SPRING | 2012

NACE CALGARY SECTION NEWS

News about corrosion and the corrosion industry produced quarterly for members of NACE International in the Calgary area

Register now for annual dinner!!!

This year's dinner features well-known Canadian stand up comic - Marcus C. Beaubier. Marcus hails originally from Newfoundland, and has been trying to escape the stereotype ever since. The fact that he lives in Alberta now, really doesn't help his cause. This irony is not lost on him. It has tempered his sense of humour, making him wickedly funny.

Whether he's raging on about pop culture, personal relationships, or politics, his fiery wit focuses in on the subject like a laser beam.

He was one of the founding members of "The Audiotoon Theatre", a sketch comedy troupe based out of St. John's. He's appeared on CBC's "Madly Off in All Directions", and in the past has contributed regularly to "Definitely Not The Opera." He performs often at Yuk Yuks in Calgary.

His material has been featured on XM Radio's Laugh Attack, and has also appeared in several feature films.

This year's dinner takes place Friday, June 1, at the Calgary Chamber of Commerce Club, starting at 5:30 p.m. In addition to entertainment, the price of $60/person for the evening includes:

- Open bar (pending sponsorship)
- Four course meal at tables of 8
- Table wine
- NACE 25 and 35 year member recognition
- Taxi chits

Click here to get more information, to sponsor and/or to attend.

Eight NACE Members to Receive Recognition at Annual Dinner

These NACE Calgary members will be recognized for their many years of participation in NACE, the Corrosion Society, at the June 1 NACE Calgary dinner:

25 Years…

- Carl Lechman
- Christopher Palmer
- Brian Stefan
- Brian Tkachyk

35 Years…

- Roger Ingeveld
- Arthur Kowalchuk
- Reg MacDonald
- E. Wayne Sudds

These members were honored last year.

Message from the Chair - Thane Schaffer
We want your ideas!!

It's been a busy three months since our last newsletter. In that time, we have sponsored a number of events and courses, made presentations to students in the new Corrosion Engineering course at the University of Calgary, and planned several networking and learning opportunities for the rest of the year. Here are a few notes on the past few months...

- 130 people attended the Managing Corrosion in SAGD Operations Technical luncheon in March which was very well received by members.
- More than 100 people attended the Protective coatings tradeshow and feedback we have received is very positive, as it is for all the tradeshows we have done. If you didn't make it this time, try to attend a future one.
- We are hard at work developing a 'cloud' archive where we can archive important executive documents, photos, technical papers and more. Members will have direct access to the technical papers archive. Dave Grzyb is looking after this and you'll hear more about it in the next newsletter.
- We had arranged to have a Refinery Corrosion course for NACE members in Western Canada, but didn't get sufficient numbers at this time to break even. We will be offering this course again in the fall. Take a look at it when we start advertising to see if it is something that would be of benefit to you.
- Program Chair, Matt Stroh, has taken a position with Canadian Fertilizers in Medicine Hat. Matt did a lot in recent years to develop a rich and well-rounded program for NACE Calgary members, and we wish him all the best in his new role. Cat Taylor will be replacing Matt as Program Chair in June.
- We will be doing our biennial member survey in the next month – please take a few minutes to respond to it as the results will help us to serve you better.
- **Click here** to email me if you would like to help out with a **satellite seminar** we are planning **in Medicine Hat** next fall, or if there is a course or event you would like us to consider in the next year.

Thane D. Schaffer

Of Courses...

- **June 2012 - Edmonton:**
  PCS 1 - June 3-5
  PCS 2 - June 6-8
  Click here for more information and to register.
- **June 10-16, 2012**
  Cathodic Protection Technologist (CP3) – Calgary
  Click here for more information and to register.
- **June 25-29, 2012**
  Internal Corrosion – Advanced - Calgary
  Click here for more information from NACE International.
- **Oct. 21-26**
  Internal Corrosion Basic – Calgary. Registration available in July 2012.
- **Oct. 22- 26**
  Basic Corrosion – Calgary. Registration available in July 2012.
- **Oct. 29 - Nov 4**
  Basic Corrosion – Calgary. Registration available in July 2012.

NACE Members Like Tradeshows!

More than 100 people attended the Protective Coatings Tradeshow on April 27. NACE received excellent feedback from both attendees and sponsors. The event included eight vendors, lunch, coffee and drinks, two presentations, and the opportunity to network with colleagues and suppliers. Thanks to a number of great vendors and sponsors, it was possible to deliver this amazing learning value for only $20/person.

VENDORS:

Sherwin-Williams Protective & Marine Coatings

IPC Integrated Protective Coatings Inc.

Cloverdale Industrial Protective Coatings

Denso

Shaw Pipe A ShawCor Company

DSI Dalco Services Inc.

HDIM Protective Coatings

★**International Paints**

Special thanks to our two guest speakers!...

- Amal Al-Borno (above), from Charter Coating Service (2000) Ltd. – *Selecting Epoxy Coatings – Common Mistakes and Best Practices*
- Dave Walker , ShawCor CSI Services – *Internal Pipe Spool Coating Best Practices*

BAR SPONSORS:

STOPAQ SEALFORLIFE

Charter Coating

★**Enerclear Services Inc.**

COFFEE AND DRINKS:

ADANAC Global Testing & Inspection

★**VISCOTAQ**
★**Polyguard RD6 Geotextile Backed Tape (In-Line Pigging Systems)**

LANYARDS:

Weatherford

New Corrosion Course at U of C

Executive members Thaier Al Issa and Jana Johnson recently gave presentations to students in the new Corrosion course sponsored by NACE at the U of C. Twenty students are participating at this time and the course has been a great success.

Jana's presentation focussed on corrosion monitoring, and Thaier's presentation was a case study on 'Corrosion and Stress Corrosion Cracking of Steel Pipeline under Disbonded Coating'.

Annual SAIT Bursaries

Doug Kellow presents NACE Calgary bursary to SAIT student Chun Wu Zeng at a recent SAIT awards event.

NACE Calgary is proud to provide six $1,000 bursaries annually to SAIT technology students in the McPhail School of Energy who have a career interest in corrosion related sciences. This year's recipier

★Taimoor Tahir, Chemical Engineering
★Zhi Fang, Chemical Laboratory
★Darren Gross, Mechanical Engineering
★Chung Wu Zeng, Petroleum Engineering
★Logan Daines, Power Engineering
★Darren McLean, Welding Engineering

Making a difference - one student - and one teacher - at a time!

"Students who understand and are excited about the sciences often become the world's most successful innovators."

This year's ASM/NACE Calgary Materials Camp for Teachers takes place June 18-22, 2012 at the SAIT Campus. This is one of many such camps that will take place throughout Canada and the US. To date 21 teachers out of a potential of 25 have already registered.

These camps have a measurable impact as they inspire teachers to inspire high school students to continue on the path toward fulfilling science and engineering careers.

Benefits to teachers who participate include:

- No Program Fees
- Free housing at residential camps
- The opportunity to learn hands-on from "Master Teachers"
- They leave with complete lesson plans and budget-oriented projects

We couldn't do it without sponsors

Thanks to all of our generous sponsors to date:
SAIT – for the classroom, labs and lab tours
ASM Materials Education Foundation
ASM Calgary Section
ASME
AUTO21 Network of Centres of Excellence
Cement Association of Canada
Enbridge
NACE Calgary Section
Talisman Energy
ERCB.

But we need a few more...

...to provide housing for teachers attending from outside of Calgary. Please contact Jana Johnson for more information at membership@nacecalgary.ca

SAGD Luncheon a Big Success

Cat Taylor, NACE Calgary Program Committee

The March, NACE Calgary technical luncheon on Managing Corrosion in SAGD Operations was very well received, with 130 in attendance!

The presentations were informative, innovative and entertaining. Joe Bojes (Baker Hughes) talked about "Key Learnings in the Evaluation of Corrosion and the Development of a Corrosion Inhibitor for Ultra-High Temperature, High CO2, SAGD Well Applications". And the presentation by Laila Abu-Abed (Cenovus) focused on "Corrosion Monitoring Maps".

NACE Calgary co-sponsored eight University of Calgary Corrosion Course students at the event, along with their professor. Thanks to Weatherford for their contribution towards making this possible.

The students later expressed their thanks, saying they appreciated the opportunity "to learn and to network with subject matter experts from industry sectors all around Alberta…", and to "discuss future career opportunities and challenges in Alberta Oil and Gas markets."

The success of our events is directly related to corporate sponsorships, and we are very grateful to Baker Hughes and RAE Engineering for making this event possible.

Executive Pipeline to the Membership… NACE Biennial Survey

Every two years, since 2006, NACE Calgary has been surveying members in order to:

- Gather your perceptions about membership in NACE International and about membership in the NACE Calgary Section
- Find out what kinds of programs and services you would value as a member
- Get your views on where we need to do things differently or better
- See changes in needs and wants of members over time.

The Calagary Executive uses the information from the survey to better understand the demographics of the NACE Calgary membership and to utilize member input as they plan for courses, events, industry promotions and other activities for or on behalf of members.

This year, the online survey will be distributed in May, with the hopes that the NACE Calgary Executive will have a good response prior to a planning meeting scheduled for mid June.

When you receive an e-notice for the survey, please take a few minutes to provide your thoughts and ideas.

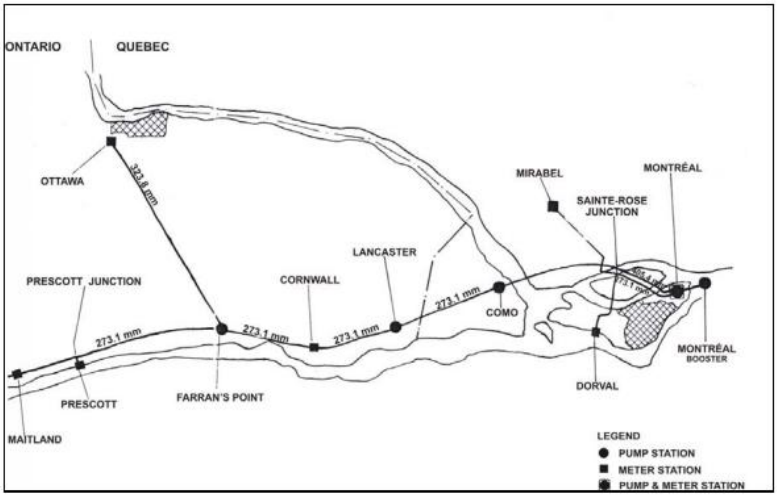
For your information...

Assembled by Thaier Al-Issa, M.Eng. P.Eng.

…Presenting some of the worst corrosion related failures recorded in Canada & around the world.

This column features a Canadian case of **Refined Product Pipeline Rupture – OPERATOR: Trans-Northern Pipelines Inc., Near Saint-Clet, Quebec - 07 December 2002.**

"On 07 December 2002, Trans-Northern Pipelines Inc. (TNPI) was delivering refined petroleum products from the Montréal, Quebec, refining basin into the Ottawa, Ontario, terminal storage facilities.
At 10:43 EST, the pipeline Control Centre Operator (CCO), located at the company's Mainline Control Centre (MCC) in Richmond Hill, Ontario, initiated a series of operations to start a scheduled full stream delivery of products into Cornwall, at Kilometre Post (KP) 119.09 (Mile Post [MP] 74.5). The CCO began by setting the Cornwall Inlet Control Valve (ICV) to 3585 kilopascals (kPa) (520 psig) to maintain mainline pipeline pressure and avoid an overpressure (OP) situation. At 10:52 EST, the CCO commanded the Cornwall Mainline Block Valve (MLV), located downstream Cornwall delivery point, to move to the fully closed position, resulting in the start of the full stream delivery of refined products into Cornwall. At that moment, Cornwall TOV moved to the fully closed position. The Cornwall meter manifold had just experienced a high-pressure condition, which prompted an alarm signal. The mainline pressure at Cornwall rose to 7019 kPa (1018 psig) and the Lancaster pump station then automatically shut down on a high pipeline pressure condition. The Supervisory Control and Data Acquisition (SCADA) system showed operational upset had occurred. In addition, the CCO observed that the pressure in the mainline pipeline suddenly dropped while the inlet pressure at Lancaster surged from 875 kPa (127 psig) to 7460 kPa (1082 psig) and then receded to 193 kPa (28 psig).
At 10:54 EST, the mainline pressure at Cornwall had reached 6047 kPa (877 psig). The Cornwall ICV was reset by the CCO to a mainline pressure of 8964 kPa (1300 psig) and the flow of product out of Montréal was commanded to shut down. At this point, the CCO suspected that a line rupture had occurred and initiated the isolation of the pipeline system by taking the Como pumping unit off line, at KP 51.17 (MP 32).
At 10:56 EST, a line balance alarm was issued to the CCO indicating a loss of product from the pipeline, which was later determined to be approximately 32 cubic metres of low sulphur diesel released from the pipeline.
At 12:55 EST, TNPI's aerial patrol identified a product stain on TNPI's right-of-way, in a field east of the Saint-Emmanuel drainage system, just east of Saint-Clet, at KP 63.57 (MP 39.5). There was a hole in the soil over the pipeline at the point of rupture, measuring 91 cm in diameter. Approximately 180 m (588 feet) east of the Saint-Emmanuel drainage ditch, which was partially covered by snow, an area 18 m by 12 m had been covered with fuel. The rupture occurred in the middle of a farmer's field with access available through a bridge that crosses the Saint-Emmanuel drainage ditch.There were no injuries."
(http://www.tsb.gc.ca/eng/rapports-reports/pipeline/2002/p02h0052/p02h0052.asp)



Schematic of the Trans-Northern Pipelines Inc. Pipeline System from the Montréal Pump Station to the Ottawa Terminal
http://www.tsb.gc.ca/eng/rapports-reports/pipeline/2002/p02h0052/p02h0052.asp

History of the Pipeline:

"The section of pipeline that ruptured was manufactured in 1952 by Stelco, using the Electric Resistance Welding process and a pipe grade of steel of 317 MPa (API 5LX, X-46).The pipe section had an outside diameter of 273.1 mm (10 inches) and a wall thickness of 7.8 mm (0.307 inch).
The pipeline was installed with 0.60 m (2 feet) of minimum cover. At the occurrence site, the pipe depth of cover was 0.61 m. In 1987, TNPI lowered the pipeline across the drainage ditches located at either end of the field in which the occurrence took place. The nearest field bends (sags and over-bends) were located on either side of the property at the ditch crossings.
The pipe was externally coated with a **C**oal **T**ar **E**namel coating and was protected against corrosion with a **C**athodic **P**rotection system. The pipeline was hydrostatically tested for 24 hours to a minimum pressure of 10 342 kPa (1500 psi). In 1952, the Board of Transport Commissioners granted TNPI leave to operate with an MOP of 8274 kPa (1200 psig). The elevation difference between the rupture site in Lot 11, which is estimated at 53.3 m above sea level (asl) and the Saint-Polycarpe block valve, which is estimated at 52.5 m asl, is nominal. Lancaster pump station to the west is estimated at 53 m asl."
(http://www.tsb.gc.ca/eng/rapports-reports/pipeline/2002/p02h0052/p02h0052.asp)

Analysis:

"The Cornwall TOV moved suddenly, without any instruction from the CCO, from the fully opened position to the fully closed position, as a result of a high manifold pressure condition that prompted the alarm signal to the CCO and a shutdown of the system. **A pressure surge was generated in the mainline**, travelled up the pipeline toward Montréal and ruptured the pipe at a zone of third-party damage.
A section of the ruptured pipe, approximately 8 m (26 feet) long, was shipped to the TSB Engineering Laboratory. The analysis (report LP 113/02) revealed that the rupture occurred at the three o'clock position with a rectangular "fish mouth" opening tear measuring approximately 1 m (40 inches) long. The fracture ran parallel to the pipe's longitudinal seam, and was located 9 to 10 cm (3.5 to 4 inches) away. The fracture occurred within a deformed and mechanically scored area. The pipe was deformed approximately 10 mm inward, which represents 3.5 per cent of the outside diameter. On its outer surface, longitudinal dents and grooves extended 2.7 m (9 feet) beyond the fracture zone.
The fracture face appeared fresh, with the exception of a series of semi-circular areas along the initiating fracture surface. Pre-existing cracks extended to a maximum depth of 40 per cent of the nominal pipe wall thickness, and initiated in the region of the noted mechanical scoring or damage on the pipe outer surface. At the 10ºC operating temperature of the pipe, Charpy impact test2results averaged 7 Joules (5 foot-pounds). These values are consistent with the materials used in 1952, but today's standards require a minimum of 27 Joules (19.9 foot-pounds) for a pipe with an outside diameter smaller than 457 mm (18 inches). The purely theoretical analysis using generalized assumptions, conducted by the TSB Engineering Laboratory, calculated that the static pressure required to rupture the damaged pipeline would have been between 11 032 and 15 169 kPa (1600 and 2200 psig)."
(http://www.tsb.gc.ca/eng/rapports-reports/pipeline/2002/p02h0052/p02h0052.asp)

Findings as to Causes and Contributing Factors:

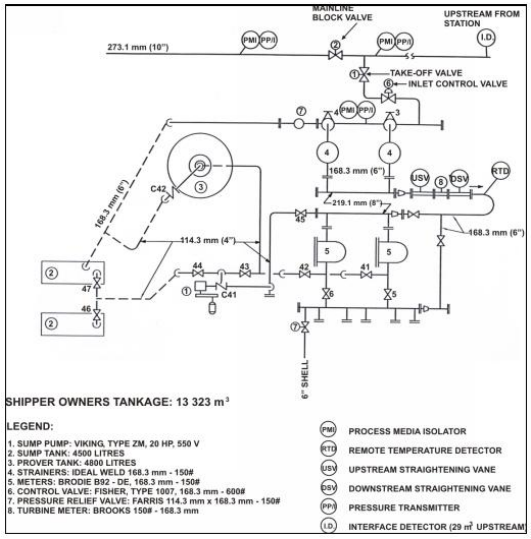
The un-commanded operation of the automatic Cornwall take-off valve resulted in an unscheduled shutdown of the station at a time when the line pack was increasing from Como operations, along with a pressure surge of between 11 032 and 15 169 kPa (1600 and 2200 psig), causing the rupture of the pipe. Since there was no check valve at Lancaster, or flow control and overpressure protection on the mainline, the high-pressure surge was carried upstream past Lancaster, subjecting the mainline to high stresses that led to the failure of the pipe.

The pipe failed from an instantaneous overstress extension of pre-existing cracks, which had initiated in the region of mechanical scoring and damage on the outer pipe surface and had been caused previously by unauthorized third-party construction activity. It was consistently concluded that the in-line inspection (ILI) indication at the occurrence site was a field bend and did not present a threat.

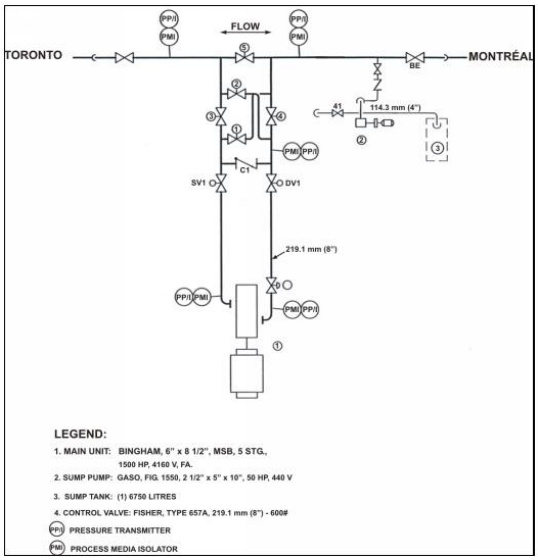
Even though the reliability of the ILI tool has been significantly enhanced since 1980, the lack of training on new ILI technology and the infrequent opportunities to practice methods of interpreting integrity inspection results likely influenced the ILI data analysts to conclude in 1993 and in 1998 that no threat existed at the occurrence site.

Had the company performed a field excavation or reviewed route alignment drawings for the pipeline or performed a standard engineering calculation, it would likely have discovered that the feature detected by the ILI tool was not a field bend."
(http://www.tsb.gc.ca/eng/rapports-reports/pipeline/2002/p02h0052/p02h0052.asp)

(For more details, please refer to TSB Pipeline Investigation Report - Report Number P02H0052)



Schematic of the Cornwall Meter Station,
http://www.tsb.gc.ca/eng/rapports-reports/pipeline/2002/p02h0052/p02h0052.asp



Schematic of the Lancaster Pump Station
http://www.tsb.gc.ca/eng/rapports-reports/pipeline/2002/p02h0052/p02h0052.asp

References: http://www.tsb.gc.ca/eng/rapports-reports/pipeline/2002/p02h0052/p02h0052.asp

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NACE News is produced four times a year by the Executive Committee of NACE Calgary Section.

To provide feedback, or to submit an article or story idea, email: nacenews@nacecalgary.ca.