

25	<ul style="list-style-type: none"><li data-bbox="451 199 1365 338">❑ FINALLY, THERE ARE SEVERAL LOCATIONS WITHIN THE STATE WHERE THE FEDERAL GOVERNMENT HAS FACILITIES THAT USE RADIOLOGICAL MATERIALS, OR WHERE MATERIAL IS STORED PENDING DISPOSAL. <li data-bbox="451 380 1365 518">❑ BOTH THE U.S. GEOLOGICAL SERVICE AND THE DEPARTMENT OF DEFENSE HAVE SUCH LOCATIONS, AS DOES THE U .S. DEPARTMENT OF ENERGY AT FORT ST. VERAIN.
26	THIS MAP ILLUSTRATES THE LOCATION OF SOME OF THE OTHER DOE LOCATIONS WITHIN THE STATE.
27	THIS CONCLUDES MODULE 7; IN MODULE 8 WE WILL DISCUSS HOW YOU CAN FIND INFORMATION TO INCLUDE IN LOCAL PREPLANS ON RADIOLOGICAL MATERIALS WITHIN YOUR JURISDICTION.

23	<ul style="list-style-type: none">❑ IN ADDITION TO THE SECURE SHIPMENTS MADE BY THE DEPARTMENT OF DEFENSE, THE U. S. DEPARTMENT OF ENERGY ALSO MAKES SECURE SHIPMENTS.❑ UNLIKE THE DEFENSE SHIPMENTS, DOE PACKAGES CONTAIN MATERIAL THAT IS HIGH LEVEL, OR COULD BE USED TO MAKE A NUCLEAR WEAPON. ❑ THESE ARE ALSO TRANSPORTED UNDER THE HIGHEST LEVELS OF SECURITY, AND LIKE THE DOD SHIPMENTS, WILL BE PROTECTED BY ARMED ESCORTS. ❑ WHEN THESE SHIPMENTS ARE MADE, THE STATE AUTHORITIES MAY BE NOTIFIED. IN COLORADO, SELECT PERSONNEL WITHIN THE STATE PATROL ARE THE NOTIFICATION POINTS.
24	<p>RESPONDERS SHOULD BE AWARE THAT THERE ARE OTHER SOURCES OF RADIOLOGICAL MATERIAL, SOURCES THAT DO NOT FALL WITHIN THE STATE’S CONTROL, OR ARE UNKNOWN. THESE CAN, AND HAVE, CREATED CONCERNS FOR LOCAL RESPONDERS.</p> <p>SOME SOURCES INCLUDE:</p> <ul style="list-style-type: none">❑ PATIENTS WHO HAVE UNDERGONE A MEDICAL PROCEDURE USING A RADIOPHARMACEUTICAL. IT IS ESTIMATED THAT ONE OUT OF EVERY 2600 PERSONS HAVE RECENTLY HAD SUCH A TEST.❑ OLD RADIUM DIALS FROM AIRCRAFT GAUGES AND WATCHES MAY CONTAIN SIGNIFICANT AMOUNTS OF RADIUM.❑ ROCK COLLECTORS OFTEN HAVE SAMPLES OF RADIOACTIVE ORE IN THEIR COLLECTIONS.❑ STOLEN EQUIPMENT AND SOURCES OCCASIONALLY TURN UP UNEXPECTEDLY, AND WILL REQUIRE PROPER HANDLING.❑ FINALLY, THERE HAVE BEEN OCCASIONS WHERE PRODUCTS MANUFACTURED OUTSIDE THE U. S. HAVE BEEN FOUND TO CONTAIN RADIOACTIVE CONTAMINATION.

20	<p>ONE TYPE OF SHIPMENT THAT IS USUALLY NOT OBVIOUS ARE DEPARTMENT OF DEFENSE SHIPMENTS.</p> <ul style="list-style-type: none">❑ THESE SHIPMENTS MAY BE IN VEHICLES THAT HAVE NO MARKINGS AND NO PLACARDS. SOME TRAIN CARS MAY HAVE A “DODX” DESIGNATION.❑ MANY OF THESE SHIPMENTS ARE MADE WITH HEAVILY ARMED ESCORTS WHO WILL TAKE ALL MEASURES TO DEFEND THE SHIPMENT. IF YOU WERE TO ENCOUNTER ONE OF THESE IN AN ACCIDENT, THE GUARDS WOULD CLEARLY WARN YOU TO STAY OUTSIDE THE SECURED AREA UNLESS THEY ALLOW YOU TO ENTER. AND THEY WILL SHOOT ANYONE WHO DOES NOT OBEY THEIR DIRECTIONS.❑ THE TRUCKS HAVE SOPHISTICATED ARMOR AND OTHER THEFT AND ENTRY DETERRENT SYSTEMS, MOST OF WHICH ARE HIGHLY CLASSIFIED.❑ FINALLY, THESE SHIPMENTS ARE TRACKED BY SATELLITE AND RADIO. SHOULD ANYTHING HAPPEN, THE DRIVER AND ESCORTS WILL REPORT IMMEDIATELY TO FEDERAL AUTHORITIES WHO MAY SEND FEDERAL AGENTS TO ASSIST.
21	<p>THIS SLIDE ILLUSTRATES THE TYPES OF AND VEHICLES USED FOR DEFENSE SHIPMENTS.</p> <p>AS YOU CAN SEE, THE TRUCKS AND ESCORT VEHICLE SHOWN IN THE TOP THREE PICTURES DO NOT LOOK LIKE ANYTHING OUT OF THE ORDINARY.</p> <p>THE RAIL CARS SHOWN INCLUDE A TRANSPORTER FOR DECOMMISSIONED NUCLEAR POWER PLANTS FROM NAVAL SHIPS AND AN ESCORT CABOOSE – ONE OF THE FEW REMAINING USES FOR CABOOSES, TODAY.</p> <ul style="list-style-type: none">❑ AS YOU CAN SEE, BOTH OF THE RAIL CARDS HAVE THE DODX DESIGNATION.
22	<p>WHERE ARE THESE SHIPMENTS GOING? SOME ARE COMPONENTS FOR THE NUCLEAR WARHEADS ON MISSILES, SUCH AS THE ONE IN THIS UNDERGROUND MISSILE SILO.</p>

16	<p>THESE SHIPMENTS INCLUDE:</p> <ul style="list-style-type: none"> ❑ SMALL QUANTITIES SHIPPED BY COMMON CARRIERS SUCH AS FED EX (NOTE THAT FED EX WILL ONLY ACCEPT WHITE I PACKAGES) AND ALSO BE SOME DEDICATED SERVICES. ❑ LARGER QUANTITIES ARE ALSO SHIPPED , INCLUDING SHIPMENTS BY COMMON CARRIER AND THOSE TRANSPORTED BY DEDICATED TRUCKS. ❑ FINALLY, THERE ARE SHIPMENTS OF “SPECIAL NUCLEAR MATERIAL” THAT ARE SHIPPED USING SPECIALIZED, DEDICATED CARRIERS.
17	<ul style="list-style-type: none"> ❑ SMALLER QUANTITIES ARE ALSO USUALLY ❑ SMALL VOLUMES OF MATERIALS SUCH AS RADIOPHARMACEUTICALS. ❑ REMEMBER THAT THESE MEDICATIONS MAY ALSO BE USED BY VETERINARY CLINICS, AS WELL. ❑ OTHER SMALL QUANTITIES MAY BE SHIPPED FOR RESEARCH PURPOSES.
18	<ul style="list-style-type: none"> ❑ LARGE QUANTITY SHIPMENTS INCLUDE LARGE VOLUMES OF LOW LEVEL MATERIAL AND ❑ SMALL TO LARGE VOLUMES OF HIGH LEVEL MATERIAL. ❑ ONE EXAMPLE IS THE MATERIAL BEING TRANSPORTED TO THE WASTE ISOLATION PILOT PLANT IN NEW MEXICO. THIS IS MATERIAL THAT HAS LOW LEVELS OF RADIATION, BUT HAS A LARGE VOLUME OF MATERIAL. <p>OTHER LARGE QUANTITY SHIPMENTS INCLUDE:</p> <ul style="list-style-type: none"> ❑ SPENT NUCLEAR FUEL FROM REACTORS, ❑ LARGE INDUSTRIAL SOURCES SUCH AS THOSE YOU HAVE BEEN SHOWN, ❑ LARGE MEDICAL SOURCES SUCH AS THOSE USED IN CANCER THERAPY, ❑ SOME RESEARCH MATERIAL, AND ❑ NUCLEAR WEAPONS.
19	<p>RAM SHIPMENTS CAN BE BOTH RAIL AND TRUCK, TYPICALLY HEAVIER OR LARGER PACKAGES ARE SHIPPED BY RAIL.</p>

13	<p>THE NEXT TYPE OF SOURCE YOU MAY ENCOUNTER IS THE DENSITY GAUGE. AS WITH THE CAMERA, THE SOURCE IS STORED INSIDE THE BODY WITH HEAVY SHIELDING.</p> <p>THERE ARE TWO WAYS THESE GAUGES MAY BE USED:</p> <p>ONE METHOD IS TO DRIVE A ROD INTO THE SOIL, THEN UNLOCK AND LOWER THE SOURCE INTO THE HOLE.</p> <p>THE SECOND METHOD INVOLVES LOWERING THE SOURCE TO THE SURFACE OF THE SOIL, BUT NOT LOWERING IT INTO A HOLE.</p> <p>AS WITH THE CAMERA, IF THE SOURCE IS INSIDE THE BODY, IT POSES NO HAZARD.</p> <p>IT IS NOT UNCOMMON FOR THESE UNITS TO BE DAMAGED BY BEING RUN OVER. AS WITH THE RADIOGRAPHIC CAMERA, UNLESS THE OPERATOR CAN VERIFY THE SOURCE IS SAFELY INSIDE THE SHIELDING, EMERGENCY PERSONNEL SHOULD EVACUATE EVERYONE TO AT LEAST 75 FEET AND REQUEST ASSISTANCE.</p>
14	<p>THIS SHOWS THE TYPICAL CASE THE DENSITY GAUGE IS TRANSPORTED IN. NOTE THAT IT IS LABELED AS A TYPE A CONTAINER.</p> <p>THESE UNITS ARE OCCASIONALLY STOLEN OR LOST OFF OF VEHICLES. SHOULD YOU RESPOND TO A REPORT OF SOMEONE WHO HAS FOUND ONE OF THESE, DO NOT OPEN IN, BUT SECURE IT, AND CALL FOR ASSISTANCE.</p>
15	<p>THE STATE OF COLORADO HAS A LARGE NUMBER OF SHIPMENTS THAT EITHER CROSS THROUGH OR ORIGINATE WITHIN OUR STATE.</p>

12	<p>IN THIS DEMONSTRATION YOU CAN SEE HOW A RADIOGRAPHIC CAMERA OPERATES.</p> <p>THE SOURCE IS STORED INSIDE THE CAMERA BODY WITH A LARGE AMOUNT OF PROTECTIVE SHIELDING.</p> <p>THE OPERATOR WRAPS X-RAY FILM AROUND THE PIPE AT THE WELDED JOINT.</p> <ul style="list-style-type: none">□ THE CAMERA IS FITTED WITH A GUIDE TUBE AND CRANK ASSEMBLY, THAT WHEN TURNED MOVES THE SOURCE OUT THROUGH THE TUBE TO THE POINT OF THE WELD. <p>AFTER THE EXPOSURE HAS BEEN MADE, THE SOURCE IS CRANKED BACK INTO THE CAMERA AND SECURED.</p> <p>IT IS IMPORTANT FOR YOU TO KNOW THAT THE SOURCE CAN BE AS FAR AS 50 FEET FROM THE CAMERA WHEN IT IS FULLY OUT IN THE GUIDE TUBE. IF THE SOURCE IS INSIDE THE CAMERA AND THE GUIDE TUBE IS REMOVED, THE CAMERA IS COMPLETELY SAFE.</p> <p>SHOULD YOU EVER ENCOUNTER A INCIDENT INVOLVING ONE OF THESE CAMERAS, THE FIRST THING YOU WOULD WANT TO FIND OUT IS IF THE SOURCE IS SECURED INSIDE THE CAMERA. THE TECHNICIAN WHO OPERATES THE CAMERA SHOULD BE ABLE TO TELL YOU THIS INFORMATION.</p> <p>IF THE SOURCE IS NOT INSIDE, OR YOU ARE UNABLE TO FIND OUT FOR CERTAIN, EVACUATE EVERYONE TO A DISTANCE OF 75 FEET FROM ALL PARTS OF THE CAMERA – INCLUDING THE GUIDE TUBE – AND CALL FOR ASSISTANCE.</p>
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8	<p>IN ADDITION TO THESE FIXED SOURCE USERS, THERE ARE A LARGE NUMBER OF SOURCES THAT ARE MOVED FROM PLACE TO PLACE, AS THEY ARE NEEDED.</p>
9	<p>IN THIS SLIDE YOU SEE THREE DIFFERENT TYPES OF INDUSTRIAL SOURCES. THE TWO ON THE LEFT ARE PORTABLE UNITS USED TO CHECK WELDS IN THE FIELD. THE LARGE SOURCE ON THE RIGHT WOULD GENERALLY NOT BE MOVED FROM PLACE TO PLACE.</p>
10	<p>ONE OF THE LARGEST USES FOR RADIOLOGICAL MATERIAL IN THE STATE OF COLORADO IS IN THE RADIOGRAPHIC CAMERAS AND SOIL DENSITY GAUGES.</p> <ul style="list-style-type: none"> <li data-bbox="451 674 1289 741">□ RADIOGRAPHIC CAMERAS ARE THE UNITS USED TO PERFORM X-RAY INSPECTION OF PIPE WELDS. <li data-bbox="451 785 1344 888">□ THE SOIL DENSITY GAUGE IS USED TO DETERMINE THE DENSITY OF COMPACTED SOIL, MOST COMMONLY FOR ROAD CONSTRUCTION.
11	<p>IN THIS PICTURE, WE SEE THE ACTUAL SIZE OF A TYPICAL INDUSTRIAL SOURCE. THIS ONE IS FROM ONE OF THE RADIOGRAPHIC CAMERAS. THE ACTUAL RADIOACTIVE MATERIAL IS INSIDE THE SMALL CAPSULE AT THE END. THIS CAPSULE IS MADE OF WELDED STAINLESS STEEL TO INSURE THE SAFETY OF THE SOURCE.</p>

3	<ul style="list-style-type: none"> ❑ IN ADDITION, THERE ARE OVER 1100 “GENERAL” LICENSES FOR SMALLER QUANTITIES OF MATERIAL, INCLUDING: ❑ EXIT SIGNS, OTHER TYPES OF GAUGES, STATIC ELIMINATORS, AND VARIOUS SPECIALIZED TESTING EQUIPMENT.
4	<p>FINALLY, THERE ARE A LARGE NUMBER OF EXEMPT SOURCES, THOSE THAT REQUIRE NO LICENSE.</p> <ul style="list-style-type: none"> ❑ THE NUMBER ONE EXEMPT SOURCE IS SMOKE DETECTORS.
5	<p>LET’S START BY EXAMINING THE RADIOACTIVE SOURCES THAT MAY BE FOUND IN FIXED LOCATIONS. THAT IS, SOURCES THAT, ONCE DELIVERED, REMAIN IN THAT LOCATION UNTIL THEY ARE NO LONGER NEEDED.</p>
6	<ul style="list-style-type: none"> ❑ INDUSTRIAL FIXED SOURCES ARE TYPICALLY HIGH LEVEL SOURCES USED FOR SPECIFIC APPLICATIONS SUCH AS GAMMA CAMERAS FOR INSPECTING WELDS, AND FOOD IRRADIATORS USED TO DESTROY BACTERIA IN FOOD PRODUCTS. ❑ THESE UNITS TYPICALLY HAVE VERY HIGH LEVEL SOURCES, ❑ ARE PERMANENTLY MOUNTED IN ONE LOCATION, ❑ AND HAVE VERY HEAVY SHIELDING. <p>IF YOU WERE TO RESPOND TO AN INCIDENT INVOLVING ONE OF THESE UNITS, IT WOULD BE IMPORTANT TO HAVE SOMEONE FAMILIAR WITH THE EQUIPMENT MEET YOU OUTSIDE THE BUILDING.</p>
7	<p>ANOTHER TYPE OF INDUSTRIAL SOURCE IS THE FLOW GAUGE.</p> <ul style="list-style-type: none"> ❑ IN THIS APPLICATION A RADIOACTIVE SOURCE IS ATTACHED TO ONE SIDE OF A PIPE AND A DETECTOR TO THE OTHER. ❑ THE RADIATION IS PROJECTED THROUGH THE PIPE TO THE DETECTOR. ❑ WHEN LIQUID FLOWS THROUGH THE PIPE IT ABSORBS SOME OF THE RADIATION, WHICH INDICATES THAT IT IS FLOWING THROUGH THE PIPE.

FOSTER ON LINE
NARRATION SCRIPT

MODULE: 7

SLIDE	NARRATION
1	WELCOME TO MODULE 7. IN THIS MODULE WE WILL DISCUSS THE TYPES OF RADIOLOGICAL MATERIALS THAT ARE FOUND IN THE STATE OF COLORADO.
2	<p>THE STATE OF COLORADO LICENSES APPROXIMATELY 350 AGENCIES AND COMPANIES WHO USE RADIOLOGICAL SOURCES THAT ARE POTENTIALLY DANGEROUS. THESE ARE CONSIDERED ‘SPECIFIC’ LICENSES.</p> <p>THESE INCLUDE:</p> <p>SOURCES USED FOR TRAINING PEOPLE ON THE SAFE HANDLING OF RADIOACTIVE MATERIALS;</p> <p>SOURCES USED IN INDUSTRY TO PERFORM X-RAY INSPECTIONS OF MATERIALS, THESE ARE CALLED RADIOGRAPHIC SOURCES;</p> <p>SOURCES FOR RESEARCH AND DEVELOPMENT, MAINLY IN COLLEGES AND ACADEMIC INSTITUTIONS;</p> <p>BLOOD IRRADIATORS, USED IN HOSPITALS TO PREPARE BLOOD FOR TRANSFUSIONS;</p> <p>RADIOPHARMACEUTICALS, WHICH WE HAVE SHOWN PREVIOUSLY;</p> <p>SOURCES USED IN MANUFACTURING, SUCH A GAUGES USED TO MONITOR THE THICKNESS OF MATERIAL;</p> <p>WELL LOGGING, SOURCES USED IN THE OIL FIELDS;</p> <p>MEDICAL SOURCES, OTHER THAN DRUGS (THIS IS THE SECOND HIGHEST NUMBER OF LICENSEES)</p> <p>THE NUMBER ONE USE IS FOR PORTABLE MOISTURE DENSITY GAUGES, USED IN CONSTRUCTION.</p>