ES473 – Introductory Video Exercise

Short Answer Review Questions from Video

Video 1: La Loma Prieta Earthquake

1. Where was the earthquake and how large was it?

In the Bay Area of California. The epicenter was in Loma Prieta, 90km to the south.

2. The tectonics of what two plates was the Loma Prieta Quake a result of?

San Andreas Plate and Pacific Plate

3. What was the magnitude of the Earthquake?

7.1

4. Where was the epicenter of the earthquake located?

In Loma Prieta, CA in the Santa Cruz Mountains

5. How far below the ground was the fault movement?

18km

6. How far was the damage felt from the epicenter?

Up to 90km away

7. Why must geologists get out and explore the surrounding areas of land quickly after an earthquake?

Because the cities move to fix the damages insanely fast, the weather can wipe ou the evidence, and damage to their own facilities.

8. What is the most important information to get out to the public after an earthquake?

Aftershocks are expected up to months after the initial quake, duration, frequency, and likelihood of the aftershocks are difficult to determine.

9. Describe the movement of the plates that caused the earthquakes.

It wasn't just a strike slip, but one of the 6 high risk segments moved up and sideways as the other plate moved to the side. This is very uncharacteristic of the fault and the quake was VERY deep but very brief as well.

10. Why was the shaking in the "marina area" much worse than other places?

The fill materials used to build up the marina area was rubble from the past major quake the area had and uncompacted mud and sand. These soft surfaces were able to liquificate and turn into a liquid like substance and everything on top comes crumbling down into the mud soup.

11. Why was the Bay Area so susceptible to damage from an earthquake?

There are a BUNCH of pockets of liquefiable materials all over the Bay Area.

12. What can we do to make old and new buildings safe?

Retrofit older structures so they are earthquake safe and build new building in earthquake safe ways and areas.

13. What can we do to prepare for earthquakes?

Install new seismic warning signals, store emergency materials and plan closely with people you know and love, make the gosh darn government fork over more cash to finance the changes and studying that needs to be done to make the world more prepared for an earthquake and so we can understand them more.

Video 2: Hanford Nuclear Cleanup

1. What was the nuclear plant built for?

The build the nuclear weapons in WW2 and to mine elements like plutonium.

2. Why was Hanford such an ideal place to build this nuclear facility?

It was a secure location far from any populated area and with access to lots of clean water.

3. What does the "Deadly Mile" refer to?

An area of farms downhill from Hanford that have higher rates of cancers and thyroid issues.

4. Did the government know what the long term effects would be to the area?

The didn't "know" and had a real "deal with it later" attitude because power is one heck of a blinder to caution.

5. How many radioactive reactors are there?

9. All are currently shut down but are still radioactive.

6. How many tons of possibly lethal fuel is sitting in the basins?

200 metric tons of lethal fuels, a quarter mile from the Columbia, leaking and in uncovered barrels.

7. What is the major issue that still poses a threat to the water table?

There is waste leeching into the Columbia from the storage facilities.

8. What are downwinders?

Farmers and people who live downhill of Hanford and have higher rates of cancers, thyroid issues, and other health issues.

9. Describe the Hanford site. Include the 100 zone, 200 zone, and buffer zones.

100 zone: where all the processing and storage plants are

200 zone: where the waste lives, a storage place and also the locations where plutonium and uranium were harvested. Some waste is in open containers just chillin', seeping waste into the beautiful countryside.

Buffer Zone: no processing or storage of radioactive in this place, and very little testing was done in this area. There's no effect on animals in this area and they run free and are unhunted.

10. Are there effects on the Columbia River ¼ mile away from the plant? Explain.

In the 70s there was so much radiation it showed up in the water and fish in the Pacific Ocean near the river delta. Currently there are very little radionuclides in the water, therefore its safe to consume and use. BUT at some localities it is 1000s of times more concentrated and way above permissible levels, but these readings dissipate a few hundred meters downstream.

11. Why can't we just leave the waste there and lock up the area?

Because it releases large amounts of flammable and explosive gases and materials the longer it is left to sit.

12. Who is involved in the decision of cleaning up? What are researchers doing in order to attempt to clean up this highly contaminated area?

Government officials and state officials, geologists, hydrologists, a multitude of earth scientists. Researchers are trying to come up with a plan to safely dispose of the waste without exposing it to the surrounding land. They are burying some waste, breaking it up with salts, checking its radioactivity levels, and sometimes, they just wait.

Long Answer Essay Questions

A. How do each of the video presentations relate to humans, and their respective ecosystem, to geologic principles and processes?

The Loma Prieta video shows us the tremendous impact that the earth can have on us. It rips our homes from foundations, destroys our connections to water, electricity, and civility. The scale of geologic processes makes us humans seem incredibly small, for a tiny movement on the geologic scale can send our lives into shambles, literally. Nature has the ability to rid us of house and home, ground to stand on, water to drink, and the air to breathe. We are at the mercy of the elements, and they have the power to make our landscapes unrecognizable. A decent size quake can have an affect on an are 100km away from the epicenter, and if it occurs under the sea it has the ability to create a tsunami.

In regard to the Hanford video, it shows how humans can affect their surroundings. By trying to gain world power and create nuclear weapons, we created a radioactive footprint that is going to taint the ecosystem for hundreds if not thousands of years to come. It shows us how these radioactive chemicals can seep into the water table, and how that in turn can negatively impact surrounding life. It shows that we are just mere humans meddling with the elements, and that their powerful effects on the environment can far surpass what we had ever expected.

B. Compare and contrast the video clips to one another. How are humans and the Earth interacting with one another in each case study?

Loma Prieta shows how the earth can affect us and Hanford shows how we can affect the earth. In Loma Prieta, the humans are working to best understand the processes behind the quakes, and figure out how to better predict them and how to better prepare our cities and homes to withstand the inevitable quakes of the future. The earth has an affect on us and we are trying our best to understand said affect. In Hanford, the humans have an affect on the environment. But this wasn't a random natural disaster like Loma Prieta, the US government knew that radioactivity had drastic long term affects but went forth with it anyway. Humans poisoned with land with radionuclides and it will have an impact that lasts for multiple generations. In both videos we can see how geologic processes, natural and human-inflicted, rule our lives more than we give them credit for.