2015 9

1 ..... 1
2 ..... 5
3 ..... 13
4 ..... 15
5 ..... 18
6 ..... 20
7 ..... 23
8 ..... 28
9 ..... 30
10 ..... 37
11 ..... 40

# 1

1.0.1

175m

1.0.2

1.0.3

1.0.4

1.0.5

175.0m 145.0m 155.0m

66.0m 63.0m

4

1.0.6

,

1.0.7

3

1.0.10

1.0.11

1.0.12

1.0.13

1.0.14

1.0.15

# 2

## 2.1

### 2.1.1

### 2.1.2

5 7

### 2.1.3

2-1

2-1

| | | |
|---|---|---|
| | (m) | ( $m^3$) |
| | 180.4 | 450.44 |
| | 175.0 | 393.00 |
| | 175.0 | 393.00 |
| | 145.0 | 171.50 |
| | 155.0 | 228.00 |

### 2.1.4

2-2

2-2

| | (m) | ( $m^3$) |
|---|---|---|
| | 67.0 | 7.41 |
| | 66.0 | 7.11 |
| | 66.0 | 7.11 |
| | 62.0 | 6.00 |

2.1.5

2-3

2-3

| (%) | ($m^3/s$) | 3 ( $m^3$) | 7 ( $m^3$) | 15 ( $m^3$) | 30 ( $m^3$) |
|---|---|---|---|---|---|
| 0.01 | 113000 | 282.1 | 547.2 | 1022.0 | 1767.0 |
| 0.02 | 111000 | 278.2 | 540.5 | 1009.6 | 1747.4 |
| 0.1 | 98800 | 247.0 | 486.8 | 911.8 | 1590.0 |
| 0.2 | 94600 | 236.6 | 467.5 | 880.3 | 1524.1 |
| 0.5 | 88400 | 221.0 | 442.8 | 833.2 | 1449.3 |
| 1 | 83700 | 209.3 | 420.8 | 796.5 | 1393.0 |
| 2 | 79000 | 197.6 | 401.5 | 759.8 | 1327.7 |
| 5 | 72300 | 180.7 | 368.5 | 702.2 | 1234.0 |
| 10 | 66600 | 166.5 | 344.6 | 656.2 | 1158.1 |
| 20 | 60500 | 151.2 | 316.4 | 603.8 | 1070.4 |

2.2

2.2.1

1000

76.4m 10000 10

5000 80.9m

86000$m^3/s$

110000$m^3/s$ 86000$m^3/s$

59.38m 58.93m

2.2.2

22500MW 4990MW

26 700MW 2

50MW 6 700MW

2735MW

1040MW 7 170MW 2

125MW 5 14 125MW

1 20MW 125MW

150MW 3210MW

2.2.3

56700$m^3/s$ 280m 34m

56700$m^3/s$ 120m 18m

2 3

56700$m^3/s$

60000$m^3/s$ 1 35000$m^3/s$ 1

2 280m 34m 3 120m 18m

## 2.3

### 2.3.1

1/10000 2-4

2-5

2-4

| m | m |
|---|---|
| 135.0 | 124.00 |
| 145.0 | 171.50 |
| 155.0 | 228.00 |
| 165.0 | 300.20 |
| 175.0 | 393.00 |
| 180.4 | 450.44 |

2-5

| m | m |
|---|---|
| 62.0 | 6.00 |
| 63.0 | 6.25 |
| 64.0 | 6.53 |
| 65.0 | 6.81 |
| 66.0 | 7.11 |
| 67.0 | 7.41 |

2.3.2

2.3.3

23 2 22 8

2-6 2-7

2-6 $m^3/s$

| m | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 23 | 2 | 7 | 22 | 20 | | 22 | | 24 | | 26 | | 29 | | 32 | |
| | 90m | 133m | 75/90/102m | 158m | 108m | | 108m | | 108m | | 108m | | 108/113m | | 108/113m | |
| 145 | 37900 | 1500 | 2400 | / | 18500 | 60300 | 20400 | 62200 | 22000 | 63800 | 23700 | 65500 | 26100 | 67900 | 28700 | 70500 |
| 150 | 39900 | 2600 | 2500 | / | 19100 | 64100 | 21000 | 66000 | 22700 | 67700 | 24500 | 69500 | 26900 | 71900 | 29600 | 74600 |
| 155 | 41800 | 3500 | / | / | 19600 | 64900 | 21600 | 66900 | 23400 | 68700 | 25200 | 70500 | 27800 | 73100 | 30600 | 75900 |
| 158 | 42900 | 3900 | / | 0 | 19900 | 66700 | 21900 | 68700 | 23700 | 70500 | 25600 | 72400 | 28300 | 75100 | 31100 | 77900 |
| 160 | 43600 | 4100 | / | 800 | 20100 | 68600 | 22100 | 70600 | 24000 | 72500 | 25900 | 74400 | 28600 | 77100 | 31400 | 79900 |
| 165 | 45400 | 4600 | / | 5800 | 19600 | 75400 | 21700 | 77500 | 23700 | 79500 | 25800 | 81600 | 28300 | 84100 | 31500 | 87300 |
| 170 | 47100 | 5000 | / | 13600 | 18600 | 84300 | 20600 | 86300 | 22700 | 88400 | 24800 | 90500 | 27200 | 92900 | 30300 | 96000 |
| 175 | 48700 | 5400 | / | 23500 | 17900 | 95500 | 19800 | 97400 | 21900 | 99500 | 24100 | 101700 | 26200 | 103800 | 29100 | 106700 |
| 180 | 50300 | 5700 | / | 35300 | 17300 | 108600 | 19200 | 110500 | 21300 | 112600 | 23400 | 114700 | 25200 | 116500 | 28000 | 119300 |
| 183 | 51200 | 5900 | | 42800 | 16700 | 116600 | 18500 | 118400 | 20300 | 120200 | 22100 | 122000 | 24700 | 124600 | 27500 | 127400 |

(1)7 8 7 1 7 90.0m 2 6
75.0m 8 102.0m
(2) 26 108.0m 6 113.0m

2-7

| | | m | ($m^3$/s) | |
|---|---|---|---|---|
| | 14 | 80.6 | 995.6 | VGS |
| | | | 991.8 | ALSTOM |
| | 12 | 85.0 | 928.5 | |
| | | 80.6 | 1000.0 | ALSTOM |
| | | 85.0 | 928.5 | |
| 6 | | 85.0 | 928.5 | |
| | | 80.6 | 1000.0 | ALSTOM |
| | | 85.0 | 928.5 | |
| 2 | | 85.0 | 66.81 | |

2.3.4

2-8

2-9

2-8 $m^3$/s

27 9

m

2.3.5

2-10-1　　2-10-2

2-11

| (m) / MW | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 | 13.0 | 14.0 | 15.0 | 16.0 | 17.0 | 18.0 | 18.6 | 20.0 | 23.0 | 27.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 125MW | 37 | 46.0 | 55.0 | 63.0 | 71.0 | 79.0 | 87.0 | 96.0 | 104.0 | 112.0 | 120.0 | | | | |

# 3

## 3.1

### 3.1.1

### 3.1.2

1 1 3

2

3

4 4 10

## 3.2

### 3.2.1

### 3.2.2

### 3.2.3

## 3.3

### 3.3.1 GB/T 22482

### 3.3.2

# 4

## 4.1

### 4.1.1 145.0m

1

0.1m 1.0m

2

41.0m 30.5m

30000m$^3$/s 4.1.1 1

0.5m

### 4.1.2

1 41.0m 30.5m

25000m$^3$/s 30000m$^3$/s

146.0m

146.0m

2 30.8m

35000m$^3$/s

### 4.1.3 8 31

40.3m 30.4m

9 150.0m

4.2

4.2.1 9 10

1 43.0m 32.5m

2 9 10 150.0m

3 9 162.0m 9

165.0m 10 175.0m

35000$m^3/s$

4.2.2 8.2.1 8.2.2

4.3

4.3.1 175.0m 18300$m^3/s$

4.3.2 175.0m

175.0m

4.3.3 1 5

8.2.3 4

155.0m 5 25 155.0m

4.3.4 8.2.3

4.3.5

0.6m

4.3.6 6 10

4.1.1 2 4.1.1

4.3.7

4.4

4.4.1 66.0m

0.5m

4.4.2

66.5m~63.0m

# 5

## 5.1

### 5.1.1

100 100 1000 1870

80000 $^3$/s

### 5.1.2

### 5.1.3

## 5.2

### 5.2.1

1

2 171.0m

44.5m

a.

b. 44.5m

44.5m

44.5m

3 171.0m 175.0m

80000$m^3/s$

45.0m

4 (

)

5.2.2

1

2

155.0m 34.4m

3 155.0m

5.2.3 175.0m

5.2.4

5.2.5

# 6

## 6.1

### 6.1.1

### 6.1.2

### 6.1.3

## 6.2

### 6.2.1 (

)

1 6

2

3

155.0m

### 6.2.2

6.2.3

6.3

6.3.1

96

6.3.2

6.3.3

6.4.4

6.4.5

6.4.6

6.4.7

6-1

6-1

| (cm) | | | | |
|---|---|---|---|---|
| | | | | |
| 100 | 50 | 100 | | |
| 200 | 180 | 200 | | |
| 400 | | 300 | | |

# 7

## 7.1

### 7.1.1

### 7.1.2

### 7.1.3

## 7.2

### 7.2.1

175.0m 144.9m

73.8m 62.0m

63.0m

7.2.2 66.5m

63.0m 3.0m 1.0m

7.2.3 50.6m

54.5m

39.0m( )

## 7.3

7.3.1 56700$m^3/s$

25000$m^3/s$ 5000$m^3/s$

7.3.2 45000$m^3/s$

60000$m^3/s$

60000$m^3/s$ 35000$m^3/s$

39.0m

7.3.3

7.3.4

12000 $m^3/s$

1500$m^3/s$

7.3.5

7.4

7.4.1

7.4.2

7.4.3

7.4.4

7.4.5 150.0m

7.4.6

7.5

7.5.1

7.5.2

7.5.3

7.5.4 7-1

7-1

| | | ($m^3/s$) | ($m^3/s$) | (m) |
|---|---|---|---|---|
| | | 45000 | 9000 10000 | 63.0 66.0 |
| | | 24000 | 8000 9000 | 63.0 66.0 |
| | | 10000 12000 | 5250 6000 | 63.0 66.0 |
| | | 35000 | 10000 15000 | 63.0 66.0 |
| | | 45000 | 15000 20000 | 63.0 66.0 |
| | | 25000 | 10000 | 63.0 66.0 |

7.5.5

10h 12h 24h 48h

7.5.6

7.6

7.6.1

7.6.2

7.6.3

7.6.4

7.6.5

7.6.6

# 8

## 8.1

### 8.1.1

155.0m

8.2.4 5 6

8.2.5

8.3

8.3.1

8.3.2

# 9

## 9.1

### 9.1.1

### 9.1.2

### 9.1.3

## 9.2

### **9.2.1**

1 135.0m 145.0m

2 1 2

135.0m 150.0m 155.0m 3

135.0m 150.0m

3 161.0m

175.0m

135.0m 150.0m

150m

5 135.0m 150.0m 63.0m 66.0m 20000$m^3/s$ 35000$m^3/s$

2500$m^3/s$

**9.2.2**

1

2

3

4 2 1

1 3

5

**9.2.3**

1 2 6

1 7 7 8 3 7

8

8

2

1000$m^3/s$ 1750$m^3/s$ 2500$m^3/s$

0.5h 1h

9.3

**9.3.1**

1 80000$m^3/s$

6.3m

2

20000$m^3/s$

3 60000$m^3/s$

10500$m^3/s$

4

20000m$^3$/s 25000m$^3$/s

7

1# 2# 43.0m

3#~7# 44.6m

5 25000m$^3$/s

30000m$^3$/s

44.6m

46.6m

6 25000m$^3$/s

47.0m

66m 47.0m

63m 49.0m

**9.3.2**

1

9-1

9-1

| m$^3$/s | | |
|---|---|---|
| 20000 | | |
| 20000 25000 | | |
| 25000 35000 | | |

| | | |
|---|---|---|
| 60000 | | |
| 86000 | | |

2

3

4

5

6

1 2

25000m$^3$/s

7 2

40000m$^3$/s 1 2

2 14

8

9

9.4

9.4.1 24h 5.0m

24h 3.0m

9.4.2 3

9.5

**9.5.1**

80.9m

**9.5.2**

1 80.9m

2 8

3 150.0m

**9.5.3**

59.5m 59.38m

9.6

**9.6.1**

1 1

175.0m 1 1 165.0m

2 6

5

3

**9.6.2**

1

2

3.0m

5.0m 2

# 10

## 10.1

### 10.1.1

### 10.1.2

1

177.0m 175.0m 2.0m

20

175.0m 5

2

3

4

## 10.2

10.2.1 175.0m~145.0m

10.2.2 ( )

10.2.3 ,

1

2

3

4

5

6

10.2.4

10.2.5

3m/d

2m/d 0.6m/d

10.2.6

10.2.7

10.2.8

10.2.9

10.3

10.3.1

( )

10.3.2

10.3.3

# 11

## 11.1

### 11.1.1

### 11.1.2

### 11.1.3

## 11.2

### 11.2.1

### 11.2.2

### 11.2.3

### 11.2.4

### 11.2.5

### 11.2.6

### 11.2.7

### 11.2.8

11.3

11.3.1

11.3.2

# 1

## 1.0.2

135m 156m

175m

2003

2008

175m 175m 2010

175m 175m

## 1.0.4

## 1.0.5 175m

4 8

2011

30000$m^3/s$

2

30000$m^3/s$

32

30000$m^3/s$

**1.0.9**

**1.0.10**

[2002]86

**1.0.11**

8

2011

**1.0.15**

# 2

## 2.1 -

### 2.1.1

## 2.2

**2.2.2** 125MW 19 170 MW
2 20MW 1 2735MW
1981 7 1988
30

125MW 150MW
3210MW

**2.2.3** 3000t 56700$m^3/s$ 10000t
45000$m^3/s$
60000$m^3/s$ 1 2
34.0m 3 18.0m

35000$m^3/s$

(

) 60000$m^3/s$

( )

**2.3**

**2.3.1**

**2.3.3** VGS ALSTOM

**2.3.5** 32 700MW

756MW

# 3

## 3.1

### 3.1.1

### 3.1.2

1 3 7

1 3 5

3

5

2 4 10

3

4

## 3.2

# 4

## 4.1

### 4.1.1 4.1.2

1 6 9

0.1m

1.0m

1.0m

0.5m

### 4.1.3 9

9

1 9

2 9

3 4.2.1 3

35000m$^3$/s

4.2

**4.2.1**

1

10 1 9

10

10

2 9

9

9

162m 165m 10 175m

8 9

9

3

**4.2.2**

8

4.3

**4.3.1** 175m 11 12

5

18300m$^3$/s

**4.3.3** 1 5

1

2 1 5

4

155m

155m

**4.3.5 4.3.6**

1 6

5 25

2 6 10

0.6m

5 25 6 10

155m

0.1m 1.0 1.5m

6 10

6

155m 5 25 0 6 10

23 17 0.53 0.59m

0.6m

4.4

4.4.2

# 5

## 5.1

### **5.1.1 5.1.2**

1

100

100 1000 1870

80000$m^3/s$

2 34.4m

1996

56.5 $m^3$

145 155m

**5.1.3**

5.2

**5.2.1**

1

100 100 1000

1870

2

3

45.0m

44.5m

100

171.0m

44.5m

4 171.0m 100

171.0 175.0m 45.0m

80000m$^3$/s

80000m$^3$/s

5

**5.2.2**

1000 1870

1

( )

2

155.0m 56.5

$m^3$

34.4m

3 155.0m

**5.2.3**

1 175m

80000$m^3$/s

1000

2 175m

**5.2.4**

**5.2.5**

44.5m

55000$m^3/s$ 40000 55000$m^3/s$

43.0m

25000$m^3/s$

25000$m^3/s$

# 6

## 6.1

165 $m^3$ 22500MW

## 6.2

### 6.2.1

175m 165 $m^3$

6-1

1 10

2 10 10 145.0m 0.1m

1.5m 4.1.1 4.1.2

3 9 10 11

5500MW 6000MW 8000MW

4 12

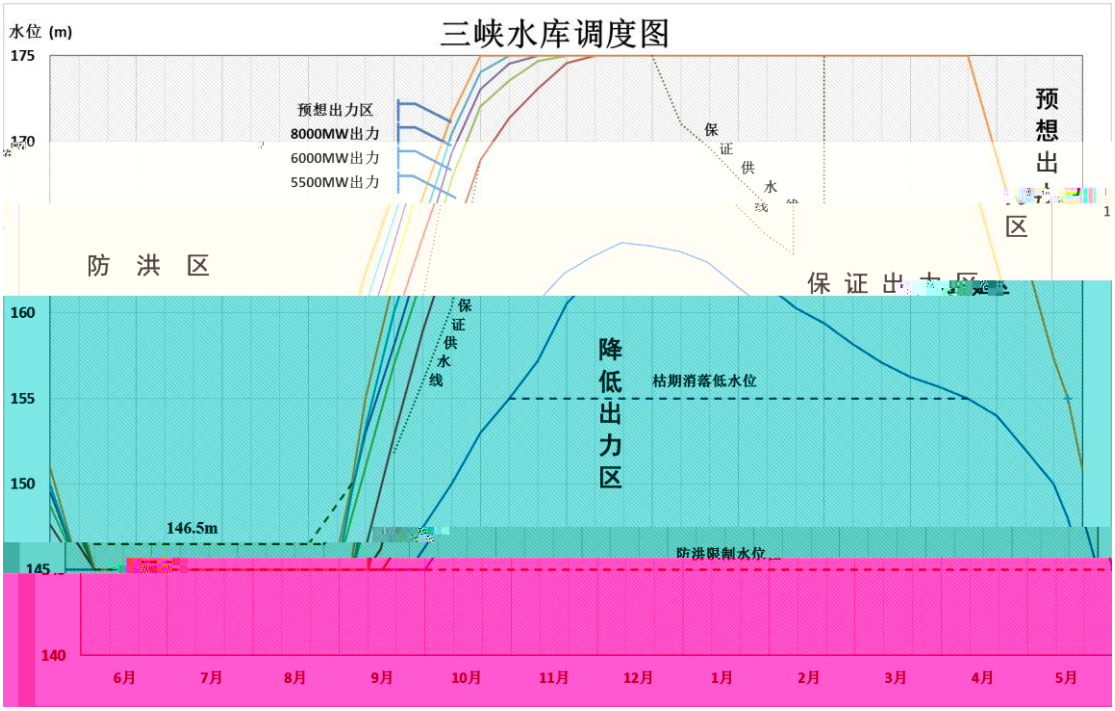
5 1 1 5 25

5 25

155.0m

6

7 90%




**6-1**

## 6.2.2

1

2 3m

1m

3 2

4

**6.2.3**

3m

1m

6.4

**6.4.1** 71.0m 71.0m

**6.4.3**

# 7

## 7.1

( )

## 7.2

(GBJ139-90)

### 7.2.1

145.0m

145.0m

0.1m

1.0.5 4

56700$m^3/s$

73.8m( 66.0m)

62.0m

62.0m

62.0m

63.0m

### 7.2.2

，

，

63.0m 66.0m

62.0m

62.5m

62.5m

63.0m

62.0m

62.0m

63.0m 62.0m

( )

**7.2.3**

39.0m( 3200m$^3$/s)

39.0m(

)

1973.2

1989 11

5 6 4 7m

2008

39.0m( )

39.0m

7.3

**7.3.1**

1 56700$m^3/s$

45000$m^3/s$

**7.3.2**

1 2 3 60000m$^3$/s

1 35000m$^3$/s

7-1

7-1

| | m$^3$/s | | |
|---|---|---|---|
| 1 | 35000 | | 1000 3000t |
| | | | 50 300TEU |
| | | | 350 800 |
| | | | 330 670 |
| 2 | 30000 | | 1942kW+2 1500t |
| | | | 1058kW+1 1500t |
| | | | 3500 5000t |
| | | | 1000 2500t |
| 3 | 25000 | | |
| | | | |

2 3200m$^3$/s

39.0m

( ) 39.0m

3

**7.3.3**

25000m$^3$/s

270kW

25000m$^3$/s

25000m$^3$/s , ,

7.4

**7.4.5** 150.0m

( )

7.5

1

2

7.5.7

3

7.6

1

< > (

[2001]13 13 )

37km(  )

8

8

2

8.2.2

1 9 10000m$^3$/s 10000m$^3$/s

10000m$^3$/s

2

8.2.3 1 2

6000 $m^3/s$

1 2

3 4

175m 165 $m^3$

8.2.4

4

5 6

8.2.5

8.3

8.3.1

8.3.2

# 9

## 9.1

**9.1.2** 1 5

**9.1.3**

## 9.2

**9.2.1**

1 90.0m,

135.0m 180.0m

2 1 2 135.0m 180.0m

2 1

3

3 135.0m 150.0m

3

135.0m 150.00m 71.50m

2 1

3 1 2

150.2m 153.7m

1 2 135.0m

150m 155.0m

3 158.0m 8.0m

160.27m 161.0m

4

,

5

102.0m

4 2

2 167.0m

30.0m 2 23

30.0m 1

1 2

2

23 1 1 2

9.2.2 1

5 170.0m

170.0m

**9.2.3**

1 1 7

90.0m 18 26

7 8

3

8

8

2

2 2500$m^3/s$

1000$m^3/s$ 1750 $m^3/s$ 2500 $m^3/s$(

)

0.5h 1h

9.3

**9.3.1**

1

27

27 81000$m^3/s$

3000$m^3/s$

2

3

4

80% 20000 25000$m^3/s$

8

9.4

9.4.1

24h 5.0m

24h 3.0m

3m

9.5

**9.5.1**

80.9m

82.0m

### 9.5.2

2 8

3 140.0m

150m

1 6

2~5

## 9.6

9.6.2

2

3m 5m

2

# 10

10.2.1

175m 145m

10.2.5 5310km

3m/d

2m/d 0.6m/d

175m

11

11.1.2