



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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Enclosed

July 29, 1996

Mr. Andre-Claude Lacoste
Directeur de la Surete des
Installations Nucleaires (DSIN)
99 rue de Grenelle
75353 Paris Cedex 07
France

Dear Mr. Lacoste:

We recently had an opportunity to discuss the important contribution international cooperation in nuclear regulation can make to safety, especially in research, and the lack of a permanent forum solely devoted to the interests and challenges faced by nuclear regulators worldwide. I have proposed establishing an independent multilateral mechanism, an International Nuclear Regulators Forum (INRF), in which nuclear regulatory officials can exchange views, coordinate approaches and harmonize arrangements, for the safe and secure use of nuclear energy for peaceful purposes.

I have accepted an invitation to make a presentation on current and future needs of nuclear regulatory bodies at the NEA Senior Regulators September 12-13, 1996 meeting in Paris. This meeting presents an opportunity to move forward with broader, more in depth discussions.

The enclosed discussion paper has been prepared for meeting participants. To provide a more concrete basis for discussion, a draft Terms of Reference (TOR) has also been included. The TOR was prepared to focus discussion on some concrete alternatives, but should not be taken to represent any fixed views about the role or structure of an INRF.

Your early views on the discussion paper and the TOR would be appreciated prior to the September Senior Regulators meeting.

Sincerely,

Shirley Ann Jackson
Shirley Ann Jackson

Enclosure: As stated

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SUMMARY OF MEETINGS AND SITE VISITS

Canada

Meeting with Dr. Agnes Bishop, Chairman, Atomic Energy Control Board of Canada (AECB), August 15, 1996.

Chairman Jackson was greeted by Dr. Bishop and the two had a one-on-one discussion before Dr. Bishop invited her senior managers to join in the bilateral discussions. Chairman Jackson's delegation, including Janice Dunn Lee, Regis Boyle, Carlton Stoiber, and William Upshaw attended the initial discussions between Chairman Jackson and Dr. Bishop.

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Signing Ceremony for the NRC/AECB Arrangement, August 15, 1996.

After Chairman Jackson's meeting with Dr. Bishop, both Chairman Jackson and Dr. Bishop signed the renewal of the NRC/AECB Arrangement. The signing ceremony was attended by the delegation accompanying Chairman Jackson on her visit and upper management personnel of the AECB.

NRC - AECB Bilateral Discussions, August 15, 1996.

After the signing ceremony, Chairman Jackson and Dr. Bishop were joined by senior managers from the AECB. They included Pierre Marchildon, Director General, Secretariat; J.G. Waddington, Director General, Analyses and Assessment; J.D. Harvie, Director General, Reactor Regulation; Murray Duncan, Director General, Fuel Cycle and Materials Regulation; and George C. Jack, Director General, Administration.

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Chairman Jackson discussed the burning of Pu in CANDU reactors, noting that NRC had received an application for export of material to Canada which is currently under interagency review.

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Chairman Jackson also pointed out that nuclear non-proliferation and nuclear safety are not mutually exclusive objectives. There needs to be a regime where both safety and safeguards are built in.

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Chairman Jackson ended the meeting by extending an invitation to Dr. Bishop to visit the NRC in Washington.

Meeting with Thomas G. Weston, Charge d'Affaires, August 15, 1996.

Chairman Jackson made a courtesy call on Charge d'Affaires Thomas Weston at the U.S. Embassy in Ottawa. Chairman Jackson briefed Mr. Weston on the purpose of her visit to Canada, NRC's mission, and general nuclear safety issues.

Visit to Darlington Nuclear Generating Station, August 16, 1996.

Chairman Jackson toured the Darlington Nuclear Generating Station on the morning of Friday, August 16. She was greeted and accompanied on the plant tour by Mr. William Farlinger, Chairman, Ontario Hydro.

The Darlington Nuclear Power Station is a 4-unit (935 MWe per unit) CANDU reactor design. Construction of the four units took 15 years (1978-1993) with the units coming on-line between 1990 and 1993. The total capital cost of the power station was \$14.3 billion (\$Cdn) and the cost of the tritium removal facility was \$0.181 billion (\$Cdn). The plant generates about 20 percent of Ontario Hydro's electricity. The plant is staffed by 1,600 Ontario Hydro personnel and 140 contractor staff.

A unique aspect of the Darlington plant is its containment system, or "Vacuum Building" as the Ontario Hydro personnel referred to it. The vacuum building, which was seen on the tour of the facility by Chairman Jackson, is a 240 ft. high cylindrical concrete structure that is connected to the four reactor buildings by a pressure relief duct. The vacuum building is maintained at negative pressure so that any release of radioactive steam from the pressurized systems would go into the vacuum building, thus preventing its escape to the atmosphere.

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Chairman Jackson also toured the tritium removal facility at the Darlington Station. The Ontario Hydro officials stated that about one-third of all the occupational exposures at Canada's commercial reactors comes from tritium. Ontario Hydro opened a tritium removal facility at the Darlington facility in 1988 to extract tritium from the heavy water used in Ontario Hydro's nuclear plants. The tritium that is removed from the heavy water is stored in stainless steel cylindrical containers within a concrete vault. Chairman Jackson was shown one of the tritium containers and was also provided with a tour of the tritium removal facility control room. Chairman Jackson was told that 130 million Curies of tritium are being stored in the concrete vaults at Darlington.

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In addition to the systems mentioned above, Chairman Jackson also was given a tour of the plant simulator, the turbine hall, the diesel-generators, the reactor building where the top of the reactor could be seen, the low-level radioactive waste management facility, the fuel bay, and the control room. The itinerary for Chairman Jackson's tour of the Darlington Nuclear Generating Station and a listing of those who were in attendance is enclosed (Attachment No. 1). The charts that were used by the Ontario Hydro personnel during their presentations to Chairman Jackson are also enclosed (Attachment No. 2).

Meeting with Atomic Energy of Canada Limited (AECL), August 16, 1996.

During the afternoon of Friday, August 16, Chairman Jackson met with AECL officials and toured the Sheridan Park Engineering Laboratory (SPEL). On the trip from the Darlington Nuclear Generating Station to the AECL facilities, Chairman Jackson was able to drive by and view the Pickering Nuclear Station of Ontario Hydro.

Chairman Jackson was greeted by William Hancox, Vice-President for Strategic Development, AECL.

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The CANDU-9 design is essentially a replica of the Darlington reactor design but with an individual containment system for each unit.]

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Chairman Jackson was given a brief tour of the AECL's Sheridan Park Engineering Laboratory (SPEL) which is a facility that supports the development and testing of CANDU reactor systems and components. During the tour she observed facilities for developing the CANDU fuel handling equipment including a fuel channel delivery system. She also observed equipment to perform fuel channel inspections including video inspections, dimensional gauging, eddy current and ultrasonic testing, and sampling. She was also shown fuel channel test rigs that allow fuel channel testing of primary heat transport conditions. Chairman Jackson was also provided with a demonstration of AECL's kinematic simulation that provides a 3D graphic simulation tool for the design, evaluation, and analysis of CANDU reactor designs.

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Reception in Honor of Chairman Jackson hosted by Consul General Gregory Johnson.

On the evening of August 16, Consul General Gregory Johnson hosted a reception in honor of Chairman Jackson. It was attended by about 20 government and business leaders from the greater Toronto area and Chairman Jackson's entire delegation.

PEOPLE'S REPUBLIC OF CHINA

Meeting with U.S. Ambassador Sasser and Senior Embassy Staff, August 19, 1996.

On Monday morning, August 19, Chairman Jackson met with Ambassador Sasser and other senior staff at the U.S. Embassy in Beijing. Chairman Jackson was accompanied by James Milhoan, Deputy Director for Nuclear Reactor Regulation, Regional Operations and Research, Janice Dunn Lee, Special Assistant for International Affairs, Regis Boyle, Special Assistant for Nuclear Materials, Waste and Fuel Cycle, and Kevin Burke, Senior International Relations Officer.

Ambassador Sasser indicated his pleasure of having another high ranking U.S. official visit China (Ambassador Sasser stated that Robert Einhorn, Council of Economic Advisers had just recently visited China).

Chairman Jackson was briefed by Ambassador Sasser and other Embassy personnel on China's energy situation and particularly its planned nuclear program. Chairman Jackson was told that the current installed electrical generating capacity in China is 210 GWe. Nuclear generating capacity makes up about 1 percent of the total electrical capacity. (China relies heavily on coal and hydro for most of its electrical generating capacity.)

China's most recent 5-year energy plan calls for the addition of 8 nuclear reactors. The current plan indicates that two reactors will be French designed, two will be Canadian designed (CANDU), two will be Russian designed (VVER), and two will be indigenous designed (PWR).

Meeting with Mr. Huang Qitao, Director General, China's National Nuclear Safety Administration (NNSA), August 19, 1996.

Chairman Jackson met with Mr. Huang Qitao (NNSA) and his senior staff on the morning of August 19. After brief introductory and welcoming remarks by both Mr. Huang and Chairman Jackson, Mr. Huang provided a description of the NNSA. NNSA was created in 1984 with the responsibility to function as the independent nuclear safety regulator over civilian nuclear power in China. Mr. Huang stressed that its responsibilities covered civilian

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nuclear power only. Military installations have their own organization responsible for safety. He also pointed out that NNSA authority extended only to on-site activities. The Chinese environmental agency is responsible for off-site impacts. He indicated that municipal and local governments are responsible for emergency response efforts.

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Chairman Jackson asked Mr. Huang if he would be attending either the Pacific Basin Conference or the Tokyo Nuclear Safety Conference. Mr. Huang stated that the Ministry of Foreign Affairs would make those decisions. Chairman Jackson extended an offer to met with Mr. Huang at either of the meetings if he attends. She also informed Mr. Huang about the International Nuclear Regulators Forum that she would be proposing at a September 1996 meeting of Senior Regulators in Paris.

Mr. Huang closed the meeting by thanking Chairman Jackson for visiting China and extended an offer to all NRC Commissioners to visit China in the future.

Meeting with Mr. Zhang Jian, Director General, China's Nuclear Safety Center (NSC), August 19, 1996.

On Monday afternoon, Chairman Jackson and her delegation met with Mr. Zhang Jian, Director General, China Nuclear Safety Center (NSC) and his senior managers. Mr. Zhang provided a brief introduction to the NSC (see Attachment No. 3). NSC made three technical presentations to Chairman Jackson on the following:

- (1) Technical Activities of the NSC (Attachment No. 4);
- (2) Analysis of Operational Events for Daya Bay Nuclear Power Plant (Attachment No. 5); and
- (3) Emergency Preparedness in NSC (Attachment No. 6).

The attachments capture all of the information that was presented at the meeting. The discussion of significant non-conformances during 1995 at the Daya Bay Nuclear Power Plant was most interesting, in particular the control rod drop time problem (See Attachment No. 4, pages 6-12).

Chairman Jackson asked several questions during the technical presentations and pointed out to the NSC that probabilistic risk assessment (PRA) was not mentioned during any of the technical presentations. Chairman Jackson emphasized the need to incorporate PRA into their evaluations of nuclear power plants. There was also some discussion of future developmental activities in China.

Chairman Jackson asked about various regulations that China might have in place. In response to her questions, the NSC provided to NRC with a complete set of their regulations (Copy available in Office of International Programs).

Meeting with Mr. Yin Dakui, Vice Minister of Health, Ministry of Public Health, August 20, 1996.

On Tuesday, August 20, Chairman Jackson met with Mr. Yin Dakui, Vice Minister of Health and his staff. Vice Minister Yin provided a brief overview of the Ministry of Public Health. He stated that the Ministry is an administrative and research institute responsible for the public's health and safety as it relates to the uses of radioisotopes, x-ray machines, and accelerators in all applications including medicine and agriculture. It is responsible for establishing radiation protection standards for protecting the public health and safety.

Chairman Jackson gave an overview of the U.S. program in regulating the use of nuclear materials. She agreed that there should be more international cooperation in this area and specifically identified the hormesis effect area as one where China and the U.S. should share data and information. Chairman Jackson invited Vice Minister Yin and his colleagues to visit the U.S. to have further discussions on these subjects.

Visit to Xian Jiaotong University, August 21, 1996.

On Wednesday, August 21, Chairman Jackson, accompanied by James Milhoan, Janice Dunn Lee, Regis Boyle, and Kevin Burke, toured the Xian Jiaotong University in Xian. Chairman Jackson was hosted by Ms. Lu Hong, Office of Foreign Affairs, Xian Jiaotong University.

Jiaotong University is one of the oldest universities in China. The university is comprised of 10 schools. Eight of those schools are related to engineering and science. The School of Energy and Power Engineering has a Nuclear and Thermal Engineering Department.

The university has about 10,000 undergraduate students, 2,000 masters degree candidates, and nearly 900 doctoral students. The university currently has more than 1,800 full-time instructors, including over 800 professors and associate professors.

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Press Conference at Beijing Grand Hotel, August 22, 1996.

Chairman Jackson held a press conference regarding her visit to China and answered a number of questions posed by reporters. Topics covered U.S.-China relations, prospects for sale of U.S. nuclear technology, disposal of nuclear waste, China's power needs and expectations, and nuclear safety and the role of an independent regulator.

Meeting with Mr. Li Ding Fan, Vice Chairman/Vice Minister/Vice President, China Atomic Energy Authority, China National Nuclear Corporation, August 22, 1996.

On Thursday, August 22, Chairman Jackson met with Vice Minister Li of the China National Nuclear Corporation (CNNC). CNNC is responsible for the development of nuclear power in China. CNNC

designs, constructs, and operates nuclear power stations in China.

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Chairman Jackson recommended to CNNC that they obtain simulators when new nuclear plants are ordered. She further recommended that the Chinese regulators obtain simulators.

Chairman Jackson raised questions on several topics with Mr. Li. The questions and/or the responses are briefly summarized below:

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Site Visit to Qinshan Nuclear Power Station, August 23, 1996.

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Chairman Jackson and her delegation visited the Qinshan Nuclear Power Station (QNPS) on Friday, August 23. Chairman Jackson was greeted at the plant by Mr. Yao Qi Ming, General Manager of QNPS. Before touring the plant, Mr. Yao and Chairman Jackson had discussions about the QNPS.

The QNPS is a 300 MWe, two-loop PWR with plant components having been designed and manufactured within China and from abroad. The plant is located on the coast about 125 km southwest of Shanghai (about a 3-4 hour ride). ||

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|| The planned ultimate capacity for the Qinshan site is 3,000 MWe.

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The plant tour consisted of visiting the following facilities: (1) simulator, (2) control room, (3) diesel generators, (4) upper turbine deck, (5) spent fuel pool, (6) LLW storage facility, (7) safety injection pump room, and (8) the construction site for units 2 and 3.

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The simulator is a full scope simulator purported to meet the guidance of ANS 3.5. During Chairman Jackson's tour of the simulator, a station blackout drill was conducted. Chairman Jackson was told that all of the operators are university graduates.

Chairman Jackson visited the spent fuel pool, an area that had never been visited by any other NRC visitors. [REDACTED]

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Chairman Jackson visited the LLW storage facility. The facility has a storage capacity of 10,000 drums of LLW. There are currently 3,200 drums stored in the facility. [REDACTED]

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Chairman Jackson and her team departed for the U.S. on Saturday,
August 24, 1996.