Coal Combusted Residue (CCR), commonly known as coal ash, is a byproduct of the combustion of coal at power plants which is often disposed in landfills. CCR typically has a moisture content of 40 to 80 percent, even after dewatering, and therefore is very difficult to compact in a fill area. Excessive amounts of moisture sometimes collect near the bottom of the CCR fill area, which causes instability throughout the fill area. There is thus a need to absorb or control the moisture or liquids in CCR and stabilize it when it is disposed in landfills.

The invention disclosed herein is a composition and method for absorbing the liquids or moisture in CCR and stabilizing the CCR in landfills and other disposal settings. The composition comprises an absorption material that both solidifies coal ash slurry and can be used as a stabilizing agent in large CCR fill areas, due to its angular properties. A contractor could lay in 4 foot lifts of CCR and then a 2 foot lift of the composition to prevent any “sliding” of the typically unstable CCR.

Because of its unique characteristics, a composition of ground stone, angular in nature, dry blended with super absorbent polymers, provides an excellent stabilizing material between lifts or layers of CCR.

Such a combination of ground stone and super absorbent polymers not only provides a stabilization layer between layers of CCR, but the blended polymers within the product absorb the moisture released from the CCR layer placed on top of it. This prevents excessive amounts of moisture from collecting near the bottom of the CCR fill area, which would cause instability throughout the fill area.

The depth of each lift must be engineered based on field factors, such as the moisture content of the CCR being placed, the type of CCR being placed, the overall size of the fill area and the external containment of the CCR fill area. Other factors may also play a part in the design, such as topography, climate and other drying agents used on the project.

Figure 1 depicts one embodiment of the composition, labeled as ASH-LOK, in alternating lifts or layers placed between layers or lifts of CCR to absorb the moisture or liquids in the CCR and stabilize the CCR. The composition can alternatively be layered or mixed with CCR at the landfill or other disposal site or can be mixed with CCR in trucks, train cars or other containers.

Figure 2 depicts one embodiment of the composition showing the crushed stone mixed with super absorbent polymers.
Figure 3 depicts one embodiment of the composition and method in which the composition of crushed stone mixed with super absorbent polymers is mixed with CCR in a small drinking plastic drinking cup by hand with a stir stick. The composition mixed with the CCR creates a solid combination within the cup in minutes.

Figure 4 depicts one embodiment of the composition of crushed stone mixed with super absorbent polymers after it is mixed with CCR in a cup and then removed from the cup in solid form, showing the stability of the CCR after it is mixed with the composition and showing the lack of moisture or liquid.

Figure 5 depicts one embodiment of the composition of crushed stone mixed with super absorbent polymers after it is mixed with CCR in a cup and then removed from the cup in solid form and further broken into smaller solid pieces to show the lack of moisture and stability of the CCR after mixed with the composition.

In one embodiment, the composition consists of an absorption material for the solidification and stabilization of Coal Combusted Residue (CCR), wherein the absorption material consists of between approximately 80% and approximately 98% by weight of ground stone and between approximately 20% and approximately 2% by weight of super absorbent polymer. In other embodiments, the composition may comprise an absorption material comprising ground or crushed stone and super absorbent polymer in varying percentages by weight. The ground stone used in the absorption material may be selected from a group consisting of granite, limestone, sandstone, slate and other Sedimentary, Metamorphic and Igneous stone. The super absorbent polymer used in the absorption material may be selected from the group consisting of sodium polyacrylate and sodium polyacrylamide. In some other embodiments of the composition, the crushed or ground stone may have a size range from powder .01” in diameter to .25” in diameter (0 mm to 6 mm).

In one embodiment, a method of solidifying a CCR waste stream having a liquid component comprises: adding to the CCR waste stream an absorbent material consisting of between approximately 80% and approximately 98% by weight, crushed stone; and between approximately 20% and approximately 2% by weight, super absorbent polymer. Said method also serves to stabilize the CCR waste stream. In another embodiment of the method, the absorption material comprising crushed or ground stone and super absorbent polymer is dry blended prior to adding to the waste stream. In another embodiment of the method, the dry blended absorption material is added to the CCR waste stream in an amount not exceeding 20% of the weight of the CCR waste stream.

Given the properties of the crushed or ground stone and the super absorbent polymer composition, there is no need to use a flocculant or flocculating agent in the composition or the absorbent material or the method of solidifying a CCR waste stream. Further, there is no need for further additives to the composition or absorbent material in order for the composition to be used in a method of solidifying and stabilizing a CCR waste stream, although other materials could be added to the composition.