



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

February 10, 2000

MEMORANDUM TO:

Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield

FROM:

Janice Dunn Lee, Director
Office of International Programs

SUBJECT:

MEMORANDUM OF MEETING BETWEEN USNRC AND THE
UKRAINIAN STATE NUCLEAR REGULATORY ADMINISTRATION
FOR IMPLEMENTATION OF NUCLEAR SAFETY AND SECURITY
ASSISTANCE PROJECTS

On Friday, January 28, 2000, Oleksandr Smyshliaiev, Chairman of the Ukrainian State Nuclear Regulatory Administration (SNRA) and the EDO signed the attached Memorandum of Meeting (MOM) describing the NRC-SNRA program of assistance. The MOM summarizes progress made over the last year between our agencies and plans for the future.

The program in the MOM is a departure from that conducted in the past. At its outset in 1993, the program was expected to be of a very limited duration, totaling two or three years. As planned, NRC supported infrastructure development and regulatory processes. As a result:

- Legislation has been enacted for the safe utilization of nuclear energy in Ukraine;
- The regulatory structure has been established;
- Projects for providing training and equipment to these organizations have been completed;
- The transfer of methodologies needed to verify safety assessments for licensing has been completed;
- The basic State Materials Protection, Control and Accounting System in Ukraine has been established.

It has become clear that a longer-term perspective is needed to sustain these developments, particularly in light of the large regulatory workload facing SNRA. Therefore, the emphasis is now on reinforcing the accomplishments of the last several years. A rolling 3-5-year planning horizon has now supplanted the 12-18-month horizon.

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415-2329

DFX2

All agreements in the MOM were made with the understanding that they depend on the availability of funds.

It should be noted that some of the material in the MOM was prepared and translated into English by SNRA. This explains the stylistic differences which occasionally appear in the document.

Attachment: Signed Memorandum of Meeting

cc w/att:

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DISTRIBUTION: - MEMORANDUM Dated: February 10, 2000
The Commission

SUBJECT: MEMORANDUM OF MEETING BETWEEN USNRC AND THE FEDERAL
NUCLEAR AND RADIATION SAFETY AUTHORITY OF RUSSIA
(GOSATOMNADZOR) FOR IMPLEMENTATION OF NUCLEAR SAFETY AND
SECURITY ASSISTANCE PROJECTS

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All agreements in the MOM were made with the understanding that they depend on the availability of funds, which are provided by the Agency for International Development. Projects related to safeguards are to be funded by the Department of Energy. NRC staff costs will be funded from NRC appropriations, not recoverable through license fees.

It should be noted that some of the material in the MOM was prepared and translated into English by SNRA. This explains the stylistic differences which occasionally appear in the document.

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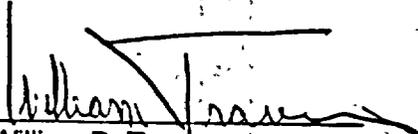
**MEMORANDUM OF MEETING BETWEEN
THE U.S. NRC AND THE
UKRAINIAN STATE NUCLEAR REGULATORY ADMINISTRATION,
MINISTRY OF ENVIRONMENTAL PROTECTION AND NUCLEAR SAFETY
JANUARY 24-28, 2000**

Representatives of the Ukrainian State Nuclear Regulatory Administration (SNRA), Ministry of Environmental Protection and Nuclear Safety, visited the United States during the period of January 24-28, 2000. The delegation was led by Oleksandr Smyshlyayev, Chairman of SNRA. Others in the delegation included Ludmilla Bogdan, Director, Department for Radioactive Waste Safety Regulation, SNRA, Igor Simonov, Deputy Director, State Scientific and Technical Center for Nuclear and Radiation Safety (SSTC), and Victor Tatarinov, Director of International Cooperation Division, SNRA. During their visit, the representatives met with Chairman Meserve and available Commissioners, the Executive Director for Operations and appropriate members of the NRC staff.

This was the ninth annual meeting between the two agencies, the purpose of which is to review program results and accomplishments since the last meeting in January 1999, to reaffirm or revise previous program commitments, and to consider proposals for future activities under the "Lisbon" program. The NRC agreed to support the program efforts described in the Memorandum of Meeting (Attachment 1), subject to obtaining the necessary funding from the U.S. Government and in accordance with U.S. Government and NRC policy. The agenda for these and other discussions is described in Attachment 2.

NRC and SNRA have agreed on an implementing agreement (Appendix 5 to Attachment 1) which will serve as the mechanism for assisting the SSTC in accomplishing the Completion Plan (Appendix 1 to Attachment 1).

This Memorandum of Meeting (MOM) differs from previous versions in three respects. First, the document explicitly includes the goal of the program and its supporting objectives (the Preface). Second, the document is organized around regulatory functions within which individual projects fit (the Table of Contents). And third, the document includes a longer term, multi-year perspective as well as the traditional short-term project descriptions. These enhancements should provide a more coherent view of the program than that reflected in previous MOMs.


William D. Travers
Executive Director for Operations
Regulatory
USNRC

January 28, 2000


Oleksandr Smyshlyayev
Chairman, Ukrainian State Nuclear
Regulatory Administration

January 28, 2000

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PREFACE

- **Program Goals and Objectives:** The goal of the program, as described in the October 25, 1993 agreement between Ukraine and the U.S., is to cooperate for "developing consistent and effective safety standards and procedures for use by regulatory authorities in Ukraine responsible for the safety of civilian nuclear facilities". The cooperation includes, but is not limited to, "training in regulatory methods and procedures, inspection techniques and evaluation, regulatory law, and the use of radioactive monitoring equipment; and improving regulatory effectiveness by developing appropriate regulatory standards, requirements and procedures and equipment."

Since 1993, NRC has successfully completed training for the State Nuclear Regulatory Administration (SNRA) in various regulatory areas as originally envisioned, and has provided assistance in strengthening SNRA's regulatory foundation.

The following are the most noteworthy accomplishments of the seven years of cooperation between NRC and SNRA:

- Legislation has been enacted for the safe utilization of nuclear energy in Ukraine;
- The regulatory structure has been established for the SNRA, the SSTC, the Information and Crisis Center and the Inspectorate;
- Projects for providing training and equipment to these organizations have been completed;
- The transfer of methodologies (guidance and codes) needed to verify safety assessments for licensing has been completed;
- The basic State Materials Protection, Control and Accounting System in Ukraine has been established.

The current emphasis is on reinforcing these accomplishments and responding to immediate obligations for licensing a wide range of regulatory activities. Over the next three-to-four years, SNRA must:

- issue long-term licenses to thirteen nuclear power plant (NPP) units;
- license numerous projects for the Chernobyl Shelter Implementation Plan;
- license the decommissioning of remaining units of the Chernobyl NPP;
- license new fuel designs for the VVER 1000;
- license the dry spent fuel storage facility at the Zaporozhe NPP;
- license two new units (Rivne Unit 4 and Khmel'nitsky Unit 2).

Work has begun on these activities. Most of the projects approved in this Memorandum of Meeting are needed to enable SNRA to perform these activities well and in a timely manner.

Duration of Program: At the outset, the program was to be of a very limited duration, totaling two-three years. As time passed, it became clear that a longer-term perspective was needed: conditions changed and there is a need to support a sustainable technical base. Therefore, a rolling 3-5-year planning horizon has now supplemented the 12-18-month horizon.

Functional Description: The original program was organized more according to project priority than to regulatory function. This approach was consistent with the assumption of the program's

short-term nature. With the passage of time, some priorities ended and new ones emerged. The shifting of priorities began to weaken the general understanding of the program. Therefore, the program structure is now organized according to the categories of the general regulatory process. This structure will be the umbrella under which projects will be initiated and completed. This new structure constitutes the Table of Contents.

I. LEGAL BASIS

A. Legislation (Former Priority 13)

U13, U6

(OGC)

Purpose:

Support regarding development of legislation and application of enforcement measures.

SNRA Accomplishments

A major objective of this priority is to develop laws and regulations which will perform the relevant framework for creating an effective legal system in Ukraine and the basis for activities of the Ukrainian State Nuclear Regulatory Administration.

Law of Ukraine "On Physical Protection of Nuclear Facilities, Nuclear Material, Radioactive Waste, Other Radiation Sources" passed the first reading on May 20, 1999 at the Verkhovna Rada (the Parliament) of Ukraine and is at the stage of preparation for the final reading. This Law defines legal basis for activity to be performed by physical and legal entities for regulation and physical protection of nuclear facilities, nuclear materials, radioactive waste, other radiation sources.

On January 11, 2000 the Verkhovna Rada of Ukraine enacted Law of Ukraine "On Permissive Activity of Nuclear Energy Utilization". The Law defines legal, organizational and economical foundations of permissive activity in the use of nuclear energy as well as basic provisions for regulation of public relations while carrying out this activity. Comments provided by the NRC experts were incorporated in the final version.

Law of Ukraine "Fee for Performance of State Regulatory Measures of Nuclear and Radiation Safety" was submitted in December 1999 to the Cabinet of Ministers of Ukraine for consideration. The Law is aimed to introduce a mechanism to compensate the State Budget costs for performance of state regulatory measures of nuclear and radiation safety.

On May 19 – 21, 1999 a meeting was held in Kiev, Ukraine among representatives of the Ukrainian State Regulatory Administration and the Main State Inspectorate on Nuclear Safety, the US Nuclear Regulatory Commission. During the meeting the current legal and enforcement issues were discussed.

SNRA's successful efforts in developing legislation and obtaining the Verkhovna Rada's approval of basic laws and various regulations have reached a sound progress toward the development of the legal structure of nuclear energy in Ukraine.

Priorities for year 2000 are as follows:

- support of passage of the draft Laws developed through the Verkhovna Rada;
- improvement the structure of the regulatory body, distribution of duties and allocation of resources, particularly improvement of the legal support to day-to-day regulatory activities.

B. Rulemaking (N/A)

C. Regulation Development: Enforcement

SNRA needs to improve its enforcement practices and regulatory framework, taking into account prior experience. In particular, SNRA needs to develop enforcement regulations and procedures, in particular in the use of severity levels in the context of inspection findings.

Future activities (including enforcement regulation development)

1) Consider the possibility of NRC representatives participating in a seminar to be held in Kiev on developing legal framework with participation of representatives of the Verkhovna Rada of Ukraine, Operating organization and other invited participants in order to have an effective legal program in Ukraine (planned for November 2000, actual date to be agreed with the Parliament Committees concerned). In addition, during this trip, NRC representatives will meet with SNRA's attorneys and representatives of the Main State Inspectorate to discuss enforcement issues.

2) Review and comment on proposed laws, regulations, and procedures upon request.

3) Carry out a one-week workshop at the NRC headquarters (proposed dates are May-June) for new attorneys employed by the SNRA and representatives of the Main State Inspectorate to discuss the following matters:

a) Duties of regulatory lawyers at NRC, especially for the legal support of inspection and enforcement activities.

b) SNRA experience in implementing enforcement regulations and procedures and need for further development, in particular application of severity levels to inspection findings; and

c) Potential revisions to the regulations and procedures for applying sanctions and determining severity levels.

One month prior to this meeting, SNRA will provide NRC in English a summary presenting SNRA experience in applying its enforcement standards and process, as well as, current regulations and procedures. NRC will provide SNRA several NRC enforcement cases to assist in the discussion.

II. REGULATORY ACTIVITIES

A. Licensing - NPPs

Background: One the most important projects for assistance is the development of sections of safety analysis reports for VVER reactors (items 23-27 of Appendix 2). Ukrainian law requires the development of Safety Analysis Reports (SAR) for issuing long-term licenses. Separate sections of SAR began to come to NRA for assessment in October 1999. Project 1 of Appendix 1 is of the highest priority to SNRA.

- | | | |
|---------------------------|------------------------------|--------------|
| 1. SAR Assessment | New Task 4 | |
| 2. SRP Development | U3.1, U21, New Task 1 | (NRR) |

(Formerly UKRAINE PRIORITY 3.1: PROGRAM FOR THE DEVELOPMENT OF A SYSTEM FOR SAFETY ANALYSES AND LICENSING OF NUCLEAR POWER PLANTS

Results to Date (FY 1999)

Five Priority 3.1 activities were accomplished in 1999. During the period from December 6-10, 1999 Ukraine Task 3.1.2-98, "Method of Regulatory Review of New Computer-based Reactor Protection Systems," was held at the Siemens facility in Erlangen, Germany. Regulatory representatives of SNRA accompanied NRC staff representatives during an audit of the Siemens Teleperm XS (TXS) digital instrumentation and control system. Information contained in the topical report, "Teleperm XS: A Digital Reactor Protection System," was reviewed. Meetings were held at the GKN Nuclear Power Plant at Neckarwestheim. This plant uses TXS in both Units 1 and 2. Meetings were also held at the EMI/ESD testing facilities at Siemens, and discussions were held on the engineering process for the development of application-specific software, the KWU organization, generic instrumentation and control system development and the various TXS installations along with issues specific to each.

During the period from September 7-10, 1999, Ukraine Task 3.1.5-97, "Preoperational and Startup Testing Program for Prestressed Containment," was held in Kyiv, Ukraine. A work development meeting was held in the U.S. involving SNRA, NRC and its contractor. Ukraine Task 3.1.2-97, "Transfer of Computer Codes for Verification and Validation of Containment Program," was held in combination with Ukraine Task 3.1.5-97. Attendance by SNRA representatives as well as representatives from other Ukrainian organizations, including all four VVER plant sites, varied from 15 to 25 during the week. A set of sample problems to be analyzed with Ukrainian structural analysis codes were sent to SNRA in advance of the meeting. The analysis of these problems at BNL with the ANSYS code was discussed during the meeting. The meeting was valuable in presenting practices in the U.S. The next cooperative phase should be the implementation of similar practices for Ukrainian NPPs. The meeting participants recommended that a joint effort be initiated to tailor this material, based on similar U.S. regulatory documents and practices, into the basic design and operational practices of Ukrainian NPPs. The ultimate goal of this work would be to take advantage of U.S. experience and provide specific recommendations for structural and leak rate testing of VVER-1000 containments, including, as a minimum, methodology, criteria, equipment, instrumentation and monitoring, recommendations and technical assistance for structural strength calculations for VVER-1000 containments for all types of normal and accident conditions. When the calculations of the sample problems are completed in Ukraine, these will be discussed with NRC and its representatives.

During the period from August 16-20, 1999 Ukraine Task 3.1.3-98, "Licensing of Plant HVAC Systems," was held at NRC. A work development meeting was held in the U.S. involving SNRA, NRC and its contractor. During the meeting, U.S. regulatory documents addressing the safety review of HVAC systems throughout the plant were discussed.

During the period from August 30 - September 3, 1999, Ukraine Task 3.1.1-96#2, "Continuation of How to Apply New Standards," was held at the NRC. A work development meeting was held in the U.S. involving SNRA, NRC and its contractor. During the meeting, an overview of the NRC process for defining the requirements and developing the guidelines for various topics were discussed. SNRA representatives suggested that they identify additional topics of near term interest for which applicable guidelines and requirements for Ukrainian plants should be developed. The topic of Technical Specifications was discussed, including the process for change using a risk-informed approach. It would be desirable to define a process for improving Technical Specifications of Ukrainian plants following the U.S. experience, in order to assure continued safe operation of Ukrainian plants.

As a follow on to Ukraine Task 3.1.1-98, "Computerized Control and Measurement Systems" was performed in Kyiv in September 1998, a representative of the NRC's contractor, Lawrence Livermore National Laboratory traveled to Ukraine to discuss recently developed Ukrainian regulatory review guidance with representatives of SNRA. Comments were provided to SNRA and are being considered for incorporation in the new review guidance.

Previously Approved Plans (Outstanding Items, FY 1999)

There are no outstanding items. Further cooperative activities within this priority could be conducted according to the same "partnering" model that was developed for Ukraine Task 3.1.1-98, "Computerized Control and Measurements Systems," and later Ukraine Tasks 3.1.5-97, 3.1.3-98 and 3.1.1-96#2. The present model encourages the active participation of SNRA specialists during the work development meetings at NRC in partnership with NRC staff experts to determine the level of detail of consultation needed for the activity, the background of the targeted audience, and particular topics for emphasis. The model is expected to continue its evolution and reflect enhanced opportunities for cooperation on regulatory guidance implementation strategies and for greater utilization of in-country resources. The NRC staff's contractor(s), one or more National Laboratories [for example, Brookhaven National Laboratory (BNL)], may also participate in the development meeting. Subsequently, NRC staff experts, accompanied by contractor representatives, would participate in consultation activities to be held in Ukraine. SNRA, laboratory, architect/engineer and plant operator representatives may participate in the activities; in addition, SNRA representatives may play a more active role in the presentation of material to reflect current practices in Ukraine.

Initiatives For Future Consideration (FY 2000)

It may be beneficial for Ukrainian regulatory representatives responsible for regulatory review of new computer-based reactor protection systems in Ukraine to participate in an international conference to be held on this topic in the U.S. in December 2000.

Formerly UKRAINE PRIORITY 21: PROGRAM FOR THE DEVELOPMENT OF SAFETY ASSESSMENT REVIEW GUIDANCE IN SUPPORT OF NUCLEAR POWER PLANT LICENSE REVIEWS.

Results to Date (FY 1999)

No Priority 21 activities were performed in 1999.

Previously Approved Plans (Outstanding Items, FY 2000)

The Priority 21 initiative identified in FY 1999 is expected to be initiated in FY 2000. SNRA described an anticipated new initiative it will be undertaking to develop guidance for reviewing new safety assessment reports being developed at the South Ukraine, Rovno and Zaporozhe 5 facilities. Work to develop the three safety assessment reports is now in progress in Ukraine under the joint sponsorship of the U.S. Department of Energy and the Ministry of Environmental Protection and Nuclear Safety in Ukraine. SNRA expects to receive the safety assessment reports by the first half of 2000.

SNRA and NRC discussed their possible cooperation for developing the methodology and the associated guidance for reviewing the safety assessment reports. SNRA explained that in Ukraine, the responsibility for developing the methodology and guidance has been assigned to the Department of Licensing of Nuclear Installations within the Nuclear Regulatory Administration (SNRA), and will be carried out with the assistance of the State Scientific and Technical Center for Nuclear and Radiation Safety (SSTC). The framework for the overall review of the safety assessments has been developed. Three primary topics of the safety assessments for which review guidance will be developed have been identified. These are:

1) Probabilistic Safety Assessment review, 2) Project Design and Design Basis Accident Assessment, and 3) Beyond Design Basis Accident Assessment.

NRC agreed that it would be appropriate for the NRC to assist SNRA in developing the methodology and guidance for performing the review of the safety assessments next year. This could involve the exchange of relevant NRC documents, the review and comment on newly developed guidance documents, and the conduct of working meetings to help finalize the documents and help SNRA prepare to review the safety assessments.

SNRA plans to provide the NRC with the safety assessments and the preliminary results of SNRA/SSTC review of this information. Possible consultation activities will be considered based on the content of the safety assessments and the results of SNRA/SSTC's review.

Since the development of guidance for reviewing probabilistic safety assessments is key to performing these reviews, the new initiative would take into consideration work already completed within Priority 14. Under Priority 14, SNRA improved its capabilities to perform probabilistic safety analyses (PSAs). With this capability established, it is now important to expand SNRA capabilities to review PSAs performed by others, specifically the owners of nuclear power plants, and to apply insights from such reviews to safety decision making. A PSA will be submitted to SNRA by each nuclear power plant owner in Ukraine as part of a plant-specific safety analysis report. The Rovno NPP-1 facility will be the first to submit this information to SNRA/SSTC, which will be in August 1999. SNRA/SSTC will submit to NRC the Rovno NPP-1 PSA Level I, including the Internal Hazard Analysis, and a limited scope Level II PSA.

Under Priority 21, NRC will provide assistance to SNRA in expanding their capability to review PSAs and to apply insights derived from such reviews to safety decision making. This assistance will consist of: sharing NRC experiences in the conduct of such reviews; provision of current NRC guidance documents related to such reviews, example staff evaluations of nuclear power plant owner or designer PSA submittals such as those from NRC advanced reactor design reviews; one workshop (one week or less in duration) led by NRC staff or contractors to discuss this current guidance and review experiences, and one or more follow-up meetings (one week or less in duration) with NRA staff as they initiate and perform reviews of PSAs. The venue for each such workshop or meeting will be determined at a later time. One potential mechanism to accomplish this could be the assignment of one or more SNRA staff to work at NRC for a short period of time. It is expected that the workshop would be held during the second quarter of FY 2000 with the overall time to complete this priority estimated to be by the second quarter of FY 2001.

SNRA also explained that it is requesting assistance in the form of additional funding for performing its reviews of the safety assessments. It was recognized that this is a matter for the consideration of the agencies sponsoring the overall program for development and implementation of the safety assessments.

Initiatives for Future Consideration (FY 2000)

The following new task was approved: "Expert Assessment of NPP SARs
("New Task 1", Appendix 1)

II. REGULATORY ACTIVITIES (Cont.)

A. Licensing - NPPs (Cont.)

3. Fuel Conversion and Fabrication

U19, New Task 4

(NRR)

Background: It is the policy of Ukraine to develop an alternative source of nuclear fuel. DOE Project 34 of Appendix 2 is aimed at establishing this source. Project 4 of the Appendix 1 responds to this need.

The activity which implements third goal is contained in New Task 4, "Expert Assessment of Ukrainian Nuclear Fuel (UNF) Project", which is approved. The goal is to establish in Ukraine for both the regulatory authority and the licensee a clear and well understood process with specific regulatory and technical requirements to ensure the safety and licensing of nuclear fuel. (The relationship between SNRA and the other entities involved is described in in Charts 1 and 2 of Appendix 4.)

A key deliverable will be to identify jointly the current specific regulatory requirements and documents, with recommended changes and technical bases. These requirements will be used by the fuel vendor to develop a proposal for lead nuclear fuel test assemblies (LTAs) design and fabrication for submittal to the SNRA. SNRA will consider developing a Standard Review Plan for review of the vendor's submittals. Consideration of other countries' regulatory requirements for licensing of third-party fuel should be included in this review.

(Former Priority 19)

In accordance with the on-going Tasks we would like to propose the following summarized scheme for licensing of new fuel types:

1. SNRA's agreement on a conceptual decision about planned changes to nuclear facility design while using new nuclear fuel type. This decision is the official statement of intention to use new nuclear fuel type and presents the information about planned works, main stages of the works, participants, and the design compliance with requirements of the current norms, rules and standards.
2. SNRA's agreement on Terms of Reference (Technical Specifications) for nuclear fuel submitted in pursuance to requirements of State Standard of Ukraine. The mentioned document shall, in particular, present main safety criteria that are important for development and safety substantiation of nuclear fuel. Qualification tests shall be envisaged for new types of fuel and equipment (if it is supposed while using new type of nuclear fuel) to demonstrate requirements stated in Terms of Reference.
3. SNRA's review on Quality Assurance Program during development and fabrication of new types of nuclear fuel and possible equipment. Conduct necessary audit.
4. SNRA's review of the Supplement to SAR – Safety (formerly known as TOB – Safety Technical Substantiation) of NPP with necessary demonstrating documents consisting of:
 - a) Safety substantiation of changes in nuclear fuel, stipulated by:
 - design and geometry;
 - selected materials;
 - methods and technologies of treatment, manufacture and control;
 - b) Impact analysis on:

- Neutron physics characteristics of fuel loading; f
- Thermo-hydraulic characteristics of the core;
- Mechanical characteristics of the fuel;

1. SNRA's review of Software (Codes) Verification Report used for safety substantiation of new nuclear fuel.

2. SNRA'S review of:

- Programs of the first stage for trial operation;
- QA Programs during performance of the first stage of trial operation
- Instructions required for ensuring all types of works during the first stage of trial operation (the existing instructions are additionally worked out)
- documents demonstrating the compliance of fabricated fuel with approved Technical Specifications (programs, methodologies and control results, inspections and tests).

3. SNRA's agreement of Technical decision on the core loading composition, submitted together with substantiation documents.

4. SNRA's agreement of Technical decision on the core operation and commissioning of modernized systems and elements (if necessary) submitted together with substantiation documents. The Technical decision shall demonstrate the observance of limits and conditions for nuclear facility safe operation and required scope of control and monitoring.

5. Review and assessment of both results of the first stage trial operation of nuclear fuel and Completion Report.

6. Agreement of decisions to move on next stages of trial operation of new fuel (and commissioning into commercial operation). It shall be done by the Administration upon results of the previous stages.

Due to a lack of practice in development and fabrication of nuclear fuel in Ukraine and either lack of experience in consideration process of Applicant's submissions, the Administration plans to precise procedures and methodology to conducts safety assessments, including the following:

- precise regulatory requirements;
- precise methodology of safety substantiation for nuclear fuel operation in the core and procedures for nuclear fuel management.

The following new task was approved: "Expert Assessment of Ukrainian Nuclear Fuel Project ("New Task 4" Appendix 1.)

II. REGULATORY ACTIVITIES (Cont.)

A. Licensing - NPPs (Cont.)

4. Spent Fuel Storage & Transportation U16, New Task 2 (NMSS)

Background: Since 1997, NRA has been performing licensing activities for the "Dry Type System for Spent Nuclear Storage at Zaporizhya NPP" project (item 35 of Appendix 2). This process has been difficult and, notwithstanding some progress, has not been completed yet due to technical difficulties. Proposed Projects 2 and 3 (Appendix 1) are aimed at resolving these problems. (Project 2 is higher priority than Project 3.)

The following new task was approved: Conservatism in Nuclear Fuel Requirements ("New Task 2" Appendix 1.)

NRC agreed to review and comment on SSTC's task proposal and, later, on the safety documents that result from the study conducted under that proposal.

II. REGULATORY ACTIVITIES

B. Oversight & Inspections

1. Inspection Strategy and Practice U4, U5, New Task 7 (NRR)

Background: The nuclear utility Energoatom intends to implement risk-informed in-service inspection (RIISI) methodology now used at NPPs in the U.S. Project 7 of Appendix 1 would train regulatory personnel in these inspection methods.

(Former UKRAINE PRIORITY 4: JOINT INSPECTION OF NUCLEAR POWER PLANTS FOR ASSESSMENT AND DEVELOPMENT OF INSPECTION PROCEDURES)

Results to Date (FY 1999)

No Priority 4 Joint Inspection activities were performed in FY99.

Previously Approved Plans (Outstanding Items, FY 1999)

Ukraine Task 4.1-94 [NRC in Ukraine] - Joint Evaluation of New Ukrainian Inspection Procedures. NRC representatives will observe and comment on initial uses of newly developed Ukrainian inspection procedures at a Ukrainian NPP.

Initiatives For Future Consideration (FY 2000)

No initiatives for future consideration within this priority have been identified.

(Former UKRAINE PRIORITY 5: DEVELOPMENT OF NUCLEAR POWER PLANT INSPECTION ACTIVITIES BASED ON THE RESULTS OF JOINT INSPECTIONS)

Results to Date (FY 1999)

One Priority 5 activity was performed in FY 1999. Ukraine Task 5.4-96 [U.S. Comment on Ukrainian Documents, Previously Identified as Ukraine Task 10.2-96 - NRC Comments on Completed NRA Fire Protection Inspection Procedures] was performed and comments forwarded to SNRA in July 1999. SNRA may provide revised inspection procedures to the NRC for translation into English and NRC review and comment.

Previously Approved Plans (Outstanding Items, FY 1999)

Ukraine Task 5.5-96 [U.S. Comment on Ukrainian Documents] - NRC Comment on Four Ukrainian Inspection Procedures Under Development During 1997. During 2000, SNRA will provide the NRC with four in-process draft inspection procedures currently under development. The NRC will translate these documents into English, review and comment on the documents, and provide English language comments to SNRA. After consideration of the NRC comments, SNRA may provide four revised inspection procedures to the NRC for translation into English and NRC review and comment.

(NRC and SNRA may jointly evaluate the initial use of the four completed inspection procedures at a Ukrainian NPP, as discussed in Task 4.1-94.)

Initiatives for Future Consideration (FY 2000)

New Task 7 (Appendix 1) was approved.

C. Analytical Techniques and Methods to Support Regulatory Activities

1 Codes

U14, U2.1, PNL #2, New Task 3

(RES, NRR)

The following new task was approved: "Implementation of New Neutron Fluence Methodology ("TORT" Program)" ("New Task 3" attached.)

Ukrainian SNRA proposed New Task 3, Implementation of New Neutron Fluence Methodology ("Tort" Program) (Appendix I), was discussed and approved. NRC agreed to provide training through a contractor in use of the TORT computer code. Additional technical details of the effort (e.g., level of support after the training, availability of adequate computer or work station) will be developed based on discussions between technical counterparts at SNRA, SSTC and NRC.

2 PRA

New Task 5

(NMSS)

Background: A significant part of NRA's continuing activities performed in 1999 are connected with licensing of activities related to Shelter for Chernobyl Unit 4. It became evident during this work that one of the most significant problems in the nuclear safety assessment is lack of clear methodology for ALARA application. Project 5 in Appendix 1 is directed toward establishing criteria and methodologies for ALARA application for the Shelter project.

The following new task was approved: "Practical Application of the ALARA Principle in the Licensing Process" ("New Task 5" attached).

3 Performance assessment

U2.1

(HR/NRR)

Results to Date (FY 1999)

USNRC representatives traveled to Kiev, Ukraine for a project meeting and to evaluate the Chernobyl software package added to the Analytical Simulator. The team witnessed a demonstration of the Chernobyl software and reviewed the software testing documentation. The Chernobyl software installation and testing was found to be within the contract requirements.

As a result of the review and demonstration, the Chernobyl software was accepted from the contractor (GSE Systems) and released it to NRA for full operation. There was also a demonstration of the addition graphics screens developed by the NRA specialist. The quality of the additional screens was excellent and compatible with the other data screens used by the simulator.

There was a discussion of the VVER-440 software currently being developed for use on the Kiev simulator. The USNRC representatives informed the NRA specialist that the work should be completed no later than February 18, 2000. The NRA representatives requested that the VVER-440 also have the additional screens that were added to the VVER-1000. This is not in the current contract but could be done fairly quickly and at less cost than the first set.

There was a discussion about the current and future uses for the simulator: These are listed below:

- Training of inspectors and emergency response specialists.
- Training of operator licensing examiners.
- Training of radiological specialists.

- Analysis of events, both actual and predicted.
- Emergency response drills and data analysis during actual emergency.
- Providing data for emergency preparedness planning.
- Analyzing technical solutions for reactor safety related upgrades.
- Modeling of possible accident scenarios.
- Storing a plant behavior data base and tracking plant performance.
- PRA analysis and scientific research.
- Analyzing certain types of plant modifications prior to implementation

There was a discussion concerning the possibility of adding SPDS capability to the simulator. This system has been added by DOE to the NPP's.

Contract NRC-26-96-265, for the installation and testing of the Analytical Simulators in Ukraine, expired on September 30, 1999. This concluded the initial work on the analytical simulators. Expiration of this contract also concluded the active involvement of USNRC's Technical Training Center staff in the project with the exception of consultation and information via e-mail, FAX or telephone.

Previously Approved Plans

All agreed upon spare parts have been purchased. There are two spare parts remaining to be delivered. GSE has agreed to deliver the remaining spare parts during a visit to Kiev by one of their representatives at the completion of the VVER-440 work.

III Emergency Response & Contingency Planning U11, U20 (IRO/HR)

Purpose

Support to the Regulatory Administration of Ukraine in the field of emergency response at nuclear facilities, radioactive waste management facilities, and at facilities using sources of ionizing radiation;

SNRA Accomplishments

One work meeting was held and provided for the following:

- The Administration completed the framework agreement (contract #05/99-i of July,2,1999) with its InfoCenter to develop the Administration emergency preparedness system; the remarks of the American party were taken into account, translated and agreed. This is the Ukrainian contract called for in the Implementing Agreement that was included in the previous Memorandum of Meeting signed on January, 22,1999.
- SNRA and NRC developed sample invoice and commercial proposal forms to meet US requirements. They will be used by the InfoCenter during implementation of contract #05/99-i.
- SNRA and NRC developed 8 Terms of Reference (Statements of Work) for different tasks within the frame of the agreement, including equipment specified for development of public affairs capabilities in a Memorandum of Meeting signed on June 4, 1999, by SNRA and NRC public affairs representatives. SNRA translated the Terms of Reference into English for agreement by both parties.

The InfoCenter prepared proposals that were accepted by SNRA and NRC and began work on 3 of the Terms of Reference:

- Equipment supply for Public Affairs division of State Nuclear Regulatory Administration – under Priority #1 (see V.B., Communications, below) ;
- Support of IEC communication system;
- Development of training material “MEPNS information & emergency center”.

At this time the InfoCenter has fully completed one task – “Establishment of a prompt notification system” – and the remaining tasks are in different stages of execution. SNRA, IC, and NRC all have had good experience using the Implementing Agreement.

Future activities

Work will proceed in the framework of the SNRA-NRC Implementing Agreement, the SNRA-InfoCenter, and the Completion Plan. Particular attention will be given to:

- Completing existing Terms of Reference.
- Supporting public affairs requirements such as equipment purchases and establishment of space for the media. This general activity is already included in the Completion Plan and details will be prepared as new Terms of Reference.
- Acquiring a copy of the ADAM for test and evaluation in the SNRA Information and Emergency Center. SNRA researched this program and monitored its use in Slovakia during the past year. It is now time to determine how well the program can support SNRA both for training and exercising emergency response personnel and for analyzing emergency data and sequences. This activity is also included in the Completion Plan.

IV INFRASTRUCTURE

A Training

PNL #1, PNL #4

(PNL/NMSS)

(Former Priority 1)

1. General: This direction should be treated in the future as task-oriented support to the SNRA experts participating in IAEA consultative and technical committees;
2. One of the most important problems that faces the SNRA is development and strengthening of the NRA's technical support organizations. In connection with early shutdown of Chernobyl, a program has been developed for employment of plant staff. One element of this program is extension of the Slavutich branch of SSTC. Employment of additional 40-50 persons is planned for work at the SSTC Slavutich branch. These people will be involved in expert reviews for the Regulatory Administration's consideration of documents substantiating safety of the decommissioning project and Shelter Implementation Plan. To accomplish this, the the SSTC NRS Slavutich branch would need to be equipped and new personnel retrained. (See D. Equipment, below)

B. Communications: Public Affairs

U2.1, U20

(HR/IRO)

SNRA Accomplishments

Two work meetings were carried out:

- Exchange of the US NRC experience on public affairs and mass media ;
- USA legislation acts and US NRC directives, publishing services, adaptation of modern information technology;

In the frame of the second meeting a workshop was arranged for the Ukrainian mass media representatives, for the Administration and its Information and Crisis Center employees on the following topics "Particular aspects of nuclear regulatory agency communication with mass media" and "The role and place of public affairs in the US NRC activity".

US NRC exchanges of experience on establishing and keeping the WEB-site in Internet. At present both the Administration and NRC do not have policy guidance. At the same time NRC has considerable practical experience of the WEB-site establishing and keeping which is of interest for the Administration;

- Transfer of experience and assistance to the Administration in development of database necessary for publication of "Nuclear and Radiation safety" magazine;

It was agreed that the NRC would provide counsel and guidance 1) on the visual presentation and content of a SNRA website aimed at providing information to the public and 2) on the conceptual design and editorial content of a journal which the SNRA and TSO would hope to publish in future.

To that end, NRC experts would travel to Kiev in late spring or early summer. In the meantime, SNRA would provide specific questions to the NRC.

C Data bases

PNL #5, New Task 6 (OIP/PNL)

Background: As Ukrainian practice of the last years shows, the most significant delays while performing expert review of the Licensee's documents are connected with need to receive additional information from the Licensee to explain safety substantiation. These are mostly operational technical regulations, instructions and methodologies of different types used by the Licensee. Proposed Project 6 is aimed at creation of an archive of these documents.

The following new task was approved: "Information Storage & Retrieval System for Review of NPP Operations" ("New Task 6" attached.)

D Equipment

U17, PNL #3

(OIP/PNL)

1. A project for equipping SSTC's Slavutich Branch discussed in IV.a.2, above will be developed at a later date.

To the end of the reporting period:

- PC specification is included into equipment specification, which is to be delivered under former Priority 11. The task is in progress (SNRA Information and Crisis Center);
- Equipment delivery is planned to be made under separate task under former Priority 11. Terms of Reference for the said work is developed, agreed with American party and given to NRA InfoCenter for execution.

Future activities

The following requests will be considered in the future:

- Repair of the room intended for the Administration Public Affairs Division, furniture and equipment supply. In this direction it is necessary to complete the work started in 1999;
- Supply of necessary computer hardware and software (preliminary specification: 3 PC, 1 color fluid printer, 1 black-and-white laser printer, 1 scanner, 1 copy machine and software – MS Windows, MS Office 2000, PageMaker, Corel Draw);
- Training of the Administration specialists on the topics of journal design and breadboarding;
- Compensation for printing costs of 12 publications.

Former Priority 2.1

Completion of work on delivery of software for VVER-440/213 analytical simulator and supplying with spares to the simulator computing equipment;

SNRA Accomplishments

In accordance with the project schedule of USNRC-GSE Systems Contract the development of software for RBMK-1000 Analytical Simulator, including delivery of software and training materials for the unit operation was completed in February 1999.

On 27 February 1999 Russian VNIIAES and Ukrainian Main State Inspectorate signed Acceptance Act with instructions that the software of RBMK-1000 option be put into into trial operation.

Current situation

- During the trial operation in 1998 a defect of hard disk of main modeling computer CHELENGER-L was detected.
- Acting in response to requirements of the Acceptance Act of February 27 1999 the company eliminated the problem (presented in Report of May 18 1999).
- In accordance with request of MSI the VNIIAES conducted training on VAGIRA computer code for specialists (for RBMK applied programs)
- Testing of the Analytical Simulator for the Y2K problem was performed (Report dated of 15.11.99) without remarks.

Future Activities

1. Software design basis loading will be complete in February 2000.
2. Complete the delivery of a remained part of spare parts for the simulator as agreed during the last meeting on September 28 1999 at HQ of the Main State Inspectorate in Kiev.
3. SNRA currently has software designed for the Kola NPP. In order to compensate for the differences between the Kola and the Rivne NPP designs, it was agreed that NRC would procure and have installed on the analytical simulator a copy of the full-scope Rivne simulator software. This software is currently being developed for DOE. When this development has been completed, the NRC will consider purchasing a copy as well as the associated Rivne training scenario.
4. The transition from the Kola software to the Rivne software as well as the delivery of the Rivne training scenarios should be completed before the end of 2001.
5. This upgrade would greatly enhance the effectiveness of SNRA's analytical simulator in all training areas, data input to the crisis center, and solve data and labeling differences that exist between the Kola software and the actual Rivne plant data.

E. MPC&A and Physical Protection U7/8 (NMSS) (Former Priority 7: Material Protection, Control and Accounting)

Purpose: Support to the Regulatory Administration of Ukraine in the field of nuclear material accountability and control;

Current Situation

1. Course on licensing of Nuclear Material Accountancy and Control Systems.
The Course was planned in 1998 but on the request of the Ukrainian party was postponed for 1999. Due to problems in financing the Course was not conducted and proposed to be postponed until 2000.
2. Course on licensing of Nuclear Material Accountancy and Control Systems for inspectors.
The Course was planned for 1998. However, the Inspectorate was not ready to attend the Course at that time and it was decided to conduct it in Kiev in October 1999 in George Kuznitch Training Center on Physical Protection and MC&A. Due to NRC financial problems the Course was not conducted. Proposed to be conducted in 2000.

3. Procedures on the measurement of nuclear material moved from the Shelter.

In 1998 The Ukrainian party requested assistance of NRC in development of methodologies for nuclear material measurement moved from the Shelter. NRC agreed to consider this issue when an appropriate funding sources is available. No decisions were made till this time.

Future activities

1. To conduct training on licensing of Nuclear Material Accountancy and Control Systems for inspectors. In 1999 the inspection functions over MPC&A were delegated to the Main State Inspectorate. The Inspectorate's inspectors are lack of the appropriate knowledge and experience in the area of Safeguards.

2. Procedures on the measurement of nuclear material moved from the Shelter. Currently, the measurements of nuclear material samples moved from the Shelter for the purpose of experimental studies are not conducted due to absence of required equipment. Moreover, at the present time it is complicated to define a type of measurement equipment because the technology for the material withdrawal is not defined. Due to the stated reasons it would be expedient to postpone the discussion about rendering assistance for this problem till 2001.

3. New proposal

Currently, problems on inspection procedures regarding the numerical criteria to put nuclear material under safeguards, the frequency and scope of measurements to be conducted during inspection at different types of facilities are not settled. For this reason SNRA proposes to incorporate the following interrelated works into the Cooperation Plan:

- Support to the Regulatory authority in development of criteria for inspection of MPC&A of nuclear material. Expected outcomes are: recommendations on inspection procedures.
- Support to the Regulatory authority in development of criteria to put and release from Safeguards. Expected outcomes: methodology recommendations to the Regulatory authority
- Support to the Regulatory authority in development of requirements to the scope of measurement depending on nuclear fuel type. Expected outcomes: methodology recommendations to the Regulatory authority

Former Priority 8: Physical Protection

Purpose: To provide support to the Regulatory Administration of Ukraine in the field of physical protection of nuclear materials and nuclear facilities;

The planned activities for 1999 were not implemented because appropriate financial resources were not provided.

Future activities

Conduct seminars on Physical Protection in Kiev:

- Raising of the Ukrainian Inspectors Skills in Physical Protection; Exchange of Experience;

- Training of Guards Responsible for Securing Nuclear Material and Nuclear Facilities.

APPENDIX 1

**COMPLETION PLAN FOR COOPERATIVE DEVELOPMENT OF
UKRAINIAN LICENSING AND INSPECTION CAPABILITIES**

II.A.1 EXPERT ASSESSMENT OF NPP SARs ("New Task 1")

Background

- Nuclear Power Plants (NPPs) in Ukraine currently operate under temporary, annual permits
- For permanent operating licenses, Safety Analysis Reports (SARs) must be developed and submitted to the State Nuclear Regulatory Administration (SNRA).
- SARs are currently under development for the lead plant of each design. This effort is part of the US Improvement of Nuclear Safety Program (INSP).
- These pilot applications are expected to be submitted in 2000 with subsequent applications for the other plants following in six to eight months.

Technical Approach

SSTC, SNRA's technical support organization, proposes to prepare for the SAR review and to perform the formal review (called State Expert Assessment for Nuclear and Radiation Safety) for the three pilot SARs. They have planned two preparatory steps and then each pilot review has been organized into 14 steps.

Part 1 Project Organization and Management:

- prepare work organization documents (orders, instructions, procedures, etc.)
- arrange interactions with SNRA, NRC, NRC contractor, specialized groups (technical, financial, economic, legal)
- work scheduling, monthly reporting (technical and financial)

Part 2: Develop Work Guidelines and Procedures

- establish basic structure and organization of experts for each review project, based on areas of review (nuclear safety, radiation safety, operation, etc.)
- develop Guidelines for each assessment area. Each Guideline shall:
 - identify work authorization process, including Terms of Reference (TOR) if necessary
 - establish detailed work plan and obtain SNRA agreement
 - identify required Expert Groups
 - describe approaches to assessment criteria for each part of SAR
 - establish completeness criteria for SAR and process for obtaining additional information
 - establish procedure for completion of intermediate and final expert conclusion
 - establish procedure for interaction with NRA, NRC and NRC contractor for discussing assessment results

Part 3: Expert Assessment of SAR for South Ukraine, Unit 1.

This work is further broken down into 14 Subtasks. A similar breakdown is used for Parts 4 and 5 for Rivne Unit 1 and Zaporizhya respectively.

Subtask 3.1: Assess NPP site analysis.

Subtask 3.2: Assess completeness of information describing NPP systems, structures and components

Subtask 3.3: Assess provision of basic safety requirements including defense-in-depth, system safety classification and basic safety functions

Subtask 3.4: Assess calculation codes and methodology including compliance with national and international practice.

Subtask 3.5: Assess internal and external events analysis including initiating events, analysis methods and analysis results.

Subtask 3.6: Assess emergency and design basis accident analysis including initiating event

selection, analysis methods and analysis results.

Subtask 3.7: Assess operational experience as reflected in SAR and for compliance with national norms.

Subtask 3.8: Assess NPP environmental impact including completeness of initial data, correctness of calculation of radiation impact under emergencies or accidents, analysis of radiation impact to on-site staff, risk to public and mitigation measures for environmental impact.

Subtask 3.9: Assessment of ongoing technical decisions including trend evaluation, effect of equipment on level of safety, evaluation of safe operation limits and analysis of deviations from norms and rules.

Subtask 3.10: Assessment of beyond-design-basis accidents including analysis methodologies, analysis completeness, analysis results, accident management criteria and recommendations.

Subtask 3.11: Assessment of Probabilistic Safety Analysis (PSA) including analysis means and methods, input data, sequence selection, completeness of functional failure trees and results of calculation.

Subtask 3.12: Assessment of safety improvement measures including completeness, soundness, classification and implementation schedule

Subtask 3.13: Assessment of Technical Substantiation for Safety

Subtask 3.14: Integral conclusion of the State Expert Assessment of the SAR

Part 4: Expert Assessment of SAR for Rivne, Unit 1.

Part 5: Expert Assessment of SAR for Zaporizhyya, Unit 5.

Deliverables

Report on initial plans, organization and schedule (Part 1)

Monthly reports (Part 1)

Review Guidelines - 14 (Part 2)

Expert Conclusion for review of South Ukraine Unit 1. (Part 3)

Expert Conclusion for review of Rivne Unit 1. (Part 4)

Expert Conclusion for review of South Ukraine Unit 1. (Part 5)

Schedule

Planning (Part 1) done by end of Month 2

Guidelines (Part 2) done by end of Month 2

Expert Assessment of South Ukraine Unit 1 SAR done by end of Month 14

Expert Assessment of Rivne Unit 1 SAR done by end of Month 16

Expert Assessment of Zaporizhyya Unit 5 SAR done by end of Month 20

Note: Schedules for Expert Assessments uncertain. Depends substantially on date and quality of licensee submittal

Resource Estimate

504 man-months (SSTC), Parts 1 through 5

Approximately 95% for actual SAR reviews (Parts 3, 4 and 5)

Western technical assistance required (Parts 1, 2 and 3)

No foreign travel expected.

II.A.3 REGULATORY REQUIREMENTS FOR ACCEPTABILITY OF NEW OR ALTERNATIVE NUCLEAR FUEL TYPES ("New Task 4)

Background

- The nuclear fuel supply situation changed with the end of the Soviet system.
- The "Ukrainian Nuclear Fuel" project is being implemented in which Westinghouse will be providing nuclear fuel (NF) in order for Ukraine to have diversity from its traditional Russian supplier.
- The State Nuclear Regulatory Administration (SNRA) has norms and experience with fuel from the traditional supplier but both norms and methods now require modernization to reflect new safety analysis methodologies and the new situation with alternate suppliers.

Technical Approach

SSTC, SNRA's technical support organization, proposes three tasks in this area, two are preparatory to doing the Expert Assessment.

Part 1 - Recommend modification of norms and improvements in safety analysis methods including:

- Develop the list and content description for documents to be submitted by the licensee for operation of new fuel. US standards will be considered in this development.
- Compare Ukrainian and US requirements in this area.
- Recommend changes to existing Ukrainian norms and acts particularly for content of licensee applications and safety criteria for evaluating those applications.

Part 2 - Develop methodologies for assessment of the safe operation of cores with new fuel:

- Develop core constants for up-to-date calculation code (HELIOS) for both Westinghouse and Russian nuclear fuel.
- Perform numerical simulation of thermal behavior of VVER-1000 core (South Ukraine Unit 3) under normal and abnormal operating conditions.
- Adapt fuel assembly efficiency codes such as FRAP-T and FREY for fuel in Ukraine.

Part 3 - Expert Assessment of licensee application to use new fuel:

- Examine fuel technical specifications, SAR, test results report, etc.
- Provide Expert Assessment of licensee documents

Deliverables

Interim Reports on possible changes to norms and on comparison of Ukrainian and US requirements. (Part 1)

Final recommendations concerning changes to norms (Part 1)

Interim report on new methodologies for analysis of new fuel for VVER-1000s (Part 2)

Expert Assessment of licensee application (Part 3)

II.A.4 CONSERVATISM IN NUCLEAR FUEL TRANSPORTATION AND STORAGE ("New Task 2")

Background

- The nuclear fuel supply and spent fuel return situation changed with the end of the Soviet system
- Spent fuel is now stored instead of being returned to the supplier.
- Specific Ukrainian norms for design of new and spent fuel shipping and storage systems include several requirements whose conservatism makes fuel storage or shipping systems expensive or difficult to license.
- Specific Ukrainian requirements for design basis accident assumptions for initial conditions, including exposure to fire, also appear to require clarification to enable effective and efficient solutions to Ukraine fuel storage problems

Technical Approach

SSTC, SNRA's technical support organization, proposes to perform two tasks in this area. The first deals with specific conservatism in normative requirements and the second concerns accident analysis assumptions

Part 1 - Conservatism:

Part 1.1 - Analyze Ukrainian norms in five areas:

- need for optimum moderator density
 - no credit for spent fuel pool boration
 - no credit for (removable) poison inserts in spent fuel
 - no burnup credit
 - assumption of maximum initial enrichment

Part 1.2- Compare Ukrainian and international standards

Part 1.3- Perform calculations including sensitivity to the five conservative requirements:

- Analysis of fresh fuel shipping cask
 - Analysis of spent fuel shipping cask
 - Analysis of NPP spent fuel pool
 - Analysis of dry storage (VSC-24 example)

Part 1.4- Summarize and recommend changes to Ukrainian normative requirements

Part 2 - Assumptions for Accident Analyses

Part 2.1: Analyze Ukrainian norms for initiating event assumption requirements, including exposure to fire

Part 2.2: Compare Ukrainian and international norms

Part 2.3: Collect and analyze safety analysis approaches and methods based on current and possibly modified Ukrainian normative requirements

Part 2.4: Summarize and recommend changes to Ukrainian normative requirements

Deliverables

Interim reports for Parts 1.1, 1.2, 1.3 and 2.1, 2.2 and 2.3.

Final reports for Parts 1.4 and 2.4

Schedule

Planning (Parts 1.1 and 2.1) done by end of Month 2

Analysis (Parts 1.2, 1.3, 2.2, 2.3) done by end of Month 13

Recommendations (Parts 1.4 and 2.4) done by end of Month 14

Resource Requirements

150 man-months (SSTC)
Western technical input (Parts 1.2 and 1.2)
No foreign travel planned.

Schedule

Normative research and development (Part 1) done by end of Month XX
Analysis of VVER-1000 (Parts 2) done by end of Month 9
Expert Assessment (Part 3) done within XX months of receipt of complete licensee application

Resource Requirements

xxx man-months (SSTC)
Western technical training (Parts 1 and 2)
No foreign travel planned.

II.B RISK-INFORMED INSERVICE INSPECTION (RIISI) ("New Task 7")

Background

- NAEK supported by the USA is implementing RIISI in Ukraine.
- SNRA realizes the necessity of reducing the role of prescriptive regulation by substituting it with RIISI based, more flexible one.

Technical Approach

SSTC, SNRA's technical support organization, proposes to develop an understanding of application of RIISI and then use that understanding in expert review of the application from the pilot plant licensee. After that application, SSTC will draft regulatory guidance for other NPP applications.

Part 1 Compare US (ASME XI) and Ukrainian ISI requirements in these areas:

- scope and frequency for inspection of safety equipment and piping
- requirement and approval of ISI program by the regulatory authority
- inspection practices: methods, inspection systems certification, staff qualification, plans and schedules

Part 2: Study US implementation experience.

- examine NRC experience with implementing Regulatory Guide 1.178, "An Approach for Plant-Specific Risk-Informed Decisionmaking Inservice Inspection of Piping"
- study RIISI implementation at NPP using Westinghouse methodology (Surry)
- study RIISI implementation at NPP using EPRI methodology (Arkansas Nuclear One - Unit 2)

Part 3: Expert Assessment of pilot application for Ukrainian NPP. The first application of RIISI in Ukraine is expected at South Ukraine NPP.

Part 4: Develop recommendations for NRA regulatory guideline on RIISI at Ukrainian NPPs. Guidance will be based on the results of the assessment of the pilot application.

Deliverables

Interim reports for Subtasks 1 and 2.

Expert Conclusion for review of pilot application. (Subtask 3)

Final report and recommendation for Subtask 4.

Schedule

Planning (Part 1) done by end of Month 3

Investigation (Part 2) done by end of Month 6

Expert Assessment of pilot application done within x months of NRA receipt of application

Recommendations (Part 4) done by end of Month 4 after completion of assessment of pilot application

Resource Estimate

48 man-months (SSTC), Parts 1, 2 and 4

Resources for Part 3 to be determined

Western technical assistance required (Parts 1, 2 and 3)

Foreign travel required (Part 2)

II.C.1 IMPLEMENTATION OF NEW NEUTRON FLUENCE METHODOLOGY ("TORT PROGRAM") ("New Task 3")

Background

- The useful life of a nuclear power unit is strongly influenced by the condition of the reactor vessel which in turn depends in part on the neutron exposure to sensitive vessel areas.
- At SSTC, calculation of this exposure has been done using the PHYBER code, but that relatively simple method has known limits of precision and accuracy.
- The program TORT was developed at Oak Ridge National Laboratories (ORNL) to accurately calculate neutron and photon transfer in three dimensions. The methodology has been used since 1965 and is considered reliable.

Technical Approach

SSTC, SNRA's technical support organization, proposes to obtain practical experience with TORT by both training at ORNL and by initial calculations for VVER-440 and VVER-1000 NPPs in Ukraine. A five-part project has been outlined.

Part 1 - Obtain TORT code and initial training.

Part 2 - Analyze VVER-440 Reactor Vessel. Including three Subtasks

Subtask 2.1: Develop calculation model for TORT

Subtask 2.2: Develop neutron and physical constant libraries and initial data.

Subtask 2.3: Calculate neutron fluence on test specimens and welded joints of Ukrainian VVER-440s.

Part 3 - Analyze VVER-1000 Reactor Vessel. Including three Subtasks

Subtask 2.1: Develop calculation model for TORT

Subtask 2.2: Develop neutron and physical constant libraries and initial data.

Subtask 2.3: Calculate neutron fluence on test specimens and welded joints of Ukrainian VVER-1000s.

Part 4 - Obtain additional experimental data and compare with calculation.

Part 5 - Final analysis and assessment of TORT implementation at SSTC.

Deliverables

Interim reports for Parts 1, 2, 3 and 4.

Final report for Part 5

Schedule

Training and Orientation (Part 1) done by end of Month 2

Analysis (Parts 2 and 3) done by end of Month 7

Final Report (Part 5) done by end of Month 12

Resource Requirements

51 man-months (SSTC)

Western technical training (Part 1) and consulting (Parts 2 and 3)

Foreign travel required (Part 1).

II.C.2 PRACTICAL APPLICATION OF THE ALARA PRINCIPLE IN THE LICENSING PROCESS ("New Task 5")

Background

- The Administration does not have a clear methodology and critical basis for ALARA application.
- There are no criteria to define priorities and in some cases necessity for activities performed at the Shelter Object.
SSTC is a MACCS code user.

Technical Approach

SSTC, SNRA's technical support organization, proposes to define man-Sievert cost equivalent on the basis of ALARA assessments, which would be used in work optimization procedures for reduction of dose loads at the Shelter Object. Develop a methodology to derive ALARA-criteria. A four-part project has been outlined

Part 1 - Study of HECOM model and its adaptation for Ukraine.

Part 2 - Assessment of cost equivalent of a man-Sievert for conditions of the Shelter Object.

Part 3 - Development of a methodology to calculate losses in cost equivalent (by MACCS code) at example of basic emergency scenarios for the Shelter Object.

Part 4 - Obtaining of cost criteria for possibility to perform work in different areas.

Deliverables

Interim reports for Parts 1, 2 and 3.

Final report for Part 4

Schedule

Study of HECOM model (Part 1) done by end of Month 6

Assessment (Parts 2) done by end of Month 8

Development of a methodology (Parts 3) done by end of Month 14

Obtaining of cost criteria (Part 4) done by end of Month 19

Resource Requirements

114 man-months (SSTC)

Western technical assistance required (Parts 1 and 2)

Foreign travel required (Part 2)

V.C. INFORMATION STORAGE AND RETREIVAL SYSTEM FOR REVIEW OF NPP OPERATIONS ("New Task 6)

Background

- Changes to safety significant systems, structures or components in Ukraine's NPPs requires regulatory review and approval of analyses documented in Technical Decisions. (TDs)
- Regulatory review of TDs depends on having reliable references of both the TDs and the associated operating reports and procedures.
- The State Nuclear Regulatory Administration (NRA) and it's technical support organization (TSO), the State Scientific and Technical Support Center on Nuclear and Radiation Safety (SSTC NRS), do not have a reliable and efficient system for storage and retrieval of NPP operating information.

Technical Approach

SSTC, SNRA's technical support organization, proposes to develop, test and populate an Automated Information System (AIS) for storage and retrieval of information from operating NPPs in Ukraine.

Six stages are planned:

Part 1 - Examination of Example Existing Information Base:

- Analyze existing scheme for operational documentation creation, use, storage, and retrieval.
- Develop the list of documents of interest for a pilot unit, Khmelniysky Unit 1 (KhNPP-1). Documents of interest are those submitted to obtain an operating license, periodic reports to NRA, and safety related procedures, drawings, tests and test results.

Part 2 - Identify AIS Structure and Collect Initial Documents:

- Based on the results of Part 1, determine the AIS structure and the criteria for search and selection of information.
- Collect information from KhNPP-1.

Part 3 - Complete pilot AIS and plan Expansion to Other Units :

- Implement AIS for KhNPP-1 through informational retrieval.
- Develop Users Manual and put system in trial use.
- Develop the list of documents of interest for other plants (Zaporizhyya, Rivne, South Ukraine)

Part 4 - Collect Information for Zaporizhyya, Rivne, South Ukraine:

Part 5 - Develop AIS Maintenance Procedures:

- Develop process for additions to documents in AIS
- Develop procedure for updating documents in AIS.
- Prepare AIS software maintenance program.

Part 6 - Trial Use at Each Plant:

Deliverables

Interim Reports containing stage results (analyses, document lists, Users Manuals, etc.). (Parts 1, 2, 3, 4, 5)

Demonstration of AIS for Pilot (Part 3) and final (Part 6)

Final Report, Including Lessons Learned in Trial Period (Part 6)

Schedule

Planning and Initial Document Collection (Parts 1 and 2) done by end of Month 5

Demonstration with KhNPP Documents (Part 3) done by end of Month 10

Complete Document Collection for All Plants (Part 4) done by end of Month 18

Final Report (Part 6) done by end of Month 20

Resource Requirements

96 man-months (SSTC)

Western technical assistance (Part 2)

No foreign travel planned.

APPENDIX 2

DOE-SPONSORED PROJECTS FOR THE UKRAINIAN NUCLEAR UTILITY

(SOURCE FOR COMPLETION PLAN IN APPENDIX 1)

TABLE 1

NUCLEAR SAFETY IMPROVEMENT PROGRAM PROJECTS IMPLEMENTED AT UKRAINIAN NPP UNDER USA ASSISTANCE (INSP)

ITEM. NO	CODE	TITLE
1 IMPROVEMENT OF OPERATIONAL PRACTICE		
1	WBS 1.01.01.1 2	FORMS OF CONFIGURATION MANAGEMENT IN UKRAINE
2	WBS 1.01.01.1 4	INFRASTRUCTURE OF OPERATIONAL SAFETY IN UKRAINE
3	WBS 1.01.01.1 6	QUALITY ASSURANCE IN UKRAINE
4	WBS 1.01.01.2 1	ANALYSIS AND REPORTING ON EVENTS AT NPP IN UKRAINE
5	WBS 1.01.04.0 7	EOP ANALYSIS
6	WBS 1.01.05.0 6	DATA BASE ON RELIABILITY OF EQUIPMENT FOR NPP
7	WBS 1.01.05.1 0	UKRAINIAN INITIATIVE ON NON-DESTRUCTIVE CONTROL AND MAINTENANCE
8	WBS 1.01.05.0 5	TRAINING AND TRANSFER OF TECHNOLOGY FOR RBMK MAINTENANCE
2 STAFF TRAINING AND SIMULATORS		
9	WBS 1.01. 02.09	FULL-SCALE SIMULATOR FOR VVER-1000 AT SUNPP-3
10	WBS 1.01.02.1 1	UPGRADING OF FULL-SCALE SIMULATOR FOR ZNPP-1
11	WBS 1.01.02.1 6	FULL-SCALE SIMULATOR FOR VVER-1000 AT RNPP-3
12	WBS 1.01.02.1 7	FULL-SCALE SIMULATOR FOR SUNPP-1
13	WBS 1.01.02.2 0	UPGRADING OF FULL-SCALE SIMULATOR FOR ZNPP-5

14	WBS 1.01.02.2 4	FULL-SCALE SIMULATOR FOR RNPP-2
15	WBS 1.01.03.0 9	TRAINING COURSES ON SIMULATORS
16	WBS 1.01.03.2 2	TRANSFER OF TRAINING TECHNOLOGIES TO UKRAINE
3 FIRE SAFETY		
17	WBS 1.02.01.0 2	IMPROVEMENT OF FIRE SAFETY FOR VVER-1000 REACTORS (PHASE 1)
18	WBS 1.02.01.0 3	IMPROVEMENT OF FIRE SAFETY FOR VVER-1000 REACTORS (PHASE 2)
19	WBS 1.02.01.1 5	IMPROVEMENT OF FIRE SAFETY FOR CHNPP-3
4 MONITORING AND CONTROL SYSTEMS		
20	WBS 1.01.02.0 8	IMPLEMENTATION OF SPDS FOR NPP SIMULATOR
21	WBS 1.02.03.1 7	SPDS FOR VVER-TYPE REACTORS
22	WBS 1.02.03.2 1	SPDS FOR CHNPP-3
5 SAFETY ANALYSIS		
23	WBS 1.03.01.0 3	SAFETY ANALYSIS AND RISK ASSESSMENT FOR SUNPP-1
24	WBS 1.03.01.1 2	SAFETY ANALYSIS AND RISK ASSESSMENT FOR ZNPP-5
25	WBS 1.03.01.1 6	SAFETY ANALYSIS AND RISK ASSESSMENT FOR KHPP-1
26	WBS 1.03.01.2 5	SAFETY ANALYSIS AND RISK ASSESSMENT FOR RNPP-1
27	WBS 1.03.02.0 3	INFRASTRUCTURE FOR SAFETY ASSESSMENT (CODES)
6 SHELTER OBJECT		

28	WBS 3.01.02.0 1	REDUCTION OF RADIATION DOSE AT "SHELTER" OBJECT
29	WBS 3.01.02.0 2	CRITICALITY OF NUCLEAR SAFETY AT "SHELTER" OBJECT
30	WBS 3.01.02.0 3	DUST SUPPRESSION AT "SHELTER" OBJECT
31	WBS 3.01.02.0 4	IMPROVEMENT OF INDUSTRIAL SAFETY AT "SHELTER" OBJECT
32	WBS 3.01.05.0 1	REPAIR OF FOUNDATION AND STRENGTHENING OF VENTILATION STACK
33	WBS 3.02.01	REMOVAL FROM SERVICE, DECONTAMINATION AND DECOMMISSIONING OF CHNPP-1
7 ALTERNATIVE NUCLEAR FUEL		
34		UKRAINIAN NUCLEAR FUEL
8 SPENT FUEL STORAGE		
35	WBS 1.04.01.0 1	DRY TYPE SYSTEM FOR SPENT NUCLEAR FUEL STORAGE AT ZNPP

APPENDIX 3
TASKS BEING PERFORMED BY THE
PACIFIC NORTHWEST LABORATORIES

Table 3

NRC-FUNDED ONGOING SSTC PROJECTS

Project #	Project title	Technical Objectives
1	Technical Translation and Interpreting	Develop a widely accessible technical standard for nuclear regulatory and safety analysis terminology. Develop widely accessible training materials for translators and interpreters to promote consistency and accuracy in translation of nuclear regulatory and nuclear safety documents and technical exchanges.
2	SCALE/ORIGEN Validation and Verification	Develop, verify, and validate computer code libraries to be used with the SCALE 4.3 package when modeling problems involving VVER and RBMK fuel elements. Document benchmarks used in the validation process. Initially, code validation will focus on applications associated with spent nuclear fuel management. Code validation may support new fuel applications in the future.
3	Information Technology System Integration	Work with Ukraine to develop a strong independent nuclear regulatory infrastructure. The focus of this effort is on providing the computer tools necessary to accelerate the development of standards regarding modification of Soviet-designed reactors by Western companies
4	Project Management Training	<ol style="list-style-type: none"> 1) Train SSTC NRS leadership so they have the knowledge needed to implement effective project management in the organization. 2) Support the development and implementation of SSTC NRS project management policies and procedures 3) Train SSTC NRS staff so they have the skills and knowledge needed to implement project management processes and systems
5	Ukraine NPP Safety Projects Database and Project Control Procedures	Work with Ukraine to develop an integrated approach to the management and control of nuclear safety improvement projects to assure that projects are appropriately prioritized and coordinated to achieve maximum benefit. [Note: This project was begun with an RFP to the SSTC NRS in 1998, which submitted a response to the RFP in October 1998, seeking a contract covering three years work. This current project proposal reduces this level of effort to 18 months.]

II.C.1 Codes

Project Title: SCALE/ORIGEN Validation and Verification (PNNL Task 2)

Host Organizations/ Nuclear Regulatory Administration (NRA) and the State Scientific and

Primary Contacts: Technical Center for Nuclear and Radiation Safety (SSTC NRC)/ Konstantin M. Skevtsov, Alexander Kozlov

Objectives:

Develop, verify, and validate computer code libraries to be used with the SCALE 4.3 package when modeling problems involving VVER and RBMK fuel elements. Document benchmarks used in the validation process. Initially, code validation will focus on applications associated with spent nuclear fuel management. Code validation may support new fuel applications in the future.

Scope:

Assist the Ukrainian Nuclear Regulatory Authority (NRA) in the collection of relevant critical experiment information that can be used to validate US codes for use with VVER and RBMK fuel elements. NRA will establish a database on material composition and geometry parameters for VVER and RBMK fuel element plus a database of relevant criticality experiments. Using information from the databases, NRA will test the performance of the codes using KENO-Y1 from the SCALE4.3 package. A workshop will be conducted to discuss the results and a final report will be prepared by NRA to document the effort. At the conclusion of the effort, PNNL will submit physical constants and neutron code libraries to the DOE code center.

Accomplishments:

A task order has been established with SNRA for validation of KENO-Y1 for use with VVER and RBMK fuel elements.

Issues:

None.

Next Steps:

The task order established a 14 month program for validation of the codes. The task order lists a series of subtasks. We are working with SNRA to solidify the schedule for completion of subtasks to allow better monitoring of the project.

IV.A. Training

Project Title: Technical Translation and Interpretation (PNNL Task 1)

Host Organizations: Nuclear Regulatory Administration (NRA) and the State Scientific and Technical Center for Nuclear and Radiation Safety (SSTC NRC)/

Primary Contacts: Konstantin M. Skevtsov, Sergei Bobriakov

Objectives:

Develop a widely accessible technical standard for nuclear regulatory and safety analysis terminology and training materials for translators and interpreters to promote consistency and accuracy in translation of nuclear regulatory and nuclear safe documents and technical exchanges.

Scope: Scope of the project shall consist of:

- Assembling existing nuclear-related terminology glossaries, dictionaries, and standards
- Reviewing existing materials to identify terms that require standard definitions or documentation of differences in meaning or usage between Ukraine and Russia (Note: the working languages of this project will be Russian and English.)
- Preparing a portfolio of sample documents for parallel translation and linguistic commentary by native Russian/Ukrainian and U.S. translators and interpreters.
- Developing a nuclear regulatory translation and interpretation training guide based on the results of parallel translation and commentary efforts.

Develop a standard guide for nuclear regulatory terminology

Accomplishments:

- Identification and exchange of benchmark documents for translation started
- Example video tapes have been identified and reformatted for use by SSTC and SNRA
- Subcontract to SSTC awarded
- Subcontract to US linguistic consultant awarded

Issues: None.

Next Steps:

- Schedule the first workshop in Ukraine
- Schedule second workshop in the US at PNNL

IV.A. Training

Title: Project Management Training and Capabilities Development (PNNL Task 4)

Objective

The object of this project is to implement effective project management processes and systems at SSTC; including the development and implementation of SSTC project management policies and procedures, and to train SSTC staff so they have the skills and knowledge required to implement project management processes and systems.

Accomplishments

Met with SSTC in August 1999 and finalized an approach to implementing project management that fit the needs of SSTC.

Issued a work order to SSTC for the project management task

Have identified four SSTC staff to come to PNNL for training and have developed a training curriculum that has been agreed to by SSTC

SSTC is in the process of developing a set of project management policies and procedures.

Next Steps

SSTC will visit PNNL for training in late February

After training SSTC will finalize their project management policies and procedures and begin implementing them

SSTC and PNNL will work together to develop project management training that meets the unique needs of SSTC

SSTC staff will be trained to conduct the project management training

Issues

No significant issues at this time.

Subcontract Forecast

No subcontracting actions forecast

IV.C. Databases

Project Title: Ukraine NPP Safety Projects Project Control Procedures and Database
(PNNL Task 5)

Primary Contacts: State Nuclear Regulatory Administration (SNRA)
State Scientific and Technical Center for Nuclear and Radiation Safety (SSTC NRC)

Objectives:

Help the Ukrainian NRA coordinate, prioritize, and certify NPP safety upgrades to optimize reactor safety and strengthen the nuclear regulatory infrastructure of Ukraine.

Scope:

Improve the ability of the Ukrainian State Nuclear Regulatory Authority (SNRA) to catalog, monitor and regulate planned and ongoing nuclear safety improvement projects at all Ukrainian nuclear facilities, whether funded domestically, by donor countries and organizations, or by via bilateral and multilateral agreements. This Project is also designed to help the SNRA integrate its efforts to regulate a high volume of nuclear safety improvements at Ukrainian nuclear facilities with its other regulatory responsibilities.

Accomplishments:

At meetings with PNNL in October and in subsequent weeks SSTC (the contractor) it was agreed to shorten the project from 18 to 15 months and to do the entire project under a single task order, facilitating project management and streamlining deliverables. SSTC agreed to provide monthly progress reports as well as specific deliverables for the four tasks it is undertaking. SSTC began work on Task I in December 1999, cataloging NPP upgrades. It did a preliminary analysis of Ukrainian NPP Safety Improvement Projects. A unified procedure has not been established for submitting the information of interest, delaying receipt of some information. This issue needs attention. Upgrades are being prioritized by their safety-significance, according to IAEA classifications. In addition, the SSTC analyzed the structure and content of the G-24 NUSAC database, and developed a preliminary set of fields for Ukraine's new safety projects database. SSTC has also reviewed existing safety improvement programs as well as existing project regulatory and monitoring procedures.

Next Steps:

In accordance with the updated project work plan and task order, it will be important in the next phase (II) of the project to:

- outline and report on the *requirements* for the data base of upgrade projects,
- list and validate the priorities according to which current and future upgrade projects will be ranked, and
- link regulatory rules and guides to each project.

In the two subsequent phases of the project it will assess and report on monitoring program rules and procedures for regulatory monitoring of nuclear safety improvement projects, provide a detailed report on the design requirements and models for a data base of nuclear safety improvement projects, and draft a Charter for a new nuclear safety improvement monitoring group, as well as establish a national database of all Ukrainian nuclear safety improvement projects.

SSTC is also working with the NRA to view this project in the context of an overall strategic plan for its development and strengthening over the next five years.

Issues: None.

IV.D. Equipment

Project Title: Information Technology System Integration (PNNL Task 3)

Host Organizations/ Nuclear Regulatory Administration (NRA) and the State Scientific and
Primary Contacts: Technical Center for Nuclear and Radiation Safety (SSTC NRC)

Objectives:

Provide the computer tools necessary to accelerate the development of standards regarding modification to Soviet-designed reactors by Western companies.

Scope:

Update and publish the SSTC Information Systems Strategic Plan. Provide SSTC with fast Internet access so that staff will have access to technical information and can collaborate with western colleagues. Assist SSTC with installing an Enterprise Network so that most staff will have access to the Internet, e-mail, shared printers, applications, and file servers. Enhance the productivity of SSTC scientists by upgrading the computers that perform heavy scientific calculations. Provide a basic, low cost solution for the storage and retrieval of documents and for document configuration management. Once the basic infrastructure is in operation, review the situation and determine if a more comprehensive document management solution is needed.

Accomplishments:

Held kickoff meeting in Kyiv in November 1999. Reviewed summary of SSTC Information Systems Strategic Plan. Reviewed availability of high speed Internet access to SSTC facilities. Procured two high speed modems to allow remote access to the SSTC network from university offices.

Next Steps:

Finalize specifications, identify potential vendors and initiate procurements for Internet services and computer equipment. Perform final review of SSTC Information Systems Strategic Plan. Commence installation and integration of computer equipment.

Issues:

None

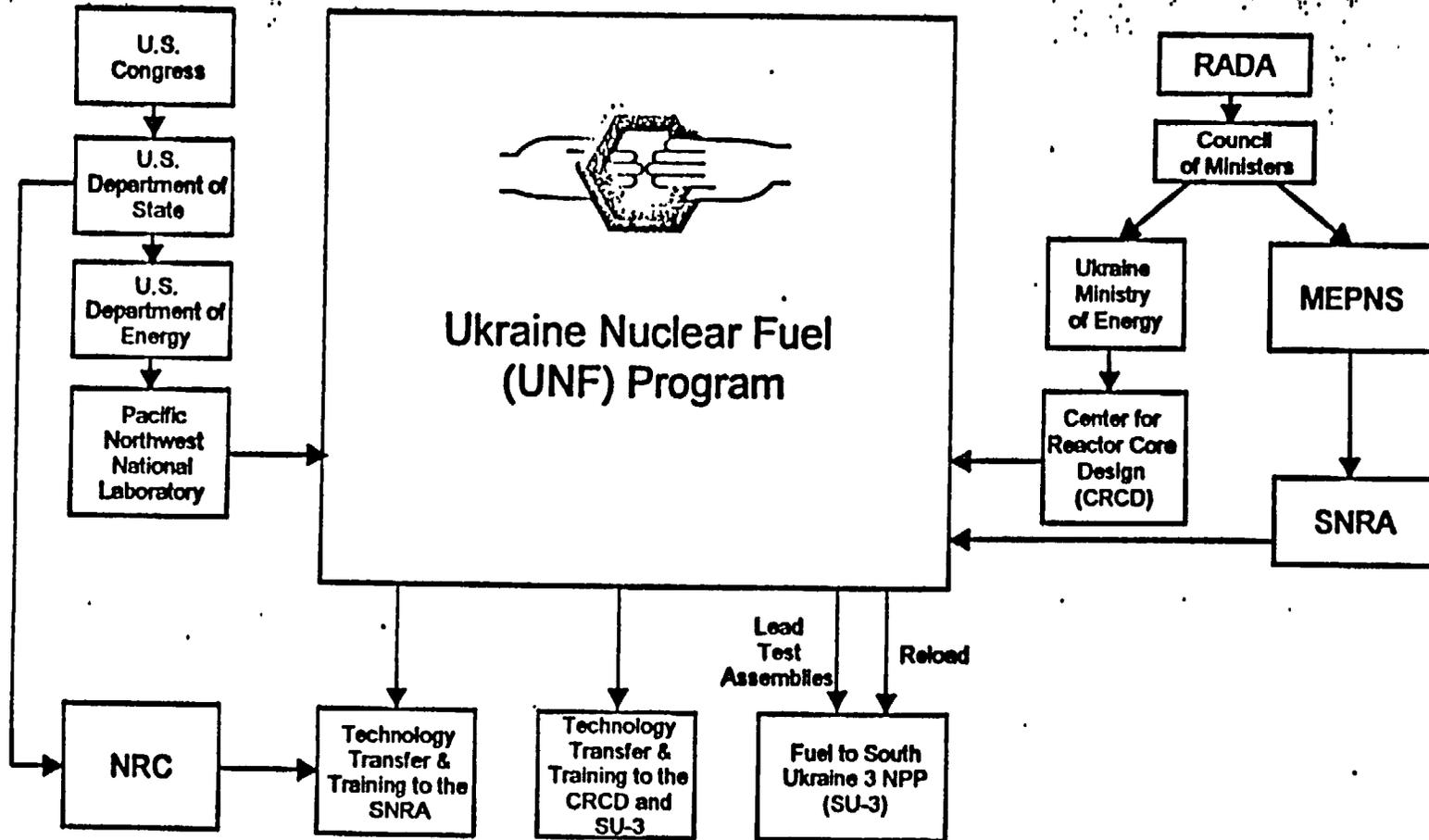
APPENDIX 4

STRUCTURE OF FUEL QUALIFICATION PROJECT



U.S.-Ukraine Fuel Qualification Project

PROGRAM PLAN



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APPENDIX 5
IMPLEMENTING AGREEMENT

IMPLEMENTING AGREEMENT

between

THE UNITED STATES NUCLEAR REGULATORY COMMISSION

and

THE UKRAINIAN STATE NUCLEAR REGULATORY ADMINISTRATION

MINISTRY FOR ENVIRONMENTAL PROTECTION AND NUCLEAR SAFETY

for

DEVELOPMENT OF LICENSING AND INSPECTION CAPABILITIES

Considering that the United States Nuclear Regulatory Commission (NRC) and the Ukrainian State Nuclear Regulatory Administration (SNRA), Ministry for Environmental Protection and Nuclear Safety (hereinafter referred to as the "Parties"):

1. Have been Parties to cooperative programs for several years to improve nuclear safety in Ukraine, including a current program under the "Agreement between the Government of the United States of America and the Government of Ukraine Regarding Humanitarian and Technical Cooperation" signed on May 7, 1992 (hereinafter referred to as the "Lisbon Nuclear Safety Initiative" (LNSI)) and funded through an interagency agreement (as amended) between NRC and the U.S. Agency for International Development originally signed on September 30, 1992;
2. Agreed, in the present Memorandum of Meeting dated January 28, 2000, of the annual LNSI meeting at NRC, to continue those tasks associated with improving licensing and inspection capabilities over a three- to five-year period;
3. Agreed that a basic objective is the development of capabilities necessary for SNRA in the future to maintain and improve its licensing and inspection capabilities by utilizing Ukrainian experts and firms; and
4. Agreed that SNRA is prepared to manage, jointly with NRC, the development of procedures and methods for licensing and inspection activities. SNRA will manage these activities under a contract with the Ukrainian firm "Scientific and Technical Center for Nuclear and Radiation Safety";

NRC and SNRA agree to the following terms and conditions:

ARTICLE I - COORDINATION

NRC and SNRA, in accordance with the provisions of this Implementing Agreement and subject to applicable laws and regulations in force in the respective Countries, will administer this Implementing Agreement as part of the NRC LNSI Program and in accordance with the provisions for coordination that have been and may be established in that Program.

ARTICLE II - SCOPE

The scope of work under this Implementing Agreement is limited to tasks defined in Appendix 1 to the Memorandum of Meeting dated January 28, 2000, "Completion Plan for Cooperative Development of Licensing and Inspection Capabilities" (hereinafter referred to as the Plan). The work will be carried out in Ukraine to improve the capabilities of the Scientific and Technical Center for Nuclear and Radiation Safety and to otherwise support those functions of SNRA. Interpretation of the Plan will at all times be consistent with the current Memorandum of Meeting dated January 28, 2000, between NRC and SNRA or as it may be modified by subsequent agreements between NRC and SNRA.

ARTICLE III - ADMINISTRATION

- A. NRC and SNRA will each designate one representative to coordinate and manage the detailed administration of this Implementing Agreement. These designated representatives are referred to as Administrators in this Implementing Agreement. The NRC Administrator will have functions and responsibilities approximating those of a project manager of U.S. contracts. The two Administrators are expected to work closely together, supporting each other in a spirit of cooperation, to accomplish the objectives of this Implementing Agreement efficiently.
- B. SNRA will designate the firm "Scientific and Technical Center for Nuclear and Radiation Safety" as its Contractor for implementing the Plan (Appendix 1 to the Memorandum of Meeting dated January 28, 2000) under contract management by the SNRA Administrator.
- C. Responsibilities of SNRA and the Administrators
 1. SNRA shall ensure that the Contractor:
 - a. Tenders proposals for all tasks (whether to be performed by the Contractor or subcontractors) in a simple format to be developed by the Administrators;
 - b. Negotiates subcontracts in accordance with U.S. and Ukrainian requirements;
 - c. Informs the SNRA Administrator of problems that may affect schedule or quality;
 - d. Certifies required performance and documentation by subcontractors and by Contractor personnel before submitting invoices to the SNRA Administrator;
 - e. Prepares a summary letter report of technical and financial status as described in Article VI.
 2. The SNRA Administrator, subject to approval of the NRC Administrator, shall take actions necessary to:
 - a. Keep the Plan current;
 - b. Develop detailed Statements of Work (SOWs) for each task defined in the Plan;
 - c. Decide on appropriate groupings of these tasks to achieve efficient implementation, including use of subcontractors;
 - d. Estimate costs and negotiate with the Contractor;
 - e. Assist the Contractor as necessary in understanding terms of performance and documentation required by the contracts, and in simplifying forms and procedures;

- f. Provide certification for each contract that the work meets requirements of the contract and applicable regulations of SNRA and Ukraine;
 - g. Approve Contractor invoices for SNRA and forward them to the NRC Administrator;
 - h. Advise the NRC Administrator of any problems that require joint resolution;
 - i. Interface with appropriate SNRA and other authorities.
3. The NRC Administrator shall:
- a. Approve the contract between SNRA and Scientific and Technical Center for Nuclear and Radiation Safety;
 - b. Assist the SNRA Administrator with NRC views, when appropriate, concerning functions III.C.2.a-e, above;
 - c. Assist the SNRA Administrator in developing and applying SOWs, contracts, and subcontracts in a manner that is consistent with LNSI, NRC, and U.S. contract regulations;
 - d. Approve Contractor invoices for NRC and submit them for payment;
 - e. Advise the SNRA Administrator of any problems that require joint resolution;
 - f. Interface with appropriate NRC and other authorities.

ARTICLE IV - EXCHANGE AND USE OF INFORMATION AND INTELLECTUAL PROPERTY

A. General

The Parties support the widest possible dissemination of information provided or exchanged under this Implementing Agreement, subject both to the need to protect proprietary or other confidential or privileged information as may be exchanged hereunder, and to the provisions of the Intellectual Property Addendum (Attachment I to this agreement), which is an integral part of this Implementing Agreement.

B. Definitions (as used in this Implementing Agreement)

1. The term "information" means nuclear-energy-related regulatory, safety, safeguards, waste management, scientific, or technical data, including information on results or methods of assessment, research, and any other knowledge intended to be provided or exchanged under this Implementing Agreement.
2. The term "proprietary information" means information made available under this Implementing Agreement which contains trade secrets or other privileged or confidential commercial information (such that the person having the information may derive an economic benefit from it or may have a competitive advantage over those who do not have it), and may only include information which:
 - a. has been held in confidence by its owner;
 - b. is of a type which is customarily held in confidence by its owner;
 - c. has not been transmitted by the owner to other entities (including the receiving Party) except on the basis that it be held in confidence;
 - d. is not otherwise available to the receiving Party from another source without restriction on its further dissemination; and
 - e. is not already in the possession of the receiving Party.

3. The term "other confidential or privileged information" means information, other than "proprietary information," which is protected from public disclosure under the laws and regulations of the country of the Party providing the information and which has been transmitted and received in confidence.

C. Marking procedures for documentary proprietary information

A Party receiving documentary proprietary information pursuant to this Implementing Agreement shall respect the privileged nature thereof, provided such proprietary information is clearly marked with the following (or substantially similar) restrictive legend:

"This document contains proprietary information furnished in confidence under an Implementing Agreement dated January 28, 2000, between the United States Nuclear Regulatory Commission and the Ukrainian State Nuclear Regulatory Administration, Ministry of Environmental Protection and Nuclear Safety, and shall not be disseminated outside these organizations, their consultants, contractors, and licensees, and concerned departments and agencies of the Government of the United States and the Government of Ukraine without the prior approval of (name of transmitting Party). This notice shall be marked on any reproduction hereof, in whole or in part. These limitations shall automatically terminate when this information is disclosed by the owner without restriction."

This restrictive legend shall be respected by the receiving Party and proprietary information bearing this legend shall not be used for commercial purposes, made public, or disseminated in any manner unspecified by or contrary to the terms of this Implementing Agreement without the consent of the transmitting Party.

D. Dissemination of documentary proprietary information

1. In general, proprietary information received under this Implementing Agreement may be freely disseminated by the receiving Party without prior consent to persons within or employed by the receiving Party, and to concerned Government departments and Government agencies in the country of the receiving Party.
2. In addition, proprietary information may be disseminated without prior consent to contractors or consultants of the receiving Party located within the geographical limits of that Party's nation, for use only within the scope of work of their contracts with the receiving Party in work relating to the subject matter of this Implementing Agreement; provided that any such dissemination of proprietary information shall be on an as-needed, case-by-case basis, shall be pursuant to an agreement of confidentiality, and shall be marked with a restrictive legend substantially similar to that appearing in Article IV. C. above.
3. With the prior written consent of the Party furnishing proprietary information under this Implementing Agreement, the receiving Party may disseminate such proprietary information more widely than otherwise permitted in subsections 1. and 2. The Parties shall cooperate in developing procedures for requesting and obtaining approval for such wider dissemination, and each Party will grant such approval to the extent permitted by its national policies, regulations, and laws.

E. Marking procedures for other confidential or privileged information of a documentary nature

A Party receiving under this Implementing Agreement other confidential or privileged information shall respect its confidential nature, provided such information is clearly marked so as to indicate

its confidential or privileged nature and is accompanied by a statement indicating

1. that the information is protected from public disclosure by the Government of the transmitting Party; and
2. that the information is transmitted under the condition that it be maintained in confidence.

F. Dissemination of other confidential or privileged information of a documentary nature

Other confidential or privileged information may be disseminated in the same manner as that set forth in paragraph D., Dissemination of documentary proprietary information.

G. Non-documentary proprietary or other confidential or privileged information

Non-documentary proprietary or other confidential or privileged information provided in seminars and other meetings arranged under this Implementing Agreement, or information arising from the attachments of staff, use of facilities, or joint projects, shall be treated by the Parties according to the principles specified for documentary information in this Implementing Agreement; provided, however, that the Party communicating such proprietary or other confidential or privileged information has placed the recipient on notice as to the character of the information communicated.

H. Consultation

If, for any reason, one of the Parties becomes aware that it will be, or may reasonably be expected to become, unable to meet the nondissemination provisions of this Implementing Agreement, it shall immediately inform the other Party. The Parties shall thereafter consult to define an appropriate course of action.

I. Other

Nothing contained in this Implementing Agreement shall preclude a Party from using or disseminating information received without restriction by a Party from sources outside of this Implementing Agreement.

ARTICLE V - FINANCIAL CONSIDERATIONS

- A. Implementation of this Agreement is subject to the availability of sufficient appropriated funds in the NRC LNSI Program, and use of those funds is subject to all provisions and restrictions of the LNSI Program.
- B. Subject to the availability of funds, NRC will provide funds to complete the tasks defined in the Plan (Appendix 1 to the Memorandum of Meeting dated January 28, 2000) in accordance with the terms of this Implementing Agreement. These funds will be disbursed incrementally for invoices submitted by the SNRA Contractor and approved in turn by the SNRA Administrator and the NRC Administrator. At this time NRC intends to provide a minimum of US\$150,000 for this purpose. NRC also intends to provide additional incremental funding as tasks are completed and as resources become available.
- C. SNRA shall ensure that Contractor invoices contain all information required by U.S. contracting regulations, based on previous experience in Ukraine under the LNSI. NRC will apprise SNRA and the Contractor of these requirements.

- D. SNRA shall ensure that the Contractor maintains complete accounting records of all funds paid to it by NRC under this Implementing Agreement in accordance with accounting principles generally accepted in Ukraine. These accounting records shall be maintained for a period of no less than three years after the expiration of this Implementing Agreement. NRC, or other authorized U.S. Government officials, shall have full access to the Contractor's accounting records for the purposes of financial audit during the period of this Implementing Agreement and for a period of no less than three years after its expiration.

ARTICLE VI - REPORTING REQUIREMENTS

SNRA shall ensure that the Contractor submits to the NRC and SNRA Administrators a summary letter report three months after the effective date of this Implementing Agreement and every three months thereafter. The copy to the NRC Administrator shall be in English. The letter shall report the technical and financial status of all ongoing tasks, including the following information:

A. Technical status

1. A listing of the tasks completed during the three-month reporting period and milestones reached or, if missed, an explanation;
2. Any significant problems or delays encountered or anticipated and recommendations for resolution;
3. Planned accomplishments for the next reporting period;
4. Information, including suggestions, that the Contractor believes may be of interest to NRC and SNRA.

B. Financial status

1. The total cost for each task completed during the reporting period;
2. The cost of each ongoing task through the end of the reporting period;
3. For each task, any difference between the approved funds and the actual or anticipated cost, with explanations, and the estimated impact if approved funds are insufficient to complete a task;
4. The status of all invoices submitted by the Contractor.

ARTICLE VII - PERIOD OF PERFORMANCE

This Implementing Agreement shall be effective from the date of signature by NRC and SNRA; it shall remain effective for a period of three years. It may be extended for a further period of time by written agreement of both Parties.

ARTICLE VIII - MODIFICATIONS AND RESOLUTION OF DISPUTES

- A. The Plan (Appendix 1 to the Memorandum of Meeting dated January 28, 2000) may be modified periodically to account for experience as work progresses. The SNRA and NRC Administrators are responsible, as defined in Article III, for maintaining a current Plan that can be completed

within the resources provided under Article V and for keeping the Parties (or their designees) informed.

- B. The Parties reserve the right to modify this Implementing Agreement by mutual agreement.
- C. Any dispute concerning the interpretation or application of this Implementing Agreement will be settled by mutual agreement of the Administrators or the Parties.
- D. Activities performed pursuant to this Implementing Agreement are subject to the "Agreement Between the Government of Ukraine and the Government of the United States of America Concerning Operational Safety Enhancements, Risk Reduction Measures, and Nuclear Safety Regulation for Civilian Nuclear Reactors in Ukraine" that was signed on October 25, 1993.
- E. Information furnished by one Party to the other under this Implementing Agreement will be accurate to the best knowledge and belief of the Party supplying the information. However, the application or use of any information exchanged or transferred between the Parties under this Implementing Agreement will be the responsibility of the Party receiving the information, and the transmitting Party does not warrant the suitability of the information for any particular use or application.



William D. Travers
Executive Director for Operations
USNRC

January 28, 2000



Oleksandr Smyshlyayev
Chairman, Ukrainian State Nuclear
Regulatory Administration

January 28, 2000

ATTACHMENT I TO THE IMPLEMENTING AGREEMENT

INTELLECTUAL PROPERTY ADDENDUM

Pursuant to Article IV of this Implementing Agreement:

The Parties shall ensure adequate and effective protection of intellectual property created or furnished under this Implementing Agreement and relevant implementing arrangements. The Parties agree to notify one another in a timely fashion of any inventions or copyrighted works arising under this Implementing Agreement and to seek protection for such intellectual property in a timely fashion. Rights to such intellectual property shall be allocated as provided in this Addendum.

I. SCOPE

- A. This Addendum is applicable to all cooperative activities undertaken pursuant to this Implementing Agreement, except as otherwise specifically agreed by the Parties or their designees.
- B. For purposes of this Implementing Agreement, "intellectual property" shall have the meaning found in Article 2 of the Convention Establishing the World Intellectual Property Organization, done at Stockholm, July 14, 1967; viz., "intellectual property" shall include the rights relating to:
- literary, artistic and scientific works, performances of artists, phonograms, and broadcasts,
 - inventions in all fields of human endeavor,
 - scientific discoveries,
 - industrial designs,
 - trademarks, service marks, and commercial names and designations,
 - protection against unfair competition,
- and all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields."
- C. This Addendum addresses the allocation of rights, interests, and royalties between the Parties. Each Party shall ensure that the other Party can obtain rights to intellectual property allocated in accordance with the Addendum by obtaining those rights from its own participants through contracts or other legal means, if necessary. This Addendum does not otherwise alter or prejudice the allocation between a Party and its nationals, which shall be determined by that Party's laws and practices.
- D. Disputes concerning intellectual property arising under this Implementing Agreement should be resolved through discussions between the concerned participating institutions or, if necessary, the Parties or their designees. Upon mutual agreement of the Parties, a dispute shall be submitted to an arbitral tribunal for binding arbitration in accordance with the applicable rules of international law. Unless the Parties or their designees agree otherwise in writing, the arbitration rules of the United Nations Commission on International Trade Law (UNCITRAL) shall govern.
- E. Termination or expiration of this Implementing Agreement shall not affect rights or obligations under this Addendum.

II. ALLOCATION OF RIGHTS

- A.** Each Party shall be entitled to a non-exclusive, irrevocable, royalty-free license in all countries to translate, reproduce, and publicly distribute scientific and technical journal articles, reports, and books directly arising from cooperation under this Implementing Agreement. All publicly distributed copies of copyrighted work prepared under this provision shall indicate the names of the authors of the work unless an author explicitly declines to be named.
- B.** Rights to all forms of intellectual property, other than those rights described in paragraph II.A of this Addendum, shall be allocated as follows:
- 1.** Visiting researchers, for example, scientists visiting primarily in furtherance of their education, shall receive intellectual property rights under the policies of the host institution. In addition, each visiting researcher named as an inventor shall be entitled to national treatment with regard to awards, bonuses, benefits, or any other rewards, in accordance with the policies of the host institution.
 - 2.** (a) For intellectual property created during joint research, for example, when the Parties, participating institutions, or participating personnel have agreed in advance on the scope of work, each Party shall be entitled to obtain all rights and interests in its own country. The Party in whose country the invention was made shall have first option to acquire all rights and interests in third countries. If research is not designated as "joint research", rights to intellectual property arising from the research will be allocated in accordance with paragraph II.B.1. In addition, each person named as an inventor shall be entitled to national treatment with regard to awards, bonuses, benefits, or any other rewards, in accordance with the policies of the host institution.

(b) Notwithstanding paragraph II.B.2. (a), if a type of intellectual property is available under the laws of one Party but not the other Party, the Party whose laws provide for this type of protection shall be entitled to all rights and interests worldwide. Persons named as inventors of the property shall nonetheless be entitled to royalties as provided in paragraph II.B.2.(a).

TUESDAY, JANUARY 25

(Rm. O-3B6)

9:00-10:00

Regulatory Activities:

Oversight & Inspections

- Inspection Strategy and Practice (New Task 7)
(NRR: Beth Doroshuk, Barry Zalcmán)

10:00-11:45

Licensing - NPPs (U3.1)

- SAR Development (New Tasks 1, 4, 5)
(NRR: E. Doroshuk, B. Zalcmán, NMSS: B. Mendelsohn)
- SRP Development (U21)
(NRR: Beth Doroshuk, Barry Zalcmán)

12:00-1:30

Lunch hosted by Commission
(Commission Dining Room, 18th Floor)

1:30-2:00

Commissioner Dicus

(Rm. O-1F5)

2:00-5:00

Regulatory Activities:

Nuclear Materials Licensing

2:00

- MPC&A (U7/8) (NMSS/FCSS: Mike Kelly)

2:30

- Fuel Conversion and Fabrication (U19)**
(NMSS/FCSS: Barry Mendelsohn; NRR: Beth Doroshuk;
DOE: Jim Cannon; W: Denny Popp)

2:45

- Spent fuel and transportation**
 - (U16)- (NMSS: Barry Mendelsohn)
 - New Task 2: Part 1- Conservatism in criticality safety requirements (NMSS/SFPO: Pat Eng)
 - New Task 2: Part 2 - Assumptions for accident analyses (NMSS/SFPO: Pat Eng)

3:45

Decommissioning and Waste Disposal

- (U9) (NMSS: Barry Mendelsohn)
- New Task 5: man-Sievert cost equivalence for applying ALARA (NMSS/DWM: Larry Camper and Robert Nelson)

WEDNESDAY, JANUARY 26

(Rm. O-1F5)

9:00-10:00

Infrastructure

- Training (PNL #1, PNL #4)
(PNL: George Vargo)

10:00-12:00

Analytical Techniques and Methods to Support Regulatory Activities

- Codes (U2.1, PNL #2, New Task 3)
(RES: Mike Mayfield; NRR: Beth Doroshuk;
HR: Jack Lewis; PNL: George Vargo)
- Uses of Analytical Simulators (U2.1)
(Jack Lewis: HR)

12:00-1:30

Lunch

1:30-2:30

Emergency Response & Contingency Planning (U11)

(Joe Himes: IRO; Jack Lewis: HR)

2:30-3:45

Infrastructure

- Communications (U1, U2.1, U20)
(Joe Himes: IRO; Jack Lewis: HR; W. Beecher)
- Data bases (PNL #5, New Task 6)
- Hardware upgrades (U17, PNL #3)
(Gordon Fowler: OIP; George Vargo: PNL)

4:00-4:45

Chairman Meserve

THURSDAY, JANUARY 27

Rm. O-1F5

10:00-1:00

Additional discussion;
Review and revise Memorandum of Meeting

2:00-3:00

Tentative meeting with Terry Lash, DOE

3:00-4:00

Gregory Sheppard, DOE

FRIDAY, JANUARY 28

Rm. O-3B6)

8:30-1:30

Review and revise Memorandum of Meeting

Rm. O-1F5

11:30-5:30

Review and revise Memorandum of Meeting

18th Floor Conference Room

3:30 pm

Principals sign Memorandum of Meeting
(W. Travers, A. Smyshlyayev)