Good morning Ladies and Gentlemen. I would like to thank our host, Dr. Travelli, for giving me the opportunity to speak about Battelle's interest, involvement, and contribution to nuclear materials transportation.

First, however, I would like to say a few words about Battelle. Battelle Memorial Institute was established in 1929 as a result of the bequest by Gordon Battelle to "provide research in the service of man". Since that time, Battelle has grown to over 7,000 employees in five major divisions: the Columbus Laboratories which comprises the original research center; the Pacific Northwest Laboratories which we manage for the U.S. Department of Energy; the Project Management Division which operates the Office of Nuclear Waste Isolation; and the Geneva, Switzerland, and Frankfurt, Germany, laboratories. In addition, Battelle operates other specialized facilities in the United States and has offices throughout the world.

Battelle's involvement in the nuclear endeavor began in 1942 under the Manhattan Project, particularly in the development of fuels and materials for gas-cooled and water-cooled reactors. The Battelle-Columbus Nuclear Facility is located in West Jefferson, Ohio, about 18 miles west of Columbus. At this site, Battelle operates a large, well-equipped Hot Cell Facility. A research reactor (the BRR), a critical facility, and a plutonium laboratory have been decommissioned after serving their purposes.

The hot cells serve both industry and government in such areas as postirradiation examination of complete LWR fuel assemblies, component failure analysis such as condenser and steam generator tubes, examination of pressure vessel surveillance capsules, analysis of fuel behavior under dry storage conditions, and evaluation of resins from TMI-2 reactor.

The operation of the Hot Cell and the other nuclear facilities required us to become expert in the handling and transportation of nuclear materials. Thus, Battelle-Columbus has been a pioneer in designing and developing shipping containers for its own needs and to meet the requirements of the nuclear industry. We have participated in the design and testing of approximately 80 licensed shipping casks. Our involvement has included cask design and testing and the preparation and updating of safety analysis reports. Battelle's capabilities also include all the
computer codes needed for thermal, shielding, criticality, and structural analyses as well as a drop test facility for validating codes and obtaining data to supplement structural analyses.

These facilities have also been used in the design and licensing of Battelle's four shipping containers, all of which are currently in service. These casks are used principally to transport radioactive sources, surveillance capsules, and spent research reactor fuel—the latter being the subject of this session.

Battelle-Columbus designed, licensed, built, and maintains four shipping casks, primarily to support our Hot Laboratory postirradiation programs on highly irradiated structural and spent fuel materials. These casks—BMI-1 and BCL-2, -3, and -4—vary in size and shipping capacities. Weights range from 1200 to 23,000 pounds. Internal cavities range from 4-1/2 in. I.D. x 5 in. deep to 15-1/2 in. I.D. x 54 in. deep. Each is licensed by the U.S. NRC for Type B fissile quantities and each has an IAEA Competent Authority Permit.

Although they are used primarily for our own purposes, the casks are available for lease to industry and the government. When leased, Battelle can, if requested, provide technical assistance to the leasee at his site, assist in obtaining transportation, route approvals, additional licenses, and any other items required to ship from one point to another. Battelle-Columbus is not licensed to be the shipper of record from another facility but we are pursuing this with the U.S. NRC because we find our leasees rely heavily on our shipping experience and would prefer us to handle all aspects of the shipments. This stems primarily from the fact that most of the leasees very rarely make shipments of radioactive material and cannot keep up to date on regulatory requirements.

The Battelle BMI-1 cask is in great demand by industry because its license for shipment covers a variety of fuel and nonfuel radioactive materials such as 24 MTR assemblies, 38 TRIGA assemblies, PULSAR assemblies, and several others. This cask has also been used in the import/export cycle. We are presently working on a license to allow us to ship the fuel equivalent of 75 light water reactor (LWR) fuel rods which have been destructively examined at our hot cells and will be shipped as TRU waste to the DOE Rockwell-Hanford facility. This cask has been used by many universities
and companies such as the universities of Michigan, Arizona, Iowa, and Virginia and Union Carbide and General Atomic, to name a few.

Battelle-Columbus averages about 150 outgoing and incoming shipments of radioactive material a year in packages that range from 50,000-pound spent fuel casks to small 5-gallon cans.

The regulatory requirements for each shipment are becoming more detailed and restrictive every day, thus each shipment can almost be considered a major project in itself. Three years ago, a truckload of radioactive waste leaving our site required the generation of only two documents; now 13 internal and external documents are required.

We feel we have a capable staff to perform the packaging and transporting operations. A one-on-one relationship with the regulatory bodies and personnel at other facilities is necessary to make a potentially difficult task into a much easier one.

The recent change which requires MTR fuel assemblies to be shipped to Idaho INEL instead of Savannah River makes the job more expensive and difficult for the reactors in the East and other parts of the world. Transportation costs and 10CFR73 security requirements are the major factors. Routing and escort requirements around or through embargoed areas become a much more difficult and detailed task. Battelle-Columbus has made several spent fuel and large quantity shipments over long distances and we're able to give advice and assistance to anyone who may require it.