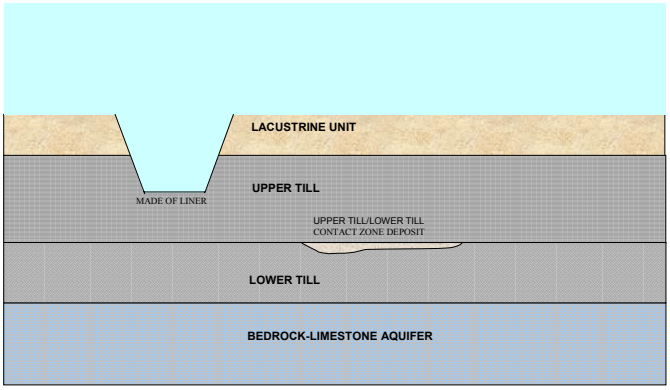
GEOLOGICAL CHARACTERISTICS

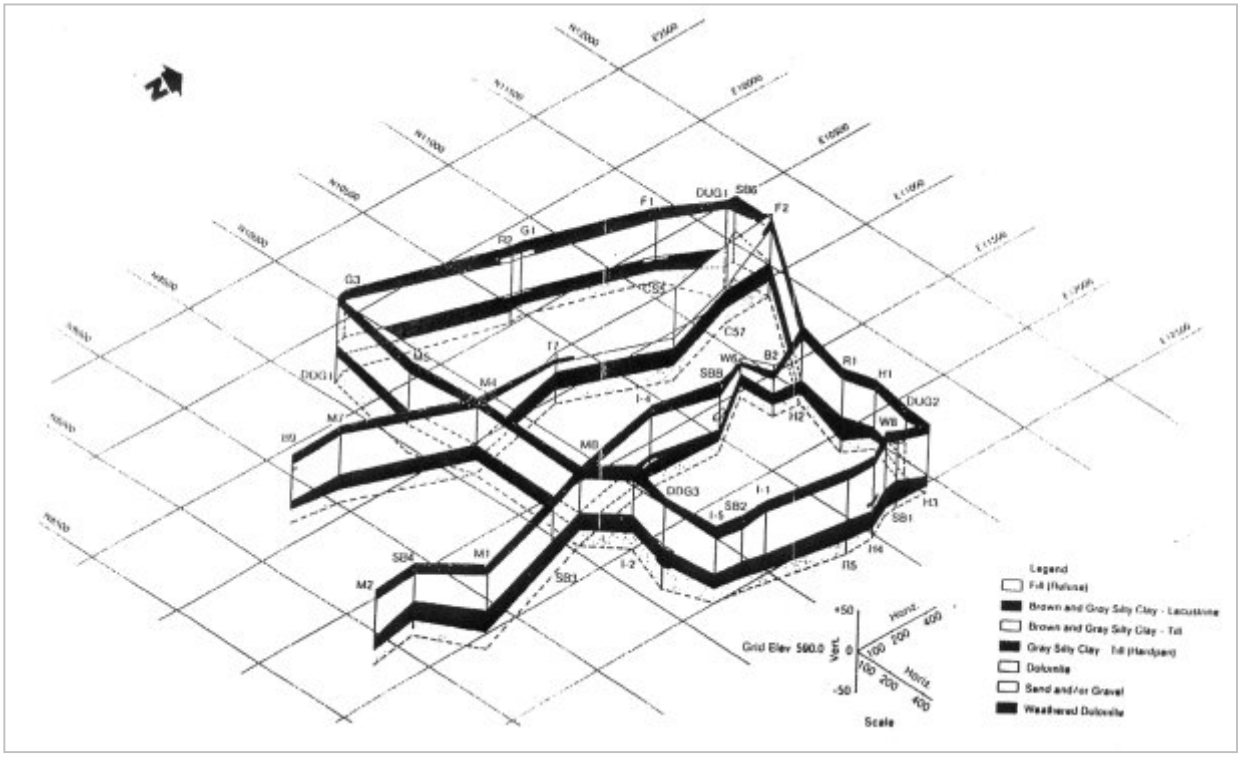
The facility is not located in an area listed in Appendix VI of 40 CFR §264, requiring a demonstration of compliance with seismic standards.

The ESOI facility is characterized by sediments deposited in glacial and post-glacial environments and is underlain with four geologic units. Typical representations of the site geology are shown on the preceding diagrams. The following four geologic units from the ground surface down exist at the facility:

- Lacustrine Clay (Lacustrine or Brown Clay)
- Upper Glacial till (Blue Clay or Upper Till)
- Lower Glacial Till (Hardpan or Lower Till)
- Limestone (Limestone Aquifer or Uppermost Aquifer)



These four geologic units exist across the site in relatively uniform thickness and physical properties. A detailed discussion of each unit is discussed below.



Lacustrine Clay

The Lacustrine clay is commonly referred to as the lacustrine deposit or the brown clay. This clay was deposited in a lake environment in geologic time; therefore, it is called a lacustrine deposit meaning lake. The soil material consists of a clay and silt mixture. The Lacustrine

deposit is approximately 20 feet thick across the site. The clay is of relatively low permeability meaning that water does not readily travel through it, like a sand or rock deposit. The permeability of the lacustrine deposit is typically 1 X 10^{-7} cm/sec. The nature of the lake environment does cause this material to be deposited into very thin layers of silt and clay. This type of deposit is called a varved deposit meaning alternating layers of fine and coarser material. Consequently, the horizontal permeability, lateral flow, is typically greater than the vertical permeability, downward flow. The uppermost geologic unit is also exposed to the effects of the weather. Freeze thaw cycles, drying during the summer and direct contact by rainfall and storm water runoff tend to effect the permeability of this material. The Lacustrine deposit, therefore, is the area where percolation from rainfall is expected to accumulate.

Upper Glacial Till

The upper glacial till is commonly referred to as the blue clay due to its color. The glacial till was deposited during the aftermath of the last period of glacial advancement (approximately 10,000 years ago). The advancement of the glaciers from Canada stripped the soil and rock materials in the path of the glacier. The soils and rock material were mixed together in the advancing glacial. As the glacier melted this material was deposited. The glacial till material is a relatively uniform clay material with occasional sand pockets, and cobbles and boulders. The sand pockets are limited in area and are not found to be interconnected. The upper till material is of a very low permeability, on the order of 1 X 10^{-8} cm/sec. In fact, this clay material is of such low permeability and consistent quality that it is used for construction of the landfill liner and cover systems. The low permeability of the material also retards water movement in this geologic unit. It should be noted that glacial tills do not have a layered or varved deposit. The upper till material is found at a depth of 20 feet below grade to a depth of approximately 60 feet (approximately 40 feet thick).

At the contact of the Upper Till and Lower Till, a thin layer of sand was detected in soil borings and monitoring wells installed near Cell G. This sand seam was investigated extensively during the permitting process. Several monitoring wells were specifically installed to determine if this sand was continuous across the site. It was believed by parties opposed to the issuance of ESOI's permit that this sand seam extended under the area of Cell M. Soil borings, well pumping tests and ultimately the excavation of Cell M Phases 1 and 2 disproved this theory. Cell M construction required the complete excavation of the upper till material to the Upper Till/Lower Till contact. Inspection of this excavation did not show this sand seam to be present in the Cell M area. However, ESOI continues to monitor the sand seam located in the vicinity of Cell G as part of the groundwater monitoring program.

Lower Glacial Till

The lower glacial till is commonly referred to as the hard pan due to its very dense properties. The lower till is also a glacial till deposited during an earlier glacial period, approximately 25,000 years ago. The lower till consists of clay of an extremely low permeability, on the order of 1 X 10^{-8} cm/sec. The high density of the material is a result of over consolidation caused by the weight of the glaciers and overlying soils on this deposit. The lower till is sound at a depth of approximately 60 feet below grade to a depth of approximately 80 feet (approximately 20 feet thick).

Limestone Aquifer

At a depth of approximately 80 feet is the limestone bedrock. The limestone deposit consists of dolomite limestone known as the Greenfield/Lockport Formation. The fractures and joints in this rock deposit allow for the flow of groundwater. The limestone aquifer or rock aquifer is the uppermost aquifer on the site. An aquifer is commonly described as a geologic unit capable of yielding a usable or significant amount of water.