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

0) $#,1'!2%!0%1&*3&%&*#1+2%#4!52,+2&,2%2) +,!51#16'!#%.!-&4&7#%,&!12!18&!92.&*%!
-&$#*#1+2%'!927&) &%1!
!
! "#$%&'()*+,-%'
.%/0),'1)23,%#%/"04%'

5,6+/'+/*'7/40,)/2%/-+$'8)$09&'
! 3,0$':;'<=<>'
8,)?%""),'()*/&+/"@&'
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(,;%2<4&.3&) &%1'!

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

- M V0*',%*,%""'#+4%'+'\$)/CM\$+"-0/C'023+9-')/'-#%'")90)%9)/)209'"-+-K"')?'D+3+/%"%'
 ! 2%,09+/"]''

l'#&3)

409-02";'+"'0/'") 2%'0/"-+/9%";'-#%'409-02"_'*%"0,%"'+,%'/)-'3,0),0-0R%*H'A#%'?)\$\$) J 0/C'%B+23\$%"')?'
9) 23\$%-%*',%3+,+-0) /"'*0"3\$+&'"0C/0?09+/-'+33,)3,0+-0) /"')?'?K/*0/C'+/*'K/9%,-+0/-&'?,)2'
409-02"'0/'4+,0) K"'9+"%"H''

Historical Examples of Reparations

!
' (%3+,+-0)/"'#+4%'"K99%""?K\$\$&'6%%/')??%,%*'0/'"%4%,+\$')-#%,'9)K/-,0%";'-)'+--%23-'-)'
2+@%'+

bd;===;===;0/'3+&2%/-"'-#,)KC#'-#%'I/*%3%/*%/-'! ""%""2%/-'8,)9%"";'J#%%'+'

C)4%,/2%/-',%"%+,9#')/"&3#0\$0"'

[K%"-0)/'-#%'4+\$K%')?'-#%'2)/%-+,&'9)23%/"+-0)/'YI/*0+/'1\$+02"'1)220""0)/;'>EF=ZH'A#0"'
%B+23\$%'#0C#\$0C#-"'-#%'-%/"0)/'6%-J%%/'409-02"'+/*'3%,3%-,+-),";'+"'J%\$\$'+"'-#%'J+&"'
,%3+,+-0)/"'9+/'6%'\$%""'2%+/0/C?K\$'J0-#)K-'C,)K3'3+,-0903+-0)/'+/*'"&26)\$09'9)23)/%/-"'\$0@%'
+/'+3)\$)C&H''

'I/'/%+,\$&'%4%,&'%B+23\$%')?'9)23\$%-%*',%3+,+-0)/";'-#%,%'0"'#%"0-+-0)/'+/*'*%\$06%,+-0)/')/'-#%'"0*%')?'-#%'409-02";'+/*'+'?),2+\$'+3)\$)C&'?,)2'-#%'3%,3%-,+-),;'-#%'C)4%,/2%/-H'A#%''%' %B+23\$%"'#0C#\$0C#-'-#%'*0??09K\$-&')?'*%4%\$)30/C',%3+,+-0)/"'-#+-'+,%'2%+/0/C?K\$'-)'-#)"%' 023+9-%*'6&'-#%'0/WK"-09%',%"-0-K-0)/'0"'+020/C'-)'+**,%""H'!/)-#%,'3)-%/-0+\$'0/"-+/9%')?' ,%3+,+-0)/"'0/'-#%'5/0-%*'.-+-%"'0"'-#%'6+--\$%')4%,'UH(H'e='0/'-#%'U)K"%')?'(%3,%"%/-+-04%"H'A#%' 1) 2 20""0) /'-)'. -K*&'+/*'V%4%) 3'(%3+,+-0) /'8,) 3) "+\$""?),'! ?,09+/'! 2%,09+/"'! 9-;'+\$")'@/) J /' +"'UH(H'e=;'0"'+'60\$\$'-#+-'J)K\$*'%"-+6\$0"#'+'9)220""0)/'-)'*%-%,20/%'-#%'/+-0)/"',)\$%'0/'"\$+4%,&;' *0"9,020/+-0)/'+C+0/"-'?,%%*'%/"\$+4%*'3%)3\$%'+/*'-#%0,'*%"9%/*+/-";'+/*'-#%'\$0/C%,0/C'023+9-"')?'"\$+4%,&H'N)-+6\$&;'-#0"'60\$\$'0"'/)-'*%6+-0/C',%3+,+-0)/"'3,)3)"+\$";'0-'0"')/\$&'*%6+-0/C'-#%') 33),-K/0-&'-)'0/4%"-0C+-%'C) 4%,/2%/-'J,)/C*)0/C'+C+0/"-'0\$+9@'! 2%,09+/"H'A#0"'60\$\$;'+-'-#%' -02%')?'J,0-0/C;'J+"'0/-,)*K9%*'-)'-#%'>>C-#'1)/C,%""'6&'(%3,%"%/-+-04%'.#%0\$+'D+9@")/'G%%;' +?-%,'<F'&%+,''')?'(%3,%''%/-+-04%'D)#/'1)&/%,'0/-,)*K90/C'-#%'60\$\$'0/-)'1)/C,%''''-)'/)'+4+0\$H' (%3+,+-0)/"'?),'"\$+4%,&'#+4%'#+*'-#%'\$%+"-'"K99%""'0/'C)4%,/2%/-'*%"30-%'%??),-"'?,)2'),C+/0R+-0)/"'+/*'2%26%,"')?'1)/C,%""H!

Japanese Incarceration and Redress

' A#%'2)"-'2+0/"-,%+2'%B+23\$%')?',%3+,+-0)/"'0/'! 2%,09+

-)'+"',%\$)9+-0)/;'%4+9K+-0)/;'+/*'0/9+,9%,+-0)/H'(%3+,+-0)/"'+,%'+\$")',%?%,,%*'-)'+"',%*,%""'+/*' ,%"-0-K-0)/H'L#0\$%'q0/-%,/2%/-h'0"'-#%'2)"-'9)22)/\$&'@/)J/'J),*'-)'*%"9,06%'-#%'?),9%*' ,%2)4+\$'+/*'023,0")/2%/-')?'D+3+/%"%'3%)3\$%'0/'! 2%,09+'+?-%,'-#%'+--+9@')/'8%+,\$'U+,6),;'0-' *)%'''/)-'3,)3%,\$&'*%''9,06%'J#+-'#+33%/%*H'X),'-#%',%2+0/*%,')?'-#0'''3+3%,;'q0/-%,/2%/-h'J0\$\$' /)-'6%'K"%*'-)'*%"9,06%'-#%'0/9+,9%,+-0)/')?'D+3+/%"%'3%)3\$%'0/'! 2%,09+/'9)/9%/-,+-0)/'9+23"H' A#0"'*09-0) /'0"',%"3%9-?K\$')?'0/-%,40%J%%'J0"#%";',%?\$%9-04%')?'\$+/CK+C%'K"%*'6&'D+3+/%"%' ! 2%,09+/'S,C+/0R+-0)/";'+/*'-#%'2)"-'?+9-K+\$\$&'+99K,+-%|'(%3+,+-0)/"'?),'D+3+/%"%'! 2%,09+/"' J%,%'2%+/-'-)'+**,%''''-#%'0/9+,9%,+-0)/')?'3%)3%')?'D+3+/%''%'+/9%'-,&'0/'-#%'5.'*K,0/C'L),\$*'L+,'IIII'A#%'! 2%,09+/'*%90"0)/'-)')??090+\$\$&'%/-%,'-#%'J+,'J+"'"3K,,%*'6&'-#%'6)260/C')?'8%+,\$' U+,6),'6&'D+3+/%"%'+0,'?),9%"')/'V%9%26%,':;'>Ee>H'AJ)'\$+,C%'"#03"'J%,%'*%"-,)&%*'+-'-#%' 8%+,\$'U+,6),'/+4+\$'6+"%'0/'U+J+0;'+/*'<;e=d'3%)3\$%'J%,%'@0\$\$%*;'J#09#'3,)23-%*'-#%'5/0-%*' .-+-%"'-)'%/-%,'-#%'J+,'+/*'8,%"0*%/-'())"%4%-'-)'%/+9-'7B%9K-04%'S,*%,'E=cc')/'X%6,K+,&'>E;' >Ee<'YD! NPH),CZH'7B%9K-04%'S,*%,'E=cc',%[K0,%*'-#+-'D+3+/%"%'+/*'! 2%,09+/"')?'D+3+/%"%' *%"9%/-'6%',)K/*%*'K3'+/*'#)K"%*'0/',%\$)9+-0)/'9+23"H'L0-#'+/&J#%,%'6%-J%%/'?)K,'*+&"'-)' -J)'J%%@"')?'/)-09%;'D+3+/%"%'! 2%,09+/"'J%,%'?),9%*'-)'*0"3)"%')?'-#%0,'3%,")/+\$'6%\$)/C0/C"' +/*'"%\$\$'-#%0,'3,)3%,-&H'A#%&'J%,%'0/"-,K9-%*'-)')/\$&'6,0/C'J#+-'-#%&'9)K\$*'9+,,&;',%"K\$-0/C'0/' \$)"-'6K"0/%""%";'3,)3%,-&;'+/*'\$+/*'*K%'-)'-#%0,'?),9%*'%4+9K+-0)/H'A#0"'J+"'#+33%/0/C'0/'+/'%,+')?'+/-0MD+3+/%"%',+90"2'+/*'")'J+"'+99%3-%*'6&'-#%'\$+,C%,'! 2%,09+/'3K6\$09H'I-'J+"',%[K0,%*'-#+-' 3%) 3%' J 0-#'+"'\$0--\$%'+"'>i>c-#'D+3

+/*',%2)4%*'?,)2'-#%,'#)2%"H'!-'AK\$%'G+@%;'+/)-#%,'2+/;'.#)09#0'D+2%"'S@+2)-);'J+""#)-'
-)'*%+-#'6&'+'CK+,*'YD! NPH),CZH'

I/9+,9%,+-0)/'%/*%*'0/'>Ee`;'+?-%,'-#%'. K3,%2%'1)K,-',K\$%*'-#+-'-#%'L (! '*0*'/)-'#+4%'
-#%'+K-#),0-&'-)'*%-+0/'\$)&+\$'90-0R%/'''0/'7/*)'4H'A#%'5/0-%*'.-+-%"H'A#%'\$+"-'9)/9%/-,+-0)/'9+23;'

AK\$%'G+@%;'*0*'/)-'9\$)"%'K/-0\$'>EecH''7B%9K-04%'S,*%,'E=cc'J+"'/)-')??090+\$\$&',%3%+\$%*'K/-0\$'>E:c'

6&'8,%"0*%/-'X),*H'I/'>EFF'8,%"0*%/-'(%+C+/'"0C/%*'UH(H'ee<;'-#%'1040\$'G06%,-0%"'! 9-')?'>EFF;'

J#09#'"-+-%"'-#+-'-#%'023,0")/2%/-')?'3%)3\$%')?'D+3+/%"%'+/9%"-,&'J+"'g\$+,C%\$&'2)-04+-%*'6&'

,+90+\$'3,%WK*09%;'J+,-02%'#&"-%,0+;'+/*'+'?+0\$K,%')?'3)\$0-09+\$'\$%+*%,"#03h'+/*'\$0"-"'0-"'C)+\$"'+"'-)'

 $K/9) \, 4\%, \%^* \, ^!2 + / \, \&!\%2) \, - \emptyset) \, / \, "'' + / \, *''' -) \, , \%''' - \# + - \, '\# + *' \, 6\%\% \, /' \, 6K, \emptyset \%^* \, ?) \, , \, ^! \, \&\% + \, , \, "H'''X) \, , \, ' + ' \, 2) \, , \%'' \, .$

9) 23,%#%/"04%'%B3\$+/+-0)/')?'-#%'C,+"",))-"""-,KCC\$%'+/*'3%,")/+\$'+99)K/-"')?'-#%'3,)9%"""

?,)2'2%26%,"')?'-#%'G)"'! /C%\$%"'9#+3-%,;'J#09#'J+,,+/-"'*%-+0\$'-#+-'0"'

\$)""%"+,%"0C/0?09+/-\$&'\$+,C%'9)/"0*%,0/C'J#+-'-#%0,'4+\$K%'J)K\$*'6%'0/'>EE="'*)\$\$+,";'J#%/'-#%'

?0,"-',%3+,+-0)/'3+&2%/-'J+"'2+*%;'+/*'0/'9)23+,0")/'-)'-#%'b<=;==='3+0*'+"',%*,%""'?),'-#%"%'

\$)""%"H'VK%'-)'-#%'#%9-09'+/*'+6K"04%'/+-K,%')?'D+3+/%"%'%4+9K+-0)/;'-#%,%'+,%'/)-'+99K,+-%'

,%9),*"'-)'*%-%,20/%'+'2),%'9%,-+0/'9+\$9K\$+-0)/')?'\$)""%"H''

Economic Impacts

P)"-'J),@')/'-#%'%9)/) 209'023+9-')?'0/9+,9%,+-0)/'"#)J"""0C/0709+/-'70/+/90+\$'\$)""%"'?),'

D+3+/%"%'! 2%,09+/"'J#)'J%,%'0/9+,9%,+-%*H'79)/) 209'\$)""%"'\$+,C%&"-%22%*'?,)2'#+40/C'-)'

"%\$'3%,")/+\$'0-%2"'+/*'3,)3%,-&'+-'+'\$)"";'\$)"0/C'6K"0/%""%";'+/*'\$)"-')33),-K/0-&'?),'J+C%'H'

P),%'"3%90709+\$'&'\$)""%"'9+2%'?,)2'"%\$\$0/C'+K-)2)60%"'-)'0/*040*K+\$"'),'-#%'C)4%,/2%/-'?),'

"0C/0709+/-\$&',%*K9%*'3,09%";'"%\$\$0/C'\$+/*'-)')33),-K/0"-"'+\$")'+-'"0C/0709+/-\$&',%*K9%*'3,09%";'

\$)"0/C'"2+\$'6K"0/%""%"'*K%'-)'-#%'0/+60\$0-&'-)'2+0/-+0/'-#%2'*K,0/C'0/9+,9%,+-0)/;'+/*'

%/-,K"-0/C'0-%2"'),'3,)3%,-&'-)'9+,%-+@%,"'J#)')?-%/'+6+/*)/%*'3,)3%,-&'),'/%4%,',%-K,/%*'

0-%2"'YQ+"#02+;'>EE: ZH'A#%,%'J%,%'+\$")'"0C/0709+/-'\$)""%"'0/'-#%'+C,09K\$-K,%'0/*K"-,&;'+"'+6)K-'

-J)M-#0,*"')?'-#%'D+3+/%"%'J),@?),9%'0/'-#%'J%"-%,/'9)+"-+\$'"-+-%"',%\$0%*')/'-#%'+C,09K\$-K,%'

0/*K"-,&'+/*'+6)K-'bF=;===;==='J),-#')?'?+,2\$+/*'+/*'%[K032%/-'6%\$)/C%*'-)'N0@@%0')/'-#%'

J%"-'9)+"-YQ+"#02+;'>EE: ZH'

S-#%,'"0C/0709+/-'\$)""%"'9+2%'?,)2'\$)"-'J+C%"H'! \$'%"-02+-%";'0/9\$K*0/C'9)/"%,4+-04%'
%"-02+-%";')/'#)J'2K9#'0/9+,9%,+-%*'D+3+/%"%'! 2%,09+/"'\$)"-'*K%'-)'3,)3%,-&'+/*'J+C%'\$)""%"'
"#)J'"0C/0709+/-\$&'#0C#%,'\$)""%"'-#+/'J#+-'J+"'3+0*'6&'-#%'C)4%,/2%/-'-)'+**,%""'-#)"%'\$)""%"'
-#,)KC#'-#%'>EeF'D+3+/%"%'! 2%,09+/'74+9K+-0)/'1\$+02"'! 9-'+/*'-#%'>EFF'1040\$'G06%,-0%"'! 9-H'1/'
-#%'74+9K+-0)/"'1\$+02"'! 9-;'-#%'5. 'C)4%,/2%/-'3+0*'+6)K-'bd:;===;==='0/'-)-+\$'-)'-#%'2+W),0-&'
)?'-#%'<c;`CF'9\$+02+/-";'+/*'-#%'>EFF'1040\$'G06%,-0%"'! 9-'3+0*'b<=;==='-)'+\$\$'"K,4040/C'
0/9+,9%,%%";'J#09#'J+"'+6)K-'b>;C==;===;==='?,)2'-#%'C)4%,/2%/-'YQ+"#02+;'>EE:ZH'U)J%4%,;'
+'"-K*&'6&'0,))2'+/*'(0%2%,'0/'>EeE'?)K/*'-#+-'6+"%*')/'9)/"%,4+-04%'2%+"K,%"')?'0/9)2%'
+/*'3,)3%,-&'\$)"";'-#%,%'J+"'+6)K-'b::;===;==='J),-#')?'\$)""%"'-)'9\$+02'?,)2'-#%'74+9K+-0)/"'

0/'-#%'9)/C,%""0)/+\$'*%\$06%,+-0)/'?),'-#%'>EFF'1040\$'G06%,-0%"'! 9-'?),'/)-'+99)K/-0/C'?),'-#%'\$)"""
)?'?0/+/90+\$'*)9K2%/-"'*K%'-)'0/9+,9%,+-0)/'-#+-'J%,%'/%%*%*'-)'3,)4%'?0/+/90+\$'\$)""%"H'O,))2'
+/*'(0%2%,'?)9K"%*')/'G)"'!/C%\$%"'+"'+'"+23\$%'+/*'K"%*'9)/"%,4+-04%'2%+"K,%"'\$0@%'6+"0/C'
9+\$9K\$+-0)/"')/'>Ee>'9)"-"'+\$-#)KC#'-#%0,"'0"""-0\$\$'9)/"0*%,%*'-#%'2)"-'-#),)KC#'+/+\$&"0"')?'
%9)/)209'023+9-"')?'%4+9K+-0)/'YQ+"#02+;'>EE:ZH''

A#%,%'0"'+'"0C/0?09+/-'\$+9@')?',%"%+,9#')/'-#%'%9)/) 209'023+9-"'?,) 2'-#%'<>"-'9%/-K,&'

+/*'-#%'C%/%,+-0)/+\$'023+9-')?'0/9+,9%,+-0)/'?,) 2'+/'%9)/) 209'3%,"3%9-04%H'1#0/'Y<==eZ'0"'-#%'

2)"-',%9%/-'%9)/) 209'"-K*&'+/*'")\$%'"-K*&')/'-#%'%B-%/-')?'\$) ""%""3%90?09+\$\$&'*K%'-)'J+C%'\$)""'

+/*'\$+6),'2+,@%-'J0-#*,+J+\$'+/*'0-"'\$)/CM-%,2'%??%9-"'+?-%,'0/9+,9%,+-0)/H'A)'K/*%,"-+/*'#)J'

2+\$%'J),@0/CM+C%'D+3+/%"%'! 2%,09+/"'J)K\$*'#+4%'?+,%*'0?'0/9+,9%,+-0)/'#+*'/)-'#+33%/%*;'

1#0/'K"%*'-#%'D+3+/%"%'3)3K\$+-0)/')?'U+J+00;'J#09#'J+"'/)-'"K6\\%9-'-)'0/9+,9%,+-0)/;'+"'+'

9)/-,)\$'C,)K3H'1#0/'?)K/*'%40*%/9%')?'%+,/0/C"'\$)""%"'K3'-)'<`'&%+,"'+?-%,'0/9+,9%,+-0)/H'A#%'

C,%+-%"-'%+,/0/C'\$)""%"'J%,%'?),'-#%'&)K/C%"-'C,)K3')?'2+\$%'0/9+,9%,%%"'+/*'J+""*%-%,20/%*'

0/9+,9%,+-%*H'(%"%+,9#'9)/*K9-%*')/'-#%'%9)/)209'023+9-"')?'0/9+,9%,+-0)/'\$+,C%\$&'?)9K"%"')/'
-#%'\$)""%"'?,)2'3,)3%,-&'+/*'%+,/0/C"')/'-#)"%'0/9+,9%,+-%*'+/*'"#)K\$*'6%'%B3+/*%*'-)'
0/9\$K*%'-#%'023+9-"')/'-#%'9#0\$*,%/')?'0/9+,9%,+-%*'D+3+/%"%'!2%,09+/"H''

Socioeconomic Status of Japanese Americans

A#%'*0"9K""0)/')?'-#%'023+9-"')?'0/9+,9%,+-0)/'2K"-'6%'9)/-%B-K+\@R\%*'6&'-#%' ")90)%9)/)209'"-+-K"')?'D+3+/%"%'!2%,09+/"'-#,)KC#)K-'-#%'<=-#'9%/-K,&H'V+-+')/'-#%' %*K9+-0)/+\$'+--+0/2%/-'+/*')99K3+-0)/')?'D+3+/%"%'! 2%,09+/"'J+"',%9),*%*'6&'-#%'5/0-%*' . -+-%"'L +,'(%\$)9+-0)/'! K-#),0-&'6%?),%'0/9+,9%,+-0)/:'#)J%4%,;'+"'2%/-0)/%*'0/' '-#%'I(.'*%"-,)&%*'0/9)2%'-+B',%9),*"')?'-#%'0/9+,9%,+-%*'?,)2'>EdE'-)'>Ee<' YQ+"#02+;'>EE: ZH'A#0""-K*&'+\$")'?)K/*'-#+-'D+3+/%"%'! 2%,09+/"'J%,%'+\$")'"K99%""?K\$'6%?),%'-#%' $J + ... + J_0 - \#'_3 + ... - J_0 - \#'_0 -$ +99)K/-%*'?),'>c')K-')?'<`'2000)/'*)\$\;+,"'0/'?\)J%,'2+,@%-'6K"0/%""'0/'G)"'!/C\\\\"YQ+"#02+;' >EE: ZH'! '>E: d'"-K*&')/'-#%'")90)%9)/)209'2)60\$0-&')?'D+3+/%"%'!2%,09+/"'\$))@%*'+-'-#,%%' $C\%/\%, +-0)/"'+/*'?)K/*'K/"K,3,0"0/C\$\&'-#+-'-#\%'\%*K9+-0)/+\$'+--+0/2\%/-'\$\%4\\$')?'-#\%'>"-'$ C%/%, +-0)/'J+"''#0C#\$&'9), %\$+-%*'J0-#'-#%''%*K9+-0)/+\$'+--+0/2%/-'\$%4%'0/'-#''?)\$\$)J0/C'C%/%, +-0)/"'6K-'?)9K"%*')/'-#%'023+9-')?'+""020\$+-0)/"'-&\$%'', +-#%, '-#+/'-#%'023+9-')?'0/9+,9%,+-0)/'YG%40/%''>E: dZH'' $!/)-\#\%, '''-K*\&'6\&'1+K*0\$\$'+/*'POB)/'Y<=><\br/>Z'\$))@\%*'+-'-\#\%'\023+9-''')?'\0/9+,9\%,+-0)/')/'$

A#%'%B0"-0/C'\$0-%,+-K,%') /'-#%'"K6W69-')?'D+3+/%"%',%3+,+-0) /"'*)%"'/)-'0/9\$K*%'+'?)\$\$) JM
K3') /'-#%'") 90) %9) /) 209'023+9-"')?',%3+,+-0) /"'+/*'\$+,C%\$&'*%/0%"'+'9) //%9-0) /'6%-J%%/'
D+3+/%"%',%3+,+-0) /"'+/*'-#%'2) 4%2%/-'?),',%3+,+-0) /"'?),'O\$+9@'! 2%,09+/"H'(%"%+,9#'/%%*"'
-) '6%'%B3+/*%*'-) '0/9\$K*%'2),%'2) *%,/'") 90) %9) /) 209'023+9-"')?',%3+,+-0) /";'+/*'
C%/%,+-0) /+\$'023+9-"')?',%3+,+-0) /"H'A#0"',%"%+,9#'J) K\$*'6%'%"3%90+\$\$&',%\$%4+/-'-)'-#%'2) *%,/'
?0C#-'?),',%3+,+-0) /"'?),')-#%,'C,) K3"'0/'! 2%,09+;'/+2%\$&;'O\$+9@'! 2%,09+/"'+/*'*%"9%/*+/-"')?'
%/"\$+4%*'3%) 3\$%H'P&',%"%+,9#'+02%*'-)'%B3+/*') /'-#%'8B0"-0/C',%"%+,9#'6&'%B+20/0/C'-#%'
C%/%,+-0) /+\$'023+9-') /'") 90) %9) /) 209'"-+-K"',%3+,+-0) /"'#+*'?),'D+3+/%"%'! 2%,09+/"'+/*'

[K+/-0-+-04%',%"%+,9#'2%-#)*"'J%,%'9)/"0*%,%*;'-#%,%'J+"'/)-'+*%[K+-%'*+-+')/'
")90)%9)/)209'"-+-K"'+/*'J%+\$-#'?),'D+3+/%"%'!2%,09+/""3%90?09+\$\$&'?),'+'\$)/C'%/)KC#'-02%'
3%,0)*H'I/?),2+-0)/'C+0/%*'?,)2'[K+/-0-+-04%'*+-+'\$)@%\$&'J)K\$*'/)-'#+4%'023+9-%*'+\$-%,%*'
9)/9\$K"0)/"'6K-',+-#%,'+**%*'+'[K+/-0-+-04%'3%,"3%9-04%'-)'-#%'+/+\$&"0"'-#+-'20,,),"'-#%'?0/*0/C"'
?,)2'[K+\$0-+-04%'+/+\$&"0"H'JK+/-0-+-04%'2%-#)*"'+\$")'J)K\$*'#+4%'3,)40*%*'*+-+'?),'*0??%,%/-',%"%+,9#'[K%"-0)/";'"3%90?09+\$\$&')/'-#%'3+--%,/"'+/*'9#+/C%"')?'D+3+/%"%'!2%,09+/'%9)/)209'
"'-+-K";'J#09#'+,%'/)-'%B3\$),%*'0/'-#0"''-K*&H!
!!!!!!!!! 'I'0/-%,40%J%*'-#%''K,404),"')?'0/9+,9%,+-0)/;'-#%'9#0\$*,%/')?'"K,404),"')?'0/9+,9%,+-0)/;'+/*'-#%'C,+/*9#0\$*,%/')?'"K,404),"')?'0/9+,9%,+-0)/'-)'C+-#%,'-%"-02)/&')/'%9)/)209'\$)"";'-)'
#%+,'0/*040*K+\$'+/*''3%90?09'+99)K/-"')/#)J'(%*,%""'2)/%&'J+"'K"%*;'+/*'-)'\$%+,/'2),%'
+6)K-'-#%'0/*040*K+\$'"0C/0?09+/9%')?',%*,%""H'P+/&'+99)K/-"'%B0"-')?'-#%'%2)-0)/+\$'"0C/0?09+/9%'
)?'-#%'C)4%,/2%/-',%9)C/-0)/')?'?+K\$-'+/*'J,)/C*)0/C;'")'+/+\$&"0"'J+"'+\$")'9)/*K9-%*'K"0/C

+/"J%,'J+"'eH>;'J0-#'-#%'\$)J%"-'+/"J%,'6%0/C'R%,)'+/*'-#%'#0C#%"-'6%0/C'FH` 'YA#0"'0"'6+"%*')/'F'
,%"3)/"%";'+"'<',%"3)/*%/-"'9)K\$*'/)-'+/"J%,'-#0"'[K%"-0)/ZH'A#%'-J)',%"3)/*%/-"'J#)',+-%*'
-#%0,'@/)J\$%*C%'-#%'#0C#%"-;')/%'+-'FH`'+/*'-#%')-#%,'+-'c;'#+*',%[K%"-%*'+/*',%9%04%*'-#%0,'

N)-+6\$&;'-#%,%'J%,%'`'3%)3\$%'J#)'J%,%'%23\$)&%*'0/'+C,09K\$-K,%;'J#09#'0/9\$K*%'''C+,*%/0/C'+/*'
?+,20/C;'J#%-#%,'),'/)-'-#%&')J/%*'-#%'?+,2\$+/*H'X),'-#%'C%/%,+-0)/'6),/'+,)K/*'-#%'>Ee=";'

#%+*'*)J/H!

=#: 4&!C?!!

5&4&, 1!*&' \$2%' &' !12! 18&!D6&' 1+2%/! ! ! EF #' !18&!GCHIHHH! '6AA+, +&%1JK!	gS?'9)K,"%'/)-h'Y"-+-%*'6&'<'*0??%,%/-',%"3)/*%/-"Z!
	IN);'I'-#0/@'0-'J+"'-)@%/H'I'-#0/@'-#+-'-#%'\$)""')?'?)K,'&%+,"')?'J),@' %*K9+-0)/'+/*'&)K,'\$0?%'+/*'-#%'\$)""')?'3,)3%,-&'+/*'%4%,&-#0/C'&)K')J/%*'\$+/*'?+,2'"-),%"'6K"0/%""%"'&)K'@/)J'3,%90)K"'?+2\$&' #%0,\$))2"H'&)K'@/)J'-#%'"#+2%;'#K2\$0+-0)/;'-#%'?%+,;'-#%'+/C%,'+/*' &)K'@/)J'6%0/C')"-,+90R%*'+"'+'3%)3\$%;'I'*)/k-'-#0/@'-#%,%k"'+/&-#0/C' -#+-'9)K\$*'9)23%/"+-%'?),'-#+-I''
	gL%\$\$;'0-'J+"/k-'"K??090%/-'?),'J#+-'-#%&'\$)"-')?'9)K,"%#'I-'J+"' 2%+/0/C?K\$'%/)KC#'-#+-'3%)3\$%'?%\$-'40/*09+-%*h!

=#: 4&!L?!!

!M,,6\$#1+2%!: N!O&%&*#1+2%!!5&4&,1!PQ#) \$4&'!						
0@R!	0@R! 0(!M,,6\$#1+2%! B0(!M,,6\$#1+2%! O0(!M,,6\$#1+2%!					
>'	a+,*%/%,'	A%+9#%,'+/*'! *20/0"-,+-),'	V)9-),;'A%+9#%,'			
c'	X+,2%,"'	(%-+0\$%,'	G+J&%,;'5/0)/'S,C+/0R%,'			

>(D)/*X*7"#.)(B#*%'';.(\$"%2#*@/)7*DB*7"00/&/2\$*F/2/&(\$"%2#*%0*./%.)/*"2*\$@/*#(-/*0(-")B3*>&/27*7"#.)(B#* \$@/*\$&(2#"\$"%2*0&%-*C%&Y"2F*')(##*\$%*.&%0/##"%2()*')(##*'(&//*I %\$/*%'';.(\$"%2#*#/.(&(\$/7*DB*(*'%--(*"2*\$@/*R6<*'%);-2*&/.&/#/2\$*%'';.(\$"%2#*@/)7*DB*7"00/&/2\$*#"D)"2F#3**

=#: 4&!S?!!

5&4&,1!T621&'!#: 261! B2)) 6%+1N!U+%3!18*2638!	II-'m-#%'#%+,0/C"n'J+"',%+\$\$\'@0/*')?'+'4%,&'-,+/"?),2+-04%' 2)2%/-'?),'-#%'D+3+/%"%'!2%,09+/'9)22K/0-&'I'
-&. *&''!V*2,&''!#%. !W+,12*N!	gL#%/'3%)3\$%'*0*'C%-'-#%'+3)\$)C&;'0-'*0*'2%+/'+'J#)\$%'\$)-H' T)K'9)K\$*'?%%\$'+',%+\$'''%/''%')?',%*%23-0)/'+/*'-#%'J#)\$%' -#0/C'+6)K-'6%0/C',%\$%4%*')?'-#+-'6K,*%/')?'CK\$\h'
	gI-'m,%*,%""n'9#+/C%*'+\$')?'K"'6%9+K"%'0-'\$0?-%*'-#+-'@0/*')?' 2+&6%'0/?%,0),0-&'),""#+2%h'
	gl'?%%\$'3,)K*%,H'T)K'@/)J;'l'-#0/@')K,'9)22K/0-&'?%%\$''' 9%,-+0/'3,0*%H'T)K'@/)J'&)K'9)K\$*'#)\$*'&)K,'#%+*'K3'6%%,h'

2+@0/C'-#%'+3)\$)C&'2),%'2%+/0/C?K\$'+/*'6%0/C'+'9)/"%[K%/-0+\$'9)"-'-)'-#%'C)4%,/2%/-'0/'
-)-+\$\frac{1}{3}\frac{

$$\begin{split} gA\#\%',\%^*,\%''''9+23+0C/'J+''/k-'WK''-'+6)K-'-,&0/C'-)'C+0/'2)/\%-+,&^{9})&23\%/''+-0)/H'\\ I'2\%+/;'&)K';0CK,\%'-\#,\%\%'&\%+,''')?'023,0'')/2\%/-'+/*'-\#\%'d='&\%+,''')?'CK0$-'+/*'\\ "\#+2\%'J\%'$04\%''J0-\#;'b<=;==='J+''/k-'C)0/C'-)'+6,)C+-\%'+\$')?'-\#+-\H'OK-'-\#\%'\\ 2)/\%&'J+'''3+,-')?'-\#\%'2\%'''+C\H'A\#\%'!&2\%,09+/'3K6\$0'*0*/k-'C04\%'+'*+2/'K/-0$'-\#\%'20/K-\%'J\%'''-+,-\%''\%2+/*0/C'9)&23\%/''+-0)/h'YD)\#/'A+-\%''\#0;'N8('I/-\%,40\%J;'P+,9\#'e;'<=<=\Z\H'\. \end{split}$$

! 99),*0/C'-)'-#%'! 2%,09+/'8"&9#)\$)C09+\$'! "")90+-0)/;'")90)%9)/)209'"-+-K";'J#09#'0"'

0/*09+-04%')?'9\$+"";'0"'g)?-%/'2%+"K,%*'+"'+'9)260/+-0)/')?'%*K9+-0)/;'0/9)2%'+/*')99K3+-0)/hll'

L#0\$%'*+-+')/'0/9)2%'J+"'/)-'9)\$\$%9-%*;'")90)%9)/)209'"-+-K"'9+/'"-0\$'6%'+/+\$&R%*'6&'K"0/C'

*+-+')/'%*K9+-0)/'+/*')99K3+-0)/;'6)-#')?'J#09#'0/?\$K%/9%'0/9)2%lf'S99K3+-0)/"'#%\$*'6&'-#%'

C%/%,+-0)/'-#+-'J+"'0/9+,9%,+-%*'+"'+*K\$-"'J%,%'\$+,C%\$&'J),@0/Cll9\$+"";'%B+23\$%"'0/9\$K*%'

?+,20/C;',%-+0\$;'C+,*%/0/C;'?0"#0/Cll'L#%/'9)23+,0/C')99K3+-0)/"'#%\$*'6&'1!;'11!;'+/*'a1!;'-#%,%'

0"'+'-,%/*'-)J+,*"'2),%'3,)?%""0)/+\$'+/*'#0C#%,'0/9)2%')99K3+-0)/"'0/'%+9#'"K99%'"04%'

C%/%,+-0)/lf'A#%')99K3+-0)/+\$'-,%/*'-)J+,*"'#0C#%,ll0/9)2%'W)6"'0"'%B%23\$0?0%*'0/'-J)'

,%"3)/*%/-"_'?+20\$0%";'"#)J/'0/'A+6\$%'dll'A#0"'-,%/*'0"''K33),-%*'6&'0/-%,40%J%%''2)"-\$&'
,%3),-0/C'-#+-'-#%&'?%\$-'g6%--%,')?'h'-#+/'-#%0,'3+,%/-_"'C%/%,+-0)/ll'A#%,%'0"'/)'\$+/CK+C%'0/'

"-+-K"'9+K"%*'6&',%*,%""'2)/%&H'A#%,%'J%,%'#)J%4%,'\$)/CM\$+"-0/C'023+9-"')/'9)22K/0-&'-#+-' 9+/'6%'+--,06K-%*'-)'-#%',%*,%""'2)4%2%/-'+/*'J0//0/C',%*,%""H'P+/&'0/-%,40%J%%"" 9) 22%/-%*') /'-#%'*+2+C%'-) '-#%'D+3+/%''%'! 2%,09+/'9) 22K/0-&'+'''+',%''K\$-')?'0/9+,9%,+-0) /' 3,)9%""+/*'409-),&H'|K)-%"'?,)2'0/-%,40%J""-#+-'%B3,%"""-#0"',%\$0%?'),'40/*09+-0)/'9+/'6%'?)K/*' 0/'A+6\$%'eH'! \$-#) KC#'-#%, %'J+"'+', %9) C/0-0) /') ?'-#%'409-), &'-#%, %'J+"'+\$") '%B3\$090-'2%/-0) /') ?' -#%'9)/-0/K+-0)/')?'")90+\$'WK"-09%'J),@'?,)2'2)"-')?'-#%'0/-%,40%J%%"H'8,%40)K"'J),@'+C+0/"-' +/-0M0220C,+/-'0/WK"-09%";'0/9\$K*0/C'+/-0MPK"\$02""%/-02%/-"'+?-%,'Ei>>'+/*'0/'-#%'A,K23' ! *20/0"-,+-0)/;'0220C,+/-'*%-%/-0)/'9%/-%,"'+-'-#%'5.'")K-#%,/'6),*%,;'),'C%/%,+\$',%9)C/0-0)/')?'C)4%,/2%/-',+90"2'J+"'2%/-0)/%*'6&'?)K,'3%)3\$%||'N)-+6\$&;'N1(('+"'+/'),C+/0R+-0)/'4)-%*' -)'"K33),-'U(e='+-'-#%'?%*%,+\$'\$%4%\$'+/*'!0'd><>'0/'1+\$0?),/0+H'A#0"'"%/-02%/-')?'9)/-0/K0/C' ")90+\$'\K"-09%'\J),@'0/'9)22\K/0-0\\")-\#\,'-\#+/'\D+3+/\\"\\'!2\%,09+/\"\0"\+\\$")',\%\\\\9-*\\0'\)-\#\\,' %B0"-0/C'-%"-02)/&'+6)K-'-#%',%*,%""'2)4%2%/-;'0/9\$K*0/C'+'>EE: '.K"+/'U+&+"0'0/-%,40%J'?,)2' -#%'^)09%"')?'D+3+/%"%'! 2%,09+/'(%*,%""'1)/?%,%/9%'0/'J#09#'P"H'U+&+"0'"+&"'-#+-'-#%'q\$%C+9&')?'-#%',%*,%""'2)4%2%/-'C)%"'6%&)/*'D+3+/%"%'!2%,09+/"h'+/*'90-%"'+'-02%'G+-0/'!2%,09+/'),C+/0R%,"'90-%*'-#%',%*,%""'2)4%2%/-'+"'3,%9%*%/-'0/'.+/'D)"%H''

L#%/'+"@%*'J#+-'9)K\$*'#+4%'2+*%',%3+,+-0)/"'2),%'2%+/0/C?K\$;'''%4%,+\$',%"3)/*%/-"'
2%/-0)/%*'-#%'*%\$+&'0/',%*,%'''H'. 3%90?09'9)/9%,/"'J%,%'-#+-'-#%'C%/%,+-0)/'J#)'J+"'

-#%,%?),%'/)-',%9%040/C',%*,%""H''.%4%,+\$'0/-%,40%J%%"'+\$")'2%/-0)/%*'-#%'C,)K3"'-#+-'J%,%'

%B9\$K*%*'?,)2',%9%040/C',%*,%"";'"3%90?09+\$\$&'-#%'D+3+/%"%'G+-0/'!2%,09+/";'J#%/'+"@%*'+6)K-'

J#+-'J)K\$*'#+4%'2+*%',%*,%"""2),%'2%+/0/C?K\$H'A#%'?)\$\$)J0/C'[K)-%""?,)2'0/-%,40%J%%'o>='

%B3,%""%*',%9)C/0-0)/')?'-#%'3"&9#)\$)C09+\$'*+2+C%'-#+-'3%,2%+-%*'-#%'D+3+/%"%'!2%,09+/'

N) -+6\$%'*0??%,%/9%"'0/9\$K*%'"9+\$%'+/*'-02%II'L#0\$%'-#%'>EFF'1040\$'G06%,-0%"'! 9-'*0*'
+2)K/-'-)')4%,'+'60\$\$0)/'*)\$\$+,"'?),'0-"'%*K9+-0)/'?K/*'+/*')4%,'>I\'60\$\$0)/'0/'*0,%9-'
3+&2%/-";'*0,%9-'3+&2%/-"')/\$&',%+9#%*'"K,4040/C'0/9+,9%,%%";'+6)K-'F=;==='3%)3\$%;'

J#09#'0""'0C/0?09+/-\$&'\$%""'-#+/'-#%'/K26%,')?'3%)3\$%'*%"9%/*%*'?,)2'%/"\$+4%*'3%)3\$%'
),'-#%'/K26%,')?'0\$+9@'! 2%,09+/"'J#)'\$04%*'-#,)KC#'002'1,)J'\$+J";'),'-#%'/K26%,')?'

O\$+9@'! 2%,09+/"'\$040/C'-)*+&H''!**0-0)/+\$\$&;'-#%'3+""0/C')?'-#%'>EFF'60\$'9+2%')4%,'e='
&%+,"'+?-%,'0/9+,9%,+-0)/;'J#0\$%'UH(He='0"'9)/"0*%,0/C'023+9-"'+99K2K\$+-%*'"0/9%'>c>EH'
A#%'*0??%,%/9%"'0/"'9+\$%'),'-02%'9+//)-'6%'+**,%""%*'0/'-#0"'3+3%,;'#)J%4%,;'3)"0-04%'

023+9-"'?,)2'-#%'1L (I1'#%+,0/C"'+,%'K/*0"3K-%*'+/*'"K33),-'-#%'*%4%\$)32%/-')?'+'
9)220""0)/'?),'"-,K9-K,+\$'+/-0M6\$+9@/%""'0/'! 2%,09+'+/*'0-"'?)K/*+-0)/;',%C+,*\$%""')?'
3)-%/-0+\$'9)"-'),'*0??09K\$-&H''

A#%')-#%,',%9) 2 2%/*+-0) /'C\$%+/%*'?,) 2 '0/-%,40%J%%"'0/'-#0"""-K*&'0"'-)'%,,') /'
-#%'"0*%')?') 4%,9) 2 3%/"+-0) /;'J#09#'0"'+,CK+6\$&'023) ""06\$%H'P+/&'0/-%,40%J%%"'
%B3,%""%*'6%\$0%?'0/'20""%*'6%/%?0-"'-#+-'J) K\$*'#+4%'9) 2%'?,) 2',%3+,+-0) /"'6%0/C'2),%'
0/9\$K"04%'+/*'C%/%,) K"H'! \$\$'0/-%,40%J%""#%\$*'-#%') 30/0) /'-#+-'-#%'3+&2%/-"'C04%/'J%,%'
/)-'"K??090%/-'-)'9) 4%,'+9-K+\$'\$) ""%";'/)-'0/9\$K*0/C'%2)-0) /+\$'-,+K2+;'+/*'/)'
0/-%,40%J%%"'-#+-'?%\$-'3+&2%/-"'J%,%'-)) 'C%/%,) K"'),'%4%/'+*%[K+-%H'1/-%,40%J%%'
"%/-02%/-'023\$0%"'-#+-'0/9,%+"0/C'2%+/0/C'+/*'%??%9-04%/%""',%[K0,%"'2),%'?K/*0/CH'
L#%/'9) /"0*%,0/C'%9) /) 209',%3+,+-0) /""?),'0\$+9@'! 2%,09+/"'0-'0"'023),-+/-'-)'@/) J'
-#+-'2+/&'D+3+/%"%'! 2%,09+/""#+*'\$+,C%\$&',%9) 4%,%*'?0/+/90+\$&'6&'-#%'-02%'-#%'>EFF'
1040\$'G06%,-0%"'! 9-'3+""%*;'-#0"'0"'9) /?0, 2%*'6&'0/-%,40%J',%"3) /"%"H'1-'0"'/)-'-#%'"+2%'
C%/%,+\$'"0-K+-0)/'?),'0\$+9@'! 2%,09+/"'C04%/'-#%'3%,"0"-0/C',+90+\$'J%+\$-#'C+3H'A#0"'2%+/"'

-#+-'2)/%-+,&',%3+,+-0)/";'+"0*%'?,)2'+/'+3)\$)C&;'?),'O\$+9@'! 2%,09+/"'/%%*'-)'6%'
0"9K""%'0/'2),%'*%3-#'?),'3)-%/-0+\$'023+9-'+/*'+2)K/-H'

! /) -#%, '023), -+/-', %9) 22%/* +-0) /'0"'-) '9%/-%, '+??%9-%*'9) 22K/0-&'2%26%, "'' 0/'-#%', %3+, +-0) /'''3,) 9%'''H'! '''%B3, %''''%*'6&'0/-%, 40%J %'';'-#%', %*, %'''''3,) 9%''''#+*'+/'' %23) J%, 0/C'+/*'#%+\$0/C'023+9-') /'9) 22K/0-&;'+"0*%'?,) 2'+/&'?0/+/90+\$'), '%2) -0) /+\$' $\#\%+\$0/C'?,) 2'-\#\%', \%3+, +-0) /'''+/*'+3) \$) C&'0-"\%$?H''A) '3) -\%/-0+$\$&'\#+4\%'+'''02\%+, '\#\%+\$0/C'
%??\%9-'?), '0\$+9@'! 2\%, 0\9+/'''0/'-\#\%''?0C\#-'?), 'UH(H'e='+/*', \%3+, +-0) /''';'0\$+9@'9) 22K/0-&'
), C+/0R+-0) /'''+/*'0/*040*K+$'''/\%*'-) '6\%'9\%/-\%, \%*'(\%) 0. 4(/) -0. 4(-\%) 0+9-(-\%) 0+-0. 1((1Tf[(e-0)-0. 534(0)-0(-\%)))$

\$0-%,+-K,%'+/*'-%"-02)/&')/'0/9+,9%,+-0)/H'123),-+/-'-#%2%"'0/9\$K*%*'-#%'#%+\$0/C'3)J%,')?'
),C+/0R0/C'?),',%*,%""'+/*'-#%'9)220""0)/'#%+,0/C";'3,0*%'0/'-#%',%*,%""'409-),&;'+/*'
2+0/-+0/%*'0/4%"-2%/-'0/'")90+\$'WK"-09%'0""K%"H'A)'+/"J%,'-#%',%"%+,9#'[K%"-0)/;
;'/)H'N)'*+-+'

?0/*0/C""KCC%"-'-#%,%'J+"'+'\$)/CM-%,2'023+9-')/'-#%"')90)%9)/)209'"-+-K"')?'D+3+/%"%'
! 2%,09+/"'J#)',%9%04%*',%*,%""'+/*'-#%0,'*%"'9%/*+/-"H'V+-+'+\$")'"KCC%"-"'-#+-'-#%,%'J+"'/)'
"#),-M-%,2'9#+/C%'0/'")90)%9)/)209'"-+-K"'6%9+K"%',%*,%""'2)/%&'J+"'2)"-\$&'K"%*'?),'C0?-"'),'
%4%,&*+&'3K,3)"%"H'0%/%?0-"'?,)2',%*,%""'J%,%'\$+,C%\$&')/'3%,")/+\$'+/*'9)22K/0-&'\$%4%\$"H'
8%,")/+\$'6%/%?0-"'0/9\$K*%*'\$0?-0/C'?%%\$0/C"')?'"#+2%'+2)/C'-#%'0/9+,9%,+-%*'+/*'-#%0,'9#0\$*,%/'
+/*'9)22K/0-&'\$%4%\$'6%/%?0-"'0/9\$K*%*'"%--0/C'+'3,%9%*%/-'?),'"3%+@0/C')K-'0/'-#%'D+3+/%"%'
! 2%,09+/'9)22K/0-&'+/*'?),'+9#0%40/C',%*,%""'0/'! 2%,09+/'#0"-),&H'A)'+/"J%,'-#%',%"%+,9#'
[K%"-0)/;'

'-#%'3) J%,')?'-#%'9) 2 20""0) /'#%+,0/C'3,) 9%""'?),'9) 2 2 K/0-&'
,%6K0\$*0/C'+/*'-#%'"KCC%"-0) /"'?),'023,) 4%2%/-'-)'-#%'"0C/0?09+/9%')?',%3+,+-0) /"'+,%',%\$%4+/-'
?),'-#%'2) *%,/',%3+,+-0) /"'2) 4%2%/-H'. 3%90?09+\$\$&;'0/-%,40%J%%"""+0*',%3+,+-0) /"'J) K\$*'#+4%'
6%%/'2),%'3) J%,?K\$'0?'-#%&'#+*'9) 2%'"')) /%,;'0/9\$K*%*'G+-0/'! 2%,09+/'D+3+/%"%;'+/*'#+*'2),%'
?K/*0/CH'a04%/'0/-%,40%J',%"3) /"%"'+/*',%?\$%9-0) /"') /',%*,%"";'9K,,%/-'3,) 3) "+\$'UH(He='"#) K\$*'
6%'3+""%*'02 2%*0+-%\$&'+/*'+-'-#%',%3+,+-0) /"'*%\$06%,+-0) /""-+C%;'#0C#%,'9) 23%/"+-0) /'"#) K\$*'

"K,404),"'#+4%'3+""%*'+J+&'+/*'#+4%'/)-'6%%/'+6\$%'-)'3,)40*%',%-,)"3%9-04%'0/3K-')/'-#%'
023+9-')?'-#%'! 9-'+/*',%3+,+-0)/""3%90?09+\$\$&H'A#%'*+-+'"#)K\$*'+\$")'6%'3,0),0-0R%*'6%9+K"%')?'
-#%'/)4%\$-&')?'-#%',%*,%""'409-),&'+/*'-#%'20/02+\$'"K99%""?K\$'%B+23\$%"')?',%3+,+-0)/"'0/'5.'
#0"-),&H'!\$")'"KCC%"-%*'0"'?K-K,%',%"%+,9#')/'-#%'")90+\$'WK"-09%'%/C+C%2%/-'+9,)""'+\$\$'!"0+/'
! 2%,09+/'C,)K3";'-)'K/*%,"-+/*'0?',%*,%"""#+*'+'2%+"K,+

Bibliography

CCC3"27"(2(00("F%?Q(#K"(Q%. (Q%2)"2/K. &/##K&/)/(#/Q"27"(2K')("- #K'%- - "##"%2KF&(2\$/7K- %&/KX4K- K7; &"2FK984=3**

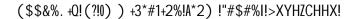
- 627"(2*1/#"7/2\$"()*: '@%%)#3**R%?/&2- /2\$*%0*%3(383B\$1(8+, #(&')\$3(8\$C&20"#2(\$6553+2)\$%3(383B** R%?/&2- /2\$*%0*L(2(7(g*627"F/2%; #*(27*I %&\$@/&2*<00("&#*L(2(7(3*M(#\$*; . 7(\$/7N*_9*0/D&; (&B* _ `9=N*@\$\$. #]00CCC3&'((2'K'"&2('3F'3'(0/2F099``9```9bba409ba9b=94=a`a[3**
- 5(. (2/#/*<- /&"' (2*I (\$"%2()*d; #/; 3*

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- $p(-(-\%\%\%^+3^*03^*7988 = \sqrt{1}('"()^*1/.(\&(\$'\%2\#)^*5(.(2/\#/^*<-/\&''(2^*1/7\&/\#\#^*(27^*<0\&''(2^*<-/\&''(2^*L)("-\#)^**) \\ + 98^*S3L3^*>@"&7^* \%)7^*M353^*[aaN^*@\$\$,]00)(C7^*F"\$()'\%--\%2\#3D'3/7; 0\$C)AQ?\%)980^*\#\#909X^*$
- p(- (\$%\f': 3^7_`9X\f'd(&'@^98\3^L"?")^\m'D/&\$"/#*U; D)\f''+7; '(\$\f'\2^0; 273^\D#()\f'\&\f9(/. /^\&7#8+33^\f'\)
 @\\$\$. #]\figur{0}\f'\(37/2\f'\g\g\g\g\f\)\f_\`\m'\D/\&\f'\f_\\+7; '(\\$\f'\2\f_\)\f'\\f_\\+7; '(\\$\f'\8\f_\)\g\g\f_\\\

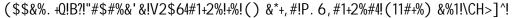
Τ

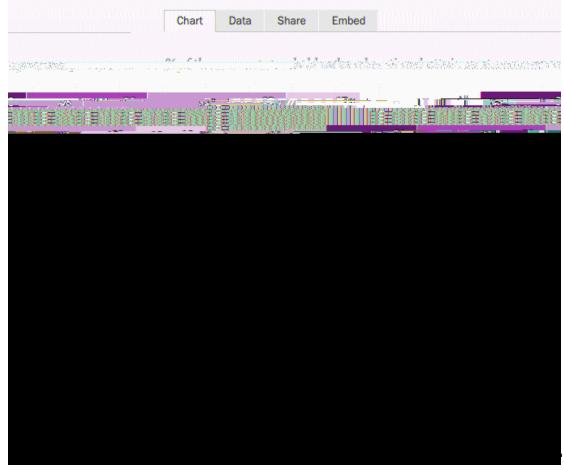




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0+9@C_{,})K/*'V\%2)C_{,}+3\#99''+/*'8+,\%/-'U0''-),&'
   >H S/'+'"9+$%')?')/%'-)'-%/;'-%/'6%/C'-#%'2)"-;'#)J'2K9#'*)'&)K'@/)J'+6)K-'&)K,'
       3+,%/- "'%B3%,0%/9%'0/'-#%'0/-%,/2%/-'9+23"]'
          +H 7B3$+0/'#)J'2K9#'0/?),2+-0)/'-#%&'"#+,%*'J0-#'&)K'+/*'J#+-'-#+-'J+"'$\@\\
   <# I?'&)K'*)'/)-'20/*'2%'+"@0/C;'J#+-'&%+,'J%,%'&)K'6),/]'</pre>
   dH L\#+-'0"'-\#\%'/+2\%')?'\&)K,'3+,\%/-Y"?'J\#)'J\%,\%'3$+9\*'0/'0/-\%,/2\%/-'9+23"]'!/*'J#+-'
       9+23'J%,%'-#%&'#%$*'0/]'
   eH L#+-'J+"'-#%,')99K3+-0)/'+/*'#0C#%"-'%*K9+-0)/+$'+--+0/2%/-]'
          +H 7B3+/*')/'-#0"'0/?),2+-0)/'6%?),%'+/*'+?-%,'0/-%,/2%/-'J#%/',%$%4+/-'
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          +H I?'&%":'3$%+"%'%B3$+0/'+/&'9$+02""+33,)4%*'+/*'+/&'0/?),2+-0)/'&)K'20C#-'@/)J'
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   FII !?'&)K'@/)J:'#)J'J+"'-#%'2)/%&'?,)2',%*,%""'K"%*'6&'&)K,'3+,%/-Y"Z]'
          +H U)J'*0*'-#%'<=;==='9#+/C%'&)K,'?+2\&\"3%/*0/C'#+60-"'*K,0/C'-#%',\%\%4+/-'-02\%'
              3%,0)*1'
.)90)%9)/)209'123+9-"'+/*'8%,")/+$'$30/0)/"'
   >H U)J'#+"'&)K,'")90)%9)/)209'"-+-K"'9#+/C%*'-#,)KC#)K-'&)K,'$0?%'YX,)2'9#$$*#))*'-)'
       +*K$-#))*'-)'3+,%/-#))*'),'+/&')-#%,'$0?%'9#+/C%Z]'
   <H V)'&)K'?%%'3%,")/+$$&'023+9-%*'&)K,'3+,%/-Y"Z'%B3%,0%/9%"'0/',%C+,*'-)'0/-%,/2%/-]'</p>
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   dll V)'&)K'-#0/@'&)K'+,%'q6%--%,h')??;'+6)K-'-#%'"+2%;'),'qJ),"%h')??'%9)/)209+$&'-#+/'
       &) K, '3+,%/-" 'C%/%, +-0) /]'L#&]'
   eH V)'&)K'-#0/e'2)/%-+,&',%3+,+-0)/"'C04%/'-)'&)K,'3+,%/-1"Z'+/*'-#%')-#%,'"K,404),"')?'
      0/-%./2%/-'J%.%'"K??090%/-1'L#&').'J#&'/)-1"
   `# V)'&)K'-#0/@',%*,%""',%3+,+-0)/"'+/*'+3)$)C&'J%,%'2%+/0/C?K$'-)'&)K,'?+20&{1'U)J'")1''
   CH V)'&) K'?%%$'3%,") /+$$&'023+9-%*'6&'-#%'3,) C,+220/C'?K/*%*'6&'-#%'1040$'G06%,-0%'''
       7*K9+-0)/'XK/*]'L#&'),'J#&'/)-H'
   : II V)'&)K'?%%$'2),%'),'$%""'9)//%9-%*'-)'&)K,'D+3+/%"%'#%,0-+C%'+/*'9K$-K,%'-#+/'&)K,'
       3+,%/-"1"
   FII L\#+-'+,\%'\&)K,'\#)3\%''?),'?K-K,\%'C\%/\%,+-0)/''')?'D+3+/\%''\%'! 2\%,09+/'']'
   EH I"'-#%,%'+/&-#0/C'%$"%'&)K'J)K$*'$0@%'-)'"+&'),'+/&'0/"0C#-'-#+-'&)K'-#0/@'J)K$*'6%'
       ,%$%4+/-'),'023),-+/-'-)'+**'-)'-#%'9)/4%,"+-0)/'+6)K-'D+3+/%"%'0/-%,/2%/-]'
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 $A\#\%'^*+-+'?),'-\#0'''C,+3\#'+,\%''')K,9\%^*'?,)2'-\#\%'!2\%,09+/'1)22K/0-&'.K,4\%&'+/*'+/+$&R\%^*'+/*'?),2+--\%^*'0/-)'-\#\%'9\#+,-'6&'-\#\%'8\%J'(\%''\%+,9\#'1\%/-\%,;'+\"'+'3+,-')?'-\#\%','?+9-\"\#\%''\%'3)3K\$+-0)/'0/'-\#\%'5/0-\%*'.-+-\%''\H$