Institute of Power Engineers

CALPINE'S –ISLAND GENERATION

EPCORS-GENESEE 3 PROJECT

EMERGENCY PLANNING

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Institute of Power Engineers

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Presidents Message

It has been my privilege and pleasure, to serve as your National President throughout this year. It is great anticipation that we introduce our new and improved Quarterly Newsletter.

I would like to start by thanking the Newfoundland/Labrador Branch, for hosting our National Convention. Secondly, I would like to thank the Board of Directors for their support this year. I would like to personally thank George Reid for his hard work on this our first National Newsletter in quite some time I would especially like to thank Chuck Puttenham for his dedication.

This year so far, has proven to be a year where we have shown some positive improvements. The Institute has relocated their Head Office to a better location, to fit our current needs. Our Web Site is being altered and improved under a new Webmaster. The much-anticipated "Newsletter" is here and has been inserted into the Web. On another positive note, the Institute of Power Engineers has endorsed the Courseware of Pan Global Training Systems.

In closing, I am very pleased with my first year as your National President. The Institute has remained true to its goals and objectives, providing Canadian Power Engineers, ***"the opportunities for continuing advancement through education, and the exchange of knowledge and skills".***

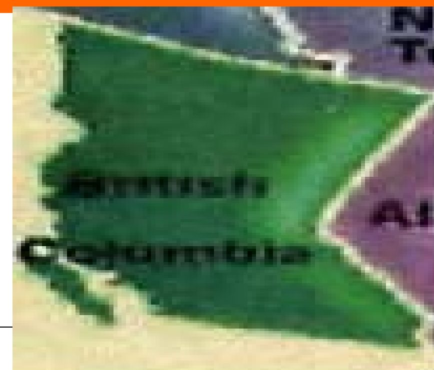
Sincerely,

Robert Fontanini

Robert Fontanini

National President

British Columbia Report



British Columbia Institute of Power Engineers

Some of the events that took place in British Columbia, in yester-year and looking to the future.

- For many years Victoria and Vancouver branches were dormant.
- I rejoined the Institute of Power Engineers on February 19, 1992 and became active. Served as President, Area Director and on various committees.
- Our recruiting was concentrated on 4th Class Power Engineers and students to form a solid foundation. At the same time we encouraged all Power Engineers to join the Institute.
- Today many of the original engineers are employed as; shift engineers, assistant chief engineers, managers and superintendents in various industries.
- The Vancouver Branch hosted the 1995 Annual General meeting and the National Convention.
- On December 12, 2002, the BCIPE was registered under the British Columbia Society Act. Special thanks must be given to the Edmonton Branch for all their support. Due to this process the BCIPE was granted its professional status and designation of "PE". Members of the BCIPE now can add the designation of **PE**
  to the present list of: ASct., P.Eng., C.Eng., and BAsc. designations presently held by our members.
- The Vancouver Branch has a new website in the start up state. Please visit our site www. ipevancouver.ca and pass on your comments to our web master.
- The Vancouver and Victoria Branch members are active in IPECC, SOPEEC, SAC and other committees.
- Both British Columbia's branches now communicate via e mail.
- The Vancouver employment postings are improving.
- Presently we are actively involved in the Boiler and Pressure Vessel Regulations.

  I want to thank all the BCIPE members who have diligently given their time to improve the Power Engineering profession.

Arthur Smith, PE
Area Director
British Columbia Institute of Power Engineers

Alberta Report

ALBERTA AREA DIRECTOR'S REPORT

Greetings from Alberta's Power Engineering community to all of our friends and associates across Canada.

I became Area Director in 2000, and thus far, the role has been an adventure, both in my own development and in the progress that we have made as an organization. Edmonton, which is the largest IPE Branch in Canada, and Calgary, which is the fastest growing IPE Branch, are both very active and work together extensively for their mutual benefit. Please take the time to visit our Branch websites at http://ipecalgary.com/home.html (Calgary) and www.geocities.com/albertaipe/ (Edmonton.) The Area Executive Council had been largely inactive prior to 2000, and it is now an important and active link between the two Branches, with Area meetings held twice annually in Red Deer. Some highlights from the past four years include:

- Registration of the IPE in Alberta as a Society under the provincial Societies Act, named the Alberta Institute of Power Engineers (AIPE.) Alberta was the first province to achieve this, and thus became the first IPE Area whose members are entitled to the "PE" credential.
- We have begun the process of obtaining a trademark for the "PE" credential, thus ensuring that it will be available exclusively to IPE members across Canada.
- Calgary Branch obtained their first corporate Branch sponsor (Ondeo-Nalco) which has provided them with cash for a number of new and ongoing projects.
- AIPE became an official member of the Power Engineering Advisory Committees at three colleges and technical institutes, bringing the total to four. We also were given a seat on the Alberta Power Engineering Curriculum Committee and continued our representation on the Alberta Boiler and Pressure Vessel Technical Council.
- We have had considerable success in attracting student members from SAIT, NAIT, and Medicine Hat College, although we need to make more progress in retaining them as members after graduation.
- Edmonton Branch hosted the 2003 national convention.
- Both Branches and the Area have instituted an annual program of service awards to supplement the national awards.
- The Edmonton Branch newsletter, Steam Lines, has evolved to become a newsletter for all of Alberta, and production has shifted to Calgary. (Steam Lines is available from the Edmonton Branch website.)
- We provided extensive input into the new Power Engineers' Regulation which went into effect in May, 2003.

Above all else, the Alberta Area and Branches have demonstrated conclusively that teamwork and cooperation are the keys to success. I would like once again to personally thank the many volunteers and leaders of the AIPE for their commitment and dedication to making our organization successful.

Lorne Shewfelt, Alberta Area Director

Ontario Report

Norm Stinson – Provisional Ontario Director

Born in Kingston, Ont., in 1938, I was raised in several places as my family moved around Ontario. Ruth, my wife of 45 years, and I live in Woodstock, Ont. We take great pride in our 2 adult daughters, son, and 2 granddaughters. In the summer we spend as much time as possible at our trailer in Bruce County.

I joined the IPE, Sault Ste. Marie Branch, in 1960. Since then I have been a member of Grand River Branch, Kingston Branch, Hamilton Branch, in conjunction with Jack Perrin made an attempt to revive the Brockville/Cornwall branches, and back to Hamilton Branch. I have held almost every office in the Kingston and Hamilton branches.

My father, Stewart Stinson, was a first class stationary engineer, and an active IPE member. Following in his footsteps, I started my career in 1957, as a helper at the powerhouse at Milliken Lake Uranium Mine, Elliot Lake, Ont. Since then I have worked at: Harding Carpets, Brantford;
- Queen's University, Kingston (where I obtained first class certification);
- Hamilton Psychiatric Hospital (my first COE position);
- DuPont of Canada, Maitland Works;
- Ford Motor Co., Oakville; and
- CAMI Automotive, Ingersoll (retired Sept.1/03)

Upon retirement, I registered NRG Down Inc. as a consulting business, in which Ruth & I are partners. We provide assistance in energy auditing and conservation, review of regulatory compliance requirements, and operating support to comply with Operating Engineers Regulations (Ont.).

I represented the IPE on the Ontario Board of Review from 1989 to 1991, and was appointed as Chair of the Board in 1991. This board was appointed under the Ministry of Consumer & Commercial Relations to advise the ministry on matters concerning the Operating Engineers Act. In addition, I participated in the Industrial Working Group which assisted the Ministry in the formation of the Technical Standards & Safety Authority, which was incorporated on August 30, 1996.

With the change to TSSA, the Board of Review was closed and we formulated the new Operating Engineers Advisory Council to the TSSA, of which I became the Chair. This council worked hard to provide input to the new Operating Engineers Regulations, under the Technical Standards & Safety Act. I stepped down from the Advisory Council in 2001, after the new Act was passed. The council continues, with Don Knibbs as Chair, to be a valuable support to the TSSA.

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Island Cogeneration

Calpine's Island Cogeneration power plant of Campbell River, British Columbia which is next to Elk Falls Mill is the largest cogeneration facility on the island. Commissioned in May of 2002 the plant has produced over 2800 gigawatts.

The major components of the facility include one Alstom model GT 24B, dual fuel, gas turbine (GT), one three pressure HRSG, a steam turbine, a common shaft generator connected via an automatic clutch, a counter flow induced draft cooling tower, natural gas compressors, and other auxiliary equipment.

The design is a single train combustion turbine-based combined cycle cogeneration power plant. In the arrangement, the 254MW turbine at design conditions averages 87,600 kg/hr of extraction steam to be sent to the Mill at 1310 Kpa and 201C.

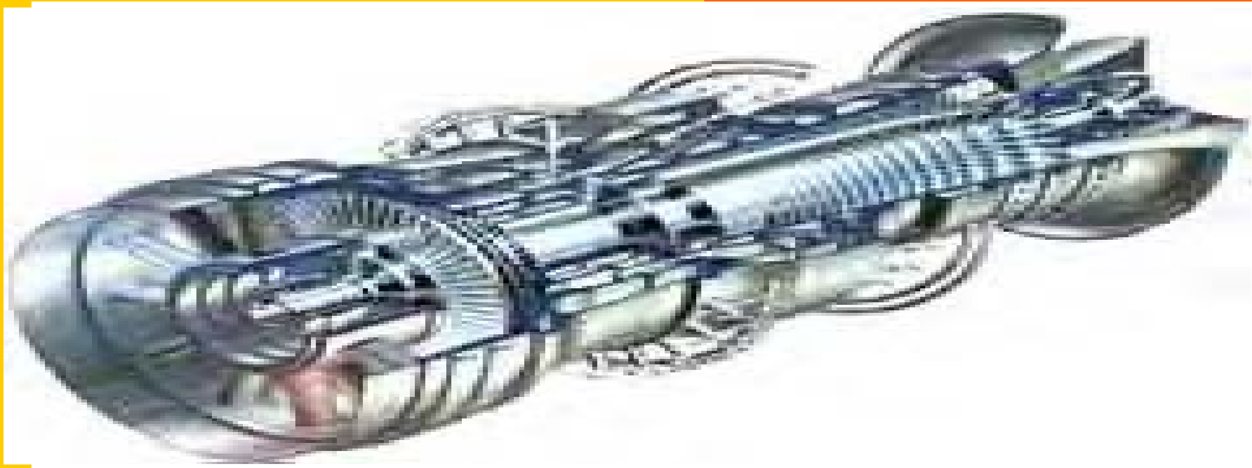
Giving a total nominal electrical output of 254MW(megawatts). The electricity is generated at 21KV, stepped up to 138 KV and connected to the BC Hydro transmission lines

The ST/GT arrangement provided by Alstom is somewhat unique in that the ST and GT are arranged in tandem and do not have separate dedicated generators. The GT is directly coupled, and the steam turbine is coupled through a clutch to the generator. The GT runs independently of the steam turbine for the purposes of start-up or ST bypass operation through disconnection of the clutch between the steam turbine and common generator

The combustion turbine incorporates two separate combustion chambers that operate simultaneously and sequentially. With sequential firing, fuel is combusted in the first or "EV" combustor section and the resulting hot gases are expanded in a single-stage high-pressure turbine. The hot gases are then directed to the second or "SV" combustor section where additional fuel is combusted and the resulting hot gases are expanded in a four-stage low-pressure turbine. The gases then exit the turbine to the HRSG. The GT is equipped with a dry low Nox combustor for firing natural gas, and utilizing water injection for Nox control when firing No. 2 fuel oil as back-up fuel. The emissions are continuously monitored with Nox emissions below 25 ppm when burning gas and 42 ppm when burning oil.

Heat Recovery Steam Generator and Steam Cycle

The hot gases from the GT are ducted to the three pressure level horizontal gas flow, natural circulation, drum type HRSG designed for outdoor installation. The HSRG must operate in a sliding pressure mode from 50% to 100% of full load and able to handle direct rapid start from cold conditions without limiting the GT ramp up time of 30 minutes.



Fuel	Natural gas
Frequency	60 Hz
Gross Electrical output	188 MW
Gross Electrical efficiency	36.9 %
Gross Heat rate	9247 Btu/kWh / 9756 kJ/kWh
Turbine speed	3600 rpm
Compressor pressure ratio	32:1
Exhaust gas flow	445 kg/s
Exhaust gas temperature	612 °C
NOx emissions (corr. to 15% O2,dry)	< 25 ppm

High-pressure steam generated in the HRSG is delivered to the ST to generate additional electrical energy. The ST is a base mounted, tandem compound, 3600 rpm, axial flow, axial exhaust, condensing turbine with one automatically controlled extraction, one single flow low pressure section.

The St is integrated into a single common shaft configuration with the GT and will drive the generator through a clutch. The clutch is a gear type flywheel which automatically engages when the turbine speed overtakes the generator speed and disengages when the turbine speed drops below the generator speed. The lube system is common to the GT,ST, generator and the clutch. This system also supplies the power oil and jacking oil systems.The power oil for the hydraulic rotor bearing has its own pump. The lube oil supply unit is composed of two 100 percent, AC motor driven main oil pumps and a DC motor-driven emergency oil pump,filters, and heat exchanger.

In addition, the steam turbine is also able to operate in a “following mode” with steam pressure varying with GT load, and be capable of operating at variable throttle pressure through startup to full load.

THE NBIC – A TOOL FOR ALL

Chuck S. Withers, NBIC Committee Secretary

The *National Board Inspection Code* (NBIC) is a worldwide recognized post-construction code/standard that addresses inservice inspection, repair, and installation requirements for pressure retaining items (PRIs). Since the National Board of Boiler and Pressure Vessel Inspectors is comprised of chief inspectors for the states and cities of the United States and provinces and territories of Canada, jurisdictional input plays a big part in the development of the NBIC. The NBIC Committee is strongly represented by government jurisdictions to ensure their input is recognized and understood. In turn, most jurisdictions have adopted by law or reference the NBIC to perform inspections and repairs/alterations to PRIs. Jurisdictions and industries worldwide recognize the importance of the NBIC; consequently there are over 300 National Board accredited repair organizations in over 50 countries. The NBIC is continually expanding and improving administrative and technical requirements to ensure the safe and continued operation of PRIs by relating and understanding jurisdictions' and industries' needs and concerns.

A PRI as defined in the NBIC is any boiler, pressure vessel, piping, or material used to contain pressure. This broad definition allows the NBIC Committee to continually improve and expand on items as industry and jurisdictional needs arise. The goal of the NBIC Committee is to constantly seek input from its stakeholders to understand their concerns, problems, and experiences in order to promote revisions to the NBIC. These revisions are then developed based on the rules of American National Standards Institute (ANSI) for consensus. The Committee encourages participation of experienced and knowledgeable personnel who are willing to participate and develop administrative and technical rules and regulations for the NBIC. As our working relationships with industries and organizations supporting those industries expand, the Committee depends on their support, increased use, and promotion of the NBIC.

Improvement of the NBIC by its committee members is realized through dedicated efforts and projects that have and will be completed in the future. For instance, to improve usefulness and understanding, the Committee is well underway to adding metric units and reorganizing and renumbering all sections of the NBIC for uniformity, consistency, and clarity. Part RB Inspection Requirements has been completely rewritten and reorganized. Technical requirements for pressure relief devices have been separated from the administrative requirements and incorporated into a new section. Other projects such as addressing requirements for controls and safety devices for fired boilers in Appendix I and incorporating requirements for inspections and repairs into ASME Section VIII, Div. 2 and 3 have been approved and will be incorporated into the 2004 Edition. Another project that is progressing concerns recognizing the validity of API 579 and potentially incorporating its information so it is easily understood by all parties who choose to apply Fitness-for-Service requirements. Task groups are in place to address how the NBIC can reference approved ASME Post Construction Standards and to address specific requirements for DOT vessels fabricated to the recently approved ASME Section

XII. All of these projects will improve the NBIC by providing technical data that expands on the needs of organizations, and will be based on industry input.

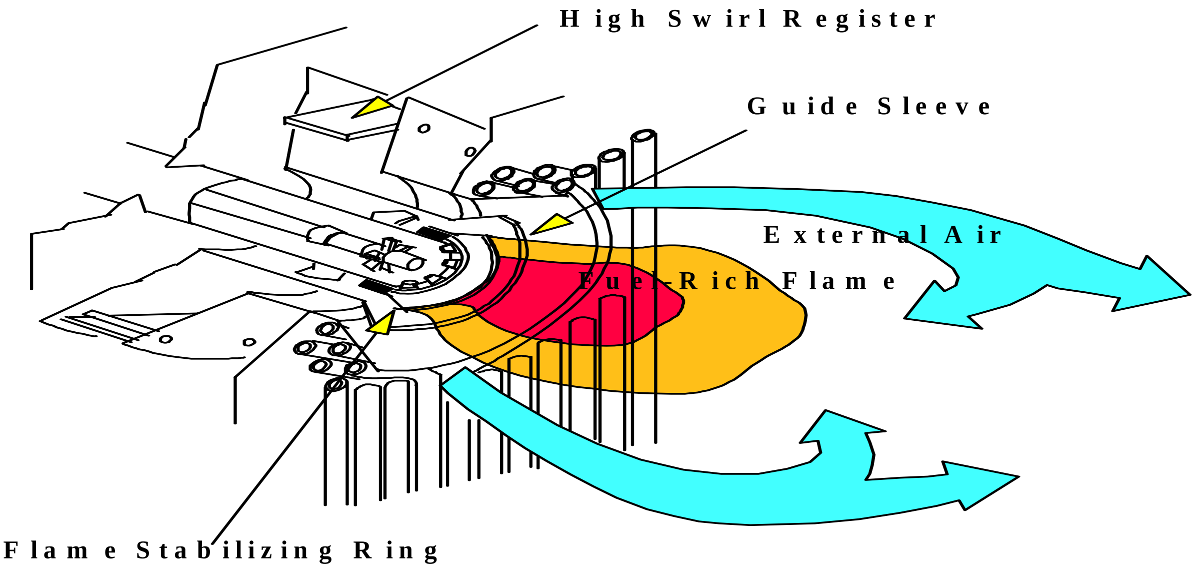
The NBIC, as it continues to be improved, is a powerful tool for inspectors, installers, contractors, manufacturers, owner-users, maintenance personnel, and jurisdictions to use well into the future.

Chuck S. Withers is secretary of the National Board Inspection Code *Committee and senior staff engineer for The National Board of Boiler and Pressure Vessel Inspectors.*

Genesee Phase 3 - Absolutely Critical

Eighty kilometers southwest of Edmonton, EPCOR Power Development Corporation and TransAlta Corporation are building Canada's most technologically advanced coal fired power facility. Known as Genesee Phase 3 (G3), the 450 MW (net) facility will use supercritical combustion technology to achieve fewer emissions per unit of energy produced. EPCOR and TransAlta have committed to offsetting CO_2 emissions from G3 to the level of a combined cycle natural gas facility. The $695 million plant is scheduled to come on-line in spring 2005.

EPCOR and TransAlta are working with Hitachi Canada on Genesee 3. Hitachi is supplying Boiler and Turbine Islands, including the emission control equipment. The plant will have a sliding pressure, once through type Benson boiler with spirally wound furnace walls producing turbine inlet conditions of 3500 psi and 1050 F. Main steam temperature control is achieved through mass-energy balance logarithms, multi-stage superheater spray systems are used to improve boiler dynamic response. Reheat temperature control is achieved through use of gas biasing dampers installed at the reheater and economizer outlets.



Hitachi NR 3 Burner

The burners used are the Hitachi NR3 burners which use in-flame NOx reduction. This burner system strengthens the high temperature reducing flame to achieve extremely low NOx emissions in addition to improving combustion efficiency. This enables a small amount of excess air at the economizer outlet (15 %) when at firing.

Another feature of the combustion system is the large capacity roller-type pulverizers (MPS225). SO2 reduction will be through the use of a spray dry absorber and fabric filter.

This system, with it's improved combustion technology and higher thermal efficiency, is EPCOR's answer to the new Canadian energy and environmental landscape.

Emergency Preparedness in the Workplace

Don't get caught with your Level A suit down!

Inevitably, as we move through our daily routines, we may encounter a set of circumstances or a significant event, which can impact on us at a very deep and personal level. This event may be so impact full that it will stand forever as a defining moment in the lives of all who witnessed it. One such event happened in Niagara Falls, Canada on November the 22nd, 2002.

On November the 22nd, 2002, I was training a newly selected Emergency Response Team at the Greater Niagara Falls General Hospital. A very progressive team of forward thinking Health and Safety Professionals, who had the foresight to imagine that an emergency could actually come their way, had selected this team. It most certainly came their way on this day!

A few kilometres up the road at a company a catastrophic accident had just occurred resulting in the critical injury and severe chemical contamination of a 31-year old worker. The worker fell victim to a mixture of phenol formaldehyde and suffered severe chemical burns. This accident had happened before in July of 1987 when a former plant manager at was splashed with concentrated phenol during the offload process. The plant manager was lucky to survive his accident but suffered horribly (open heart surgery on the helicopter ride to Toronto and woke up during the operation) from his injuries.
In the case of the worker, his fate would not be so kind. For every emergency responder who responded to the accident involving that worker that day, fate would not be so kind to him or her either. In the case of other employees who tried to rescue and decontaminate the worker, they suffered an

exposure to the chemicals on his skin through dermal absorption and became victims themselves.

The first on scene paramedics who attended to his lifeless form were not equipped with the necessary training or personal protective equipment to handle a victim of this magnitude and were victimized by his contaminated body. The Niagara Falls Fire Department, who at the time of this accident did not have a Hazardous Materials Response Team, were victimized as well. As we all know, the final destination for any industrial accident victim of this magnitude will inevitably be the hospital. What makes us think that our local hospitals are prepared to handle or accept our contaminated patients?

Niagara Falls General, like so many other hospitals the world over are not ready for this event. The contaminated body was transported directly into the hospital that day where the body heated up to ambient inside temperatures and began to off gas wildly, impacting on any human in direct or indirect contact. Were it not for the fast actions of health and safety staff that responded down from the very training room where I was training them on how to handle such an emergency, this could have been a disaster for this hospital.

Are you ready for the emergencies, which could unfold inside of your plants? Have you written ER Plans based on the local Fire Service handling all of your issues? If so, you better check with them to establish whether they have a capability to respond to your emergencies in the fashion that you had imagined. You might be in for a shock! Does the average ambulance attendant look like a chemical spill responder to you? How about your local hospital ER staff, do they look like chemical spill responders? Your victim is a spill and there is no other safe way of looking at it!

Of course, let's not forget your staff! Your employees are always the initial emergency responders to any occurrence inside or outside of your plant. What level of preparedness have you afforded them? What level of Personal Protective Equipment have you purchased for them? How often do they drill? How many of your staff can actually read and understand an MSDS sheet?

In my next article, I will address the legislation covering the provision of such in house coverage. I will also speak very candidly about how far you need to evolve in your Emergency Preparedness programs. When is it just the right things to do?

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PETER A.WHITE (B.A.)

Maintaining Closed Systems Using Filtration

INTRODUCTION

Hot and chilled (closed) water systems are found in many applications, ranging from space heating (and cooling) in commercial, industrial sites and residential applications. Closed loops frequently receive little attention in spite of the fact that their failure is potentially more inconvenient and costly. In considering the treatment requirements one factor is the range of temperatures that can be encountered in closed loops. These can range, from as low as 50ºC (120ºF) to those that run as high as 150ºC (300ºF) but, typically are between 80 - 85ºC (175ºF - 185ºF), for hot water systems. HHH Hydronic, or radiant heating, designs are becoming very popular in residential applications for both heating and snowmelting, and normally work at much lower recirculating water temperatures, i.e. 50ºC (120ºF) to 82ºC (180ºF). It is common for properly designed hydronic loops to operate in the 43 to 60ºC (110 - 140ºF) zone, while for snowmelt systems the temperature range is at, or below, the bottom end of the hydronic heating range.

By way of contrast, chilled water systems differ since they have higher levels of oxygen present (which increases the corrosion potential) but, lower temperatures, normally in the 4 to 10ºC (40 - 50ºF) reduces the potential for corrosion.

Although water is the most widely used heat exchange medium and there is widespread use of glycol/water combinations, where freeze (or burst) protection is needed. Other substitutes for glycols have received only spotty acceptance, due to their technical limitations and the incremental cost related to their "proprietary" status. While either ethylene or propylene glycols are used in concentrations from 20% to 50%, it is not rare to find systems where they are less than 20% concentration. At less than 20%, they are susceptible to biological degradation – which raises a new set of corrosion problems.

The expectations of building occupants, regarding working conditions, have increased over time, to where now it is taken as a "given" that the work environmental will be perfect all the time. Even slight difficulties meeting these needs can result in a cascade of problems with workers and electronic equipment. Combined with the need for reliability, is the fact that once a building is constructed, repairs or replacement of “embedded” systems is always a costly proposition. The need to ensure a high degree of corrosion protection is obvious and is why closed systems are treated to a high standard.

The cost to treat a closed loop is minimal and with proper maintenance, the annual water losses will be under 10% of the initial volume, which ensures that on-going water treatment costs are low. Given the risk benefit equation, especially those in commercial and institutional locations, the logical choice is to treat closed systems to obtain the lowest possible corrosion rates. Using effective inhibitor packages, it is possible to obtain corrosion rates of less than 0.2 mpy on mild steel and 0.1 mpy on copper or copper alloys.

ASPECTS OF WATER TREATMENT

In looking at a water treatment program for closed loop systems it is easy to focus on the traditional areas, such as:

1) corrosion control

2) microbiological control

3) deposition/scale control

While these are important, they do not take into account the broader scope of what needs to be done to ensure the maximum possible quality and lifespan of the fluid in the system. At one time it was acceptable to dump fluid once it had corrosion products or whenever it appeared to be too much bother to improve its quality – this is no longer an option at many sites.

The components of any program to maintain fluid quality are:

1) **Pre-operational cleaning –** effective cleaning of a system, serves to remove the usual construction debris as well as the surface corrosion that has developed on the piping. Equally importantly, it also removes oils/greases that can act as micro nutrients, an important consideration in chilled loops.

2) **Fluid Treatment –** adding treatment to the system fluid is critical to minimize corrosion and to properly passivate the metal. The lower the amount of metals in the fluid also helps to slow down the rate of glycol degradation.

3) Filtration – this low cost maintenance step removes corrosion products that are hard to flush out and can be an effective part of a micro control strategy, when properly applied.

BIOLOGICAL CONTROL

Corrosion products, primarily iron oxides/hydroxide (although copper oxides may also be present) can have a number of effects on a system:

1) they can serve to promote localized corrosion.

2) they can serve as a "sink" to soak up corrosion inhibitors or cause their breakdown.

3) they may slough off and migrate to low flow or high heat flux areas and form deposits that interfere with fluid flow or cause overheating in the boiler.metallic ions also speed up the decomposition of glycols to organic acids.

4) metallic ions also speed up the decomposition of glycols to organic acids.

The rate of break down of both ethylene or propylene glycol into a variety of organic acids is influenced by three factors:

1) temperature – as the temperature increases, so does the rate of breakdown

2) effect of metals – the presence of copper and iron ions speed decomposition

3) the degree of fluid buffering (i.e. pH)

The degradation products can range in size from those that are the same as the initial glycol (in the case of propylene glycol, 3 carbon atoms), all the way down to those that are 1 carbon. The ultimate breakdown product is carbon dioxide, which, is lost from the system. The results will vary somewhat depending on the amount of oxygen, metal ions and inhibitor used but, the overall trend is remarkably constant.

The presence of organic carbon is necessary to cause biological problems in a closed system. Microbiological activity in a closed loop system can degrade the program performance and needs to be prevented. In a closed loop, biocide are generally not suitable since each of them has side-effects that limit their overall utility.

Oxidizing biocides such as chlorine or bromine are rarely effective at eliminating all microbes, due to the fact that the biocides are catalytically decomposed by iron and copper corrosion products and even the metal surfaces. This means that the system can be readily re-inoculated from zones that did not "see" the biocide. More significantly, oxidizing biocides produced by-products, which will build up over repeated treatments and will increase the corrosivity of the water.

NOBs (non oxidizing biocides) offer a broader range of options but, the number that are actually suited for use is very limited. Non-oxidizing biocides that contribute large amounts of carbon should not be used and this is a major restriction. Other factors further reduce the options that can be considered.

The use of biocides is only useful in extreme cases where a system has become so severely fouled that it needs to be "sterilized" before it can be re-treated. There are ways to effectively eliminate, or reduce the need for biocides and this will be discussed in the following section.

FILTRATION

Although it may sound as if microbiological control of chilled water loops is impossible, it can in fact be extremely simple when coupled to a simple filtration program, that is not that dissimilar to what is done for suspended solids.

Soluble organics cannot be readily removed from the water but, once they are incorporated into the microbes, it is quite straightforward to remove them in the same manner as any other suspended solids.

The use of by-pass filtration, for closed loops, is not new and has been used for many years as a way to remove corrosion products. Cartridge filters have proven very effective in this role and provide an efficient means to trap particles and when the filter is replaced, the suspended solids are removed from the system. Depending on the size of the particulates, the nominal pore size of the filter can range from a high of 50 microns down to 20 - 30 microns. In most cases, by the time one reaches 10 microns, the water will be completely colourless and free of any measurable turbidity.

If the filters are going to be used for biological control, the 20 - 30 micron pore size is not adequate and a new standard is required. In cases where the primary problem is microbes, it is generally a good idea to start with 10 micron (pore size) filters and move down to 1 micron. By staging the migration from 10 to 5 and finally 1 micron, one can avoid excessive filter "blinding" and loss of filtration, which will only extend the time required to remove the biomass.

With a 1 micron filter, microbes will be trapped on (in) the filter cartridge and when it is removed they are removed along with it – at the same time they are removing any organic carbon that they have incorporated into their bodies. With each successive replacement of the filters, the amount of soluble carbon is reduced, as it becomes built into microbes and the microbes are removed. In effect the activity of the microbes is the actual process used to remove the otherwise uncollectible soluble organics (which is their food).

In cases where the suspended solids are difficult to filter or the biomass is removed only slowly, the results can be enhanced by the use of a polyquat (filter aid) to selectively:

1) coagulate suspended solids, specifically iron corrosion products

2) coagulate microbes and increase their average clump size

3) act as a biodispersant and remove biofilm from surfaces in the system

While conventional coagulants are used in this capacity, they lack the selectivity of a polyquat and may in fact result in blinding filters and causing the corrosion products to settle out in boilers or low flow areas. A polyquat provides good selectivity and a sufficiently low molecular weight to avoid these disadvantages.

Also being cationic, any excess polyquat will bind onto the filter media and not provide additional food. This is why a polyquat is a better alternative than biocides that either are not removed and become "bug food" or cause corrosion problems.

SUMMARY

By combining mechanical treatment and a suitable corrosion control program, it is possible to ensure that any closed loop system will easily outlast the plant it is in and provide the best possible value to its owners.

D. Hutchinson
D. Hartwick
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LETTER TO THE EDITOR

Power Engineers and the IPE – Wake up Call

The purpose of this letter is to inspire Power Engineers to support the IPE,and explore possibilities of making membership mandatory. Many of us enjoy working in this Regulated Profession because it pays well, it's secure, and it covers a wide range of "Power" technology. This makes it quite interesting and is the motivating factor for most Power Engineers. This letter will provide you with some facts on why we need to protect our fellowship, take pride in it, and develop it. We are missing some of the mechanisms to do this in comparison to other professions. We exist for but two things, Safety and Know how. Let's not allow this to be watered down.

Here are some of the issues:

* **Declining interest at meetings. It is** disappointing to see that members are not even willing to give up a few hours a month to gather with their fellow engineers to discuss business and technical issues that effect our profession and our very livelihood. We need to rekindle interest.

Mandatory membership. Many other professions/associations already do this, one should keep their organization working for them by paying yearly dues. **EVERYONE NEEDS TO PAY.** Remember, these are not private sector services, or business people with their own agenda working for you. They are the IPE working for you, helping to keep a level playing field for the Power Engineer in today's aggressive business world. Support your fellowship so it can support you.

- **Maintaining a strong voice** with respect to the Regulations and Training. Safety is priority. Statistics cannot be generated in Power Engineering. Loss of life and property would be unacceptable. Could we be getting close to this? It is difficult to justify ones existence in today's business world without statistics.
- * **The IPE needs money to operate acceptably**. It will help us in dealing with many important issues such as the title issue in Ontario dealing with "Operating Engineer vs. Power Engineer". Money is needed to put closure to this legal matter. Money is also needed for reactivating our national magazine "Canadian Power Engineer", and is needed for events, training, and general operation of our organization.

LETTER TO THE EDITOR

- * **Training**. Both the IPE and TSSA struggle with this one. We are assumed to be allied with TSSA, are we really? Should we be working closer together on training? One suggestion would be TSSA and IPE do things jointly if possible. We both have training systems, we both set standards, we are both not for profit, almost sounds like redundancy doesn't it?

- The Sault Ste. Marie Branch has forwarded an earlier version of this letter to other members in the IPE for feedback. There were e-mails going back and forth from various individuals. The general flavor was negative, and would lead any reader to believe that this was an uphill battle, met with much resistance by our own members. We the members of the IPE have to decide what it is we want our organization to stand for. Do we want to expand? Do we want mandatory membership in the province and ultimately the country? Please bring forward ideas to your next local branch meeting, we can then send to Head Office.

In closing, one needs to ask themselves “Am I doing all I can to support my Fellowship and my field?” I think if you answer this question truthfully, you might find your self lacking.

Rick Merling
IPE Member
Sault Ste. Marie Branch

INSTITUTE OF POWER ENGINEERS

APPLICATION FOR MEMBERSHIP

Member .... [ ]

Associate Member............. [ ]

Name .... Date of Birth: ..../......./.................

Day/Month/Year

Address...

(Street) (City)

.... Phone ( ) ______________________

(Province) (Postal Code)

Present Employer ....

Address...

(Street) (City)

.... Phone ( ) ______________________

(Province) (Postal Code)

Position or Title ....

Certificate No. .... Class ....Province ....

Give a brief outline of your current responsibility:

Power Plant Operation, Management, Design..

....

....

....

State why you wish to become a member of the Institute ....

....

....

Have you previously held Membership in the Institute? ....

If yes, which Branch? ....

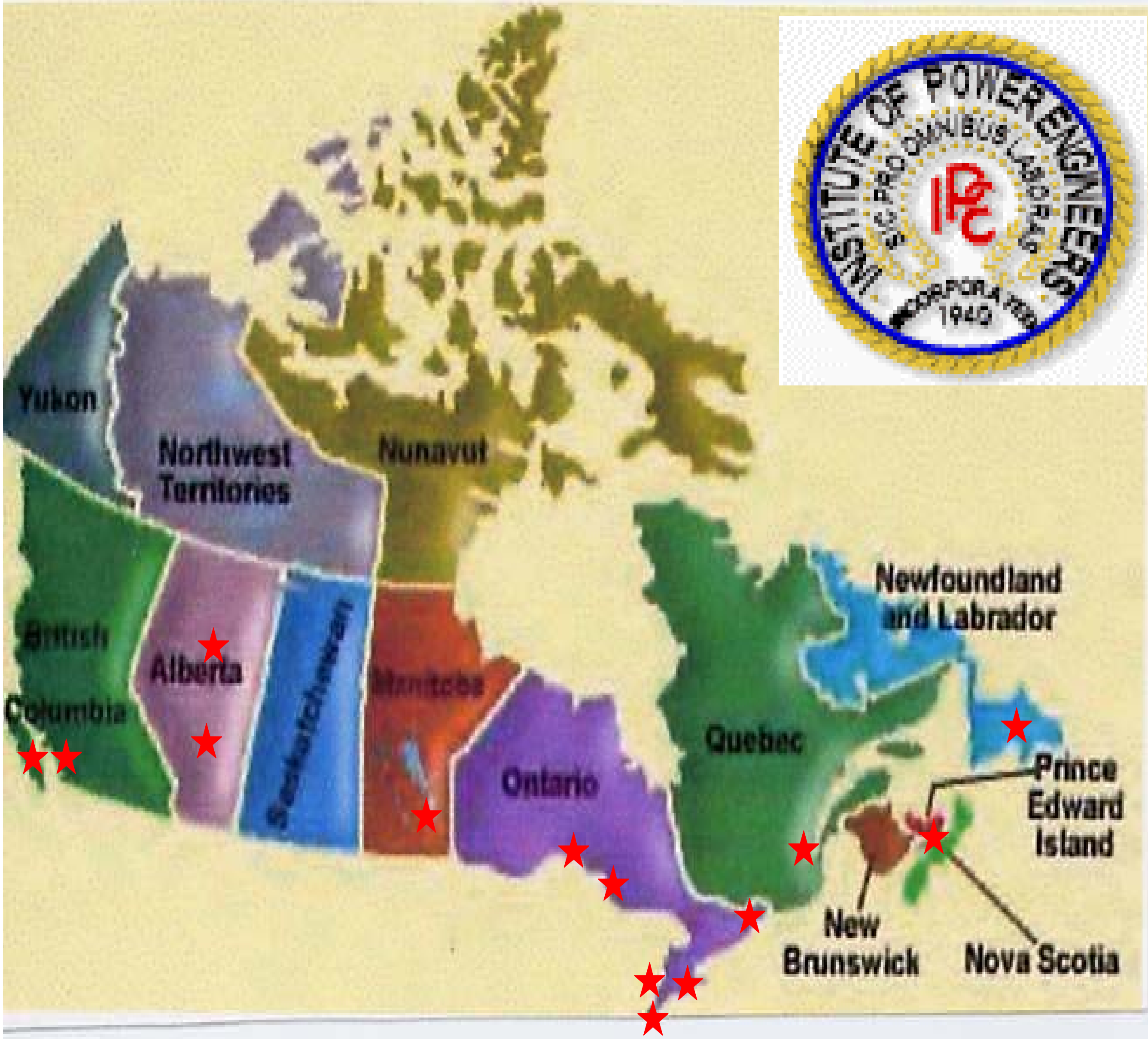
To what engineering or professional associations do you belong? ....

....

....

(over)

Where Is Your Local Branch?



Victoria	Sarnia	Lakehead
Vancouver	London	Sault Ste Marie
Edmonton	Hamilton	Sudbury
Calgary	Toronto	Montreal
Winnipeg	Welland	Newfoundland
Windsor	Ottawa	Nova Scotia