From: <dengelhardt@earthlink.net>
To: <bbyron@energy.state.ca.us>
Date: 6/26/2008 9:35 AM
Subject: AB1632 comments
Attachments: PERMANENT RADWASTE SOLUTIONS 5.ppt

Ms. Barbara Byron
California Energy Commission

Dear Ms. Byron:

AB1632 was called to my attention this week.

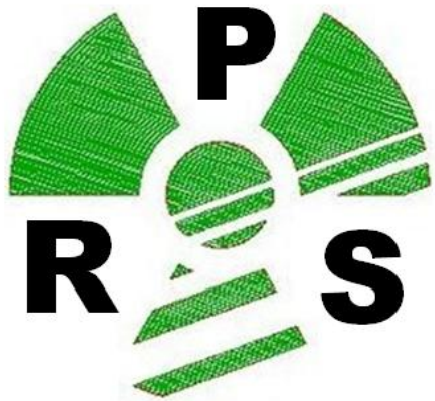
I am sending you a PowerPoint lecture as an attachment. This outlines a new approach to nuclear waste disposal.

I am available, at your convenience, to expand on the information presented and answer any questions.

Thank you.

Respectfully,

Dean S. Engelhardt
Permanent RadWaste Solutions



PERMANENT RADWASTE SOLUTIONS

A PERMANENT, SAFE, AND COST-EFFECTIVE METHOD OF DEALING WITH NUCLEAR WASTE

Permanent RadWaste Solutions

Permanent RadWaste Solutions (PRS) has a simple, safe, and secure method of eliminating nuclear waste from contaminating our environment or endangering any living thing.

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Because of the minimum time scale needed (over 260,000 years) for safety, we must rely on natural forces to take care of the nuclear waste.

Permanent RadWaste Solutions has invented a process – and the hardware – to place the radioactive waste in a location that will not harm our environment – using only natural forces.

The forces?

1. Gravity
2. The flow pattern of molten rock in the earth's mantle.

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This is possible because:

1. the mantle, a very thick layer of semi-molten rock beneath the crust of the earth, has slow-moving currents moving in a predicable pattern.

2. entrances to the center of the earth exist at subduction faults in the Pacific Ocean.

3. the currents at these faults flow down toward the earth's center.

3. the waste, in specially-designed containers (STVs), will be sent to the earth's center utilizing gravity and mantle flow.

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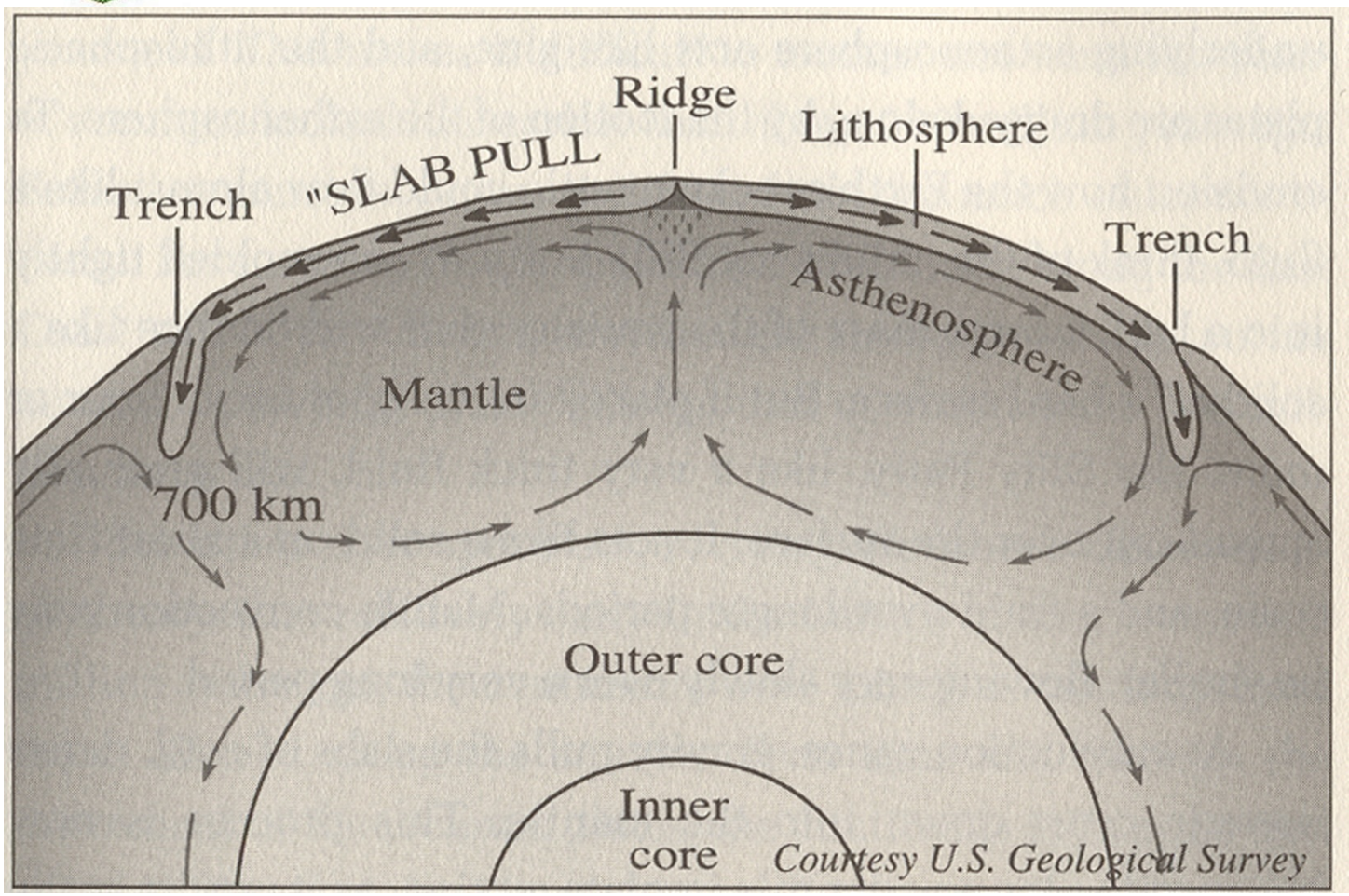

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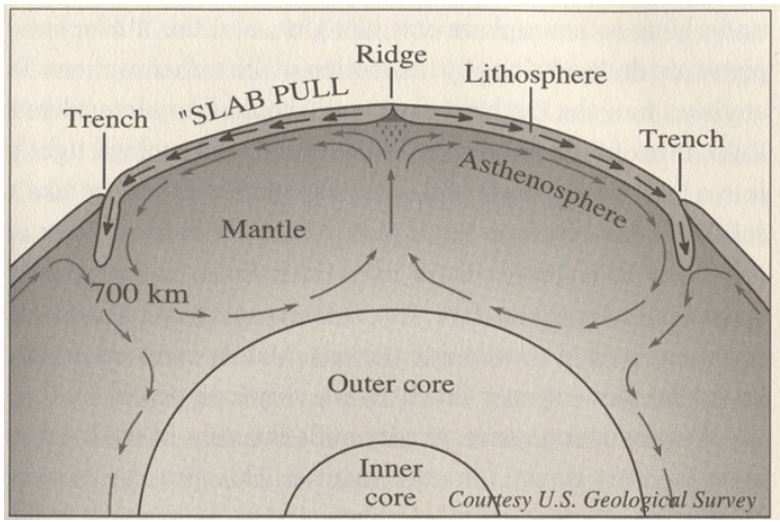

Note that the mantle's current flow at the trench is down toward the outer core.

Because the Submarine Transport Vehicle (STV), when loaded with spent nuclear fuel, is of a significantly greater mass than the surrounding mantle, the STV is propelled naturally toward the earth's center by a combination of mantle flow and gravity.

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- Because of the greater weight of uranium, plutonium, and similar metals, the STVs will continue to descend past the lighter basalt rock to the surface of the outer core.
- At the outer core, they will fall through the liquid iron – like a brick through water – to the mountains of the solid inner core, where they will rest for eternity.

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How would we do it?

1. Load the waste into a pressure-compensating container (STV) at the reactor site.
2. Transport the STV to a suitable subduction fault in the Pacific.
3. Bury the STV in the alluvium at the entrance to the fault.

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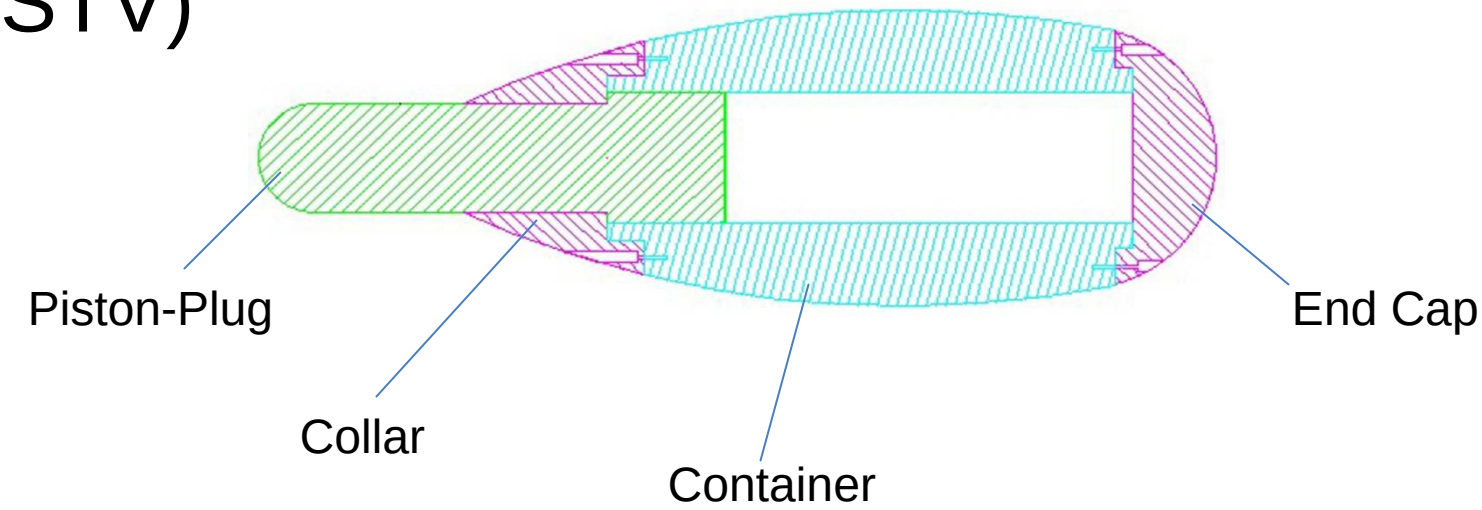
Cutaway of Submarine Transport Vehicle (STV)



With the Piston-plug and Collar already in place, the waste is put into the Container. The End Cap seals the unit.

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Why the Pacific Ocean?

1. The bulk of the world's subduction faults are located here.
2. The Aleutian Trench, a fault that is 1800 miles wide by 150 miles in length, lies along the Aleutian Chain of Alaska – American territory.

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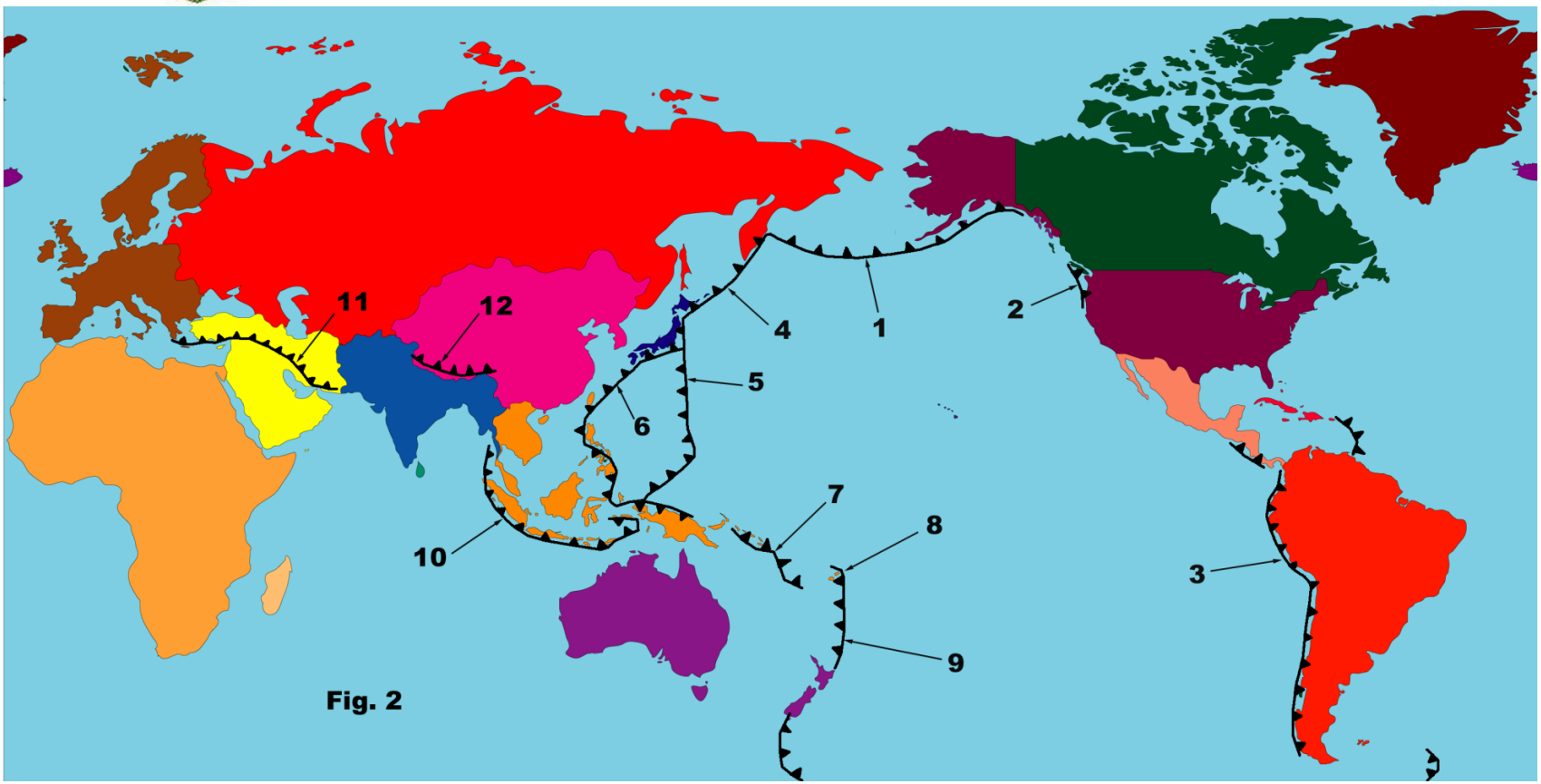

Fig. 2

Subduction faults #1-10 are suitable for nuclear disposal. Faults #11 and 12 are not as they are not in a deep oceanic environment.

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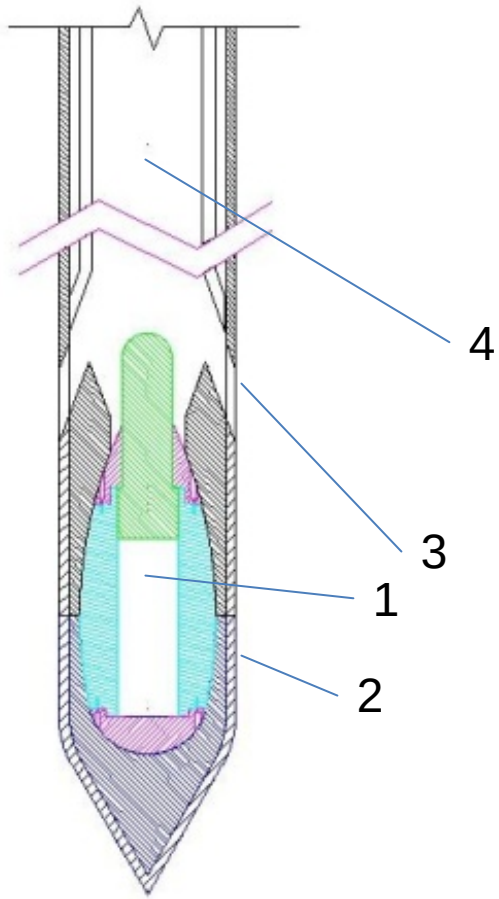

The STV (1) as mounted in the drill assembly. The STV is fully captured by but not mechanically attached to the drill assembly.

As the drill penetrates the mud, the mud travels in the screw threads (2) around the STV, through the intake vents (3), and up the central shaft (4). Pumps at the top of the central shaft create a vacuum to help draw the mud into the shaft.

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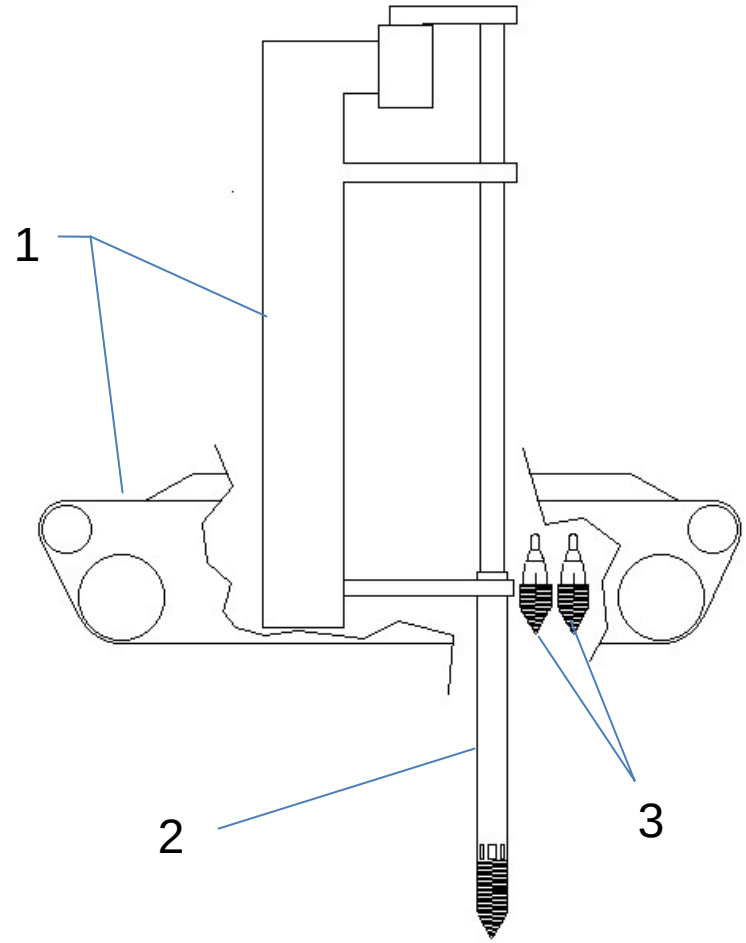
Mobile Robotic Drilling Rig (1) on ocean floor stops at desired location.

Drill (2) penetrates to desired depth. (STV not yet released).

Spare drill bits (3) with pre-loaded STVs will be planted, each in turn, when the MRDR moves forward 50-100 feet.



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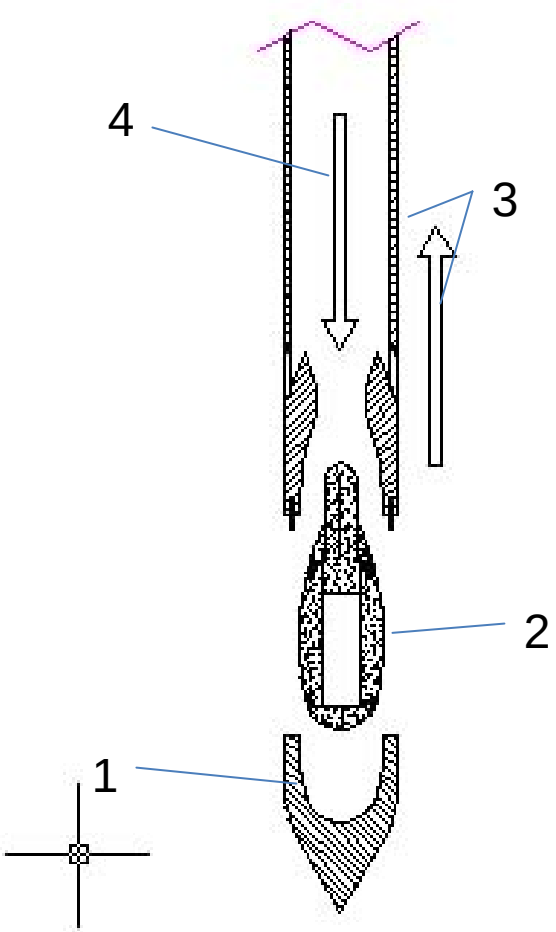

1. Drill shaft release releases drill head.
2. Drill head release also releases STV.
3. Drill shaft retracts upward.
4. As drill shaft retracts upward, the alluvium dug out of the hole is allowed to fill up the hole and bury the STV.

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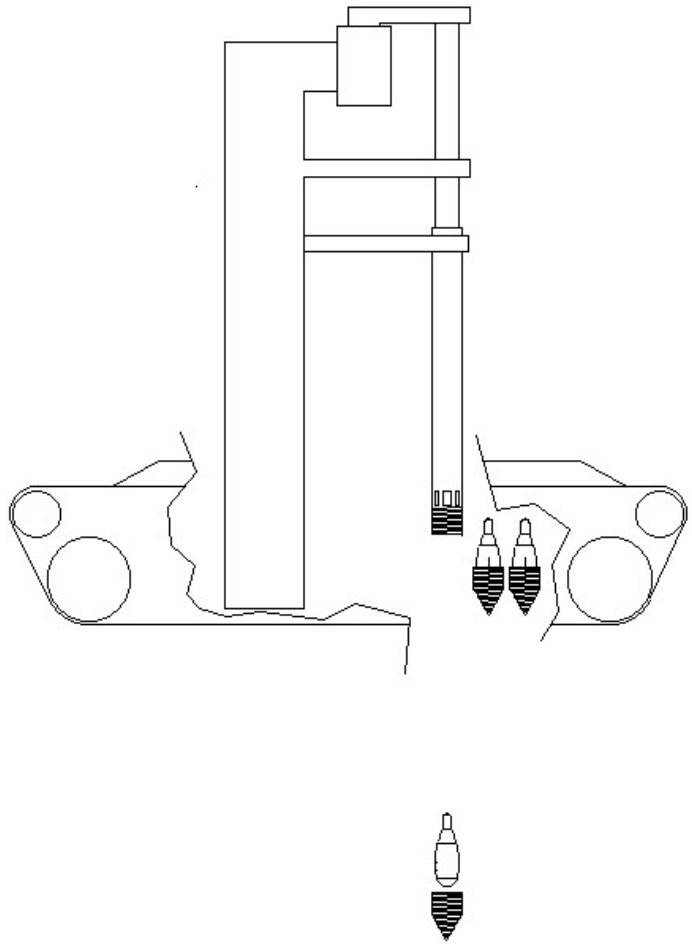
The STV is buried in a 75-ft deep hole. When the drill shaft is withdrawn (as shown), the released STV is buried by the release of the alluvium from the drill shaft.

In the illustration to the right, the drill shaft has been withdrawn, leaving both the STV and the drill bit behind.

The crawler then moves forward a few feet, reloads, and plants another STV.



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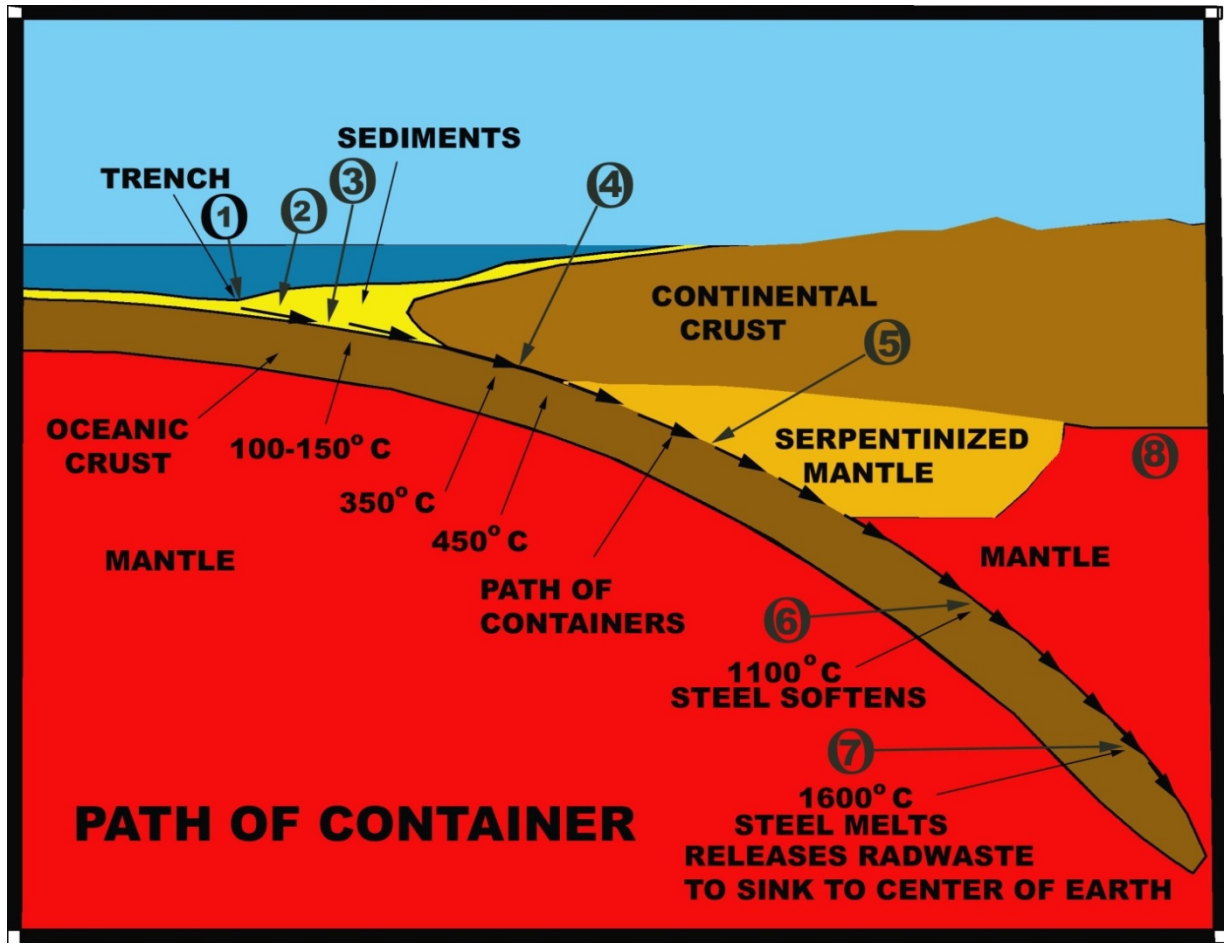
The STV is "planted" between 1 and 3. The trip from the planted location to the bedrock is quite fast compared to post-bedrock-arrival where the bedrock is moving at the rate of inches per year under the continental



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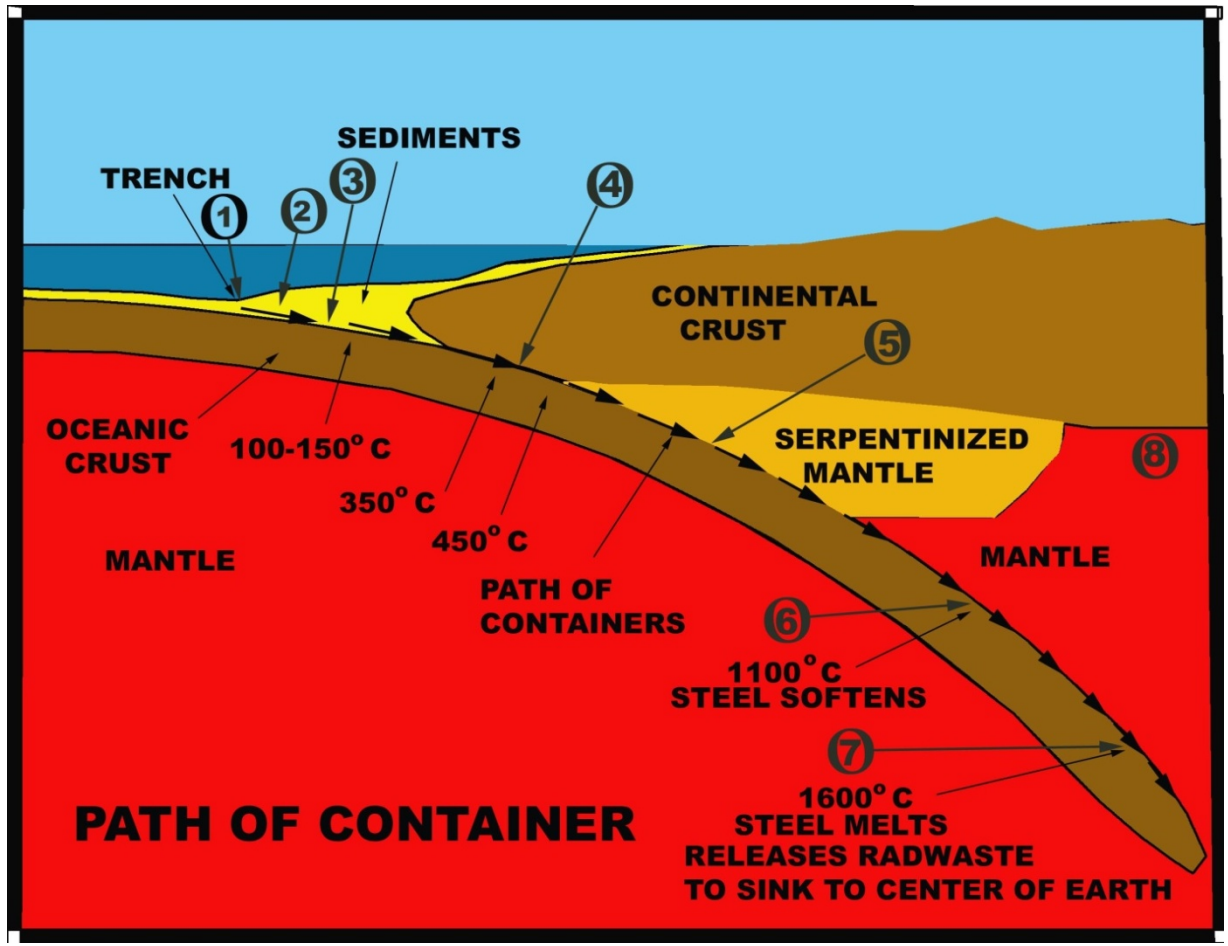
At 4, the STV is carried between the oceanic and continental crusts. By this time, the waste has become harmless due to radioactive decay.



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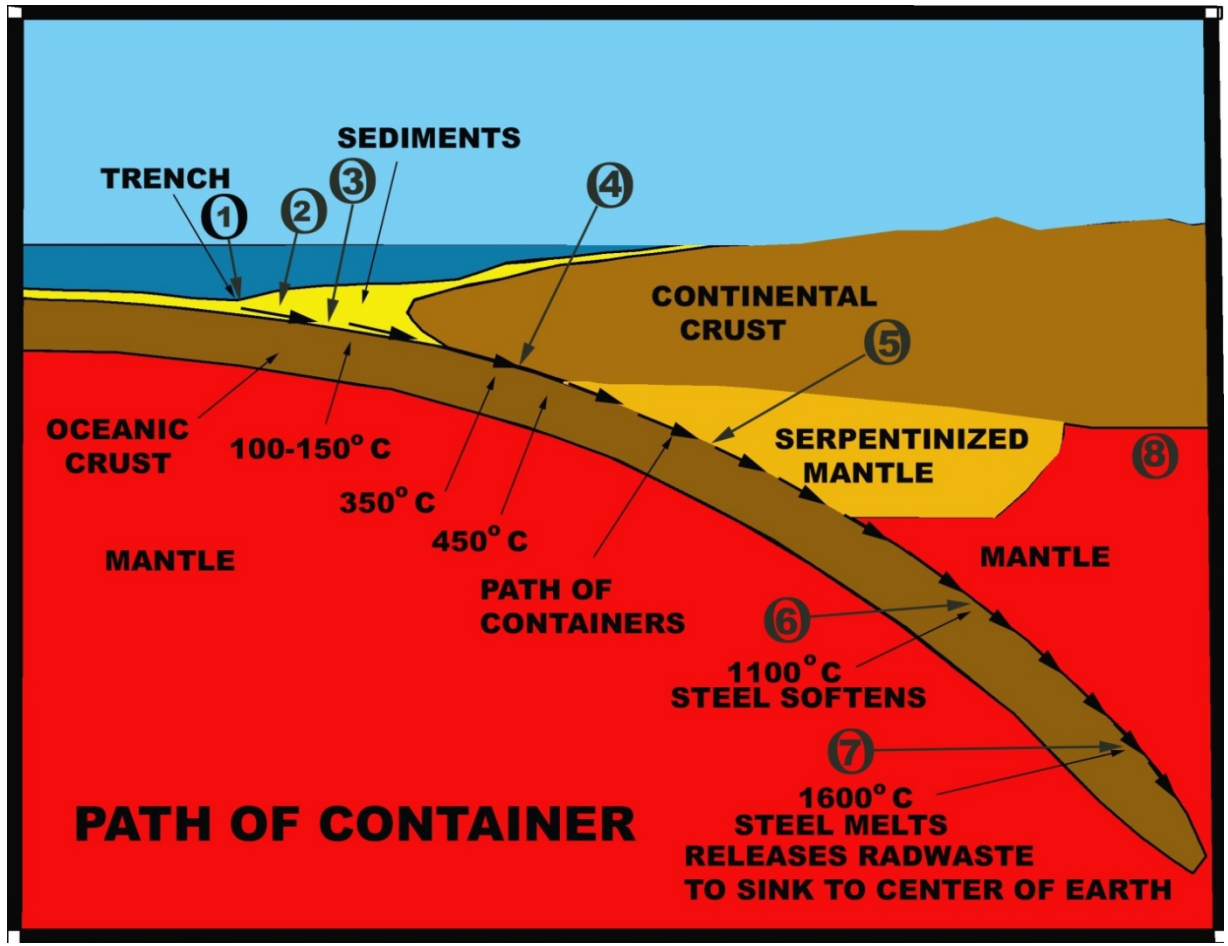
Between 6 and 7, the steel is failing. When the STV melts, releasing the waste (also melted), everything continues to sink into the earth due to the STV's much greater mass over basalt rock and sediments.



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What about failures?

Anything made by man is capable of failure. The particular advantage of this system is that the STV is in a mass of slow-moving alluvium which is much lighter than the STV. Even with a total failure of the STV, in such an environment the material can only travel downward. Unless the law of gravity can be repealed, nothing can come up to the surface.

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When the end-cap and piston-plug are installed in the container, the perimeter edge of each will start peeling the seal. The peeled seal material is deformed and jammed under great pressure between the Piston-Plug and the Container. The seal is thus thickened (strengthened).

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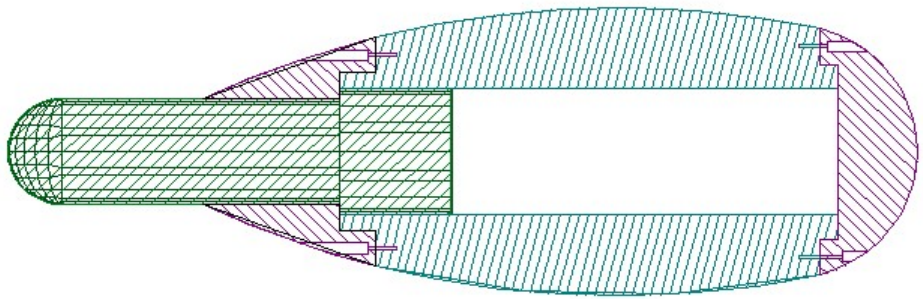
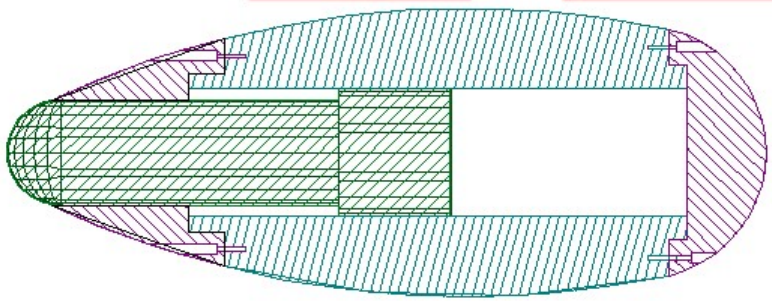
How does the STV maintain structural integrity under the increasing pressures?



STV at the surface



STV at approximately 50,000 ft. depth

The STV is designed as a huge piston within a cylinder. Under constantly increasing pressures, the piston-plug is forced into the cylinder, compressing the waste. The slight difference in pressure – inside being less than outside - assures that any leaks will go from outside to inside. Therefore, no leaks of radioactive material can occur with this design.

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What happens after planting?

1. Once planted, the STV descends rapidly through the alluvium to subseabed bedrock.
2. The subseabed bedrock is slowly moving under the lighter Continental Shelf, carrying the STV with it.
3. Below about 200 miles below the earth's surface, the container and the waste both melt.

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1. After melting at a depth of over 200 miles, the STV and contents will continue on their downward course to the Outer Core.
2. The Outer Core, being liquid iron, allows the waste to drop through it like a brick through water until it lands on the mountains of the inner core, where it will stay forever.

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Why can't the waste return to the surface?

1. The waste is many times heavier than the surrounding molten rock. (3-4 times heavier than lead)
2. Both the flow pattern of the mantle and gravity prevent the waste from traveling in any direction other than down toward earth's core.
3. As the flow pattern near the outer core flattens out, gravity causes the waste to depart the mantle and enter the outer core.

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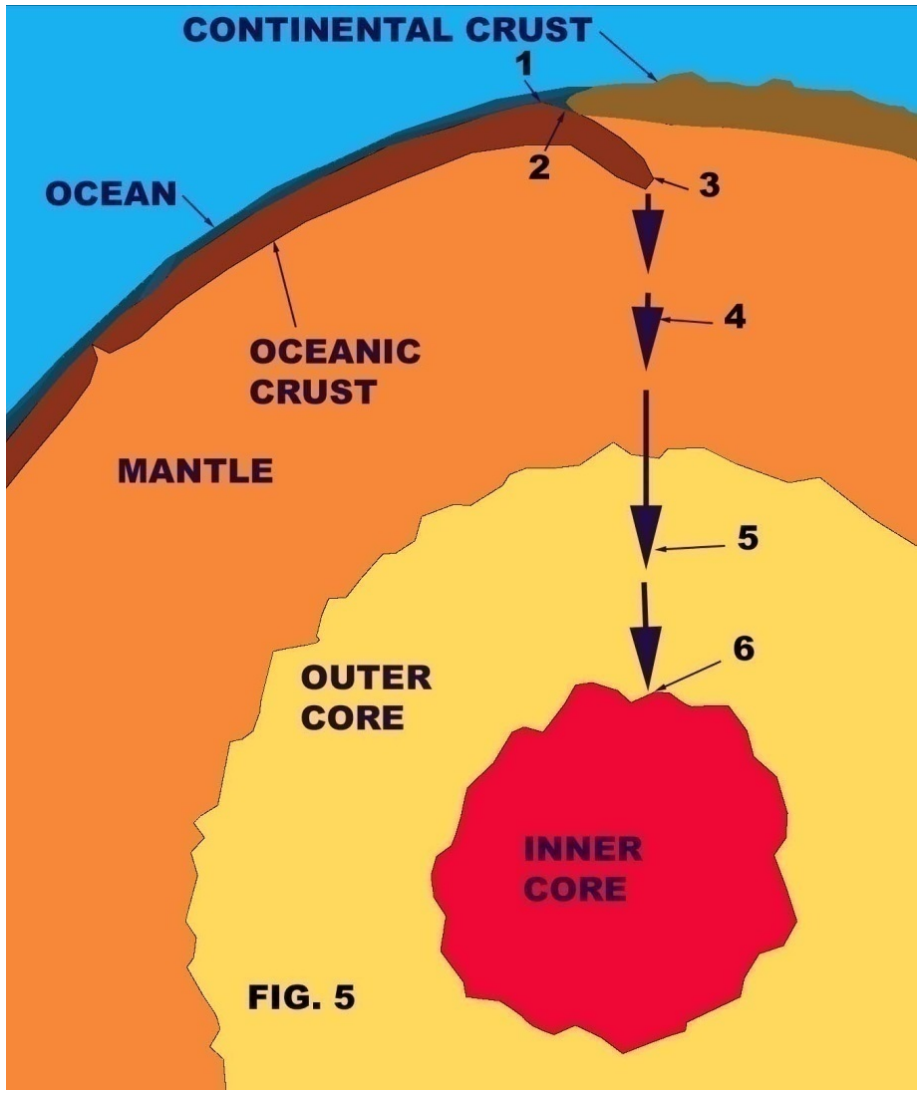
- **After melting, the waste sinks through the mantle (molten rock at 4)**
- **When reaching the outer core (liquid iron at 5), the waste drops to the surface of the inner core (6), where it will remain for eternity**



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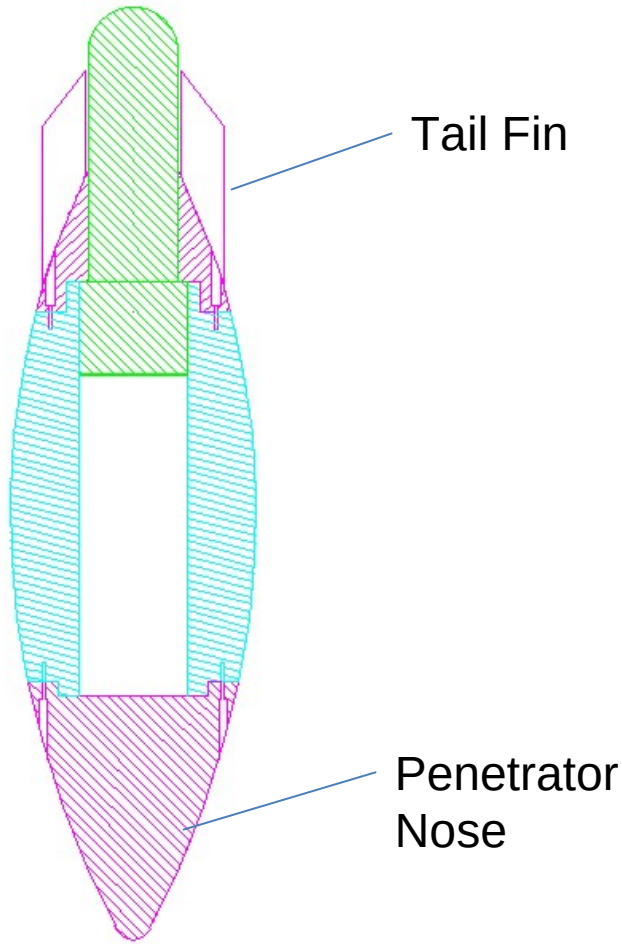
An alternative method of planting the STV in the oceanic alluvium is to use a "Penetrator" version.

The Penetrator is designed to achieve the required depth into the alluvium by a free drop of over 20,000 ft.

Just prior to impact, the heavy tail fins react to a pressure gauge to clamp the piston-plug from movement prior to impact.



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Nuclear power is the best hope we have of having enough power to sustain our economy for the next century. In the distant future (2100 AD and beyond) we may have developed wind, solar, wave and geothermal power at such a scale as to be economically feasible.

But it has yet to happen.

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Coal, oil and gas have too many pollutants. Solar, wind, wave and geothermal are not available at large scales at economical prices. Reprocessing nuclear waste to make more fuel (MOS) has dangers not present in the use of light-water reactors such as we now use.

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The solutions?

1.Use PRS STV's to eliminate the current backlog of nuclear waste. (This will require shipment on roads and railroads.)
2.Future nuclear reactors should be:
   a. Thorium reactors – there is more thorium in the world than tin. Also, thorium is safe to handle until used in a reactor.
   b. Built next to navigable waterways – PRS STVs can then be loaded in the containment building and taken directly to the dock for loading on the ship to take it to the subduction zone. This eliminates all transportation over roads and railroads and through

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Questions?

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