

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to
Enhance the Role of Demand Rulemaking 13-09-011
Response in Meeting the State's (Filed September 19, 2013)
Resource Planning Needs and
Operational Requirements.

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

!
!"#\$%&'!(%)*+'!)#,)!"#,-\$.!/0!)#*1!2,'.1!\$%\$2!,!(/ 3 45\$)\$(/4'!/+)#\$! , - .0. 1!/.!
(2 30!) 4. 5 678189;!<764=762!>0768!/6;/03 . 1?! @ - //A6 5!) :B6@6&1/.!
#0026186D!/0!,5160/ 7 0!4,%)*\$1!)/!89: ; <=>=: : !&'!)%, 01 3*)*0?!, 0!\$< 3 ,*5 3 \$11, ?\$!7*)#!
)#\$!2/(@3 \$0!)!,), (#\$2!)/!\$, (#!4\$!1/0!0, 3 \$2!*0!)#\$!/+*(*,51!\$%*(5*1)!,1!), (#\$2!
#\$%\$9"0!, 22*)*/0!.\$5\$(%)0*(!, 02!#, %2!(/4*\$1!+!(/ 3 3 \$0)1!#, -\$!&\$0!1\$0!)/!)#)\$!
A11*?0\$2!B/ 3 3 *11*/0\$!%, 02!A2 3 *0*1%)*-!\$C, 7 D@2?*\$!0!89: ; <=>=: :9!

!
EF\$(@)\$2!/0!A@?@!)! : G.H= : G!*0! I , 0!J% 0(*1(/.!B,5+ /%0*,9!

!
!
K1K!L,))#\$7!MNO\$\$+\$\$!
!

L,))#\$7!MNO\$\$+\$\$!
P%\$() /%+/%!L ,%6\$)!P\$-\$5/4 3 \$0)!Q!!
8\$?@,) /% !A+, %!<R \$1)!
M4/ 7 \$%!"0(9
ST=!L ,%6\$)!1J%\$\$)!J /@#)!J5/ /%!
I , 0!J% 0(*1(/.!BA!>G: =H!
U\$5\$4#/0\$M\$G:W\$XGXGS>X!
3 ,))9/6\$\$+\$ Y /4/ 7 \$0(/ 3!

EC"ZA[EU\!OECC]!
L,%0!B5\$,0!E0\$%?'!'+/%3\$%!
L,%0!E0\$%?'!A@#/%)'_!
ELA"CM`C]!
ELA"CM`C]!.BA!BA!

IEU\!J8APE8<U\MLcIM`!
A5,%39(/3!,02!E0\$%?\@&!
ELA"CM`C]!
ELA"CM`C]!.`]`!`]

BMC"`.LEE\A`!
B/3-\$%\$!"0(9
>T!B\"BM`!IU9
AeIU"`.!Uf!Uf!

PM`ACP!B9C"PPECC!
B,5+/%0*,!E0\$%?'!I)/%,?%!
A5\$,0(\$!
H>HX!H`P!AdE`eE!
IA`!P"EaM!.BA!BA!

LM`A!U"E8`E]<CCM]P!
E0\$%`/(.!"0(9
cM![Mf!;SX!
BA]eBMI!.BA!BA!

PM`ACP!c9\"CCA!
B/01@3\$%\$]2\$%,)*0!/+!
B,5+/%0*,!
G; ;!`AUMLA!IU8EEU.!IUE9
H==!
`M8A!I\E8"J]!
B,5+/%0*,!C,%\$!E0\$%?'!
B/01@3\$%\$!A11/(,)*0!
^BCEBA_!
; ;!`ER!LM`UaMLE8]!
IA8A!IUEBO!L]E8I!
D/*0!P8!c,%\$!1^E0\$%/(.!"0(9
B/3-\$%\$!"0(9D/#01/0!
B/0)%/51!"0(9!
:HH!!HXU\!AdE`eE!
aE8ACP!CA\8!
A11/(,)*0!/+[,!'A%\$,!
a/-%03\$0)1^A[Aa_!
:=:!XU\!IU9
MAOCA`P!.BA!BA!
LAUU\ER!MOEEJE!
M4/7\$%
ST=!LA8OEU!IU8EEU.!GU\
JcMM8!
IA`!J8A`B"IBM!.BA!BA!

DMP]!I9CM`PM`!
I/@)#\$%0!BA!8\$?*/0,5E0\$%?'!
!`\$)7/%6KC/(,5a/-%03\$0)!
I@1),*0,&5\$!E0\$%?'!
B/,5)*0K[,!'A%\$,!8\$?*/0,5

IUEc\A`"E!RA`a!
B5\$,0!B/,5)*0!
!ELA"CM`C]!
ELA"CM`C]!.BA!BA!

PA`"EC!R9PMeaCAI!
R\$1)\$%0!c/7\$%U%,2*0?!
!J/%@3!
H:S==Mf`A8P!IU9!IUE9
: ; =!

IAB\!e!BM`IUA`U`E!
B,5+/%0*,!B\$0)\$%+/%
!I@1),*0,&5\$!E0\$%?'!^BBIE_!
>;HM!IO]!cA8O!BMe8U!
Ie"UE!!:==!

IeE!LA8A!
P*\$()!A((\$11!B@1/3\$%
!B/,5)*0!^PABB_g!A5\$,0(\$!
+/%8\$),*5!E0\$%?'!L,%6\$)1!
^A8\$L_!

LA8BEC!\AR"aE8!
U#e!e)*'!8\$+/%3!`\$)7/%6!
!^Ue8`_!
SXW!LA8OEU!IU9!IUE9!G==!
IA`!J8A`B"IBM!.BA!BA!

I\"8CE]!RMM!
c,(*(!a,1!,02!E5\$()\$%!
!B/34,0'!
SS![EACE!IU8EEU![;=A!
IA`!J8A`B"IBM!.BA!BA!

LAUU\ER![A8LABO!
B,54*0\$B/%4%,)*0!
!G:T=!Pe[C"^[CdP9!Ie"UE!
:==!
Pe[C"`.BA!BA!

PAAd"RMMCE]!
I/5,%B*)!B/%4%,)*0!
!G;T!:GU\!IU8EEU!IUE9
: ; =W!
MAOCA`P!.BA!BA!

DM\`!`"L LM`I!
!I*\$%!,B5@&!
:SWEC"`.M8!AdE9!IUE9a!
L"CC!dACCE]!.BA!BA!

DM\`!R9CEIC"E.!E!b!
I#\$5E0\$%?'!`/%#!A3\$%(!,
!ELA"CM`C]!
ELA"CM`C]!.BA!BA!

L"B\AEC!cA`J"C!
E0-*/03\$0),5P\$+\$01\$!
!J@02!
HWS!cA8O!AdE`eE!IMeU\
JcMM8!:T!

MC"d"A!IALAP!
I/@)#\$%0!B,5+/%0*,!E2*1/0!
!B/34,0'!
HHGG!RAC`eU!a8MdE!
AdE`eE!

U\MLA!89[8"CC!
I,0!P*\$?/!a,1!Q!E5\$()\$%!
!X; ;=!BE`Ue8U]!cA8O!BU9!
Bc;HE!
IA`!P"EaM!.BA!BA!

C*1,<L,%\$!I,5-,(*0!
M8A!
!W=WdA`!`E!I!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

c"E8BE![eCC!
` ,)@%5!8\$1/@d(\$!P\$+\$01\$!
!B/@0(*5
: : :!IeUUE8!IU8EEU.!H=U\
JcMM8!

LEaA`!L9L]E8I!
B\$0)\$%+/%E0\$%?'!E+*(*\$0('!
!,02!8\$0\$7,&5\$!
U\$(#0/5/?*\$1^BEE8U_!
:HH<!HXU\!AdE`eE!

[EU\!8E"P!
M5`-*0\$!"0(!
!H=:!B8MR!BA`JM`!
cCABE.!IUE9:==!
IA`!8ALM`.BA!BA!

EPRA8P!OMB\
\0\$'7\$5K!A6@,(/3!
!SX:IC"`.BMC`!AdE9!IUE9
H: =!
IA`!8AJAEC!.BA!BA!

DE``"JE8!A9B\AL[E8C`!
D/#01/0!B/0)%/51!"0(9
!>=:!BALc"I"!RA]!.Ie"UE!
HT=!
BALc[ECC!.BA!BA!

EeaE`E!I9R"CIM`!
B,5+/%0*,!B5\$,0!E0\$/%'!
B/33*)\$\$!
;W=H!UA`AaE8!AdE`eE!
PAd"I.!BA!BA!
OA8E`!`9L"CCI!
B,5+/%0*,!J,%3![@\$,,@
J\$2\$%,)*!/0!
H;==!8"dE8!cCAZA!P8"dE!
IAB8ALE`UM.!BA!BA!

\EAU\E8!IA`PE8!
B,5+/%0*,!"02\$4\$02\$0)!I'1)\$3!
! M4\$%,)%/8^BA"IM_!
HW=!MeUB8Mcc``a!RA]!
JMCIML.!BA!BA!
IUEc\E`!a8MdE8!
E-\$/%\$0!E(/0/3*(1!"0(9
! ;;;!IR!UAC]M8!IU8EEU.!Ie"UE!
H=!
cM8UCA`P.!M8!M8!

E8"B!
E"IE`\ALLE8!
! B/,5)*!/0!/+E0\$/%'!
e1\$!d!^BEe_!
G=:=!JMMU`"CCI!

A\LAP!JA8ebe"
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

ACCE`!J8E"JEC!
ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

A`P]!IB\RA8UZ!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

AU\E`A![EIA!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

[A8[![M"BE!
ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

[A8[A8A!89[A8OMd"B\
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

BAIE!
! BMM8P``AU"M`!
ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

BEP8"BM8B\8"IEU`IE`!
ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

B\A8C"E![eBO!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

B\eBO![eBO!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

PA`!B`A!
ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

PAd"P!E9LM8IE!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

PAd"P!`ELUZMR!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

PAd"P!8EEP!
ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

PEA`E![e8O!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

PEd8A!RA`a!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

P"A`E!9JECCLA`!
ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

PMBOEU!BMM8P``AUM8!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

P8ER!APALI!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

EPRA8P!d``E!
ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

E`8"beE!aACCA8PM!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

E8"B!BeUUE8!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

aE`E!U\MLAI!
ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

a8Eaa!J"I\LA`!
! ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

a8EaM8]!I9a9
! OCAUU!
ELA"CIM`C]!
ELA"CIM`C]!.!BA!BA!

\MRA8P!B\M]!
U#\$!I/@)#\$/0!B,5*+/%0*,!8\$?*/0,5
E0\$/2'!\`\$)7/9/6!
ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

DA`!LBJA8CA`P!
! ELA"C\M`C]!
ELA"C\M!`C]..!BA!BA!

DAIM`!OE]EI!
! ELA"C\M`C]!
! ELA"C\M`C]..!BA!
BA!

DE8EL]!RAE`!
ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

DMEC!aALM8A`!
! ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

DM` `A!
A`PE8IM`!
! ELA"C\M`C]!
ELA"C\M`C]..!BA!
BA!

DM` `A!`APE8IM`!
ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

OE` `EU\!CAea\C``!
! ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

LACBMCL!P9
A``IcA`!
! ELA"C\M`C]!
ELA"C\M`C]..!`]!
`]!

LA8aA8EU![8eBE!
ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

LA8``A!UEcE8!
! ELA"C\M`C]!
ELA"C\M``C]..!BA!BA!

LA8O!89
\e]J]LA`!
! ELA"C\M`C]!
ELA"C\M`C]..!BA!
BA!

LAUU\ER!cCA`UE!
ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

LBE!8EaeCAUM8]!
! ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

LEC"IIA!c9
LA8U``!
! ELA"C\M`C]!
ELA"C\M`C]..!BA!
BA!

`AU\A`!Le8U\]!
ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

`B\MCAI!DcCA`IM`!
! ELA"C\M`C]!
ELA"C\M`C]..!LP!LP!

cAeC!OA88!
! ELA"C\M`C]!
! ELA"C\M`C]..!BA!
BA!

cEUE8!cEA8IM`!
ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

c8ALMP!OeCOA8`"!
! ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

8"B\A8P!\9
BMe``\A`!
! ELA"C\M`C]!
ELA"C\M`C]..!BA!
BA!

8]A`![E8`A8PM!
ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

IBMUU![CA"I``a!
! ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

IEA`!c9[EAUU]!
! ELA"C\M`C]!
! ELA"C\M`C]..!BA!
BA!

IEc\8A!A9``MR!
ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

I\AC``"!IRA8MMc!
! ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

I`eCCE8!c8"BE!
! ELA"C\M`C]!
! ELA"C\M`C]..!BA!
BA!

IUEdE!aEM8aE!
ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

U\APEeI![9BeCCE]!
! ELA"C\M`C]!
ELA"C\M`C]..!BA!BA!

U\MLAI!D9
LAB[8"PE.D89
! ELA"C\M`C]!
ELA"C\M`C]..!BA!
BA!

U"LMU\]!\`9UeUU!
ELA"CM`C]!
ELA"CM`C]!.BA!BA!

UMPP!I9aCAIIE]!
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

RA88E`!L"UB\ECC!
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

ELA"CM`C]!
ELA"CM`C]!.BA!BA!

ECA``E!I9ORE"!
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

OE``EU\!IA\L!R\"UE!
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

LA8U"``\MLEB!
ELA"CM`C]!
ELA"CM`C]!.BA!BA!

L"B\ECCE!a8A`U!
! ELA"CM`C]!
ELA"CM`C]!.Uf!Uf!

8M["`D9RACU\E8!
c\9P9
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

IUEc\E`!P9[AOE8!
ELA"CM`C]!
ELA"CM`C]!.O]!O]!

E8"``!a8"ZA8P!
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

E8"``!LACM`E!
! GXW!LAI IAB\ eIEUUI!
AdE9!Ie"UE!H!
BAL [8"PaE.!LA!LA!

I\ECC]<A``\LA]E!
;=X!\A8cE8!P8"dE!Ie"UE!;H=
LMM8EIUMR`!\`D`D

BCA8O!E9c"E8BE!
! HGT!R"``P"``a!RA]!
IU8AUJM8P.!`D`D

LA8"E!c"E`"AZEO!
! ;;HX![MZE`O"CC!8MAP!
PECA`IM`!\`]!`]!

aCE`!E9!L"U\
GGW!MaE`EIEE!IU9!IUE9: =:!
[e]JACM!``]!`]!

AC"B"A!89cEUE8IE`!
! M`E!ImeU\!LA8OEU!
! IbeA8E.!cM![Mf!: :GT!
\A88"I [e8a.!cA!cA!

LM`"BA!I9"``M!
! M`E!ImeU\!LA8OEU!
! IbeA8E.!cM![Mf!: :GT!
\A88"I [e8a.!cA!cA!

IBMUU!\9PE[8MJ]!
M`E!ImeU\!LA8OEU!IbeA8E.!cM!
[Mf!: :GT!
\A88"I [e8a.!cA!cA!

PA`!PECe8E]!
! ;;=:BM``EBU"BeU!AdE9!
! `R.!IUE9;W=
RAI\``aUM`!PB!PB!

D'CC!UAe [E8!
! :THM!LAI IAB\ eIEUUI!
! AdE9!`R.!IUE9S=H!
RAI\``aUM`!PB!PB!

IeIA`!IUEdE`I<L"CCE8!
:THM!LAI IAB\ eIEUUI!AdE9!`R.!
IUE9S=H!
RAI\``aUM`!PB!PB!

a8A]IM`!\EJJ`E8!
! :WMMAL ["A`BE!P8"dE!
! `9cMUMLAB!L P!L P!

OEd"``!LM`IE`!
E0\$?`!e1\$!d!J /@3!
! H=!O8"IU"``!BU9
IA`UA!8MIA![EAB\!J]C!
J]C!

OE`!IO"``E8!
! ;H!RAC`eU!IU8EEU!Ie"UE!
! :T==!
B"``B"``AU"!.M\!M\!

8M`![``Z!
! ;;;!EePM8A!
PE`dE8.!BM!BM!

A`P8ER!BALc [ECC!
! HMX=WWU\!IU9.IUE9: ==!
[MeCPE8.!BM!BM!

PA`"EC!L9d"MCEUUE!
! ;;SW!RAC`eU!IU9!IUE9H==!
[MeCPE8.!BM!BM!

OEd"``!BMM`E]!
! ;;SW!RAC`eU!IU9!IUE9
H==!
[MeCPE8.!BM!BM!

BAL E8M`![8MMOI!
! ;H=DE]JE8IM`!
! IU8EEU!
[MeCPE8.!BM!BM!

CA88]![9[A88EUU!
cM![Mf!T=GH>!
BMCM8APM!Ic8" ` aI.!BM!BM!

DM]BE!CEe ` a!
T=T=D"8 R" ` PACE!AdE9
"8 R" ` PACE.!BA!BA!

BA8C!I"CI [EE!
HHGG!RAC ` eU!a8MdE!AdE ` eE!
8MIELEAP.!BA!BA!

PAd"P!c9CMR8E]!
:W:W!RAC ` eU!a8MdE!AdE9
8MIELEAP.!BA!BA!

OA<R" ` a!LAaa"E!cMM `!
HHGG!RAC ` eU!a8MdE!AdE9
8MIELEAP.!BA!BA!

` ae]E `!beA `!
T;=!EAIU!JMMU" `CC!
[MeCEdA8P!
IA `!P" `LAI.!BA!BA!

O" `L!O"E8 ` E8!
GGSWU"dMC"!IU9
IA `!P" `EaM.!BA!BA!

PAd"P![A8OE8!
X;=T!BE `Ue8]!cA8O!BMe8U!
IA `!P" `EaM.!BA!BA!

BE `U8AC!J"CEI!
X; ;=BE `Ue8]!cA8O!BU!
Bc ; <E!
IA `!P" `EaM.!BA!BA!

CMaA `!MCP!
d*()/ %d, \$ \$' !R, 1)\$7 ,)\$%
8\$(5, 3 ,)*/O!A@)#/%)'!
:WST!LA" `!IU8EEU.!IU9;!
`EIcE8"A.!BA!BA!

cAeC![EBO!
H=! " ` PeIU8"AC!
! cA8ORA]!
BA8IM `!B"U]!. ` d! ` d!

LA8O!I9LA8U" ` EZ!
! T=T=! "8 R" ` PACE!AdE9!
! Ie"UEI
"8 R" ` PACE.!BA!BA!

BAIE!APL" ` "IU8AU"M `!
! HHGG!RAC ` eU!a8MdE!
! AdE9K!cM![Mf!X==!
8MIELEAP.!BA!BA!

DA `EU!BML [I!
! HHGG!RAC ` eU!a8MdE!
! AdE ` eE!
8MIELEAP.!BA!BA!

CA88]!89BMcE!
! cM![Mf!X==.!HHGG!
! RAC ` eU!a8MdE!
! AdE ` eE!
8MIELEAP.!BA!BA!

PM `!RMMP!
! GW;>!CEE!AdE ` eE!
CA!LEIA.!BA!BA!

PM `ACP!OECC]!
! ;G=WOE `]M `!IU8EEU!
! Ie"UE!G=:!
IA `!P" `EaM.!BA!BA!

OAU\8] `!IL"U\
! X;=T!BE `Ue8]!cA8O!
! BMe8U!
IA `!P" `EaM.!BA!BA!

DM]!B9]ALAAUA!
! X; ;=BE `Ue8]!cA8O!
! BMe8U!Bc;!HP!
IA `!P" `EaM.!BA!BA!

PMeaCAI!A9ALEI!
! G>S;!CMI!cAUM!
! AdE ` eE!
! \e `U" ` aUM `![EAB\.!BA!
BA!

IUEdE `!P9
cAU8"BO!
! WWWREIU!J"JU\
IU8EEU.!Ie"UE!
:G==!

A `P8EA!
\M8RAUU!
! HHGG!RAC ` eU!
a8MdE!AdE ` eE!
8MIELEAP.!BA!BA!

PAd"P!CE[CM `P!
! XT; :!8eI\
! IU8EEU!
8MIELEAP.!BA!BA!

DE ` `]JE8!L9
UIAM!I \ "aEOARA!
! HHGG!RAC ` eU!
a8MdE!AdE ` eE!
8MIELEAP.!BA!BA!

8eII!aA8RAB8P!
! HHGG!RAC ` eU!
! a8MdE!
8MIELEAP.!BA!BA!

IUEdE `!B9
`ECIM `!
! :=:!AI \!IU8EEU!
\b:H!
IA `!P" `EaM.!BA!BA!

A ` `C] `!L9
JAEIU" `M!
! X; ;=BE `Ue8]!
cA8O!BMe8U!
Bc ; :E!

C"IA!PAd"PIM `!
X; ;=BE `Ue8]!
! cA8O!BMe8U!
Bc;HA!
IA `!P" `EaM.!BA!BA!

PAdE!\A ` `A!
! : :H;T!EC!BAL" `M!
! 8EAC!
IA `!PE" aM.!BA!BA!

PAd"P!L9R]C"E!
cE!
! HW:HIB\AL[E8I!
8MAP.!Ie"UE!:=;!
UeIU" `.!BA!BA!

DMEC!L9\d"PIUE`! : : ==!UMR`!Q!BMe`U8]! 8MAP!Ie"UE!S==! M8A`aE.!BA!BA!	I\AR`!BMf! : : ==!UMR`!Q! ! BMe`U8]!8MAP! Ie"UE!S==! M8A`aE.!BA!BA!	DEJJ!\`"8IB\ :H:XM:c8EI"CCA! 8MAP! IA`UA!8MIA! dACCE]!.BA!BA! OA8"!OCM[E8PA`Z<]e! T=:!dA`!\`EI!AdE9! IUE9H=T= IA`!J8A`B"IBM.!BA!
cAeC!OE8OM8"A`! TGSW`9cACL!AdE`eE! Ie"UE! : =W J8EI`M.!BA!BA!	R"CCEL!JAP8\M`B! !)\$3.!`"0(9 ! : ==!8MCC" ` I!8P9 L"CC [8AE.!BA!BA!	U\MLAI!CM`a! SXWLA8OEUI!U9! IUE9:G==! IA`!J8A`B"IBM.!BA! BA!
U\E8EIA!LeECCE8! B"U]!\ACC!8MML!H;G! IA`!J8A`B"IBM.!BA!BA!	U#/3,1!8/&\$9!1! W=W:dA`!\`EI! ! AdE`eE! IA`!J8A`B"IBM.!BA! BA!	U\MLAI!CM`a! SXWLA8OEUI!U9! IUE9:G==! IA`!J8A`B"IBM.!BA! BA!
PA`"EC!B9E`aEC! : =: !LM`UaMLE8]!IU8EEU! :WU\!JcMM8! IA`!J8A`B"IBM.!BA!BA!	[8"A`!09B\E88]! c, (*!(!a,1!Q!E5\$(P)8(! ! B/34,0`! SS! [EACE!IU8EEU! 8MML! : =XS!	BA8A!aMCPE` [E8a! H=:!L"II"m`! ! IU8EEU!Ie"UE! : H==! IA`!J8A`B"IBM.!BA! BA!
B\A8CEI!89L"PPCEOaeJJ! SS! [EACE!IU8EEU! [; =A!K! cM! [Mf!SGGH! IA`!J8A`B"IBM.!BA!BA!	DMIEc`" `E!Re! SS! [EACE!IU8EEU!LB! ! [>A.!8L9>SW IA`!J8A`B"IBM.!BA! BA!	OA8E`!UE88A`Mda! ; ; ! `ER! ! LM`UaMLE8]! IU8EEU!Ie"UE! : XW= IA`!J8A`B"IBM.!BA!
LAU\ER!dE!cA! XWIEBM`P!IU8EEU!H`P! JcMM8! IA`!J8A`B"IBM.!BA!BA!	L"B\AEC!c9 ACBA`UA8! ! ; ; ! `ER! LM`UaMLE8]! IU8EEU!Ie"UE! : XW=!	8MIIDM`\`IM`! WHWLA8OEUI!U9! ! IUE9: >GG! IA`!J8A`B"IBM.!BA! BA!
I\APA!PAP8AI! SS! [EACE!IU8EEU!LB! [>A! IA`!J8A`B"IBM.!BA!BA!	IUEdE`!89\AE8UCE! SS! [EACE!IU8EEU!LB! ! [>A! IA`!J8A`B"IBM.!BA! BA!	AC"BE!C"PPPECC! TH=!JMCIML! ! IU8EEU!IUE!H==! IA`!J8A`B"IBM.!BA! BA!
IUEdE`!LMI! H;HWU`"8P!IU9!IUE9;GG! IA`!J8A`B"IBM.!BA!BA!	IUEdE`!LMI! H;HWU`"8P!IU8EEU! ! IUE9;GG! IA`!J8A`B"IBM.!BA! BA!	APE`"OE!APE]E]E! W=!BAC"JM8`"A!IU9! ! IUE9W==! IA`!J8A`B"IBM.!BA! BA!
[8"A`!U9B8Aaa! W=WIA`IMLE!IU8EEU! Ie"UE!>==! IA`!J8A`B"IBM.!BA!BA!	LA8CM!A9aM! W=WIA`IMLE! ! IU8EEU!Ie"UE!>==! IA`!J8A`B"IBM.!BA! BA!	MC"d"A!cA8A! W=WLM`UaMLE8]! ! IU8EEU!IUE9X==! IA`!J8A`B"IBM.!BA! BA!
8AJ"!AIIA`! : =: !BAC"JM8`"A!IU8EEU! Ie"UE!;HW= IA`!J8A`B"IBM.!BA!BA!	8M[E8U!aEf! W=WLM`UaMLE8]! ! IU8EEU!Ie"UE!X==! IA`!J8A`B"IBM.!BA! BA!	8MI"BEC"! d"CCA88EAC! ! W=!BAC"JM8`"A! IU8EEU!IUE9W==! IA`!J8A`B"IBM.!BA!

I EU\!P9\ "CUM`! U\8EE!EL [A8BAPE8M! BE`UE8.!IUE9 : :H= IA`!J8A`B"IBM.!BA!BA!	I e LA!cEEIAcAU" W=!BAC"JM8`"A!IU9! ! IUE9W==! IA`!J8A`B"IBM.!BA! BA!	R "CC"AL! 8MIUMd! I*\$%&@! W=!BAC"JM8`"A! IU9! IUE9W==! \"CCA8]! BM88"aA`! GHWP"d"IAPE8M! IU8EEU.!I e"UE! ; = ;! BAIE! AP L""IU8AU"M `! cM! [Mf!SS====g! LB! [>A! L"B\AEC! 8MB\ LA`! :XW!aAUE RA]! [CdP9! I e"UE!H;W! BM`BM8P.!BA!BA! Ad"! OMRACE R IO" G:T=!Pe [C" `! [CdP.!I e"UE! : ==! Pe [C" `.!BA!BA! IBMUU9 8A]JE8U]! : > : ;! R \"UEBC"JJ!BU9 RAC` eU!B8EEO.!
DEJ]8E]!c9a8A]! W=W.LM`UaMLE8]! IU8EEU.!I e"UE!X==! IA`!J8A`B"IBM.!BA!BA!	"8E`E!O9LMMIE`! W;!IA`UA!] `EZ!AdE9! ! IA`!J8A`B"IBM.!BA! BA!	LA8]!A9 aA`PEI [E8]! ! cM! [Mf!SGGH.!LB! [; =A< ; ==W! IA`!J8A`B"IBM.!BA!
8Ea eCAUM8]!J"CE! 8MML! cM! [Mf!SGGH! IA`!J8A`B"IBM.!BA!BA!	B\8"I!O" ` a! G===!E9; 8P!AdE9! ! IUE9G==! JMIUE8:B"U] .!BA!BA!	LA80!\ eJJ LA`! cM! [Mf!SS====.!LB! [; =A! IA`!J8A`B"IBM.!BA!BA!
PAd"P!LBBMA8P! SHMOEA8`E]!IU8EEU.! `M9 :! EC!BE88"UM.!BA!BA!	BA8CMI!CALAI< [A [["`" ! ; >X>>![ACE`U" `E! P89! IUE9H==! `ERA8O.!BA!BA!	LA80!9I L"U\ G:T=!Pe [C" `[CdP9! I e"UE! : ==! Pe [C" `.!BA!BA!
L A80!9I L"U\ G:T=!Pe [C" `[CdP9! I e"UE! : ==! Pe [C" `.!BA!BA!	8M[E8U! R9 A`PE8IM`! ! H= : !B8MR!BA`]M`! cCABE.!IUE9 : ==! IA`!8ALM`.!BA!BA!	DME!c8'D]A`M`PA! W==!]a`AB"M!dACCE]! 8P9! IUE!GW= RAC` eU!B8EEO.!BA!BA!
ACEf!OA`a! : : : :![8MAP RA] .!IUE9 : X==! MAOCA`P.!BA!BA!	c\"C"ccE!AeBCA"8! : : !8e!IECC!BMe8U! ! RAC` eU!B8EEO.!BA! BA!	E8"B!B9RM]B\"O! >>=: !BACMPE`! CA`E! MAOCA`P.!BA!BA!
L"O\A"C!\A8ALAU" : >>>!\A88"IM`!IU9! IUE9 : GH= MAOCA`P.!BA!BA!	A`U\M`]!\A88"IM`! G;T!:GU\!IU9! I e"UE! ! : =H= MAOCA`P.!BA!BA!	"IA[ECCE!aEB"CI! : >>>!\A88"IM`! IU9! IUE9 : GH= MAOCA`P.!BA!BA!
LEC"IIA!OAI`"UZ! B\$0)\$4+/4A((\$11*85\$! U\$(#0/5/?`! ; =SWAPEC`E!IU8EEU.! IUE9HH=!	MC"d"A!cAUUE8IM`! : >>>!\A88"IM`!IU9! ! IUE9 : GH= MAOCA`P.!BA!BA!	UEP!cMcE! : T: =!\A88"IM`! IU8EEU! MAOCA`P.!BA!BA!
LEC"IIA!OAI`"UZ! B\$0)\$4+/4A((\$11*85\$! U\$(#0/5/?`! ; =SWAPEC`E!IU8EEU.! IUE9HH=!	8EEP!d9IB`L"PU! ! :XX>!ACBAU8AZ! ! AdE`eE! [E8OECE] .!BA!BA!	IUEdE!O8MLE8! ; : : =!BMCCEaE! AdE`eE.!AcU!:H! [E8OECE] .!BA! BA!

U8Ad"i!Mhae"^\!
>:G!\E"^\Z!AdE9
[E8OECE]!.BA!BA!

aACE`![A8[MIE!
:!B]BCMU8M`!8P9!
! LI>=8G==!
[E8OECE]!.BA!BA!

DA`"E!cAaE!
M`E!B]BCM`E!8MAP.!LI!>=<
! : :H:!
[E8OECE]!.BA!BA!

A`P8ER!a9BALc[ECC!
HWGS!B\A`^\`"a!RA]!
[E8OECE]!.BA!BA!

c\"CC"clLeCCE8!
G;T!`Mda!AC["M`!
! RA]!
IA`!8A]AEC!.BA!BA!

DALEI![MMU\E!
! >!8E[ECM!CA`E!
! `MdaUM!.BA!BA!

PAd"PRE"PE[E8a!
>=:!BALc"i"!RA]!.IUE9
HT=!
BALc[ECC!.BA!BA!

LA\CM`!ACP8"PaE!
XSS!BEPa8!IU8EEU.!
! IUE9HG=!
IA`UA!B8eZ!.BA!BA!

9DA`!8E"PE!
! ; :XW!a8MI!8MAP!
IA`UA!B8eZ!.BA!BA!

B9IeI"E![E8C"^\!
: ;GT!U\E!ACALEPA!.IUE9
S.!`M9:G:!
IA`DMIE!.BA!BA!

DEJJ!I\"ECP!
! : : : :!E9\R]!:H=!
LA`UEBA!.BA!BA!

DM]!A9RA88E`!
! :H; :! :U\!IU8EEU!
LMPEIUM!.BA!BA!

8MaE8!da`!\M]!
:H; :! :U\!IU8EEU!
LMPEIUM!.BA!BA!

U\MLAI!I9
! O"L[ACC!
! :H; :! :U\!IU8EEU!
LMPEIUM!.BA!BA!

aA]AU8"!IB\"C[E8a!
! ; : :!P!IU8EEU!Ie"UE!A!
REIU!IAB8ALE`UM!.BA!BA!

DEJJ8E]!\A\"a"A`!
: : :!P!IU8EEU!
REIU!IAB8ALE`UM!.BA!
BA!

PMeaCAI!L9
! a8A`P]!.c9E9
! :HH=!LABAeCA]!
B"8BCE!
BA8L"B\AEC!.BA!

8"B\A8P!LBBA`^\!
! HTWW!cM8UAaE![A]!8MAP!
! Ie"UE!;!
PAd"i!.BA!BA!

DABbeEC"^\E!L9PE8MIA!
: = :!cA8OI\M8E!P8"dE!
Ie"UE! : =!
JMCIML!.BA!BA!

DM\`!B9A`PE8I!
! HW=!MeUB8Mcc"^\a!
! RA]!
JMCIML!.BA!BA!

OA8C!LEEeIE`!
! HW=!MeUB8Mcc"^\a!RA]!
JMCIML!.BA!BA!

OE"U\!a9DM\`IM`!
HW=!MeUB8Mcc"^\a!RA]!
JMCIML!.BA!BA!

LECA`"E!a"CCEUUE!
! : :W\AZECL8E!
! P8"dE!
JMCIML!.BA!BA!

IAEEP!JA88MO\cA]!
! :X;W"8M`!cM"^\U!8P9!.IUE9
! :T=!
JMCIML!.BA!BA!

B]`U\"A!\`LA`!
HW=!MeUB8Mcc"^\a!RA]!
JMCIML!.BA!BA!

DM\`!aMMP"^\!
! HW=!MeUB8Mcc"^\a!
! RA]!
JMCIML!.BA!BA!

DeP"U\!IA`PE8I!
! HW=!MeUB8Mcc"^\a!RA]!
JMCIML!.BA!BA!

HW=!MeUB8Mcc"^\a!RA]!
JMCIML!.BA!BA!

[8"A`!U\EA0E8!
! : :T!OE`!PE8EO!
! CA`E!
cCABE8d"CCE!.BA!
BA!

CM`!R9\MeIE!c\9P!
! G>=:!JC]"^\a!B!8P9!
BALE8M`!cA8O!.BA!BA!

OA8E`!\E8UE8! HH=:!J8A`B"IBM!P8"dE! IUE9:G<=:H=! EC!PM8APM!\`CCI!.BA! BA!	BA8MC]`!L9OE\8E``! HT=H!BECE[8AU"M`! RA]! RMMPCA`P!.BA!BA!	PAd"P!\e`aE8JM8P! :W:T!``\U\!IU8EEU!!L I< HH! IAB8ALE`UM!.BA!BA!
PM8MU\]!8MU\8MBO! :::W:::U\!IU8EEU! IAB8ALE`UM!.BA!BA!	DE``"JE8!RE[E8IO" G>!UE88A![ECCA! P8"dE! RAC`eU!B8EEO!.BA!BA!	OEd``!RMMP8eJJ! ::==!O!IU8EEU!!Ie"UE! H=G! IAB8ALE`UM!.BA!BA!
CAe8E`!\`AdA88M< U8E"B\CE8! ::=S!>U\!IU8EEU!!IUE9 :=S! IAB8ALE`UM!.BA!BA!	LA8aA8EU!I\E8"PA`! :W:T!``\U\!IU8EEU!! LI<HH! IAB8ALE`UM!.BA!BA!	IUEdE`!OECC]! :H:W!O!IU8EEU!!IUE9>==! IAB8ALE`UM!.BA!BA!
UA`]A!PE8"d" >:WC!IU8EEU!!IUE9 :G:=! IAB8ALE`UM!.BA!BA!	8M`ACP!C"E[E8U! HT==!BAc"UMC! AdE`eE!!IUE9G==! IAB8ALE`UM!.BA!BA!	A`P8ER![9[8MR`! HT==!BAc"UAC!AdE`eE! Ie"UE!G==! IAB8ALE`UM!.BA!BA!
C]```\Aea! HT==!BAc"UMC!AdE`eE! Ie"UE!G==! IAB8ALE`UM!.BA!BA!	d"OO"!RMMP! T;=:!!IU8EEU!!LI! AH=G! IAB8ALE`UM!.BA!BA!	OA8E`!C``P\ S>=>!RACE8aA!8MAP!! `M9: :H!cL[!::>! A`UECMcE!.BA!BA!
8MaE8!CEd]! HX=W\`e`U``aUM`! 8MAP! IAB8ALE`UM!.BA!BA!	DABO!ECC"!I! :GHMACc``E!RA]!K!cM! [Mf!TT==! UA\ME!B"U]!.BA!BA!	DABO!ECC"!I! :GHMACc``E!RA]!K!cM! [Mf!TT==! CAOE!U8A\ME!.BA!BA!
L"OE!BAPE! ::==!IRMU\!AdE`eE! IUE9:SW=! cM8UCA`P!.M8!M8!	LA8]!R"E`BOE! XHM`9E9LeCU`MLA\! Ie"UE!:X==! cM8UCA`P!.M8!M8!	DE``"JE8!\MCLEI! X;!BMCeL["A!IU8EEU! Ie"UE!G==! IEAUUCE!.RA!RA!
EdE8"UU!CM`a! \$(/;&\$\$.!"O(9 GSS!8"B\LM`P!IU9 REIU! UM8M`UM.M`M`!	A`P]!aAII`E8! >:=!REIU!:IU!IU9!`M9 H: :! `M8U\!dA`BMedE8! [B![B!	AeP8E]!CEE! ELA"CM`C]! ELA"CM`C]!.BA!BA!
AeP8E]!CEE! ELA"CM`C]! ELA"CM`C]!.BA!BA!	BCA8E!CAeJE`[E8! aACCA8PM! ELA"CM`C]! ELA"CM`C]!.BA!BA!	PA`"EC![eB\ ELA"CM`C]! ELA"CM`C]!.BA!BA!
PAd"P!cEBO! ELA"CM`C]! ELA"CM`C]!.BA!BA!	PM`ACP!9[8MMOI! !ELA"CM`C]! ELA"CM`C]!.BA!BA!	DA"LE!8MIE!aA``M`! ELA"CM`C]! ELA"CM`C]!.BA!BA!

DMA` `A!ae [LA`!
ELA"CM`C]!
ELA"CM`C]!.BA!BA!

DM\ `!E8"BOIM`!
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

L"B\AECA!JCAaa!
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

`AU\A`![A8B"B!
ELA"CM`C]!
ELA"CM`C]!.BA!BA!

`"BMCAI!C9B\AIEU!
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

`MEC!B8"IMIUMLM!
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

cE"Z\"!]A`a!
ELA"CM`C]!
ELA"CM`C]!.BA!BA!

8AB\EC!LBLA\M`!
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

8AB\EC!cEUE8IM`!
! ELA"CM`C]!
ELA"CM`C]!.BA!BA!

RE8`E8![CeLE8!
ELA"CM`C]!
ELA"CM`C]!.BA!BA!

AO\"CA!O8"I\`A`!
W=WdA`!\`EII!AdE`eE!
! WH:W!
IA`!J8A`B"IBM!.BA!BA!

A5/6\$a@4),!
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IA`!J8A`B"IBM!.BA!BA!

[%@(\$!O,0\$1#%y!
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IA`!J8A`B"IBM!.BA!BA!

B,02,(\$!L,%\$`!
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IA`!J8A`B"IBM!.BA!BA!

B#/#1)/4#%\$B5,`!
M8A!
! W=WdA`!\`EII!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

B#/#1)/4#%\$!d*5,%\$,%5
W=WdA`!\`EII!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

P,3/0!A9J%,0i!
! W=WdA`!\`EII!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

P*,0,!C9C\$!
! W=WdA`!\`EII!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

P,%*1!B#/7!
W=WdA`!\`EII!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

E5*i,&\$)#!P,%3,0!
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\,i5'0!J,%@0\$!
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D/!\$B/3/!
! W=WdA`!\`EII!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

O\$!\, /!M@',0?!
! W=WdA`!\`EII!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

O\$5!A9\`3\$!
W=WdA`!\`EII!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

L*(#\$5!0*)/!
! W=WdA`!\`EII!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

c,3\$5,!`),5/0*!
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c,@5,!a%@\$025*0?!
W=WdA`!\`EII!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

8,(\$5!L(3,#/0!
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IA`!J8A`B"IBM!.BA!BA!

8,2@!B*04,?,\$!
! W=WdA`!\`EII!AdE`eE!
IA`!J8A`B"IBM!.BA!BA!

8@11\$\$E2 7 ,%2! I ,% #!89U# / 3 , ! I (,%6\$)iC* ,0?<e\$*/!
W=Mda `i` E!i!ADE ` eEi i W=Mda `i` E!i!ADE ` eEi i W=Mda `i` E!i!ADE ` eEi
IA `i j8A ` B"IBM.IBAIBA! IA `i j8A ` B"IBM.IBAIBA! IA `i j8A ` B"IBM.IBAIBA! IA `i j8A ` B"IBM.IBAIBA!

I@2#\$\$%a /6# ,5\$! U*3 /# '1D1@B\$- , 0! d ,5@/;\$!0 ,/!
W=Mda `i` E!i!ADE ` eEi i W=Mda `i` E!i!ADE ` eEi i W=Mda `i` E!i!ADE ` eEi
IA `i j8A ` B"IBM.IBAIBA! IA `i j8A ` B"IBM.IBAIBA! IA `i j8A ` B"IBM.IBAIBA!

f* ,01B*02 'kKc*! 8\$&\$ (, iU1 , *<R \$*iC\$ \$! i SS=iC!i p/\$\$) .i (@) \$! : .Hw=i i i
W=Mda `i` E!i!ADE ` eEi i SS=iC!i p/\$\$) .i (@) \$! : .Hw=i i i
IA `i j8A ` B"IBM.IBAIBA! I , (% , 3 \$0) / .iBAIBA!

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