

Activity Report

August 2000

Office of International Nuclear Safety and Cooperation - Dr. James Turner, Director
Improving the Safety of Soviet-Designed Nuclear Power Plants

Russian nuclear safety center's achievements featured for American visitors

Highlight

On July 24, the Russian International Nuclear Safety Center (RINSC) in Moscow hosted a visit from members of the U.S. Secretary of Energy's Advisory Board (SEAB). Center director Professor Sergei Bugaenko summarized the history of cooperation between the U.S. International Nuclear Safety Center (U.S. INSC), established in 1995, and the RINSC, formed in 1996. The RINSC originally was a part of Russia's Research and Development Institute for Power Engineering (RDIPE); it became a separate legal entity in 1998 and now is an independent organization.

The RINSC has engaged in 10 joint research projects with the U.S. INSC. These projects are intended primarily to support DOE work to improve the safety of Soviet-designed nuclear power plants. Joint projects under the U.S. Department of Energy's (DOE) Office of International Nuclear Safety and Cooperation include reactor safety computer codes assessment and validation, accident management techniques and technology, evaluation of U.S. and Russian coupled codes for neutronic and thermal-hydraulics safety analysis, advanced structural analysis technology, materials properties measurements, and a safety information database. RINSC specialists also provide support to



Dr. James Turner (left), director of DOE's Office of International Nuclear Safety and Cooperation, chats with Professor Sergei Bugaenko (center), director of the Russian International Nuclear Safety Center, and Senator Howard Baker, leader of the SEAB delegation, during a luncheon meeting at the center.



***Safety analysis
capabilities under
development at
Slavutych Laboratory***



two other DOE programs—Initiatives for Proliferation Prevention and the Nuclear Cities Initiative. For these programs, the RINSC has coordinated development of a nuclear safety research plan for Russia’s Ministry of Atomic Energy (MinAtom) and provides technical assistance to projects in the nuclear cities of Sarov and Snezhinsk.

Using a combination of U.S. and Russian funding, the RINSC developed a computing center that maintains standard versions of nuclear safety computer codes, trains users from various institutes and organizations, and enables remote access to users throughout Russia and other countries of the former Soviet Union. Computer codes related to DOE’s proliferation prevention and nuclear cities initiatives also are or will be available through the RINSC computing center.

Following Professor Bugaenko’s presentation, Dr. James Turner, director of DOE’s Office of International Nuclear Safety and Cooperation, and Dr. David Hill, director of the U.S. INSC, praised the achievements of the RINSC since its inception. They especially highlighted the center’s contributions to encouraging the open and free exchange of nuclear safety information in the former Soviet Union countries, improving Russia’s nuclear safety culture, and reducing the technical isolation that characterized the Soviet Era. (Walt Pasedag, DOE, 301-903-3628; David Hill, ANL, 630-252-7112) √

Ukraine

The following milestones have been met as a result of DOE’s efforts to establish a safety analysis infrastructure at the Slavutych Laboratory for International Research and Technology:

- The U.S. team delivered a workstation to the Slavutych Laboratory to be used for safety analysis work. The workstation was connected to the local area network at the laboratory and is accessible from 10 terminals, all of which have been appropriately configured.
- The U.S. team provided a complete set of safety analysis codes (CONTAIN, MELCOR, RELAP5, ORIGEN, and PACER) to the laboratory, and the codes have been installed on laboratory computers.
- In July, four nuclear specialists from the Slavutych Laboratory attended U.S.-supported training sessions in Kyiv on the CONTAIN and MELCOR codes (see following article, “Ukrainian nuclear analysts train on safety analysis codes”). In a previous workshop held in 1999, six experts from the Slavutych Laboratory were trained in the use of the CONTAIN and MELCOR/PACER codes.

***Ukrainian nuclear
analysts train on safety
analysis codes***

***Armenia prepares for
seismic inspection***



- In August, a training workshop for the RELAP5/Mod3 code was held in Slavutych. Representatives from Argonne National Laboratory organized the workshop, and instructors from Idaho National Engineering and Environmental Laboratory conducted the training for 20 nuclear analysts, 8 of whom were from the Slavutych Laboratory.

These efforts will enable Slavutych Laboratory specialists and other scientists to use the latest available computer codes to perform comprehensive safety analysis assessments of other Soviet-designed nuclear power plants. (Walt Pasedag, DOE, 301-903-3628; Igor Bodnar, ANL, 630-252-8336) v

Nuclear analysts from the Slavutych Laboratory, other Ukrainian technical organizations, and specialists from Zaporizhzhya, Khmelnytsky, Rivne, and South Ukraine nuclear power plants (NPPs) attended a training workshop on the CONTAIN and MELCOR safety analysis computer codes. The workshop, held at Kyiv State University July 10 through 21, is part of the U.S. team project to facilitate development of a safety analysis capability in Ukraine. Two groups of 20 and 21 analysts received training on CONTAIN and MELCOR, respectively. The workshop included lectures and hands-on training involving preparation of code input and usage of the codes by the trainees. Special attention was devoted to application of the codes to nuclear power plants with VVER reactors. (Walt Pasedag, DOE, 301-903-3628; Christian Kot, ANL, 630-252-6151) v

Armenia

A representative from Argonne National Laboratory met during late July with counterparts at Armenia NPP to organize a seismic walk-down inspection of the plant. The walk-down, which will determine whether key safety components conform to seismic standards, is scheduled for September 11 through 21. Workers from Armenia NPP will conduct the inspection with guidance from U.S. specialists.

In addition to preparations for the seismic inspection, separate meetings were held with representatives of the Armenia plant; Armatom, the Armenian technical support organization; the Armenian Nuclear Regulatory Authority; and Yerevan State University to discuss safety analysis capability needs. (Dennis Meyers, DOE, 301-903-1418; Mark Petri, ANL, 630-252-3719) v

***Ignalina safety and
operating system
upgrades in progress***

Lithuania

In early August, a U.S. team member from Pacific Northwest National Laboratory met with representatives of Data Systems & Solutions, Western Services Corporation, and Ignalina NPP to discuss a safety parameter display system (SPDS) for the Ignalina plant. The SPDS is a high-priority safety enhancement for Ignalina. Because the plant is currently replacing its TITAN process computer with a new Information Computer System (ICS), a limited-scope SPDS could be combined with the ICS at considerable saving over the cost for a full-scope SPDS. During the meeting, the participants reviewed the draft specifications to ensure that the system identified was consistent with the project budget. Hardware reductions of approximately 50 percent and labor reductions of approximately 38 percent were identified by the participants.

While at the plant, the U.S. team member also reviewed the status of installation of electrical and mechanical equipment associated with the backup control-and-protection system provided for Unit 2 with U.S. support. When site acceptance tests were conducted in April 2000, installation of the sensing lines, sensors, conduit, and cable to the logic cabinets had not been completed due to reactor power operations that inhibited access to some areas of the plant. However, by early August, the remaining equipment had been installed except for one-half of the flow transmitters for the 32 main coolant pumps. According to plant management, remaining installations will occur during the fall maintenance outage, and final testing of the system will commence immediately following installation of the sensing lines. (Rich Reister, DOE, 301-903-0234; Ron Wright, PNNL, 509-372-4076)

Planned Activities

• indicates the event is new or has changed in some way since the previous report was issued.

• August 28 - September 1 - South Ukraine NPP, Ukraine Management and Operational Safety. Representatives from EnergoAtom, the Nuclear Power Plant Operational Support Institute, and the quality and environmental laboratory departments of South Ukraine NPP will conduct an audit of environmental radiation monitoring at the South Ukraine plant. Audit results will be presented to plant management. The objectives of the audit are to provide auditing experience to personnel from South Ukraine's quality organization and to encourage plant management and worker appreciation of the benefits of audits. (Dennis Meyers, DOE, 301-903-1418; Lief Erickson, PNNL, 509-372-4097)



• **September 4-5 – Khmelnytsky NPP, Neteshin, Ukraine Engineering and Technology.** A member of the U.S. team will meet with representatives of EnergoAtom, Ukraine Ministry of Energy, State Nuclear Regulatory Administration, and the Ukrainian general contractor, Transexpo Corporation, to verify final deliverables for the physical security upgrades at Khmelnytsky NPP. Deliverables to be verified include:

- completion of installation and testing for access control and interior physical barrier subsystems in reactor building, auxiliary building, and fresh fuel storage
- EnergoAtom’s commissioning and official acceptance of subsystems, including the unit alarm station
- acceptance and implementation of operational, maintenance, and training procedures.

All deliverables will require official approval of EnergoAtom and the State Nuclear Regulatory Administration in addition to that of the U.S. team. (Grigory Trosman, DOE, 301-903-3581; Andrei Glukhov, PNNL, 509-375-3961)

September 4-15 – Armenia NPP, Armenia

Training. Training and technical specialists from Armenia NPP and a U.S. trainer will begin work to transfer the Chemistry Department Shift Supervisor pilot training program to the plant. (John Yoder, DOE, 301-903-5650; Don Draper, PNNL, 509-372-4079)

September 6-7 – Prague, Czech Republic

Plant Safety Assessments. Data Systems & Solutions (DS&S) will host an international peer review coordinated by Brookhaven National Laboratory on the Methodology of Comparison (MOC) developed by DS&S in cooperation with Khmelnytsky NPP in Ukraine. Other participants include analysts from Ukraine (Engineering Technologies and Development), Finland (Fortum Engineering), Germany (Gesellschaft für Anlagen und Reaktorsicherheit mbH), and the United Kingdom (SCIENTECH). The reviewers will assess the MOC, which is part of a proposed integrated methodology for implementing the “lead-plant” concept to produce a full-scope, in-depth safety assessment, specific to the Khmelnytsky plant. Safety assessment elements from a similar lead plant will be used in this effort. (Walter Pasedag, DOE, 301-903-3628; Charles Dickerman, ANL, 630-252-4622)

• **September 11-21 – Armenia NPP, Armenia**

Plant Safety Assessment. A representative of the U.S. team will meet with counterparts from Armenia NPP to conduct a seismic walk-down of the plant. The walk-down will help determine the extent to which key safety components meet seismic standards. A technical specialist from Argonne National Laboratory also will participate in the walk-down. (Dennis Meyers, DOE, 301-903-1418; Mark Petri, ANL, 630-252-3719)



September 11-15 – Moscow, Russia

Simulators/Training. VNIIAES will host a workshop focused on the development of normative documents for simulators in Russia. Discussion topics include document development, format, and content, as well as issues related to normative documents for full-scope and multifunctional simulators. Representatives of Russian organizations involved in simulator activities and a U.S. specialist from Pacific Northwest National Laboratory will participate in the workshop. (John Yoder, DOE, 301-903-5650; Al Ankrum, PNNL, 509-372-4095)

September 11-15 – Argonne, Illinois, USA

Plant Safety Assessment. U.S. team members from Argonne National Laboratory will host a review meeting for the Khmelnytsky NPP in-depth safety assessment project. Participants will include project managers from the Khmelnytsky plant and Kyiv Energoproekt, the plant's technical support organization. The participants will discuss project progress and future activities. (Walter Pasedag, DOE, 301-903-3628; Charles Dickerman, ANL, 630-252-4622)

September 11-22 – Kozloduy NPP, Bulgaria

Training. Specialists from VNIIAES and Sonalysts, Inc., will work with training and technical specialists from Kozloduy NPP to complete plans and instructional materials for a training program for emergency operating instruction trainers at the plant. During the second week, the specialists will implement the course for trainers at Kozloduy Units 1 through 4 (all VVER-440/230 reactors). (John Yoder, DOE, 301-903-5650; Don Draper, PNNL, 509-372-4079)

September 11-22 – Kyiv, Ukraine

Training. Work will begin on a project to transfer a pilot training program for control room turbine operators to Rivne, South Ukraine, and Zaporizhzhya NPPs. Specialists from the Khmelnytsky plant, the Engineering and Technical Center for the Training of Nuclear Industry Personnel, and Sonalysts, Inc., will provide technical assistance. (John Yoder, DOE, 301-903-5650; Don Draper, PNNL, 509-372-4079)

• September 25-October 5 – Kola NPP, Russia

Simulators/Training. U.S. and host-country specialists will hold the second of three working sessions aimed at transferring a training program for simulator instructors to Kola NPP. Participants from Russia will include representatives from VNIIAES, the nuclear power plants, and the training centers at Smolensk and Balakovo NPPs. U.S. training specialists from Human Performance Analysis Corporation and Sonalysts, Inc., also will participate. (John Yoder, DOE, 301-903-5650; Al Ankrum, PNNL, 509-372-4095)



September 27-29 - Slavutych, Ukraine

Chornobyl Initiatives. The International Chornobyl Center will convene its fourth annual conference to facilitate the exchange of information on international scientific and technical activities at Chornobyl. The conference program will include plenary and workshop sessions and technical tours of Chornobyl NPP and the Unit 4 Shelter. (Riaz Awan, DOE, 38-050-257-7221; Don Draper, PNNL, 509-372-4079)



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