

! " # \$ % & ' () * +
\$ % , - . / 0 1 2 3 4
5 4 6 7 8 \$ 9 : ;

! " # \$ % & ' () * + , -

! . / 0 1 2

< = > ?

! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 2 7 8 9 : * ; < = > ? @ A = > B C * D E
. F G H 0 1 4 5 I J = > K L 9 : A 6 2 2 M % = N 8 * O P Q R S 0

编委会

@) 3 4 5
A @) 6 4 7 8 9 : ; < =
B C > ? 7 @ A B C D E F > G H
I J K L M N O P Q ! R

n 6 2 o U p q r s) - 2 3 v

.

2 3 2 4 * 6 2 5 6 7 * T 208 8 n 6 2 o U p q r s ^ 9 : f
* ; 2 3 5 < n 6 2 o U p q r s 5 = > ? t @ A 1 y z

.

o U p q r ^ 1 6 2 3 7 8 ~ • B C D E F X z 6 2 5 6 2 G
5 H I J o U K L A M N [- G J * O P Q I R S T o U a U { p q r V
W u < * ? X + X ~ Y * O Z T [\] ^ { p q r _ ` > ^ t @ A 2 y z

.

` T _ n 6 2 o U p q r s 0 a 6 2 5 b c * a) Q # \$ 6 2 z

. .

6 2 V W D E d } b c _ n 6 2 o U p q r s (# \$ 6 2 z 6 2 5 e) < f
g . h ? i 6 * { o U # \$ 5 = < o U p q r j f g ? t w k l R > E y * ~ m o U n
P 2 M 3 f o 2 p = > ~ • M q r s m - z

1

业指导书》

5 t x

6 2 k u

业指设置》

6 2 o U p q r t x	
6 2 o U p q r v X	
G J	

表 分

- 7
u o 6 p q v w x y # 7

BDYCSY-ZW-01	0			o U p q r	1
BDYCSY-ZW-02	0			o U p q r	11
BDYCSY-ZW-03	0			o U p q r	17
BDYCSY-ZW-04	SF ₆ 0			o U p q r	23
BDYCSY-ZW-05	E			o U p q r	29
BDYCSY-ZW-06	0	K		o U p q r	37
BDYCSY-ZW-07	GIS t	HGIS y		o U p q r	43
BDYCSY-ZW-08				o U p q r	51
BDYCSY-ZW-09	0			o U p q r	59
BDYCSY-ZW-10		f		o U p q r	67
BDYCSY-ZW-11	0	0		o U p q r	73
BDYCSY-ZW-12				o U p q r	79
BDYCSY-ZW-13	0			o U p q r	85
BDYCSY-ZW-14				o U p q r	91
BDYCSY-ZW-15	SF ₆ E			o U p q r	99
BDYCSY-ZW-16	0	0		o U p q r	105
BDYCSY-ZW-17	0	0		o U p q r	111
BDYCSY-ZW-18	1	0	8	o U p q r	119
TSSY-ZW-01	GIS			o U p q r	147
TSSY-ZW-02	SF ₆	J		o U p q r	156
TSSY-ZW-03	0			o U p q r	167

TSSY-ZW-04	0	0	0 8	o U p q r	175
TSSY-ZW-05	0	R		o U p q r	184
TSSY-ZW-06	0			o U p q r	192
TSSY-ZW-07	0	! " # \$ %		o U p q r	200
TSSY-ZW-08	0	! " # \$ %		o U p q r	209
TSSY-ZW-09	& '			o U p q r	219



X Y

1	() x	3
2	v ^ ; 7	3
3	o U 3	3
4	M q r s ` y z {	4
5	o U • H	5
6	o U a U	6
7	7 8 { k i 6 % ~ •	7



! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

1 Z [\]

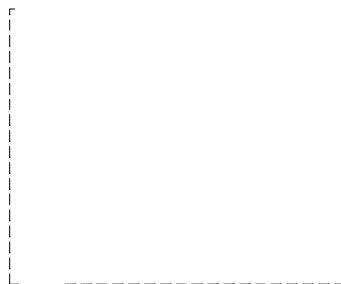
o U p q r () Q 0 z

2 B L ^ _

` 2-1 B L ^ _

p X	) } J t x
1	GB 50150~2006n 0 = 2 3 0 5 H ~ • s
2	DL 408~1991n 0 U M 2 o 3 t ' 0 • A 0 0 ys

3 0 1 a b





中国南方
CHINA SOUTHERN

! " # \$ % & ' ()

, - . / 0 1 2 3 4

4 e j k l m

4.1 0

2 5 6 7 5 o U e 6 2

2 r p ` s t v w x n

(M q r 2 o * ; e

4.2 ` s ^ y

T j - 0 . 2 4 T c (U V) 1 2 0

f 1 0 5 6 T f 1 0 . 5 (•) T j / F 5 + 3 1 0 . 5 6 T f 1 0 . 3 2 0 T D (q r) T j / F 5 3 1 0

5 0 1 n o

5.1 M N p o

` 5-1 0 1 M N p o

2 p t x	2 4 2 o V 1	d V	, V
---------	-------------	-----	-----

8 K 8 K 8 K 8 K A B K 2 1 1



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 1 S 5 1 6 . 4 8 7 9 0 . 8 m 5 1 8 m 2 1 8 . 4 7 9 0 8

{ ? (+ X z
6.9 F y z a \$ a
8 0 \$ { / 0 * d / ~ ^ B B ^ ~ / B B ~ ^ B / B +
X * 8 9 ? (* 0 % & K L ' (* 0 D ~ • 1 z
6.10 \$ 9 : ; q : ; 5 4 6 7 8 \$ 9 : ; !
6.10.1 R z Q 35kV u v 0 - * \$ e) A U 166kV u 0
- * \$ e) P Q R U 8 R S T 1 U z
6.10.2 z { : + X * u e) 4 6 2 P 0 a U * V
u e) 0 a U z W 8 e) X Y Z a * L M 5 H 8 z 0 -
{ 110kV u ^ \$ k [+ X z 0 ! | } ~ • + X z
6.10.3 R K 0 0 z 0 - { 220kV u * { @
B C + X # \$ 0 0 z 0 - 110kV * \ & ' b] ^ *
\$ + X 0 z) u % _ # & ' ` a z
6.10.4 1 0 v z d b a c 1 P z
6.10.5 % u z % u * B C y 0 1 u , d z

7 m . r ; n

7.1 m .

7.1.1 ^ e f J g U ` z { Y 6 7 = 1 _ a + X z
_ * P 8 9 * : _ ; < f = % z
7.1.2 0 8 P 1600kVA u v 0 - * " j Q :
! 41 * " j Q : ! 21 11600kVA u *
" j Q : ! 21 1 " j Q : ! 11 z
7.1.3 0 y ' v h : • * D Q 21 1 D ' (v 0
d } t 7-1 y)

$$R_2 = R_1 \frac{T+t_2}{T+t_1} \quad t 7-1 y$$

$$R_1 \quad R_2 \sim \sim ' (\{ t_1 \quad t_2 t i y \quad 0 \quad *$$

7-1 O P Q \$ R S T U \$ ~

' (" K	5	10	15	20	25	30	35	40	45	50	55	60
) q A	1.2	1.5	1.8	2.3	2.8	3.4	4.1	5.1	6.2	7.5	9.2	11.2
Y 1. > ^ K ' (L r 20 i & z 2. 8 ' (u s ' • z												

t3y 0 - 35kV u *, 8 4000kVA u * 8 + z + y h :
• + " * { ' v D j Q 1.31 \ R_{60s} Q 3000MΩ * + D o P z
t4y 0 - 220kV u , 8 120MVA u * \$) 5000V & ' 0 > 8
p z y h : • + " * { ' v D j Q 1.3 z \ R_{60s} Q 10 000MΩ
* p D o P z
7.1.8 8 R K 7 tand * v p l
t1y \ 0 - 35kV u , 8 8000kVA u * 8 7 tand z
t2y R tand D Q h : • 1301 z
t3y \ 8 ' (y h : • ' (D * d > 7-2) , ' (+ X z

7-2 } tand " ! ~

' (" K	5	10	15	20	25	30	35	40	45	50
) q A	1.15	1.3	1.5	1.7	1.9	2.2	2.5	2.9	3.3	3.7
Y 1. > ^ K ' (L r 20 i & z 2. 8 ' (u s ' • z 3. + X ' () , 2 t u l * + X v \ w E z										

7.1.9 8 R K 0 * v p l
t1y \ 0 - 35kV u *, 8 8000kVA u * 8 0 z
t2y 0 ~ • > 7-3 l z \ 6 0 x 1min * { / 0 0 z
0 D \$ > 7-4 l z

7-3 O P Q \$ R S T U a : ; \$ T n

R 1 0 kV	6 y 10	20 y 35	63 y 330	500
0 kV	10	20	40	60
Y 1. R 1 0 13.8kV 15.75kV * d 10kV ~ • 118kV * d 20kV ~ • 1 2. & ' z d R 0 - ~ • z				

7-4 S T U a T \$ a k \$ a

1 0 kV	0 { kV	{ v p ' (R 0 μA							
		10 i	20 i	30 i	40 i	50 i	60 i	70 i	80 i
2 y 3	5	11	17	25	39	55	83	125	178
6 y 15	10	22	33	50	77	112	166	250	356
20 y 35	20	33	50	74	111	167	250	400	570
63 y 330	40	33	50	74	111	167	250	400	570

67 100 150 235 330

7.2 m`

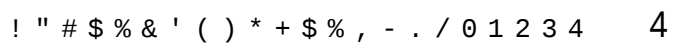
` 7-5 m`

p X	{ k	{ k a		
		W	H	S
1				

Y 7 8 { k ^ H } 2 ~ % 1 W • 1 S z



中国南方电网
CHINA SOUTHERN POWER GRID

 t, y



中国南方电网有限责任公司电

X Y

1	() x	13
2	v ^ ; 7	13
3	o U 3	13
4	M q r s ` y z {	14
5	o U • H	15
6	o U a U	15
7	7 8 { k i 6 % ~ •	16

1 Z [\]

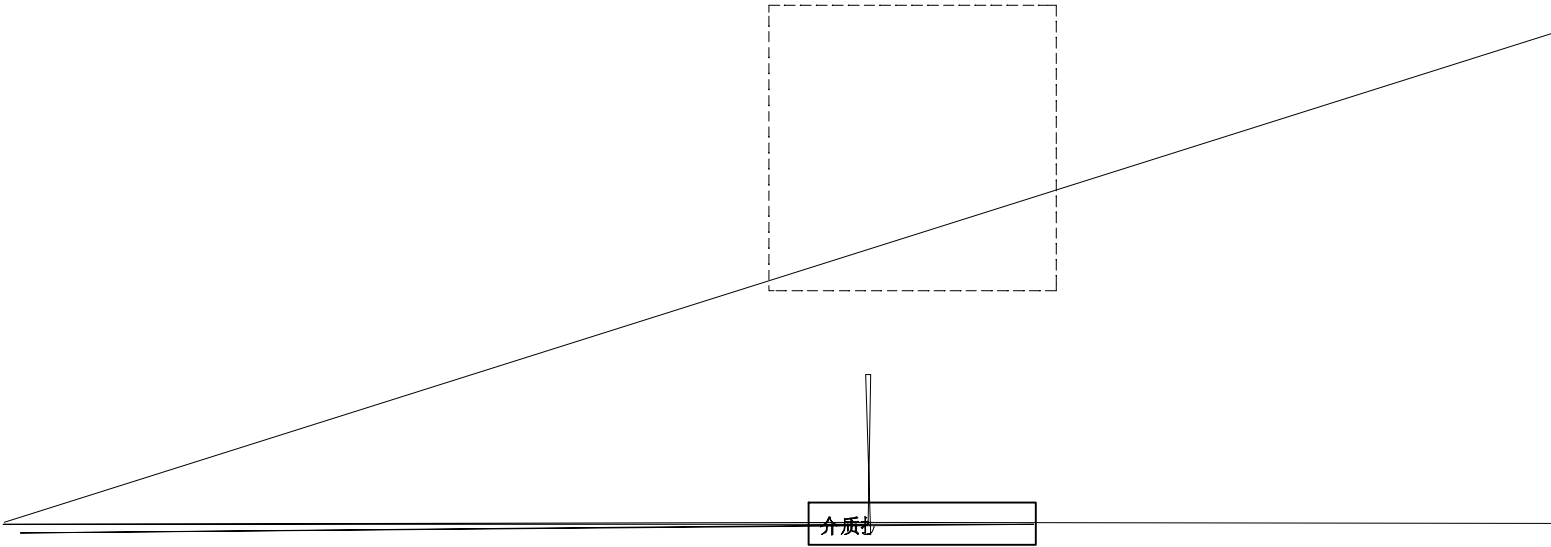
o U p q r () Q 0 z

2 B L ^ _

` 2-1 B L ^ _

p X	) } J t x
1	GB 50150~2006 n 0 = 2 3 0 5 H ~ • s
2	DL 408~1991 n 0 U M 2 o 3 t ' 0 • A 0 0 ys

3 0 1 a b



4 e f g h i j k l m

4.1 0 4 * 6 2 5 6 7 5 o U e 6 2 A * | } n 0 1 4 5 6
2 M • q r p ` s t v w x n p ` s y (M q r 2 o * ; e q r ` > z
4.2 d n p ` s ^ y 0 f n 0 1 4 5 M 6 2 o U s t v w
BDYCSY-ZW-02-01/01y* # \$ + X " ` * \ l q r - * # \$ = > W] ^ M 6 2
o U * M W b * 6 2 d V ' z
4.3 6 2 d V q r { k i 6 * 0 { M J o U V W + X M * o U
V W d Z M i 6 o U e A - 2 ^ z
4.4 M 6 2 o U 6 2 d V # \$ b * 2 o D .) 10 * 10 C
@ L o U * { 2 o [; _ 5] H z > [M U e z

t R S %	3	1	1
%	2	1	1
7 0 8 8	3	1	1
Y oUV 67GJ238 Hz			

5.2 /UqrsUs`pt

`5-2 @?/UqrsUs`pt

pX	t x	E/vX	ku	8	H Y
1	& ' 0		MΩ	1	
2	p) >		/	1	
3	X		/	1	
4	~ • 0		/	1	
5	>		V/A	2	
6			/	1	
Y nP2 G > 67GJ238 Hz					

6 01#u

4Z 0 >Nt y z

6.1 80 & ' 0 z) 2500V & ' 0 > 8, R t & ' 0 1) 2500V
& ' 0 > 8t R & ' 0 1& ' 0 D\$ Q 1000MΩ z

6.2 80 0 & ' 0 * & ' 0 D\$ j Q 1000MΩ 1 & ' 0 j
Q 1000MΩ * 8 tand z

6.3 0 % z) Z 0 A0 , R *) p) > t u
{ j 0 y > { t R zZ 0 < B? , R < L1? *
) p) > p a _ < 0? z : _ 0 < B? *
) p) > p a _ < 0? z

6.4 0 , t R 0 8 z

6.5 8] RTA S z 0 T F r* u 0 • * 0 0 * <
l 0 *] R + X z

6.6 % z { , R " 0 * t R 0 > * 0 , t R 0 z

6.7 N 0 8 8 , R D Q : • 1301 t 0.51 y* 0
8 y : • " D : 0511 t z #

7.2 m `

` 7-1 m `

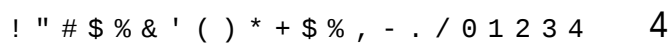
p X	{ k	{ k a		
		W	H	S
1	0			
Y 7 8 { k ^ H } 2 ~ % 1 W • 1 S z				

7.3 ; n
7 8 % d n 10kV y 500kV 0 0 2 3 7 8 + y 1 ~ • 4 0 0 2 3 s
^ Q/CK

@ A 1 M 6 2 o U

B 8BDYCSY-ZW-02-01/01

2 o		2 o		= > W	# \$ M W	# \$ d V
M q r ` { k i 6						
p x	t x	q r	q r -	q r { k i 6		
1	0	0	q r			
2	/ , 0 3 ^	5 H	^ - q r			
3	0 D 1	5 H	^ - q r			
4	5 = M x	0	^ - q r			
5	/ i 6 D u 3 ^	0				
6	/ o U M i 6 D [\					
7	0 D 1	5 H				
8	5 H R D	5 H				
9	A	5 H				
10	0 0	v				
11	0 # t	5 H	q r			
12	y 0 5 H M D H !					



t , y # \$ = > W] ^ * # \$ M W b * # \$ d V ' z # \$ d V 2 4 q r { k i 6
0 0 z t t y 2 o M i 6 D .) * @ *) _ H 1 \ V W '
* { H Y % & z @ S V W + X * 0 t \ z t y 6 7 # \$. A x A K L * T M *
R y
7 t t (y) T j / F 9 . 1 2 7 4 n n 5 f 9 . 1 2 0 T D ! M i o y 7



中国南方电网
CHINA SOUTHERN POWER GRID

中国南

X Y

1	() x	19
2	v ^ ; 7	19
3	o U 3	19
4	M q r s ` y z {	20
5	o U • H	21
6	o U a U	21
7	7 8 { k i 6 % ~ •	22

1 Z [\]

o U p q r () Q 0 z

2 B L ^ _

` 2-1 B L ^ _

p X	) } J t x
1	GB 50150~2006 n 0 = 2 3 0 5 H ~
2	DL 408~1991 n 0 U M 2 o 3 t ' 0 • A 0 0

3 0 1 a b

c3-1 01 /dlabc

交流耐压

4 e f g h i j k l m

4.1 0 4 * 6 2 5 6 7 5 o U e 6 2 A * | } n 0 1 4 5 6 2

M • q r p ` s t v w x n p ` s y (M q r 2 o * ; e q r ` > z

4.2 d n p ` s ^ y 0 f n 0 1 4 5 M 6 2 o U s t v w

BDYCSY-ZW-03-01/01y* # \$ + X " ` * \ l q r - * # \$ = > W] ^ M 6 2

o U * M W b * 6 2 d V ' z

4.3 6 2 d V q r { k i 6 * 0 { M J o U V W + X M * o U

V W d Z M i 6 o U e A - 2 ^ z

4.4 M 6 2 o U 6 2 d V # \$ b * 2 o D .) 10 * 10 C

@ L o U * { 2 o [; _ 5] H z 6 b * 6 2 10 * 2 o

}} Y4M(1) T1 / P56.32 0 2.9 0 T D

R 0 8	2	1	1
t R S %	3	1	1
%	3	1	1
7 0 8 8	3	1	1
	4	1	1
Y o U V 6 7 G J 2 3 8 H z			

5.2 / U q r s U s ` p t

` 5-2 @ ? / U q r s U s ` p t

p X	t x	E/v X	k u	8	H Y
1	& ' 0		MΩ	1	
2	p) >		/	1	
3	x		/	1	
4	~ • 0		/	1	
5	>		V/A	2	
6	k Q			1	
7	F			1	
8			/	1	
Y n P 2 G > 6 7 G J 2 3 8 H z					

6 0 1 # u

6.1 4 Z 0 > N z

6.2 8 0 & ' 0 z) 2500V & ' 0 > 8 , R t & ' 0 1) 2500V
& ' 0 > 8 t R & ' 0 1 & ' 0 D \$ Q 1000MΩ z

6.3 8 0 & ' 0 * & ' 0 D \$ j Q 1000MΩ z & ' 0 j Q
1000MΩ * 8 tand z

6.4 0 % z) Z 0 A 0 , R *) p) > t u
{ j 0 y > { t R z Z 0 < B ? , R
< L1 ? *)

b] ^ * . / 6 8 0 * 8 0 t y , D \$ 1 0 t a ! 6 y 50 1 z
 7.1.3 8] R TA S 0 S * + " z
 7.1.4 % y k " • * z
 7.1.5 0 f J , + X * { 1 0 v 1min * D * + # o z
 7.2 ; n
 7 8 % d n 10kV y 500kV 0 0 2 3 7 8 + y 1 ~ • 4 0 0 2 3 s
 ^ Q/CSG > 4-8.1.1 y 4-8.1.3 Q/CSG > 4-8.2.1 y 4-8.2.4 P F X z



! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

@ A 1 M 6 2 o U

v w BDYCSY-ZW-03-01/01

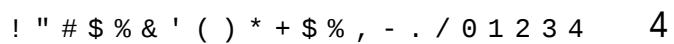
2 o

2 o

= > W

\$ M W

\$ d V



1 H Y



X Y

1	() x	25
2	v ^ ; 7	25
3	o U 3	25
4	M q r s ` y z {	26
5	o U • H	27
6	o U a U	27
7	7 8 { k i 6 % ~ •	28



中国南方电网
CHINA SOUTHERN POWER GRID





5.1 M N p o

` 5-1 0 1 M N p o

2 p t x	4 2 o V	d V	, V
& ' 0 8	2	1	1
%	2	1	1
R 0 8	2	1	1
t R S %	3	1	1
%	3	1	1
SF ₆ J 8 9	2	1	1
	4	1	1
Y o U V 6 7 G J 2 3 8 H z			

5.2 / U q r s U s ` p t

` 5-2 @ ? / U q r s U s ` p t

p X	t x	E/v X	k u	8	H Y
1	& ' 0		MΩ	1	
2	p) >		/	1	

3 461.04 TD (2) Tj/* 0 TD17.524 TD (2) Tj/* 0 TD17.524 TD (2) IN2s &'s wAs / 1

7.1 m .
7.1.1 8 & ' 0 3 A • h => P z
7.1.2 X E c 0 , t R 0 A : ! " D \$ Q 10 1 z \ b] ^ * . / 6 8 0 * 8 0 t y , D \$ 1 0 t b y 50 1 z
7.1.3 8] R TA S 0 S * + " z
7.1.4 % y k " • * t 0 R (! " % * { : • + X
* D b z { * * Q % * D C) 0
% yz
7.1.5 0 f J , + X * { 1 0 v 1min * D * + # o z
7.2 m 、

7-1 m 、

p X	{ k	{ k a		
		W	H	S
1	SF ₆ 0			
Y 7 8 { k ^ H } 2 ~ % 1W • 1S z				

7.3 ; n
7 8 % d n 10kV y 500kV 0 0 2 3 7 8 + y 1 ~ • 4 0 0 2 3 s
^ Q/CSG > 4-7.1.1 y 4-7.1.3 Q/CSG > 4-7.2.1 y 4-7.2.4 P F X z

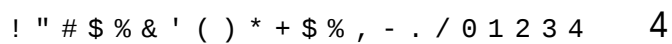
@ A 1 M 6 2 o U

v w BDYCSY-ZW-04-01/01

2 o		2 o		= > W	# \$ M W	# \$ d V
M q r ` { k i 6						
p X	t x	q r	q r -	q r { k i 6		
1	0	0	q r			
2	/ ' 0 3 ^	5 H	^ - q r			
3	A	5 H	^ - q r			
4	/ o U M i 6 D [\		/ q r			
5	0 D l	5 H	^ - q r			
6	/ i 6 D 3 ^ u	0	/ q r			
7	M x 5 =	0	^ - q r			
8	S F 6 J ^		q r			
9	5 H R D	5 H	q r			
10	5 H M i 6 D [\	5 H	/ q r			
11	0 0	v	/ q r			

12 0 # t v 5 q
H

/ y
5 T qj5/TFj5/+F15 +91. 192.
y /



>W/F1 9.15+3 Tf18.24 re8080 #\$/F1 9.15+2 Tf18.24 080 6D/F1 9.15



U V W : ; 0 1 2 3 4

V W BDYCSY-ZW-05



! " # \$ % & ' () * + \$ % ,

4

z [\]

o U p q r () Q

B L ^ _

p X

1

--

--

k

~ • S

ys

!Q5oUe" 62#A*|}n014562 1&

p X	t x	q r	q r -	q r { k i 6
5	0 D l	5 H	^ - q r	p 4) 8 0 0 * \]
6	5 H M i 6 D [\	5 H	/ q r	2 o V W B C g V p •T/F1 9.16H



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1

4

) >

1

) Q R ; , / o / 0 * E
E + X t G J a U • S yz

7 m . r ; n

7.1 m .

7.1.1 8 E n * 8 * 8 3 ^ _
z

7.1.2 8 & ' & ' 0 * D Q 1200MΩ z

7.1.3 8 q 0 0 h = > . A l z

7.1.4 z { E v + X 1 \ { v + X *
0 > 7-1 l 1 \ { v + X * E 0 h = > . A
l * ^ D ' # 0 z

` 7-1 & ' () * + , V a T : ; \$ T

1 0 kV	/ 2 0 0 kV	1min 2 P 0 { * kV			
				E E	E
3	3.6	25	25	25	27
6	7.2	32	32	32	36
10	12	42	42	42	49
35	40.5	95	95	95	118
66	72.5	155	155	155	197
110	126	200	200	200	225
		230	230	230	265

7.1.5 8 E n * 8 * 8 3 ^ _
z

7.1.6 3 ^ _ 40.5kV u v E D Q 2ms 140.5kV u E D
Q 3ms z

7.1.7 8 { E l o 0 . A v + X z

7.1.8 h = > . A l z

7.1.9 8 & ' 0 * D Q 10MΩ 1 0 y h : •
+ " z

7.1.10 E * v p l
t 1 y o o 0 { 85 1 y 110 1 U_n < o z
t 2 y o o 0 { Q 65 1 U_n * < 1 \ j Q 30 1 U_n * D z

7.2 m `

` 7-2 m `

p X	{ k	{ k a		
		W	H	S
1	E			
Y 7 8 { k ^ H } 2 ~ % 1 W • 1 S z				



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

7.3 ; n

7 8 % d n 10kV y 500kV 0 0 2 3 7 8 + y 1 ~ • 4 0 0 2 3 s

^ Q/CSG > 4-11.1.1 Q/CSG > 4-11.2.1 y 4-11.2.2 P F X z

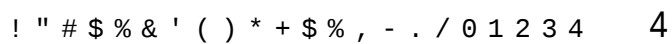
@ A 1 M 6 2 o U

v w BDYCSY-ZW-05-01/01

2 o		2 o		= > W	# \$ M W	# \$ d V
M q r ` { k i 6						
p X	t x	q r	q r -	q r { k i 6		
1	V W !	5 H	^ - q r			
2	0	0	q r			
3	/ , 0 3 ^	5 H	^ - q r			
4	5 H R D	5 H	q r			
5	0 D 1	5 H	^ - q r			
6	/ o U M i 6 D [\		/ q r			
7	5 H { 0	0	^ - q r			
8	0 D 1	5 H	^ - q r			
9			^ - q r			
10	/ i 6 D 3 ^ u	0	/ q r			
11	5 = M x	0	^ - q r			
12	A	5 H	^ - q r			

13 H X 199.2B %i 6 D

> X X F 5 9.12 Tf 9.12 0 TD (Mx) T0pF5+4 9.12 Tf 18 0 T T8 rersF5+4 9.12 Tf 9.12 0D 4(



```

t , y      # $ = > W ] ^ * # $ M W b   * # $ d V '   z # $ d V 24   q r { k i 6
0 0 z t t y 2 o      M i 6 D      . )   *      @   * ) _   H 1 \ V W '
* { H Y % &      z @ S V W + X   * 0 t \   z t y 6 7 # $ A   x A K L * T   M *
R : N = l z y \ q r -   y • q r - D , d * 5   R S f V W @ + X q r   0 k l i 6 z y
• q r - y q r { k i 6 {   24 # $ < ? z t y t D M t N   t y ! o   L z

```



1 Z [\]

o U p q r () Q 0 K z

2 B L ^ _

` 2-1 B L ^ _

p X	) } J t x
1	GB 50150 ~ 2006 n 0 = 2 3 0 5 H ~ • s
2	DL 408 ~ 1991 n 0 U M 2 o 3 t ' 0 • A 0 0 ys

3 0 1 a b

4*6: 25M67!Q5oUe" 62#A*|}n0145



> 4-1 o U e M • q r p `

p X	t x	q r	q r -	q r { k i 6
1	D 5 H R	5 H	q r	4 * % < *
2	x 5 = M	v	^ - q r	B C d l 5 = M x A ~ - M i 6 * 0

3T

6 0 1 # u

6.1 Z K U A < z

6.2 K & ' 0 8 z) 2500V & ' 0 > 8 q 0 D A j U t y & ' 0 z

6.3 K 7 A 0 8 z) 7 8 8 K q 0 D j K j K U 7 A 0 1) U 8 q 0 D j K 7 A 0 1) U 8 U t y 7 A 0 z 8 P % & 2 A K L ' (? (z

7 m . r ; n

7.1 m .

7.1.1 3 ^ B C & ' I L z

7.1.2 5 H 4 5 B C M < z

7.1.3 B C \ * / | W A * 0 y * / y K D z

7.1.4 66kV u 0 K * 8 < j K ? U R < 8 j K ? U & ' 0 z e) 2500V & ' 0 > 8 * & ' 0 D Q 1000MΩ z

7.1.5 8 20kV u _ K n & ' 7 tand A 0 * v p l { ' D Q 10 i A v * K 7 tand D Q > 7-1 l z

7-1 y z } tand n

K n & '		tand
0		0.7 t 500kV K 0.5y
		0.7
		1.0 t 66kV u v 0 - K 1.5y
		1.5
	J	1.5
	b & '	0.7
p 0 q ~ x 0 z 20kV u 0 R K h * tand 2 R 2.5 z b & ' K * \$ { K L v + X z Y 0 K 0 8 y h * R : • * " { 0 5 1 x z		

7.2 m `

7-2 m `

p X		{ k a
-----	--	-------

7.3 ; n

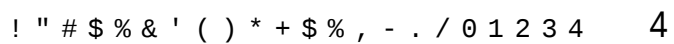
7 8 % d n 10kV y 500kV 0 0 2 3 7 8 + y 1 ~ • 4 0 0 2 3 s

^ Q/CSG > 4-1.1.10 Q/CSG > 4-1.2.6 P F X z

@ A 1 M 6 2 o U

v w BDYCSY-ZW-06-01/01

2 o	2 o	= > W	# \$ M W	# \$ d V
M q r \ { k i 6				
p X	t x	q r	q r -	q r { k i 6
1	0	0	q r	# \$ o U D E F X f M 3 M => i 6 * 0 f Y l D c Q u v i 6 4) 8 0 0 * \] P z 4 * % < * z 4 d V % z B C d l 5 = M x A ~ - M i 6 * 0 g V + X , z D E d } l 3 o z * @ o U V W * 0 5 = M x * g V 1 o V W { \$ V W * u * a F * 3 b E 0 z .) / : / * 3 B C o U V W / o U * 0 \ .) M * z o U V W 0 M * D e) 2 G * B C .) \ 2 G z d } • h => r o * \ .) 2 G z V W \ .) B P & ' 2 G M) z - * 0 * 0) B C < z V W z p H g V 1 4 % G 1 o U 3 ^ o U z D E F X 0 2 o * M i 6 * , z [% * \ * * # \$ + 2 G A
2	/ ' 0 3 ^	5 H	^ - q r	
3	/ i 6 D u 3 ^	0	/ q r	
4	M x 5 =	0	^ - q r	
5	0 D l	5 H	^ - q r	
6	A	5 H	^ - q r	
7	SF ₆ J	^	q r	
8	SF ₆ J		r q	
9	/ o U M i 6 D [\		/ q r	
10	5 H R D	5 H	q r	
11	5 H M i 6 D [\	5 H	/ q r	
12	 0 0	v	/ q r	





GIS - HGIS . V W : ; 0 1 2 3 4

V W BDYCSY-ZW-07

1 Z [\]
o U p q r () Q GIS t HGIS yz
2 B L ^ _

` 2-1 B L ^ _

p X	) } J t x
1	GB 50150 ~ 2006 n 0 = 2 3 0 5 H ~ • s
2	DL 408 ~ 1991 n 0 U M 2 o 3 t ' 0 • A 0 0 ys

3 0 1 a b



4 e f g h i j k l m

4.1 GIS(HGIS) 4 * 6 2 5 6 7 5 o U e 6 2 A * | } n 0 1 4 5 6 2 M

• q r p ` s t v w x n p ` s y (M q r 2 o * ; e q r ` > z

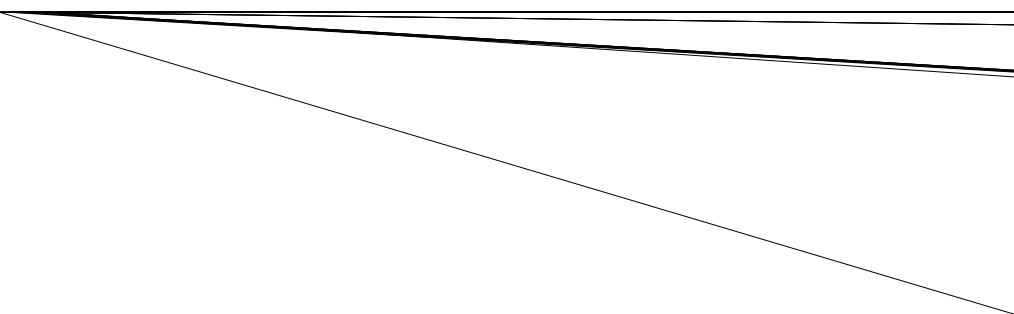
4.2 d n p ` s ^ y GIS(HGIS) f n 0 1 4 5 M 6 2 o U s t v w

BDYCSY-ZW-07-01/01 y* # \$ + X " ` 4.08 11 (0 Tj/458189-0.4-14j0.88 5+1 104j3 (d0Tj/F2+5 10.56





中国南方电网
CHINA SOUTHERN POWER GRID



$$M^T \cdot \star / : N = 1$$

\$ V W t



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * +

X Y

1	() x	53
2	v ^ ; 7	53
3	o U 3	53
4	M q r s ` y z {	53
5	o U • H	55
6	o U a U	55
7	7 8 { k i 6 % ~ •	56

1 Z [\]
o U p q r () Q
2 B L ^ _

z

` 2-1 B L ^ _

p X		) } J t x	
1	GB 50150~2006	n 0 = 2 3 0 5 H ~ • s	
2	DL 408~1991	n 0 U M 2 o 3 t ' 0 • A 0 0 ys	

3 0 1 a b

查

4.4 e f . / 0 1 . / (M & / 0 < = S [10 10
 0 1 / 0 V X 6 o
 > 4-1 o U e M • q r p `

p X	t x	q r	q r -	q r { k i 6
1	5 H R	5 H	q r	4 * % < *
D				

3	0 3			1	
4	>			1	
Y n P 2 G > 6 7 G J 2 3 8 H z					

6 0 1 # u

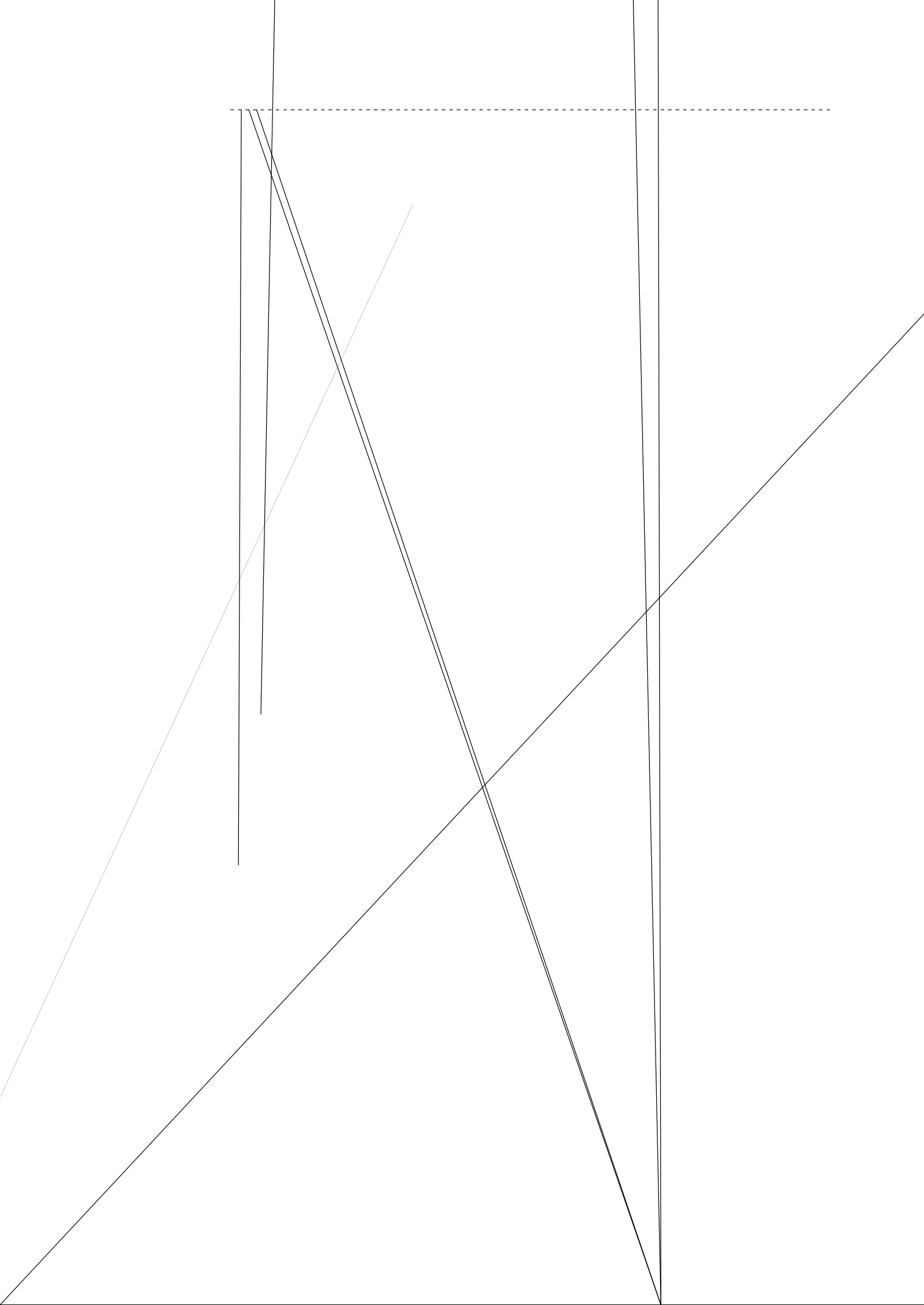
6.1 \$:

& ' 0 J A & ' 0 * G J • > 6-1 z

` 6-1 \$:

p X	2 o	o 2 M
1	& ' 0 > & ' 0 > %	9 (u = * Z & ' 0 > 9 : * 4 & ' 0 > + X %
2	A	Z & ' 0 > y 8 u t B P * Z K K K y
3	8 * 0 0 % & 8 . 2	b & ' 0 > * 9) 2500V 8 J A & ' 0 0 60s 8 0 % &
4	} 8 * Z A 0 0	} 8 * Z A 0 0

6.2 a 1mA \$ T 0.75U_{1mA} * \$ a :



@ A 1 M 6 2 o U

B 8BDYCSY-ZW-08-01/01

2 o	2 o	= > W	# \$ M W	# \$ d V
M q r ` { k i 6				
p X	t x	q r	q r -	q r { k i 6

M T * / : N = 1



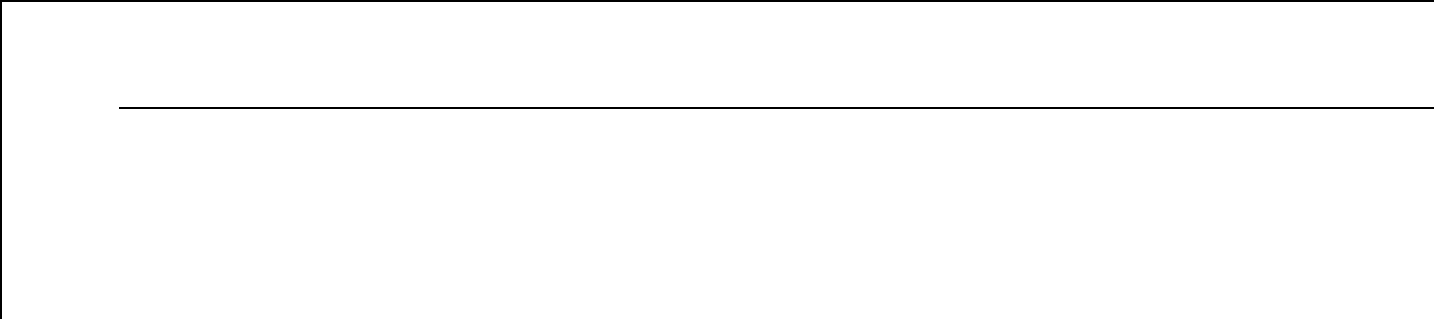
中国南方电网
CHINA SOUTHERN POWER GRID



X Y

1	() x	61
2	v ^ ; 7	61
3	o U 3	61
4	M q r s ` y z {	61
5	o U • H	62
6	o U a U	63
7	7 8 { k i 6 % ~ •	64

p X	t x	q r	q r -	q r { k i 6
5	0 0	v	/ q r	DEFX 0 2 o * M i 6 *
6	0 D l	5 H	^ - q r	p 4) 8 0 0 * \]
7	5 H M i 6 D [\	5 H	/ q r	2 o V W B C g V p
8	& ' K L	9 K L 2 o	^ - q r	^ l L
9	/ 3 ^ i 6 D u	v	/ q r	* @ o U V W * 0 5 =



6.6 F y z } tand

6.6.1 * P Z /) & ' * D y 0 5 J z

6.6.2 % & K L ' (*) < : • ' (* D Q : • 1.3 G z 8 7 3

2 y : • " * Y H I J K R) q K K * L M K > N 0 z 8 \$ { ? (

+ X z

6.7 F y z a \$ a

8 0 \$ { / 0 * 8 9 ? (* 0 % & K L ' (* 0

D ~ • 1 z

6.8 V a T : ;

{ 0 : + X * u e) 4 6 2 P 0 a U * V u e) 0

a U z W 8 e) X Y Z a * L M 5 H 8 z 0 - { 110kV u 0

^ \$ k [+ X z 0 ! | } ~ • + X z 0 * Y

H K T A D z

6.9 I

6.9.1 % J 0 [*) 500V & ' 0 > % J 0 & ' * d v J 0

d * % J 0 z

6.9.2 % q & ' * 0 X q * q \ b f W X \ 0 g & ' • ! "

* bf g Z



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

t 3 y 0 0 - 35kV u , 8 { 4000kVA u * 8 + z + y h
: • + " * { ' v D j Q 1.31 \ R_{60s}

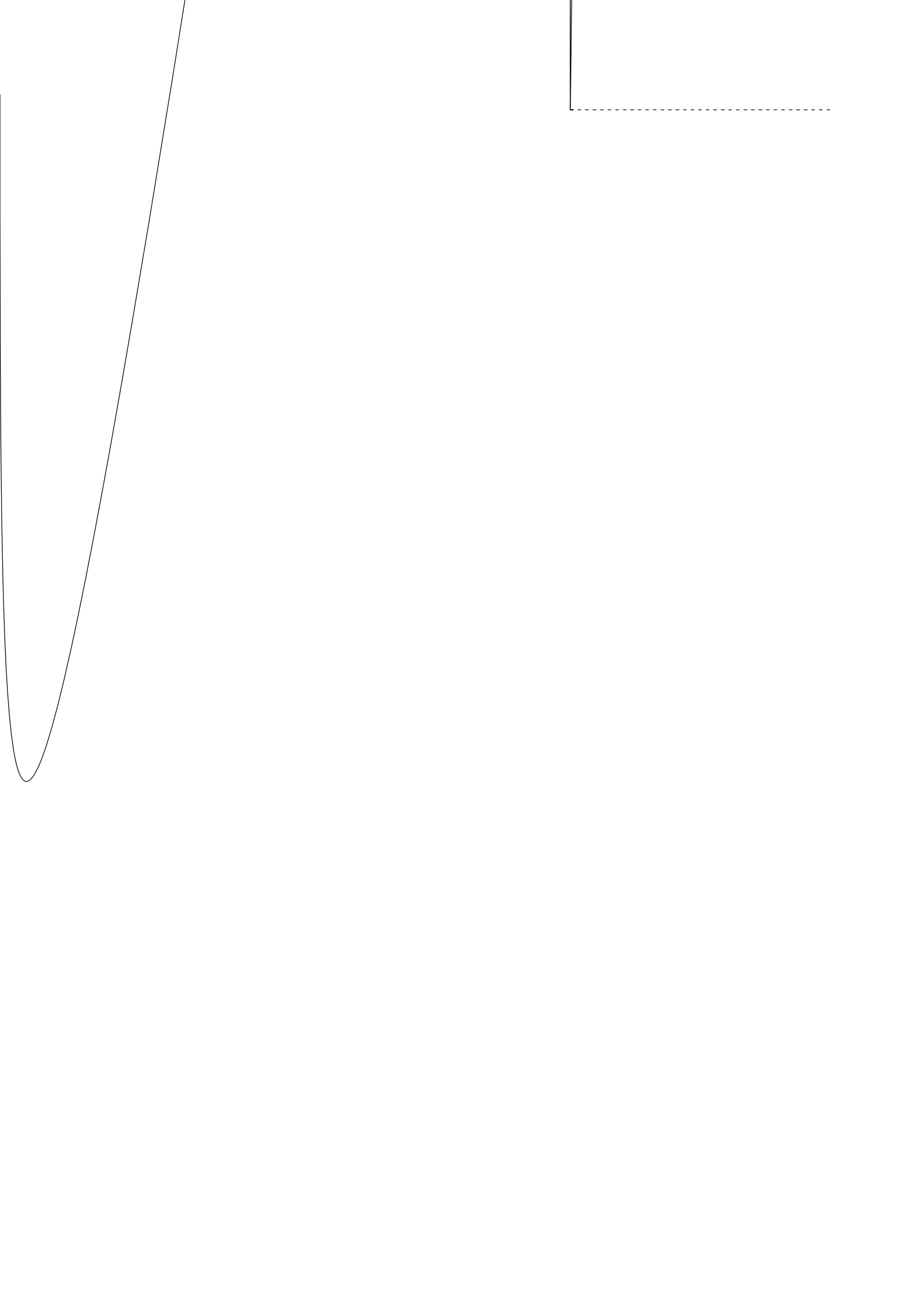
7.3 ; n

7 8 % d n 10kV y 500kV 0 0 2 3 7 8 + y 1 ~ • 4 0 0 2 3 s
 ^ Q/CSG > 4-3.1.1 Q/CSG > 4-3.2.1 Q/CSG > 4-4.1.1 y 4-4.1.10 Q/CSG > 4-4.2.1 y 4-4.2.3 Q/CSG
 > 4-5.1.1 Q/CSG > 4-5.2.1 Q/CSG > 4-6.1.1 Q/CSG > 4-6.2.1 P F X z -

@ A 1 M 6 2 o U

v w BDYCSY-ZW-09-01/01

2 o	2 o	= > W	# \$ M W	# \$ d V
M q r \ { k i 6				
p X`*	t x	q r	q r -	q r { k i 6
1	5 = M x	0	^ - q r	# \$ o U D E F X f M 3 M => i 6 * 0 f Y l D c Q u v i 6
2	/ 3 ^ i 6 D u	0	/ q r	4) 8 0 0 * \] P z { 4 * 2 o V W 0 r l * d } P * 0 2 o d V \ z
3	0	0	q r	B C d l 5 = M x A ~ - M i 6 * 0 g V + X , z
4	5 H R D	5 H	q r	* @ o U V W * 0 5 = M x * g V 1 o V W { \$ V W * u * a F * 3 b E 0 z
5	K D	5 H	/ q r	D E d } l 3 o z
6	/ o U M i 6 D [\		/ q r	.) / : / * 3 B C o U V W / o U * 0 \ .) M * z
7	& ' K L	K L	^ - q r	o U V W 0 M * * D e) 2 G * B C .) \ 2 G z
8	0 D l	5 H	^ - q r	B C - * 0 * 0) < * z
9	/ 3 ^ ' 0	5 H	^ - q r	^ l L z V W \ .) B P & ' 2 G M) z
10	A	5 H	^ - q r	p H g V 1 4 % G 1 o U 3 ^ o U z
11	5 H M i 6 D [\	5 H	/ q r	d } • h => r o * \ .) 2 G z D E F X 0 2 o * M i 6 * , z
12	V W !	5 H	^ - q r	
13	l 0 0	v	/ q r	



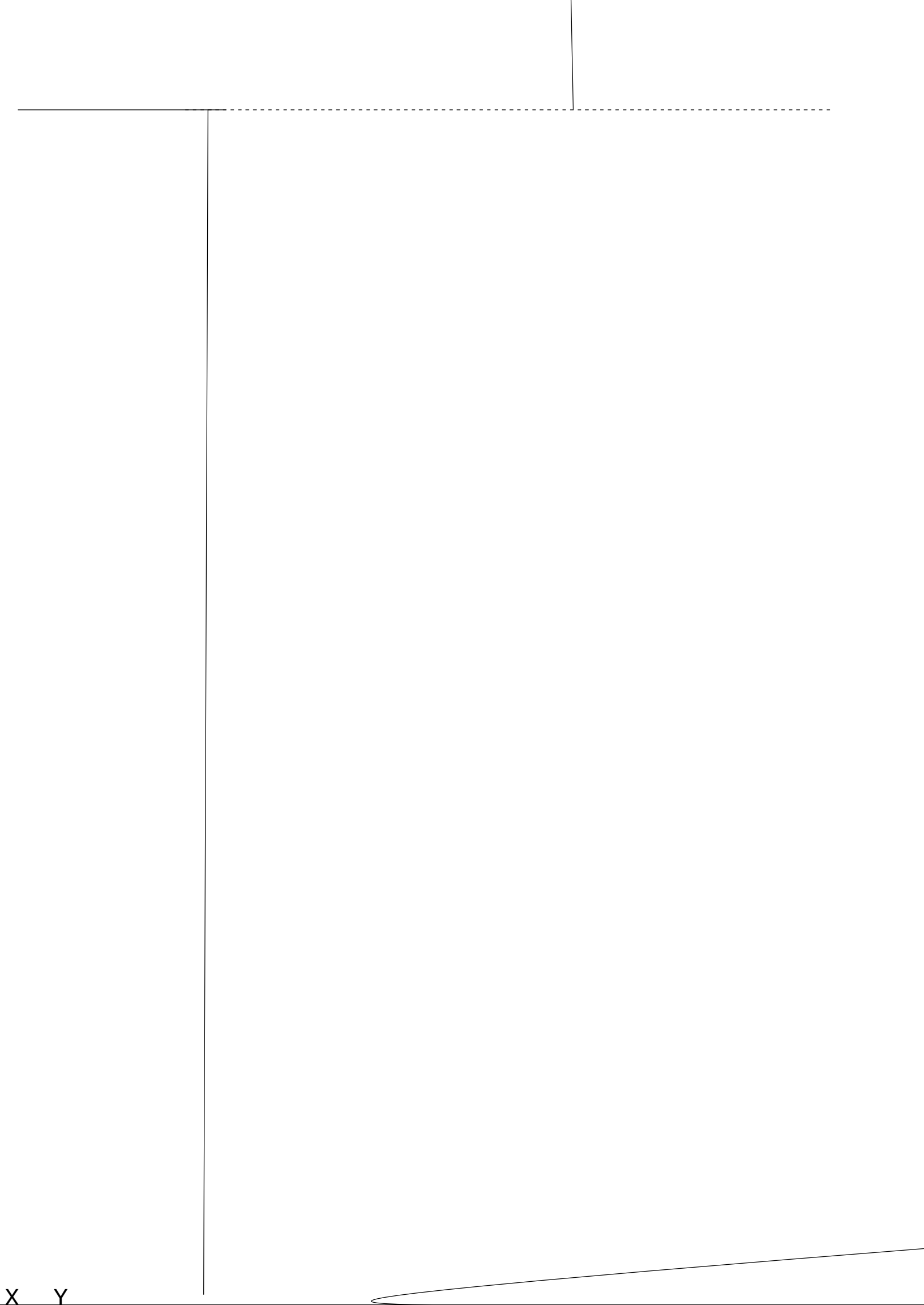


中国南方电网
CHINA SOUTHERN POWER GRID

中国南方电网有限公司

CHINA SOUTHERN POWER GRID CO., LTD.





1 Z [\]

o U p q r () Q f z

2 B L ^ _

` 2-1 B L ^ _

p X

|) 4

> 4-1 o U e M • q r p `

p X	t x	q r	q r -	q r { k i 6
1	D 5 H R	5 H	q r	4 * % < *
2	V W !	5 H	^ - q r	{ 4 2 o V W 0 r l * d } P * 0 b 2 o d V \
3	x 5 = M	V	^ - q r	B C d l 5 = M x A ~ - M i 6 * 0 g V + X ,
4	0 0	V	/ q r	D E F X 0 2 o * M i 6 * ,
5	5 H { 0	0	^ - q r	\ .) M)
6	0 D l	5 H	^ - q r	P 4) 8 0 0 * \]
7	5 H M i 6 D [\	5 H	/ q r	2 o V W B C g V p
8		V	^ - q r	4 \] + V 2 o
9	/ 3 ^ i 6 D u	V	/ q r	* @ o U V W * 0 5 = M x * g V 1 o V W { \$ V W * < u ? _ a F * 3 b E 0
10	/ o U M i 6 D [\	V	/ q r	.) / : / * 3 B C o U V W / o U * 0 \ .) M *
11	/ 3 ^ ' 0	5 H	^ - q r	D E d } l 3 o
12	A	5 H	^ - q r	o U V W A 0 M * z D e) 2 G * B C .) \ 2 G
13	i 6 D u	5 H	^ - q r	+ X 4 B C f 2 o V W * 0 V W + X ,
14	0	V	q r	- * 0 * 0) B C <

5 0 1 n o

5.1 M N p o

` 5-1 0 1 M N p o

2 p t x	4 2 o V	d V	, V
Q	3	1	1
0 8	3	1	1
& ' 0 8	3	1	1
	3	1	1
Y o U V 6 7 G J 2 3 8 H z			

5.2 / U q r s U s ` p t

` 5-2 @ ? / U q r s U s ` p t

p X	t x	E/v X	k u	8	H Y
1	& ' 0 >				
2	0				
3	=				
Y n P 2 G > 6 7 G J 2 3 8 H z					

6 0 1 # u

6.1 P R

6.1.1 % f , *] y 0 5 H b E z

6.1.2 4 2 o * V W 4 => y M [; z

6.1.3 , 5 H [; * + z

6.1.4 f 0 [* G H A z

6.2 / 0 1 2 | :

6.2.1 6 7 o 0 *) Q R 0 Q I 0 0 1 80 1 * < z

6.2.2 6 7 o 0 *) Q R 0 Q I 0 0 1 110 1 * < z

6.3 # \$:

b 8 * ~ 8 1 * p + * % & 8 0 z

6.4 \$

6.4.1 9 (u = * Z & ' 0 > 9 : * 4 & ' 0 > + X % z

6.4.2 Z & ' 0 > y * Z K / t B P

K K y z

6.4.3 b & ' 0 > 8 * % & 60s 8 z

6.4.4 } 8 * 0 0 z

6.5 T : ;

6.5.1 9 (u = Z 2 P = : = * Z < z

6.5.2 3 ^) > * 3 : # m n - * *

M i 6 0 + X % * 6 7 % \ 1 @ R z

6.5.3 0 0 % & 8 7 0 z

6.5.4 } 8 * E 0 * A 0 0 z

7 m . r ; n

7.1 m .

7.1.1 8 f q 0 0 * \$ e) 0 D j Q 100A U z 2 * D

h => A l z

7.1.2 z

` 7-1 1min / S T \$ T & U

kV

1 0	/ 2 0 0	& ' f			
				J b & '	
		: •		: •	
35	40.5	100	100	100	90

7-1t y

1 0	/ 2 o 0	& ' f			
				J b & '	
		: •		: •	
66	69.0	165	165	165	148
110	126.0	265	265	265	240
220	252.0	495	495	495	440

7.1.3 % o 0 * k " • l z

7.1.4 v p l o * \ 0 R { v p x

*] f n R f < A z

t1y 0 \ 0 0 { l 0 801 y1101 x z

t2y \ { l 851 y1101 x z

t3y t { k A 0 = \ 0 { l 0 801 y1101 x

z

7.1.5 f f R 0 = • \ < z

7.2 m `

7-2 m `

p X	{ k	{ k a		
		W	H	S
1	f			
Y 7 8 { k ^ H } 2 ~ % 1 W • 1 S z				

7.3 ; n

7 8 % d n10kV y500kV 0 0 2 3 7 8 + y l ~ • 4 0 0 2 3 s

^ Q/CSG > 4-12.1.1 Q/CSG > 4-14.2.1 P F X z



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

@ A 1 M 6 2 o U

B 8 BDYCSY-ZW8M

[illegible]

```

t , y      # $ = > W ] ^ * # $ M W b * # $ d v ' z # $ d v 24 q r { k i 6
0 0 z t t y 2 o      M i 6 D      . ) *      @ * ) _ H 1 \ V W '
* { H Y % &      z @ S V W + X * 0 t \ z t y 6 7 # $ A x A K L * T M *
R : N = 1 z y \ q r - y • q r - D , d * 5 R S f V W @ + X q r . 0 k l i 6 z y
• q r - y q r { k i 6 { 24 # $ < ? z t y t D M t N t y ! o L z

```

中国南方电网
CHINA SOUTHERN POWER GRID



中国南方电网有限责任公司电网建

CHINA SOUTHERN POWER GRID



1 Z [\]

o U p q r () Q 0 0 0 z

2 B L ^ _

` 2-1 B L ^ _

p X	) } J t x
1	GB 50150 ~ 2006 n 0 = 2 3 0 5 H ~ • s
2	DL 408 ~



中国南方电网
CHINA SOUTHERN POWER GRID

t2y 9 0 8 (u z
t3y 8 > 9 : = z
7.1.2 & ' 0
t1y { % l b .) z
t2y & ' 0 > u = M 9 : z
t3y 4 & ' 0 > + X < A ? < ? % z
t4y % * > N [z
t5y) q .) & ' R K z
t6y % A * % & ' 0 > : z
t7y & ' 0 * q d 0 z
7.1.3
t1y { % l b .) * z
t2y * ? (D \$ Q 851 z
t3y 0 l * 0 9 \ z
t4y L z
t5y \ < * L * / (L * / y R 5 H b @ &
' z
t6y F < 0] 1min z
t7y * 5 H P 0 z
7.1.4 l 0 1 0 4 P + X & ' % E * 5 H G H z
7.1.5 0 R ^ 0 A j > * D 1.08 z
7.1.6 & ' 0 D Q 2000 " Ω z
7.1.7 3 ^ + m n - * { l 0 v 1min z
7.1.8 0 0 R l 0 1 0 0 : * " D 51 * 0 + # 0 z
7.2 m`

` 7-1 m`

p X	{ k	W	{ k a H	W
-----	-----	---	------------	---

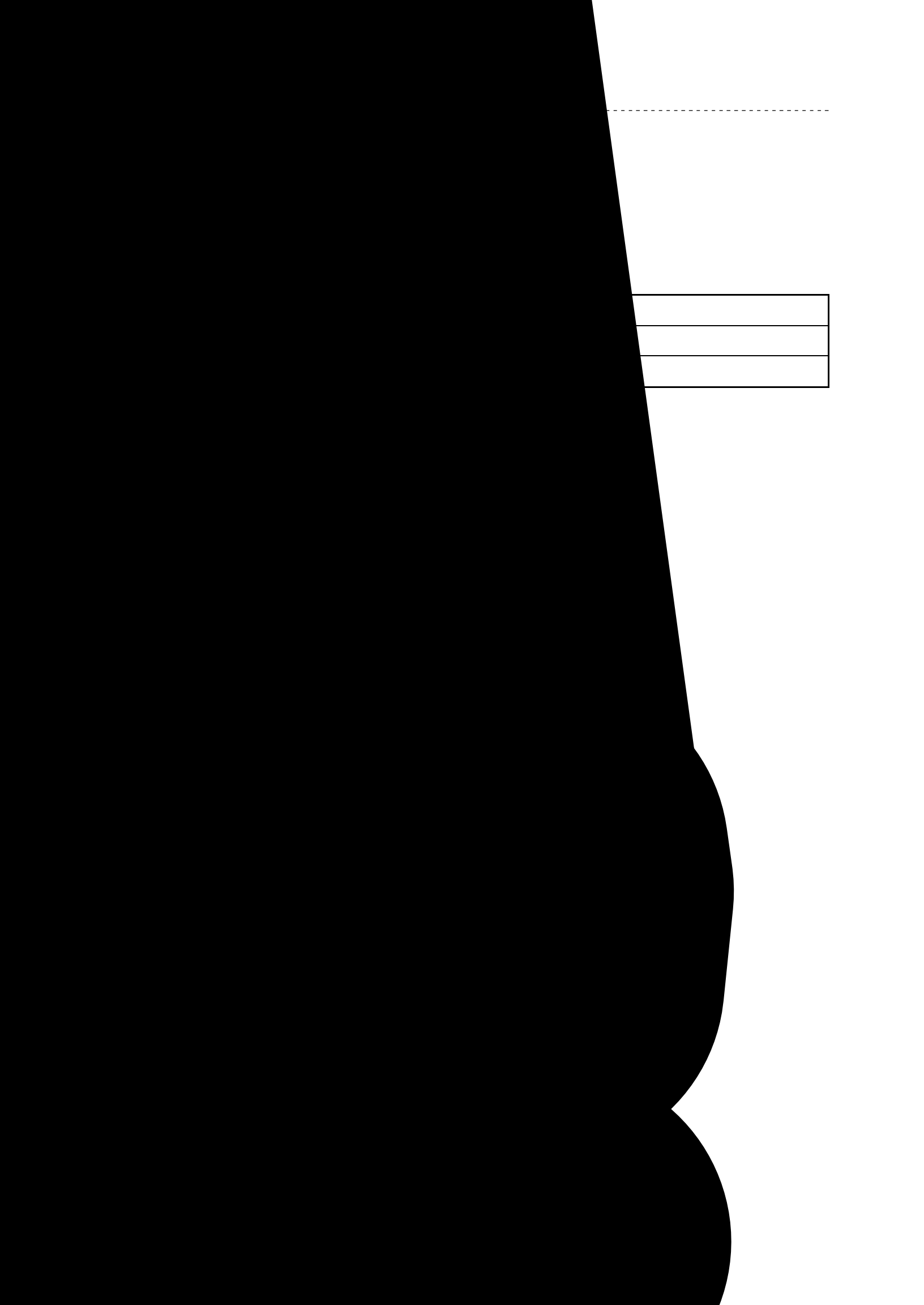
M T * / : N = 1							
# \$ V W t							

.2 0 183.3624 233.76 0.



X Y

1 () x	81
2 v ^ ; 7	81
3 o U 3	81
4 M q r s ` y z {	82
5 o U • H	83
6 o U a U	83
7 7 8 { k i 6 % ~ •	83



4 e f g h i j k l m

4.1 4 * 6 2 5 6 7 5 o U e 6 2 A * | } n 0 1 4 5 6 2 M
 • q r p ` s t v w x n p ` s y (M q r 2 o * ; e q r ` > z
 4.2 d n p ` s ^ y f n 0 1 4 5 M 6 2 o U s t v w
 BDYCSY-ZW-12-01/01y* # \$ + X " ` * \ l q r - * # \$ = > W] ^ M 6 2 o
 U * M W b * 6 2 d V ' z
 4.3 6 2 d V q r { k i 6 * 0 { M J o U V W + X M * o U
 V W d Z M i 6 o U e A - 2 ^ z
 4.4 M 6 2 o U 6 2 d V # \$ b * 2 o D .) 10 * 10 C
 @ L o U * { 2 o [; _ 5] H z @ 6 2 ' M M

5.2 / U q r s U s ` p t

` 5-2 @ ? / U q r s U s ` p t

p X	t x	E/v X	k u	8	H Y
1	& ' 0 >		V	1	
2	5 H			1	
Y n P 2 G > 6 7 G J 2 3 8 H z					

6 0 1 # u

6.1 V \$

6.1.1 E 0 * R E 4 , * 0 Z 0 z

6.1.2 Z & ' 0 > = : * Z & ' 0 > < E ? y * { b K
8 q A K y & ' 0 > 8 < L ? K < G ? t \ 4 *

6.1.3 [; _ * ~ & ' 0 > l _ * 0 & ' 0 z

6.1.4 0 & ' 0 _ * } & ' 0 > & ' 8 0 E * : _
+ X 0 z

Y \ .) & ' 0 > * & ' 0 > < l t 120r/min y* * & ' 0 > p p < ?*
Z < * ~ p l _ * 0 & ' 0 z 0 & ' 0 _ * E < *
: _ Z & ' 0 > } * _ + X 0 z

6.2 V V a T : ;

6.2.1) & ' q Z F Q 0 > 0 > d l + X \ * : _ %
\ + ! z

6.2.2 F 4 % Q { u z F 3 * , b f > 1 3 ^ * 8 , /
* , z

6.2.3 < 0 _ } 1min * 0 0 0 % & * 0 < z 2 P
[; _ * Z Q < u * : _ E 0 * E < q * 8
& ' 0 z 4 a U z

7 m . r ; n

7.1 m .

7.1.1 & ' 0 8 # \$ 7 8 • z N * { ? (A v + X 8 * { > N -
0 u K z { P Y H * K K / * L M K
> N * u " ; & ' 0 > z

7.1.2 0 Q # \$ 7 8 • * 3 ^ * N ? (' (> N - * |
> N R 0 * 0 D l * a I J L _ + X z \) I J
r & ' > N * B P) R (\ r K > N B z

7.1.3 \ b & ' I J * _ * 3 ' # b ' * & ' D * L *
: _ z

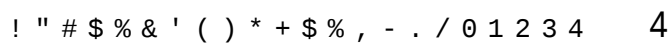
7.2 ; n

7 8 % d n 10kV y 500kV 0 0 2 3 7 8 + y l ~ • 4 0 0 2 3 s
^ P F X z

@ A 1 M 6 2 o U

v w BDYCSY-ZW-12-01/01

2 o	2 o	= > W	# \$ M W	# \$ d V
M q r ` { k i 6				
p X	t x	q r	q r -	q r { k i 6
1	0	0	q r	# \$ o U D E F X f M 3 M => i 6 * 0 f Y l D c Q u v i 6 4 * % < * z 4) 8 0 0 * \] P z { 4 2 o V W 0 r l * d } P * 0 2 o d V \ z B C d l 5 = M x A ~ - M i 6 * 0 g V + X , z * @ o U V W * 0 5 = M x * g V 1 o V W { \$ V W * u * a F * 3 b E 0 z .) / : / * 3 B C o U V W / o U * 0 \ .) M * z .)] z - * 0 * 0) B C < z V W \ .) B P & ' 2 G M) z D E F X 0 2 o * M i 6 * , z [% * \ * * # \$ + 2 G A
2	/ i 6 D 3 ^ u	0	/ q r	
3	M x 5 =	0	^ - q r	
4	/ o U M i 6 D [\		/ q r	
5	5 H R D	5 H	q r	
6	A	5 H	^ - q r	
7	5 H M i 6 D [\	5 H	/ q r	
8	/ ' 0 3 ^	5 H	^ - q r	
9	0 0	v	/ q r	
10	5 H { 0	0	^ - q r	



t , y	# \$ = > w] ^ * # \$	M w b	* # \$	d v '	z # \$	d v	2 4	q r { k i 6
0 0 z t t y 2 o	M i 6 D	.	) *	@ *	) _	H	1 \ v w '	y M
* { H Y % &	z @ S V W + X	* O	t \	z t y	6 7 # \$	A	x A K L * T	M * # \$



中国南方电网
CHINA SOUTHERN POWER GRID





! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 2 B L ^ _ 4

2-1 B L

p X I)

1 Z [\]

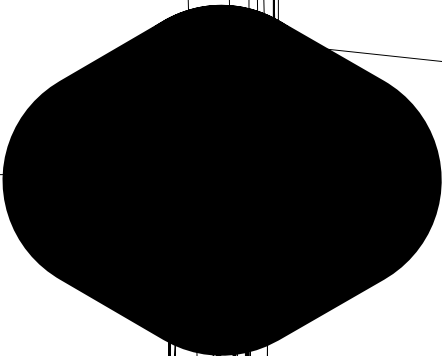
o U p q r () Q 0 z

1 GB 50150 ~ 2006 n 0 = 2 3 0 5 H ~ • s

2 DL 408 ~ 1991 n 0 U M 2 o 3 t ' 0 • A 0 0 ys

3 0 1 a b

c3-1 01 /d!abc 4 efghijklm 461 rs0PYZ[AB4*62Q5M67!Q5oUe" 62



4.3 6 2 d V q r { k i 6 * 0 { M J o U V W + X M * o U
V W d Z M i 6 o U e A - 2 ^ z

4.4 M 6 2 o U 6 2 d V # \$ b * 2 o D .) 10 * 10 C
@ L o U * { 2 o [; _ 5] H z

> 4-1 o U e M • q r p `

p X	t x	q r	q r -	q r { k i 6
1	5 H R D	5 H	q r	4 * % < *
2	5 = M x	v	^ - q r	B C d l 5 = M x A ~ - M i 6 * 0 g V + X ,

3 |

6 0 1 # u

6.1 \$:

& ' 0 8 0 & ' 0 0 & ' 0 z

` 6-1 / 0 < = / 0 r / X

p X	2 o	o 2 M
1	& ' 0 > & ' 0 > %	9 (u = * Z & ' 0 > 9 : * 4 & ' 0 > + X %
2	A	Z & ' 0 > y * Z K 8 u t B P K K y
3	9 (8 0	& ' 0 9 & ' 0 > 2500V 1 & ' 0 9 & ' 0 > 1000V
4	8 * 0 0 % & 8 . 2	b & ' 0 > 8 & ' 0 * 0 60s 8
5	} 8 * Z A 0 0	} 8 * Z A 0 0

6.2 tand r \$ = :

` 6-2 tand r \$ = :

p X	2 o	o 2 M
1	Z	9 (u = Z : = * Z <
2	d a U =	} H l y .) r *) g)
3	8 * 0 0 % & 8 . 2	b + X 8 * 0 0 % & 8 7 0
4	} 8 * E 0 * Z A 0 0	} 8 * E 0 * Z A 0 0

7 m . r ; n

7.1 m .

7.1.1 & ' 0 z

t1y \ & ' 0 > % & ' 0 > * & ' 0 > u = M * 9 : *
4 & ' 0 > + X < A ? < ? % z
t2y < & ' D & ' 0 > : D *) q
.) & ' R K * % A * % & ' 0 > : z
t3y] : 0 l Y H 0 \ * Y H & ' 0 * q d 0 * Y H >
p 8 \ z
t4y \] \$ 0 * 0 0 0 & ' 0 > " ; V * Y H >
0 [* Z A z

7.1.2 tand 0 8 z

t1y Y H z / | u y 5 H (6 @ P z = M : *]
z / | u y 5 H (6 @ P z
t2y \ + X * Y H / y _ 5 H R u R 2 z e
) U * / | ((* L *] y J b @ & ' z



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

t3y Y H_Z e^X9 a U * 9 \ 0 z 9 U * U e) 10kV 0 z
t4y v 3 b 8 D (X) T j / F 5 + 1 1 0 . 5 6 T f 1 0 . 5 6 0 6 f - 4 5 0 . 7 2 -



4

$$M T^* / N = 1$$

\$ V W t

H Y

>W/F1 9.15+3 Tf18.24 re8080 #\$/F1 9.15+2 Tf18.24 080 6D/F1 9.15



X Y

1 () x	93
2 v ^ ; 7	93
3 o U 3	93
4 M q r s ` y z {	93
5 o U • H	94
6 o U a U	95
7 7 8 { k i 6 % ~ •	96

1 z [\]

o U p q r () Q z

2 B L ^ _

` 2-1 B L ^ _

p X	) } J t x		
1	GB 50150~2006 n 0	= 2 3 0 5 H	~ • s
2	DL 408~1991 n 0 U M 2 o	3 t ' 0 • A 0 0	ys

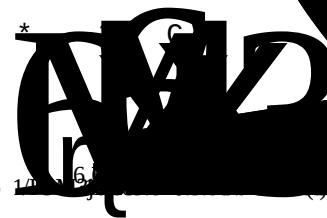
3 0 1 a b

开始

VW dZ Mi6 oUe A - 2 ^ z
4.4 M62oU 62 dV#\$ b*2o D .) 10 *
@ LoU * { 2 o [; _ 5] H z

pX t x q r q r -
> 4-1 oUe M • q r p `

qr { ki 6 1 0 6

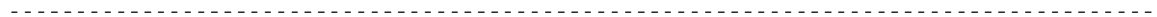


5.2 / U q r s U s ` p t sUs`

6.3.1 0 6 8 IB UB I- U- { Re H : R ^
A e H , : t Y + ^ | : 0 * b ^ | : 0 1 D *
! | : 0 * 9 0 y* IB UB , R * I- U- , R *) 0
F 8 / # R R # R 0 t 0 y* b R b u = z
6.3.2 * 0 f R 0 * 0 8 * % & 2 A R ' (z
6.4 V a T : ;
6.4.1 e) Q t R Q y A b 8 R R q 1 0 P Q 50Hz * 0
W z
6.4.2 Z ' A * / R R | A z
6.4.3 / # R z Z / < / R * # R C D A A , 0
A z
6.4.4 # R z Z / < R * / # R C D A A
, 0 A z
6.4.5 Z Q 4 5 A / R z
6.4.6 8 % & R 4 & ' 0 * [0 z
6.4.7 * d 3kV/s F (: 0 0 V T f 1 0 . - 0 . 2 4 0 T c (X) T j 0 . T] : 10.56 0 TD (X) B 0 E + 5 10.56 T f 10.56 0 TD (o) T



中国南方电网
CHINA SOUTHERN POWER GRID



t, y	# \$ = > W] ^ * # \$	M W b	* # \$	d V	'	z # \$	d V	2 4	q r { k i 6
0 0 z t t y 2 o	M i 6 D	.	)	*	@	*	) _	H	1 \ v w '
* { H Y % &	z @ S V W + X	* 0	t \	z t	y	6 7 # \$	A	x A K L * T	M *
R : N = l z	y \ q r -	y • q r -	D , d	* 5	R S	f V W	@ + X q r	.	0 k l i 6 z y
• q r -	y q r { k i 6 {	2 4 # \$	<	? z t	y	t D	M t N	t y ! o	L z



1

1



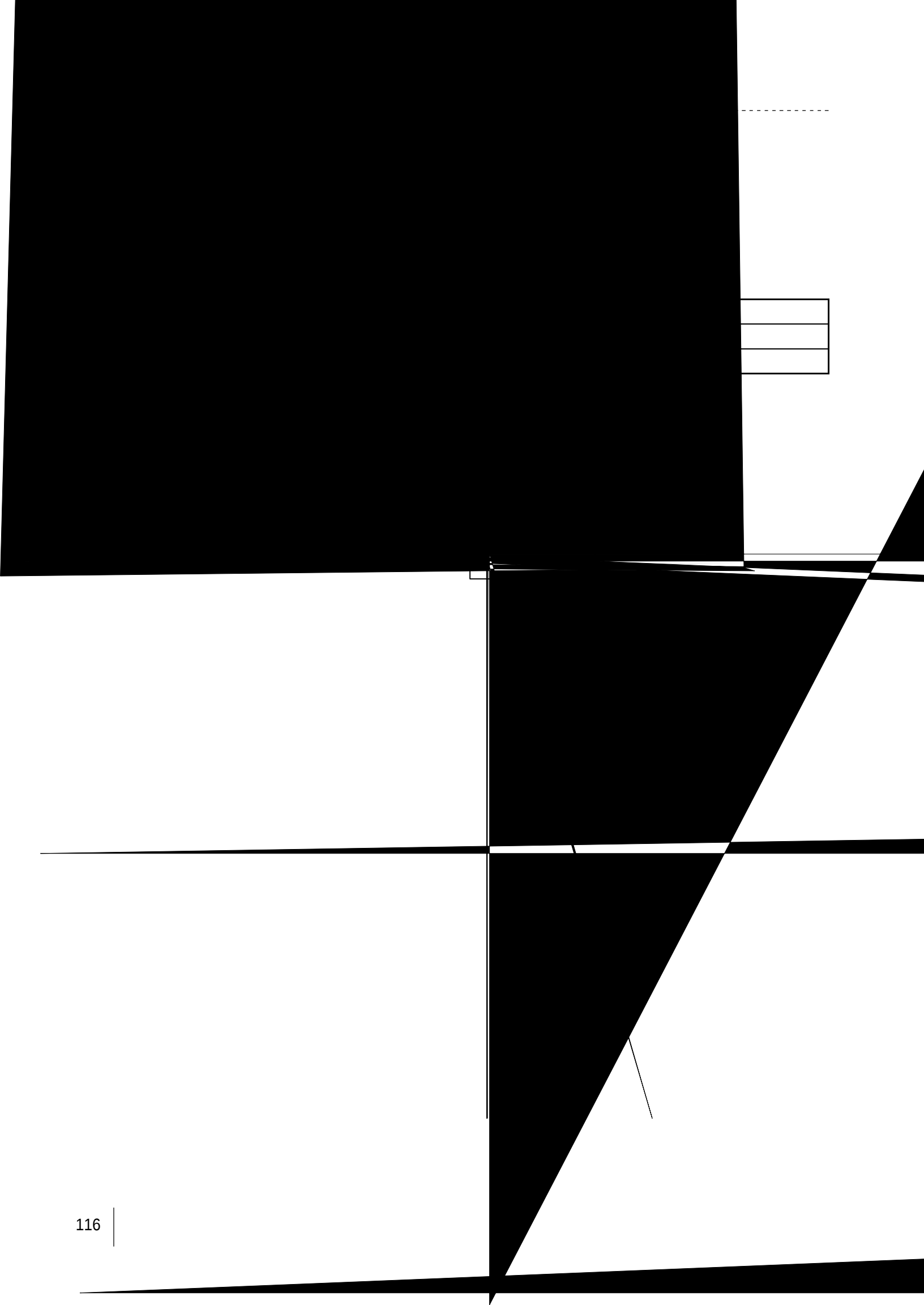
1

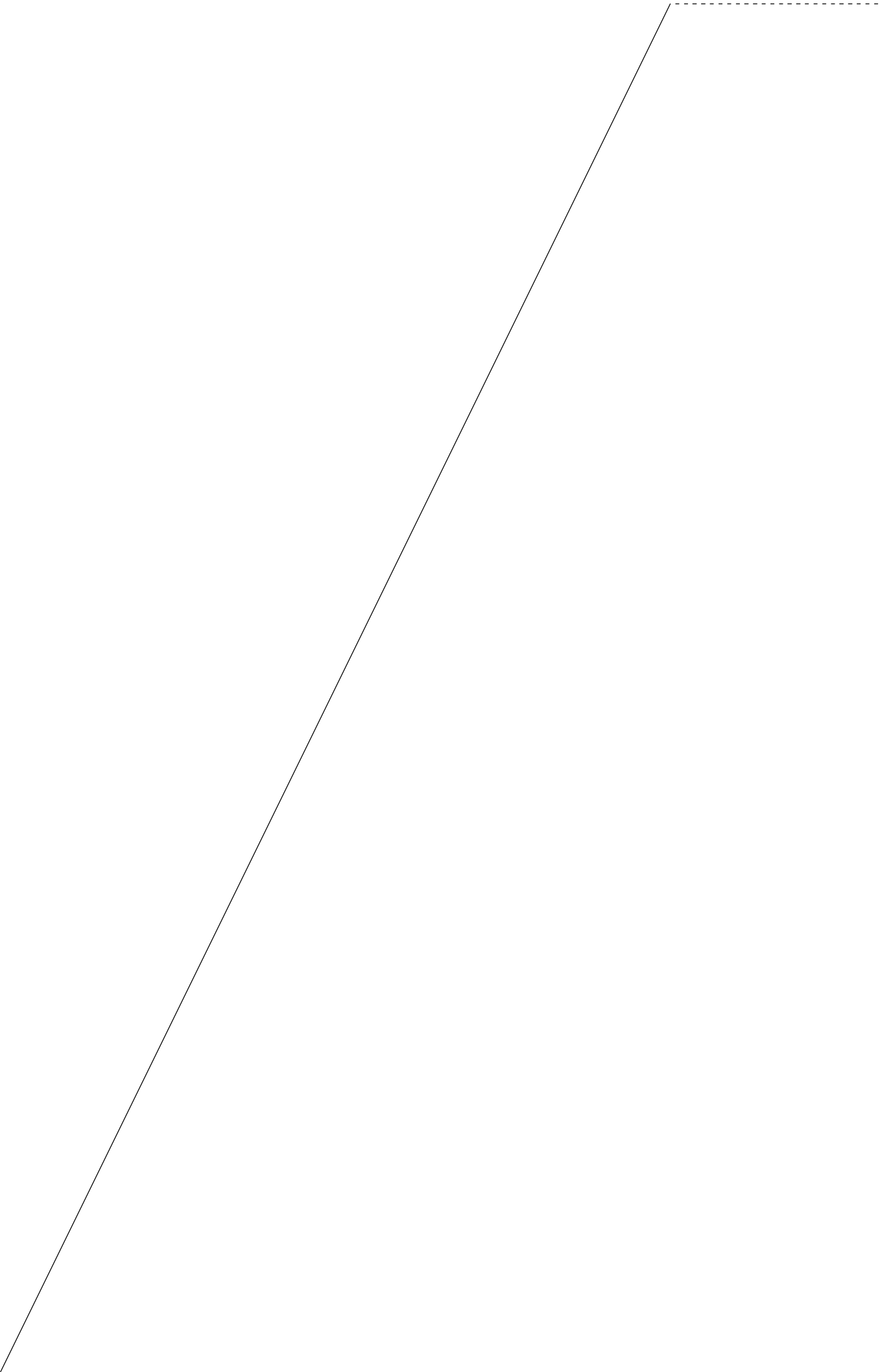
X

Y

1

1 () x

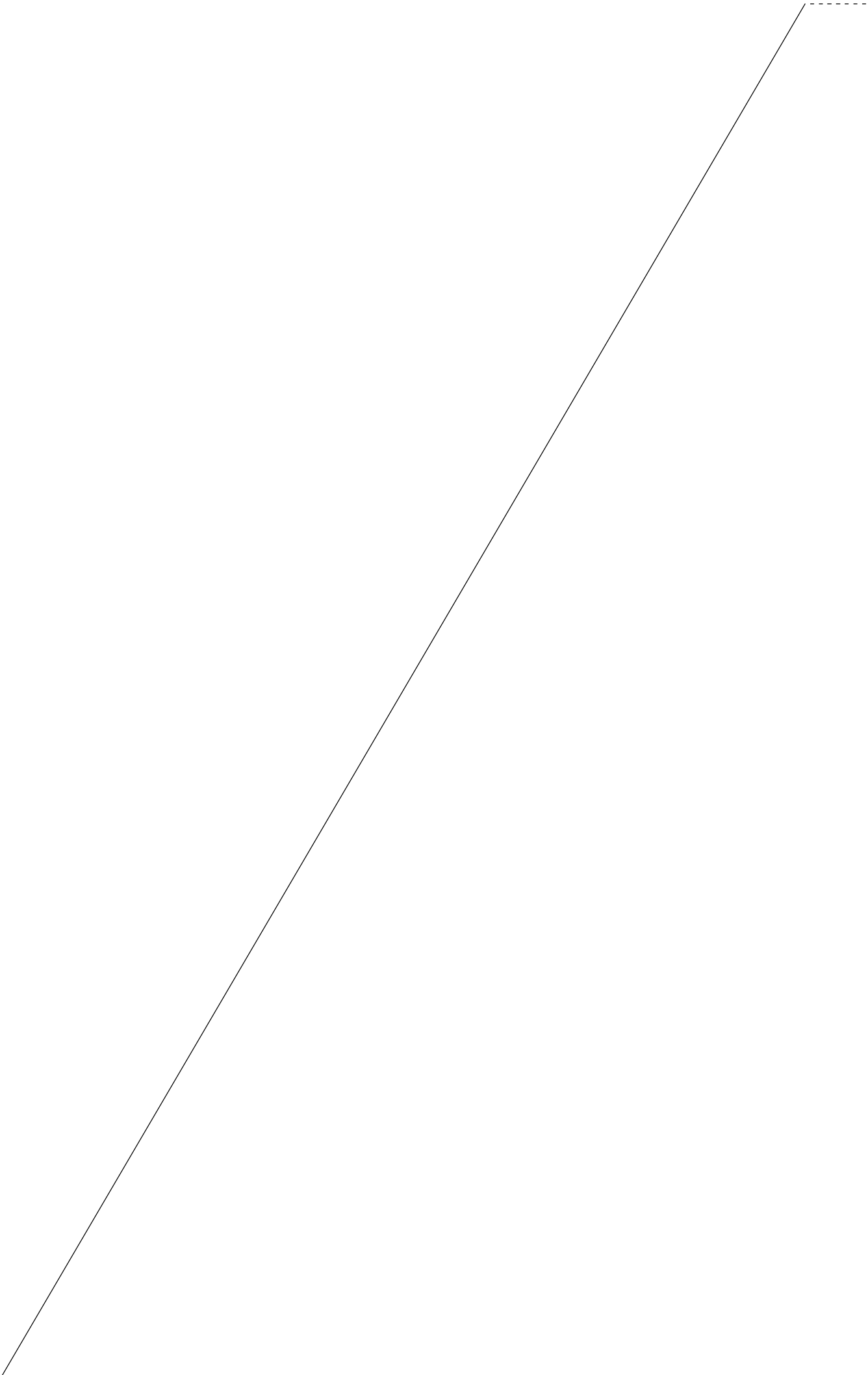






中国南方电网
CHINA SOUTHERN POWER GRID





@ A 1 M 6 2 o U

v w BDYCSY-ZW-15-01/01

2 o		2 o		= > W	# \$ M W	# \$ d V
M q r { k i 6						
p X	t x	q r	q r -	q r { k i 6		
1	0	0	q r			
2	/ , 0 3 ^	5 H	^ - q r			
3	5 H { 0	0	^ - q r			
4	0 D 1	5 H	^ - q r			
5	M x 5 =	0	^ - q r			
6	V W !	5 H	^ - q r			
7			^ - q r			
8	D i 6 u	5 H	^ - q r			
9	SF ₆ J	^	q r			
10	SF ₆ J		r q			
11	/ i 6 D u 3 ^	0	/ q r			
12	/ o U M i 6 D [\		/ q r			
13	5 H R D	5 H	q r			
14	A	5 H	^ - q r			

15 5 H M i 6 5 H / q r 5 ! D [\ ■ q r E D D

MT * / : N = 1

\$ VW t



\$ = Q \$ T U : ; 0 1 2 3 4

v w BDYCSY-ZW-16

X Y

1	() x	107
2	v ^ ; 7	107
3	o U 3	107
4	M q r s ` y z {	108
5	o U • H	109
6	o U a U	109
7	7 8 { k i 6 % ~ •	110

4 e f g h i j k l m

4.1 0 0 4 * 6 2 5 6 7 5 o U e 6 2 A * | } n 0 1 4 5 6

2 M • q r p ` s t v w x n p ` s y (M q r 2 o * ; e q r ` > z

4.2 d n p ` s ^ y 0 0 f n 0 1 4 5 M 6 2 o U s t v w

BDYCSY-ZW-16-01/01y* # \$ + X " ` * \ l q r - * # \$ = > W] ^ M 6 2 o

U * M W b * 6 2 d V ' z

4.3 6 2 d V q r { k i 6 * 0 { M J o U V W + X M * o U

V W d Z M i 6 o U e A - 2 ^ z

4.4 M 6 2 o U 6 2 d V # \$ b * 2 o D .) 10 * 10 C

@ L o U * { 2 o [; _ 5] H z

> 4-1 o U e M • q r p `

p X t x q r q r - t

	2	1	1
	3	1	1
t R	3	1	1
Y o U V 6 7 G J 2 3 8 H z			

5.2 / U q r s U s ` p t

` 5-2 @ ? / U q r s U s ` p t

p X	t x	E/v X	k u	8	H Y
1	& ' 0 >			1	
2	p) >			1	
3	k Q			1	
4	>			1	
5				1	
6	TV			1	
7				1	
Y n P 2 G > 6 7 G J 2 3 8 H z					

6 0 1 # u

6.1 0 1

6.1.1 0 a [* l * 4) % + * ~ m I \ z

6.1.2 t A 5 H [; * / | R f * 5 H 0 z

6.1.3 # \$ K L 6 @ + X * \$ D b 4 0 \$ z

6.1.4 b .) 8 > ! a % E * 0 { % l z

6.2 : ; # u

6.2.1 8 0 , t R & ' 0) 2500V & ' 0 > 8 & ' 0 1) 2500V & ' 0 > 8 t R > & ' 0 z

6.2.2 0 t ^ 0 | : y %) Z 0 A 0 ^ , R *) p) > t u { j 0

7.1.1 8 R & ' 0 * v p l & ' 0 * 8 , R t
R 4 5 t R 4 5 & ' 0 1 & ' 0 D \$ Q 1000MΩ 1 & ' 0 8 .)
2500V & ' 0 > z
7.1.2 % R A k | : v z w v k s NRk @ 0
~ A 4 5 v 8 ,



中国南方电网
CHINA SOUTHERN POWER GRID





\$] Q \$ T

U : ; 0 1 2 3 4

vWNB

X Y

1 () x	113
2 v ^ ; 7	113
3 o U 3	113
4 M q r s ` y z {	114
5 o U • H	115
6 o U a U	115
7 7 8 { k i 6 % ~ •	116



! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

1 Z [\]

o U p q r () Q 0 0 z

2 B L ^ _

` 2-1 B L ^ _

p X	) } J t x
1	GB 50150~2006n 0 = 2 3 0 5 H ~ • s
2	DL 408~1991n 0 U M 2 o 3 t ' 0 • A 0 0 ys



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

4 e f g h i j k l m

4.1 0 0 4 * 6 2 5 6 7 5 0 U D 3 8 4 . 0 4 5 7 X 5 9 6 9 . 8 6 - -

S	2	1	1
	3	1	1
t R	3	1	1
Y o U V 6 7 G J 2 3 8 H z			

5.2 / U q r s U s ` p t

` 5-2 @ ? / U q r s U s ` p t

p X	t x	E/v X	k u	8	H Y
1	& ' 0 >			1	
2	p) >			1	
3	k Q			1	
4	>			1	
5				1	
6	TV			1	
7				1	
Y n P 2 G > 6 7 G J 2 3 8 H z					

6 0 1 # u

6.1 0 1

6.1.1 0 a [* 1 * 4) % + * ~ m I \ z

6.1.2 t A 5 H [; * / | R f * 5 H 0 z

6.1.3 # \$ K L 6 @ + X * \$ D b 4 0 \$ z

6.1.4 b .) 8 > ! a T D (8) T j / F 5 + 4 1 0 4 1 0 . 5 0 b l T f 1 0 . 5 6 0 T +

0 * + X A 0 z
6.2.7 t R z .) TV R ; F * 6 t + X
* 0 2500V 1min * + 0 # 0 z
7 m . r ; n
7.1 m .
7.1.1 8 R & ' 0 * v p l & ' 0 * 8 , R t
R 4 5 t R 4 5 & ' 0 1 & ' 0 D \$ Q 1000MΩ 1 & ' 0 8 .)
2500V & ' 0 > z
7.1.2 % R A k | : * B C 5 3 P * 0 y * ~
% A 4 5 X z
7.1.3 0 R 0 8 z , R 0 8 * y) , ' (v : • *
" D \$ Q 10 1 1 t R 0 8 * y) , ' (v : • * " D \$ Q 15 1 z
7.1.4 % z y * * % .) z
7.1.5 0 0 8 * v p P
t 1 y) Q 8 > a ! 6 > * ' 8 . 2 y : • A b
: " t 30 1 y * .) > \ z
t 2 y , v * 8 1 0 20 1 50 1 80 1 100 1 A 120 1 z Q ^
0 t N y * 0 - 35kV u v 0 - 0 / 8
190 1 1 0 - 66kV u 0 / 8 150 1 z
t 3 y Q 1 0 8 t 100 1 y * 0 D \$ Q : • A 8
30 1 * c X E 0 0 D \$ " 30 1 z
7.2 m `

` 7-1 m `

p X	{ k	{ k a		
		W	H	S
1	0 0			

Y H 7 8 { k m 0 . 4 8 N m f 1 2 6 3 4 2 + (G 0 . 4 8 r e f d / F 5 + 1 9 . 1 2 T f 0 . 0 T D (

@ A 1 M 6 2 o U

v w BDYCSY-ZW-17-01/01

2 o	2 o	= > W	# \$ M W	# \$ d V
M q r ` { k i 6				
p X	t x	q r	q r -	q r { k i 6
1	0	0	q r	# \$ o U D E F X f M 3 M => i 6 * 0 f Y l D c Q u v i 6
2	⁵ H R D *	5 H	q r	4 * % < * z 4) 8 0 0 * \] P z
3	⁵ = M x	0	^ - q r	{ 4 2 o V W 0 r l * d } P * 0 2 o d V \ z
4	/ o U M i 6 D [\		/ q r	B C d l 5 = M x A ~ - M i 6 * 0 g V + X , z
5	0 D l	5 H	^ - q r	* @ o U V W * 0 5 = M x * g V 1 o V W { \$ V W * u * a F * 3 b E 0 z
6	A	5 H	^ - q r	D E d } l 3 o z
7	/ , 0 ³ ^	5 H	^ - q r	.) / : / * 3 B C o U V W / o U * 0 \ .) M * z
8	/ ³ ^ i 6 D u	0	/ q r	o U V W 0 M * * D e) 2 G * B C .) \ 2 G z .)] z
9	⁵ H R D	5 H	q r	- * 0 * 0) B C < z
10	0 0	v	/ q r	V W \ .) B P & ' 2 G M) z p H g V 1 4 % G 1 o U 3 ^ o U z
				d } • h => r o * \ .) 2 G z
				D E F X 0 2 o * M i 6 * , z
				[% * \ * * # \$ + 2 G A
Y < t x ? , ^ * b < * ? ~ % * { G H 4 q ' * z				

M T * / : N = 1							
y							
# \$ V W t							
H Y							

t , y 45+1 9775412.02T080021024*5129542546324238.4818282E-0245 TD45 @1862e9f85704096q23f8t7119545e1290LDD6



中国南方电网
CHINA SOUTHERN POWER GRID

中国南方电网有限责任公司电网建设

X Y

1	() x	121
2	v ^ ; 7	121
3	o U 3	121
4	M q r s ` y z {	121
5	o U • H	122
6	o U a U	123
7	7 8 { k i 6 % ~ •	125

2 3 4 4

^ _

) } J t x

> 4-1 o U e M • q r p `

p X	t x	q r	q r -	q r { k i 6
1	5 H R D	5 H	q r	4 * % < *
2	5 = M x	v	^ - q r	B C d 1 5 = M x A ~ - M i 6 * 0 g V + X ,
3	/ 3 ^ i 6 D u	v	/ q r	* @ o U V W * 0 5 = M x * g V 1 o V W { \$ V W * < u ? _ a F * 3 b E 0
4	M	v	q r	1. V W 3 ^ Y H X * i 6 1 2. P) 7 I J 1 3. 50m P 5 g V f 1 4. 0 0 P 5 g V f 0 5 1 5. 0 D
5	5 H { 0	v	^ - q r	.) V]

5 0 1 n o

5.1 M N p o

` 5-1 0 1 M N p o

2 p t x	4 2 o V	d V	, V
1 0 [I	4	1	1
0 8	3	1	1
Y o U V 6 7 G J 2 3 8 H z			

5.2 / U q r s U s ` p t

` 5-2 @ ? / U q r s U s ` p t

p X	t x	E / v X	k u	8	H Y
1				1	
2	0 >			1	
3	/ 0 >			1	

` 5-2 t y

p X	t x	E / v X	k u	8	H Y
4	~ • 0			1	
5	f			1	
6	0		6		
7	0		6		

8	0		6		
9	0		6		
10	1 q 0			1	
11	GPS			2	
Y n P 2 G > 6 7 G J 2 3 8 H z					

6 0 1 # u

6.1 W % \$ 9 ^ :

6.1.1 :

t1y # \$ A 1 d 5 3 P k o [z

t2y A z

6.1.2 : # u

{ , 0 - \$ u { | v | *) 1 q 0 u v 0

t1y 0 5 H y | > z

t2y { | v > z

t3y { y 5 H | v > z

t4y D 0 - \$ u , n | v | * n y | W 0 - |

7 m . r ; n

7.1 m .

7.1.1 m 8 0 * , P 0 0 D Q 10Ω * V u) =
0 z

7.1.2 8 4 * y 0 = E z

7.1.3 m L j R * 8 W 8 X ^ 0 R y > z

7.1.4 8 0 = P 9 v K z

7.1.5 8 2 5 3 P z

7.1.6 1 0 [I GB 50150 ~ 2006 ^ 26.0.2 0 * D Q 0.2Ω z

7.2 m `

` 7-1 m `

p X	{ k	{ k a		
		W	H	S
1	0 8			
Y 7 8 { k ^ H } 2 ~ % 1 W • 1 S z				

7.3 ; n

7 8 % d n 10kV y 500kV 0 0 2 3 7 8 + y 1 ~ • 4 0 0 2 3 s
^ Q/CSG > 4-20.1.1 Q/CSG > 4-20.2.1 P F X z

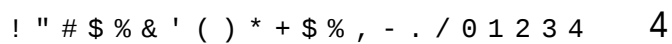


4

@ A 1 M 6 2 o U

B 8 BDYCSY-ZW-18-01/01

[illegible]



t , y # \$ = > W] ^ * # \$ M W b * # \$ d V ' z # \$ d V 2 4 q r { k i 6
0 0 z t t y 2 q o * M i 6 D .) * @ *) _ H 1 \ V W '
* { H Y % & z @ S V W + X * 0 t \ z t y 6 7 # \$. A x A K L * T M *
y \



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % ,

X Y

1	() x	3
2	v ^ ; 7	3
3	o U 3	3
4	M q r s ` y z {	4
5	o U • H	5
6	o U a U	5
7	7 8 { k i 6 % ~ •	7

1 Z [\]

b ' # 0 5 H N - a N " ; ` a 0 5 H *
] 0 q M X b *] 0 5 H M h 2 o ^ B D M , P K z m
, 5 H 2 o * # \$ o U * ` a 0 1 G H R S v k 6 2 o U p q r z o U p q
r v ^ | } _ h ~ • X U ~ • U ~ • ` a 0 1 ~ • f => 1 z
o U p q r () Q 110 y 500 kV 0 - @ d } _ h f : • ~ • E GIS
5 H * o U p q r D () Q { v R b r \$ 0 5 H z o U p
q r GIS o - 2 => P M Y H * M q r s ` - + X m
*) Q p q 110 y 500 kV GIS 2 o z

2 B L ^ _

` 2-1 B L ^ _

p X	) } J t x
1	GB 7674 ~ 1987 72.5 kV u J & ' 9 f 5 H
2	GB 50510 ~ 2006 0 = 2 3 0 5 H ~ •
3	DL/T 618 ~ 1997 J & ' 9 f 5 H # \$ 3

u f ~ • z
u ~ • 3 b @ * d @ F X z

3 0 1 a b

o U t 2 p y 3 • 1 3-1 z

4 e f g h i j k l m

4.1 GIS 6 2 4 * 6 2 5 6 7 5 o U e 6 2 A * | } n 0 1 4 5 6 2 M
• q r p ` s t v w x n p ` s y (M q r 2 o * ; e q r ` > z

4.2 d n p ` s ^ y GIS 6 2 f n 0 1 4 5 M 6 2 o U s t v w
TSSY-ZW-01-01/01y* # \$ + X " ` * \ l q r - * # \$ = > W] ^ M 6 2 o U
* M W b * 6 2 d V ' z

4.3 6 2 d V q r { k i 6 * 0 { M J o U V W + X M * o U
V W d Z M i 6 o U e A - 2 ^ z

4.4 M 6 2 o U 6 2 d V # \$ b * 2 o D .) 10 * 10 C
@ L o U * { 2 o [; _ 5] H z

> 4-1 o U e M • q r p `

p X	t x	q r	q r -	q r { k i 6
1	5 H D	5 H	q r	5 H 4 % R * \
2	5 H V M i 6 D [\		q r	\ M * 5 H 3 ^ D { 5 H R v a z 5 H D < * ~ l _ 2 o
3	5 H y 0 5 H M D	} 0	q r	2 o V W # \$ K L * y 0 5 H] @ M z V W o * 3 ^ B C b g V p ,
4	! " 0	0	q r	2 o 4 * 2 o d V R V W ~ I 2 o 2 o # \$ M i 6 0 u A M Y H *
5	/ o U M i 6 D [\		q r	2 o 4 * 2 o V W \ 2 o u = * 0 \ l M / z / o U B C M * B C Z M { 2 o u = l z .) 4 % [* B C b V * V Y H ^ * V 2 o , o) z B P .) / o U
6	! " /	0	q r	2 o 4 * 2 o d V B C \ l 2 o x * 5 = M x * D P b ` 1 { M x x V , * + f V W + "
7	0 8 j	} 0	q r	2 o 4 B C 6 2 k u R 0 m f I 6 2 0 R % 0 8 * D f 0 f 8 * \] 0 8 6 @ P
8	T A t	5 H	q r	4 P V T A t # + X % *] T A t B C A
9	T V t A	5 H	q r	4 P V T V t # + X % * T V t B C * , , * / B C
10	f !	5 H	q r	4 P g V l # \$ f + x \ * \ + ! _ a

11 0 0 q r 5 * ~ 0 _ a q r
o 1 1 _ ! H

5 0 1 n o

5.1 M N p o

` 5-1 M N p o `

2 p t x	4 2 o V	d V	, V
4 • H	5y6	1	1
	5y6	1	1
2 o	5y6	1	1
Y o U V 6 7 G J 2 3 8 H z			

5.2 @ ? / U q r s U s ` p t

` 5-2 @ ? / U q r s U s ` p t `

p X

6.1.2 4 * GIS [; # \$ 5 z

6.1.3 * GIS x b 0 t R A 0 * 0 0 t

R 0 k z

6.1.4 GIS * u v 5 H e i 6 * 6 0

t1y / 0 A z

t2y 0 A 0 0 z

t3y 0 0 t ! . / 0 0 z e) P 0 * 0 0

a • h \ D | " A * V u A n

6.2.7 [; _ GIS 0 _ 8 & ' 0 0 % & * ; z
6.2.8 * 5 H 0 Z GIS , t < 4 z

7 m . r ; n

7.1 m .

7.1.1 0 ! / " ; n z .) 0 8 = a • * 0 b •
* \] 8 + ! z

7.1.2 8 Y H , * 0] Q Q u * F z

7.1.3 0 u % A , * ' # b B C } z

7.1.4 ^ + * F < 0 * x _ + < * E 0 0 z

7.2 m ` G

7 8 { k • > 7-1 z

` 7-1 m `

p X	{ k	{ k a		
		W	H	S
1	GIS			
Y 7 8 { k ^ H } 2 ~ % 1 W • 1 S z				

7.3 ; n

7 8 % d n 10kV y 500kV 0 0 2 3 7 8 + y 1 ~ • 4 0 0 2 3 s

^ Q/CSG > 4-13.1.7 Q/CSG > 4-13.2.5 P F X z



中国南方电网
CHINA SOUTHERN POWER GRID



中国南方电网
CHINA SOUTHERN POWER GRID





X Y

1 () x

. x

~ 9 9 0

1 Z [\]

o U p q r () Q 110y500kV 0 - * 0 = 2 3 0 5 H SF₆ J o U z

2 B L ^ _

` 2-1 B L ^ _

p X	) } J t x
-----	-----------

1 GBJ 148~1990 0 = 2 3 0

4.4 M 6 2 o U 6 2 d V # \$ b * 2 o D .) 10 * 10 C
 @ L o U * { 2 o [; _ 5] H z
 > 4-1 o U e M • q r p `

p X	t x	q r	q r -	q r { k i 6
1	y 0 5 H M D	0	q r	2 o 4 * 2 o d V R V W ~ I 2 o 2 o # \$ M i 6 0 u A M Y H *
2	/ o U M i 6 D [\		q r	2 o 4 * 2 o V W \ 2 o u = * 0 \ 1 M / z / o U B C M * B C Z M { 2 o u = 1 z .) 4 % [* B C b V * V Y H ^ * V 2 o , o)
3	SF ₆ 5 H o U q D	^	q r	+ " SF ₆ 5 H + X 4 * B C b q q D M Q 15min 1 V W { % 3 ^ * q B C]
4	!	} 0	q r	K U { f R @ b f 5 H * Y H ! * B P 0 R 5 = g * V 5 = g V , 4 % A K 8 9 * % K * 1 V W B c Q q
5	J : 8	^	q r	

2	~		
3	M		
4	P 7 0		0 o]
5	' ? (3	1	
6	2 G	1	-
7		1	
8	Y G W W	1394582151800F58800D(-610)j/F911265612107610(4)88.8800456611248G(9212)0.9126	1394582151800F58800D(-610)j/F911265612107610(4)88.8800456611248G(9212)0.9126
9	K		+ D 9 K KA : , ; < * = > D M Q 1mm * 2y 4mm * K = ? I J * .) @ KA : A ; < K -
10	A 8 { k		8 0 y 1.0MPa A 8 { k =
11	l %	1	(D M Q 10μL/L
12	K	5m	B @ K
13	%		% & R PDA
14	? () >		DL/T 506 @ & B
15	? (' () >		DL/T 506 @ & C
Y n P 2 G > 6 7 G J 2 3 8 H z			

6 0 1 # u

6.1 . / n o

` 6-1 . / n o

p X	2 o	o 2 M	7 8 { k	{ k i 6
1	f # \$	2 o d V { X V W C v + " 2 o # \$ * f # \$ M i 6 6 @ 2 o P * 0 L /	# \$ M i 6 6 @ 2 o P	1 y m f # \$ q * 2 o V W { q u + X o 1 2 y) X A M

` 6-1 t y

p X	2 o	o 2 M	7 8 { k	{ k i 6
2	# \$ M => i 6	2 o R ; W p D * 2 o d V 0 2 o 2 o A M i 6 * 0 ~ # \$ M i 6 Y H *	1 y 2 o e A M i 6 ~	p X

4	0	.) M P 0 * Z 0 T < % 0 * 0	1y ! _ % 0 1 2y % 0 0 /	1y % 0 [% 0 * ! • 8 8 P X 5 H 1 2y { 0 4)) > 8 0 0 P 1 3y " 0
---	---	-----------------------------------	----------------------------------	---

6.2 . / / 0

6.2.1 0 : ;

6-2 0 : ;

p X	2 o	o 2 M	7 8 { k	{ k i 6
1		% 5 H * + X I L * \ l b I J R 8 : t 3 2 b I J R 8 { * B C - : b _ + X * K y	q d D L *	1y \ * P 8 9 z 9) D 9 R M k " z .) C I z 2y B P) 500W u 0 N q u
2	K	9 (K z 5 H J	K P	1y K 9) + D 9 K K A : , ; < 1 K = > D M Q 1mm * 2y 4mm * K = ? I J * .) @ K A : A ; < K A C K - 1 2y K 0 e) P Q R : , ; < Q 1 3y " 5m K
3	b	Z K y + * 0 z + " • H 8	%	1y 0 P 1 2y R % R

4	? (8	1y 5 H = 1 2y % & > 3 1 3y b = 1] ? (8 Q J 8 8 P 1 • \ 4y % & 8 0 1 5y % & 8	1y A K b * * L A 1 2y \] { v + X 8 1 3y 8 S Q 1 * % & 7 1 4y 8 ^ 8 Y H 5 H * v H H H H P
---	-------	---	--

v X H W • P A 1 ? (

6	7 L	1y ~ ? () 1 2y ' (~ ? (	d } P + X)	1y .) DL/T 506 @ & B ? () > Z) ? (1 2y .) DL/T 506 @ & C ? (' () > Z 8 20 i
---	-----	------------------------------	----------------	--

6.2.2 : ;

6-3 : ;

p X 9.12 Tf 1.18 0 TD D	(y) Tj /F9 9.1204.120TD (D (y) Tj /F1 9.1215.120TD	Y2(2) T1.546J/F%& 9.12 Tf .12 0 TD (Y Tj /F5+A
1	) J V W % U = - u	8
2	b	0 * f
		%
		1y 0 P 1 2y % 1 3y SF ₆ J b R 1y

3 1 8 % 30 10⁻⁶t J B y 8 D Q 8 • \

7 m . r ; n

7.1 m .

7-1 m .

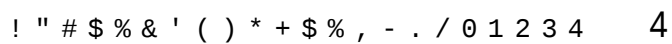
p x 0 0 0 r g 1 0 9 0 0

@ A 1 M 6 2 o U

v w TSSY-ZW-02-01/01

2 o		2 o		= > W	# \$ M W	# \$ d V
M q r ` { k i 6						
p X	t x	q r	q r -	q r { k i 6		
1	y 0 5 H M D	0	q r			

20.24 Tc (45 9.12 Tf62042 5.76 TD -q) Tj/F5+1 9.12 Tf9.12 0 TD -0.24 Tc /MU



```

t , y      # $ = > W ] ^ * # $ M W b   * # $ d V '   z # $ d V 24   q r { k i 6
0 0 z t t y 2 o      M i 6 D      . )   *      @   * ) _   H 1 \ V W '
* { H Y % &      z @ S V W + X   * 0 t \   z t y 6 7 # $ A   x A K L * T   M *
R : N = l z y \ q r -   y • q r - D , d * 5   R S f V W @ + X q r   0 k l i 6 z y
• q r - y q r { k i 6 {   24 # $ < ? z t y t D M t N   t y ! o   L z

```



中国南方电网
CHINA SOUTHERN POWER GRID



X Y

1 () x	21
2 v ^ ; 7	21
3 o U 3	21
4 M q r s ` y z {	22
5 o U • H	22
6 o U a U	23
7 7 8 { k i 6 % ~ •	24



中国南方电网
CHINA SOUTHERN POWER GRID



4 e f g h i j k l m

4.1 0 6 2 4 * 6 2 5 6 7 5 o U e 6 2 A * | } n 0 1 4 5
 6 2 M • q r p ` s t v w x n p ` s y (M q r 2 o * ; e q r ` > z
 4.2 d n p ` s ^ y 0 6 2 f n 0 1 4 5 M 6 2 o U s t v w
 TSSY-ZW-03-01/01y* # \$ + X " ` * \ l q r - * # \$ = > W] ^ M 6 2 o U
 * M W b * 6 2 d V ' z
 4.3 6 2 d V q r { k i 6 * 0 { M J o U V W + X M * o U
 V W d Z M i 6 o U e A - 2 ^ z
 4.4 M 6 2 o U 6 2 d V # \$ b * 2 o D .) 10 * 10 C
 @ L o U * { 2 o [; _ 5] H z
 > 4-1 o U e M • q r p `

p X	t x	q r	q r -	q r { k i 6
1	! " 0	0	q r	2 o 4 * 2 o d V R V W ~ I 2 o 2 o # \$ M i 6 0 u A M Y H *
2	/ o U M i 6 D [\		q r	2 o 4 * 2 o V W \ 2 o u = * 0 \ l M / z / o U B C M * B C Z M { 2 o u = l z .) 4 % [* B C b V * V Y H ^ * V 2 o , o)
3	! " /	0	q r	2 o 4 * 2 o d V B C \ l 2 o x * 5 = M x * D P b ` 1 { M x x V , * + f V W + "
4	0 8 j	} 0	q r	2 o 4 B C 6 2 k u R 0 m f I 6 2 0 R % 0 8 * D f 0 f 8 * \] 0 8 6 @ P
5	8 • * 0 /	5 H	q r	.) 0 8 = a • * 0 b • * \] 8 + !
6	0	0	q r	_ 5 * ~ 0 _ a o
7	# \$ 2 G	5 H	q r	2 o V W { _ + X % * \ # \$ + 2 G A

5 0 1 n o

5.1 M N p o

` 5-1 M N p o `

2 p t x	4 2 o V	d V	, V
4 • H	5 y 6	1	1
	5 y 6	1	1
2 o	5 y 6	1	1

5.2 @ ? / U q r s U s ` p t

` 5-2 @ ? / U q r s U s ` p t `

p X	t x	E / v X	k u	8	H Y
1	x				

2	~		a		
3	M				
4	) >			2	
5	P 7 0			2	0 o]
6	& ' o		6		
7	2 G & ' & '				
8	' ? (3			1	
9	2 G			1	
10	t & ' q - y				
11	0		6		

6.2.10 M [; _ * f 5 H 0 * * z

7 m . r ; n

7.1 m .

7.1.1 0 ! / " ; n z .) 0 8 = a • * 0 b •
* \] 8 + ! z

7.1.2 8 Y H , * 0] Q Q u * F z

7.1.3 0 u % A , * ' # b B C } z

7.1.4 ^ + * F < 0 * x _ + < * E 0 0 z

7.2 m ` G

7 8 { k • > 7-1 z

` 7-1 m `

p X	{ k	{ k a		
		W	H	S
1				
Y 7 8 { k ^ H } 2 ~ % 1 W • 1 S z N qN				

7.3 ; n

7.3.1 R ^ R / R 0 d > 7-2

$\frac{z}{X} \frac{N}{q} \frac{N}{-2}$



中国南方电网
CHINA SOUTHERN POWER GRID

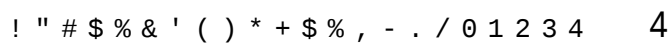
! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

7 8 % d n 10kV y 500kV 0 0 2 3 7 8 + y

@ A 1 M 6 2 o U

v w TSSY-ZW-03-01/01

2 o		2 o		= > W	# \$ MW	# \$ d V
M q r { k i 6						
p X	t x	q r	q r -	q r { k i 6		
1	! " 0	0	q r	# \$ o U		
2	/ o U M i 6 D [\		q r			
3	! " /	0	q r			
4	0 8 j	} 0	q r			
5	8 0 • * /	5 H	q r			
6	0	0	q r			
7	2 G # \$	5 H	q r			



M T * / : N = 1							
# \$ V W t							
H Y							

t , y	# \$ = > W] ^ * # \$	M W b	* # \$	d V	'	z # \$	d V	2 4	q r { k i 6
0 0 z t y 2 o	M i 6 D	.	)	*	@	*) _	H	1 \ V W '	
* { H Y % &	z @ S V W + X	* 0	t \	z t	y	6 7 # \$	A	x A K L * T	M *
R : N = l ±	y \ q r -	y • q r -	D , d	* 5	R S	f V W @ + X q r		0 k l i 6 ±	y
• q r -	y q r { k i 6 {	2 4 # \$	<	? z t	y	t D	M t N	t y ! o	L z



中国南方电网有限责任公司电网



X Y

1 () x	29
2 v ^ ; 7	29
3 o U 3	29
4 M q r s ` y z {	30
5 o U • H	30
6 o U a U	31
7 7 8 { k i 6 % ~ •	32

1 Z [\]

b ' # 0 5 H N - a N " ; ` a 0 5 H *
] 0 q M X b *] 0 5 H M h 2 o ^ B D M , P K z m
, 5 H 2 o * \$ o U * ` a 0 1 G H R S y k 6 2 0 1 p q r z 0 p q
r v ^ | } _ h ~ • U ~ ` a 1 ~ f = > l z
o U p q r () Q 110 y 5 0 1 5 3 0 5 0 1 0 4 0 3 6 0 5 6 2 7 5 1 0 5 6 . 5 6 9 T D : T 0 (0 1) T 1 - 0 . 2 4 T 0 () Z [l z 0 2) 2 o *

(3y3 10.56

4 e f g h i j k l m

4.1 0 0 0 8 6 2 4 * 6 2 5 6 7 5 o U e 6
2 A * | } n 0 1 4 5 6 2 M • q r p ` s t v w x n p ` s y (M q r 2 o *
; e q r ` > z
4.2 d n p ` s ^ y 0 0 8 6 2 f n 0 1 4 5 M
6 2 o U s t v w TSSY-ZW-04-01/01y* # \$ + X " ` * \ l q r - * # \$ =
> W] ^ M 6 2 o U * M W b * 6 2 d V ' z
4.3 6 2 d V q r { k i 6 * 0 { M J o U V W + X M * o U
V W d Z M i 6 o U e A - 2 ^ z
4.4 M 6 2 o U 6 2 d V # \$ b * 2 o D .) 10 * 10 C
@ L o U * { 2 o [; _ 5] H z
> 4-1 o U e M • q r p `

p X	t x	q r	q r -	q r { k i 6
-----	-----	-----	-------	-------------

1 y 0 5



中国南方电网
CHINA SOUTHERN POWER GRID



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

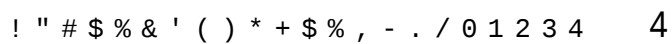




中国南方电网
CHINA SOUTHERN POWER GRID

！ "



184



中国南方电网
CHINA SOUTHERN POWER GRID



X Y

1 () x	37
2 v ^ ; 7	37
3 o U 3	37
4 M q r s ` y z {	38
5 o U • H	38
6 o U a U	39
7 7 8 { k i 6 % ~ •	39

4 e f g h i j k l m

4.1 R 6 2 4 * 6 2 5 6 7 5 o U e 6 2 A * | } n 0 1 4 5 6 2

M • q r p ` s t v w x n p ` s y (M q r 2 o * ; e q r ` > z

4.2 d n p ` s ^ y R 6 2 f n 0 1 4 5 M 6 2 o U s t v w

TSSY-ZW-05-01/01y* # \$ + X " ` * \ l q r - * # \$ = > W] ^ M 6 2 o U

* M W b * 6 2 d V ' z

4.3 6 2 d V q r { k i 6 * 0 { M J o U V W + X M * o U

V W d Z M i 6 o U e A - 2 ^ z

4.4 M 6 2 o U 6 2 d V # \$ b * 2 o D .) 10 * 10 C

@ L o U * { 2 o [; _ 5] H z

> 4-1 o U e M • q r p `

p X	t x	q r	q r -	q r { k i 6
1	! " 0	0	q r	2 o 4 * 2 o d V R V W ~ I 2 o 2 o # \$ M i 6 10

3	M				
4	) >			2	
5	P 7 0			2	0 o]
6	& ' o		6		
7	2 G & ' & '				
8	' ? (3			1	
9	2 G			1	
10	t & ' q - y				
11	R			1y2	9)
12	# \$ V % &				

6 0 1 # u

6.1 . / n o

6.1.1 R % { b 5 > 4 R { R 0 u _ + X z 6 7 P
A a * F , R + X % z

6.1.2 • H 2 o * 9 (* 5 H * 0 z

6.1.3 / ^ # ^ y 4 | 0] @ M * | W
K * Q K | + U *) K o R + X % * l
Y * 0 y A v % 2 o z

6.2 . / / 0

d l a U = z
t1y R P R S y f u = b f * \$ { / u = v % * R]
% f ! Q u = z
t2y N % X o * b ! l < * L j 0 z
t3y X % ! < { 4 5 t 3 C *
y * W A D p z
t4y Z R q Q [z
t5y d p R + X R * 0 7 + X ` w E z
t6y M [; _ * f 0 * * z

7 m . r ; n

7.1 m .

7.1.1) g) Z R d a U = z

7.1.2 # K | M * W 8 4 1 0 1 x
q 0 u z

7.1.3 8 0 K s W 8 i y C * P * . / 0
\\ z

7.1.48 V K * , Q 1 m * u / l 8 z

7.1.5b f 8 { t , y 8 * Q R 8 1 Q {
, + X 8 z



中国南方电网
CHINA SOUTHERN POWER GRID

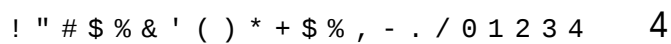


@ A 1 M 6 2 o U

v w TSSY-ZW-05-01/01

2 o		2 o		= > W	# \$ M W	# \$ d V
M q r { k i 6						
p X	t x	q r	q r -	q r { k i 6		
1	! " 0	0	q r			
2	0	0	q r			
3	/ o U M i 6 D [\		q r			
4	/ 2 G		q r			

5 2 G # \$ 5 G { d • 1 2 T f 9 . 1 2 0 T D - 0 . j / F T D (X) T j / F 1 9 . 1 2



	t , y	# \$ = > W] ^ * # \$	M w b	* # \$	d v	'	z # \$	d v	2 4	q r { k i 6
0	0 z t t y 2 o	M i 6 D	.	)	*	@	*	) _	H	1 \ v w '
	* { H Y % &	z @ S V W + X	* O	t \	z t	y	6 7 # \$	A	x A K L * T	M *
	R : N = 1 z	y \ q r -	y • q r -	D , d	* 5	R S	f v W	@ + X q r	.	O k l i 6 z y
	• q r -	y q r { k i 6 {	2 4 # \$	<	? z t	y t D	M t N	t y ! o	L z	



X Y

1 () x	43
2 v ^ ; 7	43
3 o U 3	43
4 M q r s ` y z {	44
5 o U • H	44
6 o U a U	45
7 7 8 { k i 6 % ~ •	45



! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

h4hijkhijh\$4hijk\$hf g h i j k l m



F X 6.2.6 - 2 * < [; z
6.2.9 8 0 & ' 0 z
6.2.10 ; + X * [; z
7 m . r ; n
7.1 m .
7.1.1 5 H a % E z
7.1.2 0 n & ' o R 8 0 * { , + X z , + X R 8 *
q J K R A t s , z
7.1.3 K R , * , b s 0] k D 0 n & ' o
* B C Z s 0] A * . , 0 K R z
7.1.4 0 ! / " ; 0 z .) 0 8 = a • * 0 b • *
\\] 8 + ! z
7.1.5 0 4 * + X 5 H F % 1 8 Y H , * 0] Q Q u *
F 1 ' 0 z
7.1.6 0 u % A , * ' # b B C } z
7.1.7 ^ + * F < 0 * x _ + < * E 0 0 z
7.2 m ` G
7 8 { k • > 7-1 z

` 7-1 m `

p X	{ k	{ k a		
		W	H	S
1	0			
Y 7 8 { k ^ H } 2 ~ % 1 W • 1 S z				

7.3 ; n
0 + X ^ * 3 + m n 0 - * z 0
0 A 3 > 7-2 z

` 7-2 \$ w V a T : ; \$ T a

1 0 U_N/U_t kV y	0	t min y
18/30 u v	$2.5U_N$ t R $2U_N$ y	5 t R 60 y
21/35 y 64/110	$2U_N$	60
127/220	$1.7U_N$ t R $1.4U_N$ y	60
190/330	$1.7U_N$ t R $1.3U_N$ y	60
290/500	$1.7U_N$ t R $1.1U_N$ y	60

7 8 % d n 10kV y 500kV 0 0 2 3 7 8 + y 1 ~ • 4 0 0 2 3 s
^ Q/CSG > 4-16.1.1 Q/CSG > 4-16.2.1 y 4-16.2.4 P F X z

@ A 1 M 6 2 o U

B 8 TSSY-ZW-06-01/01

2 o	2 o	= > W	# \$ M W	# \$ d V
M q r \ { k i 6				
p X	t x	q r	q r -	q r { k i 6
1	5 H D	5 H	q r	# \$ o U D E F X f M 3 M => i 6 * 0 f Y l D c Q u v i 6
2	5 H V M i 6 D [\		q r	2 o V W \ M 2 o A & ' z 5 H 4 % R * \ z 5 H 3 ^ D { 5 H R v a z 5 H D < * ~ l _ 2 o z
3	5 H y 0 5 H M D	} 0	q r	2 o V W # \$ K L * y 0 5 H] @ M z V W o * 3 ^ B C b g V p , z
4	! " 0	0	q r	2 o 4 * 2 o d V R V W I 2 o 2 o # \$ M i 6 * 0 u A
5	/ o U M i 6 D [\		q r	M Y H * z
6	! " /	0	q r	2 o 4 * 2 o V W \ 2 o u = * 0 \ l M / z / o U B C M * B C Z M { 2 o u = l z .) 4 % [* B C b V * V Y H ^ * V 2 o , o) z
7	0 8 j	} 0	q r	2 o 4 * 2 o d V B C \ l 2 o x * 5 = M x * D P b ` * { M x x V , * + f V W + " z
8	f !	5 H	q r	2 o 4 B C 6 2 k u R 0 m f I 6 2 0 R % 0 8 * D f 0 f 8 * \] 0 8 6 @ P z
9	0	0	q r	4 P g V l # \$ f + X \ * \ + ! _ a z
10	2 G # \$	5 H	q r	_ 5 * ~ 0 _ a o z
				2 o V W { _ + X % * \ # \$ + 2 G A

		M T * / : N = 1						
		# \$ V W t						
H Y		>W/F1 9.15+3 Tf18.24 re8080 #\$/F1 9.15+2 Tf18.24 080 6D/F1 9.15						

\$ a U x y ;

0 1 2 3 4

v w TSSY-ZW-07



! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

1 Z [\]

o U p q r () Q ` a 0 1 G H x @ 5 X ^ 3 8) 0 t R 0 3 8
R y ! " # \$ % z

2 B L ^ _

` 2Ry!"

439

4 e f g h i j k l m

0

4.1 0 ! " # \$ % 6 2 4 * 6 2 5 6 7 5 o U e 6 2 A * | } n 0 1 4 5

6 2 M • q r p ` s t v w x n p ` s y (M q r 2 o * ; e q r ` > z

4.2 d n p ` s ^ y 0 ! " # \$ % 6 2 f n 0 1 4 5 M 6 2 o U s t v w

TSSE0.56 T10.807D0(242)CT(3)F5j00E56(Tf16T08/017B5012410.56 Tf10.8 84 TD (Q) T Tc (sy) Ty*/F5+4 10.56 Tf

e H z V % > E t | y • DL/T 506 @ & A z

6.2.5 w t 9 y z , P { f v + X ! " % * \ ' # 0 ! " " * .
/ + X w _ % z w a U d ~ ~ Y R = > W A ^ l w a U A P \$ z
3 k " • l * \$.) w z

w U { 0 t # , \ Q l 10 y 20 G 0 * , u 2 P
0 * Z 0 T : F < l 0 120 1 * Z 0 ! < * : _ ; L j
0 < 1/2 1/5 1/10 * 3 z
Q 0 * w C t R ! A 1 \ , C ^ b t R
* % t R w 0 * t R z

6.2.6 ; \ z { 3 8) 0 t R 0 3 8 R y • \ (- 0.2 R 0.2 S *
. / ! " • > 6-1 z w E 0 ! " E * u _ 7 • z ! " • > 6-2 z

6-1 \$ a U | } x y '

• \ -	I_p/I_n t 1 y	1	5	20	100	120
0.2	" t 0 1 y		0.75	0.35	0.2	0.2
	u " t 0 y		30	15	10	10
0.2S	" t 0 1 y	0.75	0.35	0.2	0.2	0.2
	u " t 0 y	30	15	10	10	10

6-2 x y _ ~ • a N

• \ -	"	u "
0.2 R 0.2S	0.02	1

7 m . r ; n

7.1 m .

3 8) 0 R 0 3 8 R * ! " 8 0 "] 0.001 1 * u "
] 0.01 z w E 0 E * f { 1 A v c ! " > 6-1
P z

8 ^ ! " > 6-1 P * l D 1.5 G * + X z

7.2 m ` G
7 8 { k • > 7-1 z

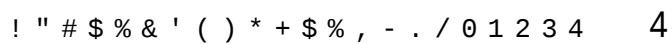
7-1 m `

p X	{ k	{ k a		
		W	H	S
1	0			
Y 7 8 { k ^ H } 2 ~ % 1 W • 1 S z				

7.3 ; n

0 ! " # \$ % JJG 1021 ~ 200 7 0 s Q/CSG > 4-7.1.3 Q/CSG > 4-7.2.2
Q/CSG > 4-8.1.3 Q/CSG > 4-8.2.2 P + X z





t , y	# \$ = > W] ^ * # \$	M W b	* # \$	d V	'	z # \$	d V	2 4	q r { k i 6
0 0 z t t y 2 o	M i 6 D	.	)	*	@	*	) _	H	1 \ V W '
* { H Y % &	z @ S V W + X	* 0	t \	z t	y	6 7 # \$	A	x A K L * T	M *
R : N = l z	y \ q r -	y	• q r -	D , d	*	5	R S	f V W @ + X q r	0 k l i 6 z y
• q r -	y q r { k i 6 {	2 4 # \$	<	? z t	y	t D	M t N	t y ! o	L z



X Y

1	() x	57
2	v ^ ; 7	57
3	o U 3	57
4	M q r s ` y z {	58
5	o U • H	58
6	o U a U	59
7	7 8 { k i 6 % ~ •	61



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

4 e f g h i j k l m

4.1 0 ! " # \$ % 6 2 4 * 6 2 5 6 7 5 o U e 6 2 A * | } n 0 1 4 5
6 2 M • q r p ` s t v w x n p ` s y (M q r T c 4 (` 4 T j - 2 . 2 8 T (f 3 1 . 4 4



中国南方电网
CHINA SOUTHERN POWER GRID



X : • p

k 0 ! "

o F z
ð * .)



中国南方电网
CHINA SOUTHERN POWER GRID

" # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

t 3 y 2 / / | * B C) g) z
-) & ' * y 500kV - D j Q 2m56 0 TD () Tj/F5456 790.8 lS391.44.56 0 T

\$

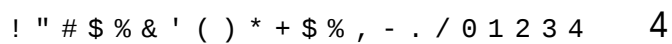


中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

	u " t 0 y	10	10	10
--	-----------	----	----	----

* 500kV 1101 n 4 l S 2 5 1 . 5 X 9 . 1 2 T f 2 . 8 8 0 T D (y) T \$ 7 T D () T j / F 1 .



t , y	# \$ = > W] ^ * # \$	M W b	* # \$	d V	'	z # \$	d V	2 4	q r { k i 6
0 0 z t t y 2 o	M i 6 D	.	)	*	@	*	) _	H	1 \ \ V W '
* { H Y % &	z @ S V W + X	* 0	t \	z t	y	6 7 # \$	A	x A K L *	T M *



X Y

1	() x	65
2	v ^ ; 7	65
3	o U 3	66
4	M q r s ` y z {	67
5	o U • H	69
6	o U a U	71
7	7 8 { k i 6 % ~ •	90



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

1 Z [\]

& ' 7 0 5 H ^ P 7 > , * G b & '

J A] C R

..

c3-1 01 /d!abc

1

4 e f g h i j k l m

4.1 & ' 6 2 4 * 6 2 5 6 7 5 o U e 6 2 A * | } n 0 1 4 5 6 2 M

• q r p ` s t v w x n p ` s y (M q r 2 o * ; e q r ` > z

4.2 d n p ` s ^ y & ' 6 2 f n 0 1 4 5 M 6 2 o U s t v w

TSSY-ZW-09-01/01y* # \$ + X " ` * \ l q r - * # \$ = > w] ^ M 6 2 o U

* M W b * 6 2 d V ' z

4.3 6 2 d V q r { k i 6 * 0 { M J o U V W + X M * o U

V W d Z M i 6 o U e A - 2 ^ z

4.4 M 6 2 o U 6 2 d V # \$ b * 2 o D .) 10 * 10 C

@ L o U * { 2 o [; _ 5] H z]

5.1 M N p o

5-1 M N p o

2 p t x	4 2 o V	d V	, V
4 • H	< M 2	1	
	< M 2	1	1
% &	< M 2	1	
4 • H t1 y	< M 1	1	
& ' t1 y	< M 1	1	
7 % & y`	< M 1	1	
Y o U V 6 7 G J 2 3 8 H z			

5.2 @ ? / U q r s U s` p t

5-2 @ ? / U q r s U s` p t`

2 G >					
p X	t x	E/v X	k u	8	H Y
1	~	P E			
2	M	P E	2		
3	M A / 2 G t y	P E	t y		/ o U R B P .)
4	K -) 2 G	P E		,	
5	' ? (3	~ •		1	
7	R g) 250mL (g) G t y A J V W O Q 20 y 100mL Y) K t y Y) j	P E	t y		



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 34434 345v4 3426.j/0F2ET 1 1 rg 07536 76432 7m7536 73816 0SBT/F25

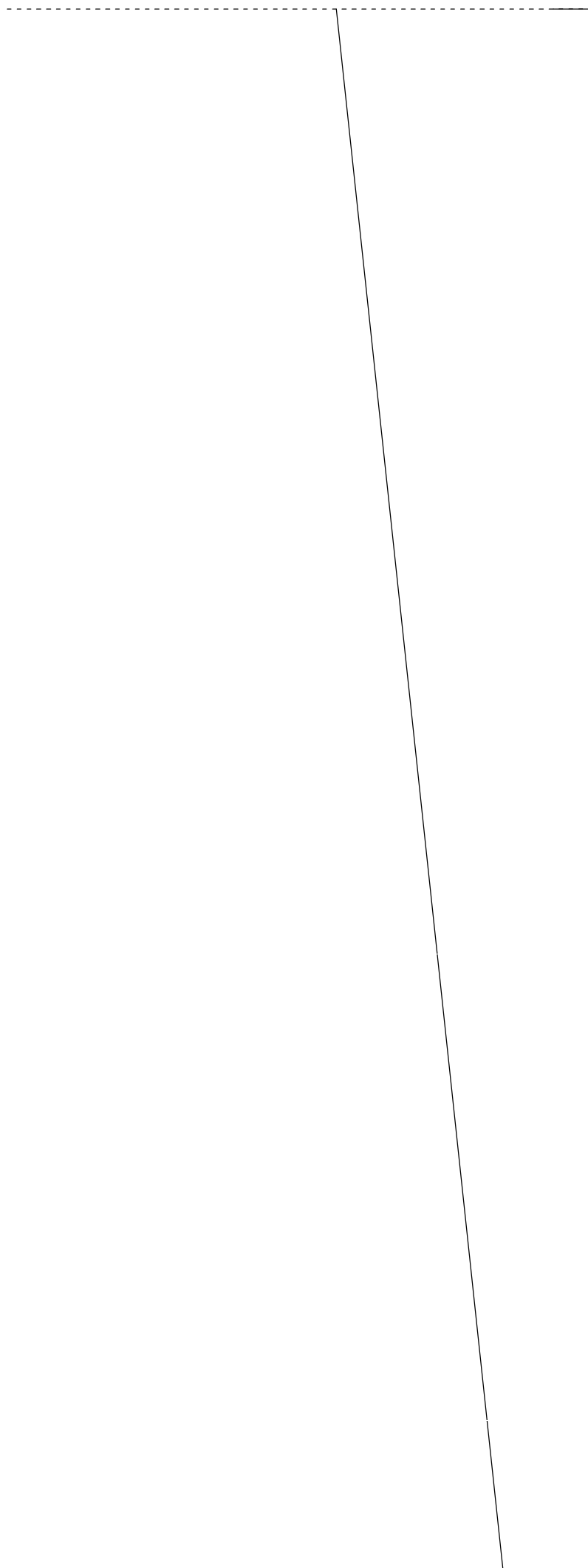
` 5-2 t y

p X	t x	E / v X	k u	8	H Y
24		t t • y t t • y t 、 y t 、 * 8 (1.19 y1 t 、 y t 、 y t t t ! + x * ' (100 i y 110 i			
25	8	' y -60 i		1	
26		' y 300 i		1	



! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

t 4 y 0 K 0 + X * d GB 50150 ~ 2006 n 0 = 2 3 0 5 H





中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4

6-3t y

p X	2 o	o 2 M	7 8 { k	{ k i 6
7	3) 2 8	6 1 0) > : ! * 0 : ! 0	6 7 D 0 * w E 2	D a U P 0 D * 0 2 b " 1 y GB/T 507 e) 0 1 2 y DL/T 429.9 a U e) : g 0 1 3 y GB/T 7595~2000 ^ P : g 0 1 1 4 y .) 3 D 0 0 > " . ~ . @ &
2 o				
1	% 2	% & 7 0 t	8 7 • \	% 5 7 M 7 % & • \ * 2 o d V V W { % & t \
2	I J 2 o	I J 0	0 A J	I J 0 A * 3 2 2 D E *) I J 3 .
3	0	2 o [; _ * Y " J t 0 { ^ y	0 M " { J ^	) J " 0
4	I L # \$ 2 o	I L N 2 o h * _ 8 9 / \	K L	Z .) + - ^ + * 8 9
o U ^ : # n P # o 0				
1	0	7	1 y A P 1 2 y G I J 1 3 y 4 D E R 1 4 y 0 * . 0 L j m 1 5 y @ + X	

6.2.3 g U t • > 6-4 yz

6-4) * 7 j

p X	2 o	o 2 M	7 8 { k	{ k i 6
4 • H 2 o				
1	f ; %	V W % ;	1 y 9 ~ % & [I 1 2 y P 1 3 y { b	1 y % 9 ~ % & 1 2 y % P 1 3 y %
2	% 0 • H	1 y 4 % g U 0 u • \ z B P + 7 Q z 2 y L * Z : Q < 8 / Q 2 o 0 z 3 y z Q 8 2 o P	1 y J + 1 2 y J 1 3 y 8 2 o P	1 y J _) % % J L u u \ + J 1 2 y % \ J : Q < 8 / Q 2 o 0 1 3 y % \ 2 o P 8



中国南方电网
CHINA SOUTHERN POWER GRID

! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

` 6-4 t y

p X	2 o	o 2 M	7 8 { k	{ k i 6
4	~ 1	~ 1 e) 4 ~ 1 8 U z) 1mL Y D • \ : R Y (~ • J 1mL t R 0.5mL y + X ~ 1 z T g U l % & R { N B A _i s t R { / h _i s y z ~ 1 { X 2 1 , A v + X * < M o 2 * 2 ~ 1 { : ! 0 2 1 u * : ! o ~ 1 2 z ! ~ 1	~ ~ ~ ~ ~	

6.2.4 ^ N 8 ` t • > 6-5y

` 6-5 0 ; 9 7 j `

p X	2 o	o 2 M	7 8 { k	{ k i 6
4 • H 2 o				
1	f ; %	V W % ;	1y 9 ~ % & [I 1 2y P 1 3y { b	1y % 9 ~ % & 1 2y % P 1 3y %
2	% 0 • H	1y 4 % g U 0 u • \ z B P + 7 Q z 2y L * Z : Q < 8 / Q 2 o 0 z 3y z Q * . 8 2 o P z + 7 Q t B P y	1y J + 1 2y J 1 3y 8 2 o P	1y J _) % % J L u u \ + J 1 2y % \ J : Q < 8 / Q 2 o 0 1 3y % \ 8 2 o P

1y \
0 f * b 9 q *
' ({ k F ' f * 5 1 R
% s ` TCD FID : ;
' (z
1s ` T(F F

3 b ; q n y \ G Y - . 2 9 4 - 1 8 . 2 4 - 1 1 . 7 6 = c (y \) T j / F 5 + 3 9 . 1 2 6 1

6-5t y

p X	2 o	o 2 M	7 8 { k	{ k i 6
3	:	1 y A Y • H 5mL Y C* M 8 B = 1 y 2 * " 0.5mL * @ 9 * " * z Z Y A : * . 6 Y = D d z 2 y : Z Y A T Z ^ : * Z ^ : Y C t e) U yz ' v = 2min * • \ % & J B t • \ < 0.1mL y* u H g U `)	1 y Y C M 8 B = 1 2 y : e) U	1 y \ Y C M 8 B = 0 P 1 2 y \ : e) U
4	~ 1	~ 1 e) 4 ~ 1 8 U z) 1mL Y D • \ : R Y (~ • J 1mL t R 0.5mL y + X ~ 1 z T g U 1 % & R { N B A i t R { / h i s y z ~ 1 { X 2 1 , A v + X * < M o * ~ 1 { : ! 0 2 1 u * : ! o ~ 1 2 z ! ~ 1	~ 1 { X 2 1 , A v + X	\ ~ 1 { X 2 1 , A v + X
5	,	` ) 1mL Y D T Y C ^ • \ : 1mL t R 0.5mL y* + X ` z + o + z T g U 1 % & R { N B A i t R { / h i y z ` y ~ 1 .) , + Y * + J B	1 y + o P 1 2 y ` y ~ 1 .) , + Y A + J B	1 y + o + 1 2 y \ ` y ~ 1 .) , + Y * + J B
6	2 ` 3)	d G 3) ^ ` R Y (t R g U 2 o [; y		
7	% & ` 2	{ g U 2 o N) t O 2 y t N 2 y , t C O y t t C O 2 y : { * % & J R N 8 * d G 3) ^ N 8		
8	` w E	d } GB/T 7252 n ^ e f J ` A w E q s R DL/T 722n ^ e f J ` A w E q s + X ` w E		
1	% % & 7	V W % 7 % & • \ [I z 2 o d V V W { % & t \	1 y 2 " D . / " 1 2 y 7 % & • \ [I	1 y % \ 2 " P 1 2 y % 0 \ 7 % & • \ [I



! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

$$6-5t \quad y$$

p X	2 o	o 2 M	7 8 { k	{ k i 6	Y 2 Y Z	19873
-----	-----	-------	---------	---------	---------	-------



! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

中国南方电网
CHINA SOUTHERN POWER GRID

` 6-6 t y

p X 2 o o 2 M 7 8 { k { k i 6 78 78

` 6-6 t y

p X	2 o	o 2 M	7 8 { k	{ k i 6
o U ^ : # n P # o 0				
3 2 x D P * Q N Q D \				
1	I 1	8 9 y > N 3	) 2 D 6 @ 71 y 72mN/m P	

6-7t y

p X	2 o	o 2 M	7 8 { k	{ k i 6
1	% 7 % &	% & 7 0 t	I 8 7 • \ [	% 2 o d v % & t \
2	* f 0 * + 0 I L # \$	1 y f 0 4 5 f * : _ f 0 f 1 2 y I L # \$ 1 3 y Y V u	0 f	% \ 0 f
o U ^ : # n P # o 0				
1	* Q A ,	1 y b _ D : 1 2 y Y " _ l ,	@ 0 f * ~ : _ @ l	

6.2.7 m 8 t • > 6-8yz

6-8 .

p X	2 o	o 2 M	7 8 { k	{ k i 6
4 • H 2 o				
1	% ; %	V W % ;	1 y 9 ~ [I 1 2 y { b	1 y % 9 ~ [I 1 2 y ;
2	% 0 • H	1 y % m 1 0 - [1 2 y % L K [	1 y 1 < 1 2 y	1 y V W % 0 1 2 y \ K 8 9
2 o				
1	,	1 y) 1 y 2 z 2 y Y " * ^ P 6 K ~ % * : _ I J * " ' (3 * + z 3 y 0 f A) f * z 5 (m ' (z 4 y (P ! F * 0 P D E + X 4 5 z < z m 4 2 0 i * F ' ({ k { X F / 2 y 3 i * 0 P D E + X 4 5 z 5 y Z * 0 Z < Q I * 3 y 4 m m z 6 y ' (x z m 4 10 i * Q m / Q 10 4 i F / 2 i , * Q Q 10 4 i F / 1 i , * < m * % & l 2	1 y] J 1 2 y < Q I P 1 3 y 3 R	1 y) Z 1 2 y Z < Q I * 3 y 4 m m 1 3 y { q Y + X * 0 f q A 4 g * R

6-8t y

p X	2 o	o 2 M	7 8 { k	{ k i 6
1	% 7 % &	% & 7 0 t	I 8 7 • \ [	% M 7 % & 5 7 V V W { • \ * 2 o d t \ % &
2	+ 0 * f * O I L # \$	1y [_ g) t y * 1 ^ L z V u z 2y f 0 z 3y f L f K : f z 4y I L # \$	f f L f f K :	% \ L f K : f f
o U ^ : # n P # o 0				
1	m t y l t i y	1y m } 4 5 1 2y 1 3y < g	1y % m } 4 5 _ @ 1 2y % >) [N N * V N O o L _ @	V N O o L *

6.2.8 1 t • > 6-9yz

6-9 / z

6.2.9 9 e t • > 6-10 yz

` 6-10 : 0 / : ;

p X	2 o	o 2 M	7 8 { k	{ k i 6
4 • H 2 o				
1	% ; %	V W % ;	1 y 9 ~ [I 1 2 y { b	1 y % 9 ~ [I 1 2 y ;
2	• H	1 y Z g K) + X I *) 9 * _) 9 * _ H) 1 2 y %) 9 t pH 6.0 y 7.0 * 0 q Q j Q 3 μ S / c m y A pH p pH ~ • e 7 8 P 0 { b 1 3 y % 9 Z 0 -	1 y P 1 2 y P	1 y \ Z g K P 1 2 y \) 9 A pH p pH ~ • e P R { b
3	pH p k t • > 6-11 y	1 y G J k a U • 4 ^ 2 y 1 2 y k pH p { D 8 0 g *] { L]	pH p P	Q I pH P " e
4	pH ~ • e k t • > 6-12 y	1 y 0.2 mol / L t e k x 40.846 g t * e Q (8 9 t R t 9 y * " 1000 mL 8 *) 9 t R t 9 y e f <) (1 2 y 0.2 mol / L t e k x 27.218 g t * e Q (8 9 t R t 9 y * " 1000 mL 8 *) 9 t R t 9 y e f <) (1 3 y 0.1 mol / L k) 8 B 8 16.8 mL Y Y " 1000 mL 8 *) 9 t R t 9 y e f <) (t e Y (0.2 mol / L y *) g ~ + 9 + 9 R Y (~ • ` e + X ~ 1 * : _ e f ; 0.1 mol / L 1 4 y 0.1 mol / L e k + x 8 g " j ^ * " 50 y 60 mL 9 . e f * " 1000 mL 8 * 2 y 3 mL 10 1 A h e u [\ * : _) 9 e f <) (* 7 = i I z s I t e Y (0.2 mol / L y *) t R Y (~ • e + X ~ 1 * : _ e f ; 0.1 mol / L 1 5 y d 3 y > E) e k ; pH D pH ~ • e	pH ~ • e P	d P k pH ~ • e

` 6-10t y

p X	2 o	o 2 M	7 8 { k	{ k i 6
2 o				
1	9 e t) g • g y	1 y 8 50mL Q 250mL Z * " - J B z 9 * t) y < 70 y 80 i * 0 { ' (v 2 5min t R { 9 Z 1 2 5min y1 2 y Z Z ^ J " * ~ s 0 < ' - * 10mL 9 : " g K ^ * pH3.6 y 5.4 x D pH ~ • e 10mL " g K ^ * { g K ^ " 0.25mL p t D pH ~ • e ; g ! y * 2 _ " g • + X g * & pH 1 3 y \ pH Q 5.4 * d > 6 j e) P R o p	1 y { k ' (A Z 1 2 y 8 9 [	1 y d P o 2 M P + X o 1 2 y \ D * B P) , 0 @@ 8 9 t R) a b c y
2	9 e t) g 3 g y	1 y > p X 1 o a U 1 y1 2 y Z Z ^ J " * ~ s 0 < ' - * 10mL 9 : " g K ^ * " 0.3mL p * 2 _ " g 3 g & y g + X g * % & pH 1 3 y \ pH Q 5.4 *) o p	1 y { k ' (A Z 1 2 y 8 9 [	1 y d P o 2 M P + X o 1 2 y \ D * B P) , 0 @@ 8 9 t R) a b c y

| R

B ④ .

6-11 pH 2 g 1 p

p t x	g x	k a U
	3.8y5.4 M y	Z 0.1g y 7.5mL0.02mol/L , i *) 9 e f < 250mL z Q I pH 4.5y5.4 Y 3 e) g U * p Q I pH 5.4
P	5.2y6.8 M y P	Z 0.1g P e Q 9.25mL0.02mol/L ^ *) 9 e f < 250mL z Q I pH 6.0
t y	6.0y7.6 M y	Z 0.1g e Q 8.0mL0.02mol/L ^ *) 9 e f < 250mL z Q I pH 6.0 Y 3 e) g U * p Q I pH 7.0

6-12 n 2 L 0 3

pH	0.1mol/L mL	0.2mol/L t mL	0.1mol/L mL	0.2mol/L t mL	e f < J B mL
3.6	6.3	25			100
3.8	2.9	25			100
4.0	0.1	25			100
4.2		25	3.0		100
4.4		25	6.6		100
4.6		25	11.1		100
4.8		25	16.5		100
5.0		25	22.6		100
5.2		25	28.8		100
5.4		25	34.1		100
5.6		25	38.8		100
5.8		25	42.3		100
6.0			5.6	25	100
6.2			8.1	25	100
6.4			11.6	25	100
6.6			16.4	25	100
6.8			22.4	25	100
7.0			29.1	25	100

6.2.10 (8 z

t1y ` V W + " J I k t l b ' 0 y* z o
R z
t2y Z b e t b 9 y " Y " 9 I t "
2/3y* b Z 1y3min* : _ : z
t3y G J o 0 a • h + X Y Z E z _ * Q I 5 = o | *
F - S < (t n P { k y z , { k % 30s [; 1
z 3 * : ! o 2 z
t4y I 1 U v * Q S < * I A t I y* { k + X
I 2y3 * I B t I y I 2y3 * I J { k N

3min H) z
t 5 y 2 \ 1 z ^ , 3 1 m R 1 D
z 1 - z ^ 2
} n _ AS1638 I J (~ • t • > 6-13 y* \ 1 NAS - * 0 3) : 100mL
^ o 5µm z Y H } ~ • P , x D ~ • ^
c * L z

` 6-13 NAS 0 4 5 7 6 n

t	/100mL y	p q * µm				
		5 y 15	15 y 25	25 y 50	50 y 100	>100
00		125	22	4	1	0
0		250	44	8	2	0
1		500	89	16	3	1
2		1000	178	32	6	1
3		2000	356	63	11	2
4		4000	712	126	22	4
5		8000	1425	253	45	8
6		16 000	2850	506	90	16
7		32 000	5700	1012	180	32
8		64 000	11 400	2025	360	64
9		128 000	22 800	4050	720	128
10		256 000	45 600	8100	1440	256
11		512 000	91 200	16 200	2880	512
12		1 024 000	182 400	32 400	5760	1024
Y n _ r r 2 U t AIA y NAS1638 1984 1 ' z						

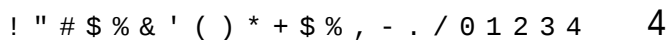
7 m . r ; n

7.1 m .
G J 7 8 { k i 6 • 6.2 y 6.10 G J . u z

7.2 m ` G
7 8 { k • > 7-1 z

` 7-1 m `

p X	{ k	{ k a		
		W	H	S
1	n			
2	/ 0 0			
3	0			
Y 7 8 { k ^ H } 2 ~ % 1 W • 1 S z				


$$11D75)(2(1652167043)07E5(2)10:565f10106561D10)56/05F2(10)560/F5+7/10:565f110:56Tf1056310D56-X110:56+7f10056f21.12+7$$



! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ` { | } ~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ à á â ã ä å æ ç è é ê ë ì í î ï ð ñ ò ó ô õ ö ÷ ø ù ú û ü ý þ ÿ            

               @

500kV 0 60kV 500 0 0 0 kV F 5 + 2 9 . 1 2 1 T f 9 . - 6 0 k V
330kV S 1 4 6 . 4 7 9 0 . 8 m 1 4 # . 8 1 S 2 8 V

8

0



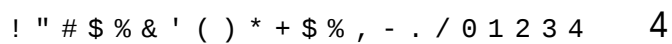
! " # \$ % & ' () * + \$ % , - . / 0 1 2 3 4 4

@ A 1 M 6 2 o U

v w TSSY-ZW-09-01/01

2 o	2 o	= > W	# \$ M W	# \$ d V
M q r { k i 6 MCD i				

p X t x q r q r - q r { k i 6 q * M i



M T * / : N = 1							
# \$ V W t							
H Y							

	t , y	# \$ => w] ^ * # \$	M w b	* # \$	d v	'	z # \$	d v	2 4	q r { k i 6
0	0 z t t y 2 o	M i 6 D	.	)	*		@	*	) _	H 1 \ v w '
	* { H Y % &	z @ S V W + X	* 0	t \	z t	y	6 7 # \$	A	x A K L * T	M *
R : N	= l z y \ q r -	y • q r -	D , d	*	5	R S	f V W	@ + X q r	.	0 k l i 6 z y
	• q r -	y q r { k i 6 {	2 4 # \$	<	? z t	y t D	M t N	t y ! o	L z	