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CURRENT CHALLENGES (SPENT FUEL STORAGE, TRANSPORTATION AND RECYCLING)

TRANSPORTAION
ABOUT 20 MILLION CONSIGNMENTS OF ALL SIZES CONTAINING RADIOACTIVE MATERIALS ARE ROUTINELY TRANSPORTED WORLDWIDE ANNUALY ON PUBLIC ROADS,RAILWAYS AND SHIPS.RADIOACTIVE MATERIALS ARE SHIPPED IN RHOBUST AND SECURE CONTAINERS.SOME 300 SEA VOYAGES HAVE BEEN MADE CARRYING USED NUCLEAR FUEL OR SEPAREATED HIGH-LEVEL WASTE OVER A DISTANCE OF MORE THAN 8 MILLION KILOMETRES.THIS CARGOS ARE GENERALLY CARRIED IN PURPOSE-BUILT SHIPS.NUCLEAR MATERIALS HAVE BEEN TRANSPORTED SINCE BEFORE THE ADVENT OF NUCLEAR POWER OVER 60 YEARS AGO.TRANSPORT IS A VERY MINOR DIRECT COST IN THE NUCLEAR. Transport is an integral part of the nuclear fuel cycle.
SPENT FUEL STORAGE
WHEN FUEL RODS IN A NUCLEAR REACTOR ARE SPENT ,OR NO LONGER USABLE THEY ARE REMOVED FROM THE REACTOR CORE AND REPLACED WITH FRESH FUEL RODS.THE SPENT FUEL RODS ARE STILL HIGHLY RADIOACTIVE AND CONTINUE TO GENERATE SIGNIFICANT HEAT FOR DECADES.THE FUEL ASSEMBLIES, WHICH CONSIST OF DOZENS TO HUNDREDS OF FUEL RODS EACH,ARE MOVED TO POOLS OF WATER TO COOL.THEY ARE KEPT ON RACKS IN THE POOL,SUBMERGED IN MORE THAN TWENTHY FEET OF WATER AND THE WATER IS CONTINUOSLY CIRCULATED TO DRAW HEAT AWAY FROM THE RODS AND KEEP THEM AT A SAFE TEMPERATURE.
RISKS and VUNERABILITIES
IF A MULFUCTION, A NATURAL DISASTER, OR TERRORIST ATTACK CAUSES THE WATER TO LEAK FROM THE POOL OR THE COOLING SYTEM TO STOP WORKING,THE RODS WILL BEGIN TO HEAT THE REMAINING WATER IN THE POOL ,EVENTUALLY CAUSING IT TO BOIL AND EVAPORATE.IF THE WATER THAT LEAKS OR BOIL AWAY CANNOT BE REPLENISHED QUICKLY ENOUGH, THE WATER LEVEL WILL DROP EXPOSING THE FUEL RODS.ONCE THE FUEL IS UNCOVERED,IT COULD BECOME HOT ENOUGH TO CAUSE THE METAL CLADDING ENCASING THE URANIUM FUEL TO RAPTURE AND CATCH FIRE,WHICH IN TURN COULD FURTHER HEAT UP THE FUEL UNTIL IT SUFFERS DAMAGE.SUCH AN EVENT COULD RELEASE LARGE AMOUNTS OF RADIOACTIVE SUBSTANCES.

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