



CNS BULLETIN SNC

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Editorial

Future Directions

The CNS has reached a critical stage in its development, and it is a stage at which extensive member input is essential if the Society is to move in the directions which reflect members' priorities.

The question of incorporation — establishing the CNS/SNC as a legally discrete organisation — must be addressed. Since its inception the Society has been identified as "The Technical Society of the CNA." Support from the CNA was essential to start the Society and has since been of inestimable value. More significantly, as far as we are aware, the CNA has provided this support without attempting to compromise the intellectual independence of the Society. But clearly, at some time the CNS/SNC must evolve to become a totally independent Society. The question is when? With membership at its current level, and with a nuclear industry in certainly no expanding condition, the Society is vulnerable. Survival as an independent entity, or even (in a worst case situation) as an offshoot of the CNA, will be predicated on, at the very least, some modest increase in membership. It could be argued that the decision to incorporate should be related to a firm commitment on the part of all members to work to encourage people to join. Certainly there does exist the possibility that the interdict placed on AECEB employee membership in CNS/SNC might be lifted following incorporation and this will help, but fundamentally the CNS/

SNC must attract more members of Canada's nuclear community if the Society is to continue as a viable (and credible) organisation.

Related to the question of incorporation is that of launching a CNS/SNC technical journal. It is certainly true that a scholarly publication for the promulgation of research results and exchange of information is a *sine qua non* for any learned society. It is also true that launching such a publication requires considerable resources (both financial and intellectual) and imposes considerable financial risks. It would not be surprising were the CNA to express unwillingness to share in the financial risks of such a venture — and share those risks they would while the CNS/SNC remains legally a part of the CNA.

So the first question to be answered is can the CNS/SNC survive as an independent entity? Assuming this can be answered positively, then the next one is: can CNS/SNC muster and maintain the considerable resources to establish a credible technical review mechanism, establish a publication team and secure enough publishable articles? The answer to this three-part question must come from the membership.

As was noted before, the questions of independence (incorporation) and a technical journal are not "if?" but "when?" And the "when is almost wholly dependent upon the commitment CNS/SNC members are prepared to make.

Perspective

Response to Tom Claridge

Mac Keillor, an eminent journalist whose experience includes ten years with the Globe and Mail, responds to Tom Claridge's address to the CNS Officers' Seminar, which appeared in the July/August 1985 CNS Bulletin. Keillor works in AECL's Public Affairs Office in Mississauga, Ontario.

When Tom Claridge addressed the Canadian Nuclear Society, he felt "...a healthy dose of skepticism..." pervading the room. In certain applications, skepticism is healthy, but this credibility gap between scientists and the media is more a cause for concern than a sign of good health.

There is ample evidence that credibility is a concern on both sides. The nuclear industry for some time has been reviewing its image and seeking means to correct widespread misconceptions. Public acceptance of the technology has been the subject of seminars and workshops in Europe, the United States and Canada.

From the media side, much of its membership has been lamenting credibility problems for some time. Scarcely a panel discussion or workshop in which the media participates reaches its end without mention of low credibility. Tom's old boss, Clark Davey, former managing editor of *The Globe and Mail* and now *Montreal Gazette* publisher, has aired the concern in *Press Review*. That federal legislation was once considered and the growth of press councils are reflections, to some degree, of the situation.

In the United States, in a cover story following the Grenada affair, *Time* magazine found that media credibility had "...fallen dramatically in recent years, threatening one of the foundations of the country's democratic system."

The publisher of one U.S. daily Paul Block Jr., commenting in *Editor and Publisher* magazine on media coverage of nuclear technology, expressed his concern in a series of questions: "Does the news media really report on the dark side of nuclear

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energy, but not the good news? Do we unintentionally emphasize the risks, the perils and the potential for disaster associated with modern technology, playing upon the reader's fear of the unfamiliar and the unknown?...Are we daily inflicting serious damage to the public's perception of forms of technology whose benefits to mankind — both actual and potential — outweigh risks by a large margin?"

Although Mr. Block had no clear-cut answers to these questions, he suggested that "...sooner or later the news industry must come to grips with one other simple and unsettling fact: If these questions were posed to virtually any representative group of nuclear scientists or engineers, the likely verdict would be 'guilty as charged'."

It is more likely this situation, rather than the war-time origins of the technology which Tom cites, that explains much of the "penchant for secrecy" Tom complains about. Watching, time after time, explanations of the technology turned into a play on the reader's fear eventually induces reticence. If you suspect you are about to be lynched, you hesitate to furnish the rope.

In that he has taken the trouble to acquire some understanding of nuclear technology and in that he does not play on the readers' fear, Tom Claridge is not typical of journalists informing the public on the subject. His comment to the CNS, however, suggests an unawareness of the industry's experience with journalists who are typical.

Honest mistakes stemming from a lack of understanding of the technology are not the subject here. It is recognized that a journalist trying to assemble a report on this complex subject in the face of a deadline only hours away might not be technically dead on target. No, Mr. Block's questions are about something else. The following is illustrative:

During the 10 or so days following the pressure tube rupture in Unit 2 at the Pickering Nuclear Generating Station in 1983, a public receiving news from Canadian radio, television or print media was told that the CANDU reactor system:

- finally has been exposed as unsafe;
- is as dangerous as 1,000 Hiroshima bombs;
- violates the Canadian licencing requirements;
- produces the most deadly substance on earth — tritium;
- finally has been exposed as too costly to continue with;
- had been infiltrated by Libyan terrorists;
- will not sell nearly as well now;
- and will not be wanted by anyone anyway.

This picture was presented to the public as fact and in some cases repeated daily. In each case opinion from anti-nuclear activists was somehow transformed into statement of fact from the media. Weeks of scare-mongering aimed at the CANDU

gradually evolved into what became known as Hydro-bashing, which is still going on.

This was the period during which Tom found that "...even Ontario Hydro was getting a bit paranoid." Although little, if any, of this fictional propaganda appeared in the *Globe*, that Tom should be surprised at the industry's reaction is itself surprising. Paranoia is an unlikely explanation.

Tom offers Three Mile Island as the "classic example the (nuclear) industry cites of the negative impact of bad journalism..." which the industry undoubtedly sees as "...a glaring example of media 'overkill'." He correctly points out that the TMI accident was a financial disaster. But the financial disaster is not the usual news "peg" for media stories on TMI. The play on readers' fear is. The TMI accident is recreated in the media each year with anniversary stories, few of which are based on the financial aspects. Some even resurrect wild-eyed horror stories, which flooded the country at the time of the accident, depicting all sorts of harm to man and beast, even though each wild story has long since been painstakingly tracked down and completely debunked.

Tom speculates that TMI might never have been, had an experience at the Davis-Besse nuclear plant in Ohio been discussed with the science editor of the *Toledo Blade*, if, Tom says, the *Toledo Blade* has a science editor. As it happens, the U.S. daily of which Paul Block Jr. is publisher is the *Toledo Blade* which, Mr. Block says in *Editor and Publisher*, pioneered the concept of a full-time science editor, has placed great emphasis on accurate and responsible coverage of science, and has won many awards for its science reporting.

It is not surprising that Tom wonders whether AECL ever has good news. That's a commodity from AECL which is not widely known, not because there isn't any, but because it is so seldom reported on.

One could start with the CANDU itself and the Canadian brains, foresight, courage and perseverance which have placed it at the head of the world's nuclear power systems; or the more than \$2 billion the CANDU has saved the Ontario taxpayer so far in electricity production; or the cobalt program which has added the many millions of person-years to the lives of cancer victims; or the contributions to medical diagnostic procedures; or food irradiation; or any number of potential benefits to Canadians still untapped because of the fear of nuclear technology perpetuated by anti-nuclear activists through the media.

Not only is AECL's good news still to be told by the media, but to refute anti-nuclear fear-mongering in the media, AECL was forced into paid advertising. Prominent print outlets carrying such scare-pieces turned down the president of the Canadian Nuclear Association eight times

when he submitted the industry's side.

Tom thinks that because of the extreme positions on nuclear technology in society, "...the truth surely lies somewhere in between." That conclusion is not really axiomatic. Some people maintain the earth is round and some maintain it is flat. The truth, as far as we know, is not somewhere between.

Tom concludes with the advice that the industry should "level" with the Fourth Estate "...so long as the journalist you're dealing with has a reputation for fairness." The industry has learned to its chagrin that such a reputation doesn't always mean fairness or objectivity. Polls surveying public assessment of media outlets consistently place such outlets as *60 Minutes* high in trust and respect. That reputation was of no help at all to Illinois Power when it suffered a perfidious smear-story on its reactor at Clinton by Harry Reasoner and producer Paul Loewenwarter.

Illinois Power put together a video reply which has become almost legendary within the nuclear industry, but which is little known in the public domain because CBS refused to broadcast it. The reply ended with familiar words of Abe Lincoln which might well be apropos to this discussion, with application to both the media industry and the nuclear industry:

"If you once forfeit the confidence of your fellow citizens, you can never regain their respect and esteem. It is true that you may fool all the people some of the time; you can even fool some of the people all of the

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La SNC procure aux Canadiens intéressés à l'énergie nucléaire un forum où ils peuvent participer à des discussions de nature technique. Pour tous renseignements concernant les inscriptions, veuillez bien entrer en contact avec le bureau de la SNC, les membres du Conseil ou les responsables locaux. La cotisation annuelle est de \$40.00 (\$5.00 pour les étudiants).

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TECHNICAL SUPPLEMENT

CNS Bulletin January / February 1986

Canadian Nuclear Society

SAFETY AND LICENSING PHILOSOPHY AND EXPERIENCE AT ONTARIO HYDRO NUCLEAR GENERATING STATIONS

Paper Presented at the IAEA Seminar on Modifications Required for Safety of
Nuclear Facilities (Backfitting), Munich, F.R.G.,
November 11-15, 1985.

W. Lee

Ontario Hydro

Abstract — *The safety and licensing philosophy adopted by Ontario Hydro in establishing the need for retrofit design modifications to CANDU nuclear generating stations in operation since the early 1970's is discussed. This philosophy was developed in response to regulatory requests to determine whether this need exists in view of the more extensive safety and licensing design features incorporated in recent CANDU nuclear generating stations compared to the earlier designs. These additional features generally reflect evolving safety knowledge and licensing requirements over time.*

The general safety and licensing retrofit philosophy developed by Ontario Hydro is based on a number of principles which recognize the basic design effectiveness and adequacy of the earlier nuclear generating stations as demonstrated by their safe and reliable operating experience to date. In addition, it is recognized that the retrofit review and assessment process must be carried out in an orderly and controlled manner according to areas of priority and that basic differences in the reference designs of the recent and earlier station designs must be acknowledged, as well as the licensing criteria and standards under which the original designs were licensed. These principles establish the practicality and extent of design retrofits, if deemed necessary.

Examples are given of the application of this retrofit philosophy to the Pickering "A" and Bruce "A" nuclear generating stations and the experience acquired to date in implementation of design modifications.

Note: *The views expressed in this paper are from a utility standpoint and do not necessarily reflect those nor imply concurrence of the regulatory authorities.*

INTRODUCTION

Ontario Hydro, the electrical utility owned by the Province of Ontario, has been operating nuclear power stations since 1962, when the 22 MWe Nuclear

Power Demonstration Nuclear Generating Station (NPD NGS) of the CANDU design went into service. Since then, Ontario Hydro has concentrated on constructing and operating multi-unit CANDU stations as part of its nuclear generation program.¹

TABLE 1
ONTARIO HYDRO
NUCLEAR GENERATION PROGRAM

Station	Unit	Net Capacity MWe	In-Service Date
NPD NGS	Single Unit Station	22	12/62
Pickering NGS "A"	1	515	7/71
	2	515	12/71
	3	515	6/72
	4	515	6/73
Pickering NGS "B"	5	516	5/83
	6	516	2/84
	7	516	1/85
	8	516	1/86
Bruce NGS "A"	1	754 (775)*	9/77
	2	754 (775)*	9/77
	3	754 (775)*	2/78
	4	754 (775)*	1/79
Bruce NGS "B"	5	830	3/85
	6	830	9/84
	7	830	4/86
	8	830	1/87
Darlington NGS "A"	1	881	5/88
	2	881	2/89
	3	881	9/91
	4	881	8/92
Total (In Operation and Under Construction)		14006	

*Figures in brackets include the electrical equivalent of steam production

This program, and its expansion with time expressed in terms of the unit in-service dates, is summarized in Table 1.

The approach to nuclear power safety in Canada is based on the fundamental principle that the licensee (owner/operator) bears the basic responsibility for safety, while the regulatory authority [the Atomic Energy Control Board (AECB)] primarily sets safety objectives and some performance requirements and audits their achievement (Reference 1). Within this framework, this paper discusses the approach taken by Ontario Hydro in developing a safety and licensing philosophy for determining the need for retrofit design modifications to the earlier nuclear generating stations in operation since the 1970's. This philosophy was developed in response to regulatory requests in view of the more extensive safety and licensing design features incorporated in current design CANDU nuclear generating stations, eg, Pickering NGS "B", Bruce NGS "B", compared to the earlier designs. These

additional features generally reflect evolving safety knowledge and licensing requirements over time. Of interest to note is that some of the later stations share the same sites, and sometimes even some of the same facilities with the earlier stations, thus making the retrofit issue a rather complex one to deal with. In particular, the decision as to whether a retrofit design modification is required must be based on compelling reasons taking into account considerations of risk, operating experience, plant design and licensing.

PRINCIPLES OF SAFETY AND LICENSING RETROFIT PHILOSOPHY

The process which Ontario Hydro is following for reviewing and assessing the need for safety and licensing retrofit design modifications to earlier plants was developed from a number of basic principles. These principles can be stated as follows:

- Retrofit reviews must be treated in a prudent and responsible manner recognizing the basic design effectiveness and adequacy of existing plants, their operating experience, and design improvements implemented or committed since first in-service.
- The review and assessment process must be carried out in an orderly manner on a case-by-case basis recognizing inherent differences in reference designs as well as differences in licensing criteria and guidelines. In particular, the review should recognize the licensing standards in place when the plant was originally licensed.
- The areas for assessment should be prioritized based on a recognition of those areas with the greatest potential impact on operational safety.
- The need for retrofit design modifications must be based on compelling reasons involving cost/benefit and licensing considerations.
- Significant review findings should be discussed with regulatory authorities on an ongoing basis to ensure common understanding.
- Periodic revision of the Safety Report using current analysis methods will further ensure that licensing documentation is brought up-to-date in accordance with applicable licensing requirements and will further confirm the design adequacy from a safety standpoint.²

1 From 1968 to 1984, the 206 MWe single-unit Douglas Point Nuclear Generating Station was also operated on behalf of its owner, Atomic Energy of Canada Limited (AECL).

2 The AECB now requires that Safety Reports for nuclear generating stations be updated once every three years.

APPLICATION OF RETROFIT PHILOSOPHY

A systematic retrofit review and assessment process is currently being applied specifically to Bruce NGS "A" based on the underlying principles as outlined. This is not to suggest, however, that no previous reviews were ever carried out on operating stations for the purpose of determining design adequacy from a safety standpoint. On the contrary, a number of such reviews have been performed on an ad-hoc basis on all operating stations since their operating licenses were first received. These ad-hoc reviews were either generated internally or in response to regulatory requests, covering such issues as reliability of special safety systems, LOCA analyses, TMI-2 follow-up, post-LOCA design reviews, etc. In addition, Ontario Hydro routinely reviews significant events occurring at all operating stations for safety and other implications, eg, production reliability.

The reviews described above generally were carried out in accordance with the safety and licensing retrofit philosophy principles outlined previously. These reviews were initiated as a result of either operating experience (both CANDU and relevant non-CANDU experience) or new safety knowledge derived from R&D work and state-of-the-art analytical capability. The outcome of these reviews frequently have resulted in design modifications or procedural changes to operating stations. The operating records of Ontario Hydro CANDU stations attest to the effectiveness of this process in the maintenance of overall plant safety and reliability.

As identified in the discussion on principles, the need for retrofit design modifications must be based on compelling reasons involving cost/benefit and licensing considerations. The latter are determined by conditions at the time of the initial licensing, specifically, accepted ground rules, accident base cases and conservatism of assessment. The former influence in particular the actual choice of design modification and recognize practical constraints unique to operating stations such as ease of implementation, impact on production, dose considerations, maintenance and testing requirements, etc.

Finally, the process of implementation of the modifications, subject to regulatory concurrence, is generally carried out according to assigned priority level recognizing availability of resources, materials procurement schedules, and impact on continued power production.

BRUCE NGS "A"

Since 1983, a systematic review and assessment process to determine the need for retrofit design modifications to the Bruce "A" Nuclear Generating Station has been in progress based on the principles and criteria discussed previously. This review arose from a regulatory request in view of the number of design changes, many based on safety grounds, incorporated into the Bruce "B" Nuclear Generating Station reference design, and the extent and scope of the supporting safety analyses based on current methodology.

In response to this request, a selection of priority areas for detailed review was made based on:

- a systematic review of the reference design differences between major Bruce NGS "A" and Bruce NGS "B" systems such as special safety systems, the primary heat transport system and the secondary side,
- a systematic review of safety related design changes incorporated into the Bruce NGS "B" reference design and their applicability to Bruce NGS "A".

In parallel with the review effort, the Bruce NGS "A" Safety Report is being completely revised to reflect current analytical knowledge. This process will further ensure that the current plant design is adequate from a safety standpoint and address any other systems not included as part of the major system review identified above.

To date the review and assessment process has resulted in a number of committed design changes such as the provision of Instrumented Pressure Relief Valves in the containment system, provision of hydrogen ignitors to mitigate the consequences of loss-of-coolant accidents involving potential hydrogen release, and provision of an engineered Filtered Air Discharge System (FADS) to control radioactive releases post-LOCA. The latter system is based on a cost-benefit analysis of upgrading the existing FADS versus provision of a new system. In addition to these design modifications, a number of other changes have been identified concerning trip effectiveness and containment response, and generally involving minor hardware or procedural changes.

Although some issues are still under consideration by the regulatory authorities and are awaiting resolution, the review process has generally been satisfactory and orderly. The results to date generally confirm the basic design adequacy of the station and the majority of the Bruce NGS "B" safety related changes have been found to be unwarranted for retrofitting on Bruce NGS "A". Frequent discussions

with regulatory staff have also contributed to a common understanding and agreement on the need for essential safety design changes. The current schedule calls for completion of the review and assessment process during 1986.

PICKERING NGS "A"

In the case of the Pickering "A" Nuclear Generating Station no systematic reviews for retrofit considerations have been performed nor are they being considered, as in the case of Bruce NGS "A". The safe and reliable operating performance over the years, coupled with the type of ad-hoc reviews, analyses and routine reviews of significant operating events referred to earlier, suggest that such a process is not warranted. As a result of one such ad-hoc review, however, a major retrofit design modification of the emergency coolant injection system (ECIS) is currently in progress. This change was prompted by safety and licensing developments in other CANDU designs. The specific system modifications being implemented consist of upgrading of the existing low pressure ECIS to a high pressure ECIS, while basically retaining the existing recovery system consisting of the moderator system. The modified ECIS will result in improved system capability in dealing with LOCA situations, and provide other tangible safety benefits in terms of reduced operator interface in the short term following a LOCA, and in improved system reliability.

The choice of the modified ECIS design in Pickering NGS "A" clearly illustrates the principles of the retrofit philosophy when applied to operating stations. During cost/benefit analyses of various design options major factors leading to the chosen option included dose considerations to personnel during installation of the system, schedule constraints and impact on power production through interference with existing systems.

In addition to the above major retrofit work on the ECIS, a number of safety system modifications

are also being implemented in Pickering NGS "A". These changes were identified as a result of safety assessments and reviews based on the principles and criteria discussed previously. As in the case of the ECIS modifications, the specific design changes to be implemented recognize the design and operating constraints of the existing station.

CONCLUSIONS

The safety and licensing retrofit philosophy discussed in this paper was developed in response to regulatory requests with regard to the applicability to operating nuclear generating stations of more extensive safety and licensing design features incorporated in current CANDU designs. The same basic principles and criteria, however, have been applied in the past when operating stations have been subjected to ad-hoc reviews and assessments on significant safety and licensing issues, and during routine reviews of significant operating events. These practices will continue in the future based on significant safety and licensing developments and operating experience.

Specific safety design modifications arising from these reviews have recognized the unique features and constraints associated with retrofitting operating stations in order to arrive at cost-effective, practical and reliable changes. This process has functioned effectively to date and has contributed to the maintenance of safe and reliable operating stations. The regulatory requirement for periodic updating of the Safety Reports will further ensure that the station designs remain adequate from a safety standpoint based on current safety knowledge.

REFERENCES

1. R.J. Atchison, F.C. Boyd and Z. Domaratzki, "Canadian Approach to Nuclear Power Safety", Nuclear Safety, Vol. 24, No. 4, July-August 1983.

time; but you can't fool all of the people all the time."

Finally, Tom's complaints about inaccessibility at AECL come as a surprise to those at CANDU Operations in Mississauga, including very busy top executives, who have never turned down a Claridge request for either interview or information. His reputation opens the doors.

Mac Keillor

PRV

As mentioned in the last Bulletin, Ontario Hydro commissioned a Tritium Issues Working Group to examine the issues raised by sales of Canadian tritium. As the liaison person for the Canadian Institute of Strategic Studies (CISS) and Ontario Hydro in the question of tritium sales, Leonard Bertin was asked to comment on the group's report. It would be difficult to find anyone better qualified. Formerly Science Correspondent for the London Daily Telegraph and currently correspondent for Janes Defence Weekly, Mr. Bertin is the author of the history of the British nuclear weapons program and has an international reputation as a specialist in defence and scientific matters. His comments to David Hardy (Senior Community Studies Planner, Ontario Hydro) are reproduced below with the permission of author and recipient.

At the request of General Bell (CISS President), and as the duly nominated liaison person for CISS with Ontario Hydro in this matter of tritium sales, I am responding to your request for comment on the Report of your Task Force on Tritium Issues. I have been asked to record the fact that the Institute does appreciate the fact that you contacted it and does find the supplied material most interesting.

I do appreciate the fact that the main purpose of this exercise was to defuse a potentially hot issue and to satisfy the public in general, and some politically interested special groups in particular, that a thorough investigation had been made of our NATO allies and closest friends, the United States of America. Conveniently they are, because of their democratic traditions, also the most open source of such material.

Nevertheless, I cannot understand why the decision was taken to concentrate uniquely on the USA which never has depended, likely never will depend, on Canada as a source of tritium and to ignore countries such as Israel. Maybe it was the thought of somebody spending the rest of his life in a Negev gaol.

The report is generally comprehensive and excellent. Partly because of its thoroughness I do have certain problems with it. Page ii of the Introduction, as an example, makes the point that publication of weapons design data "might be aiding and

abetting... irresponsible parties." In the light of that statement I am baffled by the next sentence, "consequently we have published (my added emphasis) some of our findings in an Appendix."

I can see no justification whatsoever for Appendix 6, which helps a potential enemy bring together information needed in targeting its ICBMs. Most of the contents of this Appendix have no relevance to Ontario Hydro or Ontario taxpayers. Who but the Soviets need to know that a plant in Astabule makes nuclear weapons components or that Los Alamos, Sandia and Livermore do much of the related design work? Why are Ontario tax dollars spent on ascertaining the fact (already well known) that the Nevada test site is located 65 miles from Las Vegas and occupies 800,000 acres? Who cares about the diameter of the boreholes? Do we really need to know that "lithium deuteride components are shipped from Y-12 to the Pantax plant for the final assembly of weapons"? No!

Frankly, I think that David Mosey summed up the subject very comprehensively in his report (prepared for Ontario Hydro's New Business Ventures Division) in May 1985. I appreciate the effort that went into collecting this data but I think the zeal was misplaced.

On the technical side, I do find the "do it yourself" design details in Appendix 7 (particularly the diagrams) to be exceedingly naive. I would submit that they detract from the credibility of the rest of the report and should be deleted.

There is also some confusion implied by the indiscriminate use (eg. Ch. 1, para. 1) of the word "thermonuclear." In the same paragraph (last line) the use of the word "fission" rather than "fusion" would have been more appropriate.

These remarks apart, the report makes good reading. I am sure it will find an honoured place in some museum in the Kremlin.

Leonard Bertin

Conferences & Meetings

12th Simulation Symposium on Reactor Dynamics and Plant Control

Sponsored by the CNS Nuclear Science and Engineering Division, to be held **April 21-22, 1986** in Hamilton, Ontario. For information contact: **W.J. Garland, Dept. of Engineering Physics, McMaster University, Hamilton, Ontario, L8S 4M1.**

International Symposium on the Total Risk and Benefit Impact of Energy Alternatives

Sponsored by the Institute for Risk Research, University of Waterloo, to be held **May 19-23, 1986**. For information contact: **Dr. H.D. Sharma, Department of Chemistry, University of Waterloo, Waterloo, Ontario, N2L 3G1.**

Uranium Mine Radiation Safety Course

Sponsored by Canadian Institute for Radiation Safety, to be held **June 2-6, 1986** in Saskatoon, Saskatchewan. For information contact: **CAIRS, 7 Timmins Rd., Suite 7-15, Elliot Lake, ON P5A 2R7.**

CNA 26th Annual International Conference

To be held **June 8-11, 1986** in Toronto, Ontario. For information contact: **CNA, 111 Elizabeth St., 11th Floor, Toronto, ON M5G 1P7.**

CNS 7th Annual Conference

To be held **June 8-11, 1986** in Toronto, Ontario. For information contact: **CNS, 111 Elizabeth St., 11th Floor, Toronto, ON M5G 1P7.**

Symposium on Advanced Nuclear Services

Sponsored by CNA, to be held **June 11, 1986** in Toronto, Ontario. For information contact: **CNA, 111 Elizabeth St., 11th Floor, Toronto, Ontario, M5G 1P7.**

4th International Conference on Emerging Nuclear Energy Systems (ICENES 4)

Sponsored by the Spanish Nuclear Society, CNS, ANS, et al., to be held **June 30 - July 4, 1986** in Madrid, Spain. For information contact: **G. Velarde, Director, Dept. of Nuclear Energy, ETS Ingenieros Industriales, Universidad Politecnica de Madrid, P. de la Castellana No. 80, 28046 Madrid, Spain.**

Second International Conference on Radioactive Waste Management

Sponsored by CNS, cosponsored by ANS, to be held **Sept. 7-11, 1986** in Winnipeg, Manitoba. For information contact: **T.S. Drolet, Conference Registration Chairman, CFFTP, 2700 Lakeshore Rd. W., Mississauga, Ontario, L5J 1K3.**

ANS International Topical Meeting on Waste Management and Decontamination and Decommissioning

Sponsored by ANS, cosponsored by CNS, US DOE, et al., to be held **Sept. 14-18, 1986** in Niagara Falls, NY. For information contact: **Eva Rosinger, AECL, 275 Slater St., Ottawa, ON K1A 0S4.**

Topical Meeting on Advances



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in Reactor Physics and Safety

Sponsored by ANS, EPRI, NRC and CNS, to be held **Sept. 17-19, 1986** in Saratoga Springs, NY. For information contact: **D.R. Harris, Department of Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY 12180-3590.**

International Topical Meeting on the Operability of Nuclear Power Systems in Normal and Adverse Environments

Sponsored by ANS, cosponsored by CNS et al., to be held **Sept. 29 - Oct. 3, 1986** in Albuquerque, NM. For information contact: **L.L. Bonzon, Division 6446, Sandia National Laboratories, P.O. Box 5800, Albuquerque, NM 87185.**

International Conference on CANDU Fuel

Sponsored by CNS, to be held **Oct. 6-8, 1986** in Chalk River, Ontario. For information contact: **Dr. I.J. Hastings, AECL Research Co., Chalk River, Ontario, K0J 1J0.**

CNS 2nd International Conference on Simulation Methods in Nuclear Engineering

Sponsored by CNS, to be held **Oct. 14-16, 1986** in Montreal. For information contact: **D. Rozon, GAN, Ecole Polytechnique, 6600 Côte-des-Neiges, Suite 215, Montréal, Québec, H3S 2A9, (514) 340-4201.**

Water Chemistry & Materials Performance Conference

Sponsored by CNS, to be held **Oct. 20-21, 1986** in Toronto, Ontario. For information contact: **N.A. Graham, Westinghouse Canada Inc., Dorset St. E., Port Hope, ON L1A 3V4, (416) 885-4537, ext 297.**

Tritium Safe Handling Course:

Sponsored by the Canadian Fusion Fuels Technology Project, to be held **Oct. 20-24, 1986** in Toronto and Chalk River, Ontario. For information contact: **CFFTP, 2700 Lakeshore Rd. W., Mississauga, ON L5J 1K3.**

The Unfashionable Side

Military Operations

Managing the operation of a nuclear power station is a demanding job. It has been suggested that the ideal Station Manager combines the ruthlessness of Gengis Khan, the political acumen of Machiavelli, the patience of Job and the hide of a rhino. Ability to walk on water is also desirable. In view of this, it is interesting to review the transcript of a talk given by an incoming station manager at a nuclear installation "somewhere in England" some years ago. Colonel (retd) Sir Beardesmore Starkley-Glaze arrived at the position of Station Manager of the Unmentionable 'A' Nuclear Power Station by a process which has yet to be satisfactorily explained — suffice it to say that his early retirement from a prestigious cavalry regiment was triggered by an Unfortunate Incident when his left spur became entangled in the front

off-side drive sprocket of a Centurion tank. Colonel Starkley-Glaze's comments to the senior station staff were recorded by an anonymous shift supervisor.

"At ease, Gentlemen. I won't keep you too long. I only wanted to spend a few minutes in letting you know how glad I am to be here at this fine station. I hope in the mess tonight I'll get to know you better and be able to put some names to faces, or vice versa — what!

"Now I know that when a new CO - er Station Manager — arrives, the first question on everybody's lips is "what's the Old Man going to want?" — right? Well, let me tell you, my wants are simple, as the sailor said to the barmaid ha ha. I just want to run the best, smartest and most efficient nuclear power station anywhere. And I know that Unmentionable 'A' can be that station. Now I want to be quite frank with you, and I'll tell you that I'm going to start as I mean to go on. That means that we've all got to smarten up a bit. I know this isn't the Guards, but when I came in through the main gate this morning, I noticed at least half the men had haircuts which could be only described as scruffy. And in many cases their boots were a disgrace. I want to see smart looking men about the place. As of 16:00 today, gentlemen, we are instituting pre-shift change parades and inspections. All shift supervisors will attend and will take the names of any men whose smartness does not measure up.

"That reminds me, I see from my list that Lieutenant — ah, that is, er Shift Supervisor Scroggs, is not in attendance. Is he sick? What? What did you say... the delayed neutron monitoring system? Gentlemen that is the clearest illustration of the point I was trying to make. Let me tell you here and now that delayed neutrons will simply not be tolerated at this station! As of now I'm putting the station on notice that any neutron delayed for whatever reason can expect to be charged.

"Now, I've had a chance to walk around the station and, quite frankly gentlemen, I'm shocked. The reactor vault equipment does not appear to have seen any metal polish for years, and the walls could do with a good coat of whitewash. In the control room I saw at least two toffee wrappers and a cigarette end on the floor. And the spent fuel bay — that fuel is *filthy*. I want a squad detailed this afternoon to work on that and when I carry out my inspection tomorrow at 07:00 I expect to see that spent fuel *gleaming*! There's plenty of men available — I saw at least half a dozen lounging around the control room this morning with nothing to do.

"Gentlemen, I know we can work together to get Unmentionable 'A' where it belongs — the Top Station. That's all for now. I've asked the Adj — er Production Manager — to organise Dining In Night for tomorrow. I expect to see you all there. Dismiss!"

Ernest Worthing