

W. W. Engle, Chief, Civil Engineering and Design Branch, 401 UB-K (2)

Gene Farmer, Chief, Construction Services Branch, 305 NB-K

August 7, 1974

CUMBERLAND STEAM PLANT - ASH DISPOSAL AREA - SOILS INVESTIGATION

10-10
10-30
Front office says other copy was sent to CEB, Master File.

In accordance with the request from Roy H. Dunham to me dated December 6, 1973, our laboratory has completed an investigation to determine the cause of seepage through the ash dike at Cumberland Steam Plant. A site inspection made by representatives of DED and the laboratory in early January established the boring layout shown on laboratory drawing 604K451. Sampling and in-place testing were conducted between May 7 and May 17, 1974, using a Mobil auger drill and a 3-1/4 in. i.d., hollow stem auger. The use of drilling fluid for sampling was eliminated throughout the investigation. A boat was used to determine the water depth and sample the fly ash present in the pond.

In detail, borings B-1, B-2, B-3, and B-4 were drilled in a major zone of seepage. Leakage was also observed in the area of borings A-1 and C-1, but no appreciable seepage was noticed at locations B-5 and B-6. Boring D-1 was drilled in an area which had previously been repaired. All borings were drilled to about el. 345, except boring B-2, which was carried to el. 334 to ascertain the nature of basal soils.

Borings B-1, B-2, B-3, and B-4 disclosed profiles composed of fine-grained cohesive soils, classifying lean to fat clays, CL and CH. Gravel-size particles were not present in these relatively impervious soils. However, drilling and sampling established the presence of a continuous layer of organic topsoil (original ground surface) at about el. 360 in boring B-1 and rising to about el. 363 in boring B-4. Water was encountered during drilling in this relatively soft organic stratum at borings B-2 and B-3. In boring B-4 water was encountered at about el. 359. Within 24 hours the water level in these borings rose to about el. 363 and remained almost constant for the remainder of the investigation. Although boring B-1 stayed dry during drilling, in about 18 hours water had risen to el. 362 and then remained constant. Borings B-5 and B-6, drilled in areas of little seepage, revealed similar conditions in that no zone of concentrated gravel was present in subsoils consisting of lean to fat clay, CL and CH. A zone of topsoil was present in both borings, and the water level was established at about el. 363.

RB, CEB, for possible connections to the records by CEB?
 11-1-1974
 Mansberry
 Return to Davis 11/2/74

RECEIVED AUG 8 1974		CIVIL ENG. & DES. BRANCH	
IN	OUT	IN	OUT
Date	Time	Date	Time
8/8	1:30		
8/8	8		
8/9	11	FDS	9 12:05
8/9	1	RJB	9 2
		JRF	
		RAD	
		FDJ	
8/9	2	KWB	9 2:30

2

W. W. Engle
August 7, 1974

CUMBERLAND STEAM PLANT - ASH DISPOSAL AREA - SOILS INVESTIGATION

In borings A-1 and C-1 conditions similar to those determined in the B borings were encountered. Although no zone of high gravel content was established, topsoil was present in each boring and in this layer, carried water. At location D-1 topsoil was not present and a water level was established at el. 358. Soils at this location were fine grained and cohesive, CL and CH, except for a thin zone of clayey gravel, GC, at about el. 351. The fines content was 42 percent indicating low permeability.

Standard penetration tests at almost every boring indicated a softening of the soil near the elevation at which the water level was established. Both above and below this zone soils are generally of harder consistency. Exceptions are noted in boring B-3 where medium consistency was determined in the surficial soils and in boring B-5 where a basal weakness was found at about el. 347.

Soundings from the boat were made on 25-foot centers for a distance of 100 feet into the ash pond at locations A, B, and C. As shown on laboratory drawing 604A452, water depths of up to 13 feet exist. At each sounding point a splitspoon sampler was driven by hand to determine the amount of ash present in the pond. This sampling indicated about 0.5 to 3 in. of very fine, silt-size ash had been deposited on the pond bottom.

In summary, this investigation disclosed the absence of sand or gravel layers in the dike and foundation. However, the presence of a continuous, soft, and saturated topsoil layer between el. 360 and el. 363 was established. The initial water level obtained during drilling was near the elevation of the topsoil indicating the possibility of seepage through the organic stratum.

Gene Farmer

WHC:PO

Attachment

CC (Attachment):

R. O. Lane, SMW-K

H. H. Mull, 707 UB-K

CUMBERLAND STEAM PLANT

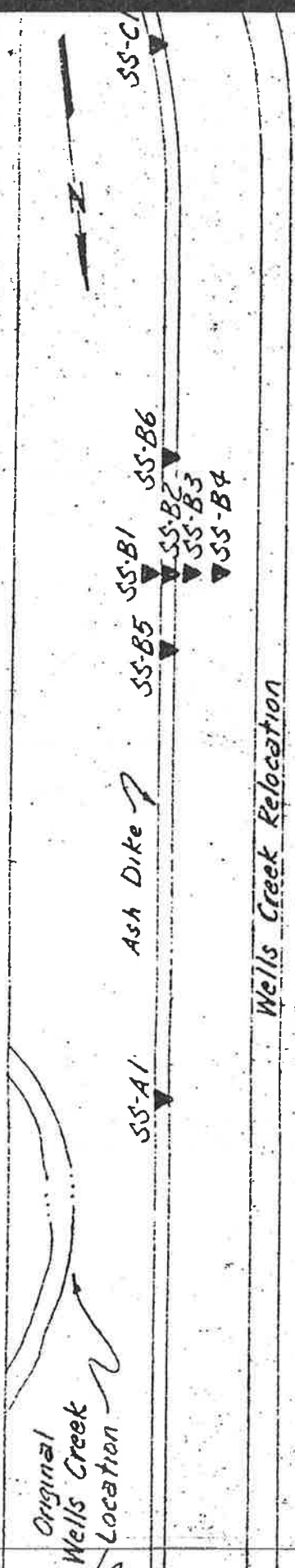
ASH DISPOSAL AREA

WATER LEVEL READINGS

<u>Boring No.</u>	<u>Surface Elevation</u>	<u>Water Table Elevation During Drilling</u>	<u>Water Table Elevation After</u>			
			<u>24 hrs.</u>	<u>48 hrs.</u>	<u>72 hrs.</u>	<u>96 hrs.</u>
SS-A1	381.1	358.0	363.1	363.4	363.1	---
SS-B1	372.6	Dry	362.1	362.1	362.3	362.1
SS-B2	380.5	360.4	362.5	362.8	362.8	362.6
SS-B3	372.0	360.8	362.5	362.5	362.7	362.7
SS-B4	362.8	358.2*	361.9	362.4	362.4	362.4
SS-B5	381.0	358.4	363.1	363.3	363.4	363.3
SS-B6	381.0	362.4	363.0	---	---	---
SS-C1	382.0	363.1	Boring Caved			
SS-D1	381.0	Dry	358.5	358.9	---	---

*Water seeping into auger hole 3.5 feet below surface and in one hour, water level stabilized at elevation 361.8.

Note: During the investigation, the water level in the ash pond varied from el. 367.5 to 367.6. The water elevation in the Wells Creek channel ranged from el. 359.1 to el 359.9.



LEGEND

Boring No.
Coordinates
Surface Elevation

Classification

Natural
Moisture
Content

Blows

Liquid
Plas
Lin
Inc