

November 4, 2005

MEMORANDUM TO: Roy P. Zimmerman, Director
Office of Nuclear Security and Incident Response

THROUGH: Eric J. Leeds, Director **/RA/**
Division of Preparedness and Response
Office of Nuclear Security and Incident Response

FROM: Randy Sullivan, Sr. Emergency Preparedness Specialist
Emergency Preparedness Directorate **/RA/** Eric Weiss For
Division of Preparedness and Response
Office of Nuclear Security and Incident Response

SUBJECT: FOREIGN TRAVEL TRIP REPORT

A summary of staff support of the International Atomic Energy Agency (IAEA) Operational Safety Review Team (OSART) Mission to Volgodonsk nuclear power plant in Russia is attached. This was the first OSART mission to Russia in over ten years. The staff supported the emergency preparedness area. The report is recommended for distribution to the Commission as it may be of interest. There are no issues that require Commission attention.

Attachments: 1. Foreign Trip Report
2. Summary of Russian EP System
3. Participant Business Cards

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ADAMS Accession Number: ML053050503 (Package)
ML053050501 (Memo) (Scanned ML053060054)

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NRC FOREIGN TRIP REPORT

Subject

Trip report on participation in the Volgodonsk Nuclear Power Plant (VNPP) OSART mission.

Dates of Travel and Countries/Organizations Visited

September 29 -October 21 2005 OSART mission conducted by the International Atomic Energy Agency

Volgodonsk, Russia

Author, Title and Agency Affiliation

Randolph L Sullivan, Sr. EP Specialist, NRC/NSIR/DPR

Background/Purpose

This was the first OSART to Russia in over ten years. The staff supported review of the emergency preparedness (EP) area and provided assistance to other members of the team. VNPP is in southern Russia, about 250 miles from Chechnya. It is a new VVER-1000 PWR.

Pending Actions/Planned Next Steps for NRC

No additional actions are expected.

Sensitivity

Non-sensitive, public

Background/Purpose

IAEA OSART missions are routinely conducted and NRC has often supported them. This mission was of particular importance because it was the first in Russia since 1993. The mission's goal was to review operations at the Volgodonsk NPP and identify areas for improvement in nuclear safety.

Abstract: Summary of Pertinent Points/Issues

There were four pertinent points.

- The plant is in excellent condition and the OSART Team was very impressed. The draft final report identified 14 "Good Practices," 12 "Suggestions" and 2 "Recommendations." These are formal terms defined by IAEA. A Good Practice is only awarded for new and innovative practices not widely implemented internationally. This is a very favorable report. It is unusual for a site to achieve so many Good Practices and so few Suggestions and Recommendations. The basis of some of the Good Practices was the use of computerized information sharing systems and a video conference link. These are used for routine operations, coordination with other Russian NPPs, Utility headquarters and support organizations, and emergency response.

- The purpose of the Mission did not encompass security issues, however, security arrangements at the plant were worthy of note. Significant security resources were spent escorting and watching team members within the plant security envelope. Movement around the plant was not permitted without an approved route and security escort, even when accompanied by senior management. There was no significant visible change to plant security after the terrorist attack in Nalchik (capital of Kabardino-Balkaria) on 10/13/05.
- VNPP and the Russian nuclear utility (Rosenergoatom) have implemented terrorist event based EP exercises. This type of exercise is conducted at one of the 10 Russian NPPs every year. VNPP has conducted such exercises in 2002 and 2004, perhaps because of its proximity to Chechnya. This was noted as a Good Practice, and to the best knowledge of the team members, represents the only national program to fully implement this necessary enhancement to EP. The US program will not begin full implementation until 2007 at the earliest. Team members were unaware of any formal effort to implement such scenarios in other countries.
- The Russian requirements for NPP EP are extensive, prescriptive and protective of public health and safety. The regulatory regimen is quite different than in western nations. An attachment contains a description of the major elements of the Russian EP system as implemented at Volgodonsk. It is of interest to note that Russia uses a very much simplified system for classification of emergencies. The system is worthy of additional study. They also use very high dose level criteria for recommendation of protective actions: 5 Rem for mandatory sheltering and 50 Rem for mandatory evacuation. These criteria are the maximum accepted in IAEA guidance.

Discussion

NRC has routinely supported OSART missions. They are of great value to the staff in that international experience in nuclear plant operations is gained. The staff is much sought after by IAEA because of the value we add to the mission, both in nuclear safety experience and to assist other team members. IAEA has a structured process and extensive guidance for the conduct of missions. International standards are fully developed for most areas and the review is performed against these standards.

The Russian regulatory program for EP is extensive and complicated. An attachment to this report contains details, but a summary is provided here. There are two major laws (decrees) and several minor decrees and agreements that are applicable. The utility (Rosenergoatom) is a quasi-government agency and as such was a partner in development of some national level requirements. These requirements are regularly inspected by two ministries as well as the utility. Requirements include extremely robust and redundant emergency response facilities and the stockpiling of large amounts of response equipment. Two onsite below ground shelters for about 1450 staff members are in place as well as an onsite and an offsite below ground Emergency Response Centers. Oversight is extensive and routine, to the point that it was difficult to sort out which entity inspects which requirements.

There are significant EP requirements for the civil authorities which are regularly inspected by a responsible government ministry. The civil authorities are required, and inspected against their ability, to implement public protective actions. They are required to conduct a 14-hour public emergency response class annually for a significant segment of the population including: students, company managers, building wardens, civil defense brigades, public officials, etc. They have training programs for workers and non-workers. About 6 hours of the training is on response to technological hazards, including the NPP at Volgodonsk. The utility is not responsible for this training, but assists whenever asked.

Medical support is required by decree. There is a clinic dedicated to the NPP with an onsite office. The medical staff are independent of the plant staff. Extensive medical supplies and equipment are stored at the plant and in the city of Volgodonsk. There is national level medical support available in Moscow, but the local staff is prepared to handle most radiological incidents.

National level EP support is rather extensive by US standards. There are 4 national laboratories, a dedicated utility response organization, utility HQ, the reactor designer and the reactor manufacturer. The staff witnessed the coordination of these entities and an oversight ministry via a video communications link during an observed drill. This was the subject of a Good Practice.

Pending Actions/Planned Next Steps for NRC

The staff will develop a presentation on the Russian EP system to foster consideration of its merits as well as for educational purposes. However, there are no further actions pending or planned for NRC.

Points for Commission Consideration/Items of Interest

The issues presented in the summary may be of interest to the Commission. No action by the Commission is expected.

Summary of Russian EP System

EMERGENCY PLANNING AND PREPAREDNESS

National policy

The national policy for nuclear power plant (NPP) emergency preparedness is well established in Russia. A decree established a Russian Federal Law titled “On Protection of Public and Territories against Emergency Situations of Natural and Technological Character,” which was approved by the Government Duma on November 11, 1994. Another decree of the Russian Federation was issued on December 30, 2003, titled “Government System for Emergency Situation Prevention and Mitigation.” These are the most significant laws defining the requirements for public protection from emergencies of a natural or technological character. In accordance with the above laws a regulation was created by the Federal Agency for Atomic Energy and Rosenergoatom Concern. This regulation was implemented by the Director General of Rosenergoatom Concern, in November 2004 and provides a system of emergency response for the nuclear power plants of the Concern.

In November 2004 the Ministry for Emergency Situations Inspection reviewed Volgodonsk NPP emergency preparedness and issued an inspection report declaring the station “fully ready to respond.” This was a comprehensive national level inspection of compliance with federal standards for Volgodonsk NPP emergency preparedness planning (EPP). The inspection reviewed the following areas:

- Compliance with requirements for protection against emergency situations of natural and technological character,
- Capability to prevent emergency situations, and provide fire safety,
- Readiness of communications, information and public notification systems,
- Preparedness for accident mitigation, rescue and other emergency response,
- Possession of the financial and material resources for emergency situation mitigation,
- Emergency response organization preparedness for response to hazards created during military actions and other emergency situations, and
- Capability to protect the local public in emergency situations.

The Russian Federation has a complete system of federal laws concerning NPP EPP and a system for inspection to verify compliance. This system is as strong as or stronger than those in other developed nations and defines a prescriptive regulatory structure appropriate for a NPP EPP program. Federal regulations delineate NPP EPP responsibilities for federal, regional, local civil authorities as well as for the Concern. The inspection also reviewed the cooperation between governmental entities and Volgodonsk NPP and verified it was satisfactory. Emergency preparedness is inspected regularly.

Functions and responsibilities

Volgodonsk NPP is located in the Rostov Region, which is further organized into districts. The city of Volgodonsk is the most populated area near the site (13.5 km). Regulations require a 30 km surveillance zone around NPPs and within this zone an elevated level of emergency preparedness is required, although civil authorities would be expected to implement protective actions beyond the surveillance zone should it be necessary. Preparations within the zone are inspected by the Ministry for Emergency Situations.

Federal law establishes a 3 km zone around the plant in which no one is allowed to live and a 5 km zone within which the plant is responsible for notification of the public. There are two small villages within the 5 km zone and Volgodonsk NPP can notify them should it be necessary. A district entity within the Rostov region is responsible for protective action decision making and implementation for areas outside of the city of Volgodonsk.

Responsibilities for emergency response are clearly defined in a Station Emergency Plan and a Unit Emergency Plan. Attachments state specific actions expected of the Station Shift Supervisor (Lead Operations Manager on shift) before the arrival of the Station Director. The direction for these actions includes start and completion times for some of the more critical tasks such as notification of offsite authorities.

The supporting procedures reflect the requirements of the plan and provide clear direction. Observation of a training drill provided evidence that these actions are understood and can be implemented if needed.

Key positions within the emergency response organization (ERO) are staffed with Deputy Chief Engineers for the various functions, e.g., Safety, Operations, Maintenance, etc. There is a staffing plan for two levels of backup personnel should a Deputy Chief Engineer not be available. The working level staff is organized into "brigades" as the emergency response requires and these are made up of the normal station staff under the direction of the various Deputy Chief Engineers. The site staff is ample and sufficient staff resources are available for emergency response.

Site and unit emergency plans undergo extensive review and approval through the involved Deputy Chief Engineers, Rosenergoatom Concern and Volgodonsk and Rostov civil authorities. These same Deputy Chief Engineers are assigned response functions and perform in regular training drills. The commitment to EP is evident. Emergency plans are revised as needed due to changes or correction of weaknesses and every 5 years they are submitted for authorization as described above.

In Volgodonsk, the Mayor holds the authority to order public protective actions and the Head of the "Section for Civil Defense and Emergency Situations" is responsible for conduct of the emergency response and for the implementation of protective actions for the public.

The Volgodonsk NPP and the city plan are linked through a notification process and regular discussions when the need arises for public protective actions. Communications channels are tested regularly and the city participates in plant drills. Interview of the Section Head and a communications point attendant showed a common understanding of emergency plan expectations between the plant and the city. Cooperation between the two entities was evident and the plant often supplied personnel to facilitate training conducted by the city.

EMERGENCY PLANS

On-site emergency plan

The concept of operation for the station emergency plan is unique to Russia. There are three states of emergency response: normal day-to-day activity; Emergency Preparedness and

Emergency Situation. The criteria for declaration of Emergency Situation are largely radiological and conservative:

- 600 micro Sv/hour (60 mr/hr) within plant spaces
- 200 micro Sv/hour (20 mr/hr) onsite or in the Sanitary Protected Area (3 km)
- 20 micro Sv/hour (2 mr/hr) in the 30 km planning zone

There are similarly conservative criteria for radioactive iodine concentrations. A lower level of exposure rates are given for the declaration of "Emergency Preparedness" and in this state a partial activation occurs in case the situation degrades. The criteria for suggesting protective actions to civil authorities (i.e., evacuation of the public) are only based on 10-day dose estimates. This means that plant may be in an Emergency Situation and local authorities notified, but the local authorities would not evacuate the public unless the radiological exposure levels at their location are projected (via dose calculations) to exceed the criteria for exposure or for radio-iodine concentrations.

The Russian criteria for mandatory protective actions due to whole body exposure are 5 rem for mandatory sheltering and 50 rem for mandatory evacuation (both are calculated as 10-day doses). There are similar limits for thyroid dose. It is expected that actions would be taken below these levels, but these are the mandatory levels at which action must be taken. The IAEA standards recommend that sheltering take place at 1 rem (2-day dose) and that evacuation take place at 5 rem (7-day dose). The standard notes that some countries use 1 rem for evacuation. Further, the standard notes that the mandatory action levels used by Russia are the same as those IAEA recognizes as always justifying sheltering and evacuation, respectively. The criteria used in Russia are much higher than those used elsewhere, although within international standards. The OSART report encouraged them to consider recommendations at a lower level, but these are the national standards and a single NPP can not deviate without approval from the Concern.

The typical international EP practice is to consider evacuation of all areas within a set distance around the plant and in the downwind direction of the radioactive plume. These same protective actions would be implemented for certain serious plant damage states even if there is no significant radioactive release. There are rather complicated operational status criteria (emergency action levels - EALs) which identify this serious damage state (General Emergency) as well as 3 emergency classifications that precede it. However, the Russian system avoids the use of these damage state criteria and simplifies the system into two emergency classes, i.e., "Emergency Situation" preceded by "Emergency Preparedness," both at very conservative radiological levels. Public protective actions are considered only where the exposure criteria are projected to be met, rather than implemented over a region, irrespective of projected exposure level.

The Russian process is unique but it has simplified elements of emergency response. An important facet of the Russian system should be mentioned. Populated areas (and other areas of interest) around Volgodonsk NPP have automatic and continuous coverage by an environmental radiation monitoring system (ASKRO) which measures exposure rate. ASKRO (see Facilities Section) data is sent to the Emergency Center, Volgodonsk and various other response centers. ASKRO provides the parameter necessary for declaration of Emergency Situation and for the consideration of public protective actions, irrespective of the availability or accuracy of dose projections. Any evacuation takes considerable time to implement.

The criteria for mandatory evacuation are set at the internationally recognized limit, but to be effective evacuation must begin well below the time when these limits are reached. While the Russian system is protective of public health and safety, lower levels for sheltering and evacuation recommendations by Volgodonsk NPP should be considered. However, the emergency situation classification system has merit due to its simplicity and should be considered more widely for implementation elsewhere.

Off-site emergency plan(s)

The Civil Defense and Emergency Situations Administration is responsible for implementation of the Volgodonsk city emergency response plan. The city has a communications point that has several channels of communication with Volgodonsk NPP. A dedicated phone line to the Volgodonsk NPP Electrical Plant Shift Supervisor is the channel planned for use and it is frequently tested. Volgodonsk NPP procedures call for Volgodonsk city to be notified within 10 minutes of an event at the plant or the declaration of an Emergency Situation. When this takes place, the communications point performs notifications of city personnel including the Mayor and head of an Emergency Preparedness Commission. The Head of Administration and many other support staff personnel are activated. The Mayor has the authority to order public protective actions, in which case, a preplanned message is loaded onto the city radio system and provided to city television and radio channels. The city has a siren system that alerts the people to the need to tune to the radio or TV. After the sirens are sounded, a message is provided which is the preliminary notification of the accident and can direct people to go indoors, seal windows, take potassium iodide and prepare in case it is necessary to evacuate. The city has a detailed evacuation plan that can be implemented should it become necessary. The city is divided into districts which each have assembly points for people to await transportation. Each district has been assigned to evacuate to population centers outside the surveillance zone where people would be accommodated, perhaps in private homes if necessary. When evacuation becomes necessary the public in the various districts are given a time to report to assembly points to meet their transportation. The city is evacuated in this stepwise and orderly manner.

Training is provided to those responsible for implementing the evacuation plan once per year. An Emergency Preparedness Commission has the oversight function for the evacuation plan and tests participants for knowledge of their assignments. The Federal Ministry for Emergency Situations evaluated the city plan in 2003. A building evacuation was demonstrated as a portion of the evaluation.

Personnel interviewed were not familiar with the detailed plans for other areas in the surveillance zone, but believed them to be similar, if less complicated due to the lower levels of population. This system of civil defense is a legacy of Russian public protection measures implemented during World War II and is mandated by Federal law. It is required that civil authorities are able to implement these measures. This function is not the responsibility of Volgodonsk NPP. However, the Head of Administration in Volgodonsk city stated that the plant supports training sessions and other areas as requested.

EMERGENCY PROCEDURES

Classification of Emergencies

As noted in the section above the system for classification of emergency conditions is quite simple and largely based on radiological conditions. There are also judgements based criteria for declaration of an Emergency Situation for fire, natural and terrorist events. The Site Shift Supervisor (SS) manages control room activities and is responsible for recognition of a situation that could be an emergency. He notifies the Station Director (or the Chief Engineer) of the situation.

The Station Director declares the Emergency Situation and directs the SS to perform his immediate actions. If the SS can not find either of these senior officials, he may make the declaration. Procedures direct that the SS will declare the emergency situation within 10 minutes of the event in case the Station Director/Chief Engineer can not be found. In any case, notification of the authorities begins within 5 minutes of the event whether an Emergency Situation is declared or not.

Notification

The SS is responsible for making 4 notifications:

- Duty dispatcher at Rosenergoatom Concern
- Duty dispatcher at Minatom Crisis Center
- Duty person at Volgodonsk Civil Defense and Emergency Center (CD&EC)
- Duty person at Rostov Region CD&EC

The expectation is that these notifications are to begin within 5 minutes of the event and be completed within 10 minutes of the event.

The SS simultaneously orders the Electrical Plant Shift Supervisor (SSS) to pass information to 15 additional entities. This must begin within 10 minutes of the event and must be completed within 20 minutes after the notification begins.

These notifications are verbal, without the use of a form, but are simply a statement of the event, regardless of whether Emergency Situation is formally declared. The notifications are performed rapidly and their formalization through an approved form would slow down the notification. Follow up notifications performed in the Plant Emergency Center (EC) are approved by management and contain detailed information.

Activation of Emergency Response Organization (ERO)

Emergency response personnel are activated by the SS during the first few minutes of the emergency. This is accomplished by activating an automatic telephoning system which dials on 8 lines simultaneously. This is used to contact the leaders and other members of the ERO who then report to prearranged pick up locations. Department heads have telephone tree schemes for activating their employees. The plant has the option to use the EC in Volgodonsk or the EC at the plant. Most of the ERO lives in Volgodonsk and travel by city bus is the norm.

Activation of the Volgodonsk EC would be quicker, but using the plant EC has other advantages. In accordance with procedure, the SS tells the bus drivers which EC to bring the staff to. During work hours the ERO is activated by plant page (loudspeaker) announcement which occurs throughout the 5 km protection zone and the plant EC is used.

Public protective Measures

Within the 5 km protection zone, Volgodonsk NPP is responsible for public notification. Within Volgodonsk City, the administration is responsible and elsewhere the Rostov regional authority is responsible. Within the 5 km zone, Volgodonsk NPP has control of the siren and public announcement system. Within a few minutes of an event, the SS activates the 5 km siren system and an automatic message which announces that an event has taken place at the plant. This warns the public to prepare for further protective actions and activates the ERO on site. The Station Director, Chief Engineer and SS have the authority to activate the sirens and implement evacuation plans.

When the emergency organization is operational there is frequent contact with the Volgodonsk and Rostov civil authorities. Volgodonsk authorities have access to ASKRO and if dose projections or measurements (ASKRO or monitoring teams) indicate that the criteria will be exceeded, the recommendation to implement protective actions is given. The civil authorities consider this recommendation and decide on implementation.

Source Term Determination and Dose Projection

The plant has a computer program (Quasar) for estimating the source term and the amount of radioactive material released to the environment. These estimates are based on a set of design basis accidents and beyond design basis accidents as well as monitor readings. Should the release be through the plant stack, (an unlikely event) process monitors within the stack can be used to estimate radioactive release parameters. Should the release be through an unmonitored pathway, Quasar can use readings from radiation monitors on plant building roofs and on the site to estimate the release rate. Readings from the ASKRO may also be used to estimate the release rate.

The estimate is provided to the dose projection specialist who calculates the expected offsite dose considering weather, release point and plume height. This estimate is compared with the readings received from any of the 50 area radiation monitors located on the plant site (outside of buildings) and from ASKRO.

Two specialty groups associated with the Concern (Labs) also calculate offsite doses and these are compared with those developed on site.

Radiological Monitoring

The plant has some 450 process and area radiation monitors; 400 in plant and 50 on site. There are radiation monitors on the roofs of several of the site buildings. Many of the monitors have a wide range of measurement. The Radiation Protection staff performs three pre-planned site surveys immediately upon declaration of an Emergency Situation.

These are around various regions of the plant site to establish the radiological situation. Any radioactive areas found are marked with signs. Three teams are assigned this task and can complete it in 30 minutes.

Associated with the Environmental Monitoring Lab (see facilities section) is a monitoring van, which has radiation measuring capability that is cross referenced to a global positioning system. Radiation level data is transmitted by radio or cell phone to the EC. The van has air sampling capability for particulate and iodine and has spectral analysis equipment that can be operated in the field. Samples can also be brought back to the environmental lab for analysis.

Vogodonsk NPP can field two additional radiation monitoring teams to measure contamination and radiation levels in the field. Volgodonsk city can also field two teams. The priority of the field monitoring effort is to ensure the evacuation routes are safe and to verify the radiation level in populated areas. This differs from the practice in other countries of focusing on refining the location of the radioactive plume. The Russian practice is consistent with a view toward public health and safety.

A military radiological monitoring brigade can arrive at Vogodonsk NPP within about 6-8 hours. Further, Rosenergoatom Concern has a support group at Novovoronezh that can be at the site within 12-14 hours with specially trained personnel, special tools, decontamination equipment, robots and other accident mitigation capabilities.

Personnel Monitoring and Dosimetry

There is a significant amount of instrumentation and equipment in place and stored in emergency centers for radiological monitoring of personnel. A personnel decontamination facility with monitoring instrumentation is present at both EC's and a personnel decontamination facility without instrumentation is available at the Sanitary Treatment Point (see facilities section). The site has ample radiation and contamination detection instrumentation, electronic personnel dosimeters and thermoluminescent dosimeters. Another supply of this equipment is stored in the shelters and in equipment warehouses. Radiation Protection Technicians are assigned to emergency response centers when they are activated. The EC's and shelters have installed area radiation monitoring instrumentation.

Personnel Accounting

The plant has a computerized access system that can track employees onsite. At any given time most members of plant operating and support divisions are expected to be at or near their normal work location. They generally "key" into these locations and are tracked by the access system as accounted for. Employees away from their normal work station will gather at one of seven assembly points within buildings. A senior person is assigned as a monitor for each of these locations and arrives with particulate masks and KI. He passes the names of individuals to management for accountability purposes. Plant personnel stated that this process can develop a list of missing personnel in about 30-40 minutes.

EMERGENCY RESPONSE FACILITIES

Plant Facilities

The main emergency response facility onsite is the Emergency Center (EC). It is a below ground facility with significant protective features:

- Significant radiological shielding,
- Blast doors,
- Independent electrical power,
- Food,
- Protected ventilation system,
- Independent water sources,
- Fire detection,
- Fire suppression,
- Fire extinguishers, and
- Multiple exits.

The EC has several rooms for the various function of the emergency response organization (ERO). The main room is for the emergency management team and it is in tele-conference with similar teams at the Rosenergoatom Concern Emergency Center, the Rosenergoatom Concern Technical Center, a government technical support center specializing in dose projection and three other governmental laboratory technical support centers. This system is the subject of a Good Practice. The heads of major functions (Deputy Chief Engineers) sit at a meeting table and support the Station Director/Chief Engineer, take direction from him and direct the staff under in their departments to form response brigades as necessary to mitigate the event.

A room is dedicated to radiological protection, where dose projections can be developed via a computer program using current meteorology. Another room is dedicated to the lead maintenance manager to develop damage control plans and direct team assembly. Maintenance personnel are not assembled at the EC but are gathered from other areas as they are needed. There is also a room for the lead public information manager and the personnel responsible for notification of government agencies and other concerns. Various other spaces are available for food, medical care, supplies and the like. The ERO reports to the EC in ample numbers and with appropriate expertise to fully respond to plant emergencies.

The EC has multiple communications links with government, support and oversight agency locations. The EC has a complete set of control room procedures and a set of plant drawings. Various other procedures and supporting information is also available. The EC has personnel decontamination facilities as well as medical supplies. The facility can support extended emergency operations in an excellent manner. It is well organized and robust.

A plant parameters display system (Stargazer) has been developed and it is capable of providing a large suite of parameters in various formats. Stargazer is available throughout the EC, various locations of the plant, at Volgodonsk city and in Moscow. Stargazer can support emergency operations in an excellent manner and communicates plant status to various emergency response organizations. The use of Stargazer to share plant information during emergencies is a program strength.

The plant has an environmental radiological monitoring system (ASKRO) with 19 points within the 30 km surveillance zone. The monitoring points measure radiation level and temperature. Each point reads out at the plant and various other government, support and oversight agency locations. The radiation readings are displayed on a plant owned website and regularly published in local newspapers. The radiation levels at these monitoring points also serve as action criteria for radiological survey. The system is displayed prominently in the EC and is available through the plant parameter display system.

The EC has a unique ventilation system. It operates in 3 modes, normal, filtered and isolated. The filtered mode includes particulate and charcoal filters. The EC can perform for 18 hours with the ventilation system isolated. There is an oxygen regeneration system and a system of compressed air bottles is used to pressurize the EC to ensure no in leakage.

The plant has a Sanitary Treatment Point for the decontamination of vehicles and personnel leaving the plant. This facility is staffed by plant personnel and is able to process 20 or more vehicles and 30 or more personnel per hour. The facility is on the road to Volgodonsk, about 3 km from the plant and consists of three vehicle bays with high pressure washing equipment. There is a parallel facility for decontaminating personnel. Contaminated fluid is directed to a tank where it is filtered and monitored before being placed back in the well for reuse. If the fluid can not be cleaned sufficiently for reuse, it is trucked to the plant for processing. This facility would help ensure that contaminated vehicles and personnel from the plant are cleaned before joining the civilian population. It is unique among Russian plants and represents a strong commitment to safety of the public and workers.

Volgodonsk NPP also has two onsite shelters for plant personnel. These serve as safe assembly points for plant personnel during an emergency, as well as holding points for maintenance and other personnel who may be called on to respond within the plant. The larger center can hold 1200 people and the smaller can hold 160. These centers have protective features similar to the EC. They have independent power and ventilation capabilities similar to the EC and communications channels to allow the EC to give direction for the assembly of mitigation teams or to prepare for evacuation should it be necessary.

There is a radiological laboratory in Volgodonsk which can analyze samples during an emergency. It has low level counting, sample preparation and spectral analysis capability. This lab is capable of supporting multiple analyses and monitoring teams. The lab recently obtained a portable multi channel analyzer for use in the field during emergencies.

In Volgodonsk City 13.5 km from the plant, there is a duplicate EC which can be activated should the on site EC not be available. All functions of the plant EC are available at the Volgodonsk EC. In addition the City Emergency Center is also located in the same facility. The City Emergency Center may be used for any emergency the city faces.

Plant management has the option to direct the emergency organization to the Volgodonsk EC rather than the plant EC for speed of activation (since most staff members live in Volgodonsk) or due to high radiation along the route to the plant. The Volgodonsk EC is larger and would accommodate teams of emergency support personnel from the Rosenergoatom Concern. A considerable amount of emergency equipment is stored at the Volgodonsk EC, e.g., anti contamination clothes, coats, medical supplies, tools, radios, dosimeters, etc. The duplicate

Emergency Centers provide a very strong basis for operations in support of an emergency at Volgodonsk NPP. Few programs have such complete back up emergency centers.

Near the plant site warehouses have been established to store large amounts of emergency response equipment. These are regularly inspected by the Ministry of Emergency Preparedness. The equipment includes cold weather clothing, respirators, anti-contamination clothing, dosimetry, radios, hydraulic jacks and pipe cutters, mechanical and electric hydraulic pumps to operate hydraulic equipment, chain falls, hoses, etc. Large amounts of supplies and equipment are stored in the warehouse as are several sets of specialized tools.

Medical Centers

The medical support staff at Volgodonsk NPP is from the Sanitary Facility # 5, a clinic dedicated to the Volgodonsk NPP in Volgodonsk. The medical staffs is not part of the NPP staff, but are required by Russian Health Ministry rules to support the plant. The medical staff acts independently of the station staff with respect to medical matters. The city hospitals have arrangements for mutual aid if the need arises and will assist Facility #5 if the numbers of injuries exceed the clinics capacity.

The onsite staff consists of at least 3 people during days and one nurse at night. The night nurse is a senior nurse as are most of the day shift nurses. There is a medical response brigade that is available for rapid response. It includes a surgeon, therapist, Sr. nurse and 3 nurses. There is a site ambulance and 4 other vehicles available to support the transport of injured personnel. Four additional ambulances are immediately available from Volgodonsk. A call out list of staff is maintained for rapid activation. The hospital maintains a week's supply of KI for all emergency workers on site.

The medical function is guided by federal regulation for the disposition of radiological injuries. The guidance includes triage criteria for emergency exposures. Those exposed beyond 2 Gy are sent to a special clinic in Moscow, those below are allowed to continue work and their medical care is provided locally. The clinic on site has stores of medical supplies reserved for radiological emergencies. These are for both the site and for hospitals in Volgodonsk. The clinic also has several kits for the response of medical personnel to the site.

The civil authorities also organize an extensive network of first aid brigades. A competition between volunteer brigades from various civil and commercial enterprises was observed. The teams were evaluated in their response to simulated injury victims within radiological, chemical and bacterial hazardous environments.

The medical support for Volgodonsk NPP is excellent and complete.

TRAINING, DRILLS AND EXERCISES

Training

Volgodonsk NPP has a full scope simulator and specialized EPP training for every type of position in the ERO. The SS is responsible for initial implementation of the emergency plan. The training program addresses his demanding duties and tests the timeliness and accuracy of his actions once per year. Managers who hold ERO positions get 25 hours of plant EPP

training annually and every 3 years have 3 days of specialized training on accident response conducted by national experts on nuclear plant accidents and emergency response. This training was recently conducted at the plant, but these managers may also be sent to Moscow for training. Mitigation teams also get specialized training annually and some 35 are additionally trained and certified on the use of rescue tools. The EPP training program is very strong and certainly meets international standards.

Drills and Exercises

Volgodonsk NPP develops an annual plan for drills and exercises. The Ministry of Emergency Preparedness gives direction on the objectives of drills for a given year and inspects full scale exercises periodically. The last inspected exercise was in 2004 and the next is in 2007.

Volgodonsk NPP will conduct 6 training drills in 2005. These largely include the emergency management staff and the Rosenergoatom Concern support organizations. Training drills are also conducted for the various teams.

The OSART team observed a training drill for emergency management supported by Rosenergoatom Emergency Center and Technical Support Center as well as 3 specialized technical support laboratories and the reactor designer. These 6 technical and managerial support entities were tied together by a video conference link which is the subject of a Good Practice. This training drill served to maintain the key skills of a cadre of management and technical support staff and is one of 6 that will be conducted in 2005.

The team noted that the drill was well conducted. However, drill realism could be improved by allowing the participants access to the data they would normally have. This could be accomplished with data sheets for key Stargazer displays and radiological monitoring systems, in-plant, onsite and offsite (ASKRO). An even greater improvement would be to load the scenario data on personal computers (PCs) designed to simulate Stargazer displays and position these in the EC. Perhaps PCs with this same data set could be provided at the management and technical support entities where Stargazer and ASKRO are provided.

Damage control, medical, fire, survey, etc., teams perform in drills that are focused on their key skills through out the year. Full scale exercises involving most of the ERO are conducted annually and also include local and regional civil officials.

The content of scenarios varies from the expected design basis accidents to severe accidents. The focused training drills tend toward less severe and the exercises involve scenarios that require consideration of protective actions in populated areas. However, Volgodonsk NPP integrated terrorist event based scenarios into the 2002 and 2004 exercises. This is the subject of a Good Practice.

Critiques are conducted to identify areas for improvement and orders are issued by plant authorities to correct weaknesses. In addition, critiques from other Rosenergoatom plants are shared for consideration. In one example from the Kola NPP, Volgodonsk NPP was able to incorporate 6 of 12 corrective actions into its own program.

The drill and exercise program is extensive and provides good training for the ERO.

LIAISON WITH PUBLIC AND MEDIA

The public information program consists of the requirements implemented during emergencies and the public outreach during normal periods. When an emergency has been declared the lead public information manager is required to issue the first press release within 90 minutes of the event and every 90 minutes thereafter. The development of an accurate and timely initial press release was demonstrated during a training drill the team observed. Initial releases are brief, but informative and are followed up by more detailed information. The Station Director (or the manager acting for him) must approve the release before it is provided to the press outlets.

The public information function is integrated into the EC and has a dedicated room with appropriate equipment and communications channels. There are approximately 16 personnel in the public information department.

The public outreach program is excellent. There is a regulatory basis for such a program within Russia, but the implementation of these requirements at Volgodonsk NPP has been awarded for excellence three times by the Rosenergoatom Concern. The program publishes 2 weekly newspapers with plant events and status information as well as other articles of interest. These are for different regional audiences, but over 30,000 copies are distributed. A glossy magazine is published quarterly with special articles on plant staff and major evolutions. One thousand copies are distributed to hotels and other points. Articles on personnel safety or war remembrances are included. The staff also contributes to the Rosenergoatom Concern quarterly magazine and offered about 200 articles to local newspapers in the past year. Volgodonsk NPP has a television studio where they prepare pieces for local and regional television stations to broadcast. Local press conferences are performed every quarter and regional press conferences are performed every six months. Additionally, the daily radiation readings from the environmental monitoring system are sent to local newspapers. The staff also posts these readings on a website in live time.

The staff has published several educational brochures on topics such as radiation, nuclear power plant design and Volgodonsk NPP. They also have educational and informative computer disks to distribute to interested parties. One of these is a virtual tour of the plant. The staff maintains an automated phone line with plant status that people can call into for information.

This is an aggressive program that uses extensive and unique outreach techniques to inform the public of the benefits and safety of nuclear power. It is deserving of recognition by the international nuclear community.

A federal law requires that the public be educated in preparations for civil defense, including the implementation of public evacuations. This requirement encompasses the actions that would be expected of the public during an Emergency Situation at Volgodonsk NPP. It is expected that many members of the public receive 14 hours of training in preparedness, including 6 hours of technological and nuclear accident preparedness. This training is delivered to the managers at local companies and civil entities, certain planning committee members, building wardens

and he like. Committees and functionaries in villages are also trained. There is an extensive program for school children. The training is segregated into sessions for people of working age and those who are not working (generally the elderly). The Head of the Civil Administration was asked if Volgodonsk NPP supported his training efforts and he indicated that plant personnel have always responded to requests for providing training sessions and the like. The public information officer, emergency preparedness personnel, engineers and managers have all supported training sessions. This is a strong program that exceeds IAEA standards.