JZIGI

DESIGN REPORT

Temporary Sedimentation Structure

J21-G1

Kayenta Mine

Navajo County, Arizona

For

PEABODY WESTERN COAL COMPANY

FEB 2 0 1998

TABLE OF CONTENTS

INTRODUCTION

Sedimentation Structure J21-G1 will be an earthen embankment designed and constructed by Peabody Western Coal Company as a temporary sedimentation structure to control runoff and sediment from portions of the J21 disturbed surface mining area at the Kayenta Mine. The location of Structure J21-G1 and its watershed boundary are shown on Drawing No. 85400 (Sheet N-11) and Drawing No. 85405. The site-specific general construction plans are shown on the attached Exhibit 1.

This design report contains information specific to Structure J21-G1, which is in series with sedimentation structure J21-G. Mine-wide design, construction, and reclamation information is presented in the "General Report, Kayenta and Black Mesa Mines, Navajo County, Arizona, for Peabody Western Coal Company", December, 1985 (PAP), Chapter 6, Attachment D, Volume 2, along with the methods and results of analyses used for slope stability, hydrology, and hydraulics, and in Chapter 6, Pages 11 to 42, "Sediment and Water Control Facility Plan".

INSPECTION

The construction site of the proposed Structure J21-G1 was inspected in August, 1997 by a Registered Professional Engineer from Peabody Western Coal Company, to assure that the site is suitable and no adverse conditions exist to prevent the successful construction of this structure. A detailed geotechnical investigation was not performed, rather, the information in Chapter 6, Attachment D was utilized for embankment design and will be utilized during construction to construct a stable embankment.

SITE DESCRIPTION

LAND USE

The J21-G1 and J21-G Structures have a combined watershed of 269.2 acres and are located on a tributary upstream of Dinnebito Wash at the Kayenta Mine. The 137.6 acres watershed, which contributes directly to structure J21-G1 is classified as 69% spoil, 14% undisturbed, and 17%, disturbed.

DESIGN ANALYSES

GENERAL

Structure J21-G1 was designed under the supervision of a Registered Professional Engineer from Peabody Western Coal Company. The design was performed in accordance with applicable 30 CFR 780 and 816 regulations of the United States Department of Interior, Office of Surface Mining (OSM) and included a review of available project files. The most current information contained in the Peabody Western Coal Company files includes topographic maps developed from aerial photography flown in 1992 for Peabody Western Coal Company and was used in the analyses of the structure.

STABILITY

Structure J21-G1 is assumed to be a Category A-3 embankment. The embankment category will be reevaluated during construction under the supervision of a Register Professional Engineer and Table 3-6, Attachment D, Chapter 6 will be utilized as the guidance to construct stable embankment slopes. A homogeneous earthen embankment, compacted in lifts to design specifications, and approximately 15 feet wide on top will be constructed. An upstream slope of 3:1 (horizontal to vertical) or flatter slope and a downstream slope of 3.5:1 or flatter slope is assumed. Based on the total embankment height of approximately 15 feet, these slopes are equal to or flatter than the recommended "worst case" embankment/foundation condition slopes in Table 3-6, Attachment D, Chapter 6; therefore, the embankment will be stable. The emergency spillway will be a minimum 30-foot wide, riprap-lined, trapezoidal channel.

HYDROLOGY

The hydrologic analysis was completed using the computer program SEDCAD+ (see Appendices A, B, and C). Structure J21-G1 will be constructed in series with proposed downstream Structure J21-G. Structure J21-G1 is classified as a low hazard structure (see Drawing No. 85408). In addition, the mine area is sparsely populated with no one living in the downstream floodplain. The structure will impound less than 20 acre-feet and be less than 20 vertical feet in height from the upstream toe of the embankment of the natural stream elevation to the emergency spillway invert elevation. The two structures have a combined capacity greater than 20 acre-feet; therefore, the spillway was analyzed using the 100-year, 6-hour storm event in lieu of the 25-year, 6-hour event. Structures J21-G1 and J21-G were conservatively assumed to be full to the emergency spillway at the time of 100-year storm event. The storage capacity of structure J21-G1 was analyzed using the 10-year, 24-hour storm event. The combined ponds in series were verified to completely contain the 10-year, 24-hour storm event, and provide adequate sediment storage volume, without discharging into the Dinnebito Wash.

The following parameters were used in the hydrologic analysis (see Appendix B and C):

		J21-G1
1.	Water Course length, L	0.432 mi.
2.	Elevation Difference, H	180 ft
3.	Time of Concentration, T_c	0.133 hr
4.	SCS Curve Number	86
5.	Rainfall Depth, 10-year, 24-hour storm	2.1 in
	100-year, 6-hour storm	2.4 in
6.	Drainage Area	137.6 acres

HYDRAULICS

The SEDCAD+ and Flow Master computer programs were used to evaluate inflow to the sedimentation structure, outflow from the structure and the resulting water surface elevations. The initial conditions and results of the analysis are summarized in the following table (supporting calculations are presented in Appendices A, B, and C).

J21-G1 SEDIMENTATION POND HYDRAULICS TABLE

	Units	10-Yr, 24-Hr Storm	100-Yr, 6-Hr Storm
Initial Reservoir Volume Condition		Empty	Full to emergency spillway
Inflow			
Peak Flow	cfs	123.2	221.3
Volume	ac-ft	10.6	13.3
Storage			
Peak Stage	msl	N/A	6948.6
Emerg. Spillway Elev.	msl	6947.0	6947.0
Peak Storage	ac-ft	N/A	23.9
Storage Capacity	ac-ft	19.62	19.62
Outflow			
Peak Flow	cfs	N/A	146.2
Spillway Elevation	msl	6947.0	6947.0
Embankment Crest Elev.	msl	6950	6950
Peak Stage	msl	--	6948.6
Freeboard	ft	--	1.4
Emergency Spillway Channel			
Flow Depth	ft	--	1.6
Critical Velocity	fps	--	5.1
Mannings "n"	—	--	.031
Width	ft	--	30
Outflow Channel			
Slope	%	--	25
Normal Velocity	fps	—	8.1
Normal Depth	ft	—	0.6
Mannings "n"	--	--	.061
Riprap D_{50}	in	—	6

EMERGENCY SPILLWAY AND OUTLET CHANNEL

The emergency spillway and outlet channel for J21-G1 will be a trapezoidal channel with dimensions listed below. The alignment and dimensions are shown on Exhibit 1.

Minimum Channel Depth	(Spillway)	3.0	ft
	(Outflow)	2.0	ft
Channel Width		30	ft
Channel Length	(Spillway)	40	ft
	(Outflow)	250	ft
Sideslopes (Horizontal to Vertical)		3:1	or flatter
Average Slope	(Spillway)	0	%
Maximum Slope	(Outflow)	25.0	%
Spillway Elevation		6947.0	ft

A minimum 15-foot long, riprap-lined, channel will be constructed beyond the toe of the embankment as a transition into the downstream channel.

STORAGE CAPACITY

The impoundment stage-capacity table (see Exhibit 1) is based on the 1992 aerial topographic mapping conducted for Peabody Western Coal Company. Structure J21-G1 is designed to contain approximately 19.62 acre-feet.

The calculations for the sediment load entering structure J21-G1 were made utilizing the Revised Universal Soil Loss Equation with the following parameters:

1.	Rainfall Factor, R	40
2.	Soil Erodibility Factor, K	0.15
3.	Slope Factor, LS	4.28
4.	Cover Factor, C	0.89
5.	Erosion Control Factor, P	0.86

The hydrologic analysis gives the storage volume required to contain the 10-year, 24-hour storm, and the remaining storage volume available for storing sediment. Structure J21-G1 does not have sufficient storage to contain the 10-year, 24-hour storm by itself; however, in series with structure J21-G the cumulative storage capacity of the two ponds is adequate. The combined sediment storage capacity was determined for the two structures in series and the results of the analysis are presented in the following table.

Combined Storage for Structures J21-G1 and J21-G

	J21-G1	J21-G	Combined
Total Storage Capacity	19.62	19.30	38.92 acre-ft
10-Year, 24-Hour Storm Inflow	10.61	6.38	16.99 acre-ft
Available Sediment Storage Capacity	—	--	21.93 acre-ft
Sediment Inflow Rate/Year	1.23	1.45	2.68 acre-ft
Sediment Storage Life	--	--	8.2 years

*   *   *

The following appendices and drawing are attached and complete this design report.

Appendix A   - Hydrology, Hydraulic, and Sedimentation Calculations

Appendix B   - SEDCAD+ (Input and Output) 10-Year, 24-Hour Storm Event

Appendix C   - SEDCAD+ (Input and Output) 100-Year, 6-Hour Storm Event

Exhibit #1   - J21-G1 Temporary Proposed Sedimentation Pond

APPENDIX A

Hydrology, Hydraulic, and Sedimentation Calculations

PEABODY WESTERN COAL COMPANY
CALCULATED HYDROLOGIC DATA

PROJECT: J21 AREA

STRUCTURE: J21-G1

TIME OF CONCENTRATION:

Start Elevation (ft) =	7120
End Elevation (ft) =	6940
Elevation Difference, E (ft) =	180
Watercourse Length (ft) =	2280
Watercourse Length, L (mi) =	0.432

$Tc = (11.9L^3/E)^{0.385} =$ 0.133 hours

ROUTING PARAMETERS:

Between structure routing parameters were calculated using the SCS Upland Method in SEDCAD+.
Input and output parameters are shown on the SEDCAD+ printouts in Appendices B and C.

SCS CURVE NUMBER:

Cover Type	Soil Group	Curve Number	Area (acres)	CN*Area
Sagebrush-Grass	C	73	4.2	306.6
Pinyon Juniper	C	78	15	1170
Disturbed	C	91	22.7	2065.7
Spoil	B	86	95.7	8230.2
TOTAL:			137.6	11772.5

Weighted CN = Total CN*Area/ Total Area =   86

DRAINAGE BASIN AREA:

137.6 Acres

PROJECT: J21-G1 Pond

SOIL ERODIBILITY FACTOR:

Soil Type	Erodibility Factor, K	Area (acres)	K*Area
Spoil	0.12	95.7	11.48
Disturbed	0.22	22.7	4.99
36	0.39	0	0.00
20	0.25	19.2	4.80
TOTAL:		137.6	21.28

Weighted K = Total K*Area/ Total Area =   0.15

SLOPE FACTOR:

Length (ft)	Elevation Change (ft)	Slope (%)	m	Slope Angle (deg)	LS Factor
500	60	12.0%	0.6	6.8	4.78
400	40	10.0%	0.5	5.7	2.75
600	50	8.3%	0.5	4.8	2.66
400	30	7.5%	0.5	4.3	1.97
300	30	10.0%	0.5	5.7	2.38
400	50	12.5%	0.6	7.1	4.41
400	110	27.5%	0.6	15.4	11.01

Average LS =   4.28

The LS Factor was calculated by:

LS = (Slope Length/72.6)^m(10.8*sin(slope angle) + 0.03) for Slopes < 9%*

LS = (Slope Length/72.6)^m(16.8*sin(slope angle) - 0.5) for Slopes > 9%*

Where:

Slope < 3%	*m = 0.3*
Slope = 4%	*m = 0.4*
5% > Slope < 10%	*m = 0.5*
Slope > 10%	*m = 0.6*

COVER AND PRACTICE FACTORS:

Cover Type	Cover (%)	Canopy (%)	Area (acres)	Cover Factor, C	C*Area	Practice Factor, P	P*Area
Sagebrush-Grass	20%	25%	4.2	0.20	0.84	1.00	4.20
Pinyon Juniper	20%	25%	15	0.22	3.30	1.00	15.00
Disturbed	0%	0%	22.7	1.00	22.70	1.00	22.70
Spoil	0%	0%	95.7	1.00	95.70	0.80	76.56
TOTAL:			137.6		122.54		118.46

Weighted C = Total C*Area/ Total Area =   0.891

Weighted P = Total P*Area/ Total Area =   0.861

RAINFALL FACTOR:

R = 40

PEABODY WESTERN COAL COMPANY
CALCULATED SEDIMENT YIELD

PROJECT: J21-G1 Pond

The following spreadsheet calculates the predicted sediment yield for the project area. The gross sediment yield is determined according to the Revised Universal Soil Loss Equation.

PARAMETER DESCRIPTION	VALUE	
Annual Rainfall Factor	40.00	
Soil Erodibility Factor	0.15	
Length Slope Factor	4.28	
Cover Factor	0.89	
Practice Factor	0.86	
Gross Annual Sediment Yield	20.30	tons/acre/year
Sediment Density	94.00	pcf
Gross Annual Sediment Yield	0.0099	acre-feet/acre/year
Sediment Delivery Ratio	90%	
Estimated Annual Sediment Yield	0.0089	acre-feet/acre/year
Watershed Area	137.6	acres
Watershed Annual Sediment Yield	1.23	acre-feet/year
Number of years	1	years
Calculated Sediment Volume	1.23	acre-feet

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SEDCAD+ RIPRAP CHANNEL DESIGN
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          J21-G1 SPILLWAY

          INPUT VALUES:

Shape                      TRAPEZOIDAL
Discharge                    146.20 cfs
Slope                         25.00 %
Sideslopes (L and R)        3.00:1          3.00:1
Bottom Width                  30.00 feet
Freeboard                  None


               RESULTS:

Steep Slope Design - PADER Method

Depth                        0.57 ft
   with Freeboard            0.00 ft
Top Width                   33.42 ft
   with Freeboard           30.00 ft
Velocity                     8.08 fps
Cross Sectional Area        18.09 sq ft
Hydraulic Radius             0.54 ft
Manning's n                  0.061
Froude Number                1.94
Dmax                         0.625 ft ( 7.50 in)
D50                          0.500 ft ( 6.00 in)
D10                          0.167 ft ( 2.00 in)
```

J21-G1 Spillway
Worksheet for Trapezoidal Channel

Project Description

Project File	untitled.fm2
Worksheet	J21-G1 Spillway
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data

Mannings Coefficient	0.031	
Channel Slope	0.015175	ft/ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	30.00	ft
Discharge	146.20	cfs

Results

Depth	0.88	ft
Flow Area	28.61	ft²
Wetted Perimeter	35.55	ft
Top Width	35.26	ft
Critical Depth	0.88	ft
Critical Slope	0.015176	ft/ft
Velocity	5.11	ft/s
Velocity Head	0.41	ft
Specific Energy	1.28	ft
Froude Number	1.00	
Flow is subcritical.		

APPENDIX B

SEDCAD+ (Input and Output) 10-Year, 24-Hour Storm Event

CIVIL SOFTWARE DESIGN

SEDCAD+ Version 3

PEABODY WESTERN COAL COMPANY : POND G1 & G (10 YEAR, 24-HR)

by

Name: D. GLEASON

Company Name: ACZ, INC.
File Name: J:\861\0400\SEDCAD\J21G

Date: 02-04-1998

Company Name: ACZ, INC.
Filename: J:\861\0400\SEDCAD\J21G   User: D. GLEASON
                 Date: 02-04-1998 Time: 10:05:47
    PEABODY WESTERN COAL COMPANY : POND G1 & G (10 YEAR, 24-HR)
  Storm: 2.10 inches, 10 year-24 hour, SCS Type II
            Hydrograph Convolution Interval: 0.1 hr

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SUBWATERSHED/STRUCTURE INPUT/OUTPUT TABLE
==

-Hydrology-

BS	SWS	Area (ac)	CN	UHS	Tc (hrs)	K (hrs)	X	Base-Flow (cfs)	Runoff Volume (ac-ft)	Peak Discharge (cfs)
11	1	137.60	86	F	0.133	0.000	0.000	0.0	10.61	123.21
			Type: Pond		Label: J21-G1 POND					
11	Structure	137.60							10.61	
11	Total IN	137.60							10.61	123.21
11	Total OUT								10.61	72.76
12	1	131.60	79	F	0.200	0.000	0.000	0.0	6.38	68.70
			Type: Pond		Label: J21-G POND					
12	Structure	131.60							16.99	
12	Total IN	269.20							16.99	136.34
12	Total OUT								16.99	71.88
11 to 112 Routing						0.005	0.424			

APPENDIX C

SEDCAD+ (Input and Output) 100-Year, 6-Hour Storm Event

CIVIL SOFTWARE DESIGN

SEDCAD+ Version 3

PEABODY WESTERN COAL COMPANY : POND G1 & G (100 YEAR, 6-HR)

by

Name: D. GLEASON

Company Name: ACZ, INC.
File Name: J:\861\0400\SEDCAD\J21G10

Date: 02-03-1998

Civil Software Design -- SEDCAD+ Version 3.1

Company Name: ACZ, INC.
Filename: J:\861\0400\SEDCAD\J21G10   User: D. GLEASON
Date: 02-03-1998 Time: 09:47:21
PEABODY WESTERN COAL COMPANY : POND G1 & G (100 YEAR, 6-HR)
Storm: 2.40 inches, 100 year- 6 hour, SCS Type II
Hydrograph Convolution Interval: 0.1 hr

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GENERAL INPUT TABLE
========================

Detailed Between Structure Routing:

| | To | Seg. | Land Flow | | | | Segment | Muskingum | |
J B S		#	Condition	Distance (ft)	Slope (%)	Velocity (fps)	Time (hr)	K (hr)	X
1 1 2	1		8	201.00	10.00	9.49	0.01	0.005	0.424

Civil Software Design -- SEDCAD+ Version 3.1
Copyright (C) 1987-1992. Pamela J. Schwab. All rights reserved.

Company Name: ACZ, INC.
Filename: J:\861\0400\SEDCAD\J21G10   User: D. GLEASON
Date: 02-03-1998 Time: 09:47:21
PEABODY WESTERN COAL COMPANY : POND G1 & G (100 YEAR, 6-HR)
Storm: 2.40 inches, 100 year- 6 hour, SCS Type II
Hydrograph Convolution Interval: 0.1 hr

===
SUBWATERSHED/STRUCTURE INPUT/OUTPUT TABLE
===

-Hydrology-

JBS	SWS	Area (ac)	CN	UHS	Tc (hrs)	K (hrs)	X	Base-Flow (cfs)	Runoff Volume (ac-ft)	Peak Discharge (cfs)
111	1	137.60	86	F	0.133	0.000	0.000	0.0	13.33	221.31
		Type: Pond		Label: J21-G1 POND						
111	Structure	137.60							13.33	
111	Total IN	137.60							13.33	221.31
111	Total OUT								13.33	146.20
11~	1	131.60	79	F	0.200	0.000	0.000	0.0	8.46	134.70
		Type: Pond		Label: J21-G POND						
1	Structure	131.60							21.78	
112	Total IN	269.20							21.78	259.79
112	Total OUT								21.79	160.76
111 to 112 Routing						0.005	0.424			

Company Name: ACZ, INC.
Filename: J:\861\0400\SEDCAD\J21G10   User: D. GLEASON
Date: 02-03-1998 Time: 09:47:21
PEABODY WESTERN COAL COMPANY : POND G1 & G (100 YEAR, 6-HR)
Storm: 2.40 inches, 100 year- 6 hour, SCS Type II
Hydrograph Convolution Interval: 0.1 hr

==============================
POND INPUT/OUTPUT TABLE
==============================

J1, B1, S1
J21-G1 POND

Drainage Area from J1, B1, S1, SWS(s)1:   137.6 acres
Total Contributing Drainage Area: 137.6 acres

ISCHARGE OPTIONS:

	Emergency Spillway
iser Diameter (in)	----
Riser Height (ft)	----
arrel Diameter (in)	----
Barrel Length (ft)	----
Barrel Slope (%)	----
anning's n of Pipe	----
pillway Elevation	----
owest Elevation of Holes	----
of Holes/Elevation	----
ntrance Loss Coefficient	----
ailwater Depth (ft)	----
otch Angle (degrees)	----
eir Width (ft)	----
iphon Crest Elevation	----
iphon Tube Diameter (in)	----
iphon Tube Length (ft)	----
anning's n of Siphon	----
iphon Inlet Elevation	----
iphon Outlet Elevation	----
nergency Spillway Elevation	6947.0
rest Length (ft)	40.0
:1 (Left and Right)	3 3
ottom Width (ft)	30.0

OND RESULTS:

	Permanent Pool (ac-ft)
	========
	19.6

	Runoff Volume (ac-ft)	Peak Discharge (cfs)
IN	13.33	221.31
OUT	13.33	146.20

Peak Elevation	Hydrograph Detention Time (hrs)
6948.6	0.00

****

J1, B1, S2
J21-G POND

Drainage Area from J1, B1, S2, SWS(s)1:   131.6 acres
                Total Contributing Drainage Area: 269.2 acres

DISCHARGE OPTIONS:

	Emergency Spillway
Riser Diameter (in)	----
ser Height (ft)	----
l el Diameter (in)	----
Barrel Length (ft)	----
Barrel Slope (%)	----
Manning's n of Pipe	----
Spillway Elevation	----
Lowest Elevation of Holes	----
# of Holes/Elevation	----
Entrance Loss Coefficient	----
Tailwater Depth (ft)	----
Notch Angle (degrees)	----
Weir Width (ft)	----
Siphon Crest Elevation	----
Siphon Tube Diameter (in)	----
Siphon Tube Length (ft)	----
Manning's n of Siphon	----
Siphon Inlet Elevation	----
Siphon Outlet Elevation	----
Emergency Spillway Elevation	6864.0
Crest Length (ft)	40.0
Z (Left and Right)	3 3
' ɔm Width (ft)	30.0

POND RESULTS:

Permanent
Pool
(ac-ft)

```
                       =========
                          19.3

                      Runoff     Peak
                      Volume    Discharge
                      (ac-ft)    (cfs)
                      ======================
              IN       21.78     259.79
              OUT      21.79     160.76

          Peak            Hydrograph
        Elevation      Detention Time
                           (hrs)
        ===========================
         6865.6            0.20
```

****

Company Name: ACZ, INC.
Filename: J:\861\0400\SEDCAD\J21G10   User: D. GLEASON
Date: 02-03-1998 Time: 09:47:21
PEABODY WESTERN COAL COMPANY : POND G1 & G (100 YEAR, 6-HR)
Storm: 2.40 inches, 100 year- 6 hour, SCS Type II   .
Hydrograph Convolution Interval: 0.1 hr

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ELEVATION-AREA-CAPACITY-DISCHARGE TABLE
==

J1, B1, S1
J21-G1 POND

Drainage Area from J1, B1, S1, SWS(s)1:   137.6 acres
Total Contributing Drainage Area: 137.6 acres

SW#1:   Emergency Spillway

Elev	Stage (ft)	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	
6935.00	0.00	0.88	0.00	0.00	
6936.00	1.00	0.99	0.93	0.00	
6937.00	2.00	1.10	1.97	0.00	
.00	3.00	1.22	3.13	0.00	
.00	4.00	1.34	4.41	0.00	
6940.00	5.00	1.47	5.81	0.00	
6941.00	6.00	1.60	7.35	0.00	
6942.00	7.00	1.74	9.02	0.00	
6943.00	8.00	1.88	10.83	0.00	
6944.00	9.00	2.03	12.78	0.00	
6945.00	10.00	2.18	14.88	0.00	
6946.00	11.00	2.37	17.16	0.00	
6947.00	12.00	2.57	19.62	0.00	Stage of SW#1
6947.70	12.70	2.71	21.47	30.80	
6947.80	12.80	2.73	21.74	40.29	
6947.90	12.90	2.75	22.02	50.68	
6948.00	13.00	2.77	22.30	61.92	
6948.50	13.50	2.88	23.71	136.90	
6948.55	13.55	2.89	23.86	146.20	Peak Stage
6949.00	14.00	2.99	25.18	229.05	
6949.50	14.50	3.10	26.70	334.84	
6950.00	15.00	3.21	28.28	472.05	

****

J1, B1, S2
J21-G POND

Drainage Area from J1, B1, S2, SWS(s)1:   131.6 acres
Total Contributing Drainage Area: 269.2 acres

SW#1:   Emergency Spillway

Elev	Stage (ft)	Area (ac)	Capacity (ac-ft)	Discharge (cfs)

==

```
5857.00   0.00   2.19    0.00        0.00
5858.00   1.00   2.35    2.27        0.00
5859.00   2.00   2.51    4.70        0.00
5860.00   3.00   2.68    7.29        0.00
5861.00   4.00   2.84   10.05        0.00
5862.00   5.00   3.00   12.97        0.00
5863.00   6.00   3.16   16.05        0.00
5864.00   7.00   3.33   19.30        0.00    Stage of SW#1
5864.70   7.70   3.41   21.66       30.80
5864.80   7.80   3.43   22.00       40.29
5864.90   7.90   3.44   22.34       50.68
5865.00   8.00   3.45   22.69       61.92
5865.50   8.50   3.54   24.43      136.90
5865.63   8.63   3.56   24.90      160.76    Peak Stage
5866.00   9.00   3.62   26.22      229.05
5866.50   9.50   3.70   28.05      334.84
5867.00  10.00   3.79   29.93      472.05
5867.50  10.50   3.88   31.84      629.82
5868.00  11.00   3.97   33.81      819.57
:*****************************************************************************
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