

Activity Report

April 2000

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

Full-scope simulator completed for South Ukraine

Highlights

During April, U.S. and Russian technical specialists finished all work associated with the construction and installation of a full-scope simulator at South Ukraine nuclear power plant (NPP). The state-of-the-art simulator will be used to train control room operators for South Ukraine's Unit 3, a VVER-1000 reactor.



South Ukraine Unit 2 (middle) came on-line in the early 1980s, along with Unit 1 (left). Unit 3 (right) began operation in 1989. All three units are VVER-1000 reactors.

Full-scope simulators have proven their worth to the nuclear industry as a very effective tool for preparing reactor operators to respond appropriately to actual emergency situations. A full-scope simulator provides hands-on training by replicating the control room of a nuclear power plant. A computer links an instructor station with a full-size physical replica of the control panels. As reactor operators manipulate controls, the simulator responds by displaying the changes in conditions that would occur in the plant. The instructor can select the initial state of the plant, introduce malfunctions and failures, freeze the exercise, and enable retrospective viewing.



Completion of the site acceptance testing at the plant in late April represents the culmination of a jointly funded Ukrainian-U.S. project that began in July 1995. Through the U.S. Department of Energy's cooperative program to improve the safety of Soviet-designed reactors, the United States purchased the computer hardware, software, input/output system, power supplies, and control panels. The U.S. team also completed the system software development and testing initiated by South Ukraine NPP.



A test operator from South Ukraine NPP checks through the final site acceptance test procedure for the Unit 3 full-scope simulator.

Project participants have scheduled the simulator's official turnover to the plant for early June (see **Planned Activities**). (John Yoder, DOE, 301-903-5650; Joe Cleary, PNNL, 509-372-4094) v

***Priest's blessing
highlights Kola
simulator turnover
activities***

In meetings held April 11 through 13, the U.S. team officially turned over a state-of-the-art full-scope simulator to Kola NPP. Completed in March 2000 (see March **Activity Report**), the simulator will be used in training operating staff for the VVER-440/213 reactor of Kola Unit 4.

Participating in the turnover activities were officials and technical specialists from Rosenergoatom, the All-Russian Institute for Nuclear Power Plant Operations (VNIIAES), and General Energy Technologies (GET). GET is the Moscow-based joint venture between VNIIAES and U.S. simulator contractor GSE Power Systems, Inc., of Columbia, Maryland. Representative Kola NPP managers and team members from the U.S. Department of Energy and Pacific Northwest National Laboratory also took part.





Key participants in the Kola Unit 4 simulator project gather for the official turnover at the plant in April. Pictured in front of the new simulator are, left to right, Joe Cleary, Pacific Northwest National Laboratory; John Yoder, U.S. Department of Energy; Oleg Sharbarkin, interpreter; Yuri Filimonstev, VNIIAES; Gennady Alekseev, Rosenergoatom; Andrei Zlokazov, VNIIAES/GET; Leonid Kumkov, Kola NPP; Viktor Petrushin, Rosenergoatom; Yulia Rumiantseva, Rosenergoatom; A. A. Afanaziev, GET; and Sergey Netchaev, M. A. Kvasov, and V. P. Pirog, Kola NPP.

At the invitation of plant management, a local priest formally blessed the simulator, highlighting the turnover.



Kola Unit 4 simulator receives traditional Russian Orthodox blessing during turnover.

During the meetings, training staff from Kola NPP demonstrated the instructional program they had developed to incorporate the full-scope simulator into the plant's overall program for training reactor operators. (John Yoder, DOE, 301-903-5650; Joe Cleary, PNNL, 509-372-4094) ✓



***Bilibino analytical
simulator undergoes site
acceptance tests***

Russia

The U.S.-provided analytical simulator for Bilibino NPP successfully completed site acceptance testing on April 28 at the plant site in far-eastern Russia. Technical specialists from LAKROM, the Russian subcontractor for software development, accompanied the simulator shipment to the plant and collaborated with Bilibino NPP staff to run this final round of acceptance tests.

In comparison to a full-scope simulator, an analytical simulator uses computer monitor screens instead of replicated control panels. The computer's graphic displays represent plant systems. Operators enter computer commands to practice responding to various plant conditions. GSE Power Systems, Inc., is the U.S. overall contractor for the Bilibino simulator development work.



Operators training to work in the Bilibino NPP control rooms soon will benefit from the plant's new analytical simulator. Provided with support from the U.S. team, the simulator's computer screens replicate the complex instrument panels and gauges shown here.

After the tests were completed, the specialists declared the new simulator "ready for training." Actual certification of the simulator for training will be done by Gosatomnadzor, Russia's organization responsible for regulating the safety of nuclear reactors. That will be done as part of the official simulator turnover activities scheduled for late May/early June (see **Planned Activities**). Following the turnover, Bilibino NPP will have a state-of-the-art tool for training the plant's reactor operators, greatly augmenting the site's existing training program. (John Yoder, DOE, 301-903-5650; Joe Cleary, PNNL, 509-372-4094) ✓



**Workshop covers
multiple aspects of spent
fuel management**

At the end of March, representatives of Gosatomnadzor participated in a workshop on spent fuel management held in St. Petersburg. The participants came from a cross section of the organization's facilities in Russia—the headquarters office, the Scientific and Engineering Center, and the Leningrad, Volga, and Chelyabinsk regional offices.

Gosatomnadzor is the Russian agency responsible for regulating the safety of nuclear reactors and fuel cycle enterprises. Gosatomnadzor is the shortened form of the name *Gosudarskvenniy Kommityet po Atomnoi u Yadernii Nadzory*, which translates to State Committee for the Supervision of Atomic and Radiation Safety.

The U.S. team, represented by two technical experts from Pacific Northwest National Laboratory, organized and conducted the workshop specifically for the Gosatomnadzor group.

The U.S. specialists covered a wide range of relevant topics in their presentations:

- magnitude of the spent fuel management challenge in the United States
- overview of spent fuel management technologies
- licensing requirements for spent fuel storage
- spent fuel pool island option
- naval propulsion spent nuclear fuel storage
- computer codes for spent fuel storage safety analysis
- radiological safety and emergency planning requirements for spent fuel storage
- Point Beach spent fuel cask hydrogen ignition event
- radiological safety and emergency planning for spent fuel storage facilities
- quality assurance issues related to the Vectra spent fuel cask.

The Russian participants presented their proposed regulations for spent fuel storage, practices for handling of damaged fuel, and proposed safety requirements for spent fuel reprocessing. In addition, two issues were introduced during the workshop:

- As of March 20, 2000, Minatom stated it would comply with Gosatomnadzor's requirements and normative documents for the spent fuel cask being designed and provided under the Arctic Military Environmental Cooperation and Cooperative Threat Reduction programs, likely resolving an issue. Minatom has maintained that Gosatomnadzor does not have jurisdiction in the matter.
- The issue of burnup credit for criticality analyses for spent fuel storage casks is a significant area of discussion in licensing actions for both the U.S. and Russian representatives.

Overall, participants judged the workshop as highly successful and informative for all participants. (Grigory Trosman, DOE, 301-903-3581; Mike McKinnon, PNNL, 509-372-4198) ✓



***Events database
installed for testing on
Zaporizhzhya computers***

***Zaporizhzhya hosts
training course on
validating simulators***



Ukraine

Ukrainian software technicians worked with computer specialists from Zaporizhzhya NPP to conduct a test installation of a specialized database at the plant in mid-April. The database is designed to hold information related to event analysis, reporting, and lessons learned (EARLL). As the pilot plant in Ukraine for database implementation, Zaporizhzhya eventually will install and use the database on its plant computer system.

The test installation, using a limited number of plant computers, enabled specialists to test the hardware, hardware interfaces, and software for collecting, analyzing, and reporting data on operating events at Zaporizhzhya. Based on the testing, specialists identified items needing resolution before the database is implemented fully at the plant.

Participants in the testing included the project manager and software technicians from Novator-Kiev (Ukrainian subcontractor), the Zaporizhzhya manager for event analysis, and computer technicians on the Zaporizhzhya NPP staff. Novator-Kiev technicians brought the database files and conducted the testing of the database on the Zaporizhzhya computers. The Zaporizhzhya staff coordinated installation, conducted testing, provided comments, and identified issues needing Novator's further resolution before finalizing the database for implementation.

Implementation of the EARLL database at Zaporizhzhya NPP will facilitate the plant's analysis and reporting of operational events at the site. After a pilot implementation period at Zaporizhzhya, U.S. and Ukrainian specialists likely will collaborate to install future versions of the database at the other nuclear power plant sites in Ukraine. (Dennis Meyers, DOE, 301-903-1418; Lief Erickson, PNNL, 509-372-4097) √

During the week of April 3, Zaporizhzhya NPP hosted a training course on verification and validation of full-scope and analytical simulators. Course presenters included technical specialists from General Energy Technologies, VNIIAES, Energoatom, Balakovo and Zaporizhzhya NPPs, and Brookhaven National Laboratory. The course was provided specifically for staff of South Ukraine, Rivne, and Zaporizhzhya NPPs who will participate in validation testing of the simulators at their respective plants.

The Brookhaven and General Energy Technologies representatives described experience with verification and validation in the U.S. nuclear industry. Related topics covered the relationship between the nuclear utility and the U.S. Nuclear Regulatory Commission, as well as regulatory requirements for both initial and periodic recertification. The group also reviewed and

***International
Radioecology Laboratory
opens in Slavutych***

***International Chernobyl
Center convenes Council
of Members in Slavutych***



discussed nuclear standards related to simulator verification and validation, training programs, operator licensing, and software and hardware standards.

Ukrainian practices were reviewed and technical discussions were held regarding steps in the acceptance test program. Typical examples were presented in comparing simulator results to plant data and/or analytical calculations. Zaporizhzhya NPP staff demonstrated various transient scenarios on the full-scope simulator. A specific scenario was analyzed step-by-step with regard to plant response and how comparison and checks were made. (John Yoder, DOE, 301-903-5650; Joe Cleary, PNNL, 509-372-4079; Peter Kohut, BNL, 631-344-4982) v

The official opening of the International Radioecology Laboratory (IRL) took place in Slavutych, Ukraine on March 23. The IRL was created to facilitate and expand international research on the environmental effects of the 1986 Chernobyl disaster.

Senior-level officials from the Ukrainian and U.S. governments and scientific institutions attended the event, as did representatives from the international community. Representatives of Energoatom, Ukrainian National Academy of Sciences, Ukrainian State Nuclear Regulatory Administration, University of Georgia, Savannah River Ecology Laboratory, Pacific Northwest National Laboratory, U.S. Environmental Protection Agency, U.S. Peace Corps, the U.S. Department of Energy, and the Franco-German consortium RiskAudit were present. Participants were given detailed tours of the IRL facility and shown its equipment and capabilities.

Financial support for development of the IRL comes from the office of the U.S. Department of Energy's Deputy Assistant Secretary for Environmental Management. (Riaz Awan, DOE, 38-050-257-7221; Michele Dash, PNNL, 202-586-3550) v

On March 30, the International Chernobyl Center convened its Council of Members (COM) meeting in Slavutych. The COM is an international advisory body to the Center on organizational and project development issues and meets on a periodic basis. Representatives from the U.S. Department of Energy, U.S. Department of State, U.S. Embassy in Kyiv, United Kingdom Department of Trade and Industry, the Franco-German consortium RiskAudit, the German government, and the Chernobyl Center were in attendance. Participants discussed the Center's current and future projects, its financial budgets, its organizational development, and planning for the Center's upcoming annual conference. The U.K. representative signaled that its scientists are interested in research activities through

***Progress reviewed
for Zaporizhzhya
safe-shutdown analysis***

the Center's International Radioecology Laboratory. (Riaz Awan, DOE, 38-050-257-7221; Michele Dash, PNNL, 202-586-3550) v

Engineering Planning and Management Inc. (EPM) hosted a progress meeting for participants in the safe-shutdown analysis under way at Zaporizhzhya NPP. Analysts from Kyiv Energoprojekt met with technical specialists from EPM and Brookhaven and Pacific Northwest national laboratories at EPM offices in Framingham, Massachusetts, for the four-day review in April.



Participating in the Zaporizhzhya safe-shutdown analysis review were (left to right) Ali Azarm, Brookhaven National Laboratory; Andy Minister, Pacific Northwest National Laboratory; Vadym Buyalsky, Energoprojekt; Rich Denning, Pacific Northwest National Laboratory; Victor Shenderovych, Energoprojekt; Alexander Myakinkykh, Energoprojekt; George Krasnyansky, Energoprojekt; and Bob Kalantari, Engineering Planning and Management.

Participants held detailed discussions on two reports documenting specific tasks completed by Energoprojekt specialists as part of the safe-shutdown analysis:

- ***The List of the Equipment Required for the Safe Reactor Shut down in Case of Fire Including Associated Circuits and Their Equipment***
- ***Fire Protection Means for Rooms with the Equipment and/or Cabling Required for Safe Reactor Shutdown in Case of Fire. Fire Compartments and Fire Cell.***

The group reached agreement on revisions needed to clarify important information in each of the reports. Energoprojekt analysts will make the revisions and resubmit the reports. Participants also reviewed a third Energoprojekt task report, ***The List of the Unit Systems and Their Functions to be Used for SSD in Case of Fire***, and agreed no further revisions were needed.



***International team
reviews South Ukraine
probabilistic risk
assessment***

The balance of the meeting focused on plans for future work, including the start of the deterministic and probabilistic analysis tasks. The project team agreed to hold the next project review in Ukraine in fall 2000. (Grigory Trosman, DOE, 301-903-3581; Andrew Minister, PNNL, 509-376-4938) v

Members of an international team conducted an early-April review of the Level 1 probabilistic risk assessment (PRA) for internal initiating events of South Ukraine Unit 1. The review was conducted in Kyiv by an international probabilistic safety assessment review team (IPSART), a service provided by the International Atomic Energy Agency (IAEA).

The review was held at the offices of Energorisk, Ltd., the main technical subcontractor for the South Ukraine in-depth safety assessment project. The IPSART consisted of experts from the IAEA, other Soviet-design reactor and support organizations, and the U.S. Nuclear Regulatory Commission. Members of the U.S. team from SCIENTECH, Inc., and Argonne National Laboratory participated primarily as observers and to provide a programmatic perspective for the work under review.

The IPSART reviewed the final PRA report, significant portions of the supporting documentation, and the project archives. The overall evaluation of the PRA was positive; the reviewers identified the following strong points:

- the extensive use of thermal-hydraulic analysis to support success criteria definition and accident sequence timing
- the project quality assurance program
- plant-specific databases and the efforts to develop a very comprehensive and realistic reliability database.

The IPSART mission turned up several key findings:

- the need for a detailed independent peer review (***in process of being implemented***)
- the omission of certain accident scenarios, e.g., steam line and feedwater-discharge line breaks outside the containment (***will be analyzed as part of internal flooding***)
- accounting for some dependencies between human actions (***needs to be checked***)
- some questions with respect to common-cause failures and the unavailability of systems due to corrective maintenance (***mostly to be resolved before issue of final report by IPSART***).



***Participants review
South Ukraine safety
assessment project***

The successful IPSART mission represents an important milestone for the in-depth safety assessment projects in Ukraine: it provided the first review by a recognized international body of an important aspect of the overall safety assessment for a reactor unit. (Walter Pasedag, DOE, 302-903-3628; Christian Kot, ANL, 630-252-6151) v

Status of the South Ukraine in-depth safety assessment project was reviewed on April 15 in Kyiv. Representatives of South Ukraine NPP, Energorisk, SCIENTECH, Inc., and Argonne National Laboratory conducted the review. The group determined that for the first phase of the internal/external hazards assessment, which includes hazards identification and data collection, all tasks are essentially complete. Only the internal flooding report still is under review. Work on the design-basis accident analysis is progressing well and is in accord with the revised schedule developed in December 1999.

Possible and planned future activities, including priorities and potential issues, were discussed. These activities included external hazards, internal hazards, limited beyond-design basis analysis, Level 2 PRA, support for emergency operating instructions, a living PRA, and the implementation of peer review. (Walter Pasedag, DOE, 302-903-3628; Christian Kot, ANL, 630-252-6151) v

***Management skills
workshop presented at
Armenia***

Armenia

During the last week of April, U.S. specialists conducted a three-day seminar for managerial and supervisory personnel at Armenia NPP. The seminar, presented previously at nuclear power plants in Russia, Ukraine, and Bulgaria, is part of an overall training program under way at Armenia NPP with joint support from the International Atomic Energy Agency and the United States. The seminar covered basic management skills including communication, decision making, teamwork, motivation, human factors, and organizational structure. (John Yoder, DOE, 301-903-5650; Don Draper, PNNL, 509-372-4079) v



***Hardware for upgraded
Ignalina 2 control-and-
protection system under-
goes site acceptance test***

***Host-country nuclear
specialists prepare for
plant decontamination
and decommissioning***



Lithuania

On April 13, a partial site acceptance test was completed on hardware for the control-and-protection system upgrade at Ignalina Unit 2. The test involved simulating the sensor input to the four logic cabinets and relay terminal interface boxes. Plant workers will connect the system to the sensors later in the year, so that the system can be made operational when the plant returns to power following a fall outage. The balance of the site acceptance test will be conducted at that time.

An identical system has been in operation at Unit 1 since September 1998. The purpose of the system is to provide backup protection to safely shut down the reactor for several important accident sequences that are not mitigated sufficiently by the original reactor protection system.

Principal participants in this project are Parsons Power (technical management), Foxboro, SCIENTECH, the Lithuania Energy Institute, Ignalina NPP, and VATESI, the Lithuanian regulatory authority. The partial site acceptance test completes the U.S. scope of responsibility for this effort. (Grigory Trosman, DOE, 301-903-3581; Ron Wright, PNNL, 509-372-4076) v

Cross-Cutting Events

In March 2000, Lithuania's parliament gave final approval for the early closure of Ignalina Unit 1. Decommissioning the reactor is scheduled for completion in 2005. The closure date for Ignalina Unit 2 is to be determined in 2004. And, although a specific date has not yet been set for decommissioning Armenia NPP, its Unit 1 was shut down permanently in 1990; Unit 2 permanent shutdown is expected in 2005. Specialists in both countries are developing decommissioning plans for their respective nuclear power plant sites.

In preparation for the upcoming decontamination and decommissioning (D&D) activities, two nuclear specialists from Ignalina NPP and one from Armenia NPP toured three nuclear power plant sites in the United States to gather information specific to nuclear power plant D&D. They participated in technical discussions onsite with D&D personnel from Trojan NPP (Oregon), the Hanford reactors (Washington State), and Connecticut Yankee NPP (Connecticut).

U.S. team members from Sonalysts, Inc., and Pacific Northwest National Laboratory accompanied the group to facilitate discussions and provide additional technical information on D&D-related activities. The tour and discussions provided the host-country specialists with opportunities to interact and establish contacts with counterparts at U.S. facilities with D&D experience.



Lithuanian and Armenian nuclear personnel pose with hosts in front of spent fuel dry storage area at Trojan NPP in Oregon. Touring the shutdown plant are (left to right) Genadij Negrivoda, technical director, Ignalina NPP; Saulius Urbonavicius, head of production, Ignalina NPP; Chuck White, senior planner/scheduler, Portland General Electric; Hakob Malkhasyan, head of technical department, Atomservice (Armenia); Alma Machshanova, interpreter; Bruce Wallis, project manager, Decommissioning and Spent Fuel Management, Portland General Electric; Aram Gevorgyan, Head, Department of Atomic Energy, Armenia Ministry of Energy; and Mark Bierschbach, development engineer, Pacific Northwest National Laboratory.

Also participating was the head of the Armenian Department of Atomic Energy, who toured the first two sites with the group. He then flew to Washington, D.C., for additional discussions with U.S. Department of Energy officials.

The Lithuanian experts ended their U.S. visit in Waterford, Connecticut, at the training facilities of Sonalysts, Inc., for a tour and additional technical discussions regarding training activities associated with D&D. The Armenian expert spend the week following the tour at Pacific Northwest National Laboratory where he and U.S. technical specialists discussed preparation of a preliminary decommissioning plan for Armenia NPP. (John Yoder, DOE, 301-903-5650; Dennis Meyers, DOE, 301-903-1418; Steve Short, PNNL, 509-375-2868; Don Draper, PNNL, 509-372-4079) v

***Multinational
stakeholders involved in
neutron kinetics code
assessment for RBMKs***



The Lithuanian Energy Institute (LEI) is developing neutron physics and coupled computer code RELAP5-3D models for analysis of RBMK transients. The models will be verified with analysis of benchmarks being defined by specialists at Russia's Kurchatov Institute. LEI analysts also plan to use the verified models in other projects, such as participation in the safety analysis for Ignalina Unit 2 and review of the safety analysis of the second shutdown system under the sponsorship of the Swedish International Project (SiP) in coordination with a project sponsored by the European Union.

To help coordinate the activities sponsored by the United States and Sweden, a U.S. specialist from Argonne National Laboratory participated in late-March meetings in Stockholm, Sweden. Also at the meeting were representatives of SiP, the Kurchatov Institute, and Sweden's Royal Institute of Technology (KTH).

The U.S. Department of Energy (DOE) and SiP activities were summarized and discussed for potential areas of common interest. Discussion participants identified several areas in which the two programs can collaborate for maximum benefits:

1. evaluation of the cross section libraries at KTH (sponsored by SiP)
2. definition of coupled code benchmarks by the Kurchatov Institute (sponsored by DOE)
3. development of a safety analysis capability at LEI (sponsored by DOE and SiP)
4. analysis of the benchmarks and comparison of results at LEI and Kurchatov (sponsored by DOE) and at KTH (sponsored by SiP).

Analysts at KTH and LEI are encountering questions about detailed modeling of RBMK control assemblies, control logic, and cross section libraries. Kurchatov analysts believe that the code cannot model the RBMK logic without additional source code changes. This issue is important, as it would affect the specifications of the benchmarks and, ultimately, the analysis capabilities of LEI. A followup meeting will be held in a few months, when additional modeling is complete, to review the technical issues in detail. Close coordination among all stakeholders in the code assessment will facilitate the technical communications needed to resolve these questions.

(Walter Pasedag, DOE, 301-903-3628; Jordi Roglans, ANL, 630-252-3283) v

Planned Activities

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

• **May tbd — South Ukraine NPP, Ukraine**

Engineering and Technology. The U.S.-provided safety parameter display system for South Ukraine Unit 2 will undergo site acceptance tests at the plant. The specific test date is contingent upon reload fuel being supplied to the plant so it can return to power operation. (Richard Reister, DOE, 301-903-0234; Richard Denning, PNNL, 614-424-7412; Frank Panisko, PNNL, 509-372-4472)

• **May 7-12 — Armenia NPP, Armenia**

Engineering and Technology. The U.S.-provided safety parameter display system for Armenia NPP will undergo site acceptance testing at the plant. Plant technical staff and representa-



tives of U.S. contractors Science Applications International Corporation, Data Systems & Solutions, and Burns & Roe Enterprises, Inc., will participate in the testing. (Richard Reister, DOE, 301-903-0234; Rich Denning, PNNL, 614-424-7412; Frank Panisko, PNNL, 509-372-4472)

May 8-12 — Pittsburgh, Pennsylvania, and Argonne, Illinois, USA

Plant Safety Assessment. With U.S. support, a technical expert from the Lithuanian Energy Institute will attend PHYSOR 2000, the American Nuclear Society (ANS) international topical meeting, Advances in Reactor Physics and Mathematics and Computation into the Next Millennium. Following the ANS meeting, he will join U.S. team members from Argonne National Laboratory to plan pipeline whipping analyses for Ignalina NPP. (Dennis Meyers, DOE, 301-903-1418; Mark Petri, ANL, 630-252-3719)

• May 13-20 — Millstone NPP, Connecticut, and Palo Verde NPP, Arizona, USA

Plant Safety Assessment. Ukrainian specialists representing the Engineering and Quality directorates at Energoatom and the Nuclear Power Plant Operational Support Institute (NPP OSI) will gather information on two different approaches to collecting design basis data for operating nuclear power plants. This information will provide the basis for a development plan for design basis documents at Ukraine's four VVER nuclear power plants in Ukraine; the NPP OSI specialists will develop the plan. A member of the U.S. team also will participate in the site visits. (Walter Pasedag, DOE, 301-903-3628; Lief Erickson, PNNL, 509-372-4079)

• May 15-26 — Rivne NPP, Ukraine

Training. A U.S. training expert from Sonalysts, Inc., and training and technical specialists from Ukraine's Khmelnytsky NPP the Engineering and Technical Center for the Training of Nuclear Industry Personnel will implement a pilot training program for control room reactor operators at Rivne NPP. The program will be piloted to a group of incumbent control room reactor operators and supervisors who also will be asked to provide feedback on the training. (John Yoder, DOE, 301-903-5650; Don Draper, PNNL, 509-372-4079)

• May 18-19 — Vienna, Austria

Plant Safety Assessment. Nuclear analyst specialists will meet at the International Atomic Energy Agency (IAEA) for technical discussions on the development of guidelines for analysis of RBMK transients and their implications on the RELAP5/MOD3.2 code validation for application to RBMK reactors. Representatives from the IAEA, Kurchatov Institute, Idaho National Engineering and Environmental Laboratory, and Argonne National Laboratory will participate. (Walter Pasedag, DOE, 301-903-3628; Jordi Roglans, ANL, 630-252-3283).



- **May 21-26 — Moscow, Russia**

Simulators/Training. The U.S. team will begin a series of three working visits to transfer the Simulator Instructor Training Program to Russia. Representatives from VNIIAES, the Balakovo and Smolensk training centers, and Russia's nuclear power plants will participate. U.S. team members from Sonalysts, Inc., Human Performance Analysis Corporation, and Pacific Northwest National Laboratory will attend. (John Yoder, DOE, 301-903-5650; Al Ankrum, PNNL, 509-372-4095)

- **May 22-23 — Moscow, Russia**

Plant Safety Assessment. Project participants will hold a technical meeting at the Russian International Nuclear Safety Center (RINSC) to discuss progress in the code validation for application to VVER and RBMK reactors and finalize comparison of analyses for an RBMK standard problem. Representatives from RINSC, Electrogorsk Research and Engineering Center, Kurchatov Institute, and Argonne National Laboratory will participate in the discussions. (Walter Pasedag, DOE, 301-903-3628; Jordi Roglans, ANL, 630-252-3283)

- **May 22-26 — Zaporizhzhya NPP, Ukraine**

Engineering and Technology. The U.S.-provided safety parameter display system for Zaporizhzhya Unit 3 will undergo site acceptance tests at the plant. (Richard Reister, DOE, 301-903-0234; Rich Denning, PNNL, 614-424-7412; Frank Panisko, PNNL, 509-372-4472)

- **May 27-June 4 — Scholkino, Ukraine**

Management and Operational Safety. Specialists from Ukraine's Crimea Scientific and Engineering Center and Zaporizhzhya NPP will present a training seminar on the application of procedures for event analysis and reporting. Fifteen Zaporizhzhya NPP personnel will participate as trainees. The seminar seeks to provide a plant-wide understanding of procedures and improved practices for nuclear power plant event analysis and reporting to Energoatom. (Dennis Meyers, DOE, 301-903-1418; Lief Erickson, PNNL, 509-372-4079)

- **May 29-June 9 — Kozloduy NPP, Bulgaria**

Training. A representative of Sonalysts, Inc., and a specialist from VNIIAES will work with training and technical specialists from Kozloduy NPP on the development of an instructional program for emergency operating instruction (EOI) trainers. Kozloduy technical personnel are providing expertise on the EOIs, while the U.S. and Russian specialists are helping develop a training program on EOIs. During the second week of this working visit, participants will implement the EOI training program for a pilot group of trainers at Kozloduy Unit 1. (John Yoder, DOE, 301-903-5650; Don Draper, PNNL, 509-372-4079)

- **May 29-June 9 — Zaporizhzhya NPP, Ukraine**

Training. A U.S. training expert from Sonalysts, Inc., and training and technical specialists from Ukraine's Khmelnytsky NPP the Engineering and Technical Center for the Training of



Nuclear Industry Personnel will implement a pilot training program for control room reactor operators at Zaporizhzhya NPP. The program will be piloted to a group of incumbent control room reactor operators and supervisors who also will be asked to provide feedback on the training. (John Yoder, DOE, 301-903-5650; Don Draper, PNNL, 509-372-4079)

• **May 30-June 2 — Bilibino NPP, Russia**

Simulators/Training. The U.S.-provided analytical simulator for Bilibino NPP will be turned over officially to the plant. Participants will include representatives of the plant, Gosatomnadzor, Rosenergoatom, LAKROM, VNI AES, GSE Power Systems, and Pacific Northwest National Laboratory. Following the turnover ceremony, participants will review the status of the plant's training program and instructional materials for operators. (John Yoder, DOE, 301-903-5650; Joe Cleary, PNNL, 509-372-4094)

• **June 7-9 — South Ukraine NPP, Ukraine**

Simulators/Training. The U.S. team will officially turn over the full-scope simulator for Unit 3 to South Ukraine NPP. Organizations participating in the turnover will include South Ukraine NPP, the Main State Inspectorate, Energoatom, LAKROM, GSE Power Systems, Inc., the U.S. Department of Energy, and Pacific Northwest National Laboratory. (John Yoder, DOE, 301-903-5650; Joe Cleary, PNNL, 509-372-4094)

• **June 12-18 (*rescheduled from May 22-27*) — Kyiv and South Ukraine NPP, Ukraine**

Management and Operational Safety. U.S. specialists will work with Ukrainian team members to prepare a plan for auditing radiation monitoring of the environment at South Ukraine NPP. Representatives of South Ukraine NPP, Energoatom, the Nuclear Power Plant Operational Support Institute, SCIENTECH, Inc., and Pacific Northwest National Laboratory will participate. The South Ukraine audit plan and resulting audit (scheduled to begin June 24) will provide a framework and field data from which a functional area performance guide can be developed for use at all nuclear power plants in Ukraine. (Dennis Meyers, DOE, 301-903-1418; Lief Erickson, PNNL, 509-372-4097)

• **June 19-30 — South Ukraine NPP, Ukraine**

Training. A U.S. training expert from Sonalysts, Inc., and training and technical specialists from Ukraine's Khmelnytsky NPP the Engineering and Technical Center for the Training of Nuclear Industry Personnel will implement a pilot training program for control room reactor operators at South Ukraine NPP. The program will be piloted to a group of incumbent control room reactor operators and supervisors who also will be asked to provide feedback on the training. (John Yoder, DOE, 301-903-5650; Don Draper, PNNL, 509-372-4079).



• **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. Conference organizers are seeking speakers to give presentations at the conference. (Riaz Awan, DOE, 38-050-257-7221; Michele Dash, PNNL, 202-586-3550)



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