

4

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

! . / 0 1 2

为深入贯彻科学

科

! " # \$ % & ' () *
+ , # - . / 0 1 2 3 4 5 6 7 8 * 为 9 : ; < =
> ? @ = AB C D < EFG HI J * K
7 为 L 4 M * N = AB * K OP
* 为 27 Q RSNTUV W < XYZ [AB TUV \] ^ YZ [AB
_ V \] ^ YZ [AB SF₆ \] ^ YZ [AB \ a ; YZ [A
B PV8 Z [AB GIS HGIS Z [AB bcdGefg
YZ [AB hY! i j : k Z [AB l mn AB o P
YZ [AB p : Z \ q XAB r s PYZ [AB _ V < XY
Z [AB SF₆ ; Y PV X] ^ YAB t V X] ^ YA
B u [u vw AB GIS Z \ q XAB SF₆ = Z [AB W < XY
Z \ q XAB < XYxyzM { ^ | XAB } w AB < XY ~ < • AB Z \ q XA
B \] ^ Y B X] ^ Y B TZ [AB
7 > ? B #
4 " +

编 委 会

345

647 89: ; < =

>?7 @ A BCD E F >GH

I JK L M NOP Q! R M >GH

B

编制说明

`abcd ! " # \$ % & ' () * + e G f g h M N i j k l m n \$ % \$;
6 7 o 6 p q l * + # \$ % , r - s t u ! " # \$ % & ' () * + \$ % \$; o 6
p q v w x y z { | } ~ u p q v w x y •。

upqvwxy 按 \$, 等级分 ` 主 % 交流 % 分及配 % % 分 l 按专 q 特点细分 ` - \$ 线路 & 5 \$ 土 \$ & 5 \$ \$ 气安装 & \$ 气试验 & 继 \$ G 护 & 5 \$ 自动 g & 9 : & 配 % 6 7 8 个分册 l 共 & 208 项 p q v w l 其 主 % 交流 % 分 - \$ 线路 z 包括 g , \$ 缆 • & 5 \$ 土 \$ & 5 \$ \$ 气 & 试验共 124 项 z - \$ 线路 13 项 l 5 \$ 土 \$ 28 项 l 5 \$ \$ 气安装 17 项 l \$ 气试验 27 项 l 继 G 19 项 l 自动 g 13 项 l 9 : 7 项 • 配 % % 分 84 项 z 土 \$ 30 项 l \$ 气 45 项 l 9 : 及自动 g 9 项 •。

- s i 内容按适用 n 围 & - s 依据 & p q 流 7 & 6 p 前安全风险辨析与控制措 o & p q / < & p q # 法 & 质量控制措 o 及检验 . / 7 个 % 分来 - s l 重点描述 o 6 p q # 法。

安全风险辨析与控制措 o 依据 u o 6 安全 # / 风险 v " y l 执 * u 安全 o 6 p q 票 y l 使安全措 o 在 o 6 技术 v w 更具可操 p 性。在质量控制措 o 及检验 . / 引入 WHS 质量控制点 l 使 p q 人员更 v a 本 p q i 质量关键控制点。

考虑到 o 6 p q 技术 i 发展和 ; < 材料 i 更 _ l 今后将采用滚动修 - i # 式来不断完善 p q v w x i 内容和数量。

| N

n Q M - . / O 208 " M
* • Q # 1

\$ # \ Q M412 Y
> # / O 2 #
(*) #OP " | #* 2

*) # Q M 4|

n Q M|
•
\ ! >

《施工作业指导书》分析表

OPN	

目 录

- 制说7

u o 6 p q v w x y 应用# 法说7

BDYCSY-ZW-01	T UV W<XYZ [AB	1
BDYCSY-ZW-02	T UV \] ^YZ [AB	11
BDYCSY-ZW-03	_V \] ^YZ [AB	17
BDYCSY-ZW-04	SF ₆ \] ^YZ [AB	23
BDYCSY-ZW-05	` a ; YZ [AB	29
BDYCSY-ZW-06	PV8 Z [AB	37
BDYCSY-ZW-07	GIS HGIS Z [AB	43
BDYCSY-ZW-08	b c d G e f g YZ [AB	51
BDYCSY-ZW-09	h Y ! i j : k Z [AB	59
BDYCSY-ZW-10	l m n AB	67
BDYCSY-ZW-11	o PYZ [AB	73
BDYCSY-ZW-12	p : Z \ q XAB	79
BDYCSY-ZW-13	r s PYZ [AB	85
BDYCSY-ZW-14	_V < XYZ [AB	91
BDYCSY-ZW-15	SF ₆ ; Y	99
BDYCSY-ZW-16	PV X] ^YAB	105
BDYCSY-ZW-17	t V X] ^YAB	111
BDYCSY-ZW-18	u [u v w AB	119
TSSY-ZW-01	GIS Z \ q XAB	147
TSSY-ZW-02	SF ₆ = Z [AB	156
TSSY-ZW-03	W < XYZ \ q XAB	167

TSSY-ZW-04	$W < XY \times y \wedge | \quad XAB \} z M \{ \quad w \quad AB$	.....	175
TSSY-ZW-05	$W < XY \sim \quad < \bullet \quad AB$	.....	184
TSSY-ZW-06	$Z \setminus q \quad XAB$	.....	192
TSSY-ZW-07	$\setminus] \quad \wedge Y \quad B$	.....	200
TSSY-ZW-08	$X] \quad \wedge Y \quad B$	.....	209
TSSY-ZW-09	$T Z [\quad AB$	.....	219



NBDYCSY-ZW-01

1	%	.....	3
2		.....	3
3	\	.....	3
4	>	.....	4
5		.....	5
6		.....	6
7	! B	.....	7

1

7 TUV W<XY

2

2-1

1	GB 50150 2006 =? >? = Z [AB
2	DL 408 1991 > \$ < =M*

3

4

4.1 TUV W<XYZ[AB Q M ! Q " #
> & n 123> \$% • ! " # *
4.2 TUV W<XYZ[AB" o# > & N
BDYCSY-ZW-01-01/01 ' s - . / O (G*) >
& > * + , - . / (2 > ZO [1ZO#
4.3 + * 2 - . / (2 > ZO [1ZO#
+ > 2- 34 " >
4.4 > &5 + 6 OP u7 <y489 10: ; < 10:
= > & (ZQ M ? @
4-1 " > &

	A B	CD)	
1	8 E?FG H	I J KL		M N 6O(P QE @E < RS \$%
2	ET } > U m V	WXY KL Z[		D \ ` w] 6>
3	AB[: ^	KL	_	n` - B 5+ \ ` @AB[:
4	AB a[u [u b	KL WXc	-	AB | \ ` @[u: de \$%4 [u [ubf
5	AB [: ^	gK		AB hijk l m[: + *@[: e 3
6	ABnoa > p	q W Xc		ABno \$ > p rs > >t D
7	AB u H	KL		[AB | vYw u X wsA B m
8	Txy	xy xy		fzT{ | } T~ ?{ 7•
9	XAB< % 3	q WXc		ABn` y | H > p S 5 | 4 3 | 4 n` 4 X (
10	> D	2 WXc		a T [: y e > }
11	XAB< X	KL		\$ \ 5
12		KL		> } y e•V D8# Ne
13	X FAB	X KL		F H " >t D
14	[AB u	KL		n` - B \ ` @AB[: AB u: ; () ? + n
15	[AB uyq	WXY		6 D = & 2- 4Q>]
16	A c	WXc	-	AB | ! y2 A) * { { # [u: 4 [u

5

5.1

5-1

		+	D
8 AB	2	1	1
X ? # @ AB	2	1	1
w ~ 8 8 # \ v	2	1	1
@ * [# X	2	1	1
@ < XY # " [: " < X Y : # 3	2	1	1
T AB	2	1	1
v G w	2	1	1
w ~ 8 8 # K e tand	3	1	1
w ~ 8 8 # \ { \	3	1	1
~ < • AB	2	1	1
~ 8 8 # Z \ q X AB	5	1	2
~ 8 8 # xy ^ X AB } z M { AB	5	1	2
X # s [AB	5	1	2
" @	2	1	1
N \$ J			

52H2

HHHH



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CHINA SOUTHERN POWER GRID



" 2?(_#: =

6.9

w { | \y\$ X O ABQ B_Bu B_Bu _ B Bu
w | ?(_#: = %& ' ({ | \ ; <Z[# \$

6.10 (4)

6.10.1 ~ <• AB 2 35kV! X) <XY \$ _XA; vh 66kV! (X) <XY \$ PQR| w ~ ST U

6.10.2 Z\qXAB <XY# : Z\qXAB 4 4 P X#AB V 4 ^| X#AB W XoYZ^|qXAB V 4LMAB P X) 110kV! (#<XY 37\$ [Z\qXAB AB X ! Z[

6.10.3 ~ 8 8 #xy^| XAB} zM{ AB X) 220kV! (#<XY >?y xy^| X} zM{ AB X) 为110kV#<XY \2] ^y \$ zM{ AB w<XYOM_贯 3# `a

6.10.4 X # s[AB bF c\$ m

6.10.5 @" @<XY#" " d

7

7.1

7.1.1 T ef= #gU* T y| <XY 6T) *7 \$ #y 4 fT 89fPY : !y; <" M= B

7.1.2 <XY \ vw m1600kVA! X) "<XY 4" w #"] | ! # 41 : w #"] | ! # 21 1600kVA ("<XY 4" w #"] | ! # 21 : w #"] | ! # 11

7.1.3 <XY# \ v ' h - w " | <G | 21 ' (v V 7-1) N

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

V N

R₁ R₂ ' (t₁ t₂ i y# v Ω T 3) : 235 j : 225

- w k) 3 ' (' h - w " | <G | 21

7.1.4 @ * [# X " *s " | +k , | ws X # \$ - X) 220kV! (# W<XY X # . / * [y为O0.51

1 X) 35kV X 3#<XY X . / 为O11

2 <XY * [X . / 为O0.51

3 * [# X | <XYvh X 1 # 1/10 O I ; <O11

7.1.5 CD 为 7[u 2<XY(#CD[u: 8 y | T w 245# v 2500V v w 69y 为1min | +mn! o

7.1.6 <XY} | X ? < AB @ n q # MF

w < vv y w #< vv " y # e y ! ws " m

7.1.7 w ~ 8 8 # v G | ws p\$ N

1 v _ h AB # 701

2 \w ' (h AB y# ' (w sy 4 7-1) 3 ' (y#

7-1

' (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
N1. K为- w' (Lr 20i # 2 2. w ' ((sT' 为												

3 <XY X) 为 35kV! (, P 为 4000kVA! (y | w h
 " | +k ' | 1.3 \ R_{60s} 3000MΩy 4 +* m

4 <XY X) 为 220kV! (, P 为 120MVA! (y \$ 5000V v w
 G w h " | +k ' 1.3 \ R_{60s} 10 000MΩ
 y G 4 +* m

7.1.8 w ~ 8 8 # K e tand | ws p\$ N

- 1 \<XY X) 为 35kV! (, P 为 8000kVA! (y | w K e tand
- 2 w~ # tand | h AB # 1301
- 3 \w y# ' (h AB' (wsy 4 7-2) 3 ' (y#

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
N1. K为- w' (Lr 20i # 2 2. w ' ((sT' 为 3. #' (), AB' 2; <7#Ltu\$ y | vs* w										

7.1.9 w ~ 8 8 # \{ | \ | ws p\$ N

- 1 \<XY X) 为 35kV! (, P 为 8000kVA! (y | w \{ | \
- 2 AB X | ws 7-3#\$ \] AB Xx 1miny X O { | \ {
 | \ \$; < 7-4#\$

7-3

~ X kV	6y 10	20y 35	63y 330	500
\ AB X kV	10	20	40	60
N1. ~ X 为 13.8kV! 15.75kV y 10kV) 18kV y 20kV) 2. *) <XYZ A~ X) #				

7-4

X kV	AB X{ kV	p' (y# ~ { | \ μA							
		10i	20i	30i	40i	50i	60i	70i	80i
2y 3	5	11	17	25	39	55	83	125	178
6y 15	10	22	33	50	77	112	166	250	356
20y 35	20	33	50	74	111	167	250	400	570
								400	570

7.2

7-5

	7	V		
		W	H	S
1	<XYAB			|
N	7 HN} ~ 7 WN• O7 SN 7			

7.3

B 10kV y 500kV 9 < ! J B \$ L 4 KN < = AB
 # Q/CSG 4-1.1.1y 4-1.1.17 Q/CSG 4-1.2.1y 4-1.2.8 m



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>) Q/ NO

[1 Z O ,

j k N 7&5



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1	%	13
2		13
3	\	13
4	>	14
5		15
6		15
7	! B	16

1

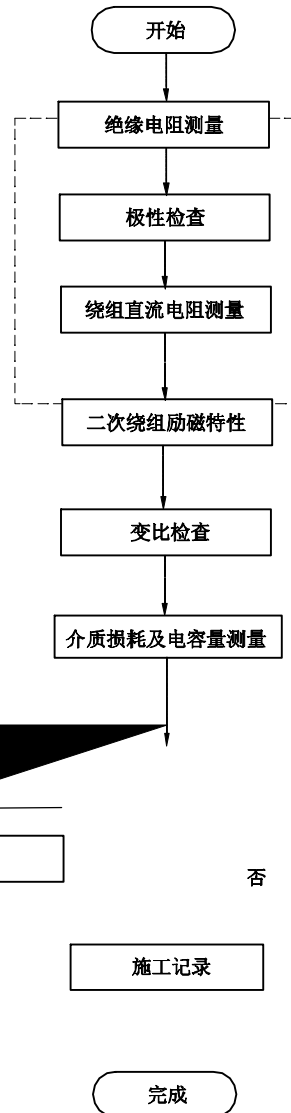
7 TUV \] ^ Y

2

2-1

1	GB 50150 2006 =? >? = Z [AB
2	DL 408 1991 > \$ < = M*

3



4

4.1 TUV \] ^YZ [AB Q M ! Q " #
 > & n 123> \$% • ! " # *
 4.2 TUV \] ^YZ [AB" o# > & N
 BDYCSY-ZW-02-01/01 ' s - . / O (G*) >
 & > * + ,
 4.3 + * 2 - . / (2 > ZO [1ZO#
 + > 2- 34 "
 4.4 > &5 + 6 OP u7 <y489 10: ; < 10:
 = > & (ZQ M ? @
 4-1 " > &

	A B	CD)	
1	AB a[u [u b	KL	-	AB | \ ` @[ u: 8[4 [u bf
2	ABnoa > p	WXc		ABno \$ > p r s > >t D
3	[AB uyq	WXY		= & 2- 4Q>] 6 D
4	AB u H	KL		[AB | vYw u X wsA B m
5	XAB< % 3	q		ABn` y | H > p S 5 | 4 3 | 4 n` 4 X ( |
6	> D	2		a T [: y e > }
7	XAB< X	KL		\$ \ 5

t?~ @tS3 @	3	1	1
< @	2	1	1
K ! P w	3	1	1
N \$ J			

5.2

5-2

		\$ /			
1	v wAv		MΩ	1	
2	1V		/	1	
3	A<XY		/	1	
4	\] ^Y		/	1	
5	Z\B>		V/A	2	
6	KwAv		/	1	
N	Y ! vYv	\$ J			

6

AB CD \] ^Y N ! EF_G

6.1 w \] ^Y# v 2500V v w ?~ 2t?!u# v 2500V
v * w t?~ !u# v v \$ _ 1000MΩ

6.2 w PV \] ^Y# # v v \$ 1000MΩ 2u v
1000MΩy | w tand

6.3 \] ^Y# 3 @ AB: H I \] ^Y# ?~ 8[1 J {
3 \J(# K* [w#t?~ (H I # B :l [3 ?~ # Ll
y L 1 # 1M5N e * 3 0 OF : PnH I # B AB: y
L 1 # 1M5N + * 3 0 OF

6.4 \] ^Y t?~ \ vw

6.5 w D TA#@tS3Q: ABy X R (r \为& O X <
\ D | SQAB

6.6 < @ ?~ Hλ \ t?~ [\ O t?~ \

6.7 KK ! P w N ?~ 2 # K | # 1301 T0.51 P
; O51 2t?~ !u# K 21

7

7.1

7.1.1 w v | ws\$ m

7.1.2 \$? \] ^Y t?~ # \ v ! # (\$ 101 \
] ^y |] #w \ w \ \ U \$; < \ ! # 501

7.1.3 w D TA#@tS3Q: D \] ^Y#S3"] | + V

7.1.4 < @| " *s" w

7.1.5 \] ^YqXAB \$ AB X 1min +(o

7.2

7-1

	7	V		
		W	H	S
1	TUV \] ^YAB	|		
N	7 HN} ~ 7 WN• O7 SN 7			

7.3

B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
 # Q/CSG 4-8.1.1y 4-8.1.3 Q/CSG 4-8.2.1y 4-8.2.4 m

1 > &

BDYCSY-ZW-02-01/01

	y	u7		>	+
	> * !				
	AB	CD)		
1	A c	q	! _		
2	XAB< X	" K	!		
3	AB u H	# D H gK	!		
4	ABnoa > p	q	!		
5	XAB< % 3	q	!		
6	> D	2	!		
7	AB u H	gK	!		
8	AB a[u [u b	gK	! _		
9		" K	!		
10	[AB uy q	WXY	!		
11	\] ^Yt? #n;	KL	!		

12 ET }
> Um V

>) Q/ NO							
[1ZO ,							

j k N 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



中国南

1	%	.....	19
2		.....	19
3	\	.....	19
4	>	.....	20
5		.....	21
6		.....	21
7	! B	.....	22



1

7

_V \

2

1	GB 50150 2006
2	DL 408 1991

3

停止试验

4

4.1 $_V \setminus] ^{YZ} [AB \quad Q M ! Q \quad " \quad \#$
 $> \& \quad n \ 123 > \quad \$\% \quad \bullet \ ! \ " \ # \quad *$

4.2 $_V \setminus] ^{YZ} [AB" \ o\# \quad > \quad \& \quad N$
 BDYCSY-ZW-03-01/01 's - . / O (G*) >

4.3 $+ \ * \ 2 \quad - \ . \ / (2 \quad > \ ZO \ [\ 1ZO\#$
 $+ \ > \ 2- \ 34 \quad "$

4.4 $> \quad \&5 \quad + \quad 6 \quad OP \ u7 \ <y489 \quad 10: \ ; \ < \ 10:$
 $= \ > \quad \& \quad (\ ZO \ M \ ? \ @$
 $4-1 \quad " \ > \ \&$

	A B	CD)	
1	AB a[u [u b	KL	-	AB | \ ` @ [ u : 8 [4 [ub f
2	ABnoa > p	WXc		ABno \$ > p r s > >t D
3	[AB uyq	WXY		= & 2- 4Q>] 6 D
4	AB u H	KL		[AB | vYw u X wsA B m
5	AB E?y> D	KL		E?y 6O(P ME?
6	XAB< % 3	q		ABn` y | H > p S 5 | 4 3 | 4 n` 4 X (
7	> D	WXc		a T [: y e > }
8	XAB< X	KL		\$ \ 5
9		KL		e • V y > } Ne
10	\] ^Yt?#n;	WXc KL		AB \ ` @ [: e
11	A c	WXc	-	AB | ! y2 A) * { { # [u : 4 [u

5

5.1

5-1

		+	D
vw	2	1	1
3 @	2	1	1

~ \ vw	2	1	1
t?~ @tS3 @	3	1	1
< @	3	1	1
K ! P w	3	1	1
Z\qXAB	4	1	1
N \$ J			

5.2

5-2

		\$ /			
1	vwAv		MΩ	1	
2	1V		/	1	
3	A<XY		/	1	
4	\] ^Y		/	1	
5	Z\B>		V/A	2	
6	" XY			1	
7	\Y			1	
8	AB<XY		/	1	
N Y ! vYv \$ J					

6

6.1 AB CD \] ^Y NEF_G

6.2 w \] ^Y# v 2500V v w ?~ 2t?!u# v 2500V
v * w t?~ !u# v v \$ _ 1000MΩ

6.3 w \] ^Y# # v v \$ 1000MΩ 2u v
1000MΩy |w tand

6.4 \] ^Y# 3 @ AB: H I \] ^Y# ?~ 8[1 J {
3 \J(# K* [w#t?~ (H I# B :I[3 ?~ #
L1 y L 1 # 1M5N e OF *3 0 : PnH I# B AB:
y L 1 # 1M5N + OF *3 0

6.5 \+2 10. 56 TTf10. 56 O TD (O) Tj 356 T, . 56 O TD Oj /

] ^y |]#w \ w \ \ U \$; < \ ! # 501
7.1.3 w D TA#@tS3Q: N D \] ^Y#S3"] | + V
7.1.4 < @| " *s" w
7.1.5 \] ^YqXAB8 n 7 AB Q \$ AB X 1min + (o
7.2
B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
Q/CSG 4-8.1.1y 4-8.1.3 Q/CSG 4-8.2.1y 4-8.2.4 m

1 > &

NBDYCSY-ZW-03-01/01

y		u7		>	+
> * !					
	AB	CD)		
1	A c	q	! _	=7 | " > \$ ! >	N
2	XAB< X	" K	!	! AB | \ ` @ [ u : 8 [4 [u b f	
3	> D	2	!	! [AB | v Y w u X w s AB m	
4	AB a [u [u b	gK	! _	! ABno \$ > p r s >	> t D
5	XAB< % 3	q	!	! AB e # > D	
6	ABnoa > p	q	!	! AB AB 6 @ V > Um	
7	AB u H	gK	!	! \$ \ 5	
8		" K	!	! a T [: y e > }	
9	AB E?y > D	" K	!	! e • V Y y > } Ne	
10	[AB uy q	WXY	!	! ABn ` y | H > p 3	
				! S 5 | 4	
				! | 4 n ` 4 X ( |
				! e • V Ne	
				! M N 6 O (P Q E @ E <	
				! RS \$ %	
				! AB | ! y 2 A) * { { # [u :	
				! 4 [u	
				! = & 2 - 4 Q >] 6 D	
				! AB ' \ ` @ \ ([: d) * + y [u	
				: d (, + - . / e	

>) Q/ NO							
[1ZO ,							

j k N 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



SF₆

NBDYCSY-ZW-04

1	%	.....	25
2		.....	25
3	\	.....	25
4	>	.....	26
5		.....	27
6		.....	27
7	! B	.....	28

1

7AB

SF₆ \] ^ Y

2

2-1

1	GB 50150 2006 =? >? = Z [A E
2	DL 408 1991 > \$ <

3

交流耐压

是否发现

4

- 4.1 SF₆ \] ^YZ[AB Q M ! Q " #
> & n 123> \$% • ! " # *
- 4.2 SF₆ \] ^YZ[AB" o# > & N
BDYCSY-ZW-04-01/01 ' s - . / O (G*) >
- 4.3 + * 2 - . / (2 > ZO [1ZO#
+ > 2- 34 "
- 4.4 > & 5 + 6 OP u7 <y489 10: ; < 10:
= > & (ZQ M ? @
4-1 " > &

	A B	CD)	
1	AB a[u [u b	KL	-	AB | \ ` @[ u: 8[4 [u bf
2	λZ l	WXY }Z		6> \ ` > ZO] D
3	ABnoa > p	WXc		ABno \$ > p r s > >t D
4	[AB uyq	WXY		6 D = & 2- 4Q>]
5	AB u H	KL		AB | vYw u X wsAB m
6	AB E?y> D	KL		E?y 6O(P ME?
7	[q SF ₆ = <[\	<[\] ^1K	-	• = y D 6 H bf
8	> D	WXc		a T [: y e > }
9	XAB< X	KL		\$ \ 5
10	XAB< % 3	WXc		ABn`y | H > p S 5 | 4 X 3 | 4 n` 4 X ( |
11		KL		e•V y > } Ne
12	\] ^Yt?#n;	WXc KL		AB \ ` @[: e
13	A c	WXc	-	AB | !y2 A) * { { # [u: 4 [u

5

5.1

5-1

		+	D
vw	2	1	1
3 @	2	1	1
~ \ vw	2	1	1
t?~ @tS3 @	3	1	1
< @	3	1	1
SF ₆ = 893AB	2	1	1
Z \ qXAB	4	1	1
N \$ J			

5.2

5-2

		\$ /			
1	vwAv		MΩ	1	
2	1V		/	1	
3	A<XY		/	1	
4	\] ^Y		/	1	
5	Z \ B>		V/A	2	
6	AB<XY		/	1	
NI. Y ! vYv \$ J 2. wAv mN #w v ! Bs \$ _O					

1005.

6

6.1 AB CD \] ^Y N ! EF_G

6.2 w \] ^Y# v 2500V v w ?~ 2t?~ ! u# v

1000V v * w t?~ ! u# v v \$ _ 1000MVA 1320TD62 TD 89+2 9 1

7.1

7.1.1 w v N| ws\$ m

7.1.2 \$? \] ^Y t?~ # \ v ! # (\$ 101 \] ^y |] #w \ w \ \ U \$; < \ 1 # 501

7.1.3 w D TA#@tS3Q: N D \] ^Y#S3"] | + V

7.1.4 < @| " *s" w \] ^Y#< (# B ybd <A
B >?y / <G Z[ABy 2< AB cMc * 23 @ \] ^YABY
d @

7.1.5 \] ^YqXAB8 n 7 AB Q \$ AB X 1min +(o

7.2

7-1

	7	V		
		W	H	S
1	SF ₆ \] ^YAB	|		
N 7 HN} ~ 7 WN•O7 SN 7				

7.3

B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
Q/CSG 4-7.1.1y4-7.1.3 Q/CSG 4-7.2.1y4-7.2.4 m

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



NBDYCSY-ZW-05

1	%	.....	31
2		.....	31
3	\	.....	31
4	>	.....	31
5		.....	32
6		.....	33
7	! B	.....	34

1

7 ` a ; Y

2

2

1	GB 50150	2006	=? >?	=	Z [AB
2	DL 408	1991	>	S	< = M*

3

封面地址

	A B	CD)	
5	AB u H	KL		AB | vYw u X wsAB m
6	AB E?y> D	KL		E?y 6O(P ME?

4			c	1	
5	Z\qX		8	1	
6			8	1	
7	2.5mm ² : ! [u:		m	-	
N Y ! vYv \$ J					

6

6.1

6.1.1 @n >? ' wsAB#

6.1.2 # 6@AB m

6.1.3 @ & >

6.1.4 AB ws m hi " m

6.1.5 " ABvYd O f

6.2

6.2.1 @n >? f +ghKX

6.2.2 @n l O+ /e kY +1m o

6.2.3 l [ud 4

6.2.4 l Ot?[: no

6.2.5 l *s 3 d

6.3

6.3.1 w * s[: k# v \ v 500V v * w *[: k s[: k2
u# v m _ 10MΩ ` a* w *[: k s[: k# \ v

6.3.2 pq g @ 500V v w g# v @pq g X 3" w
Hλ g # u @ gZrM5e pqgi M5e

6.4

6.4.1 w ;Y ; 2u! # # v ;Y s[st * w C" ; 2u
v *[stw 4 #> # v

6.4.2 wAy m wA :

6.5

6.5.1 \ ; vwAv* w C" ; # \ v

6.5.2 ; vwAv m4 [u H< : ; Y4 8[Xw : | \ 9 : O#

6.5.3 w y \ m 100A w O m H yn` O

6.5.4 w ' m~wAv{ uq nWA ;

6.5.5 mWA' 2wsh \$% wAy %&\y '(v #)

6.6

6.6.1 Xn S3wAv* w ; Y#* s[y vZy ! _3 ABvY4
[u

6.6.2 w y m u X! =Xb #

6.6.3 s[< ; YvZy 40.5kV (3ms 40.5kV 2ms

6.6.4 * s[y wA- . |wsh # # \$

6.6.5 w 5Fgi # =S3 w ; Y ; X 851y1101 U_n/O ; Yq4 #

* s 651 U_n/O ; Yq4 u*n 301 U_n/O ; Y q* s

6.7

AB<XY XY D XZ\ ; 为 XZ\ u * 2 ; YC" #s[st2
u * [st # qXAB AB • Sx3ABZ\qXABM*

7

7.1

7.1.1 w ; Y q #* s[y w * s[# _3 w s[< q [q #vZ
y

7.1.2 w Py# v | _ 1200MΩ

7.1.3 w C" ; # v | wsh # # \$

7.1.4 Z\qXAB | ; Ys[!*[st Z\qXAB \ s[st y AB
X|ws 7-1# \$ \ * [st y `azj{ # #AB X|wsh #
#\$ AB | 贯 3{

7-1

X kV	3 kV	Imin Pq1 X { kV			
		" 2u	"	; Y #	l m #
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 w ; Y q #* s[y w * s[# _3 w s[< q [q #vZ
y

7.1.6 s[< q [q #vZy N40.5kV ; Y | 2ms 40.5kV! (; Y |
3ms

7.1.7 w | ; Y 5 X! | X#

7.1.8 - w | wsh # # \$

7.1.9 w * s[: k! s[[qY: k# v | _ 10MΩ \ v h A
B " | +k

7.1.10 ; Y5Fgi #AB | ws p\$ N

1 s[5 #5 X 851y1101 U_ny5Fgi | 4 F

2 * [5 #5 X 651 U_ny | 4 u* [\ 301 U_ny | * [

7.2

7-2

	7	V		
		W	H	S
1	` a ; YAB	|		
N 7 HN} ~ 7 WN•O7 SN 7				

7.3

B 10kV 500kV 9< ! J B \$ L 4 KN< =AB
Q/CSG 4-11.1.1 Q/CSG 4-11.2.1y 4-11.2.2 m

1 > &

NBDYCSY-ZW-05-01/01

	y	u7		>	+
> * !					
	AB	CD)		
1	AB ^ [:	gK	!	=7 | " > \$ ! > N	
2	A c	q	! _	! AB | \ ` @ [ u : 8 [4 [ubf	
3	XAB< X	" K	!	! [AB | v Y w u X ws AB m ! AB hijk l m [: + * @ [: e 3	
4	AB a [u [u b	gK	! _	! AB ; Y g i j • + ! ABno \$ > p r s > > t D	
5	AB u H	gK	!	! > [u :	
6	> D	2	!	! ABn` y | H > p S 5 | 4 > p | 4 n` 4 X ( | 3	
7	? ^ |	q	!	! AB e # > D ! AB | ! y 2 A) * { { # [u :	
8	AB u H	gK	!	4 [u ! \$ \ 5	
9	ghZFM*	X 2	!	! a T [: Yy > } e • V Ne	
10	XAB< % 3	q	!	! M N 6 O (P Q E @ E < RS \$ %	
11	ABnoa > p	q	!	! = & 2 - 4 Q >] 6 D ! AB ' \ ` @ \ ([: d) * + y [u : d (, + - . / e	
12		" K	!		
13	AB E?y > D	" K	!		
14	[AB uy q	WXY	!		

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



NBDYCSY-ZW-06

1

7

PV8

2

2-1

1	GB 50150 2006 =? >? = Z [A B
2	DL 408 1991 > \$ < = M*

3

是否发现

4-1 " > &

	A B	CD)	
1	AB a[u [u b	KL	-	AB | \ ` @[ u: 8[4 [u bf
2	ABnoa > p	WXc		ABno \$ > p r s > >t D
3	[AB uyq	WXY		= & 2- 4Q>] 6 D
4	AB u H	KL		[AB | vYw u X wsA B m
5	AB E?y> D	KL		E?y 6O(P ME?
6	= { |xy	xy	4[1#	j k 5 e Y
7	= t{ \	\] ^1K	-	AB fn{ =}
8	XAB< % 3	WXc		ABn` y | H p S 5 | 4 X 3 | 4 n` 4 X ( |
9	> D	WXc		a T [: y e > }
10	XAB< X	KL		\$ \ 5
11		KL		e•V y > } Ne
12	A c	WXc	-	AB |!y2 A) *{ { # [u: 4 [u

5

5.1

5-1

		+	D
P tandWA	2	1	1
N	\$ J		

5.2

5-2

		\$ /			
1	X v			1	
2	K wAv			1	
3			c	1	
N	Y ! vYv	\$ J			

6

6.1 8 n [u

6.2 8 # vw 2500V v * w D2 2 u #
v

6.3 8 # K e P w K w v* w 8 # D2 8 8
2 K e P e[w D2 8 K e P [w
2 u K e P w y %&AB' 2 ' (?(

7

7.1

7.1.1 AB< I _G

7.1.2 AB bc45 > 4 [u

7.1.3 AB[: e X : W4qA A 8[no X: K: [u: q~S
Z•

7.1.4 66kV! (# P 8 |w X 8 2 w 8 2 # v
2500V v w v | _ 1000MΩ

7.1.5 w 20kV! (_ 8 # K e tand P |ws p\$ N {
' _ 10i ## 8 # K e tand | 7-1 # \$

7-1

tand

8 D		tand 3
PV	TUI	0.7 500kV 8 0.5 ' "
	UI	0.7"
	#I	1.0 66kV! X) 8 1.5 ' "
	\$%&'	1.5
	=	1.5
	g* s (	0.7
! p# X为q) X " 220kV! (PV) I 8 #* h tand 4为2 2.5 (g*s 8 # KAB \$ _+ N PV8 #-w P h *s AB " | O51% O		

7.2

7-2

	7	V		
		W	H	S
1	PV8 AB	|		
N 7 HN} ~ 7 WN•O7 SN 7				

7.3

B 10kV y 500kV 9 < ! J B \$ L 4 K N < = A B
Q/CSG 4-1.1.10 Q/CSG 4-1.2.6 m

1 > &

NBDYCSY-ZW-06-01/01

	y	u7		>	+
> * !					
	AB	CD)		
1	A c	q	! _	=7 | " > \$ ! >	N
2	XAB< X	" K	!	! [AB | vYw u X wsAB m	
3	XAB< % 3	q	!	! AB | \ ` @[u: 8[4 [ubf	
4	ABnoa > p	q	!	! n`AB 5+ \ ` @AB[:	
5	AB u H	gK	!	! ABno \$ > p rs >	>t D
6		" K	!	! \$ \ 5	
7	, \$t{ SF ₆ =	\	! _	! ABn`y |H	> p ₃
8	SF ₆= { |	=xy	! 4[1#	S 5 | 4	|4 n` 4 X ( |
9	> D	2	!	! a T [:	y e > }
10	AB a[u [u b	gK	! _	! e•V Yy > }	Ne
11	AB E?y > D	" K	!	! j k 5 e Y	
12	[AB uyq	WXY	!	! AB e # > D	
				! AB |!y2 A) *{ { #[u:	4 [u
				! AB fn{ =}	
				! M N 6O(P QE @E <	RS \$%
				! = & 2- 4Q>] 6 D	
				! AB ' \ ` @ \ ([:d) * +y[u	:d(, +- /e

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2 2
 O t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <7y
 | p%&<7/O 2 ZO , \ | # %)> Q
 NO 8 \) &) dy Q M| " = \$% 9 &
) n : ; < , = > , # ! } &•



GIS HGIS

NBDYCSY-ZW-07

1

7 GIS HGIS

2

2-1

1	GB 50150 2006 =? >? = Z [A B
2	DL 408 1991 > \$ < = M*

3

!abc



4

4.1 GIS(HGIS)Z [AB Q M ! Q " # >

& n 123> \$% • ! " # *

4.2 GIS(HGIS)Z [AB" o# > & N

BDYCSY-ZW-07-01/01 ' s - . / O (G* 为为 为 为 为 为



4 *GAB | X] ^Y fgY D=> ?l mn
 5 AB X 为 AB] X # 801
 6 AB X#]N\$ #AB X|]3C" 45> C? " #
 | [u#45" 8 CDM <M] ? X y| HW4qLMo
 #=*AB? W GIS M λAB X

6.2.7

GIS # k #4C8@! | M 3?#AB B Aq#e 3 4C8@
 M N

- 1 [un l mn #]" 8@
- 2 [un X] ^Y#]" 8@
- 3 l mn ; Y#]" 8@
- 4 l mn l mn #]" 8@
- 5 Bp: #l mn Cp: 5 8@

7

7.1

7.1.1 w ; # v \$ \ 100A # \X- wA' 2 | ; <h
 # \$ # 1.2G

7.1.2 ; #Z\qXAB | h # DL/T555 = bc9D Y
 qXAB 6 # \$ AB X 为 AB X# 801

7.1.3 893AB4 4[(_ 1E10⁻⁶ # | v 24={ 89M F[•
 wy | |GH y4 zMRG = { | w 24h # | =) C
 D={ l | =Q | 11 { | #w | 9DV s Y) = 24h

7.1.4 w SF₆= 20i # * | ws p\$ N

- 1 j * f # l { | 150μL/L
- 2 + j * f # l { | 250μL/L
- 3 = #w | 9DV s Y) = 48h

7.1.5 9D s YO4k #AB | " | k # #AB l 2+ * n#
 4 [

7.1.6 \ s Y#5FABy o@ D@? F | 4 F =F | X? #5F
 AB | h # # \$

7.1.7) = < @ = 8(C Y! XWF } #F | wsh # # \$ 2 [Z3 # | JB

7.2

7-1

	7	V		
		W	H	S
1	GIS(HGIS)9DV s =AB			|
N	7 HN} ~ 7 WN•O7 SN 7			

7.3

B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
 # Q/CSG 4-13.1.1y 4-13.1.7 Q/CSG 4-13.2.1y 4-13.2.5 m

1 > &

NBDYCSY-ZW-07-01/01

y	u7		>	+
> * !				
	AB	CD)	
1	A c	q	! _	=7 | " > \$ ! > N
2	XAB< X	" K	!	! AB | \ ` @[u: 8[4 [ubf
3	> D	2	!	! AB | vYw u X wsAB m
4	? ^|	q	!	! AB hijk l m [: 5 + *@[: e 3
5	XAB< % 3	q	!	! ABno \$ > p rs > >t D
6	ABnoa > p	q	!	! ABn`y |H > p S 5 | 4 3 |4 n` 4 X ( |
7		" K	!	! \$ \ 5 j k 5 e Y
8	AB ^[:	gK	!	! a T [: e•V Y y > } Ne
9	ghZFM*	X 2	!	! AB |!y2 A) *{ { #[u: 4 [u
10	FAB 3	" K X	!	! AB ; Ygi j • + ! AB e # > D ! F H " >t
11	AB E?y > D	" K	!	! D ! AB fn{ =}
12	, \$t{ SF ₆ =	\	! _	! M N 6O(P QE @E < RS \$%
13	SF ₆= { |	=xy	! 4[1#	! = & 2- 4Q>] 6 D ! AB ' \ ` @ \ ([: d) * +y[u : d(, +-. /e
14	AB a[u [u b	gK	! _	
15	AB u H	gK	!	

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 2O t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



NBDYCSY-ZW-08

1	%	.....	53
2		.....	53
3	\	.....	53
4	>	.....	53
5		.....	55
6		.....	55
7	! B	.....	56

1

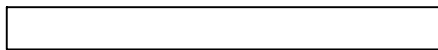
7 bcdGefgY

2

2-1

1	GB 50150 2006 =? >? = Z [AB
2	DL 408 1991 > \$ < = M*

3



4.4

10

10

4-1 " > &

	A B	CD)	
1	AB a[u [u b	KL	-	AB | \ ` @[ u: 8[4 [u bf
2	ABnoa > p	WXc		ABno \$ > p r s > >t D
3	[AB uyq *	WXY		= & 2- 4Q>] 6 D
4	AB u H	KL		AB | vYw u X wsAB m
5	XAB< % 3	WXc		ABn` y | H > p S 5 | 4 X () 3 | 4 n` 4 X ( ) |
6	> D	WXc		a T [: y e > }
7	? ^ |	WXc		>[u:
8	XAB< X	KL		\$ \ 5
9	A c	WXc	-	AB | ! y 2 A) * { { # [u: 4 [u

5

5.1

5-1

		+	D
vWA	2	1	1
\ 1mA X U _{1mA} ! 0.75U _{1mA} # { | \ w	3	1	1
@{ %&YF /O	2	1	1
N	\$ J		

5.2

5-2

		\$ /		
1	X \ Y		8	1
2	v			1

3	{ 3 JBv			1	
4	2>		D	1	
N Y ! vYv \$ J					

6

6.1

vWARSfgY7 OK# vWA OP• 6-1

6-1

	OP	5 !
1	O{ v v @	s v {H AB 2 v 7W @
2	8[wA: [u:	v #[u AfgY#u: 8[} K#8[: [] 3 AfgYw M y[(K
3	n`w O %&w ' 2	bF v 2500V Lw fgY7 OK# v O 60s #W %&
4	} %w A A; { [u	} %w A A; { [u

6.2

1mA **0.75U_{1mA}**

ABRSNw bcdGefgY \ 1mA + X ! 751 \ 1mA + X U_{1mA} #{ |
\ OP• 6-2

6-2

1mA

U_{1mA}

0.75U_{1mA}

	OP	5 !
1	O{ \ X Y vY [u	s \ X Y H{ vY[u 4 [u
2	" | #AB O AB [:	AB[: rH vY j k H<AB 8[: O AB [:
3	n`w O %&w ' 2	bF \ X Y w O %&w ' 2
4	} %w nvY u! A { [u	} %w n \ X Y u A A; { [u

6.3

{ 3 YF /OwA• 6-3

6-3

	OP	5 !
1	{ 3 YJBv @ 3 YF /O	{ 3 YJBv2{ 3 Y{ 3y5? 3 Y| 4 F
2	} %w wAv{ ' f	DvY u {

7

7.1

7.1.1

```

vWA | ws      mN
1      v O{    | >  O{ |    Ho AB 2      v      A;    n;
wA @
2 AB # : |      D8:    K:  \` @wA:  [u: #8[    @      v
  #9  [:
3 w y H      v_ d    X- _ v    r w y | e
4 }%w y      A d彻O{    %)    { KL      v    "    WXB
  Hv rd{    ' u    A A; [u
5    " AB$ 2wA' 2    w N 5000V      v w      v      2500MΩ
  &K      v _ 5MΩ
    
```

7.1.2

```

\ 1mA X 0.75U1mA #{ | \wA | ws $ N
1 vY{ | >      H O . X : #M ! A 8[ # ( 6@ m
2 \ ` 2 [: rH @AB[: X : K: x( (s 6 N e
  [uM @V# Um
3 n` ABY 6 - XO: fz X<P \;
4 }%w      nvY u! A { [u    A d彻O{    %    WXB
5    " AB$ 2wA' 2    w NbcdGefgY2| \ + \ # \
  + X      *w #wA    | _ GB 11032 Z\+ ?bcdGefgY $
      wsh # # $ -w " $      <G | O51 0.75
G \ + X #{ | \ | 50μA wsh # # $
    
```

7.1.3

```

@{ 3 YF /O | ws $ N
1 { 3 YJBv @{ 3 YF /Oy | %vY X { X AB<
  6vY X      W @VUm W QA{ ; wA : x( { 3 YJB
v[u | 4 [u
2 }%w y % { 3 YJBvc X C?AB { 3 Y B
v{
3    " AB$ 2wA' 2    w    @{ 3 Y#F | 4 fgY R \
  r | bf 3 YAB' 2 d
    
```

7.2

7-1

	7	V		
		W	H	S
1	bcdGefgYAB	|		
N	7 HN} ~ 7 WN•O7 SN 7			

7.3

B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
 # Q/CSG 4-19.1.1 Q/CSG 4-19.2.1y 4-19.2.2 m

1 > &

BDYCSY-ZW-08-01/01

	y	u7		>	+
> * !					
	AB	CD)		
1	A c	q	! _		
2	XAB< X	" K	!		
3	> D	2	!		
4	? ^ |	q	!		
5	XAB< % 3	q	!		
6	A c	q	! _		
7	AB a[u [u b	gK	! _		

8

>) Q/ NO

[1ZO ,

j kN 7&5 > * + , 1 + n * 2
 2O t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



NBDYCSY-ZW-09

1	%	.....	61
2		.....	61
3	\	.....	61
4	>	.....	61
5		.....	62
6		.....	63
7	! B	.....	64

1

7 4 X) # _ V hY TUV hY i j : k # Z [AB

2

2-1

1	GB 50150 2006 =? >? = Z [AB
2	DL 408 1991 > \$ < = M*

3

	A B	CD)	
5	[AB uyq	WXY		6 D = & 2- 4Q>]
6	AB u H	KL		AB | vYw u X wsAB m
7	AB E?y> D	KL		E?y 6O(P ME?
8	Txy	xy xy		fzT{ | }T~ ?{ 7•
9	XAB< % 3	WXc		ABn`y | H > p S 5 | 4 X 3 | 4 n` 4 X ( |
10	> D	WXc		a T [: y e > }

5-2 9

		\$ /			
3	\ vwAv		mΩ	1	
4	\ Y		/	1	
5	Z\qX 8		/	1	
6	V		/	1	
N	Y !vYv	\$ J			

6

6.1

6.1.1 @ hY>? ' hYTU d' V wsAB#

6.1.2 # 6@AB m

6.1.3 @ & >

6.1.4 AB ws m hi " m

6.1.5 " ABvYd O f

6.1.6 @ hY4 f +ghKX

6.1.7 hY[ud 4

6.1.8 >? ' ' "

6.1.9 @WXY#4} =d M: n Tj 7 #} =d: n hY7 +|T o

6.1.10 @ hY *s 3 d

6.2

7QAB| hY7 AB Js>?N

6.2.1 vN 8 ETEQ a 8 2500V v * w [:
2 ! # v " # # | k 2 66kV
(X 8 # P 8 | 2500V v w 8 2 # v | _
1000MΩ

6.2.2 Kw N e[: w 8 2 # K e tand! P [: v
Y r#[: V 10kV XwA K XwA: | } f a !!
u f> % λ XABno w # K! P |
k |wsZ[m

6.3

T y| hY 6T) *7 \$ #y 4 3f YZ " 2?(_#[
\Y hY{T} •]T #PY N^_ yN ~AB# hYTI
_ fT 89fPY : !y; <" M= B

6.4

vwAvw ~ \ v w y| %&f ' () "
hY \ v"] ! # 21

6.5

#AB\$ T Bs > W ?(_ U 801 #: =
w > | @ v M5) @ 2 mw G # hY | @ v
A; \ _ 2mA AB| %&f AB ' () < " ' (m _
701 mw ~ 2u ~ ! CD2u 2u# v

6.6 **tand**
 6.6.1 ABY Kv XAB: } a hY5 [q
 6.6.2 %&fABY# '()< " '(y | # 1.3G w
 2 | HI J8 : K8 LM8 # N{ | \ w \$ " 2?(
 _#: =
 6.7
 w { | \ y\$ X O w | " 2?(_#: = %& '({ | \
 ; <Z[# \$
 6.8
 hY# : Z\qXAB 4 4 P X#AB V4 ^| X#
 AB W XoYZ^|qXAB V 4LMAB P X) 110kV! (#
 hY 37\$ [Z\qXAB AB X ! Z[hYZ\qXABY |
 H8 TA n;
 6.9
 6.9.1 @= C Y>? f 500V v @= C Yq7 F = C Y
 AB ` @= C Yq7Dsbf
 6.9.2 @WX g bf H Z g gr e Z e /; Z\ X e
 6.10
 bF c\$ m AB

7

7.1

7.1.1 w ~ 8 8 # \ v | ws p\$ N
 1 w | 4* [# (
 2 -w #<G\$- | d
 3 " hY~ \ v "] | " ! # 21
 4 hY i j : k# \ v ' h " | <G | 21
 5 hY# \ v ' h -w " | <G | 21 '(
 v V 7-1) N

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

V N

$R_1 R_2$ '($t_1 t_2$ i y# v Ω
 T 3) : 235 j : 225

7.1.2 CD 为 7[u \ hY(#CD[u: 8 y | T w 245#
 v 2500V v w 69y 为 1min | +mn! o

7.1.3 w ~ 8 8 # v G | ws p\$ N
 1 v _ h AB # 701
 2 \w '(h ABy# '(wsy 4 7-1) 3 '(y#

7-1

' (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
N1. K为-w' (Lr 20i # 2 2. w '((sT' 为												

3 hY X) 为 35kV! (, P 4000kVA! (y | w h
 " | +k ' | 1.3 \ R_{60s} 3000MΩy 4 +
 * m

7.1.4 w ~ 8 8 # K e tand | ws p\$ N

1 \ hY X) 为 35kV! (, P 8000kVA! (y | w K e tand
 2 w~ # tand | h AB # 1301
 3 \ w y #' (h AB' (wsy 4 7-2) 3 ' (y #

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
N1. K 为- w' (Lr 20i # 2 2. w ' ((sT' 为 3. #' (), AB' 2; <7#Ltu\$ y | vs* w										

7.1.5 w ~ 8 8 # \{ | \ K 15+2 10. 56 Tf 10. 56 O T252 O TD

7.3

B 10kV y 500kV 9 < ! J B \$ L 4 K N < = A B
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 m

1 > &

NBDYCSY-ZW-09-01/01

	y	u7		>	+
> * !					
	AB	CD)		
1	ABnoa > p	q	!	=7 | " > \$ ! > N	
2	XAB< % 3	q	!	! AB | vYw u X wsAB m ! AB hijk l m [: 5 + *@[: e 3	
3	A c	q	! _	! ABno \$ > p rs > >t D	
4	AB a[u [u b	gK	! _	! ABn`y | H > p S 5 | 4 | 4 n` 4 X ( |	3
5	8 E? FG H	KL	!	! \$ \ 5	
6	> D	2	!	! a T [: y e > } ! e•V Yy > } Ne	
7	Txy	xy	!	! AB |!y2 A) *{ { #[u: 8[4 [ubf	
8	AB u H	gK	!	! fzT{ | } T~ ?{ 7•	
9	XAB< X	" K	!	! AB e # > D	
10		" K	!	! M N 6O(P QE @E < RS \$%	
11	AB E?y > D	" K	!	! jk 5 e Y ! = & 2- 4Q>] 6 D	
12	AB [: ^	gK	!	! AB '\` @ \([: d) * +y[u : d(, +-. /e	
13	[AB uy q	WXY	!		

>) Q/ NO

[1ZO ,

j kN 7&5 > * + , 1 + n * 2
 2O t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



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1	%	69
2		69
3	\	69
4	>	69
5		70

1

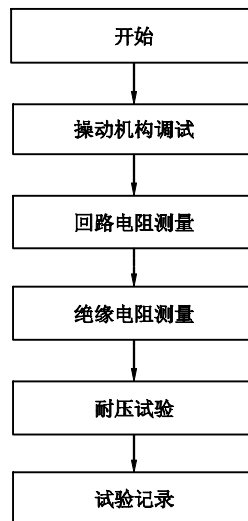
7 I mn

2

2-1

1	GB 50150 2006 =? >? = Z [AB
2	DL 408 1991 > \$ < = M*

3



3-1 ()

4

4.1 I mn Z [AB Q M ! Q " # > &
n 123> \$% • ! " # *
4.2 I mn Z [AB" o# > & N
BDYCSY-ZW-10-01/01 ' s - . / O (G*) >
& > * + ,
4.3 + * 2 - . / (2 > Z O [1 Z O#
+ > 2- 34 "
4.4 > & 5 + 6 O P u 7 < y 4 8 9 10 : ; < 10 :
= > & (Z O M ? @

4-1 " > &

	A B	CD)	
1	AB a[u [u b	KL	-	AB | \ ` @[ u: 8[4 [u bf
2	AB [: ^	gK		AB hijk l m[: + *@[: e 3
3	ABnoa > p	WXc		ABno \$ > p r s > >t D
4	[AB uyq	WXY		= & 2- 4Q>] 6 D
5	? ^ |	q		e > D
6	AB u H	KL		AB | vYw u X wsAB m
7	AB E?y> D	KL		E?y 6O(P ME?
8	ghZFM*	WXc		AB gi j • +
9	XAB< % 3	WXc		ABn` y | H p 3 S 5 | 4 n` 4 X ( |
10	> D	WXc		a T [: y e > }
11	XAB< X	KL		\$ \ 5
12		KL		e • V y > } Ne
13	FAB 3	X " K		F H " >t D
14	A c	WXc	-	AB | ! y 2 A) * { { # [u: 4 [u

5

5.1

5-1

		+	D
5Fgi A	3	1	1
; vw	3	1	1
vw	3	1	1
Z \ qXAB	3	1	1
N	\$ J		

5.2

5-2

		\$ /			
1	v		c		
2	; vWA v				
3	Z\qXAB?		8		
N	Y ! vYv	\$ J			

6

6.1

6.1.1 @l mn # ?st O } k n7

6.1.2 AB &dnf AB # ZO > ZO d

6.1.3 ? ghM*d>? gh+ab

6.1.4 l mn =M*>? ' AB#

6.2

6.2.1 - . #5 u XY AB u u X3 # 801 5Fgi 4 *s

6.2.2 - . #5 u XY AB u u X3 # 1101 5Fgi 4 *s

6.3

bFWAvn` w ~w H vY r + < Gy %&w v

6.4

6.4.1 s v { H AB 2 v 7W @

6.4.2 v #[u A #[u 8[] K#8[: [3 A # X y
[(K

6.4.3 bF v n` w %& 60sy#w

6.4.4 } %w { [u

6.5

6.5.1 s PqX? H{ [u 4 [u

6.5.2 AB< | Lv <G/O A mn cd (/O | - X f
> @ @/O = AB e%AB

6.5.3 O %&w ! AB X]Xy

6.5.4 } %w n u A; { [u

7

7.1

7.1.1 w l mn ; # v \$ \ 100A # \X- wA' 2 | ; <
h # \$

7.1.2 Z\qXAB

7-1 1min

kV

X	3 X	f l mn	
		o g	
		Z [	Z [
35	40.5	100	90

7-1 9

X	3 X	f l mn			
				o g	
			Z [		Z [
66	69.0	165	165	165	148
110	126.0	265	265	265	240
220	252.0	495	495	495	440

7.1.3 @5Fgi : k#3_F X | ws " # \$

7.1.4 5Fgi #AB|ws p\$ NFWV5Fgi #* s[5 \ X =X p%
y | OI mn # [g [un 4 u* [s[

1 Fg5Fgi N\ Fg[: # X X# 801y1101% Oy

2 XQa=5Fgi N\ =X =X# 851y1101% Oy

3 t? : k tD@? N\ : k[: # X X# 801y1101%
Oy

7.1.5 l mn + n #gh =D@? | 4

7.2

7-2

	7	V		
		W	H	S
1	l mn AB	|		
N	7 HN} ~ 7 WN• O7 SN 7			

7.3

B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
Q/CSG 4-12.1.1 Q/CSG 4-14.2.1 m

1 > &

4WB048CSY(ZYB87451-3W) (7) 1635L6 791

>) Q/ NO



[1ZO ,

j kN 7&5 > * + , 1 + n * 2
 2O t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



NBDYCSY-ZW-11

1	%	75
2		75
3	\	75
4	>	76
5		77
6		77
7	! B	78



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CHINA SOUTHERN POWER GRID

1

○ W PY

2

2-1

	GB 50150	2006	=? >?
	DL 408	1991	> \$

Limit



中国南方电网

CHINA SOUTHERN POWER GRID



2 Pw v sJ
 3 w yv | {
 7.1.2 vwAN
 1 ABvY 1_O
 2 v O{ |> | {H
 3 AB 2 v A; n; wA @
 4 @ A st N|_G f _+
 5 AB # : | D8: K:
 6 \` @wA: [u: #8[@ v #9 [:
 7 % v_ d X-_
 7.1.3 Z\qXABN
 1 4ABvY 1_O ste
 2 ABY: =|YZ ?(\$ 851
 3 AB uH qX X e
 4 4ABvYO{s Ho
 5 AB[: e no4 Ozs X: x(s X: u " N @V
 Um
 6 Xy|no] <AB Xy 6 lmin
 7 AB' V 2) * {
 7.1.4 s[ABN X @|s 4 sZst
 7.1.5 PY 4" P#3 3 > |; < 1.08
 7.1.6 v _ 2000MΩ
 7.1.7 Z\qXAB< | +mn cd (/O AB\$ X ABY lmin H<
 7.1.8 o PY X 4" \ | v ; < 51 PY| +(o
 7.2

7-1

	7	V		
		W	H	S
1	W PYAB	|		
N	7 HN} ~ 7 WN•O7 SN 7			

7.3
 B 10kV y 500kV 9 < ! J B \$ L 4 KN < = AB
 # Q/CSG 4-18.1.1 Q/CSG 4-18.2.1 m

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



NBDYCSY-ZW-12

1	%	.....	81
2		.....	81
3	\	.....	81
4	>	.....	82
5		.....	83
6		.....	83
7	! B	.....	83

1

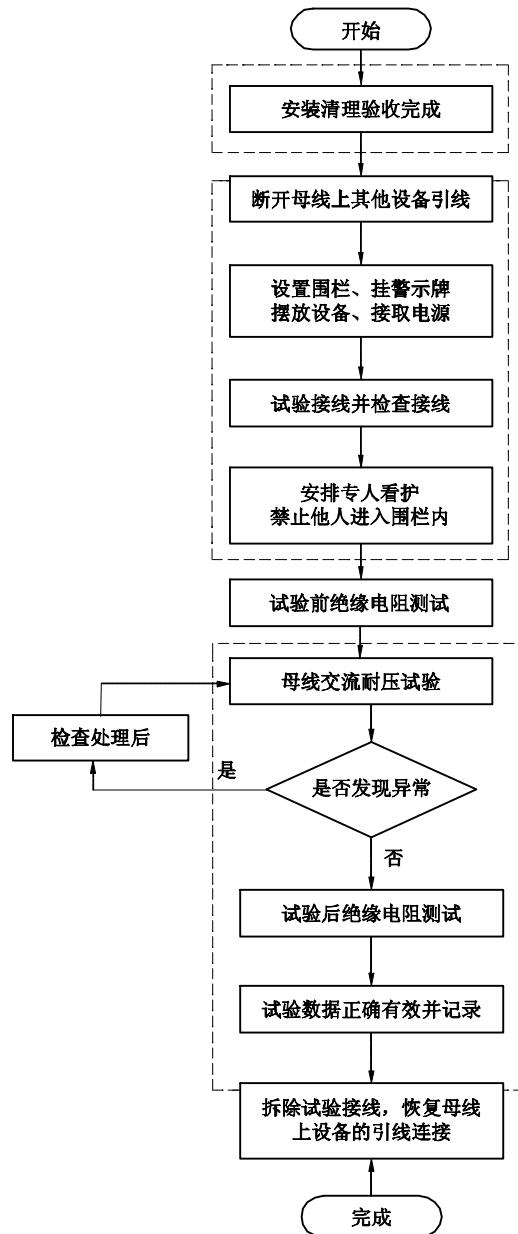
7 10y 35kV p: Z \ q X Z [A B

2

2-1

1	GB 50150 2006 =? >? = Z [A B
2	DL 408 1991 > \$ < = M*

3



3-1 ()

4

4.1 p: Z\qXAB Q M !Q " # > &

n 123> \$% • ! " # *

4.2 p: Z\qXAB" o# > & N

BDYCSY-ZW-12-01/01 ' s - . / O (G*) >

& > * + ,

4.3 + * 2 - . / (2 > ZO [1 ZO#

+ > 2- 34 "

4.4 > &5 + 6 OP u7 <y489 10: ; < 10:

= > & (ZQ M ? @

4-1 " > &

	A B	CD)	
1	AB a[u [u b	KL	-	AB | \ ` @ a

a

5.2

5-2

		\$ /			
1	V v		V	1	
2	qX		8	1	
N	Y ! vYv	\$ J			

6

6.1

6.1.1 np: # u (, n24# 8: [u{

6.1.2 v { H v #[u E A #[u " 8 } K:
#w : #=: K: * v #w L ! K G " 8[wA\ " y
/" A[[u

6.1.3 [: ~ v H O v

6.1.4 O v# }% v 2 A # #w n [: : 12 A
) * {

N\ F v y NwF v < r: 120r/min Sy v 1| x 1
=: [< A ~ 1H O v# O v# N n[< A #=:
: v }%Zr 3 12 A) * {

6.2

6.2.1 : X<XY XY X \ [: e 8[: yz @[:
M5e +

6.2.2 X | @ XYM5 R - X< | R v] X< | 8 R X
; R A

6.2.3] < AB X }. 1min O { | \ %& 1no- _AB X<R PZ\qXA
B | { N XY- <R : nAB u 1 n[< A # : w AB"
v | 4/" AB "

7

7.1

7.1.1 vw 为 • O7 S ?(## w y 4 A N]
K Sy [: (H A (# K |[] X# X: } ~m[uM* LM K2
u# N{ | z" v <

7.1.2 { | \ < GQ为 • O7 AB< a=? (' (N• x Q A
N a={ { | \ H | IJ _+• 1 AB \{ | y| _+IJ
#OEr A f N#x y4N T \#r _G8 N#

7.1.3 \ A 为 g AB | q 6\为 b |! y•
: 1 AB

7.2

B 10kV y 500kV 9< ! J B \$ L 4 KN< =AB
m

1 > &

NBDYCSY-ZW-12-01/01

	y	u7		>	+
> * !					
	AB	CD)		
1	A c	q	! _	=7 | " > \$ ! >	N
2	XAB< % 3	q	!	! AB | \ ` @ [ u : 8 [4 [ubf	
3	ABnoa > p	q	!	! [AB | vYw u X wsAB m	
4	> D	2	!	! ABno \$ > p rs >	>t D
5	AB a[u [u b	gK	! _	! ABn`y | H > p 3	S 5 | 4 | 4 n` 4 X ( |
6		"K	!	! a T [: y e > }	
7	AB E?y > D	"K	!	! > [u : ! AB | ! y 2 A) * { { # [u : 4 [u	
8	XAB< X	"K	!	! AB e # > D	= & 2- 4Q>] 6 D
9	[AB uy q	WXY	!	! AB ' \ ` @ \ ([: d) * + y [u	: d (, + - . / e
10	? ^ |	q	!		

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 2O t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



NBDYCSY-ZW-13

1	%	.....	87
2		.....	87
3	\	.....	87
4	>	.....	87
5		.....	89
6		.....	89
7	! B	.....	90

1

7

rs PY

2

1	GB 50150 2006 = ?
2	DL 408 1991 >

3

是否

查找原因，采取相应措

4.3 + * 2 - . / (2 > ZO [1ZO#
+ > 2- 34 "

4.4 > &5 + 6 OP u7 <y489 10: ; < 10:

= > & (ZQ M ? @
4-1 " > &

	A B	CD)	
1	AB a[u [u b	KL	-	AB | \ ` @[ u: 8[4 [u bf
2	ABnoa > p	WXc		ABno \$ > p r s > >t D

3

6

6.1

vWARSw r s PY v r s PY_X 2u v

6-1

	O P	5 !
1	O{ v v @	s v {H AB 2 v 7W @
2	8[wA: [u:	v #[u A #u: 8[] K#8[: [3 Aw M y[(K
3	s #w X	v#wA v 2500VJ 2u vWA v 1000VJ
4	n`w O %&w ' 2	bF v n`w v O 60s #w
5	} %w A A; { [u	} %w A A; { [u

6.2 tand

6-2 tand

	O P	5 !
1	O{ Kv vY[u	s Kv H{ vY[u 4 [u
2	" | #AB O AB[:	AB[: rH vY j k AB 8[: AB
3	n`w O %&w ' 2	bF Kv w O %&w ! AB X
4	} %w n Kv u A A; { [u	} %w n Kv u A A; { [u

7

7.1

7.1.1

vWA

1 e O{ v @ v st v O{ | > O{ | Ho
AB 2 v A; n; wA @

2 8[| no 4 %wA: b v #9 q[^ AB # : |
D8: K: \ ` @wA: [u: #8[@ v #9 [:
3 6 \9 XH HO y e H v_ d X- _ Hv
r w y | e

4 A d 彻O{ %) { KL v " WXB Hv rd
{ ' u A A; [u

7.1.2 tand! P wA

1 H . X : #M ! A 8[# (6@ m vY{ | > H
O . X : #M ! A 8[# (6@ m

2 e AB[: H XwA: _ A [uM Um< / RWA' 2
e[X : x(s Ozs 6 N e @V# Um

3 He [: e #AB X e[e[10kV AB X
4

1 > &

y	u7		>	+
> * !				
	AB	CD)	
1	A c	q	! _	
2	XAB< X	" K	!	
3	> D	2	!	
4	XAB< % 3	q	!	
5	ABnoa > p	q	!	
6	AB u H	gK	!	
7	AB a[u [u b	gK	! _	
8		" K	!	0

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



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1	%	93
2		93
3	\	93
4	>	93
5		94
6		95
7	! B	96

1

7

_V < XY

2

2-1

1	GB 50150	2006	=?	>?	=	Z [A E	
2	DL 408	1991	>	\$	<		

3

开始



+ > 2-34 "

4.4 > &5 + 6 OP u7 <y489 10: ; < 10:

= > & (ZQ M ? @

4-1 " > &

	A B	CD)	
1	AB a[u [u b	KL	-	AB | \ ` @[ u: 8[4 [u bf
2	ABnoa > p	WXc		ABno \$ > p r s > >t D
3	[AB uyq	WXY		6 D = & 2- 4Q>]
4	AB u H	KL		AB | vYw u X wsAB m
5	AB E?y> D	KL		E?y 6O(P ME?
6	XAB< % 3	WXc		ABn` y | H p 3 | 4 n` | 4 X ( |
7	> D	WXc		a T [: y e > }
8	XAB< X	KL		\$ \ 5
9		KL		e•V y > } Ne
10	A c	WXc	-	AB | ! y2 A) * { { # [u: 4 [u

5

5.1

5-1

		+	D
v wA	2	1	1

5-1 9

		+	D
< o[wA	2	1	1
\ v wA	2	1	1
Z \ q XAB	3	1	1
N \$ J			

5.2

5-2

		\$ /			
1	v wAv			1	
2	<XY \ v wAv			1	
3	<XY< wAv			1	
4	AB<XY			1	
N	Y ! vYv	\$ J			

6

6.1

6.1.1 CD wA 6-1 • V[: v 2500VJ w CD2 o ! u#
 v 1min ~ v r H %&AB' 2! ABY #' ?(?AB' V 2
 A) *{ (wA: *:

6-1

w A V	[: s t		[: •
	L v	E v	
CD-u	CD	u	(nCD u 8[(n y [u 8[q(n 4
-u		u	(n u 8[CD #4 o [u
CD-	CD		

6.1.2 ~ wA 6-2 • V[: A~ " A[_ A~ " A[[u CD
 o [u v L [A~ E [u v 2500Vw A~ 2
 _ A~ u# v -w<XY X P m %&\$ y 15s 60s 10min
 v G ! AB #' ?(?AB' V 2 A) *{ (wA: *:

6-2

wA V	[: s t	
	AB# ~	_AB# ~
_Bu	X~ A[[L	45[u _X~ A[[u [E
_ Bu	_X~ A[[L	45[u X~ A[[u [E
B_u	X _X~ A[[L	45[u E[u

6.2

6.2.1 < wAv# 6 wA: X3 A B C _X3 a b c [_X~ # "
 : (_X q[" 2| *[b wA

6.2.2 *s 3) CD* [# <X : nvY u 9λ wA* [#< o'
 @wA[: *[b + : nvYwAn n` wA @ AB' V %&w #<
 o' @' 2 X# 4J _X##<X b wA

6.3

6.3.1 \ vwAv#8 w : IB UB I- U-[<XY~ H/" : :
 H " : (" Yo' + 37 w: v 37 w" v " Do' {
 ! w" v 9D •A w: v IB UB I- U- <XY \ vwAv
 F" w X#~ 4J _X#~ #" v \ v *[#~ * [b|wA

6.3.2 [fWA: :nvY un 2 A~) O r#w %&AB' 2 ~ '(
 6.4

6.4.1 Z\ XY Xj w ~ #AB<XY sABq) uPQ 50Hz X
 • |W4q[e •

6.4.2 w' k [u X~ _X~ : A[

6.4.3 X#~ qXAB AB<XY XAB: [< X~ _X#~ ! CD o
 A[[u

6.4.4 _X#~ qXAB AB<XY XAB: [<_X~ X#~ [u! CD o
 A[[u

6.4.5 XY45 AB<XY X~ h [u

6.4.6 w %& A~ #A v A 2 A) *{

6.4.7 ABY 3kV/s# X: (H X <AB X 为 qXAB # 801 6 1min
 - X<0 n u]X y R X ; +(/O X \ (r [: c =
 mn (R (/O| -X [λu: D @k(

6.4.8 w %& A~ #A v A 2 A) *{

6.4.9 (: *: %& ' ?(

7

7.1

7.1.1 vwAN ~ 8 8 -w * Je3 20i Je3S' (v
 -w _ h AB # 701

7.1.2 < wA @ * [# X " *s " | +k X) 35kV
 X 3 #<XY X . / 为O11 <XY * [X . / 为
 O0.51 * [# X | <XYvh X 1 # 1/10 O I ; <O11 , |ws
 X # \$- #<XY u nxO O

7.1.3 \ vwA 1600kVA! X) " <XY 4" w #"] 4 s #<XY

7-1

	7	V		
		W	H	S
1	_V<XYAB	|		
N	7 HN} ~ 7 WN•O7 SN 7			

7.3

B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
 # Q/CSG 4-2.1.1y 4-2.1.3 Q/CSG 4-2.2.1y 4-2.2.2 m



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>) Q/ NO



[1ZO ,

j kN 7&5 > * + , 1 + n * 2
 2O t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



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1	%	101
2		101
3	\	101
4	>	102
5		103
6		103
7	! B	104

1

7

SF₆ ; Y

2

2-1

1	GB 50150	2006	= ?	> ?	=	Z [AB
2	DL 408	1991	>	\$	<	= M*

3

c3-1 01 /d!abc

断路器已检查调整

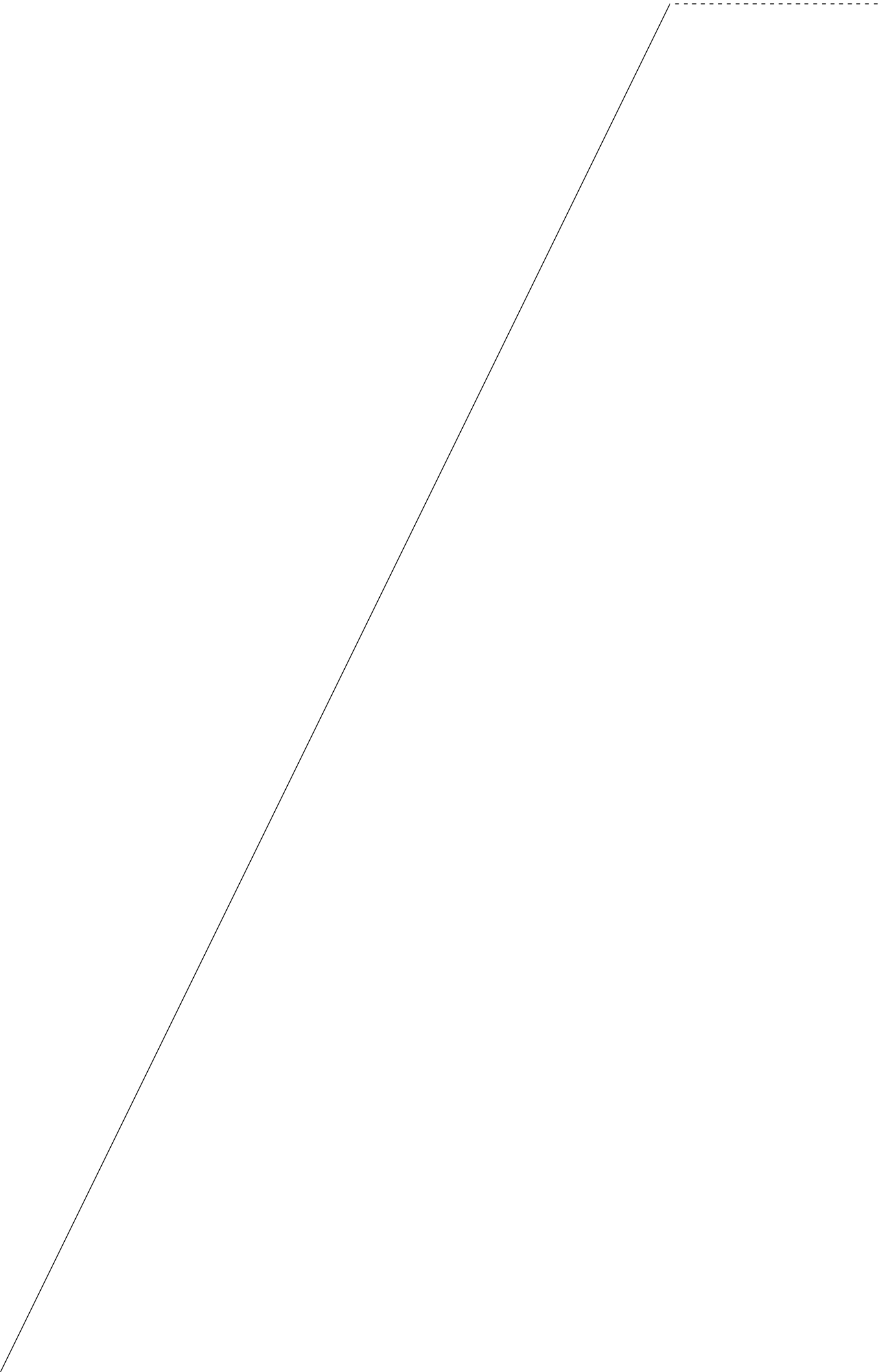
分、合闸线圈绝缘电阻

断路器操动机构试验

断路器绝缘电阻测量

主回路及断口交流耐压试验

是否发现异常



	A B	CD)	
15		KL		e • V y > } Ne
16	FAB 3	X " K		F H " > t D
17	A c	WXc	—	AB |! y2 A) * { { # [u: 4 [u

5

5.1

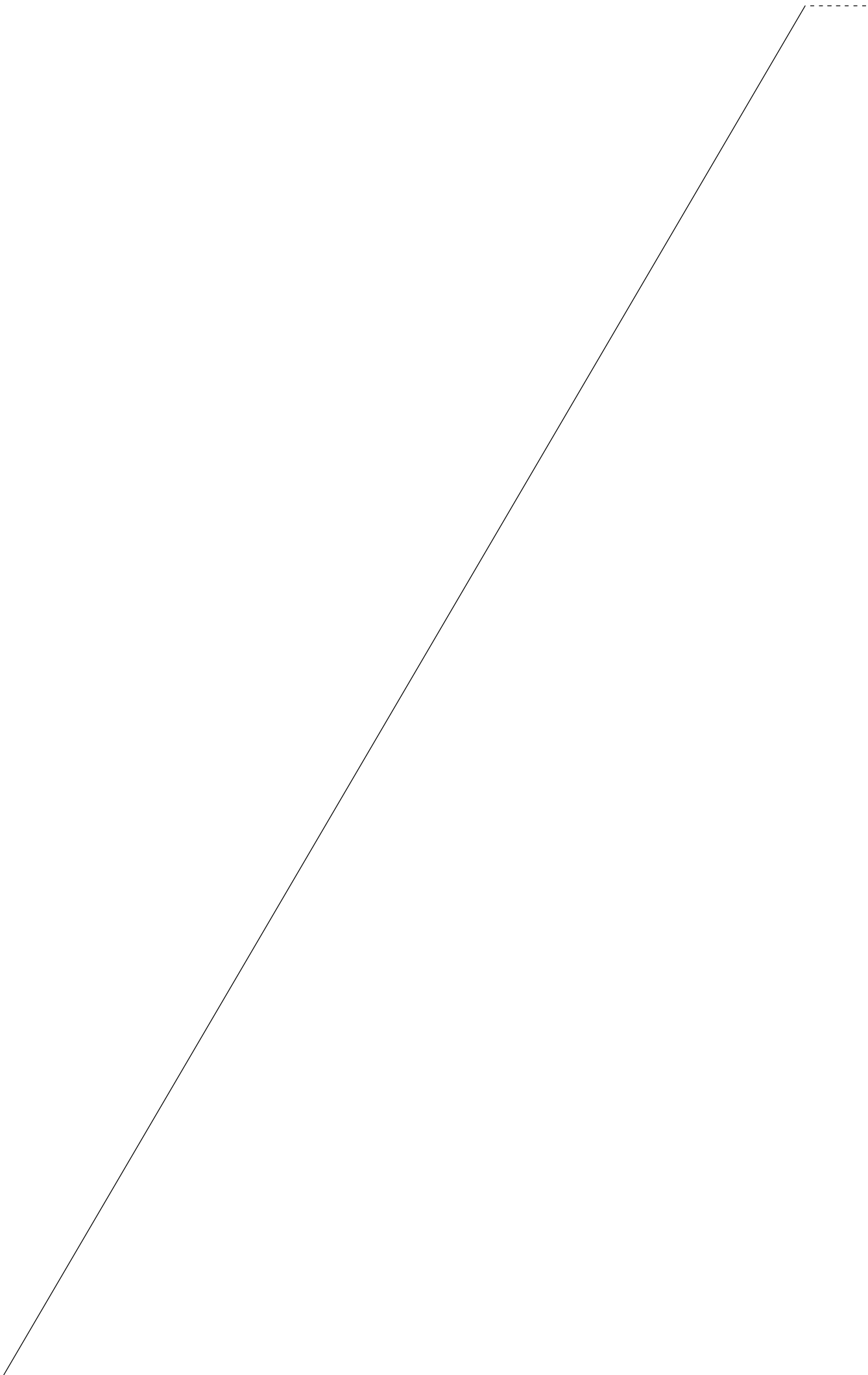
5-1

		+	D
w v	2	1	1
w C" ; # v	2	1	1
; YS3AB	3	1	1
SF ₆ wA	2	1	1
893AB	2	1	1
; Y5Fgi AB	2	1	1
Z \ qXAB	4	1	1
N \$ J			

5.2

5-2

		\$ /		
1	v		c	1
2	\ ; vwAv			1
3	Xn wAv			



1 > &

NBDYCSY-ZW-15-01/01

	y	u7		>	+
> * !					
	AB	CD)		
1	A c	q	! _		
2	XAB< X	" K	!		
3	? ^|	q	!		
4	AB u H	gK	!		
5	ABnoa > p	q	!		
6	AB [: ^	gK	!		
7	ghZFM*	X 2	!		
8	FAB 3	" K X	!		
9	, \$t { SF ₆ =	\	! _		
10	SF ₆= { |	=xy	! 4 [1 #		
11	XAB< % 3	q	!		
12	> D	2	!		
13	AB a[u [u b	gK	! _		
14		" K	!		

15 AB E?y
> D " K ! [u !R
[] D

为



>) Q/ NO

[1ZO ,



L 4 M* = AB

NBDYCSY-ZW-16



1	%	.....	107
2		.....	107
3	\	.....	107
4	>	.....	108
5		.....	109
6		.....	109
7	! B	.....	110

1

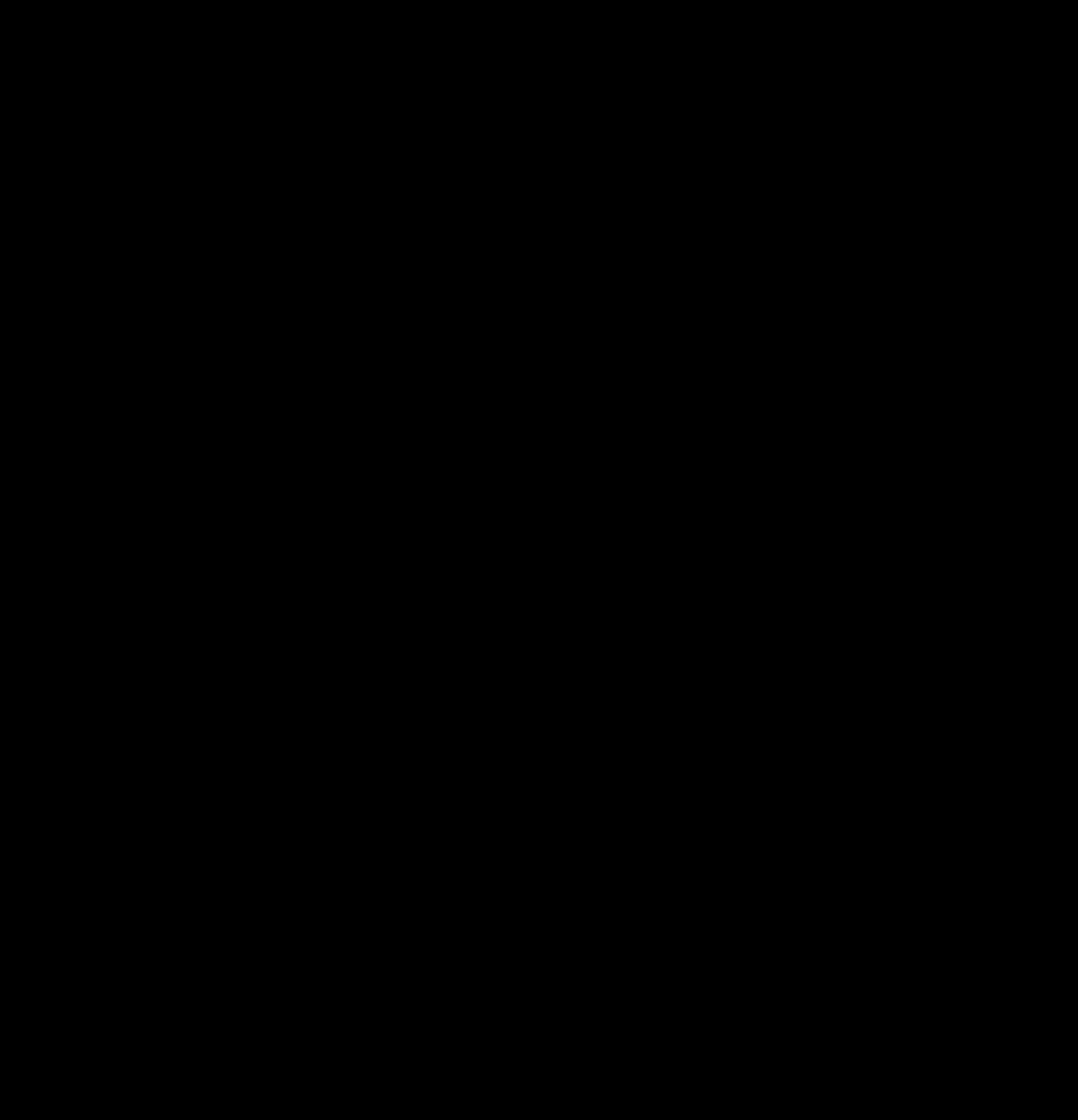
7

PV X] ^Y

2

2-1

1	GB 50150 2006	=?	>?	=
---	---------------	----	----	---



< wA	2	1	1
KwA	3	1	1
t?~ qX	3	1	1
N	\$ J		

5.2

5-2

		\$ /			
1	V v		c	1	
2	1V		c	1	
3	" XY			1	
4	Z\B>		c	1	
5	< wAv			1	
6	ABTV			1	
7	KwAv			1	
N	Y ! vYv	\$ J			

6

6.1

6.1.1 X] ^Yd >? ' o no 4 @+(I We

6.1.2 t?[: [u X :a8[dfn + f[u %^|q

6.1.3 6@AB AB V#Z \4d t _

6.1.4 #w v ! Bs \$ _O

6.2

6.2.1 w X] ^Y t?~ # vN 2500V v w v 2500V
v w t?~ > ! 2u# v

6.2.2 X] ^Y X d # 3 @N AB: H I X] ^Y <XY#
?~ 8[1 J { 3 \J(# K* [w#t?~ (H
I# B :I[3 ?~ # LI y L 1 # 1M5N e OF *3
0 : PnH I# B AB: y L 1 # 1M5N + OF *3 0

6.2.3 X] ^Y~ \ vw N aw vY m [: 5 * w)~
t?~ # \ v %&AB '()

6.2.4 X] ^Y#< @N ABvY j k [: 5 wAvw X] ^Y
X < 3)

6.2.5 *X P K ! P w X] ^Y j k w C₁ C₂
C_k bF KwAv 10kVAB X O P V e #[K P wA

6.2.6] ^Yt?~ Z\qXAB ABTV X ;]t? ; 2uZ\qXA
B AB X 2500VAB y 1min +{ o为H<

7

7.1

7.1.1 $w \ 4] \ ^Y \sim \# \ v \ | \ ws \ p\$ \ N] \ ^Y \# \ v \ w \ ? \sim \ 2t?$
 $\sim \ ! \ 45 \ 4t? \sim \ ! \ 245\# \ v \ v \ \$ _ \ 1000M\Omega \ vw \ |$
 $2500V \ v$

7.1.2 $@] \ ^Y \# \ " \ [: \ " \] \ ^Y \ : \ # \ 3 \ ws \ 3 \ m \ | \ *s(\#$
 $\% \ 45(\#w \ " \ w$

7.1.3 $X] \ ^Y \sim \# \ \ \ vw \ ? \sim \ \ \ vw \) \ 3 \ ' \ (\ #$
 $" \ \$ \ 101 \ t? \sim \ \ \ vw \) \ 3 \ ' \ (\ # \ " \ \$ \ 151$

7.1.4 $@ \ X] \ ^Y < \ | \ " \ *s \ 3" \ w$

7.1.5 $P^*XY \ P \ K \ e \ tand \ #w \ ' \ 2N \ P \ <G \ ; \ <-5$
 $1 \ 101y \ Q \ H \ tand \ | \ 0.51 \ # \ /4yw \ w \ PY \ 10kV < \ X\% \ O$
 $P \ # <G \ 11yw \ 为 \ s$

7.1.6 $P^*XY! \ <XY \sim \ PqXAB \ | \ ws \ p\$ \ U \ AB \ , \ _ \ Sx$
 $m \ N \ 2 \ t \ k' \ i \ /4 \ t \ k \ @RS \ <XY \# \ @tQ: \ w \ hY \ ^ \ hw \ v$
 $Y \ Y \ # \ 3q \ @$

7.2

7-1

	7	V		
		W	H	S
1	PV X] ^YAB	|		
N	7 HN} ~ 7 WN•O7 SN 7			

7.3

$B \ 10kVy \ 500kV \ 9 < \ ! \ J \ B \ \$ \ L \ 4 \ KN < \ =AB$
 $\# \ Q/CSG \ 4-9.1.1y \ 4-9.1.2 \ Q/CSG \ 4-9.2.1y \ 4-9.2.2 \ m$

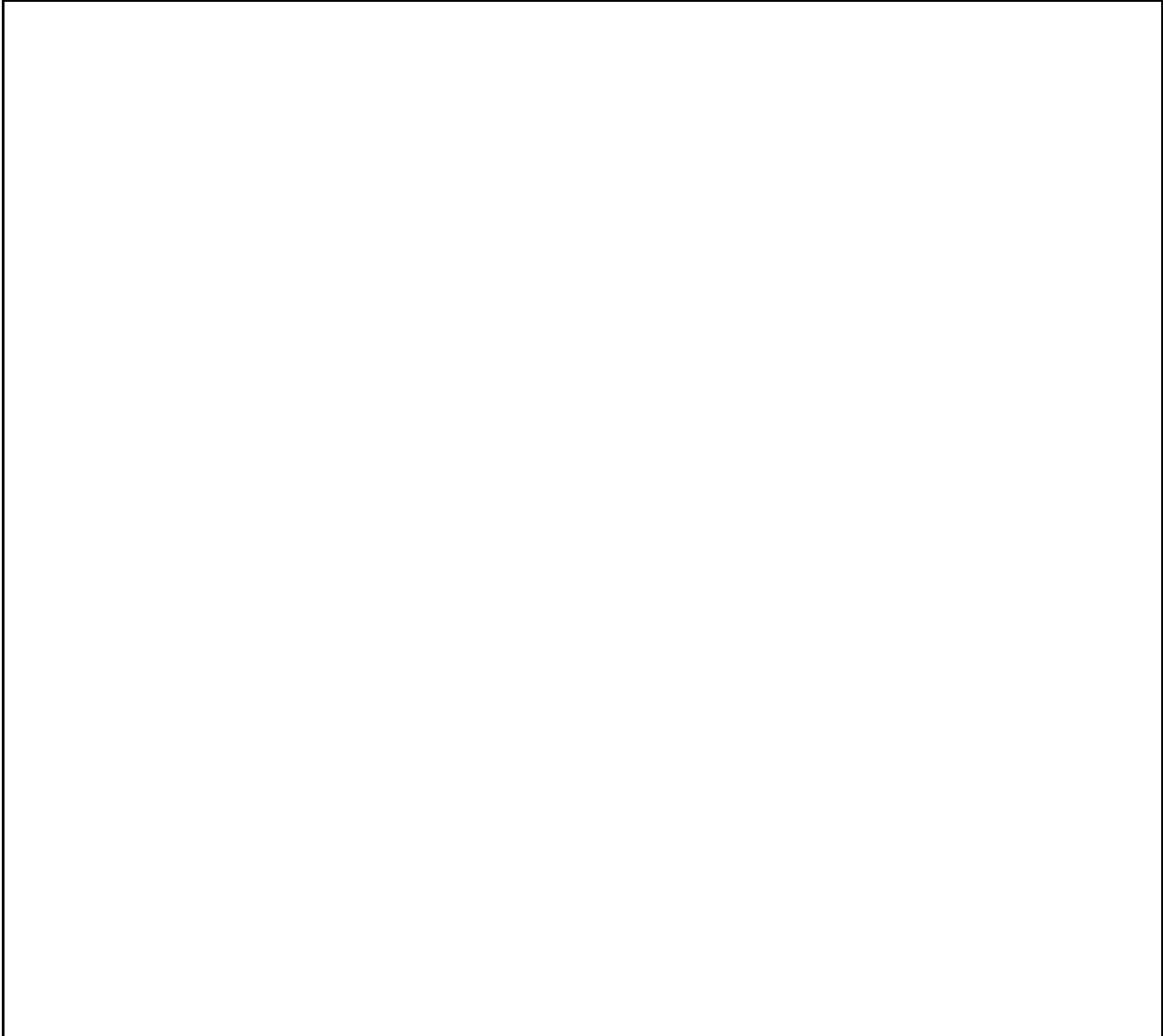


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>) Q/ NO



[1ZO ,

j kN 7&5 > * + , 1 + n * 2 2
 O t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <7y
 | p%&<7/O 2 ZO , \ | # %)> Q
 NO 8 \) &) dy Q M| " = \$% 9 &
) n : ; < , = >, # ! }&•



NBDYCSY-ZW-17

1	%	113
2		.....	113
3	\	.....	113
4	>	.....	114
5		.....	115
6		.....	115
7	! B	.....	116



4

4.1 t V X] ^YZ[AB Q M ! Q

@t S3wA	2	1	1
KwA	3	1	1
t?~ qX	3	1	1
N	\$ J		

5.2

5-2

		\$ /			
1	v		c	1	
2	1V		c	1	
3	" XY			1	
4	Z\B>		c	1	
5	< wAv			1	
6	AB TV			1	
7	KwAv			1	
N	Y ! vYv	\$ J			

6

6.1

6.1.1

6.1.2

6.1.3

6.1.4

10.56^ (#\$KL) fj/Y~. 88 AB O TD (#W) tj/F552 10.56 TfRTD (v) T
 6@AB AB V#Z \4d t
 #w v ! 4

AB X K P wA
6.2.7] ^Yt?~ Z\qXAB ABTV X ;]t? ; 2uZ\qXA
B AB X 2500VABy lmin +{ o为H<

7

7.1

7.1.1 w 4] ^Y~ # v |ws p\$ N] ^Y# v w ?~ 2t?
~ ! 45 4t?~ ! 245# v v \$ _ 1000MΩ vw |
2500V v

7.1.2 @] ^Y# "[: "] ^Y : # 3 ws 3 m | *s(#
% 45(#w " w

7.1.3 X] ^Y~ # \ vw ?~ \ vw) 3 '(#
" \$ 101 t?~ \ vw) 3 '(# " \$ 151

7.1.4 < @ w #< | *s(# "w 2m #] ^Y 4c @ * [#<

7.1.5 tV X] ^Y#@tQ: w |ws p mN

- 1 @tQ: w #v 为 ! w ' 2 ABG VABG
λ 301 y |*2 #v CDM5e
- 2 U/O @tQ: w 7为 X# 201 501 801 1001 1201 2 37
[[u# X] ^Y N [u X) 35kV! X)# X] ^Y3 w
7为1901 X) 66kV! (# X] ^Y3 w 7为1501
- 3 2 Xw 7 1001 @t \ \$ ABG VABG #w
301 ? \$ X] ^YS7#@t \ \$" 301

7.2

7-1

	7	V		
		W	H	S
1	tV X] ^YAB	|		
NHN 7 HN} ~ 7 WN• O7 SN 7				

7.3

B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
Q/CSG 4-10.1.1y 4-10.1.3 Q/CSG 4-10.2.1y 4-10.2.3 m

1 > &

NBDYCSY-ZW-17-01/01

y	u7		>	+
> * !				
	AB	CD)	
1	A c	q	! _	=7 | " > \$ ! > N
2	AB a[u [u b*	gK	! _	! AB | \ ` @[u: 8[4 [ubf ! [AB | vYw u X wsAB m
3	ABnoa > p	q	!	! AB hijk l m[: 5 + *@[: e 3
4	> D	2	!	! ABno \$ > p rs > >t D
5	AB u H	gK	!	! ABn`y | H > p S 5 | 4 | 4 n` 4 X ( | 3
6		" K	!	! \$ \ 5
7	XAB< X	" K	!	! a T [: y e > }
8	XAB< % 3	q	!	! e•V Yy > } Ne ! >[u:
9	AB a[u [u b	gK	! _	! AB ||!y2 A) *{ { #[u: 4 [u
10	[AB uy q	WXY	!	! AB e # > D ! M N 6O(P QE @E < RS \$%
				! j k 5 e Y
				! = & 2- 4Q>] 6 D
				! AB ' \ ` @ \ ([: d) * +y[u : d(, +- . /e
N AB p } * %# j kSABS & q) < T				

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



NBDYCSY-ZW-18

1	%	.....	121
2		.....	121
3	\	.....	121
4	>	.....	121
5		.....	122
6		.....	123
7	! B	.....	125

1

7

u [u v w

2

2-1



4-1 " > &

	A B	CD)	
1	AB a[u [u b	KL	-	AB | \ ` @[ u: 8[4 [u bf
2	ABnoa > p	WXc		ABno \$ > p r s > >t D
3	XAB< % 3	WXc		ABn` y | H > p S 5 | 4 4 3 | 4 n` 4 X ( |
4	O: >	WXc	-	1. AB O: < | Hf T f Hr 2. AB: <; • R 3. 5: Cl 50m S 4. \ X S Hr s 5. < OO: O FwA:
5	? ^ |	WXc		D >[u:

5

5.1

5-1

		+	D
[u = 3wA	4	1	1
[u vw	3	1	1
N \$ J			

5.2

5-2

		\$ /		
1	l m<XY		1	
2	Z \ \		1	
3	Ov X		1	

5-2 9

		\$ /		
4	\] ^Y		1	
5	a = n		D	1
6	X wA:		-	
7	\ wA:		-	

8	X :			-	
9	\ :			-	
10	u H vWA v			1	
11	6V GPS		c	2	
N Y ! vYv \$ J					

6

6.1

6.1.1

1 # N[u d 3 m
2 : =# NY:

6.1.2

D X)# n CD I j [u : 为 +7 u H vWA vWA \ vN
1 7 l = [uM* +7>
2 " N l j [u : >
3 j p: [u : >
4 X)# n <XY[u : 为 +7 wA <XY +7
X) p: [u : +7# \ v

6.1.3

1 w X)C l = [u : +7# \ v
2 w X)" N l j [u : > # \ v
3 w X p: j # [u : # \ v
4 w <XY为 +7 <XY +7 X) p: +7 [u : # \ v

6.2

6.2.1

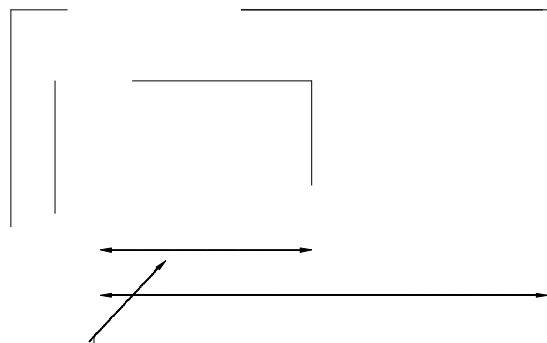
[u? # [uvh @ #m? (8 " S [u? #sO\$% B wA | W
_+ w @ a ' y | g

6.2.2

1 (P \ wA [u? # PS3 AB \ \$为 3y20A PQ\$为
40y60Hz (P W [P , vY wswA m
2 2 P \ wA [u? # PS3 6 | [u l m<XY
W4q] AB \ AB \ \$ 50A wAvYwsAB m S
HAB#>

6.2.3

1 wA [u? PS3 # \ | O W ~ • 6-1 H \ A [u?
#Um d_{CG} | 为 A [u? 3 2 : x (D # 4y5G 2; # [u? #w
A 4. a : ; \ : wA : \ ~Um { : y @ vQ! Ou
n# d_{CG}4 2D @ Q ! Oun4 3D



7

7.1

7.1.1 为 3 #w \ U m \ #[u v 10Ω V4 . y #[u?
\
| fg: < #[u? #8[n

7.1.2 w

7.1.3 为 L _ # R w : |W 4q~mZ #9 : ; >

7.1.4 w #O fn \ u

7.1.5 [uvhw ' 2ws 3 m

7.1.6 [u = 3wA |ws GB 50150 2006 26.0.2 Q \ v | 0.2Ω

7.2

7-1

	7	V		
		W	H	S
1	[u vw			|
N	7 HN} ~ 7 WN•O7 SN 7			

7.3

B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
Q/CSG 4-20.1.1 Q/CSG 4-20.2.1 m

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



1	%	.....	3
2		.....	3
3	\	.....	3
4	>	.....	4
5		.....	5
6		.....	5
7	! B	.....	7

1q! y 1u

Z # 1

AB \$%

110y

B 7

\qXZ[AB#

110y 500

4

4.1 GISqXAB Q M ! Q " # > &
n 123> \$% • ! " # *
4.2 GIS qXAB " o# > & N
TSSY-ZW-01-01/01 ' s - . / O (G*) >
& > * + ,
4.3 + * 2 - . / (2 > ZO [1ZO#
+ > 2- 34 "
4.4 > &5 + 6 OP u7 <y489 10: ; < 10:
= > & (ZQ M ? @
4-1 " > &

	A B	CD)	
1	AB E?yFG H	" K	-	QE @F} u \FGno
2	AB E?yD > D	X	-	| e > QE< E`#e OFy ~ H 1
3	AB E?y } > Um V	M*}	-	| hi } 6@ V#> Um ET| 56O 5 E?< M D
4	λ} I	q	-	AB + | . Z~I W u7 OP > N } M > H Q
5	> D	2	-	| k > # ; : no ' - o e(> } @ M5 f HW| ~ 2 | Q D y a T
6	λAB Xno	q	-	AB + % > p `# > p\$ D %+ λ
7	AB uP	M*}	-	< f l W+y u X uP /O qc un #P AB uP 6@ m
8	TAt?n;	" K	-	AB 2TAt?# @ OTA t? A; [u
9	TVt?A;	" K	-	AB 2TVt?# @ TVt? n; , 7[u X [u
10	n ABst ^	" K	-	AB ' s l 3 2n st \ \+ 4n`AB
11	c	q	-	-X |!y u: ~)*{ 4 5
12	- .	KL	-	AB ' V | \ ` @ \ +- . /e

5

5.1

5-1

		+	D
AB #	5y6	1	1
Z\qXwA	5y6	1	1
e'	5y6	1	1
N	\$ J		

5.2

5-2

		\$ /			
1	ET	16T/25T/50T		1	
2	a T			1	
3	PYZqXAB?		8	1	RS P I AB<XY hY P*XY !X
4	XY			1	y
5	l m<XY			1	
6	v	2500V	c	1	
7	w TA		c	1	
8	Z\ \		c	1	
9	Z\ X		c	1	
10	• \		c	2	
11	: j		j	1	RS+ : >: [u : } > p
12	u:		D	1	RS u a=n K \F DY u : z|6@AB m
13	y			3	y|qq1" | AB X
14	{ y			1	
15	j		D	1	O? ug p 4C
16				1	
N	Y !vYv |!	Bs	\$_O		

6

6.1

6.1.1 GIS | >? f) s # SF₆= = 8(| 6

6.1.2 , qXAB4 GIS | d 4Q ABQ

6.1.3 ABy GIS] X% O# \] ^Y#t?~ | A; [u tV X] ^Y#t? ~ | n; 7[u

6.1.4 GISqXy | l m fz] AB XN

1 X a:

2 W<XY o hY

3 tV X] ^Y *练AB阶 . / } (tV X] ^Y <P uy tV X] ^Y \ / Qt 饱 # V4 ; QqX l | OABPQ m

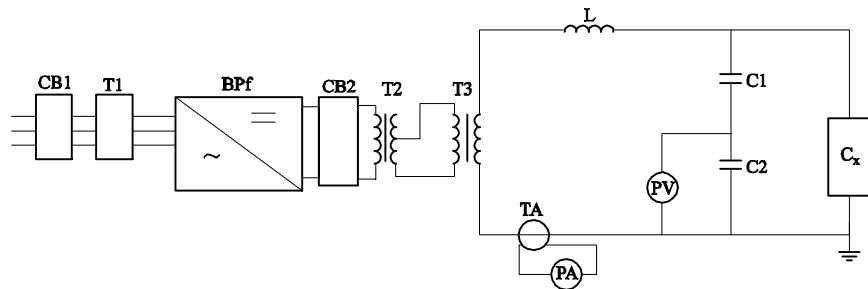
4 fgY *练AB阶 . / } (fgY l qXy fgYA; [u

6.1.5 GIS 扩 M* qXy " N | } [u 56 | +, : 2 M* " #K B

6.1.6 GIS] X% O# ; Y l mn s([un * n _ABM* /" | 4 [u

6.2

6.2.1 \$ AB O AB[: PXoYZ rH • 6-1



CB1 CB2 u n T1 l m<XY T2 XY T3 @t<XY Bpf P ul L X hY Cx AGIS C1 C2 P*XY TA \] ^Y PV X PA \

6-1

6.2.2] X V Uc ; qX \$ #AB X|] 3C" ; 45> C? " Sy " # ; | [u45" 8] ^ GIS# ; Y l mn # # Z9 >?< 1 3KL f | ! #qXAB 6AB X| [3" | # (## # AB u" 8 | # " [u#45" 8

6.2.3 AB /M N! *练ABN*练AB X] Xy | DL/T 618 1997 = bc9Dn qX! AB 6 # c " 协商 2 500kV GIS *练AB 3 Z " X 318kV] 15min " Z\qXN Z\qX | 为 AB X # 801 2 500kV GIS AB X# 544kV 592kV / CqX qXy lmin

6.2.4 qXAB >?f A \ AB stbf / 委托 2AB @ \ AB + : [3] X8 A" /" 4 [u

6.2.5 v 2500V w v f%& + (4 qXAB AB ; <YZst S< X9 X 100kV AB XF <*练AB X 6 15min AB X <qXAB X 6 lmin P: - X<R nAB u X [u:

6.2.6 AB< 2 mn (/O | 暂} AB AB | @AB M5KL KL X c GISOM{ | { /O X ~B b fy u) * AB { y刻 AB 共 协商= AB#] X

6.2.7 qX 2 GIS) * { 1w v %& ?AB /"

6.2.8 AB' V (, [: E?qXAB GIS# t?[:) * <AB st

7

7.1

7.1.1 AB X] < /" <XY#KB 7AB # Xw ? | <J J G
W +

7.1.2 ABy| 8 H R O XY• R 3RQ X

7.1.3 ABy|] 62 u !AB ;# @ R (y } %AB

7.1.4 AB +(6C9 X<AB X x3qXy 迅: - X<R u [u:

7.2

- 7-1

7-1

	7	V		
		W	H	S
1	GIS Z \ qXAB			
N	7 HN} ~ 7 WN• O7 SN 7			

7.3

B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
Q/CSG 4-13.1.7 Q/CSG 4-13.2.5 m



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>) Q/ NO							
[1ZO ,							

j k N 7&5 > * + , 1 + n * 2
 2O t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



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1 %

%

1

7 110y 500kV X) =? >? = SF₆ = Z [AB

2

BB

2-1



1

GBJ 148 1990 =? >? W 488 (W) Tj30 Tc 97512 Tf12 O TTj

确定试验间隔

设置安全措施，放置仪器设备，选定试验连接片

4.4 > &5 + 6 OP u7 <y489 10: ; < 10:
= > & (ZQ M ? @
4-1 " > &

	A B	CD)	
1	V } #> Um	q	-	u7 + | . Z~IW > OP > N } M H Q
2	> D	2	-	# ;: |k > } no ' - o e(> @ M5 f HW| ~ 2 |Q D
3	2{ O SF ₆ y H b	\	-	λ{ O# SF ₆ AB nb gH M 15min AB w< H `e 6bf
4	ql	M* }	-	wA F gi j O#n # q7n # y H % ql y 红O J l m V4 D

5 = : { | \ - AB | @ } F#893 @A
B8 [M5no %|= AB
• (. 8BOOT DDD(9) 1 20/FB+(7B) T

2	rs	—	
3	> }	—	
4	携V u:	—	} \ F DY
5	' ? (3	1c	
6		18	ug
7	AB8[ [	1D	
8	? (v 37v	1	W凝V37v#w 37% ' (20i y | 6 @0y-60i w | ; <O0.6i vPV? (3w 37% | 6@0y-60i w | ; <O2i
9	AB F	—	+8 锈 聚8氟乙烯 壁厚 M 1mm O 为 2y 4mm O壁光9I J % 橡 聚氯 乙烯
10	XW \		XWw 0y 1.0MPa \ # } =
11	3 | v	1	4 [(M 10μL/L
12	t =	5m	普H橡
13	AB%&		%&7 PDA
14	37? ()		DL/T 506 & B
15	? (' ()		DL/T 506 & C
N Y ! vYv		\$ J	

6

6.1

6-1

1	@	+ Z } 领 λ @ > M56@ m > / 4 9	> M 56@ m	1 f (AB5 2 LN I # Z / O > Um
---	---	---------------------------------------	--------------	--

6-1 9

	OP	5 !	7
2	> ZO	p队 + 20 & (# OP > Z~ > ! H Q	1 " Z ~ M 5 y2

6

12 9.12 T4 Tf 125.76 .24 Tc (y2)] 12 5 6 9 0 2 5 1 0 5 2 (0 9 1 1 2 5 1 5 0 2 4 9

4	[AB u	ws > m# u: u: ABu7P< X uj [u	1 % [- X u 2 @ u X M5<	1 @ uM5为[X u % ZZ 2 [AB u w u XM5wsAB m 3 %[入 \ u
---	--------	-------------------------------------	---------------------------------	---

6.2

6.2.1

6-2

	OP	5 !	7	
1	AB[8[	@ [ 2 [灰尘凝 l 灰尘凝'e 'et 2 灰尘凝'e ? t e uq wA 56{弃! ?AB	%[匹J d| =	1 e [m89bf 锈 黄 " % C [y 500W (# 吹 2 y 500W (# 吹 -[M
2	8[AB F	s #AB8[F 8 [3 (# = [ (	ws \$% m# F	1 AB F4 +8 锈 聚8氟乙烯 壁厚 M 1mm O 为2y4mm O 壁光9I J % 橡 聚 氯乙烯 C 2 F8[衬 | 紫 垫 聚8氟乙烯垫 3 [入5m #vYt =
3	bFvY	8[vY =#8[:nvY u vY 入 w st	vY @e	1 uwsvY m 2 W镜37v | @W镜M5 _G
4	?(w	1 :n (#} = 2 %&XW 3(#XW 3 nonb=; } = yz w= \ wsw m 4 %&w O 5 %&w ' Vy#XW	O? (w #	1 [F | = / O |e%AB !y • { | M 2 vY# ^YM = XW w 3 w 趋 H 4%& 4 w 8 H #XW< G XW - P!|y D (#} = e%w @kXW - # M5C9w

6-2 9

	OP	5 !	7	
5	AB '	1 D (# } = 2 f, 8[(# [3) * # ##89 4 3 @ { |	+{ |	1 D (#} =y % W<猛 d} =KL " = { | 2 f, 8[(# [y y # = 4{ |!y D (#} = y) * [O= O= 1{ | @k 1(卸 8[M 3 3 |v @ | +{ | 4 { | | f%& H .

6	.	1 37 ? (#) 2 ' (? (#Xe	\$%# m)	1 DL/T506 & B =X W# 37? () 37) 3? (2 DL/T506 & C? (' () w Xe3 20i y#
---	---	-----------------------------	-------------	---

6.2.2

6-3

	OP	5 !	7	
1	RG	薄膜RG w# [] = M	RG 8	1 RG | NI _G 2 RG# \$ 4* RG 3 薄膜 O+" i P /m?
2	bFvY	8[u : nvYn	vY we	1 uwsvY m 2 @vY[u: bf 3 wAvY2 SF ₆ = R|
3	|	CDRGM { | 30E 10 ⁻⁶	vYw	1 2 { | ; < 30E 10 ⁻⁶ #M 3 | # w{ | 7 2 2 { | M 30E 10 ⁻⁶ #M | @={ #XWM5e e # | 3 1? w { | 7
4	3) | =Q	$F = \frac{CV1P}{\Delta t} \text{ MPa} \cdot \text{m}^3/\text{s}$ $F_y = \frac{F \times 31.5 \times 10^6}{V(P_r + 0.1)} \times 100 \quad 1$ F为| = F _y 为| | =Q	{ | Q<11	C RG # SF ₆ = 浓(10 ⁻⁶ Δt RGy s P =XW 0.1MPa P _r) =XW MPa V1 RG m ³ , RG # V O# = m ³
5	AB' V	D | v u	@vYR| e	1 DvY @vY2 SF ₆ = R| e 2 (, vYu: | N D u 3 | , RG薄膜

6.2.3

6-4

	OP	5 !	7	
1	ABvYI	1 DvY 2 u 3 vY{ .	+ - |	\` @ 5- | vY! vY
2	e'	1 + N @ +- | 撤 令 2 + > e' 9	撤m	q [.
			%& <Z	\` XAB% & (y " 映 I W

7

7.1

7-1

	(o	
1	w H	1 @37vM5e y @ F [M5I J 2 F [xyy|I J F AB[y e l_[F 3 \= } #/ y w / H | +, vPV37v 4 wA SF ₆] ^Y SF ₆ <XYy vP37v 5 薄膜} e SF ₆ # = V/" w F
2	w 往	1 @vYM5e FM5{ | = w 2 @w '(M5" '(" y w ' 2/ 3 = # ge/ Rw #e 3 y|w # ge
3	w O k	1 @vYM5e y = w 2 @w '(M5" '(" y w ' 2V/ 3 SF ₆ ge/ Rw #e 3 AB_ 暂} SF ₆ ge
4	= { |	= 撑7 % 4W Q8[F 脱" SF ₆ = { |
5	= XW @	@= XW ^ 马(H "

7.2

- 7-2

7-2

	7	V		
		W	H	S
1	SF ₆ = Z [AB			|
	N 7 HN} ~ 7 WN•O7 SN 7			

7.3

B 10kVy 500kV 9 < ! J B \$ L 4 KN < = AB
 # Q/CSG 4-7.1.1 Q/CSG 4-7.2.3 Q/CSG 4-12.1.1 Q/CSG 4-12.2.4 Q/CSG 4-13.1.7
 Q/CSG 4-13.2.4 m

1 > &

NTSSY-ZW-02-01/01

y	u7		>	+
> * !				
	AB	CD)	
1	} # > Um V	q	! -	=7 | " > \$ ! > N
2	> D	2	! -	! | e > \$ D D
3	2{ OSF ₆ yH b	\	! -	! OP + | . Z>IW u7 Q > N } M > H
4	qI	M* }	! -	! | k > # ; : > } > } no ' - o e(@ M5 f | ~ HW 2 | Q D
5	= : { |	\	! -	! 2 { O# SF ₆ AB nb gH M 15min AB w< H `e 6bf
6	{ X? n		! -	! wA F gi j O#n # q 7n # y | H % qI 红O J JI y4 D
7	= XW @	3q -	! -	! AB | @ } F#893 @AB8 [M5no %|= AB • (# vY= 9 #[x A= M y \N
8	} =) *y a	} Z	! -	! { X? 逗. ! AB< AB = XW - |!yH . j k/O ~ = >t} yu wA
				! 2 F} =#D # wA' V N D #=} 1m?=* D nb } \+ = uq } 2 EF顶 X} =#D # wA' V D F } 1 [驳#(

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



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1	%	21
2		21
3	\	21
4	>	22
5		22
6		23
7	! B	24

1

Z[ABMq! y 1u W Z9 >? N# " #` a % W T
 O Wq) > Z # 1 M O W > sh 4M# D= w 为 6
 G ? Z[AB \$%Z[AB
 # ! " # \$% \$
 7 110y 500kV X) >?# " AB ABs # =
 Z[AB 7 >? A # = 7
 2 < XYZ \ q XZ[AB# 5 7 > H Q > OP z
 # \$% 110y 500kV < XY# Z \ q XZ[AB

2

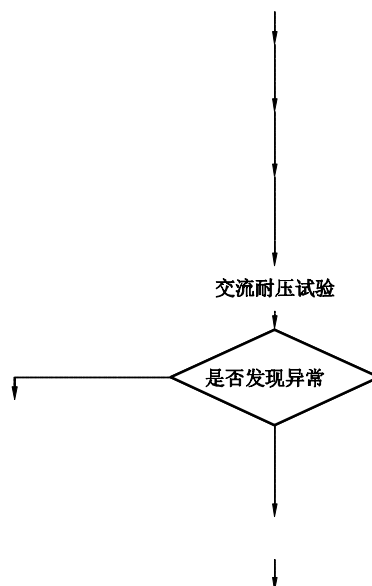
2-1

1	GB 1094.1 1996 W< XY L 1M* Nk 6
2	IEC-60076-1 2000 Power Transformer
3	GB 1094.3 2003 W< XY L 3M* N AB 4 a = ?
4	GB/T 16927.1 1997 XAB L M* UAB m
5	GB 50150 2006 =? >? = Z[AB

! "
 (7 3 7

3

\ • 3-1



4

- 4.1 W<XYZ\qXAB Q M ! Q " #
> & n 123> \$% • ! " # *
- 4.2 W<XYZ\qXAB " o# > & N
TSSY-ZW-03-01/01 ' s - . / O (G*) >
- 4.3 + * 2 - . / (2 > ZO [1ZO#
+ > 2- 34 "
- 4.4 > &5 + 6 OP u7 <y489 10: ; < 10:
= > & (ZQ M ? @
4-1 " > &

	A B	CD)	
1	λ} I	q	-	AB + | . Z~I W u7 OP > N } M > H Q
2	> D	2	-	# ;: |k > } no ' - o e(> @ M5 f HW| ~ 2 | Q D
3	λ XABno	q	-	AB + % > p ` # > p\$ D %+ λ
4	AB uP	M*}	-	u X uP /O qc un #P AB uP 6@ m < f l W+y
5	w vYaJ AB X<	" K	-	# Xw ? | <J J G w +
6	c	q	-	-X |!y u: ~)*{ 45
7	- .	KL	-	AB' V | \ ` @ \ +- . /e

5

5.1

5-1

		+	D
AB #	5y6	1	1
Z\qXwA	5y6	1	1
e'	5y6	1	1

5.2

5-2

		\$ /			
1	ABHr p			-	



2	r s		块
3	> }		8
4			c
5	携V u:		c
6	5 y		
7	(: ! }		8
8	' ? (3		c
9	j		D
10	: R : [u:		

6.2.10 MAB DAB u (, AB[: AB' V

7

7.1

7.1.1 AB X] < /" <XY#KB 7AB # Xw ? | <J J G
W +

7.1.2 AB y | 8 H R O XY • R 3RQ X

7.1.3 AB y |] 62 u ! AB ; # @ R (y } %AB

7.1.4 AB +(6C9 X < AB X x 3qXy 迅: - X < R u [u:

7.2

• 7-1

7-1

	7	V		
		W	H	S
1	<XYZ\qXAB			|
N 7 HN} ~ 7 WN• O7 SN 7				

7.3

7.3.1 2<XY_X~ X~ X~ AB X 7-2#AB qXy Imin AB
< +mn { (

7-2

kV

q) X	3 X	Z\q1 X
110	126	160
220	252	288 316
330	363	368 408
500	550	504 544
N <XYAB XM GB 1094.3 W<XY L 3M*N AB 4 a = ? \$ # AB X乘 0.8 #		

7.3.2 ~ X为 110kV! (#<XY 37| Z\qXAB • 7-3 ABq1
X 为 AB X # 801

7-3

110kV

kV

q) X	3 X	37[u V	Z\q1 X	Z[Z\q1 X
110	126	[[u	95	76
220	252	[[u	85	68
		[[u	200	160
330	363	[[u	85	68
		[[u	230	184
500	550	[[u	85	68
		v h[u	140	112

7.3.3

B 10kVy 500kV 9< ! J B \$ 为 为 为 为

1 > &

NTSSY-ZW-03-01/01

y	u7		>	+
> * !				
	AB	CD)	
1	λ} I	q	! -	=7 I | " > \$ ! > N
2	> D	2	! -	! | e > 8 ! AB + | . Z>IW u7 OP > N } M >
3	λ XAB no	q	! -	H Q ! | k > # ; : > } > } no
4	AB uP	M*}	! -	' - o e(@ M5 f HW| ~ 2 | Q D
5	w vYaJ AB X<	" K	! -	! AB + % D > p ` # > p\$ D %+ λ
6	c	q	! -	! u X uP /O qc un #P AB uP 6@ m < fIW+y
7	- . 3	KL	! -	! # Xw ? <J J G w + ! -X !y u: ~) *{ 45
				! AB' V \ ` @ \ + - . /e

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



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1	%	29
2		29
3	\	29
4	>	30
5		30
6		31
7	! B	32

1

Z[ABMq! y 1u W Z9 >? N# " #` a % W T
O Wq) > Z # 1 M O W > sh 4M# D= w 为 6
G ? Z[AB \$%Z[AB
! " # \$% \$

7

110y 500 Tc (qr) Tj EFD (h) 为 浙 +m 1.35 0.036 (5) TD (hxhxhxhx TD 31Tj/9xhx T)
MA 5.36 O TD - r

4

- 4.1 W<XYxy^| XAB} zM{ w AB Q M ! Q " # > & n 123> \$% . ! " # *
- 4.2 W<XYxy^| XAB} zM{ w AB " o# > & NTSSY-ZW-04-01/01 ' s - . / O (G*) > & > * + ,
- 4.3 + * 2 - . / (2 > ZO [1ZO# + > 2- 34 "
- 4.4 > & 5 + 6 OP u7 <y489 10: ; < 10: = > & (ZQ M ? @ 4-1 " > &

	A B	CD)	
1	} > Um V	M*}	-	| hi O{ y| M D } 6@V#> Um
2	λ} l	q	-	AB + | . Z~l W u7 OP > N } M > H Q
3	^|	q	-	| 4 #u: " # #45 u: 4 8[
4	> D	2	-	| k > # ;: > } > } @ M5 f no ' -o e(HW| ~ 2 | Q D
5	a 2	x	-	• y |e % 2 y f D [: no %
6	λ XABno	q	-	AB + % > p ` # > p\$ D %+ λ
7	AB uP	M*}	-	< f l W+y u X uP /O qc un #P | AB uP 6@ m
8	w vYaJ AB X<	" K	-	# Xw ? | <J J G w +
9	c	q	-	-X |!y u: ~)*{ 45
10	- . 3	KL	-	AB ' V | \ ` @ \ +-. /e

5

5.1

5-1

		+	D
AB #	5y6	1	1
z M{ wA	5y6	1	1
e'	5y6	1	1

5.2

5-2

		\$ /			
1	ABHr p			—	
2	r s		块	—	
3	> }		8	—	
4			c	2	
5	携V u:		c	2	} \F DY
6	5 y			—	
7	(: ! }		8	—	
8	' ?(3		c	1	
9	j		D	1	
10	: R : [u:			—	
11	{ l			—	
12	X	0.5)	D	1	
13	z { v	1.0)		1	
14	X] ^Y	0.2)		1	
15	` %&7		7	—	

6

6.1

6.1.1 A<XY ? ' ` a T | 7%48h (

6.1.2 <XY _X#! 37 ? : 4M8[: (, 8 TA t?# | A; [u

6.1.3 <XY# \$ABQ v G K tand \

v X TAB d AB' 2 | ws # m

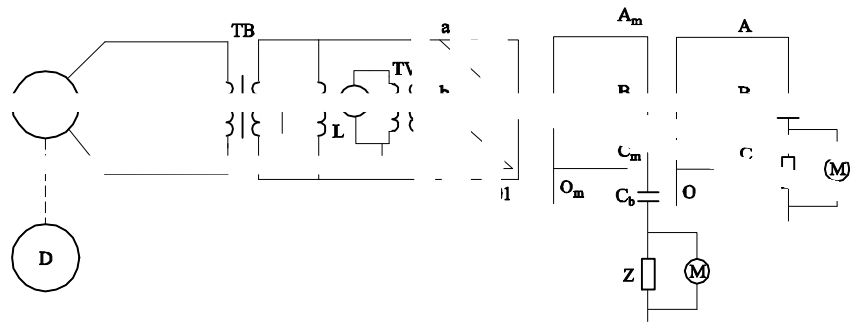
6.1.4 | 380V " u \为250A

6.2

6.2.1 n` AB s #ABvY O{ f [AB u (, <XY _

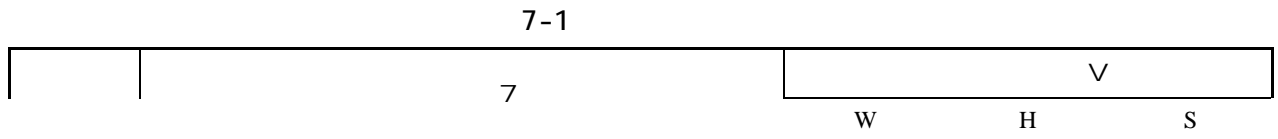
X#! 37 4M#8[: 6@V> Um 8 TA t?#A; [u

6.2.2 \$ AB O AB[: <XY X8 (! X 37[u



7.2

- 7-1



1 > &

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y	u7		>	+
> * !				
	AB	CD)	
1	} Um V >	M* }	! _	=7 " > \$! > N
2	λ} I	q	! _	! e > 8 ! M D hi } O{ y 6@V#> Um
3	^	q	! _	! AB + . Z>I W u7 OP > N } M > H Q
4	> D	2	! _	! k > # ; : > } > } no ' - o e(@ M5 f HW ~ 2 Q
5	a 2	X	! _	D ! • y e % 2 y f D [: no %
6	λAB X no	q	! _	! AB + % D > p ` # > p\$ %+ λ
7	AB uP	M* }	! _	! u X uP /O qc un #P | AB uP 6@ m ! # Xw ? | <J J G w +
8	w vYaJ AB X <	" K	! _	! -X !y u: ~)*{ 45 ! AB ' V \ ` @ \ + - . /e
9	c	q	! _	
10	- . 3	KL	! _	

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



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1	%	37
2		37
3	\	37
4	>	38
5		38
6		39
7	! B	39



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4

4.1 <XY~ <• AB Q M ! Q " #
> & n 123> \$% • ! " # *
4.2 <XY~ <• AB " o# > & N
TSSY-ZW-05-01/01 ' s - . / O (G*) >
& > * + ,
4.3 + * 2 - . / (2 > ZO [1ZO#
+ > 2- 34 "
4.4 > &5 + 6 OP u7 <y489 10: ; < 10:
= > & (ZQ M ? @
4-1 " > &

	A B	CD)	
1	λ} l	q	-	AB + | . Z~l W u7 OP > N } M > H Q
2	^|	q	-	#45 u: 4 8[ | 4 #u: " #
3	> D	2	-	# ;: |k > } no ' - o e(> @ M5 f HW| ~ 2 | Q D
4	a 2	x	-	• y |e % 2 y f D [: no %
5	- .	KL	-	AB ' V | \ ` @ \ +- . /e

5

5.1

5-1

			+	D
	AB #	5y6	1	1
	~ <• wA	5y6	1	1
	e'	5y6	1	1

5.2

5-2

		\$ /			
1	ABHr p			-	
2	r s		块	-	

3	> }		8	-	
4			c	2	
5	携V u:		c	2	} \F DY
6	5 y			-	
7	(: ! }		8	-	
8	' ?(3		c	1	
9	j		D	1	
10	:R : [u:			-	
11	<XY~ <•wAv			ly2	
12	`%&7		7	-	

6

6.1

6.1.1 <XY~ <• w| \ABQ > ~) * { | [: m
[: V F 2<XY#4D~ w

6.1.2 n` AB s #ABvY O{f [AB u

6.1.3 (, <XY _X#! 37 4M#8[: 6@V> Um (, # : W4q
~m w<XY8 2 8 : + (, #<XY 4. 8 为R| w l
| k | # # w' 2

6.2

\$ AB O AB[:
1 <XY~ # PR|S3 * [n # \$ 3 * [w | O
C? wy* [n ! • " #
2 wl 弱 [: ! | H 4 L [q v
3 /DI w # [u: ! | 4 8[<XY45(#k [u C [u 3f
7[u [u: | W4qA | 缠~
4 ~ <•wAq) A '
5 24~ ~ <•wA 2 * w
6 MAB DvY u (, AB[: AB' V

7

7.1

7.1.1 AB 8[: A~ " | #AB O AB[:

7.1.2 wAy<XY4#8 : | M(, W fz4M_ fzAB u13_ fz\$
浮 _

7.1.3 w Ks[u: | W A 3f <XY#C 7[u [u7 bf P \#
\ e

7.1.4 w y | ~m8 U| 1m z R P #w ' 2

7.1.5 2 n | W { 3 * [L w 8 X~ w 2+ X<XY|
* [w

7.1.6 C?wAy \$ CvY [: V| "

7.2

- 7-1

7-1

	7	V		
		W	H	S
1	<XY ~ <• AB			|
N	7 HN} ~ 7 WN• O7 SN 7			

7.3

` ' 2" " > ' 2" +k + ` %&y 4 y_ 2

B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
Q/CSG 4-1.1.8 Q/CSG 4-1.2.4 m

1 > &

NTSSY-ZW-05-01/01

y	u7		>	+
> * !				
	AB	CD)	
1	λ} l	q	! -	=7 | " > \$ ! > N
2	^|	q	! -	! | e > 8 ! AB + | . Z>IW u7 OP > N } M > H Q
3	> D	2	! -	! | 4 #u: " # # 45 u: 4 8[
4	a 2	X	! -	! | k > # ;: > } > } no ' - o e(@ M5 f HW| ~
5	- . 3	KL	! -	2 | Q D ! • y | e % 2 y f D [: no %
				! AB' V \ ` # @ \ + - . /e

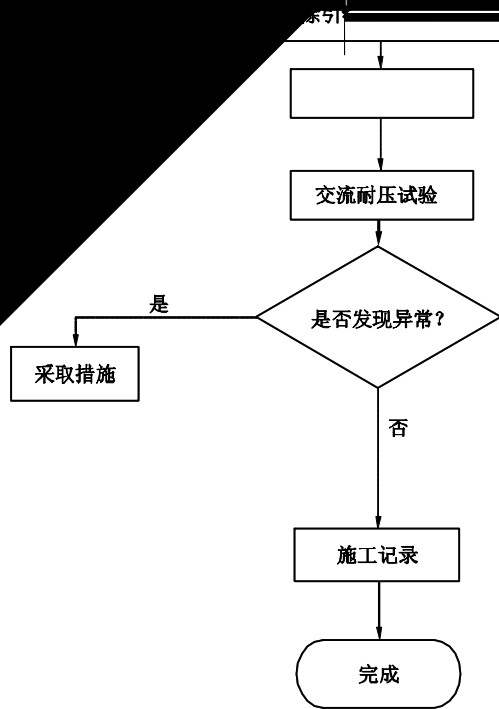
>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



NTSSY-ZW-06

1	%	.....	43
2		.....	43
3	\	.....	43
4	>	.....	44
5		.....	44
6		.....	45
7	! B	.....	45



4

4.1 Z\qXAB Q M ! Q " # >
& n 123> \$% • ! " # *
4.2 Z\qXAB " o# > & N
TSSY-ZW-06-01/01 ' s - . / O (G*) >
& > * + ,
4.3 + * 2 - . / (2 > ZO [1ZO#
+ > 2- 34 "
4.4 > &5 + 6 OP u7 <y489 10: ; < 10:
= > & (ZQ M ? @
4-1 " > &

	A B	CD)	
1	AB E?yFG H	" K	-	QE @F} u \FGno
2	AB E?yD > D	X	-	| e > OE< E`#e OFy ~ H 1
3	AB E?y } > Um V	M*}	-	| hi } 6@ V#> Um ET| 56O 5 E?< M D
4	λ} I	q	-	AB + | . Z~I W u7 OP > N } M > H Q
5	> D	2	-	| k > # ; : > } > } no '-o e(@ M5 f HW| ~ 2 | Q D
6	λ XABno	q	-	AB + % > p `# > p\$ D %+ λ
7	AB uP	M*}	-	< f I W+y u X uP /O qc un #P AB uP 6@ m
8	n ABst ^	" K	-	AB 's l3 2 ; Y I mn st \ \+ 4n`AB
9	c	q	-	-X |!y u: ~)*{ 45
10	- . 3	KL	-	AB ' ABqVW{

5-1

		+	D
AB #	5y6	1	1
Z \ qXAB	5y6	1	1
e'	5y6	1	1

5.2

5-2

		\$ /			
1	v			1	
2	<PYZ XAB?		8	1	
3	Z \ Xw q)		8	1	

4

1



6.2.6 <AB
6.2.9 1?w ! " # v
6.2.10 ? /" #AB AB

7

7.1

7.1.1 AB Bs

7.1.2 2 # qXAB w vy |* C "(C "(AB w y
/" bc K bc8 铠?s Q[u

7.1.3 2bc K bc8 [u | Ds< X DY# D Z\qXAB
y Ds< X DYA[# bc K bc8+y[u

7.1.4 AB X]< /" 2 #KB 7AB # Xw ? | <J J G
W +

7.1.5 2]X | AB # X @ ABY|8 H R O XY• R
3RQ X y % X <

7.1.6 ABY|]62 u !AB ;# @ R (y }%AB

7.1.7 AB +(6C9 X<AB X x3qXy 迅: - X<R u [u:

7.2

- 7-1

7-1

	7	V		
		W	H	S
1	Z\qXAB			|
N	7 HN} ~ 7 WN• O7 SN 7			

7.3

2 Z\qXAB AB< +mn { (/O 6ABH< Z\qXAB
X y 7-2 r

7-2

X U_N/U kV	A B X	y min
18/30!	$2.5U_N$ $2U_N$	5 60
21/35y 64/110	$2U_N$	60
127/220	$1.7U_N$ $1.4U_N$	60
190/330	$1.7U_N$ $1.3U_N$	60
290/500	$1.7U_N$ $1.1U_N$	60

B 10kVy 500kV 9< ! J B \$ L 4 KN< =AB
Q/CSG 4-16.1.1 Q/CSG 4-16.2.1y 4-16.2.4 m

1 > &

TSSY-ZW-06-01/01

y	u7		>	+
> * !				
	AB	CD)	
1	AB E?y FG H	" K	! _	=7 | " > \$ ! > N
2	AB E?y D > D	X	! _	! | e > 8 ! QE @F} u \FGno ! QE< E`#e OFy ~H 1
3	AB E?y } > Um V	M*}	! _	! | hi } 6@V#> Um ET|56O 5 E?< M D
4	λ} l	q	! _	! AB + | . Z>IW u7 OP > N } M > H Q
5	> D	2	! _	! | k > # ;: no ' - o e(} > } @ M5 f HW| ~ 2 | Q D
6	λ XAB no	q	! _	! AB + % D > p `# > p\$ D %+ λ
7	AB uP	M*}	! _	! u X uP /O qc un #P AB uP 6@ m
8	n ABst ^	" K	! _	! AB 's l 3 2n g[st \ \+ 4n`AB
9	c	q	! _	! -X |!y u: ~)*{ 45 ! AB' V | \ ` @ \ + - . /e
10	- . 3	KL	! _	

>) Q/ NO							
[1ZO ,							

j k N 7&5 > * + , 1 + n * 2
 2O t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



NTSSY-ZW-07

1	%	.....	49
2		.....	49
3	\	.....	49
4	>	.....	50
5		.....	50
6		.....	51
7	! B	.....	53

1

7

~

2

#

B

% O ? ! Z

3

\] ^ Y

\] ^ Y 3

2

(3) Tj/_Tj-0.230 rg 5489TD 6 TD (2) T

2

TD (2) Tj^

2

(3) Tj/L

2

4

- 4.1 \] ^Y B Q M ! Q " #
> & n 123> \$% • ! " # *
- 4.2 \] ^Y B " o# > & N
TSSY-ZW-07-01/01 ' s - . / O (G*) >
- 4.3 + * 2 - . / (2 > Z O [1 Z O #
+ > 2- 34 "
- 4.4 > & 5 + 6 O P u 7 < y 4 8 9 10 : ; < 10 :
= > & (Z Q M ? @
4-1 " > &

	A B	CD)	
1	λ} l	q	-	AB + | . Z~l W u7 O P > N } M > H Q
2	^|	q	-	| 4 #u: " # #45 u: 4 8[ ? ; | D 4 #[u7 A \] ^Y_wAt?~ #_ |[u
3	> D	2	-	| k > # ; : } > } no ' - o e(@ M5 f HW| ~ 2 | Q D
4	a 2	X	-	• y | e % 2 y f D [: no %
5	a T \$ } > Um V	M*}	-	a T | 560 驾 5 a T < F < M D
6	a T \$ Um V	" K	-	a T | 560 驾 5 a T < F < M D
7	t? ; n;	" K	-	\ | @ t? ~ O A ; b f
8	) * \ \] ^Y # t ? ; [: y ^	" K	-	(, \] ^Y # t ? ; [: y f % &) * y \ ` @ * 2
9	- .	KL	-	AB ' V | \ ` @ \ + - . / e

5

5.1

5-1

		+	D
B	2	1	
B<	3y4	1	1

HX ` %& + • DL/T 506 & A

6.2.5 退t 4 U m 随g/O B \ A \] ^Y# ; y .
 / 退t 1 B 3 #退t | s(# \$ #退t m为\$
 " a \$ \$ D; 退t
 D; 退t N \] ^Y#t?#[D" \ + 10y20G#4< v ?H P
 Z\ \ \ R 9u < \ # 1201 1 \! Onou-<R : ?L 4
 < v< # 1/2 1/5 1/10 =*(; <
 2 m?)# \] ^Y 退ty C #t?~ !|A; \ DC mDt?~
 y #t?~ [退t v #t?~ n;

6.2.6 3 \] ^Y \] ^Y#3 ~ # ()为0.2 0.2S)
 . / • 6-1 w A \] ^Y# M5s | X # 为 #X l • 6-2

6-1

)	I_p/I_n 1	1	5	20	100	120
0.2	○1		0.75	0.35	0.2	0.2
	" ○		30	15	10	10
0.2S	○1	0.75	0.35	0.2	0.2	0.2
	" ○	30	15	10	10	10

6-2

)		"
0.2 0.2S	0.02	1

7

7.1

23 # \] ^Y \] ^Y#3 ~ w yO # . 3 0.0011 "
 . 3 0.01 w A# \] ^YM5s | + + y# M5ws 6-1
 # m
 2w ; < 6-1# m l ; < 1.5Gy |! * w

7.2

- 7-1

7-1

	7	V		
		W	H	S
1	\] ^YAB			|
N	7 HN} ~ 7 WN• O7 SN 7			

7.3

\] ^Y B| RUJIG 1021 2007 W] ^Y # Q/CSG 4-7.1.3 Q/CSG 4-7.2.2
 Q/CSG 4-8.1.3 Q/CSG 4-8.2.2 m

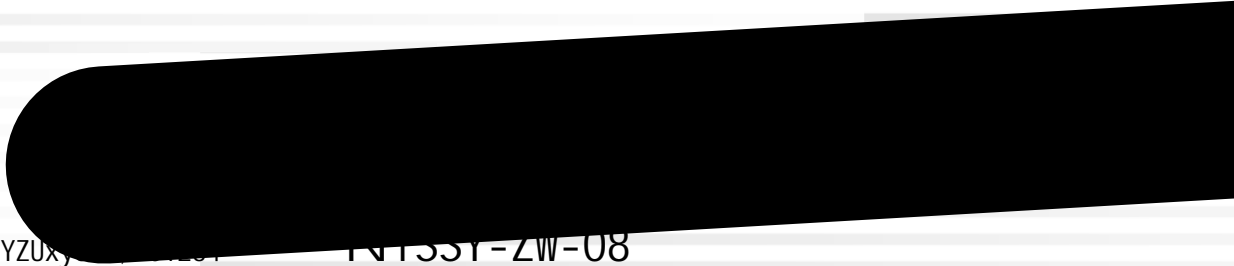
1 > &

NTSSY-ZW-07-01/01

y		u7		>	+
> * !					
	AB	CD)		
1	λ} l	q	! _	=7 l | " > \$ ! > N	
2	^|	q	! _	! | e > 8 OP + | . Z>IW u7 Q > N } M > H	
3	> D	2	! _	! | 4 #u: " #4 5 u: 4 8[\] ^Y ? ; | D4 #[u7 A \] ^Y_wAt?~ #_ |[u	
4	a 2	x	! _	! | k > # ;: > } > } no ' - o e(@ M5 f HW| ~ 2 | Q D	
5	a T \$ } > Um V	M*}	! _	! • y | e % 2 y f D [: no %	
6	a T \$ Um V	" K	! _	! a T | 560驾 5 a T < F < M D	
7	t? ; n;	" K	! _	! A; t?~ y | \ ` * 2 y@ l AB |yz @t?[: 8[4 q 缠~ _ A ~ M5A;	
8	) * \ \] ^Y yt? ; [: 4q ^	" K	! _	! (, \] ^Y # t? ; [: y f % &) * y \ ` @ * 2	
9	- . 3	KL	! _	! AB ' V | \ ` @ \ + - . / e	

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



4!"#\$%&'

\$TYZUXy

NTSSY-ZW-08

1	%	.....	57
2		.....	57
3	\	.....	57
4	>	.....	58
5		.....	58
6		.....	59
7	! B	.....	61

4

4.1 X] ^Y B Q M ! Q " #
> & n 123> \$% • ! " # *

4.2 X] ^Y B " o# > & N
TSSY-ZW-08-01/01 ' s - . / O (G*) >

4.3 + * 2 - . / (2 > ZO [1ZO#
+ > 2- 34 "

4.4 > &5 + 6 OP u7 <y489 10: ; < 10:
= > & (ZQ M ? @
4-1 " > &

	A B	CD)	
1	AB E?yFG H	" K	-	QE @F} u \FGno
2	AB E?yD > D	X	-	| e > OE< E`#e OFy ~ H 1
3	AB E?y } > Um V	M*}	-	| hi } 6@ V#> Um ET| 56O 5 E?< M D
4	^|	q	-	| 4 #u: " # #45 u: 4 8[
5	λ} l	q	-	AB + | . Z~l W u7 OP > N } M > H Q
6	t?~ A;	" K	-	n` AB | *2t?[: +
7	> D	2	-	| k > # ;: } e(> } no ' - o @ M5 f HW| ~ 2 | Q D
8	a 2	X	-	• y |e % 2 y f D [: no %
9	λAB Xno	q	-	AB + % > p `# > p\$ D %+ λ
10	) * X] ^Yyt? ; [: 4q ^	" K	-	(, X] ^Y#t? ; [: y f% &) *y \ ` @*2
11	c	q	-	-X |!y u: ~)*{ 45
12	- .	KL	-	AB ' V

5.1

5-1

		+	D
B	2	1	
B<	3y5	1	1
B •	1	1	
N	\$ J		

5.2

5-2

)			
1	X] ^Y	0.05) ! (		1	4R]
2	X X?		8	1	4R]
3	XY			1	
4	X+ j	3		3	4Rt? ~ L
5	] ^YJ Bv	2		2	1
6	?8[:			1	截N 1.5mm ² ! (# :
7	t?8[:			1	截N 1.5mm ² ! (# :
8	[u:			1	截N 6mm ² (
9	u:			1	截N 6mm ² (
10		3	D	1	
11	[uy			1	
12	Q y			ly2	[? : 4R
13				ly2	R
14	j		D	1	O?
N	Y ! vYv	\$ J			

6

6.1

6.1.1 明确 4 @ ~ # 3 @ 3 ~ # B

6.1.2 4 @ p` a> X* 予 B

1 4 KX 8 I J 2TUV T r s乎\$ 2 d&' V
i 痕

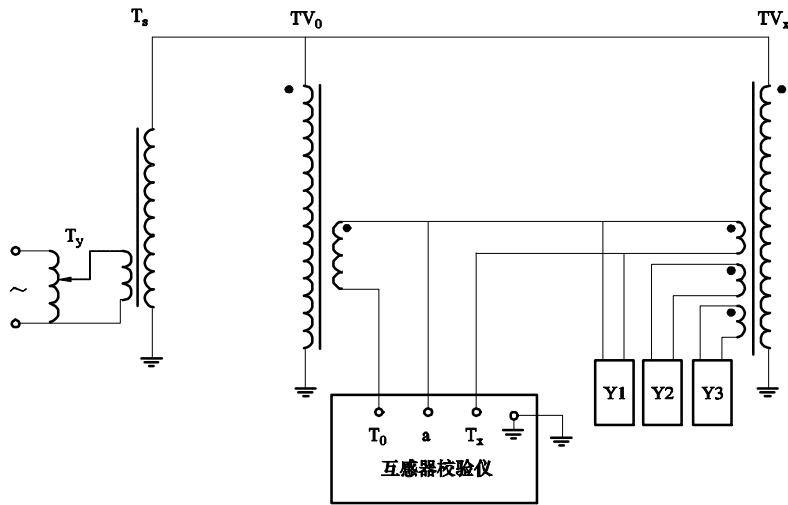
2 *s! # 志 RS 3 志] ^Y
" I 月 ()

3 [: ` ` M KL + %

6.1.3 k AB[: X] ^Y wA 7 /C " X] ^Y

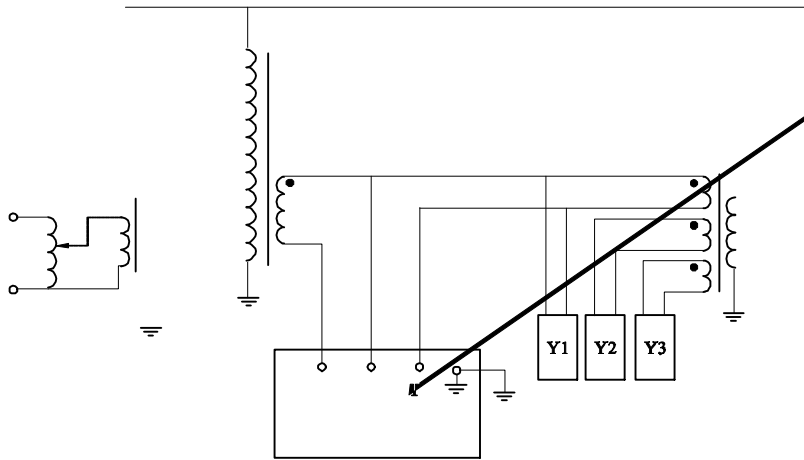
wA# [: [: j k " \$
wA tV X] ^Yy 4 tV XY # " A X] ^Y) 为 XY
wA PV X] ^Yy | YZ X? wA GIS s Y # tV X] ^Yy |
4] # XY X

1 wA tV X] ^Y # [: • 6-1



T_y XY T_s XY TV_0 X] ^Y TV_x A X] ^Y Y1 Y2 Y3 X+ j
6-1

2 wA PV X] ^Y # [: • 6-2



	" O	10	10	10
--	-----	----	----	----

* 500kV 为 1101

6-2

)		"
0.2	0.02	1

7

7.1

23 # X] ^Y X] ^Y#3 ~ w yO # . 3 0.0011 "
 . 3 0.01 w A# X] ^YM5s |! + + y# M5ws
 6-1# m

2w ; < 6-1# m l ; < 1.5 Gy |! * w

7.2

- 7-1

7-1

	7	V		
		W	H	S
1	PV X] ^YAB	|		
2	tV X] ^YAB	|		
N 7 HN} ~ 7 WN• O7 SN 7				

7.3

X] ^Y B| RUJJG 1021 2007 W] ^Y # Q/CSG 4-9.1.2 Q/CSG 4-9.2.1
 Q/CSG 4-10.1.2 Q/CSG 4-10.2.1 m

1 > &

TSSY-ZW-08-01/01

	y	u7	>	+
> * !				
	AB	CD)	
1	AB E?y FG H	" K	! _	=7 | " > \$ ! > N
2	AB E?y > D	X	! _	! | e > 8 ! QE | @F} u \FGno ! QE< E`#e O Fy ~H 1
3	AB E?y } > Um V	M*}	! _	! | hi } 6@V#> Um ET|56O 5 E?< M D
4	^|	q	! _	! | 4 #u: " #4 5 u: 4 8[A X] ^Y_wAt?~ #_ |4 [u
5	λ} l	q	! _	! AB + | . Z>IW u7 OP > N } M > H Q
6	t?~ A;	" K	! _	! t?[: y\` *2 y|@ l + ! | k > # ;: > } > } no '-o e(@ M5 f HW|~ 2 |Q D
7	> D	2	! _	! • |e % 2 y f D [:no %
8	a 2	X	! _	! AB + % > p rs > p\$ D %+ λ]X< D
9	λ XAB no	q	! _	! (, X] ^Y#t? ;[: y f%&) * y \` @*2
10	) * X] ^Y yt? ;[: 4q ^	" K	! _	! AB' V |!y u: ~)*{ 45 ! AB' V | \` @ \ + -./e
11	c	q	! _	
12	- . 3	KL	! _	

>) Q/ NO							
[1ZO ,							

j kN 7&5 > * + , 1 + n * 2
 20 t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•



中國



1	%	.....	65
2		.....	65
3	\	.....	66
4	>	.....	67
5		.....	69
6		.....	71
7	! B	.....	90

1

TM) T = = # > WX I DC ~ !
 = Aq TZ[ABR<XY hY TUV] ^Y TUV8) T
 4D) T = T# GB 50150 =? >? = Z[AB m
 sλZ #" G =3qQ #AB T ws m O T
 sλZ > H Z
 7 110y 500kV X) >?# " AB ABs # =
 TZ[AB

2

2-1

1	GB 50150 2006 =? >? = Z[AB
2	Q/DG 1 1157.77y 86 2009 = 3AB
3	DL 409 > \$
4	DL 5009.3 W > \$
5	Q/CSG 1 0004 = & \$% < M*
6	DL/T 703 T = #=" gUw
7	DL 429.7 T w
8	DL 429.9 T 6(w
9	DL 450 T = #w tdG _脱
10	DL/T 423 T = w `aX
11	DL/T 722 <XYT ef = * w 6
12	DL/T 421 T vQw
13	GB/T 261 1983 Th m7w D#
14	GB/T 511 Th] gh/ w =
15	GB/T 510 Th 凝7w
16	GB/T 1884 T | Th 8(- B{ w 8(3
17	DL/T 1096 <XYT (
18	GB 2536 <XYT
19	DL/T 1094 W<XY T
20	GB/T 17623 T ef = * =" gUw
21	GB/T 5654 | P" 2 K vQ#w
22	GB/T 507 T Xw
23	GB/T 6541 Th T2 N Ww
24	GB/T 264 Th w
25	GB/T 7252 <XYT ef = * w 6
26	GB 7595 Z <XYT
27	GB 7597 W T <XYT gT
28	GB/T 7598 Z <XYT gT e3 w g
29	GB/T 7600 Z <XYT * w
30	GB/T 7601 Z <XYT *w =" gU
31	GB/T 14542 Z <XYT D 6

3

\ • 3-1

4

4.1 TZ[AB Q M ! Q " # >
& n 123> \$% • ! " # *
4.2 TZ[AB " o# > & N
TSSY-ZW-09-01/01 ' s - . / O (G*) >
& > * + ,
4.3 + * 2 - . / (2 > ZO [1ZO#
+ > 2- 34 "
4.4 > &5 + 6 OP u7 <y489 10: ; < 10:
= > & (ZQ M ? @
4-1 " > &

	A B	CD)	
1	> D	2	-	# ; : | k > > } no ' - o e(@ M5 f HW| ~ 2 | Q D
2	} #> Um V	q	-	+ | . Z-I W u7 OP > N } M > H Q
3	T @	3q -	-	AB | @ T T <_y|! y|H . j k/O ~ T >t } yu wA
4	}) * ya	3q -	-	' V | \ } > 4mn
5	G学A 4	[q3ef XB	-	G学A e y | 橡 8 D 镜 \$ \$
6	ABvY|	q	-	@ \ABvY#bc45| u: [qbf
7	q} AB	q	-	AB + % > p rs D %+ 入
8	\Y \	X	4[1#	\$ \$ 5 \Y # 6
9	=| =6=	X	-	AB{ d= nb = | O4=; F8[ #+{ |
10	5 \} X	X	4[1#	ABY| \$ \$ 5 % X y 8
11	A H46= g	X	-	2 G学A]?# f y ~m=u (5
12	ABY i	X	-	AB @ | f D 镜 \$ \$ 5
13	G学A a| _G	[q3ef XB	4[1#	AB' V | \G学A | _G 4 mn

5

5.1

5-1

		+	D
	<M2	1	
	<M2	1	1
%&	<M2	1	
AB 1Q	<M1	1	
TAB 1Q	<M1	1	
AB %& *	<M1	1	
N	\$ J		

5.2

5-2

Y ! vYv					
		\$ /			
1	rs	m\$	D	—	
2	>	m\$	顶	—	
3	> }	m\$	#	—	a y
4	ug	m\$		8	
5	' ? (3		c	1	
6	%&K _G EO	m\$		—	
7	500mL 125mL # bc 250mL (薄膜 衬垫 20y100mL \Y bc H} k qT \Y M	m\$	D	—	
8	Z m f光# T j # \Yb cT j 盒	m\$	D	—	
9	%& ,	m\$		—	
TAB Y ! vYv					
1	K vQABv	ws m		1	
2	XABv ?Y	ws m	8	1	

5-2 9

		\$ /			
3	" gUv ' yZ Y	" gUv | ws GB/T 17623 m	8	1	
4	= = = XQ a= s=	= = = (- 9.991 XQ a=| G+T	N = Y	4 1	
5	2 * v	ws m		1	
6	D#m7w v ABT	ws SH/T0315 D# m7w Y #		1	
7	=	5L	D	1	
8	N Ww v	u N\$x 为 40mm 60mm A 45mm # f • Y		1	
9	8(3	ws m	8	1	
10	3 v	ws m		1	
11	• • \ W凝Y	x 30cm			

5-2 9

		\$ /			
24	A	t & A t & A dG * " 28(为 1.19 T * * t t A ! | -+ -+' ( 为 100i y 110i		-	
25	凝7v	{ ' y -60i		1	
26	^j	{ ' y 300i		1	
27	A	ws m	D	1	
28	' (3	0y 110i		-	
29	' ? (3	ws m	D	-	
30	_XB K	ws m		-	
31	AB%&		7	-	
32	~} T |		D	-	
N Y ! vYv		\$ J			

6

6.1

6.1.1 <XY hY TABQ GB 50150 2006 =? >? = Z[AB
20.0.1 20.0.2 \$ X ? T λ n Tj | Xw

6.1.2 2 X) 66kV (# <XY hY | T7 qX zM{ AB 24h
s[XZ 24h 4 ? <XY hYYWO T#T ef = #gU*

6.1.3 X) 为 500kV # <XY hY \$ y 7 w T # =

6.1.4 2 X) 500kV # <XY hYsZ U w T xy(

6.1.5 X) 66kV! (#TUV X] ^Y RS PV X] ^Y ^ | qXAB | 4
? T#gU*

6.1.6 2 3q] ^#] ^Y | w 3q ws p\$ N

1 T# 3q | ws GB 50150 2006 =? >? = Z[AB 20.0.1
20.0.2 \$ m

2 X) 66kV (#TUV] ^Y |



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6-2 9

	OP	5 !	7	
2		1 @ABvYM54 [u 2 @wAvw 8[: M 5 18[1 ABvY 4 [u 2 w 8[: 8 [bf	1 ng AB N @ ABvY[u/O 2 \w 8[: 8[bf
w K				
1	I J #	@ #M5I J	fz #O壁c . e" xy	. JG# O z EG # C 7 _ #
2	I _	~A _	fz c. e " xy	d _ st λ
3	] ' (	] ' ( 为 m # 90i T为 100i	' (^	\` @
4	2A ]	] x3 ' (O 4 #' (Oli	w ' 2	\` L' (\' Oli O 1] X w
5	bFw	\] x3 ' (bF w	' (ws m	\O4 #' (Oli y
6	%&AB' 2	/ ? 1w # D 为 # tand	H/?O # | 0.0001] (/Dw D# 251	2 q6@(; =* 3 m C92A w 3" N/?O > # 0.0001] (/Dw D# 251y w ' 2u H
vQwA				
1	I J #	@ #M5I J	fz #O壁c . e" xy	. JG# O z | EG # C 7 _ #
2	I _	~A _	fz c. e " xy	d _ st λ
3] ' (] ' (

6-2 9

.56 0 TD 0 Tc (!"# \$% 790.86m423.D () Tj34.02-279.12 -736.56 4w! 790.8 1S331.44 790.8 m333./F5+4 1F 790.8790.8 1S516.48 790.8 m518.

6-3 9

	OP	5 !	7	
7	3) * w ' 2	6 ? 8 9 w # X #) ! 为 ! X	# D w AB' 2	AB m# AB X' 2 (N 1 GB/T 507 M / C 2 DL/T 429.9 M 3 GB/T 7595 2000 # AB m为 w 4 3 C • s w # X > # (• # &
e ' .				
1	@4QAB ' 2	%& ,	w	@4QABQ M5= %&M5 + ! 4AB AB%&(, \
2	I J	I J ! T	T J G	I J T 2A # A B' 2 s | ! I J # T _ 3
3	T # ? {	C ? T λ J G # T T	G # T MU J	J G T U
4	I ' V	I AB } h # / e AB # } T f 8 9 ? {	f z x y	d # O E F e ~ 3 x y e ~ • } T f 8 9 ? {
4 q # (o ! 2				
1	XAB	wA (	1 +, # M5ws m 2 +, ? T Y M5 I J _ + 3 +, A B T M5 1 ? s R 4 F UL 5 = AB	

6.2.3 gU* • 6-4

6-4 色谱

	OP	5 !	7	
AB				
1	@ ; T	AB @ ; M5 \$ %	1 R 9 , %& 2 ws m 3 1 _ O	1 @ R 9 , % & 2 @ M5ws m 3 @ y
2	@ v Y	1 n g N @ g U v 4 8 [[u : ! 4 = ; 8 [M 5 b f y 7 # 垫 2 : n = = a = k } ! 4 L X } X W 9 < v Y y X W 3 w v Y 4 = ; H X } 4 = ; X W \ w s v Y m	1 = + { | 2 = X W e 3 X W \ w s v Y m	1 : n 4 = | | @ 4 = k } L X } ! 4 = ; 8 [M \ + = { | 2 @ \ = X W 9 < v Y y X W 3 @ \ v Y 4 = ; X W \ w s v Y m

6-4 9

	OP	5 !	7	
3	nbABvY	<p>1 \d:n4= :n vY un nb g :n 4' (Y 'n @s { TCD FID! q r GY' (2 ~s { TCD FID' (< q rGY' (< 360i y 2 m { 7= 3 @TCD a \</p> <p>4 ~vY3qH w4= ; \ wsvY m nbg U* ~&: H n` *</p>	<p>1 '(e 2 + ={| 7 7 =e 3 \e</p>	<p>1 H LvYZ M5 e '(3 ws { ' (2 @ \ m {d 7 3 nb l a\ uy \dn = \ws m 4 H{ OH =C</p>

A B

1 AT wN 100mL
\YA T M*
w \YD< 40.0mL刻(
橡 9 \Y #89 为
t, 9 MOa= 4 AT
) M 89y89x: #M

89

6-4 9

	OP	5 !	7	
4	vY	vY# N 4 1mL \Y D d 4 *浓(# s = 1mL 0.5mL 3#gU (%&4 *#{ N A _i s { h _i s vY| vYZ OH , " ## <M=* 5 2? 2? #=* 3| ! #O21 O ! 为vY #' 2 C?AB! | vY	vY	#~ %& 4

6.2.4 T = * • 6-5

6-5

	OP	5 !	7	
AB				
1	@ ; T	AB @ ; M5\$%	1 R9 , %& 2 ws m 3 1_O	1 @ R9 , % & 2 @ M5ws m 3 @ y
2	@ vY	1 ng N @gUv48[[u: ! 4=; 8[M5 bf y7 # 垫 2 :n = = a= k }! 4LX} XW9 < vY y XW 3 wvY4=; HX} 4=; XW \ wsvY m 7 # 垫 y	1 = +{ | 2 = XWe 3 XW \ ws vY m	1 : n4= | | @4= k} L X} ! 4=; 8[M \ += { | 2 @ \ = XW9 < vY y XW 3 @ \ vY4=; X W \ wsvY m
3	nbABvY	1 \d: n4= : nvY un nb g : n4' (Y 'n @s { TCD FID! q rGY' (2 ~s { TCD FID' (< q rGY' (< 360i y 2 m { 7= 3 @ TCD a \	1 ' (e 2 + = { | 7 =e 3 \e	1 H LvYZ M5 e ' (3 ws { ' (2 @ \ m {d 7 3 nb l a \ uy \dn = \ws m 4 H{ OH =C
A B				
1		1 AT wN 100mL \YA T M* w \YD< 40.0mL刻(橡 9 \Y #89 为 t, 9 MOa= 4 AT) M 89yN X 9 Ma = 89 5 < | H % a== \AT \YAO 2] v =N =l _ 5mL \Y B<M3? : 5.0mL = AT = _ 4 \] no 入 AT# \YAO 橡 9 ((89'	1 a== + 入 T \YAO 2 橡 9 (d (89'	1 z 5 2 \橡 9 (d (89'
2	Z 脱=	Z vN \YA{ 入 ' yZ YO#Z &(H{ # \Y # M bFZ Y ' 50i 89Z 20min 7% 10min	{ Z YOZ &(# \Y #w s m	@ \{ Z YOZ &(# \Y # M

6-5 9

	OP	5 !	7	
3	r < v =	<p>1 = \Y# N 5mL \YC M AT _Y O壁 1y2? 入 0.5mL AT 8(橡 9 入 B 1 1 (\ YO#a= AToot A T) 6 \YO壁8?} dc? a= 2 r < v = N \YA Z & # v =H<B 1 r < 3 \YCO | 2eX r < {' { 2min %& < 0.1mL gU*</p>	<p>1 \Ycd M AT _Y O壁 2 r < v = 2eX r <</p>	<p>1 \ \Ycd M AT _Y O壁 w s m 2 \r < v = d 2eX r <</p>
4	vY	<p>vY# N 4 1mL \YD d 4 * 浓(# s = 1mL 0.5mL 3#g U (%&4 * #{ N A_i { h_i s vY| vYZ OH , " ## < M = * 5 /? /? # = * 3| ! #O21 O ! 为vY #' 2 C?A B! | vY</p>	<p>vY vYZ OH , " # #</p>	<p>\vY d vYZ OH , " ##</p>
5	*	<p>A * N 1mL \YD \YC = 1mL 0.5mL * y5 3 1P 1P 1P 3#gU (%&4 * #{ N A_i { h_i * | vY \Y "</p>	<p>1 y5 ws m * vY \Y "</p>	<p>1 y5 3 1P 1P 1P 2 \ * | vY " \Y</p>
6	' 2* 3)	<p>V3) T 4* * 浓(5gU</p>		
7	%&* ' 2	<p>gU N L * d = O₂ = N₂ dG CO tdG CO₂ # { /O % &4= * V3) T =</p>		
8	* ! w	<p>GB/T 7252 <XYT e f = * w 6 DL/T 722 <XYT ef = * w 6 * w</p>		
A B e '				
1	@AB %&	<p>AB @AB %&M 5 + ! AB AB%&(, \</p>	<p>1 /? = * AB ' 2# ; < / 2 AB %&</p>	<p>1 @ \/? = * AB' 2# ws m 2 @ \AB % &</p>

6-5 9

	OP	5 !	7	
2	g	1 DvY u 2 ~vY' (-<{' y D4 =; k} 3 AB vY + @	DvY u }=	@ \vY u 4= M5d D M5 = { |
4q # (o! 2				
1	ng	1 '(Y 2 q7 3 \ e	1 }%' (Y @ 2 @=uM5e FM5{ | a= = # EM5s 3 @ YM5e uM5 n	
2	*	1 vY&: H < 2 y| = + TCD{ +FID{ + dG tdG { 3 vY' (XW \ 5 # <G 4 Z v= M V	1 || @4=; 8[#M5 |= M o 7 89垫k• @ LvYs { w Y rGY' (M5H M 'M @ X 7 • oqvY 3 X• # 垫 |= 7 • 2 @ \Y 橡 垫893 TCDa\ = Q = 熄= rGY q M5e 1 • = 3 ~vYZ # H = 2vY * 4 r< v=#/O 1] # v = 3 \YO : =* 5	

6.2.5 N Ww • 6-6

6-6 界面张

	OP	5 !	7	
AB				
1	@; T	AB @ ; M5\$% I	1 R9 , 1 @ R9 , I | 2 1_O 2 ;	

6-6 9

	OP	5 !	7	
A B				
1	a w	<p>w a =# N WN 50y 75mL25i O1i # Cλ I _ < # A < 刻 (A { 3 N Wv # A K(I _ < # N Wv(4 w # A K UλA w< 深(; < 6mm < 刻(为% oo- _ A K D< 6 W` R7 S M\ P 膜[" i 7y | oou w O 膜" i y W` z R7 \ P 脱y O 刻(a = 8(r₀-r₁ = 0.997g/mL D V3) # N W 3) ' 2 | 6@7ly 72mN/m # m 4w T # N W</p>		
2	*	<p>1 w A 25i y # 8(< 0.001g/mL 2 T # N Ww N N Wv R7 4 w # A K Uλ # 5mm 深((ooCλd < 25i O1i < # A < 10mm (H q! T N T N 6 30s O1s : (; 15 w T # N W A C λA < T 膜" i M5 y 60s % NP 脱y 刻 (& O 3 (; = * AB ? ! % & V3) A # N W 4 EF N Wv w | vY5 j k</p>	<p>1 q! T N 2 P 膜 [" i 7y : (y | oou w O 3 A C λ 膜" i y W` z R7 A < T 膜" i M5 y 3 5 y 60s O</p>	
A B e '				
1	@4Q AB' 2	%& ,	w	@4QABQ M 5= %&M5 + ! 4AB A B%&(, \
2	AB' V D vY u vY I AB	<p>1 AB A O#TC3 } T } O _ ~ • A I __ G { 2 T I _ u [6 _ 3 ! __G g{ 3 DvY u 4 I AB</p>	u f + `	5 u I _ <

6-6 9

	OP	5 !	7
4q # (o! 2			
1	a w	w a=# N Wy 3)' 2 6@7ly72mN/m# m	2x 3 m 4qM5 N Wv w \ A G d |= w N Wv l_ # _|UA : = w w ' 2zx 3 m

6.2.6 * AB • 6-7

6-7

	OP	5 !	7
AB			
1	@; T	@ ; M5\$%	1 R9 , l 2 ws m 3 1_O
2	@ vY	1 8[u: 2 vYj k 8[u: : [3 * v 3 NI _ _+# fl { λ g]λ f |< f l# 刻(100mL {O} λ 10mL f | |N {e| N 2_ vY_+ O? λ<g : f # #• (`a'	1 @ R9 , l | 2 @ M5ws m 3 ; |!y
3	vY A Je	1 nbvYn nF t Y s # : (J v YbF` n` f ? #c * f |< 呈红g λ Sy f | gF < 3 呈黄g f 2 \ f |x3e7 vY bF` 0.5μL \Y 0.1μL d # H< fl (M# # λ fl Je vY r# #" 2 | ; < O51 ; S% | vY \ Y 893? 0.1μL ! x m 6\为vY A '	e Y : (J 3 f | h 为s L
A B			
1	T *	1 vY v \Y AT 1t _3? 2 1mLAT = | = t 3 N vY#bF : H < fl (M# #迅: λ fl 1 qq! f | Sy EF f<e7 \wA ' vY A暂 EF: ' 2 % r 4 T <M=* AB2? (!	\Y AT _ -G \YOAT =? \Y1 (t AT O=

6-7 9

	OP	5 !	7	
A B e '				
1	@4QAB %&	%& ,	w	@4QABQ M 5= %&M5 + ! 4AB A B%&(, \
2	AB' V D vY u vY I AB	1 N D t Yn : DvY un 2 I AB 3 \Y{	vY u D	@ \vY ud D
4q # (o! 2				
1	vY A J e T *	1 vYnb xy v 2 λAT w y x, -	= 7 f | ~vY v = w	

6.2.7 m7w • 6-8

6-8 闪

	OP	5 !	7	
AB				
1	@; T	AB @ ; M5 \$%	1 R9 , I 2 1_ O	1 @ R9 , I | 2 ; |! y
2	@ vY	1 @D#m7w v u : M5d8[f 2 @ = LX}! F M58[f	1 ABvY | 4 [u 2 = { |	1 AB | N @[u/O 1: nvY u 2 \ F89bf
A B				
1	*	1 T AT_ 1y2? 2 A λT A ? 63 s %• : ((I J _+# λ' (3 { wAv 3 : nvY un 7= = n s #m7 ' (4 ABn`] : (! O (_m7 20i y ' : (C* 2y3i 5 vY7=Y = =7 = 3[• 为 3y4mm 6 A ' (3x _m7 10i y 2 m7 104i A C 2i 7= ? 2 _ 104i A C 1i 7= ? < m=为% %&w ' 2	1 6T J G 2 = ws m 3 AB< =\ R	1 AT T _ _G 2 = 3[• 为 3y4mm 3 AB| H O D g fz=\ R

6-8 9

	OP	5 !	7	
A B e ' .				
1	@4QAB %&	%& ,	w	@4QABQ M5= %&M5 + ! 4AB AB%&(, \ /
2	AB' V D vY u =u vY I AB	1 AB T O#TC 3 }T } O - ~ • ABT { 2 DvY u 3 D = LX} n ! = #n 4 I AB	= LX} n ! = #n d D	@ \ = LX} n ! = #n d D
4q # (o! 2				
1	m7 D# w i	1 m7v} % 2 7=Y 4 3 7=Y= 熄z	1 @m7v} % 7=Y 4# • e = T AB 2 @ = XW M5=d M5 a=\ 吹z @k • = T AB	

6.2.8 w • 6-9

6-9 酸

6-9 9

	OP	5 !	7	
4	0.02y 0.05mol/L d G 乙 e | J	1 迅: 0.5g dG < 0.01g { λg O } λ 200mL + 乙 dG Mef t d #" 浓(# e | 2 J f# dG 乙 e | | ] 8# gA O ? .	e | J ws m	\ dG Mef
A B				
1	*	1 250mL • g A T 8y 10g < 0.01g 2 + 乙 50mL C λ AT# • g ?(\ W凝Y (] F \ 5min • g] λ 0.2mL BTB r 0.02y 0.05mol/L # dG 乙 e | < e | 5黄g < g为% % i # dG 乙 e | # 3 BTB r 3e | 为 g AT} g# R e7 g为 g 4 C? y } % \ < ' # y < 3min 5 + 乙 50mL (; 2 a AB 6 V3) AT ' 2	1 2 89 | | 2 y ws m	1 | E_G2 = (89' 7 2 = AB 2 y ; < \$ # y = AB
e '				
1	@4QAB ' 2	%& ,	w	@4QABQ M5= %&M5 + ! 4AB AB%&(, \

1 • N _ I
- 1 Ed 3
_ G G √ * 为 为 Im_ 为 I 为 _ 8 \ 购 _ G 为 为 为

2 • 2
I _ _ G @

6.2.9 e3 AB • 6-10

6-10 溶 酸

	OP	5 !	7	
AB				
1	@; T	AB @ ; M5\$%	1 R9 , 2 1_O	1 @ R9 , I | 2 ; |!y
2	4CvY Y A	1 • * || g N _ l _ 1 Ed _ 3 _ G ^ _ W X 2 @AB pH 为 6.0y 7.0 Q 3μS/cm 4C A pH r pH n e || ws m 1_O 3 @] Z v u 8[:	1 Y ws m 2 A ws m	1 \ • * || g ws m 2 \AB 4CA pH r pH n e | ws m 1_O
3	pH r J • 6-11	1 J • 4 2 2 J f # pH r | ] 8# gA O ? •	pH r ws m	pHy oo] 入
4	pH n e | J • 6-12	1 0.2mol/L t e | J N 40.846g t e , t? <入 1000mL P 1 , t? <刻(2 0.2mol/L t e | J N 27.218g t e , t? < 入 1000mL P 1 , t? <刻(3 0.1mol/L J N 16.8mL浓 入 1000mL P , t? <刻(Se | 浓(为 0.2mol/L 1 砂 + + d #" 浓(# e | : 0.1mol/L 4 0.1mol/L dG e | J N 迅: 8g dG {入 g] 入 50y 60mL e f <入 1000mL P 1] 2y 3mL 101 #氯G e | : 1 <刻(7 l (sl | Se | 浓 (为 0.2mol/L t d #" 浓(# e | : 0.1mol/L 5 (; 3 > E (; e | J pH # pH n e |	pH n e | w s m	mJ pH n e|

6-10 9

	OP	5 !	7	
A B				
1	e3 AB g盒 g	1 50mL AT 250mL • O] λ N < #] k = < 70y 80i S' (F 5min {] Z v(o F 5min 2 • # | C λ * | | O ~ * s W < { ' 10mL]] λ g | * pH3.6y 5.4% # pH n e | 10mL *] λ # g y (; 4 g] λ 0.25mL r pH n e | J g 阶 O { λ g盒 g %& pH 3 \ T # pH 5.4y 6 / 紫 r	1] ' (Z y 2 * || 89 f	1 m5 ! m 5 2 \ * || | | y | E _ G = (89'
2	e3 AB g 3 g	1 7 15 1 2 • # | C λ * | | O ~ * s W < { ' 10mL]] λ g y] λ 0.3mL r O { λ g3# g g& g %& pH 3 \ T # pH 5.4y 4 r	1] ' (Z y 2 * || 89 f	1 m5 ! m 5 2 \ * || | | y | E _ G = (89'
A B e '				
1	@4QAB %&	%& ,	w	@4QABO M5= %&M5 + ! 4AB AB%&(, \
2	• * || g | _ _G @	• * || g N | _ 1 Ed _ 3 _G ^ _ WX	Y J G	\ • * || g d MI _ _G
3	AB' V D vY u vY | A B	AB' V DvY u vY { | AB		
4q # (o! 2				
1	T e3	1 • F Z < " i 2 * || ||	1 7 • = AB 2 | E _ G = (89' 7 * || = AB	

6-11 pH 剂

r	< g%	J
	3.8y 5.4 黄y	0.1g 7.5mL0.02mol/L d G Q O , < 250mL 1 pH为 4.5y 5.4 N g r pH为 5.4
紫	5.2y 6.8 黄y 紫	0.1g 紫e 9.25mL0.02mol/L d G , < 250mL 1 pH为 6.0
	6.0y 7.6 黄y	0.1g e 8.0mL0.02mol/L d G , < 250mL 1 pH为 6.0 N g r pH为 7.0

6-12 缓 溶液

pH	0.1mol/L mL	0.2mol/L t mL	0.1mol/L d G mL	0.2mol/L t mL	< 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 xy (w

- 1 * λJ G{ | W _G ((_G 5 y
D 镜
- 2 T t = N ? T # ab9 { λd λ_G #; I _YO Uλ
2/3 nbZFt = 1y 3min : EF_G
- 3 wAN wAv 5 vY s ng vY5
F vYXW< s为% M \: U wy 为 30s 1?w
A =* wA 3? ! 为AB' 2
- 4 I _vY 卸 wAT XW w <R ? (I _| A • I _| XW
I _ 2y3? 7 I _| B _G| _| 1I _ 2y3? 1 (a I J XW吹

3min _ + v Y
 5 wA' 2) T # • s U为3CD NI • " • I • (\$
 6m • v Y w # M4C • s s # 1 T * O # wA' 2
 2 AS1638 I J (*) • 6-13 T # NAS) 3) 100mL T
 5μm # H2 y mC * O% # q; < " | *
 O# 56 -) •

6-13 NAS 清洁 级

*) /100mL	μm				
	5y 15	15y 25	25y 50	50y 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

N a : os / AIA NAS1638N1984 I 1月 O

7

7.1

• 6.2y 6.10 # u

7.2

• 7-1

7-1

	7	V		
		W	H	S
1	<XYAB			|
2	X o hY			|
3	TUV \] ^YAB			|

N 7 HN} ~ 7 WN • O7 SN 7

- TABQ m• 7-4
- 1 TZ [AB s λ Z T 4QAB B | ws GB 50150 2006
=? >? = Z [AB 20.0.1 20.0.2 \$) T ! O
XWj # T 4QAB B | ws 18.0.8 \$ X ? T 入
n Tj X | ws 20.0.1 \$
 - 2 <XY hYT ef = #gU* 4?w # Z k | +k
?<XY hYT H₂ D= μL/L Q \$; < p Nk N20
H₂N10 C₂H₂N0
 - 3 X) 66kV! (#TUV X] ^Y ^ | qXAB | 4 ? T#gU
* /?w # " | k 2 3q] ^# X) 66kV! (#TU
V] ^Y | T ef = #gU* T ef = * μL/L \$; < p
k N10 H₂N50 C₂H₂N0
 - 4 X) 500kV # 8 T) 7 y \$ T ef = #gU* T ef
= * μL/L \$; < p k N10 H₂N150 C₂H₂N0
 - 5 X) 为 500kV # <XY hY \$ y 7 w T # =
| 11 *
 - 6 500kV! (Z \ <XYT (\$ NsZ TU 100mLT 5μm #
T 2000 D 500kV! (\ \ <XYsZ TU (\$ N100mL
T 5μm # T 1000 D
 - 7 T \ sy s | T# - . EN T * ' ,
2 | ws GB 50150 2006 =? >? = Z [AB 20.0.1 L 3 11
Q# \$ T | GB 50150 2006 =? >? = Z [AB
20.0.2 # \$ T # AB
 - 8 2 # # Z [AB | s \$ # l , s y | H " A
BQ # AB _ GB 50150 2006 =? >? = Z [AB
20.0.1 20.0.2 18.0.8 # \$

7-2

	Q				j k	
1	4s	k +/ 浮e			4 R	
2	e3 pH	5.4			GB/T 7598	
3	mgKOH/g	T 0.03			GB/T 7599	
4	m7 D# i	—	DB-10 140	DB-25 140	DB-45 135	GB 261
5	* mg/L	500kVNT 10 220y 330kVNT 15 110kV! X) NT 20			GB/T 7600 GB/T 7601	
6	N W 25i mN/m	35			GB/T 6541	
7	K tand 1	90i y λ = T 0.5 λ = T 0.7			GB/T 5654	

7-2 9

	Q				j k

8	X	500kVN 60kV 330kVN 50kV 60y 220kVN 40kV 35kV! X) N 35kV	1 GB/T 507 DL/T429.9 2 T | E A 3 ! 为 w 4 + GB/T7595! GB/T507 4 2 入 # T! | _ 7
9	vQ 90i Ω·m	6E 10 ¹⁰	GB/T 5654 DL/T 421
10	T = 1 *	330y 500kVNT 1	DL/T423 DL/T450 c 2 330y 500kV
11	T e 1 *	T 0.02	GB/T 511
12	T ef = * gU*	• w	GB/T 17623 GB/T 7252! DL/T 722

7-3 类

ABD	%
X	1 6kV (= O# T 入(; # T 2 2 p/O> 4 XABN 1 35kV] ^Y ABds # 2 15kV T ; Y 入 T# Xd 35kV! (# 3 7 \$ T#
G*	1 λ<XY hY] ^Y 8 # T | GB 50150 2006 20.0.1 # L 2y 9 Q\$ 2 λT ; Y# T | 20.0.1 # L 2 3 4 5 8 Q\$
*	2T# 3q] ^y | 20.0.1 # MQ

7-4 充 箱 求

Q	m	A B
X	! O 2 64/110y 190/330kV _ 50kV 2 290/500kV _ 60kV	GB/T 507 T Xw
	XWj _ 50kV	
K	! O 2 64/110y 127/220kV # 0.005 2 190/330y 290/500kV # 0.003	DL/T 596 1996 11.4.5.2 #
	XWj 0.003	

7.3.3

B 10kVy 500kV 9< ! J B \$ L 4 KN< = AB
Q/CSG 4-1.1.17 Q/CSG 4-1.2.8 Q/CSG 4-4.1.10 Q/CSG 4-4.2.3 Q/CSG 4-8.1.1
Q/CSG 4-8.2.3 Q/CSG 4-15.1.1 Q/CSG 4-15.2.1 m

1 > &

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y	u7		>	+
> * !				
	AB	CD)	
1	> D	2	! -	=7 " > \$! > N
2	} #> Um V	q	! -	! D e > \$ D
3	T @	3q -	! -	! k > # ;: > } > } no ' - o e(@
4	}) *y a	3q -	! -	2 Q D M5 f HW ~
5	G学A 4	[q3ef XB	! -	! OP > N } M > H Q
6	ABvY	q	! -	! AB @ T T <_y !yH j k/O ~ T >t} yu wA
7	q} AB	q	! -	! 'V | * \ } > 4mn
8	\Y \	X	! 4[1#	! G学A y | 橡 8 D 镜 \$ \$ 5
9	=| =6=	X	! -	! @ \ABvY#bc45| u: [qb f
10	5 \} X	X	! 4[1#	! AB +
11	A H46= g	X	! -	
12	ABy i	X	! -	

13 G学A al [q3ef ! 4[1#
_G XB

>) Q/ NO							
[1ZO ,							

j k N 7&5 > * + , 1 + n * 2
 2O t OP u7 > <y7&3x4 4: 56| = >& (Z @ \ <
 7y | p%&<7/O 2 ZO , \ | # %) >
 Q NO 8 \) &) dy Q M| " = \$% 9
 &) n : ; < , = > , # ! } &•