WORKING DRAFT 3 - COAL COMBUSTION ASH PRODUCTS

BENEFICIAL USES	INDUSTRIAL STANDARDS	ENVIRONMENTAL AND PRACTICAL BENEFITS	REGULATORY SAFETY NET
ON-SITE CONSTRUCTION APPLICATIONS CCA is used to replace cement, sand and aggregate in various grout/ concrete projects on site including: -Equipment pads - Foundations -Grouted rock rip-rap spillways -Bricks - Asphaltic concrete	By reference, Transportation Department Quality Control Standards as well as ASTM Standards	CCA exhibits pozzalanic properties which make it an effective substitute for cement in certain concrete and grout applications., with the following environmental benefits: - Conservation of energy & materials. The process of cement uses significant energy and raw materials and substituting CCA helps conserve these resources. - Reduced CO2 Emissions. Every ton of CCA substituted for cement avoid 1 ton in CO2 emissions which would have been generated in the production of the cement.	State & Federal Requirements: -Surface Water (NPDES) -Clean Air Act - Superfund
SOIL STABILIZATION CCAs are used for soil stabilization to reduce the shrink and swell factors as water either evaporates from the soil or infiltrates into the soil.	By reference, Transportation Department Quality Control Standards as well as ASTM Standards	One example of soil stabilization is to mix CCA with soils underlying a road in lieu of lime and concrete. By doing so, the plasticity index is reduced, maintenance requirements are decreased and the life of the road is extended. The effective substitution of CCA for lime and cement component of concrete provides environmental benefits, as follows: Conservation of energy & materials. The process of cement uses significant energy and raw materials and substituting CCA helps conserve these resources. Reduced CO2 Emissions. Every ton of CCA substituted for cement avoid 1 ton in CO2 emissions which would have been generated in the production of the cement.	State&Federal Requirements: -Surface Water (NPDES) - Clean Air Act - Superfund

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SOIL AMENDMENT / ACID MINE DRAINAGE CCAs are used as agricultural soil amendments at a mine site for a variety of purposes including: -providing a soil cover to prevent water infiltration into mined areas, - controlling acid mine drainage, and -as additives to soil to prevent potential acid mine drainage by effectively adjusting the pH balance.	See Also, Draft ASTM Standard for CCA Used as Soil Amendment and U.S. Department of Agriculture, Natural Resources Conservation Service Soil Survey Documents	The CCAs are a substitute for agricultural lime, which would typically be relied upon from off-site sources. The effective substitution of CCA for lime and cement component of concrete provides environmental benefits, as follows: - Conservation of energy & materials. The process of cement uses significant energy and raw materials and substituting CCA helps conserve these resources. - Reduced CO2 Emissions. Every ton of CCA substituted for cement avoid 1 ton in CO2 emissions which would have been generated in the production of the cement. In addition to the environmental benefits realized from not relying upon off-site agricultural lime to accomplish the same purpose, the use of CCAs as a soil amendment to neutralize acidic soils has been a critical component to Acid Main Drainage projects in the Eastern U.S. and effectively prevents future acid mine problems through its use in the reclamation process at sites in the Western U.S.	State & Federal Requirements: -Surface Water (NPDES) -Clean Air Act - Superfund

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STRUCTURAL FILL / COMPACTION (To fix underground subsidence**)** CCAs are used for construction fill material, including: - structural fills as a substitute for aggregate / soil - injection into underground mines, where coal or lignite has been removed, in order to minimize the occurrence of subsidence	Engineering Standards By reference, Transportation Department Quality Control Standards as well as ASTM Standards See Also, Draft ASTM Standard for CCA Applications at Mine Sites.	CCA materials replace soils, aggregate and cement materials routinely used as construction fill material (for structural support) and the cement or grout materials which would be injected into underground mines to prevent subsidence. In the absence of CCA materials, these materials would be excavated (either on or off site), processed to meet the engineering specifications and hauled to the mining site. The effective substitution of CCA in place of soils, aggregate and cement provides several environmental benefits, as follows: - Land / Habitat Conservation. Less land would be disturbed to excavate / extract the clay and aggregate. As a result more ecologically valuable habitat remains undisturbed. - Reduced VOC and PM Emissions. The use of CCA, (which is usually available from the power plant on-site or close to the mine site), will reduce the distance required to haul the clays, limestone rocks and aggregate materials from off site and will eliminate the additional excavation (and therein the use of heavy equipment) of these materials from on site, reducing the emissions associated with these activities. Also for some operations, the same trucks are used not only to haul coal or lignite to the power plant, but also for the reverse trip to haul CCA from the power plant to the mine area. Diesel truck emissions are reduced by this efficient use of vehicles. - Reduced Noise & Improved Safety. The reduction in driving distances for the diesel haul trucks and the reduced operations of heavy equipment also reduces the noise / potential safety issues associated with blasting, extracting, crushing, sizing, and hauling new clays and rocks for use in roads. - Conservation of energy & materials. The process of cement uses significant energy and raw materials and substituting CCA helps conserve these resources. - Reduced CO2 Emissions. Every ton of CCA substituted for cement avoid 1 ton in CO2 emissions which would have been generated in the production of the cement.	State & Federal Requirements: -Groundwater (SMCRA) -Surface Water (NPDES) (SMCRA) -Air (CAA) -Waste (RCRA) -Clean-up (CERLCLA)

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RAMP ADVANCEMENT (Surfacing and Fill) CCAs are used for the construction of ramps in the active pit areas which would otherwise require the use of virgin dirt or spoil material.	30 United States Code Sections 1201-1309b) (Surface Mining Control & Reclamation Act [SMCRA]) Implemented by Detailed Regulations and Engineering / Design Review and Approval Implemented at State Level and Inspected by Office of Surface Mining (OSM) and State Agencies See Also, Draft ASTM Standard for CCA Applications at Mine Sites	Using CCAs for ramp construction provides increased operational flexibility as well as minimizing the need to disturb additional ground at the end of the project. In addition, surfacing the ramps with CCAs provides the necessary traction to efficiently access the pits during inclement weather conditions, i.e., slippery, wet, and/or frozen. The CCAs also provide a good surface for equipment required to operate on roads located on the pit floor (effective as structural fill). The effective substitution of CCA in place of soils provides several environmental benefits, as follows: - Land / Habitat Conservation. Less land would be disturbed to excavate / extract the soils. As a result more ecologically valuable habitat remains undisturbed. - Reduced VOC and PM Emissions. The use of CCA, (which is usually available from the power plant on-site or close to the mine site), will reduce the distance required to haul the soils from off site and will eliminate the additional excavation (and therein the use of heavy equipment) of these materials from on site, reducing the emissions associated with these activities. Also for some operations, the same trucks are used not only to haul coal or lignite to the power plant, but also for the reverse trip to haul CCA from the power plant to the mine area. Diesel truck emissions are reduced by such efficient use of vehicles. - Reduced Noise & Improved Safety. The reduction in driving distances for the diesel haul trucks and the reduced operations of heavy equipment also reduces the noise / potential safety issues associated with the excavation and transportation of the soils.	State & Federal Requirements: -Groundwater (SMCRA) -Surface Water (NPDES) (SMCRA) -Air (CAA) -Waste (RCRA) -Clean-up (CERLCLA)

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ACHIEVING APPROXIMATE ORIGINAL CONTOUR (AOC) -Pits -Final Pits, and -Abandoned Mine Land (AML) Projects) CCAs are used in reclamation of pits, final pits and AML projects. It is used selectively in areas where there are low volumes of available spoil material and in order to minimize additional land disturbance (extraction of rock and /or soils for the purposed of refilling pit areas.)	30 United States Code Sections 1201-1309b (Surface Mining Control & Reclamation Act [SMCRA]) Implemented by Detailed Regulations and Engineering / Design Review and Approval Implemented at State Level and Inspected by Office of Surface Mining (OSM) and State Agencies See Also, Draft ASTM Standard for CCA Applications at Mine Sites	The use of CCA in place of soils /overburden spoils provides several environmental benefits, as follows: - Land / Habitat Conservation. Less land would be disturbed to excavate / extract the soils. As a result more ecologically valuable habitat remains undisturbed. - Reduced VOC and PM Emissions. The use of CCA, (which is usually available from the power plant on-site or close to the mine site), will reduce the distance required to haul the soils from off site and will eliminate the additional excavation (and therein the use of heavy equipment) of these materials from on site, reducing the emissions associated with these activities. Also for some operations, the same trucks are used not only to haul coal or lignite to the power plant, but also for the reverse trip to haul CCA from the power plant to the mine area. Diesel truck emissions are reduced by such efficient use of vehicles. - Reduced Noise & Improved Safety. The reduction in driving distances for the diesel haul trucks and the reduced operations of heavy equipment also reduces the noise / potential safety issues associated with the excavation and transportation of the soils. In addition, the use of CCAs to assist in achieving AOC provides a critical additional volume of material that enhances AOC activities in several ways: 1) Provides alternative source of fill when there are shortages of overburden (spoil) available for reclamation purposes in the immediate vicinity of the pit being reclaimed. 2) Allows operators to lessen steeper slopes in areas where low volumes of available spoil material typically result in steeper post mine slopes and create slope diversity and enhances post mine contours while maintaining compliance with the regulatory permitting requirements. [Typically in active mine areas, CCAs are placed in pits at depth below the approved topsoil and subsoil depth increments.] 3) Because of 1) and 2) above, may reduce landowner concerns at the time of reclamation performance bond release by improving the attractiveness of land features created during the reclamation process.	State & Federal Requirements: -Groundwater (SMCRA) -Surface Water (NPDES) (SMCRA) -Air (CAA) -Waste (RCRA) -Clean-up (CERCLA)