from the "curb valve" to the street main or sometimes in the reverse direction.

The actual sequence is to first thermally join the "saddle tee" on top of the 4" I.D. main. This is done using a fixture that grips the 4" main on both sides of the intended bond. The "saddle tee" is held by the same fixture and a shaped heated platen is inserted between the two surfaces to be thermally joined. The platen is heated, then slipped out and the fixture presses the two surfaces to be joined. At this point no hole has been made into the wall of the 4"I.D. main.

The "saddle tee" is attached to the 4"I.D. street main and has a passage to allow pressure test of the joined area for leakage. The "tee" part is actually another "tee" allowing insertion of a bore tool and connection to the 1" line from the "curb valve". This top access allows a pressure test to be performed on the 1" line run from the street main, through the "curb valve", to the "meter bar" at the foundation. The next step is to pressure test the service connection. After the pressure leak test is passed, a bore tool is inserted through the top access and drives a plug cutter into the ½" wall thickness and with extraction removes a "plug" and stores it above the 1" line. At this point the gas pressure in the street main is passing into the service 1" line which is turned off by an on-off valve that is part of the "meter bar". At this point the top of the "saddle tee" is closed off by a cap and the threads checked for leakage using a soap solution. At this point a National Grid technician opens the on-off valve on the "meter bar" to purge the 1" service connection of air and fill it with NG. Once purging is complete the on-off valve on the "meter bar" is locked and sealed with a bolt and the service connection is complete.

This operation is repeated at the remaining 9 service connection locations and this completes Part A and National Grid completed this phase by November 24, 2008.

Part B

The only part the customer's plumber has done up to this point is to select the foundation location for the "meter bar", and prepare the quote and equipment list. In Part B this is now executed at each customer location.

The first step is to install the appropriate connected pipe lengths to connect the output arm of the "meter bar", pass through the wall of the house and then route just under the basement ceiling rafters (which are really the floor supports for the first floor. The plumber's crew measures, cuts to length, threads, pipe dopes and assembles the lengths and hangs in place under the floor supports using "hanger Us". Where each gas appliance will be connected the piping has an in line "on-off" gas valve (with a yellow handle) installed and for now is turned off.

At this point a pressure test fixture with a gauge and a Schrader valve is threaded into the output of the "meter bar". The capped volume consists of the plumber installed piping with the appliance outlets "on-off" valves turned off. The requirement is that, after filling with compressed air to a test pressure through the Schrader valve, the volume should show no leakage as monitored by the pressure gauge for at least 15 minutes..

The "official" test must be witnessed by a Town engineer and has to be "signed off" to make the test official and the work can proceed. This test witnessing by the Town became a big PITA. Part of the reason was that only 6 Town engineers were trying to process 200 on-going gas conversion installations and no one for the Town coordinated their activities. This resulted in a time delay from November 24th until December 29th before the first customer had service.

Once the piping had been leak tested and witnessed by the Town, the next step was to set up the new gas appliances and have a National Grid technical representative install the gas meter on the "meter bar", turn on the on-off valve on the bar, turn on the on-off valve at one appliance and verify the pressure out of the meter bar with a manometer at 7" WC (water column), with the appliance in operation. (Part of the "meter bar" assembly is a pressure regulator that drops the street natural gas pressure to the 7" WC). At this point the National Grid tech representative sign off and now you have gas.

In my case, after "witness of pressure test" on 12/29/'08, my service was signed off on 1/13/'09 on the same day the plumber installed the conversion gas burner, the stainless steel liner in my chimney and abandoned the 550 gal. underground oil tank.

Comment

The operation of the gas conversion on my 3-year old boiler has been flawless. The boiler behaves no differently (which is as it should be). The stainless steel chimney liner is preventing any condensation on the inside masonry surfaces of my near 60-year old chimney and should extend its life indefinitely.

Overall I am pleased with the result.

FWIW during January, gas cost the equivalent (oil) of $2.57/gal. and with the recession, oil has been driven below that price/gal. But I feel converting to gas is the RIGHT thing to do.