

EMBANKMENTS CONSTRUCTED OF COAL COMBUSTION BY-PRODUCTS

**DESCRIPTION:** The Contractor shall have the option of using coal combustion by-products (C.C.B.P.) as borrow or as B borrow. C.C.B.P. shall not be used as backfill for MSE walls nor within 0.3 meter (1 ft) of subsurface drain trenches unless otherwise approved. Adherence to the provisions herein does not preclude applicability of local, state or federal regulations and laws.

**MATERIALS:** C.C.B.P. include fly ash, bottom ash, or boiler slag or combinations of these materials produced by coal-fired electrical or steam generating units. These by-products shall be type III or type IV materials per IDEM's restricted waste typing criteria. Current production materials shall not contain boiler tube scalings containing high concentrations of arsenic and selenium. C.C.B.P. shall be in accordance with 203.08 for borrow or 211 for B borrow unless otherwise stated herein.

The maximum fly ash content for C.C.B.P. mixtures shall be limited to 40%, dry unit mass (weight) unless otherwise approved. Fly ash is defined as that portion of C.C.B.P. passing the 75µm (#200) sieve.

C.C.B.P. shall be supplied dry or in a moist condition and transported to the project in a manner that prevents the release of dust and loss of material.

The Contractor shall provide the Engineer with a certification stating the typing of the material and that the C.C.B.P. test at less than 5ppm of boron as determined by the Indiana Neutral Leachate Testing methodology (INLT). The form of the certification shall be as follows:

**C.C.B.P SOURCE CERTIFICATION**

This is to certify that all C.C.B.P. produced by the \_\_\_\_\_ Power Plant of \_\_\_\_\_  
(Company)  
located in \_\_\_\_\_, \_\_\_\_\_, shipped for use on Indiana Department of  
(City) (State)  
Transportation project \_\_\_\_\_ is type \_\_\_\_\_ material according  
(III or IV)  
to IDEM's restricted waste typing criteria with further restrictions that the boron levels  
test at less than 5ppm (INLT methodology) and current production materials do not  
contain boiler tube scalings. \_\_\_\_\_ also agrees that any part of the  
(Company)  
named power plant associated with the production of such C.C.B.P. may be checked at

regular intervals by properly identified representatives of the Indiana Department of Transportation.

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Company)

\_\_\_\_\_  
Signature

The Contractor shall, if requested, furnish the Engineer with a copy of the most recent testing results upon which the certification is based. This information shall include the following information:

- a. entity performing the test,
- b. date samples were obtained,
- c. date samples tested,
- d. test methods used,
- e. frequency of sampling, and
- f. stockpile sampling locations including depths and available historical testing results.

The Department reserves the right to conduct independent quality assurance testing at any time and may reject non-conforming material.

### **CONSTRUCTION REQUIREMENTS**

C.C.B.P. not incorporated into the contract through placement, compaction, and encasement within five calendar days will be considered to be in storage. Prior to storing C.C.B.P. within the contract limits the Contractor shall have an approved erosion control plan to prevent C.C.B.P. runoff and erosion. Total C.C.B.P. in storage shall not exceed 7000 cubic meters (9200 cubic yards) and the maximum time in storage shall be 180 calendar days.

Adequate measures shall be taken during construction to control dust. Spraying with water, lime water, bituminous sprays, or other sealing sprays will be considered to be acceptable methods for dust control.

Type III C.C.B.P. shall not be placed as follows:

- a. Below the seasonal high water table
- b. Within 100 horizontal feet (30 m) of a perennial stream/river and lake/reservoir.
- c. Within 150 horizontal feet (46 m) of a well, spring, or other ground water source of potable water
- d. Adjacent to a wetland or other protected environmental resource area.

It will be the Contractor's responsibility to prepare bids for this item by

anticipating placement limits and estimating quantities of C.C.B.P. by referencing to the restrictions set out by a. through d.

The placement and compaction of C.C.B.P. shall be performed in accordance with 203.23 except that unless otherwise approved in writing, the Contractor shall arrange to conduct test strips to determine appropriate compaction methods and moisture control limits. The construction of these test strips shall be as directed by the Department's Division of Materials and Tests.

C.C.B.P. shall be placed in 200 mm (8 in.) loose lifts.

They shall be compacted using a vibratory steel wheel roller unless otherwise approved. The minimum total compactive effort shall be 21 338 Kg (47,000 lb). If the manufacturer's charts do not list the static mass (weight) acting upon the compaction drum, the roller shall be weighed. The mass (weight) shall be added to the centrifugal force and the roller rated in accordance with the Construction Industry Manufacturer's Association. The roller shall not exceed 4.5 km/h (3 mph).

Compaction shall start at the edges and progress towards the center of the embankment.

Based on the results of the test strips the Department's Division of Materials and Tests will determine appropriate compaction and moisture control criteria. Nuclear gauges shall not be used to measure moisture or density unless a new calibration curve is made for C.C.B.P. and approved by the Division of Materials and Tests.

Areas of C.C.B.P. adjoining dissimilar materials, excluding encasement, shall be benched to prevent slope failures and control differential settlement.

If the Contractor elects to place C.C.B.P. with a high hydraulic conductivity (e.g. bottom ash), a drainage plan to alleviate hydraulic pressure within the fill shall be submitted to the Engineer. Embankment construction shall not commence until the Engineer approves the plan.

While type III C.C.B.P. will not be considered as corrosive to metal structures the Department reserves the right to conduct appropriate tests (e.g. pH) and direct the Contractor to take reasonable protective measures if a pH less than 6 is detected. Such measures may include the substitution of natural soil borrow for C.C.B.P. in areas of concern.

Encasement shall be soil in accordance with 203.09. C.C.B.P. shall not be used as encasement. C.C.B.P. shall be covered with a minimum of 0.3 m (1 ft) of soil. Soil encasement shall be placed and compacted at the same time as the C.C.B.P. lifts. All cover materials shall be appropriately seeded and vegetated in accordance with 621.

**METHOD OF MEASUREMENT.** C.C.B.P., including encasement, will be measured by the cubic meter (cubic yard).

**BASIS OF PAYMENT.** C.C.B.P. embankments will be paid for as borrow at the contract unit price per cubic meter (cubic yard) placed and compacted.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Borrow .....	m3 (CYS)

The costs of the construction of test strips, drainage systems necessary to alleviate hydraulic pressure, water, lime water, bituminous sprays, or other sealing sprays necessary for dust control, or for moisture content will be included in the cost of the pay item.

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