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Chers Amis,

Ainsi que nous vous l'avions annoncé dans notre newsletter précédente, nous avons le plaisir de consacrer cette édition au discours que Georges Vendryes a fait lors de sa remise du prix ANS «W. Bennett Lewis for Sustainable Energy», ainsi qu'à celui d'Eric P. Loewen lors de l'Assemblée Générale de la SFANS.

Jean-Claude Gauthier

Allocution de Georges Vendryes suite à la remise du Prix «W. Bennett Lewis for Sustainable Energy» par Eric P. Loewen, Vice-President President Elect of ANS - Paris, 16 septembre 2010

Dear friends, dear Eric,

Many thanks for your kind words. I feel greatly honoured to receive the Bennett Lewis Award, which bears the name of a world pioneer of nuclear energy whom I had the priviledge to know in person many years ago. I want to address warm thanks to Jan van Erp, who proposed my nomination, to all those who supported it, to the members of the Honors and Awards Committee and of the Executive Committee of the ANS Environmental Sciences Division who endorsed it. I am particularly grateful to Eric Loewen, for accepting to deliver this Award on the occasion of his visit to France, and to Jean-Claude Gauthier, for organizing this ceremony at the General Assembly of SFANS. On this happy day I will not fail to express my heartfelt thanks to my wife who over many years supported me in all senses of the word.

In selecting me, the ANS had in mind to emphasize the major importance of the fast neutron breeder reactor, to which I devoted a large part of my activities during the many years I worked at the French CEA. Only through the remarkable phenomenon of breeding, will nuclear energy rank among the sustainable and

renewable energies and be able to bring a significant contribution to the growing energy needs of the world for an unlimited future.

France began to work in that field significantly later than the US, the UK and USSR. I may say that our starting point was in the United States. In 1954 Jules Horowitz and myself made a long tour of the American nuclear research centers which were just opening to foreign visitors in the wake of the Atoms for Peace appeal of President Eisenhower. At Argonne we had long discussions with Walter Zinn, who presented to us with his usual fire his new EBR2 project. His

enthusiasm was so convincing and communicative that I took on the spot the decision to give up myself to launch as soon as possible a similar venture in my own country.

The necessary conditions were met three years later, and the project of the sodium-cooled fast neutron experimental breeder reactor Rapsodie was started under the direction of Pierre Zaleski. Our programme, covering all the techniques and industrial sectors of the sodium-cooled breeder reactors and their fuel cycle, expanded and developed regularly. It included two major steps. First the demo plant Phénix of 250 MWe whose construction at Marcoule was managed by Rémy Carle, Jean Mégy and Michel Rozenholc. It started operation in 1973 and in 1998 ANS confered to it the much praised title of Nuclear Historic Landmark. As a follow-up was built at Creys-Malville the prototype Superphénix of 1200 MWe, jointly owned by EDF, ENEL and RWE, which started operation in 1985.

On the whole this programme, which had become an exemplary model of European collaboration, progressed satisfactorily, in spite of many shortcomings and even failures of which I am fully aware. The main reason why we were able to overcome the many difficulties facing us and to move forward is to be found in the unfailing support we received during fourty years from the successive French governments at the highest level.

In November 1967 we were honoured to welcome at Rapsodie in Cadarache the visit of Général de Gaulle, who was followed two years later by Georges Pompidou. Both became ardent supporters of the fast neutron breeder reactor, in which they viewed a significant element to alleviate the energy dependence of our country. The same can be said of their successors, Valéry Giscard d'Estaing who took in 1976 the decision to build Superphénix, and of François Mitterand who repeatedly refused to shut it down, in spite of the pressures exerted on him by top members of his own party.

Over the years the breeder reactor became the main focus of the opposition of the antinuclear movements, for the only basic reason that it was the way for nuclear energy to last for ever. Their opposition, well organized on a multinational level and plentifully financed by vested interests in the oil and coal business, used all means at their disposal without hesitating to resort to extreme violences on occasion.

End of July 1977 tens of thousands of young people on vacation from various countries gathered at Creys-Malville where the construction of Superphénix had begun. They were indoctrinated, enroled and thrown to storm the site by militants equipped with weapons, wearing crash helmets and goggles, waving anarchist black flags and well trained in guerilla warfare, whose declared objective was to cause all kinds of destruction. In the course of the fierce fights with the security forces in charge of protecting the site a young student was wounded to death. One night of January 1982 bazooka missiles were fired onto the plant under construction from the other side of the Rhône by a group of skilled international terrorists recruited and led by a green member of the Geneva Council. One of the rockets exploded within the reactor building. Fortunately none of the workers was injured.

On the political level opposition against the fast breeder started in the US in the wake of the Vietnam war and expanded rapidly throughout all Europe. In 1977 President Carter decided to stop the construction of the Clinch-River 300 MWe breeder power plant at a time most big components were already being manufactured. Ten years later the Minister-President of the Nord-Rhein Westphalen Land in Germany, newly elected by a green-socialist coalition, refused steadfastly to sign the decree giving a legal existence to the SNR 300 breeder plant at Kalkar, whose construction had been completed in 1985 and to which all the necessary permits had been granted by the safety authorities. After years of obstruction the plant had to be dismanteld without operating a single day. In 1997, the new French socialist government decided without any debate at Parliament to put an end to the operation of Superphénix, only to keep promises made to the green party in a previous electoral arrangement,

For sure Superphénix had been plagued by too many technical problems during its first years of operation but the safety of the plant was never put into question. It was obliged to remain idle for a total of several years as a victim of lawsuits disputing unceasingly the detailed wording of its operating licence. After enduring youth diseases, Superphénix did not die from cancer or heart attack. It was intentionally murdered

while it enjoyed perfect health. Over the twelve months of 1976, its last year of operation, it delivered to the electricity grid 3,4 billions of kWh with an availability of 95% and only one incident at the lowest level 1 on the international scale.

In 1998 EDF received imperative instructions from the French ministry for environment to demolish immediately key parts of the nuclear island which would be extremely difficult to repair or to replace, with the clear objective to prevent any attempt to restart the plant later on. It was a will to kill.

It is useless to lament over an accomplished fact, whatever judgment one passes on those who are responsible for it. Nonetheless it is advisable to keep in mind what happened to draw lessons for the future.

The situation is now changing to evolve.

According to the best estimates the world energy consumption will about double till the middle of the present century. At present more than 80% of it come from the burning of fossile fuels. It is widely recognized that this is becoming a cause of major problems. It is mandatory to increase as soon as possible the share in our energy mix of the sources which do not emit greenhouse gases. to promote renewable energies, in particular to pursue vigorous R&D programmes aiming at economical ways to master the direct conversion of solar energy, which offers a large potential for innovation. But each method has merits and drawbacks. To meet the previsible needs of mankind during the present century the use of nuclear energy at a large scale is an imperative in all scenarios.

Everyday now appear signs of its renewal in a growing number of countries. We all follow with great attention the regular progress of the procedures which will lead to the construction of new nuclear units in the US. We all know enough the dynamism and the competitive spirit of our American friends to be sure that, as soon as the renewal of nuclear energy in the US will take place, it will be spectacular. It will also have a driving effect on many other countries, notably in Europe.
In such a context it is not surprising to see the breeder reactor returning to the forefront of the international scene after a long interruption in the Western countries.

Meanwhile all the breeder plants which are today under operation or under construction are located outside of the Western world. All of them are made of sodium-cooled fast neutron reactors.

In Russia the BN600 power plant of 600 MWe is operating regularly at Bieloiarsk in the Urals since 1980. On the same site is under construction a more advanced and bigger plant, BN800 of 800 MWe, which will start operation withIn about two years. Designs of plants of unit power up to 1800 MWe are on the drawing board. China which is currently preparing the nuclear start-up of a first experimental reactor of limited power, of Chinese design, has concluded an agreement with Russia in order to build with Russian assistance two copies of the above-mentioned BN 800 plant adapted to the Chinese context. Last May, after years of debates, Japan put again in service the Monju reactor, which unfortunately will be once more shut down for a long period following a serious incident caused three weeks ago by a wrong move on its fuel handling system. In India, the operation at Kalpakkam of the small experimental reactor FBTR continues regularly, A power plant of 500 MWe, PFBR, inspired by the late European project EFR, is under active construction on the same site. It is expected to start operation in 2012. The Indian government has already approved in principle the construction in close succession of four more identical plants. In South Korea the design of the Kalimer 150 MWe prototype breeder reactor has been performed recently in the framework of a national long-term programme.

It is remarkable that all these countries, in spite of the extreme diversity of their political regimes, give a clear expression to the same will to move forward on the breeder line, as they are unanimous to recognize in it a basic need.

The same vision inspires the Generation 4 International Forum set up by the US several years ago, but so far the activities of most of its participants have remained in a state of long-term intentions.

In France CEA is at present carrying on the preliminary studies of an advanced sodium cooled fast neutron breeder reactor called ASTRID which President Chirac instructed him early 2006 to design and to build. This decision is of course extremely welcome but one should

not underestimate the tremendous efforts to accomplish to restore the previous French expertise which was acquired by decades of hard work and which has now been lost. Many obstacles have to be overcome before the construction of ASTRID can begin.

As far as I know, no specific project to build a breeder reactor is yet under preparation in the US.

The present world juncture may be considered as a mere paradox, but its deeper meaning should not be overlooked. I cannot help to see in it a telling testimony, among others, of the spectacular rise of the Asian countries and a clear harbinger of the shift in the balance of power which is taking shape from the Western to the Eastern part of the globe.

I am well aware of the immense ressources of the US. I highly value the creativeness of the American society, the way it promotes innovation and progress through free enterprise. I have always admired the unique ability of your great nation to react to adverse events. In the course of the 20th century you succeeded to hold the foremost place in all areas of science and technology.

May I take the liberty to urge my American friends not to loose ground in the field where lies the ultimate goal of nuclear energy. The Blue Ribbon Commission on America's Nuclear Future, Eric just talked about, is making recommandations in favor of closing the nuclear fuel cycle. This would be a prerequisite but only a first step on the way to the deployment of breeder reactors. I am sure that the ANS is ready to strive hard so that your country will regain the leading position it occupied for long years in this key sector. The best way for me to conclude my talk is to recall the warning expressed by Enrico Fermi in Los Alamos as early as 1945: «The country which first develops a breeder reactor will have a great competitive advantage in atomic energy».

I thank you for your attention.

Discours d'Eric P. Loewen, President Elect ANS, lors de l'Assemblée Générale de la SFANS - Paris, 16 septembre 2010

«France & US Nuclear Programs: What we can learn from each other»

Good evening.

I am privileged to have been invited to be with you. Jean-Claude Gauthier, President of Section Francaise de l'ANS (SFANS), thank you for your communications and guidance. Also, to Dominique Greneche, Immediate Past President of SFANS/ANS, Board Member, and to France Bres-Tutino, SFANS Board Member/ANS International Committee Chair, thank you for your efforts during and subsequent to the 2010 ANS Annual Meeting, which have been very helpful.

To the members of the SFANS - I salute you. In 1970, the SFANS - France's Local Section of the ANS - received its American Nuclear Society charter, one of the first ANS chapters in Europe. Leaders then and leaders now. Last year, this section hosted then-ANS President Tom Sanders on the occasion of that meeting AREVA's Chalon/St. Marcel Plant received an ANS Nuclear Historic Landmark Award for the

Remise du Nuclear Historic Landmark Award par Mr Tom Sanders président ANS à l'usine Areva NP Chalon Saint Marcel, Jeudi 10 Septembre 2009

long safe operations. This historical blend, the awards, our bond is what brings me - us - to this 2010 SFANS General Assembly event tonight.

Tonight I will address the following areas: our ANS mission and some emerging issues in R&D and waste disposal, and close with how we can learn from each other.

Our common ANS Mission

First let me address our ANS mission. I see our focus, the mission of our technical society for the stewardship of the technical information that it's members and others, to generate supportive research in the nuclear sciences and technologies – the NS&Ts – our technical core. This is our core. The ANS core that generates the energy that holds our society together.

Let us recall our response to the Atoms for Peace program. The ANS was formed in 1954 to serve as the technical steward of NS&T information… to develop, collect, organize, document and share information for all NS&T applications – for energy, medicine, industry, food, and space. Sometimes we get too focused on power generation and forget the many other technical disciplines within ANS that are pushing the boundaries of the NS&Ts. The ANS mission is accomplished by advancing the broad nuclear science and technology professional by providing those professionals with an opportunity for professional development by honing their leadership and technical skills.

How does ANS accomplish our mission? We accomplish our mission by providing membership value through our 19 active technical divisions, three technical groups, three technical publications, two professional publications, the Society tabloid, ANS NEWS, the conduct of numerous national and topical meetings, and other related professional activities. Let us not forget the many standing committees, such as

the International Committee, who continue the relationships that bring me here tonight.

Today, more than ever, we nuclear professionals must continue implementing this mission. I think ANS must stay the course by accomplishing the following:

(1) Electronically archive all issues of previous publications. This is stewardship. This is our duty. We must make this NS&T repository information more accessible in the digital age. To go forward toward the future, any organized body of information must not lose the past achievements and failures, lest they be repeated.

(2) Maintain and further enhance the scope and efforts of in ANS Nuclear Standardsdevelopment. That's what we do best. Our ANS/ANSI Standards are recognized worldwide.By putting stakeholders, competitors, and regulators together in one room, and withaccepted processes to create, hone and then implement the standards, we gain consensuson the requirements. This produces the high standards to which we hold ourselves.Standards for continued and safer operation of nuclear power plants, for safe disposal ofnuclear waste, for safe transport of nuclear materials… the safe application and acceptanceof all our NS&Ts across society.

(3) We need to work cooperatively with related organizations - SFANS and other ANS International Local Sections, the IAEA, the ANS Agreement Societies (which includes many national nuclear societies and the OECD/NEA), the INSC, and the PNC – for the mutual benefit of all partners. We need to encourage more cosponsored meetings – again for the mutual benefit of BOTH (all) organizations. We currently share a relatively small number of international meetings. We co-sponsor CONTE, ICAPP, GLOBAL, LWR Fuel Management, etc. And again we recognize and appreciate the positive contributions of SFANS to cosponsorship of these and of other ANS National and Topical Meetings. These accomplishments can continue only with your good cooperation.

Our Emerging Future

What are the emerging technical futures in which our society will play a major role? There are a few examples that I am seeing domestically in the areas of small modular reactors, university research and supporting the Efforts on the Blue Ribbon Commission. Our key to the future, our key to success is continuing the participation and making the technical contributions from the ANS membership in these areas.

Small Modular Reactors

Earlier this year, U.S. Secretary of Energy Steven Chu stated that as we build a new generation of clean and safe nuclear plants, we are constantly looking ahead to the future of nuclear power. One of the promising technologies is small modular reactors (SMRs).

Steven Chu

The ANS SMR Special Committee is leading the nuclear science and engineering community by organizing a forum for technical dialogue on SMR licensing issues. The Committee has members from more than three dozen organizations representing all relevant stakeholders. The ANS SMR Special Committee solutions to SMR generic licensing issues will be issue driven and focused on technology neutral solutions. More importantly, they will be driven by Science. The SMR is a technology that is gaining international interest and I give credit to President Tom Sanders for pushing this issue and raising awareness.

University-Led Research

I am pleased to share with my French Colleagues that DOE consolidated its university support to what is now called the Nuclear Energy University Programs (NEUP). The US DOE Nuclear Energy directorate has designated that 20 percent of funds appropriated to its R&D programs will be competively bid to universities. What are the results?

This past May, Secretary Chu announced that 42 university-led research and development projects were awarded $38MM for nuclear energy related research – to advance nuclear education while developing the next generation of nuclear technologies.

The research area that I most appreciate is the Generation IV Reactor Research and Development, with 20 projects that allocated $20MM. This type of R&D will accelerate the **deployment** of the next generation of nuclear reactors that will produce more energy and create less waste. With the advancing research on cross-cutting technologies in the area of fuels, materials, and reactor modeling, I hope that, as a collective group, we can focus on a project to build something. Even something small. It is the act of building something tangible that expands options, grows and captures wisdom, and stirs the passion of individuals to do more.

Educational support requires more than bricks and mortar. It also needs scholarships and fellowships to recruit and train the next generation of nuclear scientists and engineers – the ones who will follow us, who will learn from us - the technical infrastructure of ANS. The funding in this area is about $5MM providing more than 100 scholarships/fellowships to students who are studying our NS&Ts.

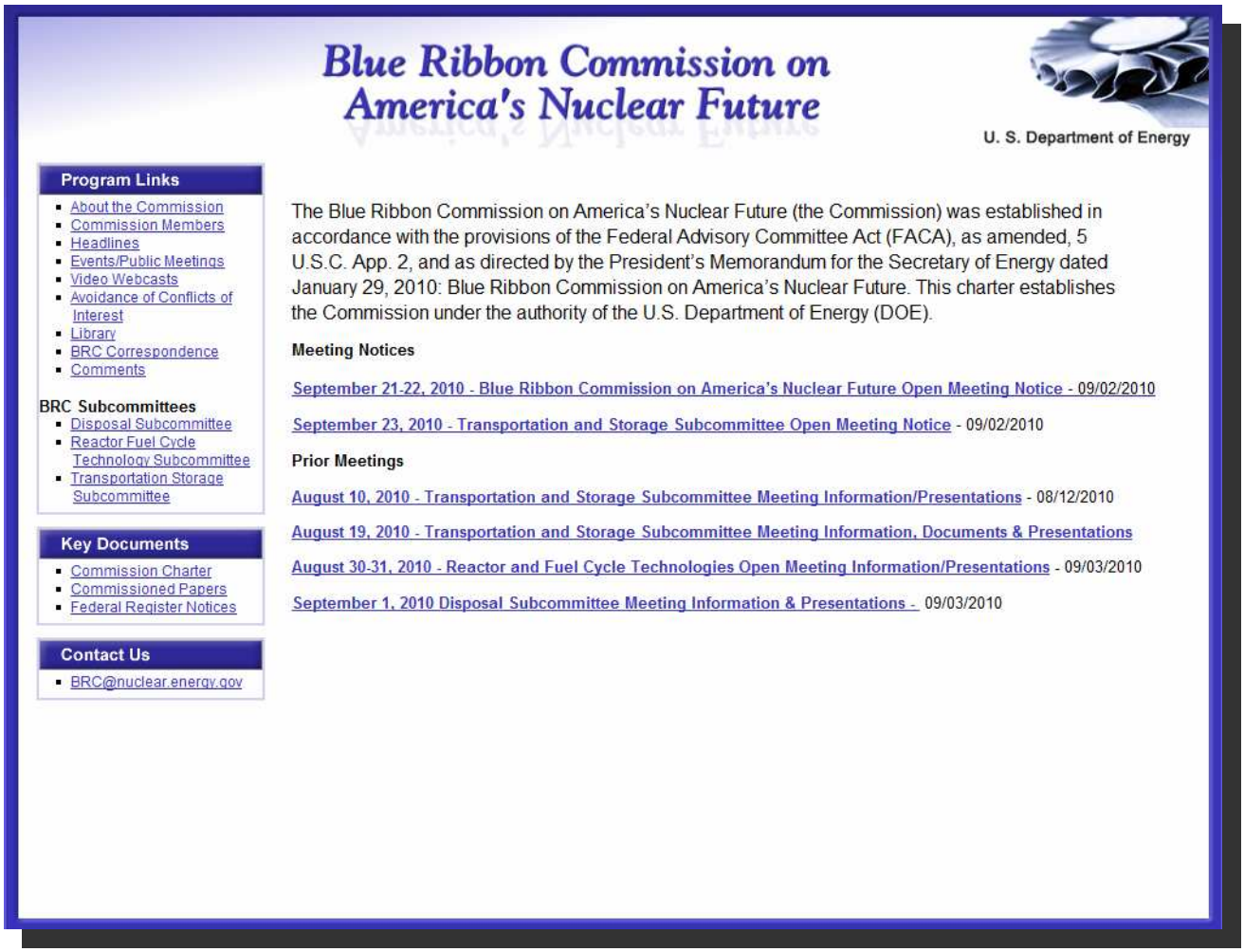
Blue Ribbon Commission

When our new U.S. administration declared that Yucca Mountain was no longer an option for repository storage of spent nuclear fuel, U.S. President Obama established a Blue Ribbon Commission on America's Nuclear Future (the BRC). This occurred during Dr. Sander's term as ANS President.

Among many in the technical community, the ANS was disappointed in this government decision. We had previously issued ANS's Position Statement 80 "Licensing of Yucca Mountain as a Geological Repository for Radioactive Wastes," to encourage:

(1) the development and use of geological repositories for disposal of high-level radioactive wastes,and

(2) expeditious processing of the Yucca Mountain license application in an open, technically sound manner.



Why does the ANS support the completion of the ongoing licensing process when the political winds are blowing in the opposite direction? Because, as a technical community we recognize that geologic repository management of spent nuclear is a better option than deep sea burial or launching it into outer space. The ANS has declared that we believe the repository program should be adequately funded to pursue the license. If the license fails for technical reason, then we all learn why and can advance a better solution. If Yucca Mountain repository passes the licensing process but fails political approval, then we have also learned that we got it right technically, but failed to win support of the public. As I stand before you tonight, the fate of underground repository of spent nuclear fuel in the United States is held thrall to the U.S. legal system.

Let me share, for my French colleagues, how the BRC came about. President Obama issued a memorandum to Energy Secretary Chu which positively recognized that the expansion of U.S. nuclear energy is crucial for the following three reasons: support U.S. climate change policy, enhance U.S. energy security, and increase world-wide economic prosperity. In the next paragraph, the memorandum acknowledges that our long-term domestic nuclear energy strategy must have "a well-considered policy for managing used nuclear fuel and other aspects of the back end of the nuclear fuel cycle." This new approach is hoping to redirect the efforts of scientists and engineers from the past 20 years toward a search for a different approach to repository storage of spent nuclear fuel.

I believe that the key sentence in this memo is ". . . *the Commission should consider a broad range of technological and policy alternatives, and should analyze the scientific, environmental, budgetary, economic, financial, and management issues, among others, surrounding each alternative it considers*."

How has your ANS responded? Past President Sanders established a special committee titled "Used Nuclear Fuel Management Options." The Committee Chair is Audeen Fentiman and the members are Lake Barrett, Yoon Chang, Margaret Chu, Mike Corrandini, Kenneth Hughey, Donna Jacobs, Linda Kinnard, Kathy McCarthy, Craig Piercy, Dana Powers, and Dan Stout. This special committee is compiling a report that analyzes the advantages and disadvantages of various approaches for managing the back end of the nuclear fuel cycle.

At the first BRC public meeting, then ANS President Tom Sanders testified, emphasizing the relevant technical expertise of the ANS membership, and he offered the commission access to a forthcoming ANS report on the challenges and advantages of various nuclear fuel cycle alternatives (being developed by the ANS Special Committee on Used Nuclear Fuel Management Options). Dr. Sanders urged the Commission to consider reforming the operational mechanics of the nuclear fuel cycle by recommending creation of an independent entity to oversee the management of used nuclear fuel in the U.S.

Continuing, Sanders advocated the adoption of a "cradle-to-grave" policy that would enable the U.S. to export nuclear fuel, goods, and services and then accept the used nuclear fuel, thereby minimizing the threat of proliferation. Sanders called for a sense of urgency in completing the Commission's overall tasks, challenging the Commission to minimize political influence on its decisions with respect to used nuclear fuel management. The Commission's Subcommittee on Reactors and Fuel Cycle Technologies invited the ANS to address a 30 August meeting regarding Small Modular Reactors, and what their role could be in a new future for nuclear power. Dr. John Kelly's testimony (available on the www.brc.gov website) declared that the ANS has encouraged a dialogue between SMR developers and the U.S. Nuclear Regulatory Commission (NRC) in pursuit of their – the NRC – desire that "the SMR community should provide a consensus approach." Dr. Kelly is a Co-Chair of the ANS Special Committee on SMR Generic Licensing Issues.

As leaders in our Nuclear Science and Technology community, we need to stay tuned as the Commission produces interim and then final reports to the US Government. Although the Commission does not have any decision making authority, I am sure their recommendations will be closely followed not only in the U.S. Congress. Let's us remain vigilant on this issue.

The Role of Governments

I close tonight with some information I learned from a sector of the society that we technologists may not be particularly informed about – the entertainment sector. Less than I year ago, my work at GE Hitachi Nuclear Energy was featured in the December 2009 of Esquire Magazine. This put me in the same room with an author, a film financer, a former U.S. attorney general, economists, medical Doctor, and others. Tonight I highlight one of my compatriots by name, Claire Lockhart. Ms. Lockhart was coauthor with Ashraf Ghani for the book titled "Fixing Failed States". It was written from their wisdom gained in working in Afghanistan. It sounded the clarion call for 'how **DO** you fix a government? I recommend you read this book, as it has some parallels to implementing long term nuclear policy. The book addresses ten things a government must do to fulfill their citizens' needs. As you expect, most are logical - Rule of Law, control of violence, administrative control, sound management of public finance, Investments in human capital, citizens' rights through public policy, infrastructure services, formation of market, management of public assets, and effective public borrowing.

So what does this have to do with us nuclear technologists? What can we learn from Ms. Lockhart? What can we learn from each other… and from the U.S... and from France?

When I look at the French nuclear complex and the ten basic functions of the State, your long-term investment of nuclear energy was the highest form of administrative control, infrastructure services, and management of public assets. The use of MOX fuel in your country has shown that your government has the staying power to implement a nuclear policy because of No oil, No coal, No choice. Tomorrow I will tour La Hague to learn more about your technical and operational achievements.

When I compare U.S. nuclear waste policy against the ten basic functions of the State, I see short comings in our areas of rule of law, administrative control, investments in human capital, and formation of a market. The U.S. is in a long term technology process that extends beyond many of our election cycles. In the U.S. this causes problems in the areas of infrastructure services, making nuclear markets, and the effective use of public funds. Simply put, this represents risk in the U.S. nuclear market. This issue of spent nuclear fuel non-disposal ultimately causes more economic harm across our society. It shakes the technical and political confidence to get something done.

For a technical example of policy disruption, look at "Geologic Repository Performance Models." They have been discredited as it too complex to predict the future performance of repository. Yet, significantly more complex climate models are considered as gospel.

This open-to-the-general-whim [opacity-based] policy development impedes the necessary science- and business based-commercial risk-definition and acceptance. This adds to cost by creating uncertainty of return on investment. This slows advancement of technologies due to uncertainty of future change in regulation. Need we wonder why there are no new builds in the U.S.? The absence of firm government policy makes the business future difficult to predict. This instability in government nuclear policy is deterring confidence in nuclear directed investment. Stability and clarity - the ability to sense with confidence the potential IRR (internal rate of return) - will convince stakeholder to make investments.

I hope that our U.S. Blue Ribbon Commission on America's Nuclear Future develops its recommendations with opacity. Opacity in the process to open a repository. Opacity in the definition of what is defined as waste. Opacity of consequences for placing transuranics in an underground repository. Opacity in the time-line for repository management, etc, etc. etc.

I suggest that we in the U.S. take inventory of your French success with both commercial scale aqueous separations and the use of MOX in water cooled reactors. A significant lesson for the larger international technical community to study is the policy of management of LWR used nuclear, fuel not only here in France, but in the UK and Japan. You – these - governments have

stayed the course… followed a policy. The United States needs to learn from your successes with reprocessing and the application of LWR recycling. That learning needs also to include best practices, and economics.

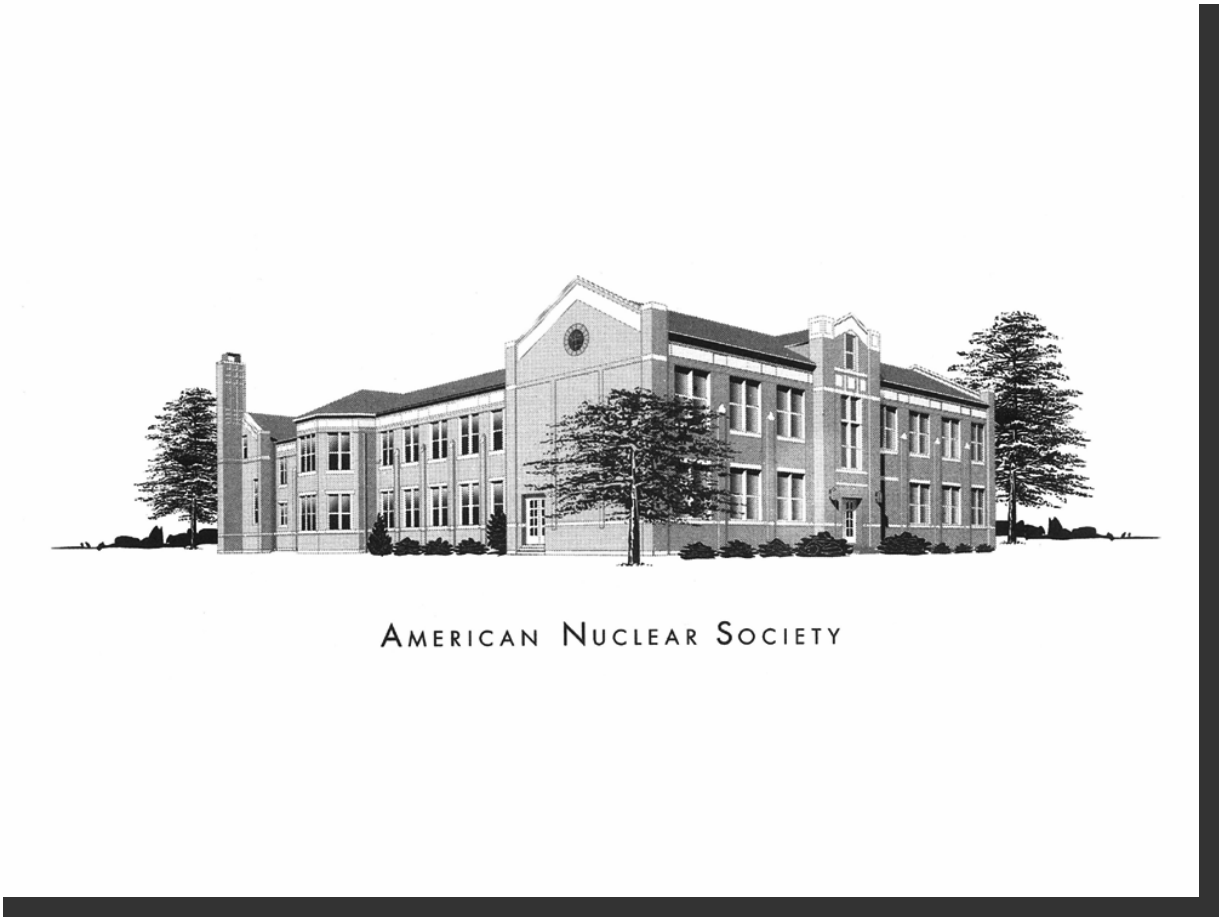
So that there is no misunderstanding, I reiterate that I do not say that reprocessing or "recycling plutonium" by any nation is wrong. The ANS has many members, member companies, and position statements supporting the use of MOX fuel. My statement is that the U.S. should now evaluate a different approach that could fully recycle all the transuranics in a fast spectrum cooled recycling reactor. Simply put, full recycling can ultimately extract more than 95% of the available energy from uranium ore. France's current fast reactor program recognizes this.

We all know that water reactors can extract only about 1% of the available energy from uranium. And we all know that reprocessing with LWRs extracts only about 2% more energy from the original energy content of uranium.

To explore and define and select different approaches for our technical community, I look to your support to leap-frog current options. Be revolutionary to commercialize fast reactors, rather than continue slowly along the evolutionary policies of today. I suggest a technical revolution using the technologies long studied to provide the energy needs of our world.

As technologists, leaders, and world citizens let us continue the development of nuclear science and technology.

I wish you all very good lives.



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