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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

ENGINEERING FILE COPY

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

GENERAL

State Texas County Caldwell ; ____ ¼, ____ ¼, Sec. ____, T ____ R ____ ; Watershed Guadalupe

Subwatershed Plum Creek Fund class [illegible] (FP-2, WP-1, etc.) Site number 21 Site group II Structure class A

Investigated by [illegible] (signature and title) Equipment used Failing 1500 (Type, size, make, model, etc.) Date 7/23/61

Dale L. Bidwell P.C.E.

SITE DATA

Drainage area size 8.65 sq. mi., 5540 acres. Type of structure compacted earth Purpose floodwater retarding

Direction of valley trend (downstream) south Maximum height of fill [illegible] feet. Length of fill [illegible] feet.

Estimated volume of compacted fill required [illegible] yards

STORAGE ALLOCATION

	Volume (ac. ft.)	Surface Area (acres)	Depth at Dam (feet)
Sediment	198	130	16.3
Floodwater	2514	332	33.0

SURFACE GEOLOGY AND PHYSIOGRAPHY

Physiographic description Blackland Prairie Topography gently rolling Attitude of beds: Dip [illegible] Strike NE-SW

Steepness of abutments: Left 4.3 percent; Right 8 percent. Width of floodplain at centerline of dam 300 feet

General geology of site: Site 21 is located on an outcrop of the Wilcox group of Lower Tertiary age.

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DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Centerline of Dam
(Centerline of Dam, Principal Spillway, Emergency Spillway, the Stream Channel, Investigations for Drainage of Structure, Borrow Area, Reservoir Basin, etc.)

DRILLING PROGRAM

Equipment Used	Number of Holes		Number of Samples Taken		
	Exploration	Sampling	Undisturbed (state type)	Disturbed Large	Disturbed Small
Failing 1500	11	5	1 Dam		17
Acker	4				
Total	15				

SUMMARY OF FINDINGS
(include only factual data)

The valley floor section to the left of the main stream channel exhibits fairly consistent conditions outlined as follows:

(1) A near surface (upper) horizon of sandy clay (CH) materials rests upon a slightly laminated sand and clay (CH) soil. Below this horizon lies a horizon containing interbedded laminae of sand and clay with the sand lamina increased percentage wise. This horizon also contains gypsum. Parent material consisting of laminated sand and shale lies below the lower horizon.

(2) Exceptions to the generalized conditions above were found in test holes 2 and 3 where horizons of SC materials were penetrated.

(3) To the right of the primary stream channel conditions in the lower horizons were similar to the segment previously described. The upper horizon, however, is composed of GC materials.

The foundation of the abutments is composed of interlaminated sand and clay materials.

An inter-connecting channel to be excavated between separated sediment ponds was investigated at stations A 26+00 and A 28+00 of the borrow area.

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DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Centerline Principal Spillway
(Centerline of Dam, Principal Spillway, Emergency Spillway, the Stream Channel, Investigations for Drainage of Structure, Borrow Area, Reservoir Basin, etc.)

DRILLING PROGRAM

Equipment Used	Number of Holes		Number of Samples Taken		
	Exploration	Sampling	Undisturbed (state type)	Disturbed Large	Disturbed Small
Failing 1500	3	1			6
Total					

SUMMARY OF FINDINGS
(include only factual data)

Foundation conditions beneath the principal spillway are very similar to those described for the valley floor segment of the centerline of the dam.

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DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Emergency Spillway
(Centerline of Dam, Principal Spillway, Emergency Spillway, the Stream Channel, Investigations for Drainage of Structure, Borrow Area, Reservoir Basin, etc.)

DRILLING PROGRAM

Equipment Used	Number of Holes		Number of Samples Taken		
	Exploration	Sampling	Undisturbed (state type)	Disturbed Large	Disturbed Small
Failing 1500	1	1		2	
Acker Auger	12	7			
Total	13	8			

SUMMARY OF FINDINGS
(include only factual data)

Two soil horizons were found in the forebay section, crest, and upper part of the exit channel of the spillway.
The upper horizon consisted of a sandy CH material.
The lower horizon consisted of interlaminated clay and sand, and was classified as an SC-CH material.
Composite samples were taken of each of these two horizons.
Laminated CH materials similar to those found in zone A of the borrow were found in the lower part of the spillway exit channel.

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DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Stream Channels
(Centerline of Dam, Principal Spillway, Emergency Spillway, the Stream Channel, Investigations for Drainage of Structure, Borrow Area, Reservoir Basin, etc.)

DRILLING PROGRAM

Equipment Used	Number of Holes		Number of Samples Taken		
	Exploration	Sampling	Undisturbed (state type)	Disturbed Large	Disturbed Small
Hand Auger	2				
Total					

SUMMARY OF FINDINGS
(include only factual data)

Two stream channels are present and cross the centerline dam on this site. Laminated sandy CH material was found to a depth of three feet at the centerline of "C" section on the left stream channel.
Three feet of gravelly materials were found above laminated CH clay at the centerline "C" section on the right stream channel.

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DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Borrow Area
(Centerline of Dam, Principal Spillway, Emergency Spillway, the Stream Channel, Investigations for Drainage of Structure, Borrow Area, Reservoir Basin, etc.)

DRILLING PROGRAM

Equipment Used	Number of Holes		Number of Samples Taken		
	Exploration	Sampling	Undisturbed (state type)	Disturbed Large	Disturbed Small
Acker Auger	18	3		6	
Total					

SUMMARY OF FINDINGS
(include only factual data)

The borrow area was divided into four areal zones, mainly due to the presence of different types of materials in the surface horizon.

Three soil horizons are present in areal zone "A".

The surface horizon consists of sandy CH material.

The second horizon is a laminated sandy CH material containing slight amounts of gravel and slight to moderate amounts of gypsum.

The third horizon is a laminated, sandy, shaly clay.

Areal zone "B" is present along the left stream channel and two material horizons were present.

The top horizon was a laminated SC-CH material.

The second horizon was weathered shale.

A high water table was found in this zone as shown on the grid sheets.

Areal zone "C" contains three material horizons which are very similar to those found in areal zone "A". Reference should be made to the description of zone "A" materials.

Areal zone "D" also contains three soil horizons.

The top horizon is a GC or GC-CH material.

The second horizon is a laminated, sandy CH material with slight to moderate amounts of gypsum and slight amounts of gravel.

The third horizon is a shaly CH material similar to the third horizon material found in areal zone "A".

Materials found along the proposed sediment pool connecting trench line are similar to those found in zone "D" of the borrow and will be used as borrow material.

Representative samples were taken of the materials present in areal zones "A", "B" and "D".

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DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

State Texas County Caldwell Watershed Guadalupe Subwatershed Plum Creek

Site number 41 Site group II Structure class A Investigated by Henry H. Swope Date 7-19-61
(signature and title)

INTERPRETATIONS AND CONCLUSIONS

Centerline of Dam : If the cutoff wall is founded as recommended on maps submitted with this report most problems relating to near surface permeability and seepage reduction should be resolved.
Use of materials from the cutoff trench excavation in the abutment segments should be as recommended for spillway materials.
The use of materials from the valley floor segment of the cutoff wall trench should be as recommended for equivalent borrow materials.
Principal Spillway: Because of the great similarity of the foundation of the principal spillway to that of the valley floor segment of the centerline of the dam, to the left of the main stream channel, treatment of the principal spillway is the same as recommended for the above segment of the centerline of the dam. Materials used as backfill in the conduit foundation trench should be as identical as possible to those used in backfilling adjacent segments of the cutoff wall trench along the centerline of the dam.
Borrow: Materials throughout the borrow are characterized by their laminated condition; however, the material horizons found in the borrow are fairly uniform and easy to correlate.
Due to the similarity of the materials present, Materials Testing Section information for zone "A" samples may be referred to zone "C" materials.
Sandy materials in zone "B" along the stream channel may be difficult to excavate due to the high water table present. The water table in this area should fluctuate considerably according to the occurrence of wet and dry periods.
Loading of borrow materials by making long passes with the scrapers should give compaction curves which will more nearly correspond to Materials Testing Section compaction data on the soils.
CH materials found in the borrow may be used anywhere in the dam, unless gypsum content is found to be high.
If materials are found to contain high gypsum content they should be avoided or used in the center section of the dam above the sediment reserve elevation.
SC-CH, SC and SC-CH materials should be used in the shell of the dam or in the downstream section.
Emergency Spillway: The second horizon SC-CH material present in the forebay and crest section of the spillway is highly laminated and contains pockets of less plastic sandy materials.
A more accurate correlation between the laboratory compaction data and the field curve during construction may be obtained by making relative long passes with the scrapers during spillway loading operations.
Materials found in the lower exit channel section may be referred to materials found in zone "A" of the borrow.
CH materials may be used anywhere in the dam.
SC-CH materials should be used in the shell or downstream section of the dam.
A vegetative cover should be placed on the spillway areas after construction to reduce the effects of erosion.
Channel:Stream channel investigation was limited due to excessive stream flow.
Gravelly and highly organic materials should be removed from the stream channel.

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REPORT TO ACCOMPANY
DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

SAMPLES OF FOUNDATION MATERIALS FOR LABORATORY TESTS

Watershed [redacted] Site No. 21

Hole No.	Sample Type	Field Class.	Depth From	Depth To	Type of Test M.A.	Shear	Cons.	Perm.	Salt	Dis.
1	[redacted]	SC-CH	[redacted]	[redacted]	[redacted]			[redacted]	[redacted]	[redacted]
2	Dist	CH	[redacted]	[redacted]	[redacted]				[redacted]	[redacted]
2	"	SC-CL	6.0	16.0	[redacted]				[redacted]	[redacted]
2	"	CH	[redacted]	20.0	[redacted]				[redacted]	[redacted]
2	"	SC	[redacted]	24.0	[redacted]				[redacted]	[redacted]
2	"	CH	[redacted]	28.0	[redacted]				[redacted]	[redacted]
3	"	SC	8.0	[redacted]	[redacted]				[redacted]	[redacted]
8	"	SC-CH	[redacted]	8.0	[redacted]				[redacted]	[redacted]
8	"	CH	8.0	[redacted]	[redacted]				[redacted]	[redacted]
8	"	CH	16.0	22.0	[redacted]				[redacted]	[redacted]
8	"	CH	22.0	26.0	[redacted]				[redacted]	[redacted]
8	"	CH	26.0	[redacted]	[redacted]				[redacted]	[redacted]
302	"	CH	[redacted]	[redacted]	[redacted]				[redacted]	[redacted]
302	"	CL	[redacted]	[redacted]	[redacted]				[redacted]	[redacted]
302	"	CH-CL	[redacted]	[redacted]	[redacted]				[redacted]	[redacted]
302	"	CH	[redacted]	[redacted]	[redacted]				[redacted]	[redacted]
302	"	CH	20.[redacted]	24.5	[redacted]				[redacted]	[redacted]
302	"	CH	24.5	29.0	[redacted]				[redacted]	[redacted]

Comments: _____

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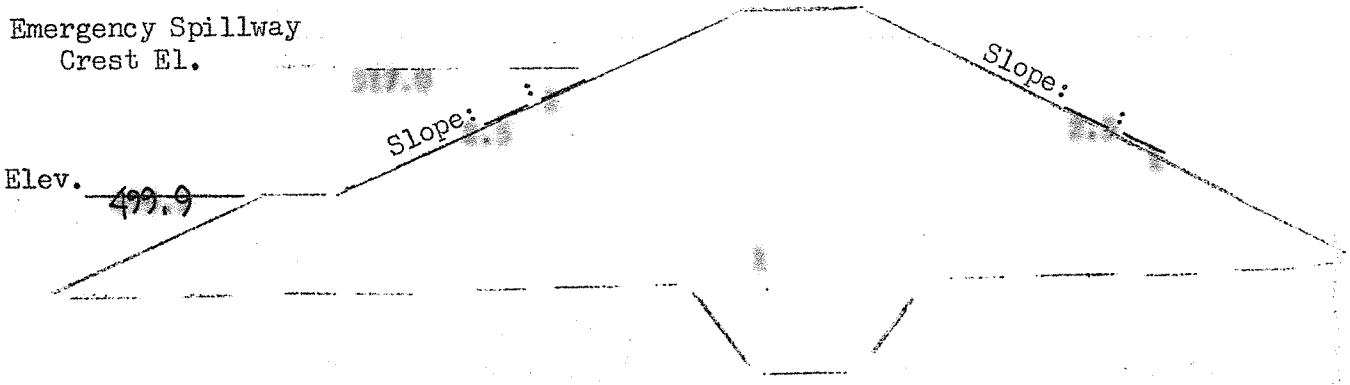
REPORT TO ACCOMPANY
DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

COMPOSITE SAMPIES FOR MOISTURE DENSITY DETERMINATION

Watershed Plum Creek Site No. 21

SUGGESTED EMBANKMENT SECTION(S)



SUGGESTED USE OF MATERIALS

Comp. No.	Material Source	Hole Nos.	Field Class.	Depth From	Depth To	Emb. Sec.	Quan. Avail. (Est.) Cu. Yds.
		153-155					
1			CH	1.0	3.0		53,000
		253-155					
			CH	3.0	10.0		50,000
			CH	10.0	13.0		44,000
			CH				20,000
			SC-CH		Grade		65,000
			SC-CH				15,000
		B	SC-CH		2.0		8,000
			CH		12.0		19,000

Comments: Above materials to be placed in embankment on a selective basis at the discretion of the U. S. Government representative(the plastic materials to be placed toward center of embankment and the less plastic materials to be placed in outer portions of embankment, if at all possible).

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REPORT TO ACCOMPANY
DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

GROUNDWATER ELEVATIONS AND SUGGESTED TRENCH DEPTHS FOR CUTOFF AND PRINCIPAL SPILLWAY FOUNDATION

Watershed [redacted] Site No. 21

Centerline Embankment					Centerline Principal Spillway				
Test Hole No.	Ground Water Elev.	Trench Bottom Depth	Trench Bottom Elev.	Material at Grade	Test Hole No.	Ground Water Elev.	Trench Bottom Depth	Trench Bottom Elev.	Material at Grade
53		4.0	587.8	CH	301?				
1		4.0	999.4	CH	~~301~~		10.0	~~434.~~	CH
2		9.7	488.8	SC-CL	302				
5		12.0	483.9	CH-CL	~~302~~		11.0	493.0	CL
302		11.0	483.0	CL	303				
4		8.0	482.2	CL	~~303~~		9.7	433.0	CH-CL
1401		2.0	481.7	CH					
5		4.5	494.5	CH					
6		5.0	499.3	CH					
7		[redacted]	491.2	CH-CL					
8		8.0	490.6	CH	Alternate Location				
9		9.0	490.7	CH					
1402		4.0	490.8	CH					
10		2.0	495.5	CH					
14		5.0	503.3	CH					
51		4.0	512.0	CH					
52		0							

Comments: