

3

Disposal of Nuclear Waste

Problem

What problems are encountered when storing nuclear waste

Purpose

To determine what type of container if any would be appropriate to bury a dangerous nuclear waste.

Materials

Each team

4 sodium hydroxide pellets

4 jars with lids filled $\frac{3}{4}$ with water

Phenolphthalein solution

Plastic wrap

Twist-tie

Aluminum foil

Modeling clay

Tweezers

Safety goggles

Tap water medicine droppers

Latex gloves

Procedure

1. Fill jars $\frac{3}{4}$ water.
2. Use the medicine dropper to put 4 drops of phenolphthalein solution in each jar.
3. Use gloves and the tweezers to put one sodium hydroxide pellet in one of the jars. Put a lid tightly on the jar. This jar is the control. Be sure to label ALL jars.
4. handling the pellet with the tweezers and gloves, wrap one of the pellets tightly in aluminum foil. Try to make it water tight. Place it in a jar. Label and put the lid on tight
5. Wrap another pellet in plastic wrap, and tie it securely with string or twist ties. Make sure it is water tight. Put a lid on tight.
6. Place the last pellet into the clay and mold the clay tightly around the pellet so there are no leaks. Place in a jar and place a lid on tight.
7. These jars represent soaking nuclear waste in different types of storage containers in ground water. Observe for three days. Look for signs of leaks. Record the information in the data table.

Analysis

1. What happened when you put a sodium hydroxide pellet into the water of the control jar?
2. Did any wrapped pellets show signs of leakage? If so, which type of wrapping was used and on which day?

3. Compare your data with that of other groups in your class. Which material would make a storage container with acceptable risk against leakage?

| | Day 1 | Day 2 | Day 3 |
|----------|-------|-------|-------|
| Control | | | |
| Aluminum | | | |
| Plastic | | | |
| Clay | | | |