

AGENDA FOR KINGSTON SCRUBBER WET GYPSUM STACKING DISPOSAL

Wednesday November 19, 2003, 10:30 am

- | | | |
|---------------|---|------------------------|
| 10:30 - 11:30 | Introduction and Overview of Project | Dan Smith/Larry Bowers |
| | <ul style="list-style-type: none">•• Review of KIF Site•• Review of Phase 1A Drawings•• Gypsum Quantities•• Objectives | |
| 11:30 - 12:15 | Lunch (on your own) | |
| 12:15 - 1:00 | Discussion of Design Considerations | Group |
| | <ul style="list-style-type: none">•• Underdrain design considerations;•• Use of gypsum as starter dike•• Stack drainage | |
| 1:00 - 3:00 | Configurations for Stack Construction, Including Operational Considerations | Group |
| 3:00 - 4:00 | Selection of Optimal Design Configuration | Group |
| 4:00 - 4:30 | Wrap Up | Group |

Thursday November 20, 2003

- | | | |
|---------------|---|--|
| 7:30 am | Meet at TVA (exact location to be determined) & leave for Kingston Fossil Plant | |
| 9 - 9:30 am | Assemble at Parking lot near ammonia unloading facility | |
| 9:30 - 10:30 | Site visit | |
| 10:30 - 11:30 | Meet at EPRI Conf Room; Review of project (assumptions) with plant representatives | |
| 11:30 - 12:15 | Working Lunch | |
| 12:15 - 2:30 | Presentation to plant representatives of engineering recommendations for conceptual design (basis of Phase 1 costs) | |
| 2:30 - 3:00 | Wrap up | |

Kingston Fossil Plant

Gypsum Stack Conceptual Design
Background and Objectives

Background

- Kingston Fossil Plant (KIF) has 9 units, and generates 1750 mw
- Fly ash is wet sluiced to an approximate 75 ac pond located NW of the Plant
- Fly ash is dredged to 3 dredge cells located in the north side of the pond
- Dredge cells provide sufficient disposal capacity for the year 2015, based on current projections

Background (Continued)

- Option 3B for KIF-generated gypsum disposal involves wet sluicing gypsum to the ash pond, and wet stacking.
- Option 3B estimated capacity is approximately 18.7 million cy
- Bull Run Fossil Plant (BRF), located nearby, does not have sufficient capacity on-site for gypsum disposal

Background (Continued)

- **CURRENT DESIGN BASIS FOR GYPSUM PRODUCTION**
 - KIF projected annual gypsum production is 344,830 cy (wet sluiced)
 - BRF projected annual gypsum production is 197,440 cy (transported to KIF in trucks [dry])
 - Combined annual generation rate is 542,270 cy
 - Plan is to market gypsum to the extent practical (flexible design for disposal)

Background (Continued)

- CURRENT DESIGN BASIS
 - Nearly all gypsum is sulfate; very small amount of sulfite
 - 84 lb/cf density assumed (0.88 cy/ton conversion factor)
 - Capacity factor = 75%
 - Sulfur content in coal = 1.25%
 - Based on 18.7 million cy capacity, approximately 34.5 years of capacity is available

Background (Continued)

- Based on available disposal capacity, TVA requested that combined gypsum & ash disposal facility be investigated for the ash pond location
- TVA requested that the facility be configured such that gypsum & ash disposal can end concurrently.

Background (Continued)

- TVA was planning on wet gypsum disposal in concert with wet ash handling/disposal for Option 3B
- TVA is now entertaining dry ash disposal at KIF
- TVA may consider dry gypsum disposal if ash disposal is converted to dry (Option 2B)

Background (Continued)

- Other Options (1A and 1B) are being considered for another location on the TVA KIF Reservation. These options would involve a gypsum-only disposal facility – most likely a wet gypsum stack for KIF and dry stack for BRF-transported gypsum

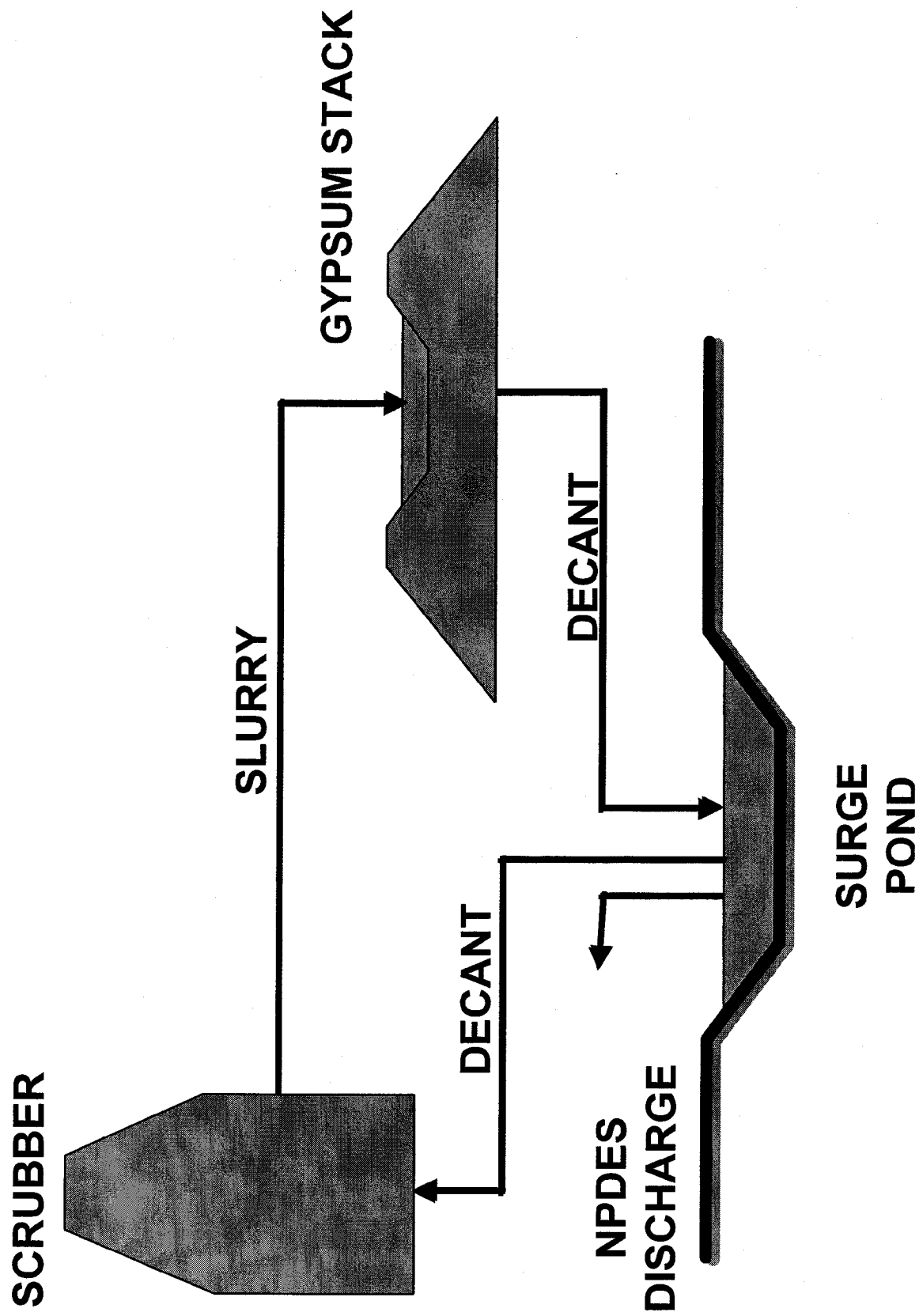
Objectives

- Develop conceptual configurations for disposal of wet and dry gypsum in concert with ash disposal (Option 3B)
- Discuss pros & cons of each configuration
- Reach consensus on a concept that is both feasible and cost effective
- Discuss dry gypsum disposal for KIF (advantages & disadvantages vs wet disposal)

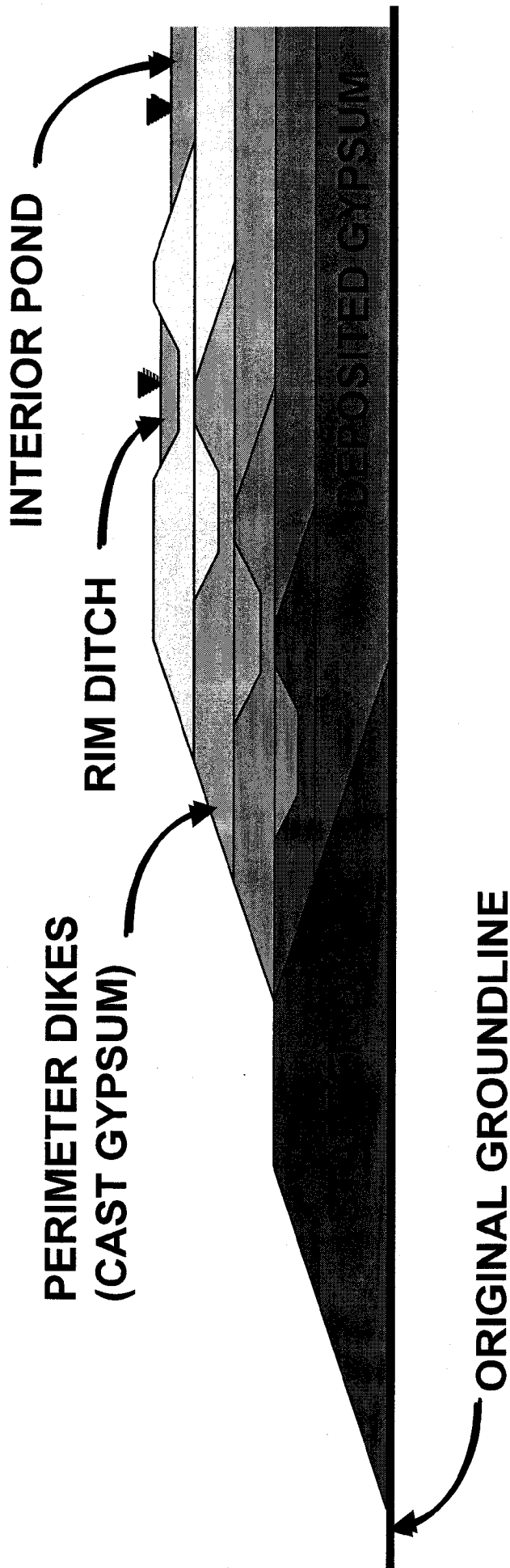
Objectives (Continued)

- Scope of work for study:
 - Develop disposal concepts
 - Develop cost basis for disposal
 - Use constraints set by TVA (i.e., develop disposal facility only, not evaluate process systems (wet vs dry).

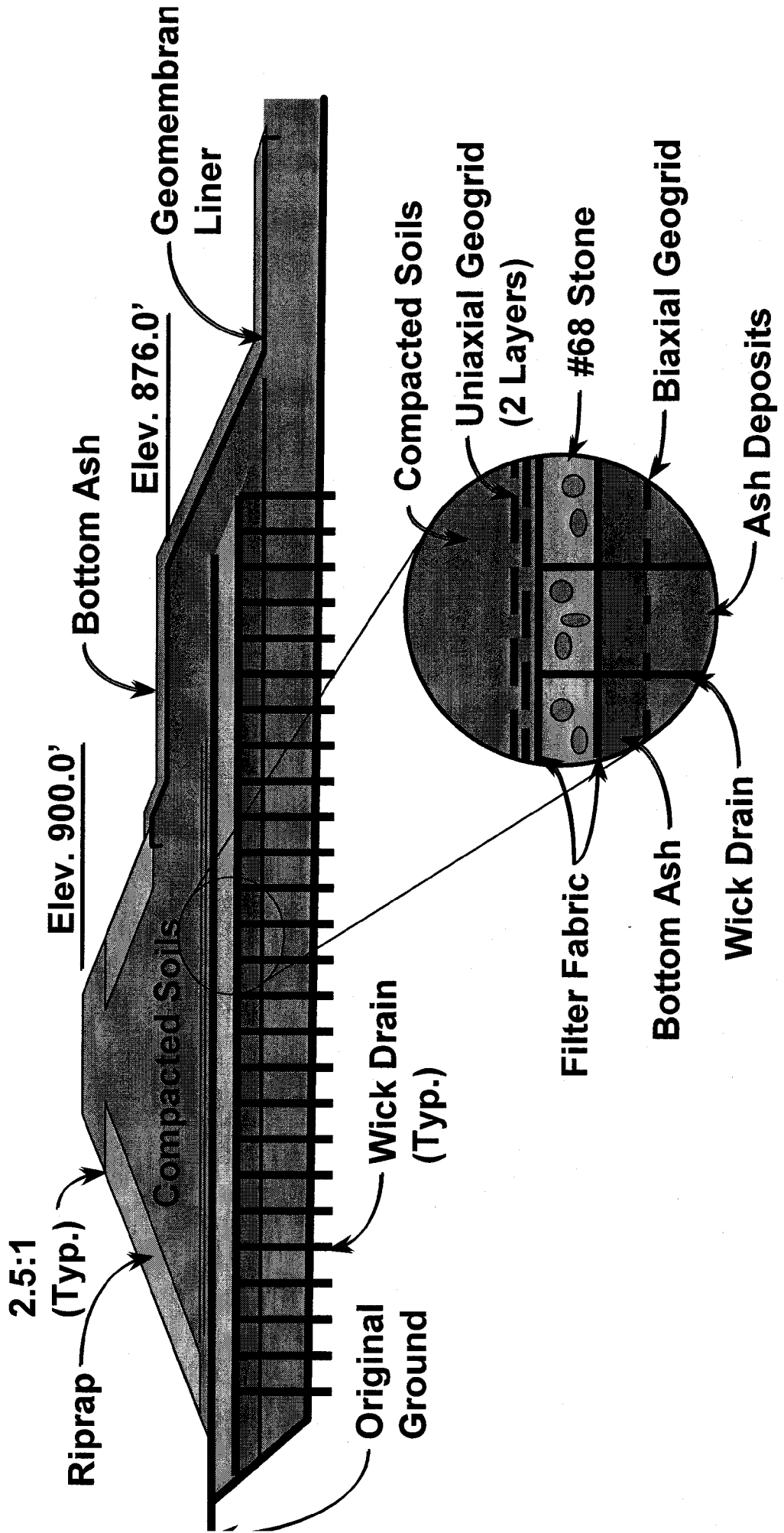
CALCIUM SULFATE DISPOSAL



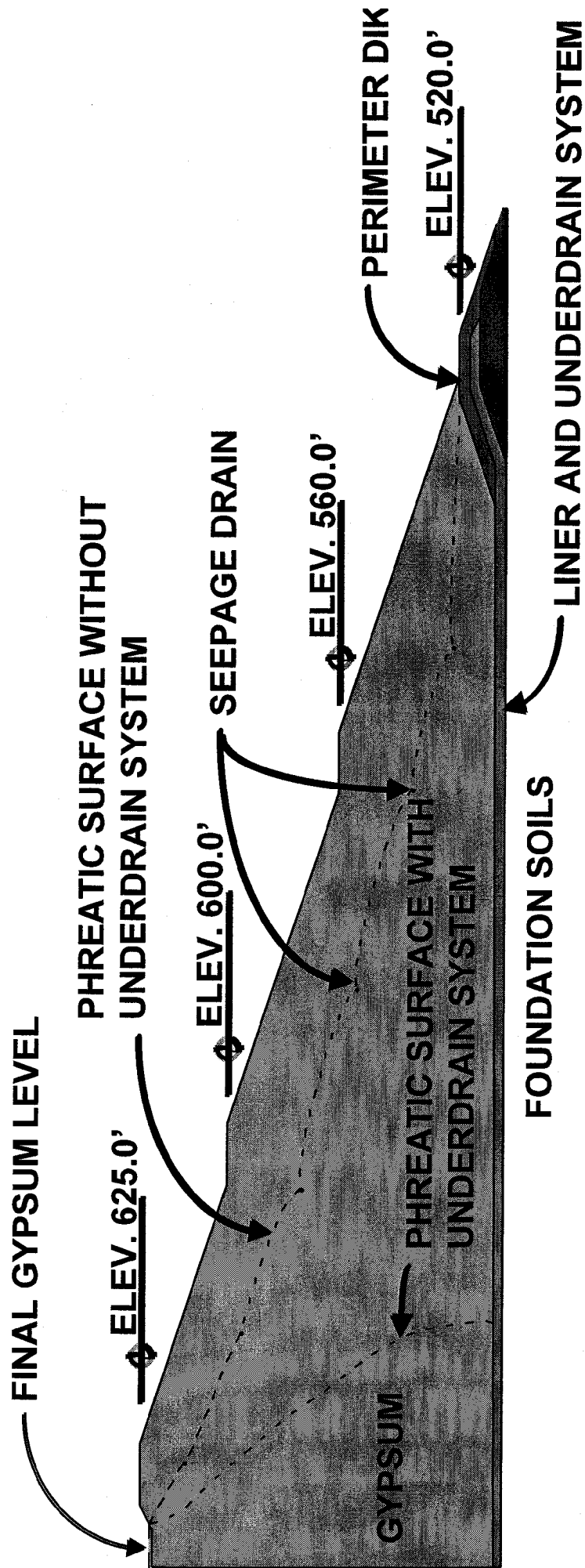
GYPSUM STACKING



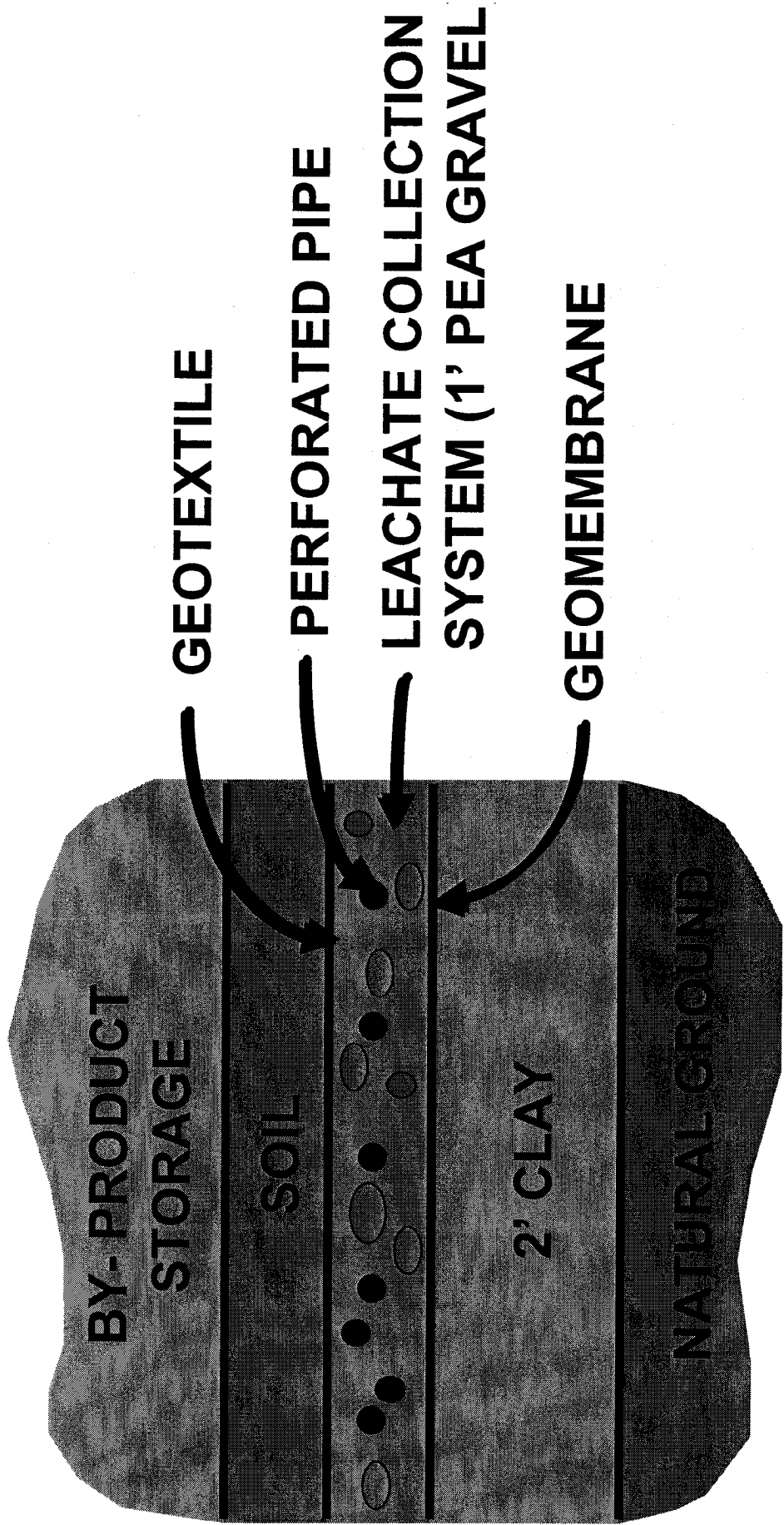
TYPICAL SECTION OF DIKE ON FLY ASH



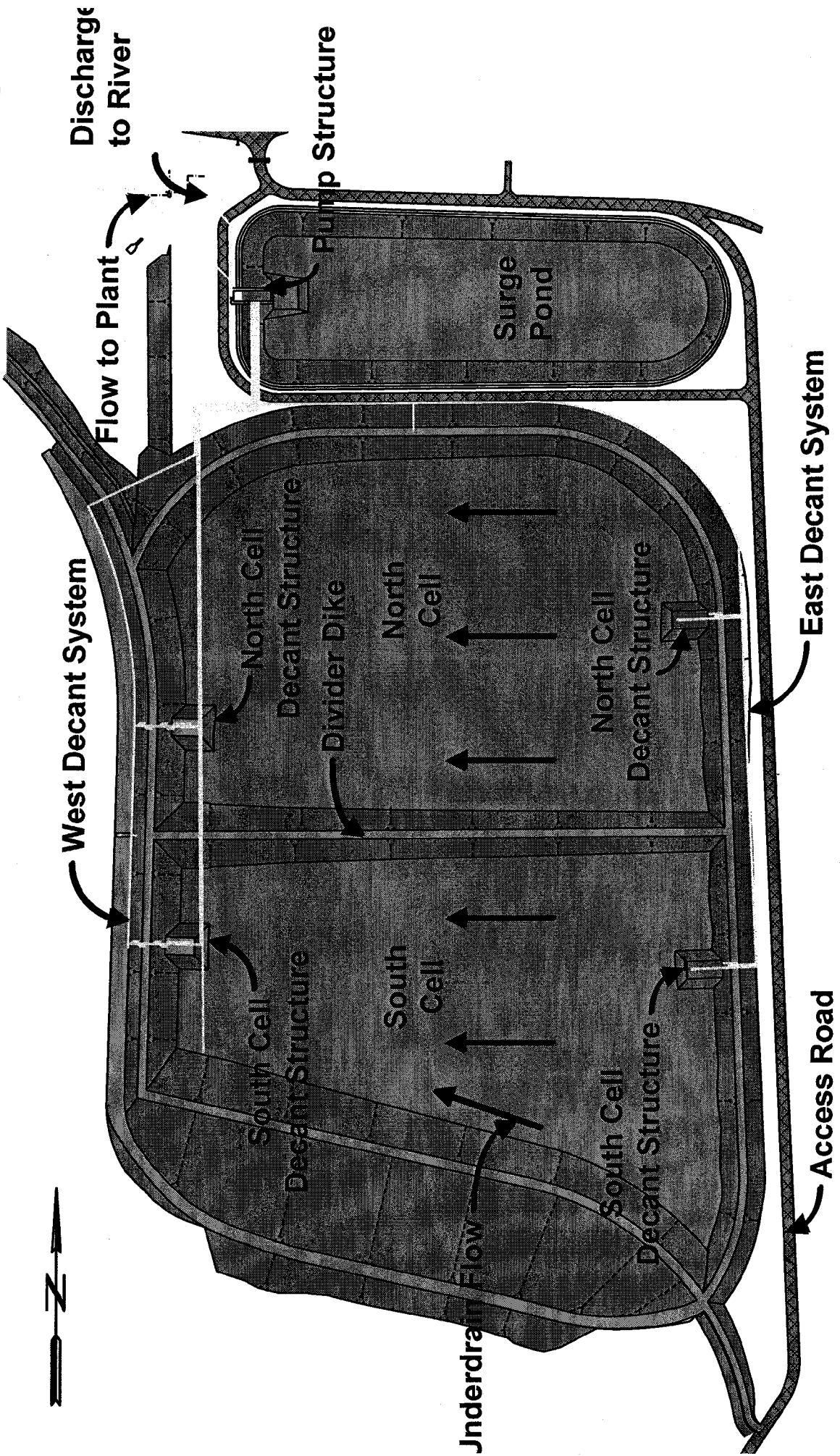
SCHEMATIC DESIGN

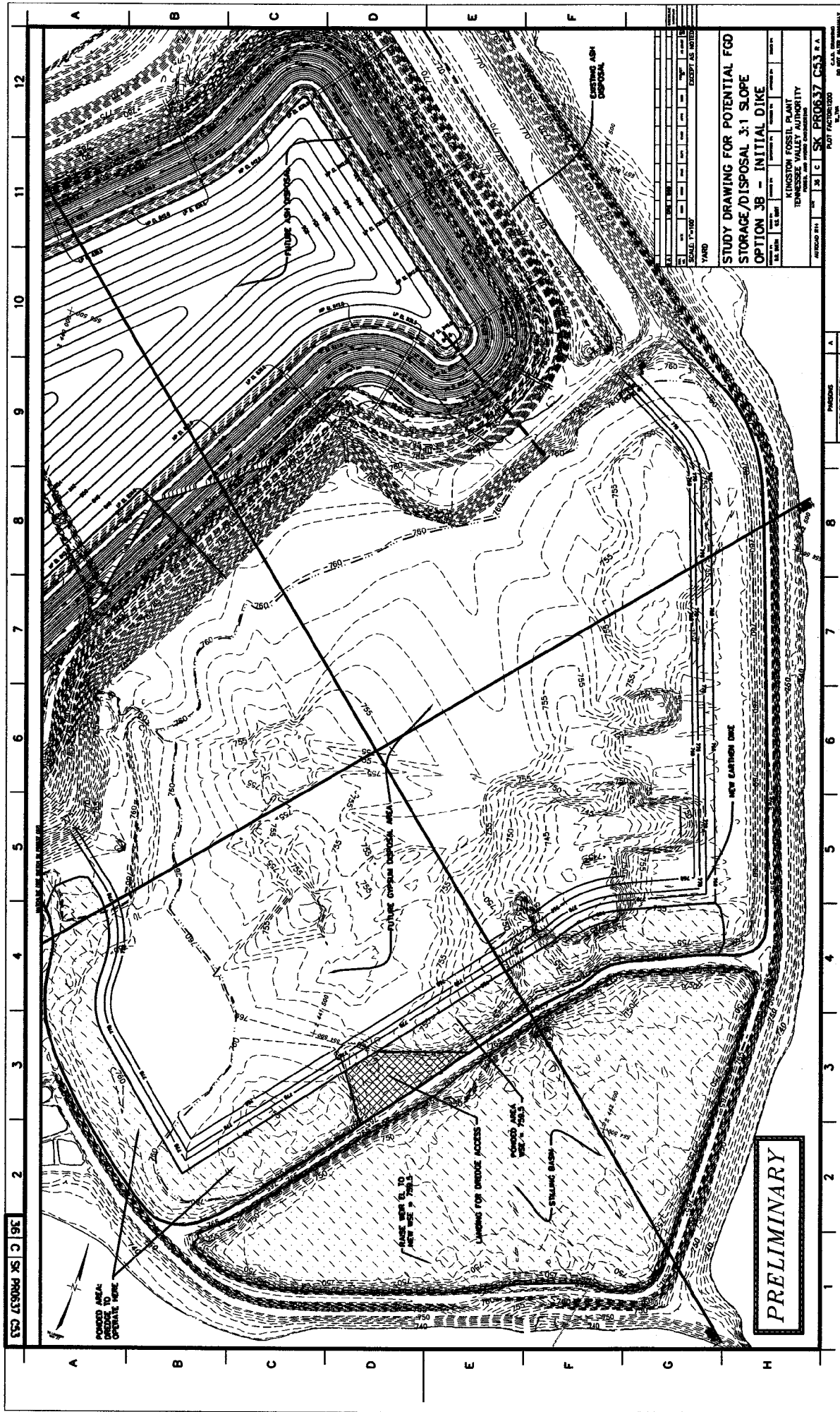


SINGLE COMPOSITE LINER WITH LEACHATE COLLECTION SYSTEM

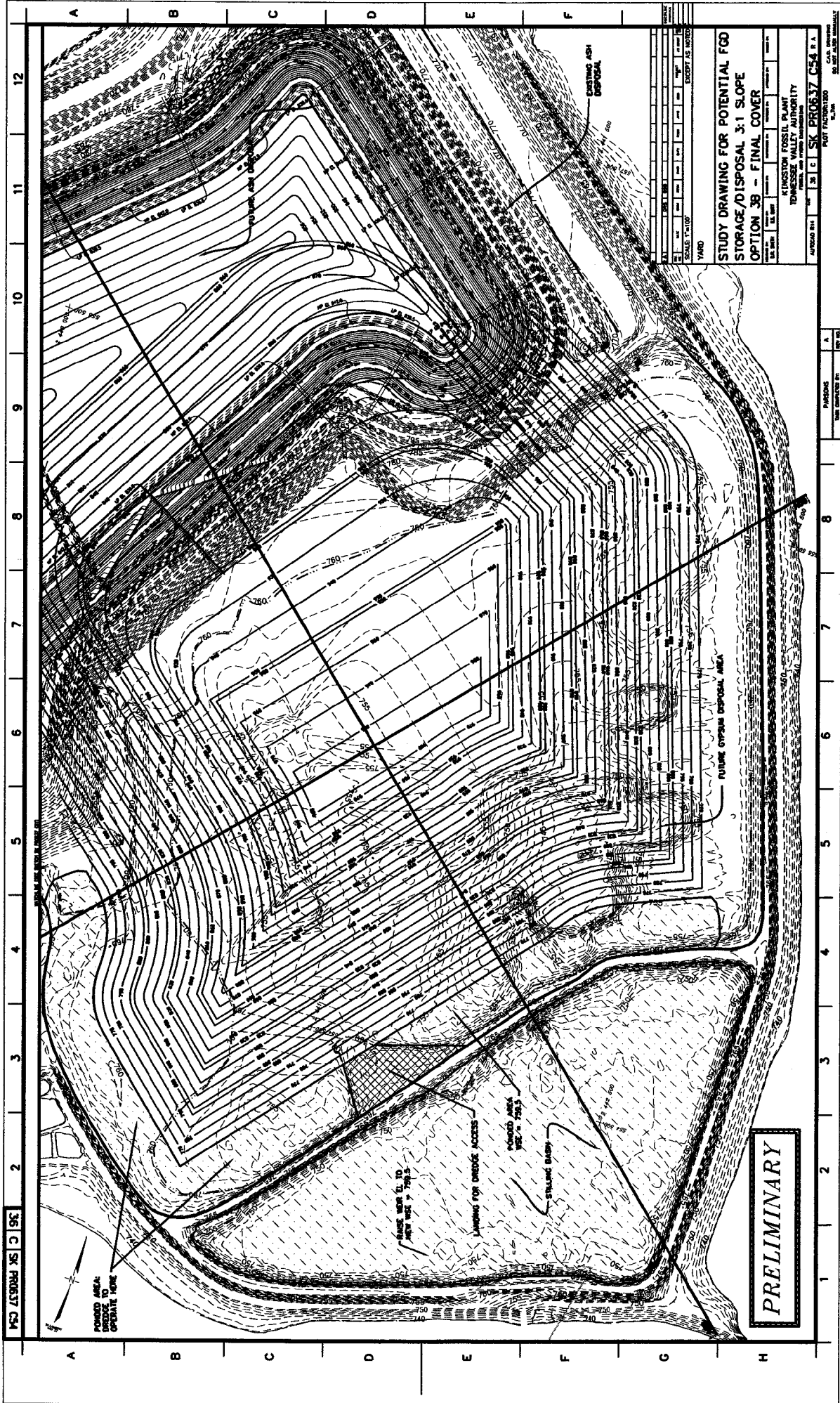


TYPICAL DECANT SYSTEM SCHEMATIC





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36 C SK PROBST C54

POSSIBLE ASH DISPOSAL TO OPERATE HERE

LANDING FOR DRUDGE ACCESS

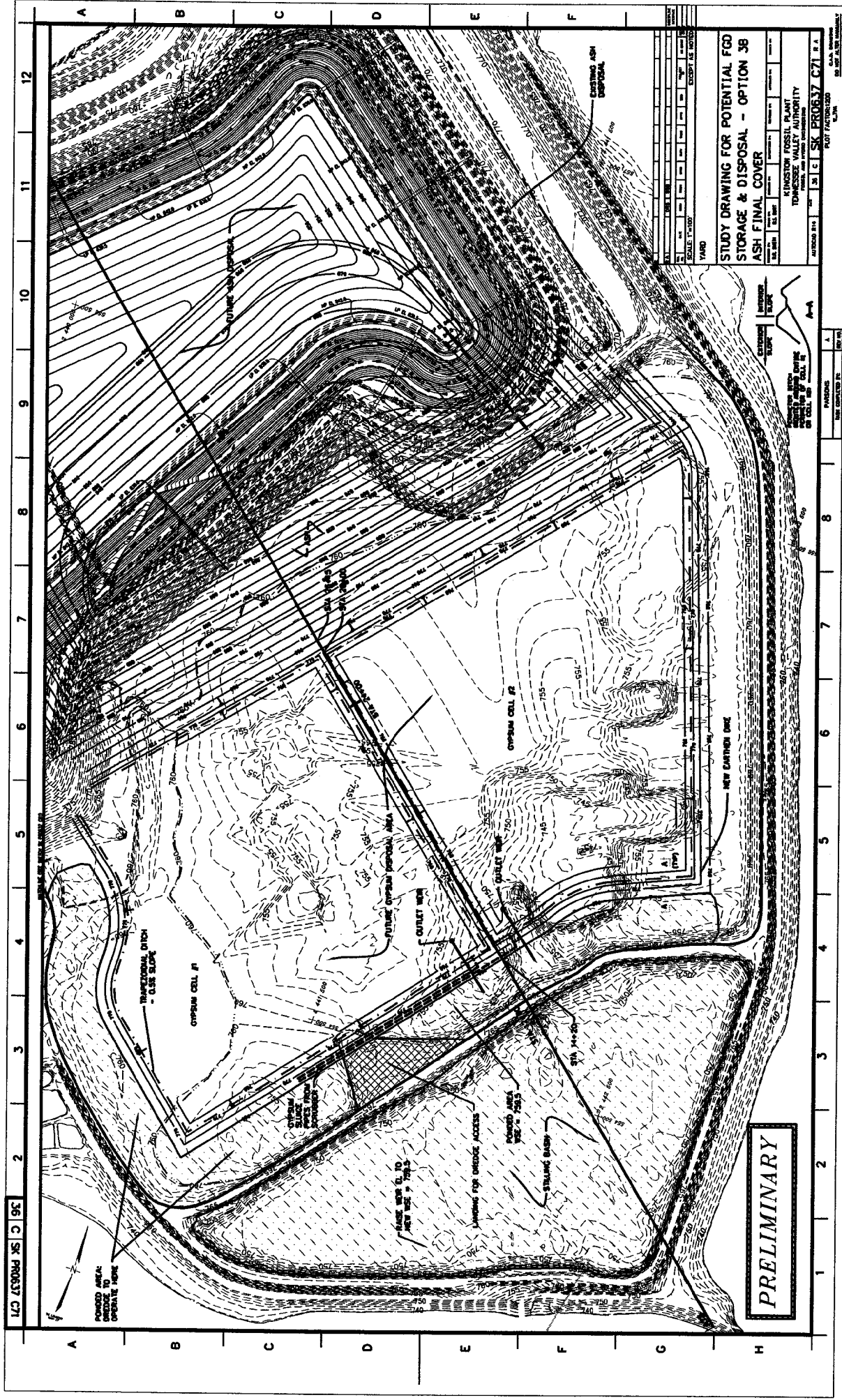
PONDING AREA
ELEV. 750.0

STILLING BASIN

PRELIMINARY

STUDY DRAWING FOR POTENTIAL FCO STORAGE/DISPOSAL 3:1 SLOPE OPTION 3B - FINAL COVER											
SCALE: 1"=100'											
KINGSTON FOSSEL PLANT											
TOWN OF KINGSTON											
PROJECT NO. SK PROJ 0637 C54 A											
DATE: 11/19/03											
DRAWN BY: [Name]											
CHECKED BY: [Name]											
APPROVED BY: [Name]											
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**STUDY DRAWING FOR POTENTIAL FGD
STORAGE & DISPOSAL - OPTION 3B
ASH FINAL COVER**

DATE		DESCRIPTION	BY	CHKD	APP'D
11/19/03	11/19/03	DESIGN			
11/19/03	11/19/03	CHECK			
11/19/03	11/19/03	APPROVE			

SCALE: 1" = 100'

WARD

KINGSTON FOSSIL PLANT
TOPSOIL AND FERTILIZER FACILITY

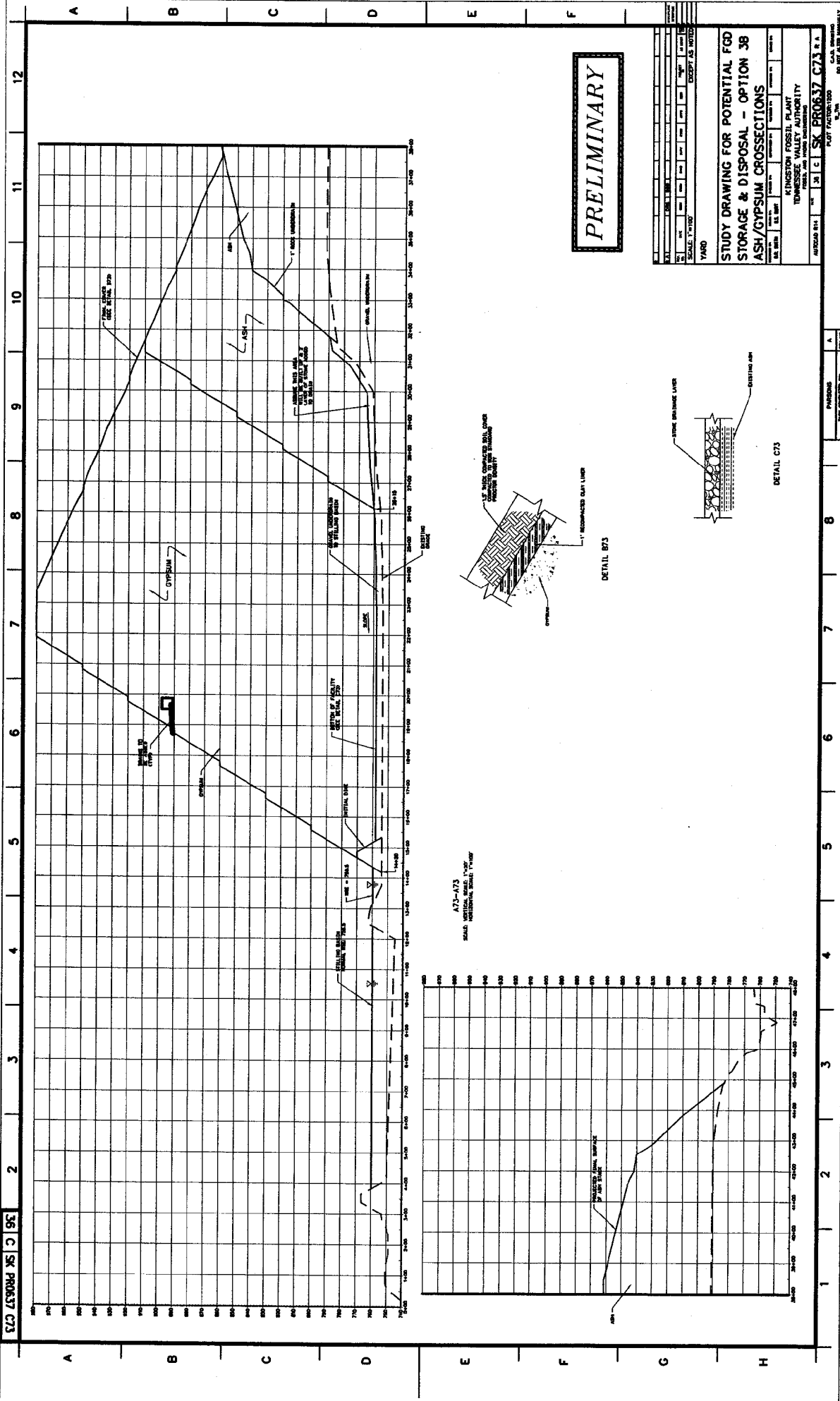
PROJECT NO. 36 C SK PROJ037 C71 R.A.

DATE: 11/19/03

PROPOSED AREA
SUBJECT TO
OPERATING PERMITS

GRID: 1-12, A-H

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Year	0.9% Sulfur		1.1% Sulfur (Base) [Note 1]		1.5% Sulfur		2.0% Sulfur		
	Gypsum	Ash [NOTE 2]	Total Ash + Gypsum	Ash	Total Ash + Gypsum	Ash	Total Ash + Gypsum	Ash	
2008	337418		426800		562098		722933		
2009	337418		426800		562098		722933		
2010	337418		426800		562098		722933		
2011	337418		426800		562098		722933		
2012	337418		426800		562098		722933		
2013	337418		426800		562098		722933		
2014	337418		426800		562098		722933		
2015	337418		426800		562098		722933		
2016	337418	325312	662730	329220	562098	396723	722933	396723	
2017	337418	325312	662730	329220	562098	396723	722933	396723	
2018	337418	325312	662730	329220	562098	396723	722933	396723	
2019	337418	325312	662730	329220	562098	396723	722933	396723	
2020	337418	325312	662730	329220	562098	396723	722933	396723	
2021	337418	325312	662730	329220	562098	396723	722933	396723	
2022	337418	325312	662730	329220	562098	396723	722933	396723	
2023	337418	325312	662730	329220	562098	396723	722933	396723	
2024	337418	325312	662730	329220	562098	396723	722933	396723	
2025	337418	325312	662730	329220	562098	396723	722933	396723	
2026	337418	325312	662730	329220	562098	396723	722933	396723	
2027	337418	325312	662730	329220	562098	396723	722933	396723	
2028	337418	325312	662730	329220	562098	396723	722933	396723	
2029	337418	325312	662730	329220	562098	396723	722933	396723	
2030	337418	325312	662730	329220	562098	396723	722933	396723	
2031	337418	325312	662730	329220	562098	396723	722933	396723	
2032	337418	325312	662730	329220	562098	396723	722933	396723	
2033	337418	325312	662730	329220	562098	396723	722933	396723	
2034	337418	325312	662730	329220	562098	396723	722933	396723	
2035	337418	325312	662730	329220	562098	396723	722933	396723	
2036	337418	325312	662730	329220	562098	396723	722933	396723	
2037	337418	325312	662730	329220	562098	396723	722933	396723	
2038	337418	325312	662730	329220	562098	396723	722933	396723	
2039	337418	325312	662730	329220	562098	396723	722933	396723	
2040	337418	325312	662730	329220	562098	396723	722933	396723	
Subtotal	11134794	8132801	19267594	6584400	12928254	5950845	14458660	4760676	19219336

NOTES

1. % Sulfur for KIF (Base) is 1.1% and BRF (Base) is 1.3%.

2. Forecast for Ash annual volume for Base case is 433814 tons, greater than volume provided by TVA (360,000 cy).

Forecast for Ash annual volume (0.9% sulfur) is 355,727 tons per year (agrees w/published results), which is equivalent to 325,073 cy/yr. Assuming 360,000 cy/yr for ash (base case).

3. Density of ash = 0.9145 cy/ton

4. Density of gypsum = 0.88 cy/ton

5. Disposal Capacity is 18.7 million cy

KIF Gypsum and Ash Disposal Volumes for Sizing Disposal Facility

Year	Gypsum	Ash	Total Ash + Gypsum
2008	542270		542270
2009	542270		542270
2010	542270		542270
2011	542270		542270
2012	542270		542270
2013	542270		542270
2014	542270		542270
2015	542270		542270
2016	542270	325073	867343
2017	542270	325073	867343
2018	542270	325073	867343
2019	542270	325073	867343
2020	542270	325073	867343
2021	542270	325073	867343
2022	542270	325073	867343
2023	542270	325073	867343
2024	542270	325073	867343
2025	542270	325073	867343
2026	542270	325073	867343
2027	542270	325073	867343
2028	542270	325073	867343
2029	542270	325073	867343
2030	542270	325073	867343
2031	542270	325073	867343
2032	542270	325073	867343
2033			0
2034			0
2035			0
2036			0
2037			0
Subtotal	13556750	5526241	19082991

Notes:

1. 1.25% sulfur assumed, 0.88 tons/cy assumed
2. Bottom ash is not disposed in this facility
3. 335,832 cy (KIF) + 188,438 cy (BRF) annually
4. Combined capacity of Option 3B is 18.7 million cy