MEMORANDUM
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF RADIOLOGICAL HEALTH

DATE: June 19, 2007

TO: Municipal Solid Waste Advisory Committee
through Paul L. Sloan, Deputy Commissioner, TDEC
and Tracy Carter, Senior Director, Air Resources

FROM: LEN Lawrence E. Nanney, Director, DRH

SUBJECT: The Tennessee Bulk Survey for Release (BSFR) program

The Bulk Survey for Release (BSFR) program is jointly administered by the Divisions of Solid Waste Management (DSWM) and Radiological Health (DRH)[1], based on a Memorandum of Agreement and a division of regulatory responsibilities between these agencies.

DSWM regulates the receipt and disposal of BSFR material at Class I solid waste landfills, through its Special Waste Approval process. DRH regulates the waste processing companies which send these wastes to a few (five), specifically identified and approved landfills, through its regulatory process for licensing and inspecting the possession of radioactive materials.

BSFR material has been characterized in media reports on this issue as "low-level radioactive waste". The implication of such a characterization has led people to believe that these materials can only be properly disposed in a licensed low-level radioactive waste (LLRW) disposal facility, of which there are three (3) in the U. S. This is both confusing and untrue.

BSFR material is primarily construction/demolition debris, soils, concrete rubble, and similar materials which have very low levels of incidental radioactive material, derived from decommissioning projects at commercially operated nuclear facilities licensed and regulated by the U. S. Nuclear Regulatory Commission (NRC) or Agreement State radiological health programs. It is what remains after the waste materials that need to go to a licensed LLRW disposal facility have been segregated out and properly disposed.

To clarify the confusion regarding LLRW requires understanding that the definition of "low-level radioactive waste" has no lower endpoint, below which something is considered "not radioactive". The foods we eat (e.g., beans, potatoes, bananas, nuts), the building materials used in our homes (e.g., concrete, brick, granite), and our own bodies (e.g., potassium), contain measurable, naturally occurring radioactivity. Since everything in the world is radioactive to some degree, that definition, taken literally, would imply that all waste materials need to go to a licensed LLRW disposal facility.

[1] See Attachment 1 for a description of the program responsibilities of the Division of Radiological Health.

It is implicit in this definition of LLRW that common sense is expected to prevail, acknowledging that all solid waste in the country cannot be, and does not need to be, sent to one of three licensed LLRW disposal facilities. These facilities are constructed and operated to standards designed for the disposal of LLRW containing radioactivity at the upper end of one or more of three broad classes of LLRW.

The way LLRW is "defined" and regulated throughout the nation allows room for discretion and for decisions to be made which are reasonable in the context of assessment of acceptable risk and of other facilities available for safe disposal.

What are the risks associated with the BSFR program?

The waste acceptance criteria for the BSFR program are extremely protective of human health and the environment. BSFR material is limited in several ways so that it cannot contribute a radiation dose of more than 1 millirem per year to any member of the public, now or in the distant future.

A dose of 1 millirem per year is generally accepted worldwide by the radiation protection profession and in national and international publications and guidance as negligible. The risk associated with that dose is consistent with, and in many cases significantly less than, that considered by the U. S. Environmental Protection Agency (EPA) as acceptable for radiation and other carcinogenic materials that it regulates, for which the theoretical dose/response relationships assume that there is no exposure level to which some level of risk cannot be attributed. To quantify that associated risk, it is equivalent to a theoretical one-in-a million probability of cancer induction.

To put that dose (1 millirem per year) and its associated risk into perspective, it is important to understand that each member of the public receives a radiation dose of approximately 300 millirems per year from naturally occurring background radiation in the environment. Also, many members of the public are exposed to other sources of radiation such as diagnostic medical procedures (x-rays and nuclear medicine scans), which almost always exceed that dose by a wide margin. Medical therapeutic doses of radiation administered to individuals for treatment of cancer are typically several million times that dose.

Another example that illustrates the level of protection offered by the 1 millirem per year criterion is a comparison with allowable limits set by both EPA and the states under the Safe Drinking Water Act. Under both federal and state rules, the allowable limit for radiation dose from drinking water is 4 millirems per year, which would be received by all persons served by that water system. The BSFR program is designed so that the maximum dose that could be received from this material being disposed in Class I solid waste landfills is 1 millirem per year, ¼ of the amount allowed from public drinking water, and to only a few individuals, as will be illustrated below.

There are many conservative factors applied in determining the maximum amounts of radioactive material to be allowed for disposal through the BSFR program, to be consistent with the 1 millirem per year dose criterion. Various scenarios are taken into consideration to ensure the protection of workers who might come into contact with these materials during transportation, disposal, or other routine landfill operations, during both the operational and post-closure phases of the landfill's life.

One scenario considered in determining acceptable disposal limits is that of the "resident farmer". This scenario assumes that, once the landfill is released from post-closure monitoring, a farmer buys the landfill property, builds a house on top of the wastes disposed there, resides there, drills a well, and uses the water to drink, cook, bathe, and irrigate crops. It is assumed that the farmer has livestock that eat the crops and grass and drink the water, and that the farmer consumes the crops, livestock, and milk from the cows. While in reality there will be a soil cover placed over the site, this scenario assumes no cover, that is, it assumes direct contact with landfilled wastes. In determining the projected radiation dose from groundwater use, it is assumed that the synthetic liner, which is designed to prevent landfill leachate from entering the groundwater, doesn't exist. The disposal limits are established such that, even in this most extreme scenario, the dose received by a resident farmer would not exceed the 1 millirem per year dose criterion, at any time from the present out to 1000 years in the future.

The BSFR program is based on numerous such conservatisms, which, when combined with other factors that come into play from a practical and operational standpoint, would lead to the actual dose to any individual being much less than the projected dose criterion of 1 millirem per year. Any potential dose from BSFR material to individuals living adjacent to, as opposed to living on, the landfill would be expected to be much closer to zero than to 1 millirem.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF RADIOLOGICAL HEALTH

Mission Statement

The mission of the Division of Radiological Health, within the Department of Environment and Conservation, is to protect and improve the health of Tennessee's citizens through the prevention of radiological conditions that could be a threat to good health, and to treat, through education, enforcement, and remediation, radiologically hazardous conditions that might affect the health or environment of Tennesseans.

Division's Purpose and Function

The Division of Radiological Health (DRH) strives to protect the citizens of Tennessee whenever ionizing radiation could present a harmful situation to the public health and safety or to the environment. To accomplish that goal, it functions both as a regulatory agency and as a service organization. DRH regulates, by license and by registration, the users of radioactive materials and radiation-producing machines, and responds to incidents and citizens' complaints regarding any source of radiation. DRH is comprised of four main sections that report to the Director's Office. The following describes the function of each section in meeting the Division's goals and objectives:

Director's Office

The Director's Office consists of the Director, Deputy Director, Health Physicist Consultant, Administrative Assistant Director, and Administrative Secretary. These personnel are responsible for all policy, technical, budgetary, contract, and administrative functions of the Division. They serve as official liaison to numerous organizations outside of State government, including the Conference of Radiation Control Program Directors, the Organization of Agreement States, the Southeast Compact Commission for Low-Level Radioactive Waste Management, the U. S. Nuclear Regulatory Commission, the U. S. Department of Energy, the U. S. Food and Drug Administration, and the U. S. Environmental Protection Agency. The personnel that provide these services are located in the Nashville Central Office.

Licensing / Registration / Planning Section

The Licensing / Registration / Planning Section is responsible for licensing the possession and use of radioactive material within the State of Tennessee, licensing the delivery of radioactive waste to Tennessee processing facilities, registering x-ray producing equipment within the State of Tennessee, reviewing "reduced fee" applications for x-ray equipment, and developing and documenting policy issues relating to the Division. This section routinely meets with licensees and registrants in an effort to foster better communication and compliance. File

reviews by concerned citizens, environmental groups, attorneys, licensees, and license applicants are also handled by this section. The personnel that provide these services are located in the Nashville Central Office.

Inspection and Enforcement Section

The Inspection and Enforcement Section is responsible for the inspection of facilities that utilize x-ray equipment and radioactive materials within the State of Tennessee. This section routinely meets with licensees and registrants in an effort to foster better communication and compliance. This section is directly responsible for responding to radiation events and incidents. File reviews by concerned citizens, environmental groups, attorneys, licensees, and license applicants are also handled by section staff in each EAC, upon request. The personnel that provide these services are located in the Nashville Environmental Field Office (EFO), the Memphis EFO, the Chattanooga EFO, and the Knoxville EFO.

Technical Services Section

The Technical Services Section consists of four program areas: Personnel / Environmental Monitoring, Emergency Preparedness / Training, Radioactive Waste Management, and Standards Development / Processing. The key services provided by these programs are:

Personnel / Environmental Monitoring - maintaining the Division's personnel dosimetry program, sampling and surveying areas of the state, including facilities that are not licensed by the Division for possession of radioactive materials (e.g., foundries and metal scrap facilities, pulp and paper plants, water and wastewater treatment plants, and Federally-licensed nuclear power plant and nuclear fuel fabrication plant environs) for background radiation levels and for possible radioactive contamination, assisting inspection and enforcement personnel with inspections at major State-licensed facilities, overseeing radiation measurement equipment acquisition, inventory, and calibration, maintaining the Environmental Protection Agency's (EPA) ambient air and water radiological monitoring stations, and maintaining a database for radioactive material samples and analytical results.

Emergency Preparedness / Training - revising and reviewing the State's emergency plans and standard operating procedures for Sequoyah and Watts Bar Nuclear Power Plants and for the Department of Energy facilities on the DOE Oak Ridge Reservation, training first responders in the counties affected by these plans to respond to emergencies and incidents involving radioactive materials,

training Division staff for emergency response, and maintaining the Division's emergency kits and supplies.

Radioactive Waste Management - monitoring and evaluating all trends in low-level waste generation and processing in the State, and inspecting all high-level waste shipments from DOE-Oak Ridge and other facilities to ensure their compliance with U.S. Department of Transportation regulations.

Standards Development / Processing - drafting regulations to ensure the protection of the public health and safety and the environment from any harmful effects of radiation, and maintaining the Division's database for licensing, registration, inspection, and fee assessment.

All personnel in the Technical Services Section are located in the Nashville Central Office.

Administrative Services Section

The Administrative Services Section is responsible for daily support functions for the Division's technical staff such as answering phones and file management, as well as assisting with the collection of license and registration fees. This section has direct daily contact with the licensees and registrants. Many members of this section participate in emergency exercises with the technical staff in responding to radiation events and incidents. File reviews by concerned citizens, environmental groups, attorneys, licensees, and license applicants are handled by this section depending upon their availability and other workload constraints. The personnel that provide these services are located in the Nashville Central Office, the Nashville Environmental Field Office (EFO), the Memphis EFO, the Chattanooga EFO, and the Knoxville EFO.