

December 15, 2004

MEMORANDUM TO: Chairman Diaz
Commissioner McGaffigan
Commissioner Merrifield

FROM: Luis A. Reyes */RA/*
Executive Director for Operations

SUBJECT: INSTALLATION OF ADDITIONAL RADIATION MONITORS

In response to the Commission's SRM dated September 10, 2004, the Office of Nuclear Security and Incident Response (NSIR) has compiled information on the Environmental Protection Agency's (EPA) Environmental Radiation Ambient Monitoring System (ERAMS). This memorandum describes ERAMS and EPA's plans to expand ERAMS. The memorandum also discusses the environmental monitoring programs already implemented by the Nuclear Regulatory Commission (NRC) nuclear power plant (NPP) licensees.

EPA Environmental Monitoring Programs

The current ERAMS has been operated by the EPA since 1973. It was established from other monitoring systems such as the Radiation Alert Network and the Pasteurized Milk Network, both operated by the U.S. Public Health Service. ERAMS was established to measure fallout from nuclear weapons testing. According to the ERAMS Web site, "ERAMS is a national network of monitoring stations that regularly collect air, precipitation, drinking water, and milk samples for analysis of radioactivity. The ERAMS network has been used to track environmental releases resulting from nuclear emergencies and to provide baseline data during routine conditions. Data generated from ERAMS provides the information base for making decisions necessary to ensure the protection of public health."

Three objectives of ERAMS are to provide data for nuclear emergency response assessments, to provide data on ambient levels of radiation in the environment, and to inform the general public and public officials about the results. Across the United States, the ERAMS network consists of 54 particulate air monitoring stations, 75 drinking water stations, 42 milk-sampling stations, and 37 precipitation-monitoring stations. Only one or two of the sampling stations are located within the 10-mile plume exposure pathway emergency planning zone (EPZ) of a nuclear power plant. Samples are collected by local volunteers such as State or local officials. The samples are analyzed by EPA's National Air and Radiation Environmental Laboratory (NAREL) in Montgomery, AL. These sampling stations cannot provide real time results because samples must be collected and forwarded to the lab for analysis. The data is published quarterly in the EPA publication "Environmental Radiation Data Reports" and is publicly available at <http://www.epa.gov/enviro/html/erams>.

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Based on discussions with EPA staff, EPA plans to expand ERAMS in metropolitan areas around the country in support of homeland security efforts. EPA believes ERAMS could provide information about radioactive materials released in the unlikely event of an accident or terrorist attack. EPA has coordinated the proposed upgrades to ERAMS with the Department of Homeland Security (DHS). EPA and DHS found that there are no other comprehensive nationwide programs for monitoring environmental radiation. EPA intends to add 180 air monitors to the current ERAMS system. The additional monitors give almost real-time information on the radioactivity in the air. While the design of the system is not yet complete, EPA hopes that the updated system will provide information on radioactive contaminants and their concentrations for decisions on protective actions to protect the public. The data will be available to high-level decision-makers at EPA, who will evaluate the information and convey it to other stakeholders. The initial siting of these monitors will be in metropolitan areas with large populations. If more funds are available, other siting criteria may be considered. The initial 180 monitors will not be completely installed until Fiscal Year (FY) 2009.

ERAMS might be useful to NRC and licensees as a confirmatory system for implementing intermediate or late-phase protective actions such as the transfer of dairy cows from fresh forage to uncontaminated stored feed and the interdiction of food or milk. However, because ERAMS monitors are in population centers and are not within the 10-mile plume exposure pathway EPZ, the information would not be useful for NRC licensees in their protective action recommendations in the plume phase of an emergency.

EPA is in the planning and development stage of updating ERAMS. In FY 2004, 99 percent of ERAMS resources were spent on development costs; in FY 2005, 79 percent of ERAMS resources will be for development costs; and in FY 2006 the system is expected to be operational at 120 sites covering 60 percent of the U.S. population. Additional resources will be allocated to the program to upgrade the existing monitors and obtain additional monitors, locate new sites, develop a central database, build the communication infrastructure connecting the sites and the central database, and operate the system.

NRC Radiological Monitoring Programs

NRC nuclear power plant licensees have a radiological environmental monitoring program (REMP) that is designed to complement the real-time radiological effluent monitoring program. In accordance with 10 CFR Part 50 Appendix A, Criterion 64, radiological environmental monitoring programs must be established to provide data on measurable levels of radiation and radioactive materials in the environs of NPP sites. The REMP includes airborne samples for radioiodine and particulates; direct radiation monitoring using dosimeters or an instrument for continuously measuring and recording dose rate; waterborne samples from surface water, ground water, drinking water, and sediment from shorelines; and ingestion samples such as milk, fish and invertebrates, and food products. These samples are collected at various locations and distances from the NPP, both onsite and offsite. Offsite samples are taken at distances up to 30 kilometers from the site. The results of the REMP are intended to supplement the radiological effluent monitoring data by verifying that measurable concentrations of radioactive materials and levels of radiation are not higher than expected. Nuclear power plants use radiation monitors and sample analysis to determine the quantity and nuclide breakdown of the radioactive effluents. Computer models are used to account for factors such as wind speed, terrain, and weather estimating the radiation dose to members of the public.

Between 1980 and 1998, NRC had contractual agreements with 34 States to support an environmental monitoring program that modeled the program required of NRC licensees, as described above. The intent was to support State radiation health programs and to provide independent monitoring and confirmation of environmental monitoring results reported by NPP licensees. These contracts were discontinued by the NRC in 1998 because the data was not needed to support the NRC inspection program.

The staff recently requested that NEI conduct an informal survey of United States nuclear power plants to determine if there are monitoring capabilities that go beyond the capabilities required in the regulations for environmental monitoring. Licensees were asked whether they had radiation monitors around their plants for emergency preparedness use. Approximately 49 percent of licensees responded to the survey and approximately 16 percent of those respondents have some type of electronic instrumentation to monitor ambient radiation levels in real time as part of the REMP. The electronic instrumentation used to satisfy the requirements of REMP may also be useful in the event of an emergency. One respondent was considering implementation of enhanced radiation detection capability for emergency preparedness, but cost was a deterrent.

Apart from REMP, licensees are required by Appendix E to 10 CFR Part 50 to have an Emergency Response Data System (ERDS) for emergency preparedness purposes. ERDS provides the NRC Operations Center updates on certain plant parameters, including radiation levels in the plant and data from radioactive effluent monitors. Licensees use this information, along with meteorological data, in the early stages of an accident to make protective action recommendations and event classifications. Licensee emergency plans also address plume monitoring, and in the event of an emergency at a nuclear power plant, field teams are deployed to monitor the path of the plume and the nuclide concentrations in the air. The field teams follow the plume as it travels downwind and provide accurate information about the plume.

As a result of the Commission's query, the NSIR/EPD staff has contacted the Department of Homeland Security/Federal Emergency Management Agency (FEMA), because FEMA is the chair of the Federal Radiological Protection Coordinating Committee (FRPCC). FRPCC consists of approximately 20 member agencies (including the EPA) that meet quarterly to discuss radiological protection issues. The next meeting will be in the first quarter of 2005. The EPD staff will use this forum to monitor the progress of Federal efforts in radiological monitoring and to foster connectivity within Federal agencies regarding environmental monitoring programs for radioactivity.

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