

1 July 1994

# DRAFT

D A Howard, BR 3D-C

## KINGSTON FOSSIL PLANT - COAL YARD RAINFALL RUNOFF STUDY

The design package for the subject study has been revised to reflect those design premises listed in my memorandum to R G Johnson on June 29. It has been forwarded to Cost Estimating in a format that will allow cost estimates to be prepared for three design alternatives.

An analysis of significant rainfall events was made for a recent three-year period (5/1/91 through 5/31/94). Attached is a brief report that describes the analysis and findings.

A recommended design will be made as soon as the cost estimates have been completed. We are requesting that they be completed by August 26 in order to support preparation of a PAB package for the September PAB meeting.

If you have any questions please call me at 4446 or Chuck Bohac at 7319.

Dan Scott  
Project Engineering  
LP 2P-C

### Attachments

DWS

cc (attachments):

J S Baugh, LP 5G-C  
D E Bohl, LP 2G-C  
K W Burnett, LP 2G-C  
R W Clevenger, SP 3F-C  
J L Glover, LP 2G-C  
F L Johnson, SP 3F-C  
R G Johnson, LP 2G-C  
K E Lewis, Kingston  
C H McFall, BR 4A-C  
C L Mount, LP 2G-C  
L W Wolfe, LP 5D-C  
RIMS, CST 13B-C

# KINGSTON COAL YARD RAINFALL RUNOFF STUDY

## ANALYSIS OF SIGNIFICANT RAINFALL EVENTS BETWEEN 5-1-91 & 5-31-94

### BACKGROUND

If rain falls continually for several days or if two rainfall events approaching the size of a 10-year, 24-hour rainfall event closely follow each other, a runoff collection pond can overflow even though the pump/pond system is adequately sized to normally handle a 10-year, 24-hour rainfall event. State and federal regulations do not prescribe a definite interim of time in which the system must recover from such large rainfall events.

Historical rainfall data for the Kingston Plant region was analyzed for frequency of events of large magnitude.

### SUMMARY OF FINDINGS

Five significant rainfall events occurred during the period of 5-1-91 through 5-31-94. With no pumps operating, the pond would have overflowed during each period except that of 4/12-16/94. (Refer to Attachment 1 for pump and pipeline configurations.) It would not have overflowed during any event if at least one pump had been operating. The most significant event occurred in February 1994 when more than 602,000 cubic feet of water would have overflowed if no pumps had operated.

INTERVAL	----- TOTAL -----		----- PEAK -----	
	RAINFALL (INCHES)	INTERVAL (DAYS)	RAINFALL (INCHES)	INTERVAL (DAYS)
03/23-27/93	5.73	5.0	4.09	1.25
12/04-10/93	6.03	7.0	4.72	1.25
02/09-11/94	6.27	3.0	3.00	0.25
03/27-31/94	6.18	5.0	4.78	1.00
04/12-16/94	4.58	4.5	2.41	0.25

### RECOMMENDATION

The results of this analysis could not be used to predict the frequency that runoff would likely overflow the pond in the future for each of the three pump/pipeline configurations. However, it is reasonable to presume that overflow would occur no more than once over any three year period if one pump (1500 gpm) and pipeline are installed.

With two pumps and one pipeline the chances for overflow would be much less because of second pump standby capability in the event of first pump failure and because of the added pumping rate (about 20%) provided by a second pump. It is believed that this design and resulting reduced frequency of occurrence would be condoned by state regulators during any possible future review of compliance measures taken to reduce pond overflow. Therefore, a two-pump, one pipeline configuration is believed to be environmentally adequate.

ATTACHMENT 1

KINGSTON COAL YARD RAINFALL RUNOFF STUDY  
BASIS FOR PUMPING CAPACITY NEEDED TO PREVENT POND OVERFLOW

	VOLUME & DURATION TO PUMP SAID VOLUME	
	<u>(CU FT)</u>	<u>(DAYS)</u>
POND STORAGE (1ST PUMP START TO OVERFLOW)	1,733,200	
PUMPS OPERATING		
1,200 GPM PUMPS		
ONE PUMP, ONE LINE		7.5
TWO PUMPS, ONE LINE		6.3
TWO PUMPS, TWO LINES		3.8
1,500 GPM PUMPS		
ONE PUMP, ONE LINE		6.0
TWO PUMPS, ONE LINE		5.0
TWO PUMPS, TWO LINES		3.0
10-YEAR 24-HOUR RAINFALL EVENT	1,680,700	
1,200 GPM PUMPS		
ONE PUMP, ONE LINE		7.3
TWO PUMPS, ONE LINE		6.1
TWO PUMPS, TWO LINES		3.6
1,500 GPM PUMPS		
ONE PUMP, ONE LINE		5.8
TWO PUMPS, ONE LINE		4.9
TWO PUMPS, TWO LINES		2.9
24-HOUR PUMPING		
1,200 GPM PUMPS		
ONE PUMP, ONE LINE	231,000	1.0
TWO PUMPS, ONE LINE	277,200	1.0
TWO PUMPS, TWO LINES	462,000	1.0
1,500 GPM PUMPS		
ONE PUMP, ONE LINE	288,700	1.0
TWO PUMPS, ONE LINE	346,500	1.0
TWO PUMPS, TWO LINES	577,500	1.0
	FROM WATER TOP TO OVERFLOW ELEVATION	
	<u>(CU FT)</u>	<u>(INCHES)</u>
POND RESERVE DURING FEB 1994 EVENT*		
PUMPS OPERATING		
NONE	(602,200)	(9)
1,200 GPM PUMPS		
ONE PUMP, ONE LINE	115,400	1
TWO PUMPS, ONE LINE	369,500	6
TWO PUMPS, TWO LINES	923,900	20
1,500 GPM PUMPS		
ONE PUMP, ONE LINE	404,100	7
TWO PUMPS, ONE LINE	577,400	11
TWO PUMPS, TWO LINES	1,113,200	27

dws

07/29/94