

!"#\$%&'(#&)\*+),-.)"/0#1"22/),3,.0#4.'.,5.#36.,7#8&,7#96&7.#':##  
;&' ,) .0#<)\*.7#36.#=>?@#1!1#A/,\*,.) .0B?#

!"#\$%&'!#"#()\*+,-#\$. /!01)23/(4,!&/#2!05.52567,!!  
8/936!056%:,!;#<=>6!0?62@A<sup>B</sup>,!C'D(\*>!E6F@G<sup>H</sup>!

!@H(@2I@\$.:,!+J+J!

!  
#

CD037&'3'!!&!2#K5\$!=51>L!5=!/I#(@!#I5>(\$#(35636%!)%>3/@.36@L!=5\$!MNOPQRST!F#1136@L!3L!  
9)@)@\$#6/!)59!(5!H\$35\$3(3A@!#11@LL!=5\$!2365\$3(<!H5H>.#(356L!())#(!)#F@!I@@6!H#\$31>.#\$.<!<br>#=@1(@/!I<!())@!H#6/@231,!#6/!I@@6!())@!L>IK@1(!5=!)3L(5\$31#.!#6/!L(\$>1(>\$#./!3L#/F#6(#%@,!!<br>H#\$31>.#\$.<!U.#1\*!#6/!P6/3%>65>L!36/3F3/>#.L!!V@!L32>.#(@!())@!+JSW!MQM!O#1136@!&..51#(356!<br>%>3/@.36@L!>L36%!/#(#!=\$52!())@!&2@\$31#6!M522>63(<!0>\$F@<!>6/@\$!/3==@\$6(!#LL>2H(356L!56!<br>(5(#.!F#1136@!L>HH.<!!U.#1\*!#6/!P6/3%>65>L!36/3F3/>#.L!152I36@/!\$@1@3F@!#!)3%)@L)#\$@!5=!!<br>F#1136@L!152H#\$@/!(5!())@3\$!H5H>.#(356L!L)#\$@!=5\$!#..!#LL>2H(356L!56!(5(#.!F#1136@!L>HH.<!!<br>-59@F@\$,!())@3\$!F#1136@!L)#\$@!>6/@\$!())@!+JSW!MQM!%>3/@.36@L!3L!156L3/@\$!I.<!59@\$(!())#6!())@3\$!<br>L)#\$@!5=!!MNOPQRST!/@#()L!#6/!#%@R#/#>L(@/!//@#()L!!V@!())@6!L32>.#(@!56@!2

6!P6/@X!Y&QPZ!#L!#!H\$5X<!-5\$!

/3L#/F#6(#%@,!9@!L)59!()#(!#7J [ !)3%)R&Q!\$@L\$F@!361\$@#L@L!())@!6>2I@\$!5=!F#1136@L!#..51#(@/!  
(5!U.#1\*!5!\$P6/3%>65>L!36/3F3/>#.L,!93!)#!L)#\$@!()#(!#HH\$5#1)@L!())@3\$!MNOPQRST!/@#()!L)#\$@!  
9)@6!())@3\$!#6/!#I5>(G!:!23..356!>63(L'!!

@X1@..@6(!#LL3L(#61@'!!!

<sup>1</sup>!CP; !,M#2 I\$3/%@!C&!J+S4T,!D0&'!HH#()#\* ] 23('@/>!  
<sup>4</sup>!D63F@SL3(<!5=!"@66L<.F#63#!")3.#/@.H)3#!" &!ST\$J7,!D0&'!L1)23/() ]>H@66'@/>!  
<sup>7</sup>!CP; !,M#2 I\$3/%@!C&!J+S4T,!D0&'!#/#2L5. ] 23('@/>!  
<sup>1</sup>!CP; !,M#2 I\$3/%@!C&!J+S4T,!D0&'!L56%++ ] 23('@/>!  
<sup>B</sup>!U5L(56!M5..@%@,!M)@L(6>(!-3..!C&!J+7BG,!D0&'!#<=>6'L562@A ] I1'@/>!  
<sup>G</sup>!U5L(56!M5..@%@,!M)@L(6>(!-3..!C&!J+7BG,!D0&'!#!>6F@ \$ ] I1'@/>!!!

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5IL@F#(356L!#LL3%6@/!(5!)@!%\$5>H!3L!#HH\$5X3 2 #(<@!\>#.!(5!)@!6> 2 I@\$!5=!H@5H.@!36!)@!%\$5>H!  
#L!156=3\$ 2 @/!5\$!@L(3 2 #(@/!=\$ 2 !#L@156/#\$<!L5>\$1@'!

!

; )@!"DC0!/#(#!5@L!65(!156(#36!36=5\$ 2 #356!56!()@!)@#.(.)!1)#\$#1(@\$3L(31L!5=!L>\$F@<@/!  
36/3F3/>#L'!!V@!/@=36@!#6!36/3F3/>#.#L!)3%)!\$3L\*!3=!( )@<!)#F@!#!15 2 5\$I3/3(<!L>1)!#L!1#61@\$!,  
\*3/6@<!/3L@#L@,!)@#\$(!/3L@#L@,!/3#I@(@L,!5\$!)3%)!UCP!36!()@!Uak00'!!V@!()@6!%\$5>H!()@!Uka00!  
/###!I<!#%@!I36,!L@X,!\$#1@,!#6/!=5\$!@#1)!15 2 I36#(356,!9@!15 2 H>(@!)@!H\$5H5\$(356!5=!)@!  
H5H>.#(356!()@!3L!)3%)R\$3L\*!'; )@6!9@!\$@(>\$6!(5!)@!"DC0!/#(#!#6/!@#1)!36/3F3/>#.#L!#LL3%6@/!(5!  
()@!\_)3%)!\$3L\*!1#(@%5\$<!9 3()!)@!H\$5I#I3.3(<!\$@.#F#6!(5!)@3\$!%\$5>H!36!()@!Uka00'!!!

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a36#..<!9@!2>L(!3 2 H>(@!#6!&QP!L15\$@!=5\$!@#1)!36/3F3/>#.'!!V@!1#665(!#LL3%6!()@!#1(>#.!&QP!5=  
@#1)!H@\$L56!36!()@!"DC0!/#(#!I@1#>L@!&QP!3L!15 2 H>(@/!>L36%!1@6L>L!I.51\*!.@F@.!#F@\$#%@L!#6/  
()@!"DC0!%@\$#H)31!LH@13=313(<!3L!56.<!#(!)@!">I.3!DL@!C31\$5/#(#!&\$@#Y"DC&Z!.@F@.'!036%)!  
Y+JJ4Z!\$@H5\$(L!)@!SG!15 2 H56@6(L!#6/!)@3\$115@=313@6(L!>L@/!(5!/@(\$ 2 36@!)@!1@6L>L!(\$#1(!.@F@.!  
&QP!36!STTJ'!V@!>L@!()@L@!15@=313@6(L!(5!=36/!&QP!#(!)@!)5>L@)5./!.@F@.'!8#1)!15@=313@6(!3L!  
#LL3%6@/!#!9@3%)(!=5\$!()@!)5>L@)5./!>L36%"DC0!/#(#!#(!)@!)5>L@)5./!.@F@.'!; )@!9@3%)(@/!L> 2!  
5=115@=313@6(L!%3F@L!)@!\$#9!6> 2 @\$31#!&QP!L15\$@!5=!)@!)5>L@)5./!'0361@!"DC0!.36\*L!  
)5>L@)5./!L!(5!36/3F3/>#L,!9@!#LL3%6!()@L@!L15\$@L!(5!@#1)!36/3F3/>#.!5=!)@!)5>L@)5./!36!"DC0!  
V@!/3F3/@!()@!/3L(\$3I>(356!36!/@13.@L!#6/!#LL3%6!@#1)!/@13.@L15\$@L!S!(5!SJ'!!!

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V@!#\$\$! 2 36/=>.!()#(!)@\$@!#\$\$@L@F@\$#!.3 2 3(#(356L!(5!5>\$!L3 2 >.#(356!I@1#>L@!5=!/#(#!156L(\$#36L'!!  
;)@! 2 5L(!3 2 H5\$(\$#6(!.3 2 3(#(356!L@ 2 !=\$ 2 !1@\$(#36!//#(#!5 2 3LL356L!36!"DC0!/#(#!#6/!)@!=#1(!)@#(!  
9@!15 2 H>(@!&QP!#(!)@!=# 2 3.<!@F@.!\$#()@\$!)#6!()@!1@6L>L!I.51\*!.@F@.'!V@!5 2 3(!W! 2 3..356!H@5H.@!  
.3F36%136!%\$5>H!\>#(\$@L!>1)!#L!H\$3L56L,!6>\$L36!=#13.3(3@L,!#6/!15..@%@!#6/!>63F@\$L3(<!)5>L36!#L!  
2 5L!"DC0!F#\$3#I.@L!/5!65(!@X3L!=5\$!()@ 2 !#6/!)@<!#\$\$@!#>(5 2 #31#..<!@X1.>/@/!=\$ 2 !()@!)3%)R  
&QP!%\$5>H'W!!05 2 @! 2 3LL36!F#\$3#I.@L!=5\$!H@5H.@!.3F36%136!)5>L@)5./!L@((36%#\$\$@!#LL> 2 @/!(5!I@!J'!!  
;)@!&HH@6/3X!H\$5F3/@L! 2 5\$@!/@(#3.!56!5>\$! 2 @)5/5.5%<'!!!

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+++E ; &' , ) .#C%''&3,")#/) \* .7#=>?@#1 ! 1#- / , \* . , ) .0#

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a3%>\$@!S!\$@H5\$(L!)@!H\$5H5\$(356!5=!F#1136@L!#..51#(@/!(5!U.#1\*!#6/!P6/3%@65>L!H5H>.#(356L!  
Y15 2 I36@/Z!#L!9@!F#\$<!)@!(5(#!!/5L@L!5=!F#1136@L!>6/@\$!)@!+JSW!MQM!%>3/@.36@L!#LL> 2 36%!#

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V @\$H5\$(!)\$@@!I@61) 2 #\*\$L!=5\$!15 2 H#\$3L56!36!()@!a3%>\$@!()@!H5H>.#(356!=\$#1(356!5=!U.#1\*!#6/!  
P6/3%@65>L!%\$5>HL,!()@!=\$#1(356!5=!MNOPQRS\$@.#(@/!/ @#()L!# 2 56%!U.#1\*!#6/!P6/3%@65>L!  
H5H>.#(356L,!#6/!()@!#%@R#/K>L@

/3==@\$@61@!#1\$5LL!L(#@L!#L!F#1136@!L>HH.<!361\$@#L@L'!!; )3L!1#6!I@!L@6!I<!15 2 H#\$36%!()@!15.5\$L!  
#1\$5LL!()@!(9 5!L1@6#\$35L!36!()@!L@156/!H#6@.!5=!a3%>\$@!+'!!

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; )@!()3\$/!H#6@.!5=!a3%>\$@!+!L)5 9L!()#(!\$.#(3F@!(5!()@!L)#\$@!5=!/@#()L!36!()@!L(#@,!65\$()@#L(@\$6!  
L(#@L!\$@1@3F@L!.@LL!()#6!()@3\$L)#\$@!5=!/@#()L,!9)3.@!L5>()@#L(@\$6!L(#@L!\$@1@3F@! 2 5\$@!()#6!()@3\$!  
L)#\$@!5=!/@#()L'^@9!m@\$L@<!#6/!^@9!j 5\$\*!L(#6/!5>!>6/@\$!I5!()@!+J!#6/!: J! 2 3..356!L1@6#\$35

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\$#(35636%,!=5\$!)@!156(@X(!5=!L1)55.!L@#(!#LL3%62 @6('!!P6!)@!+JJG!"#\$@6(L!P6F5.F@/!36!M52 2>63(<!01)55.L!FL'!0@#((. @!1#L@,!!)@!D63(@/!0#(@L!0>H\$@2 @!M5>\$(!/@13L356!\$>.@/!#%#36L(!/3\$@1(<!>L36!\$#1@!#L!#!=#1(5\$!36!hRS+!#/ 2 3LL356L'!!0(#\$(36%!36!+JJT,!M)31#%5!">I.31!01)55.L!#/5H(@/!#!6@3%) I5\$)55/RI#L@/!#==3\$2 #3F@!#1(356!L<L(@2 ,!>L36%!56.<11@6L>L!(\$#1(!.F@.!2 @#L>\$@L!5=!/3L#/F#6(#%@!YQ>\$,!"#()#\*!#6/!0?62 @A!+J+Jn!8..3L56!#6/!"#()#\*!+J+JZ'!  
!  
&QP!)#L!#.L5!I@@6!>L@/!36!\$@1@6(!9 @3%)(@/!.5((@\$<RI#L@/!L1)@2 @L,!#LH@13#.!1#L@!5=!\$@L\$F@!  
L<L(@2L,!(!5!#..51#(@!#6(3RF3\$#!!/\$>%L!Y"#()#\*!@('!#.'!+J+JIZ'! ; )@!M52 2569 @#.( )!5=!"@66L<.F#63#!  
)#L!>L@/!&QP!#L!H#\$(!5=!())@!L(#(gL!5==313#!H5.31<!5\$!#..51#(36%!L1#\$1@!MNOPQLH@13=31!  
2 @/31#(356L,!361.>/36%!k@2 /@L3F3\$!MNOPQ!H#(3@6(L!9)5!\$@L3/@!93(36!())@!25L(!/3L#/F#6(#%@/!  
6@3%) I5\$)55/L!36!"@66L<.F#63#!\$@1@3F@!)3%)@\$!H\$35\$3(<!9 @3%)(L!(5!\$@1@3F@!())@L@!L1#\$1@!

a3%>\$@!7!3..>L(\$#@L!)59!#!\$@L@\$F@!L<L(@2!95>./!95\$\*!=5\$!F#1136@L!93()!#!)3% )R&QP!\$@L@\$F@!  
1#(@%5\$<!36!# / /3(356!(5!()@!5\$3%36#!.+JSW!MQM!1#(@%5\$<'!! ; )@!(5H!H#6@.!L)59L!()@!H\$5H5\$(356!5=  
361\$@2@6(#.!F#1136@!>63(L!#9#\$/@/!(5!()@!)3%)!&QP!H5H>.#(356!



# 25>6(!;! ; )@!@==@1(!56!)@!5()@\$!(95! 2 @#L>\$@L!5!=#3\$L)#\$@L!/>@!(5!#!)3%)R&QP!\$@L@F@!3L!  
6@%.3%3I.@'!!!

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; )@!&HH@6/3X!\$@H5\$(L!56!L@F#\$#!5()@\$!/3 2 @6L356L!5=!F#1136@!#..51#(356!!a3%>\$@!&S!#/ /L!  
- 3LH#631!H5H>.#(356L!(5!a3%>\$@!;!#6/!L)5 9 L!()#(!#!)3%)R&QP!\$@L@F@!\$@L>.(L!36!#!)3%)@\$!L)#\$@!5=!  
U.#1\*,!P6/3%@65>L,!#6/! - 3LH#631!\$@13H3@6(L'!!&(!G:! 2 3..356!>63(L,!#7J [ !)3%)R&QP!\$@L@F@!\$@L>.(L!  
36! 2 5\$@!F#1136@L!(5!())3L!%\$5>H!()#6!I5()!()@3\$L)#\$@!5=!()@!H5H>.#(356!#6/!()@3\$L)#\$@!5=!MNO PQ!  
/ @#(L'!!a3%>\$@!&+!15 2 H#\$@L!#!)3%)R&QP!\$@L@F@!(5!#!/3\$@1(!\$#13#!.\$@L@F@!5\$!U.#1\*!#6/!  
P6/3%@65>L!36/3F3/>#L'!!a5\$!.@F@.L!5=!F#1136@L!>6/ @\$!SJJ! 2 3..356!H@L\$56!>63(L,!#7J [ !)3%)R&QP!  
\$@L@F@!)#L!#L3 2 3.#\$!@==@1(!#L!#!: [ !L@L@F@!5\$!U.#1\*!#6/!P6/3%@65>L!36/3F3/>#L'!!a3%>\$@!&4!  
L)5 9 L!()#(!()@!#F@\$#%@!#%@!5=!F#1136@!\$@13H3@6(L!3L!..5 9 @\$!()#6!()@!H5H>.#(356!#F@\$#%@!>6/ @\$!+JSW!  
MQM!%>3/ @.36@L!5\$! 2 5L(!.@F@.L!5=!F#1136@L!>HH.<'!a3%>\$@!&7/L)5 9 L!()#(!()@L)#\$@!5=!F#1136@L!  
#..51#(@/!(5!=@ 2 #.@L!3L!)3%)@\$!()#6!()@!H5H>.#(356!-\$#1(356!5\$!F#1136@L!>HH.<.@L!()#6!SJJ!  
2 3..356!H@L\$56!>63(L,!I>(13L!1.5L@!(5!()@!H5H>.#(356!=@ 2 #.@!-\$#1(356!9 )@6L!>HH.<!3L!%\$#@#(5!()#6!  
SJJ! 2 3..356!H@L\$56!>63(L'!

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;E 1")'%/0,")#

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; )@!1>\$@6(!/ @I#(@!56!)5 9 !(5!H\$35\$3(3A@!F#1136@!#..51#(356!=5\$!)#\$/ @L(R)3(!15 2 2 >63(3@L!)#L!65(!  
9 \$@L(.@/! 9 3(!LH@13=31!/@(#3.L!5=! 9 )@()@\$!@X3L(36%!L<L(@ 2 L!#\$@!@ \>3(#I.@!I#L@/!56!@ 2 H3\$31#!./#(#!  
5\$!)5 9 !(5!#1(>#..<13 2 H.@ 2 @6!@)3%)@6@/!H\$35\$3(<!=5\$!H#\$31>.#\$!%\$5>HL'!!0361@! 2 #K5\$!%\$5>HL!)#F@!  
65(!<@(!=36#3A@/!%>3/ @.36@L!56!#..51#(356!/ @LH3(@!9 5\$\*,!9 @!\$@H5\$(!56!)5 9 !()@!+JSW!MQM!  
"#6/ @ 2 31!P6=.>@6A#!O#1136@!%>3/ @.36@L!9 5>./!#..51#(@!F#1136@L!(5!U.#1\*!#6/!P6/3%@65>L!  
36/3F3/>#L!#6/!#1\$5LL!L(#@L'!!!!

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N>\$!#6#.<L3L!3..>L(\$#@L!()@!3 2 H5\$(#61@!5=!#H\$@13L@!/@=363(356!5=!@ \>3(#I.@!#..51#(356!36!L@((36%!  
F#1136@!#..51#(356!H5.31<'!V @!@L(3 2 #(@!()#(!U.#1\*!#6/!P6/3%@65>L!H5H>.#(356L!15 2 I36@/!\$@1@3F@!  
2 5\$@!F#1136@L!15 2 H#\$@/!(5!()@3\$(5(#.!H5H>.#(356!L)#\$@!5\$!#..!@F@.L!5=!F#1136@L!>HH.<'! - 5 9 @F@,\$!

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@L(3 2 #(@L!5=!MNO PQ!1#L@L!#6/!/ @#()L'!!&L!3 2 H\$5F@/!/ #(!I@15 2 @!#F#3.#I.@,!3(!9 5>./!I@!  
9 5\$( ) 9 )3.@!(5!\$@F3L3(!()@L@!@L(3 2 #(@L'!! ; )@!L@156/!3LL>@!36F5.F@L!(#\*@R>H'!!0@F@\$#!.L(>/3@L!  
L>%%@L(!()#!U.#1\*!

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4.:.7.)'.0#

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M@6(@\$L!=5\$!Q3L@#L@!M56(\$5.'!+JSW'!!\_&..51#(36%#!#6/!;!#%@(36%!"#6/@231!P6=>@6A#!O#1136@!  
Q>\$36%#!#6!P6=>@6A#"#6/@231`!!DO!Q@H#\$(2@6(!5=!-@#.)!#6/!->2#6!0@\$F31@L'!!

!

M5)@6,lm56'+J+J'!\_ ; )@!e36@!3L!a5\$236%!=5\$#!MNOPQRST!O#1136@'!V)5!0)5>./!U@!#(!()@!  
a\$56(i`!!"#%\$"%\$,!m>6@!+T'!/53ISJ'SS+BsL13@61@'#!I/:GGJ!!

!

M5F3/(\$#1\*36%'152'!!+J+J'!\_ ; )@!MNOPQ!k#13#!Q#(!; \$#1\*@\$`!!&F#3.#I.@!#(!  
15F3/(\$#1\*36%'152s\$#1@'!e#L(!#11@LL@/!&>%>L(!+W,!+J+J'!

!

Q55.36%,!h#( ).@6'+J+J'!!\_MNOPQRST!O#1136@!"\$35\$3(3A#(356!V5\$\*!b\$5>H!M56L3/@\$(356L``!!  
&MP"!MNOPQRST!O#1136@L!V5\$\*!b\$5>H'!!&F#3.#I.@!#(!  
)((HLlss999'1/1'%5FsF#1136@Ls#13Hs2@@(36%Ls/596.5#/LsL.3/@LR

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"#()#\*,"#\$%&'!;#<=>6!0?62@A,!C'D(\*>!E6F@\$,!#6/!C'!U>236!j @62@A'+J+J'!!\_ ;\$3#%@!  
"\$5(515.!Q@L3%6!=5\$!O@6(3.#(5\$!k#(35636%!36!#!"#6/@2311!P6(@%\$#(36%!C>.(3H.@!8()31#.!O#.>@L!  
)\$5>%)!k@L@F@L`!!^U8k!V5\$\*36%!"#H@\$!+BT:S'!

!  
"#()#\*,"#\$%&'!;#<=>6!0?62@A,!C'D(\*>!E6F@\$,!#6/!C'!U>236!j @62@A'+J+J'!!\_a#3\$!  
&..51#(356!5=!O#1136@L,!O@6(3.#(5\$L!#6/!&6(3F3\$#!!;\$@#(2@6(L!e@#F36%!^5!8()31#.!O#.>@!U@)36/!  
36!-@#.)!M#\$@!k#(35636%`!!&>%>L(!&F#3.#I.@!#(!!)(HL!ss#\$X3F'5\$s#ILs+JJW'JJ4G7'!

!  
r>366,!0#6/\$#!M\$5>L@,!&2@.3#!m#23L56,!O31\*3!0'!a\$@32>(),!m3!&6,!b\$@%5\$<!k'!-#6151\*!,Q56#./!  
C>L#!+JSG'!\_8XH.5\$36%\$#13#!.36=->@61@L!56!=->!F#1136@!#((3(>/@L!#6/!I@)#F35\$!k@L>.(L!5=!#!  
6#(356#.!L>\$F@<!5=!V)3(@!#6/!&=\$31#6!&2@31#6!#/>.(L`!A\*""#%\$,!4:YWZ,!SSBGRSSG7'!

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"#!

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!"#\$%&'(())"\*+,-./:0123456789@A\$B7%3\$82(1-36C)  
!"#\$%&'(())"\*+,-./:0123456789@A\$B7%3\$82(1-36C)

Tier 1

Tier 2

Tier 3

Tier 4

Tier 5









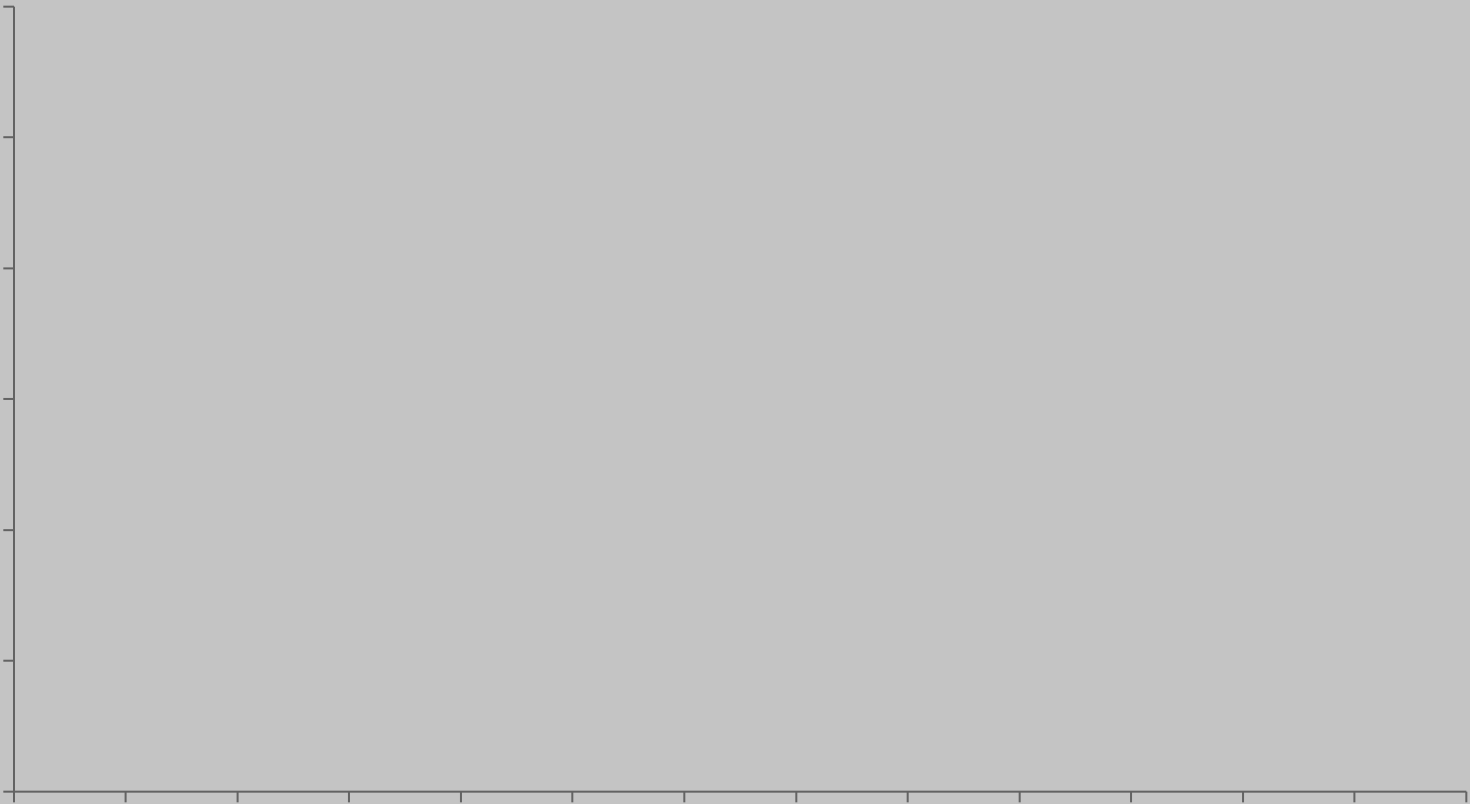
Figure 4

Marginal share of high-DI population obtaining a vaccine

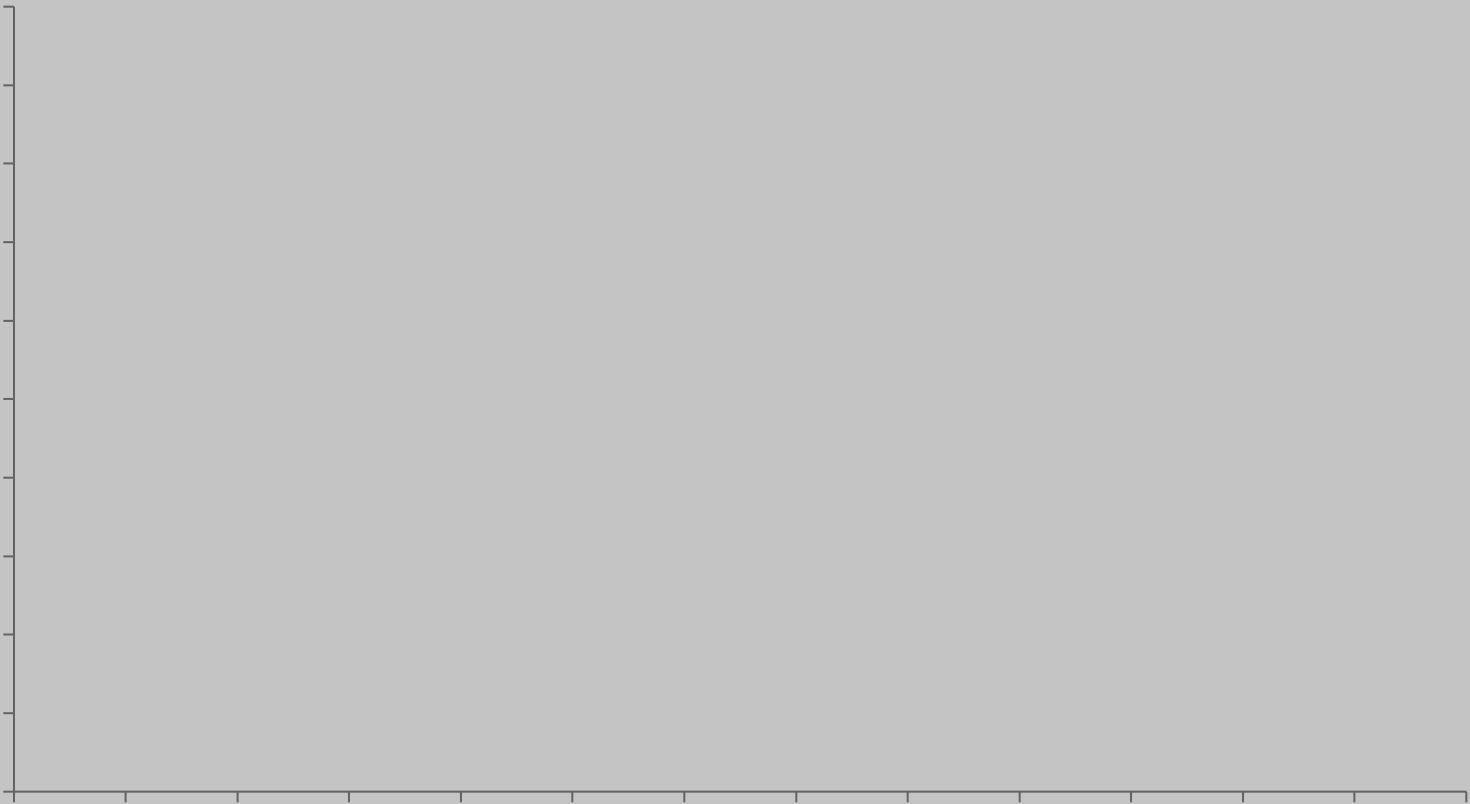
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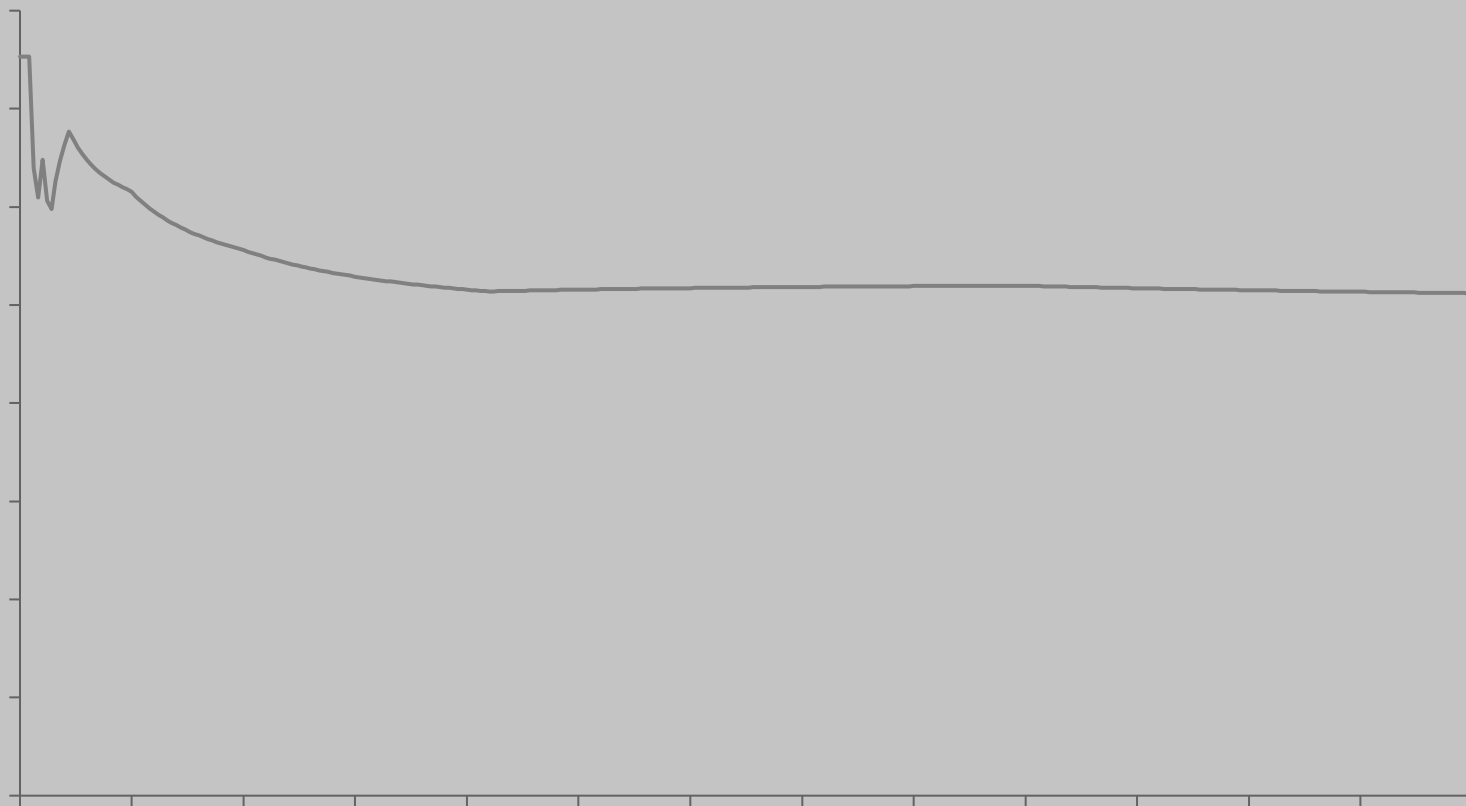












!

! '#\$%'&' ( (%'')\$\*+&,\$ - .#/0\$1''&2314%) .3%&/'')&5 /0/&, 1.34%6&

!

"#!\$%#!&'()\*!(+ ,!-+ , ./0+#12!3#4 4 1+."02!50)0.60!"70.8!9(.8!: 7(80!#;!!  
<()).+02!+= , 08!"70!>?@A!3% 3!B 1. , 0'.+02CD!&E!

F(8(/!G#!F("7(\*!J (8(' ,!: )74 . , "I!G , ( 4!: #'# 4 #+!K , L. +!: #+ /!M(E; 1+!: N+ 4 00! P #! ="\* 1!Q+608!

!

71''0%'06&

G@H! R6086.0L#####>!

G@H@H! %("(!: #18)02#####>!

G@H>H! :.4 1'(" .#+!F8#)0, 180#####S!

G>H! M.08!T(U0'' .+ /!38."08.(#####M!

G>H@H! 3% 3! /8#1W2!(+ , !.082#####M!

G>H>H! %("(!.22102!(+ , !.4 W08;0)"!L#8\*(8#1+ , 2#####A!

G>H>H@H! R))1W(" .#+('!2W0).;.)"E!(+ , !21W0820"" .+ /!#####A!

G>H>H>H! X(" .#+('!20)18."E! /8#1W!2.00#####Y!

G>H>H\$H! J ./7Z8.2\*!)# + , .".#+2!(+ , !"70!&5 9 : : #####@?!

G>H>H^H! F80 /+ (+ " !L# 4 0+#####@!

G>H\$H! 3# 4 4 0+ " !#+! ".08!(+ , ! /8#1W!2.002#####@S!

G>H^H! M.08!UE!" .08!)8."08.( ! , 0"(.'2!;#8!'(U0'' .+ /!#; !F= P : ! , ("#####@S!

G>H^H@H! X(" .#+('!20)18."E!W082#++0'#####@S!

G>H^H>H! J 0 ("7)(80!W082#++0'#####@V!

G>H^H\$H! K 4 W'#E002!#;!)8.".)('!.+ , 12"8.02#####@ [!

G>H^H^H! J ./7Z8.2\*! , 0 4 # /8(W7.)2#####@A!

GS#H! 3(')1'(" .#+!#; !G%-!6('102#####@Y!

GS#H@H! R6086.0L#####@Y!

GS#H>H! P .22.+ /!6('102!(+ , !# 4 ."0 , !#U2086(" .#+2#####>?!

GS#H\$H! 3# 4 W#++0+ " !UE!)# 4 W#++0+ " ! , 0"(.'2#####>@!

GV#H! X#"02!#+!B8(W7.+ /#####>>!

GV#H@H! %0("7!8("02\()1('!(+ , !(/OZ( , ]12"0 , ^!UE!8()0\_0"7+.)"E#####>>!

GV#H>H! : ("0!UE!2("0! , .2"8.U1" .#+#####>S!

G[ #H! M(U'0!#; !; . '02#####>S!

!

&

!



' 89k ! : %3 : \$% ; &

!

' 8989k 5 / 0 / & , 1.34%6&

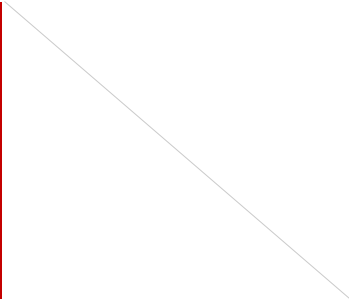
!

` 0!U(20!#18!W8.#8."E!".082

0eW'.)."!2"("040+"!\\$+#"!.)'1,0,!.+!7./708!W8.#8."E!/8#1W2D^I!"70!3%3d2!.4W'.)."!2"("040+"!  
 \\$#"708!/8#1W2D^I!#8!)#44#+#!20+20!\L#!/8#1W2!"7("!"70!F=P:!,#02+d"!,.,;080+."("0!U1!"127#1',!!  
 +#!")1('E!#608'(W^H!R18!1+,082'(+,./!#;!"7#20!802"8.).#+2!7(2!U00+!())#1+"0,!,#8!.+!#18!  
'(UO''.+!/!)8."08.(H!  
!  
%10!"#!,("(!'.4."(.#+2I!L0!80'E!#+!8(+,#4.0("#+!;#8!"70!(22./+40+"!#;!W0#W'0!"#!)08"(./+3%3!  
/8#1W2H!  
!  
M70!G3: !F=P:!,#02!+#!"+)'1,0!,("(!#+!"70!W8020+)0!#;!7./7Z8.2\*!)#+,."#+2I!L7.)7!.4W()!"2!  
#+0d2!".08!W8.#8."E! `0!21WW'040+"!L."7!>?@A!,("(!;8#4!"70!&07(6.#8('!5.2\*!9())#8!:1860.'(+0!  
 :E2"04!&59: :^!\3%3!>?@AU^H!G2!"70!#U2086("#+2!+!"70!&59: :!(80!1+80'("0,!"#!"7#20!+!"70!  
 F=P: !L0!80'E!#+!8(+,#4.0("#+!#!'.+\*!"70!"L#!,("20"2!UE!)#4W1".+/"70!W8#W#8".#+!L."7!(!  
 7./7Z8.2\*!)#+,."#+!;#8!0()7!)7(8()08.2".)!04#/8(W7.)!/8#1W!.+!"70!&59: :!(+,(22./+./!0()7!  
 #U2086("#+!.+!F=P: !W082#+!,("(!2!7./7Z8.2\*!12.+/"L0./7"0,!)#.#+!;.W2H!P#80!,0'(.2!(80!.+!"70!  
 \$M.08!+)'12.#+!)8."08.(D!20)".#+!#;!"7.2!,#)140+"H!  
!  
 `0!)7#20!"#!81+!"70!".08!(22./+40+"!W8#)022!#+'E!#+)0!,10!"#!"70!'(8/0!2.00!#;!"70!,("20!"(+,!"70!  
'(8/0!2.002!#;!/8#1W2!(+,,!,04#/8(W7.!)("0/#8.02!80'("60!"#F`BMFH!M7.2!.2!+#!("P#+!0!3(8#!  
 2.41'("#+H!  
!  
 `0!120!U#!"7!"70!W082#+!(+,"70!7#12.+/"1+."!F=P:!,("(!;#8!(22./+./!G80(!%0W8.6("#+!+.,0e!!  
 \G%-^!>H?!+=+.6082."E!#;!\`2)#+2.+!:)7##!#;!P0,.)+0!(+,"F1U'.!)J0("7!>?@[^!"#!.+,.6.,1('2I!  
 (2!"70!)#4W#+0+"2!#;!"70!G%-!.+6#'60!U#!"7!.+,.6.,1('Z'060!'("8.U1"02!;#1+,!#+'E!.+!"70!W082#+!  
,("(!(+,"7#1207#',Z'060!'("8.U1"02!;#1+,!#+'E!.+!"70!7#12.+/"1+."!,("H!\`0!L080!(U'0!"#!'+\*!"70!  
 "L#!,("20"2I!(2!L0"!(2!.0+";E!802.,0+"2!#;!"70!2(40!7#12.+/"1+."!L."7.+!"70!W082#+!,("I!12.+/"!  
 "70!6(8.(U'0!:K5-GTXRI!(+!-%!+14U08!1+.b10!"#!"70!7#12.+/"1+."!"7("!.2!W8020+"!.+!U#!"7!"70!  
 W082#+!(+,"70!7#1207#',!,("H!  
!  
 `0!)(++#!(22./+!"70!)1('!G%-!#;!0()7!W082#+!.+!"70!F=P:!,("(!U0)(120!G%-!2!)#4W1"0,!  
 12.+/"!0+212!U'#)\*!'060!(608(/02!(+,"70!F=P:!/0#/8(W7.)!2W0).;)."E!#+'E!/#02!,#L+!"#!"70!  
 F1U'.!)=20!P.)8#,("(!G80(!\F=P G^!'060'H!\`0!.+2"0(,(WW8#e.4("0!"70!G%-!#;!0()7!;(4.'E!  
 12.+/"(608(/02!"(\*0+!(!"70!;(4.'E!



=\$%3k AB\$@CDE%3Fk B\$@Ck ,%:%3\$0FGk	6. ?0\$%303/'Hk ; \$0C\$''0\$%3k A113k0\$%3k8Gk	J31. (k	5 %IS''\$0\$1''k	7 5 7K6k L60\$ - /0%)k M. - ?%3k\$''k J31. (k
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@!	S!;#8!;8#+".+0! K P : I [!;#8! ;8#+".+0!'(L! 0+;#8)040+! (+ ,!;80! 2086.)02!!a!;#8! 802"!	K 4 08/0+)E!2086.)02!(+,!W1U'.)! 2(;0"E!20)"#8!W082#++0'!\0H/!! 04 081.99065-2(1.99021T f 0.1294
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S!

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&(+\*.+!/! j !;.(+)0I!)704 .)(!'  
;##,! j !(./8.)1""180I!  
W7(84 ()01".)(!W#2"(! j !  
27.WW.+/I! j !"8(+2W#8"(.#+!20)"#8!





' <9<909& B\$@CP3\$6H&41'')\$0\$1''6&/')&0C%&QRS, ,&

!

M70!F= P :!, #02!+#"!7(60!, ("(!#!"70!70("7!)#+, ".# +2!#;!70!21860E0,!.+, .6., 1('2#! ` 0!"7080;#80!  
.4 W1"0!3 R<-%Z@Y!8.2\*!;#8!0()7!#U2086(" .#!. +!"70!F= P :!12.+/"70!&59 : :!, ("(#!

!

` 0!"(U0!0()7!#U2086(" .#!. +!"70!&59 : :!(2!7./7Z8.2\*!;#8!3 R<-%Z@Y!.;!(!"0(2!"# +0!#;!70!  
;#''#L.+/"2!"810g!

¥ M70!.+, .6., 1('!7(2!U00+!\$K608!"#', ^!E#1!7(, !2\*.+) (+)08D!!

¥ M70!.+, .6., 1('!7(2!U00+!\$K608!"#', ^!E#1!7(, !(+E!#"708!"EW02!#;!) (+)08D!!

¥ M70!.+, .6., 1('!7(2!U00+!\$K608!"#', ^!E#1!7(60!\*., +0E!, .20(20D!+#!.+) '1, .+/"\*, .+0E!  
2"# +02I!U' (, , 08!.;0)".#!#8!.)#+" .+0+)0!!

¥ M70!.+, .6., 1('!7(2!U00+!\$K608!"#', ^!E#1!7(60!)78#+.)!#U2"81)".60!W1' 4#+(8E!, .20(20I!  
3#R#F#%#H!04 W7E20 4 (!#8!)78#+.)!U8#+)7".2D!!

¥ M70!.+, .6., 1('!.2!#U020I!, 0;.+0, !(2!7(6.+/"(!& P -!1m!S?!

¥ M70!.+, .6., 1('!7(2!U00+!\$K608!"#', ^!E#1!7(, !(+/.+(!#8!)#8#+(8E!70(8"!, .20(20D!

7./7Z8.2\*H! ` 0!#4."!(+E!#U2086("&#x22;L7080!#+0!#8!4 #80!#;!"7020!,04 #/8(W7.)!6(8.(U'02!(80!  
1+\*+#L+!#8!4 .22.+/H!  
!





- o ` 0!( ""04 W"0, !"#!120!"70!21W0820!"#;!"7#20!L."7!(!XG-3 :!)# , 0!#; !Y>A@@?Fi !# P -TZ =# : #!G840 , !9#8)02I!&8(+ )7!X#": !: W0). ; , 0, !#8!Y>A@@?Fa!# P -TZ P .!". (8E!50208602!R8!X(" .#+(!B1(8, !L7#!7(60!+#"!(!'80( , E!U00+!(22./+0, !"#".08!@!21U".08!>#!J #L0608I!"7.2!20!"#+'E!80W8020+"2!a>\*!W0#W'0!.+!"70! = : !W#W1'(" .#+I!2./+.;.) (+ "E!'022!"7(+!"70!3%3d2!02".4 ("0!#; ! [??\*#!G2!L0!)#1', !+#"!.)80(20!#18!+14U08!L."7#1"!.)'1 , .+ /!W0#W'0!;8#4 !#"708!U8(+ )702!#;!"70!4 .!". (8E!(+ , !+#+Z4 .!". (8E! .+ , .6. , 1('2I!L0! , 0). , 0, !"#!(22./+!0608E#+0!.+!#18!( ""04 W"0 , !21W0820!"#!"7.2!/8#1W! .+2"0( , !#; !/#.+ /!"78#1/7!#18!21W0820"" .+ /!W8#)0 , 180#!

¥ K220+ . (!'4 .!". (8E!21WW#8!(+ , !212"(.+40+!"W082#++0!

- o 3%3!2.00!02".4 ("0g!i [?\*
- o : 1W0820"#!"7#20!L."7!(!4 .!". (8E!XG-3 :!)# , 0!\Y>A@@?F@!# P -TZ=# : #!G84EI!Y>A@@?F>!# P -TZ=# : #!G.8!9#8)0I!Y>A@@?FS!# P -TZ=# : #!X(6EI!Y>A@@?FV!# P -TZ =# : #! P (8.+02I!!Y>A@@?F [!# P -TZ=# : #!3#(2!"B1(8, !Y>A@@?Fi !# P -TZ=# : #!G840 , !9#8)02I!&8(+ )7!X#": !: W0). ; , 0, !Y>A@@?Fa!# P -TZ P .!". (8E!50208602!R8!X(" .#+(!B1(8, ^!L7#!7(60!+#"!U00+!(22./+0, !"#!(+E!#;!"70!(U#60!+(" .#+(!20)18."E!/8#1W2!o 5(+ , #4 'E!(22./+!i [?\*"#;!"7.2!21W0820!"#!"7.2!/8#1W!

!"#\$%#&+\*#&\*+&

¥ 804 (.+./!( )".60! , 1"E!4 .!". (8E!(+ , !0220+ .(!'21WW#8!

- o 3%3!2.00!02".4 ("0g!@H[!4 .!".#+!
- o ` 0!( ""04 W"0, !"#!120!"70!21W0820!"#;!"7#20!+#!(22./+0, !"#!(!7./708Z8(+\* .+ /!+(" .#+(!20)18."E!/8#1W!L7#!(80!( )".60! , 1"E!4 .!". (8E!W082#++0!"! P -T!mm!@^!R5!L7#!7(60!(!4 .!". (8E!XG-3 :!)# , 0!\Y>A@@?F@!# P -TZ=# : #!G84EI!Y>A@@?F>!# P -TZ =# : #!G.8!9#8)0I!Y>A@@?FS!# P -TZ=# : #!X(6EI!Y>A@@?FV!# P -TZ=# : #! P (8.+02I!!Y>A@@?F [!# P -TZ=# : #!3#(2!"B1(8, !Y>A@@?Fi !# P -TZ=# : #!G840 , !9#8)02I!&8(+ )7!X#": !: W0). ; , 0, !Y>A@@?Fa!# P -TZ P .!". (8E!50208602!R8!X(" .#+(!B1(8, ^!J #L0608I!"7.2!20!"#+'E!80W8020+"2!>[V\*!W0#W'0!.+!"70! = : !W#W1'(" .#+I!2./+.;.) (+ "E!'022!"7(+!"70!3%3d2!02".4 ("0!#; !@H[!4 .!".#+#!G2!L0!)#1', !+#"!.)80(20!#18!+14U08!L."7#1"!.)'1 , .+ /!+#+Z4 .!". (8E!.+ , .6. , 1('2I!L0! , 0). , 0, !"#!(22./+!0608E#+0!.+!#18!( ""04 W"0 , !21W0820!"#!"7.2!/8#1W!.+2"0( , !#; !/#.+ /!"78#1/7!#18!21W0820"" .+ /!W8#)0 , 180#!

!

' <9T9<9k B%/#0C4/3%k (%361''''%#k

!

!"#\$%#&#%#&\*%&\*&

- ¥ )8.) (!'.+W(" .0+!"70( ""7)(80!W8#6. , 082!\ .08!@!21U".08!@!.;!;8#+"" .+0I!@!21U".08!a!.;!+#"!o 3%3!2.00!02".4 ("0g!S#>!4 .!".#+!
- o : 1W0820"#!"7#20!L."7!(!XG-3 :!)# , 0!#; !i>>P!PK%ZB0+08('!P0 , .) ('!G+ , !: 18/.) ('!J #2W."('2I!G+ , !: W0). ('E!\Ke)0W"!F2E)7. ("8.)!G+ , !: 1U2" (+)0!GU120^!J #2W."('2I!o 5(+ , #4 'E!(22./+!S#>!4 .!".#+!#;!"70!21W0820!"#!"70!/8#1W!
- o R;!"7#20!(22./+0, !.+"7.2!/8#1W!8(+ , #4 'E!(22./+!7(' ;!"#".08!@!21U".08!@!2!;8#+"" .+0!+W(" .0+!"J 3 ` 2!(+ , !7(' ;!"#".08!@!21U".08!(2!+#+Z;8#+"" .+0!+W(" .0+!"J 3 ` 2#!

¥ )8.) (!'1"W(" .0+!"70( ""7)(80!W8#6. , 082!\ .08!@!21U".08!V!.;!;8#+"" .+0I!@!21U".08!a!.;!+#"!o 3%3!2.00!02".4 ("0g>#i!4 .!".#+!

- o : 1W0820"7#20!L."7!(!XG-3 :!)# , 0!#;!XG-3 :!#;!i>@! PK%ZR; ;.)02!R;!  
F7E2.).(+2!R5!i>@V! PK%ZR1"W(.0+!13(80!30+"082!R5!i>@i! PK%ZJ#40!J0("7!  
3(80!:086.)02!
- o 5(+ , #4 'E!(22./+!>#i!4.'.#+!#;!70!21W0820!"#!"70!/8#1W#!
- o R;!7#20!(22./+0 , !+!"7.2!/8#1W!8(+ , #4 'E!(22./+!7(';!"#!"08!@!21U".08!V!(2!  
;8#+".+0!#1"W(.0+!"J3 ` 2!(+ , !7(';!"#!"08!@!21U".08!a!(2!+#+Z;8#+".+0!#1"W(.0+!"  
J3 ` 2#!

¥ )8.).('!#+/Z"084!) (80!;().'. "E!\TM39^!W082#++0!"\ ".08!@!21U".08!a^!

- o 3%3!2.00!02".4 ("0g@#i!4.'.#+!
- o : 1W0820"7#20!L."7!(!XG-3 :!)# , 0!#;!i>S@! PK%ZX182.+ /!3(80!9()).'. "02!  
\ :\*.'0 , !X182.+ /!9()).'. "02^!R5!i>S P! PK%Z502. , 0+."(!3(80!9()).'. "02!Ke)0W"  
: \*.'0 , !X182.+ /!9()).'. "02!
- o 5(+ , #4 'E!(22./+!@#i!4.'.#+!#;!70!21W0820!"#!"70!/8#1W!

¥ W1U'.)!70("7!W082#++0!"\ ".08!@!21U".08!a^!

- o 3%3!2.00!02".4 ("0gS??\*!
- o : 1W0820"7#20!.+!(!XG-3 :!.+ , 12"8E!.+!"70! PK%!)("0/#8E!(+ , !7(60!+#!)('80( , E!  
(22./+0 , !"#!(+E!(!W806.#12!70("7)(80!/8#1W!  
! PK%!)("0/#8Eg!ri>@!r!ri>@>r!ri>@S@r!ri>@S>r!ri>@Ss Pr!ri>@Vr!  
ri>@ir!ri>@ Pr!ri>> Pr!ri>>>r!ri>S@r!ri>S Pr!  
! M7080!.2!+#!.+ , 12"8E!)# , 0!#;#8!W1U'.)!70("7!2#!L0!(80!8(+ , #4 'E!'(U0'' .+ /!  
404U082!#;!70!40 , .)('!.+ , 12"8E!(2!W1U'.)!70("7!W082#++0"!#!
- o 5(+ , #4 'E!(22./+!S??\*!#;!70!21W0820!"#!"70!/8#1W!

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

¥ R"708!70("7)(80!W082#++0!

- o 3%3!2.00!02".4 ("0gS[?\*
- o : 1W0820"7#20!.+!(!XG-3 :!.+ , 12"8E!.+!"70! PK%!)("0/#8E!(+ , !7(60!+#!)('80( , E!  
(22./+0 , !"#!(+E!(!W806.#12!70("7)(80!/8#1W!  
! PK%!)("0/#8Eg!ri>@!r!ri>@>r!ri>@S@r!ri>@S>r!ri>@Ss Pr!ri>@Vr!  
ri>@ir!ri>@ Pr!ri>> Pr!ri>>>r!ri>S@r!ri>S Pr!  
o 5(+ , #4 'E!(22./+!S[?\*!#;!70!21W0820!"#!"70!/8#1W!

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' <9T90% L - (#1F%%6k1I&43\$0\$4/#k\$'') .603\$%6k

!"#\$%+##%#&\*&%&

¥ )8.).('!W7(84()).2"2!(+ , !W7(84())E!"0)7+.).(+2!\ ".08!@!21U".08!V^!

- o 3%3!2.00!02".4 ("0ga>[\*
- o : 1W0820"7#20!L."7!(! : R3!#))1W(.#+!)# , 0!#;!>Y@?[@! PK%ZF7(84()).2"2!#8!  
>Y>?>[! PK%ZF7(84())E!M0)7+.).(+2!!
- o 5(+ , #4 'E!(22./+!a>[\*!#;!70!21W0820!"#!"7.2!/8#1W!

¥ )8.).('!KP :I!(L!0+ ;#8)040+!I!(+ , !491Tm/T81694cm150403.9998-1910T72Tm/TT21Tf (!)Tj ETQq0

! >Y>?V>! P K%ZK 4 08/0+)E! P 0,.)('!M0)7+.).(+2!!  
! >Y>?VS! P K%ZF(8( 4 0,.)2!R 5!!  
! [SS?@@!M5 XZG 4 U1'(+)0!%8.6082!G+,!G""0+, (+!2I!Ke)0W"!K 4 08/0+)E!  
P 0,.)('!M0)7+.).(+2!!  
! SS@?@@!F 5 MZ9.82"ZT.+0!: 1W086.2#82!R;!3#880)".#+( '!R;;.)082!  
! SS@?@>!F 5 MZ9.82"ZT.+0!: 1W086.2#82!R;!F#'.)0!G+,!%0"0)".602!  
! SS@?>@!F 5 MZ9.82"ZT.+0!: 1W086.2#82!R;!9.80!9./7".+!/!G+,!F8060+").#+!  
` #8\*082!  
! SSS?[?!F 5 MZF#'.)0!R;;.)082!  
! SSS?@>!F 5 MZ3#880)".#+( '!R;;.)082!G+,!q(. '082!  
! SS>?@@!F 5 MZ9.80;./7"082!

o

! >>@S>!H=MTZ



! VAIHM5XZ

¥ )7.' ,80+!(/0!SZ@A!L."7!(!7./7Z8.2\*!40,.)('!)#+,."#+!  
○ G22./+!#"7.2!/8#1W!.+, .6., 1('2!(/0!S!"#@AI!.+)'12.60I!L7#!7(60!U00+!'(U0'0,!(2!  
7(6.+/!(!7./7Z8.2\*!)#+,."#+!6.(!"70!W8#)0, 180!, 02)8.U0,!.+!"70!\$ J./7Z8.2\*!  
)#+,."#+2!(+,!"70!&59: :D!20)".#+!#;"7.2!,#)140+"H!

!"#\$%\$#&#&\*&+&

¥ )7.' ,80+!SZ@A!L."7#1"!(!7./7Z8.2\*!40,.)('!)#+,."#+!  
○ G22./+!#"7.2!/8#1W!.+, .6., 1('2!(/0!S!"#@AI!.+)'12.60I!L7#!7(60!XRM!U00+!  
'(U0'0,!(2!7(6.+/!(!7./7Z8.2\*!)#+,."#+!6.(!"70!W8#)0, 180!, 02)8.U0,!.+!"70!\$ J./7Z  
8.2\*!)#+,."#+2!(+,!"70!&59: :D!20)".#+!#;"7.2!,#)140+"H!

!"#\$%\$#&#&\*&#&

¥ G,1"2!@YZiV!L."7!(!7./7Z8.2\*!)#+,."#+!  
○ G22./+!#"7.2!/8#1W!.+, .6., 1('2!(/0!@Y

M70!8(L!+1 4 08.)('!G%-!2)#80!#;!0()7!;( 4.'E!.2!)(')1'("0,!!(2!"70!L0./7"0,!21 4 !#;!."2!6('10!;#8!  
0()7!)#4 W#+0+"!12.+/"!70!L0./7"2!(U#60!#9#8!(;! ( 4.'E!9!"70!8(L!+1 4 08.)('!G%-!.2!(2!;#'#L2g!  
!

: ; <=>?@ 2 A ()BC&# κ L &M N O\*# !  
#

!` 0!"70+!(22./+!"70!8(L!+1 4 08.)('!G%-!#;!0()7!;( 4.'E!"#!0()7!4 0 4 U08!#;!70!;( 4.'E!# ` 0!  
02".4 ("0!"70!8(L!+1 4 08.)('!G%-!,.2"8.U1".#+!#;!70!0+ ".80!=#:#!"80(" ./!0()7!#U2086(" .#+!!.+!"70!  
F= P :!W082#+!, ("(!2!! 6. 7! 8!

` 0!+#"0!"7("!"70!)("1(!G%-!)#4W1"0,!("!"70!)0+212!U'#)\*!'060!'('2#!#4."2!)#4W1".+!/(+!G%-!;#8!  
)0+212!U'#)\*2!L."7!4#80!"7(+!SS f !#;"!"70!W#W1'("#.#+!' .6.+!/.+!/8#1W!b1(8"082!\=+.6082."E!#;!  
` .2)##+2.+!:)7###!#;!P0,.)+0!(+,!F1U'.)!J0("!"7!>?@[^H!  
!

9#8!"7#20!' .6.+!/.+!7#1207#' ,2I!(+E!4 .22.+!/) #4 W#+0+"2!L.'!U0!)#+2.,080,!?H!K608E!7#1207#' ,!  
7(2!(!"0(2"!@!4 .22.+!/) #4 W#+0+"I!(2!W8#W08"E!6('10!(+,!4#8"/(/0!(80!4 .22.+!/) ;#8('!"80+"082!(+,!  
/8#22!80+"!.2!4 .22.+!/) ;#8('!"L7#!#L+!"70!7#1202!"70E!' .60!.+H!  
!

9#8!(608(/02!)#4W1"0,!("!"70!;(4.'E!'060'I!L0!)#+2.,08!"70!7#1207#' ,!#;"!"7#20!' .6.+!/.+!(!  
7#1207#' ,!L."7!(!+#+Z4 .22.+!/) ;(4.'E!.+ )#40!6(8.(U'0!"#!U0!(;! (4.'E!M7.2!.+)'1,02!7#1207#' ,2!  
70(,0,!UE!2(40Z20e!)#1W'02H!9#8!"7#20!+#"! .6.+!/.L."7!;(4.'E!,10!#!' .6.+!/.UE!"70420'602!#8!L."7!  
+#+Z;(4.'E!8##44("02I!L0!)#+2.,08!0()7!W082#+"#!U0!"70.8!#L+!;(4.'E!  
!

' 090& 71 - (1''%'0&?F&41 - (1''%'0&) %0/\$#6&

@H F#W1'("#.#+!(/0,!y>[!E!L."7!z!Y!E!#;!0,1)(".#+I!f!  
(H



>H R;!70!,0)0(20,!6.)".42!)#1+"0,!UE!GFP!5020(8)7!T(U2!(2!41".8()).('I2#40!#"708!8()0I!  
#8!1+\*+#L+!8()0I!"70!W8#W#8".#+!L7#!.,0+";.0,!(2!&'()\*!#8!-+,. /0+#12!.2!0b1('!"#!  
R)\* S(O)' &Q !

M70!W8#)0,180!(+,(2214W".#+2!;#8!)(')1'(".+!/(/OZ(,]12"0,!0("7!27(80!;#8!&'()\*!(+,!  
-+,. /0+#12!W0#W'0!(+,"70!"L#!,0("7!8("02!;#8!&'()\*!I-+,. /0+#12I!(+,"T("+#!W0#W'0!(80!  
(+'#/#12H!

!

' T9<9k ,0/0%k?Fk60/0%k)\$603\$?.0\$1''k

!

:"(0!4(W2!L080!)80("0,!(2!Ke)0!;.'0,!4(W2!L."7!(!\$%.608/.+!/!\SZ)#'#8^D!)#'#8!2)7040!L."7!"70!  
\$P.,W#.+!D!\E0'#L^!6('10!20"!(!@H?H!M70!\$P(e.414D!\800+^(+,\$P.+414D!\80,^!6('102!(80!  
,.2W'(E0,!(!"70!"#W!(+,"U#"#4!#;!"70!'0/0+,I!802W0)".60'EH!

!

M70!02".4("0,!6()).+02!80)0.60,!W08!2"("0!1+,08!"70!6(8.#12!8020860!2E2"042!L(2!)(')1'("0,!+!  
#18!4(.+!W8#)0,1802!(U#609kM70!W#W1'(".#+!W08!2"("0!L(2!)#4W1"0,!;8#4!"70!G3:!,("(!L."7!"70.8!  
L0./7"29kM70!\$;(.8!27(80D!.+,0e!80'(".60!#!W#W1'(".#+!.2!"70+!"70!8(".#!#;!"70!W8#W#8".#+!#;!"70!  
"#"(!6()).+02!80)0.60,!UE!(!2"("0!#!"70!W8#W#8".#+!#;!W#W1'(".#+!.6.+!/!.+!(!2"("0H!!

!

M#!)(')1'("0!(+'#/#12!;(8!27(80!.+,. )02!80'(".60!#!)(20!(+,!0("7!.+).,0+)0I!;.82!",("(!#+!"#('!  
)#+;.840,!) (202!(+,!0("72!.+!0(7)2"("0!L(2!0e"8()"0,!#+!G1/12"!@V!\3%3!>?>?U^H!M70+!"70!

".08u,04#/8(W7.)u/8(W7.+/#5!



R%I%3%"4%6&I13&0C%& ' ( (%'')\$\*&

!

GFP!5020(8)7!T(UH!>?>?H!3#'#8!#;!3#8#+(6.812g!3R<-%Z@Y!%0("72!UE!5()0!(+,!K"7+.)".EI!

G1/12"![]>?>?!% ("(!50'0(20H!50"8.060,!#+!G1/12"!@I!>?>?!;8#4!

7""W2g\_LLLH(W48020(8)7'(UH#8/\_)#6.,\_,0("72



@@I!>?>?!;8#4!7""W2g LLL>H)0+212H/#6 W8#/8(42Z

21860E2\_()2\_40"7#, #'#/E\_, 02./+u(+, u 40"7#, #'#/E\_()2u, 02./+u 40"7#, #'#/Eu)7@@u>?@VHW, ;!