\mathbf{n}

 $\#\$\%"\&\%''`\%()*"+,),\%"-'./\%0(.,1"2\&+-3"4.50)01"+1(,\%6".(")"7899\%:\%;9\%/\%9"<'.,"8/\%0(\%''\51",\$\%"=08/8(,")'>"+\%'.80"?.7\%"=0\%(.>\%',"080"A7)>\%6.7"A@0).0(")'>",\$\%"B@0.7\%@"A7)>\%6.7"A@0).0(C" 2D)7<9,1"E)'>588F"GHGG;GI"!CGCG3"#\$\"4.50)01"+1(,\%6".(")"7899)580),./\%J"7899\%:.)9J")'>">./\%0(\%":08<K"8@"0)7<9,1")'>"(,)@@"*\$8"(<KK80,",\$\"%><7),.8')9")'>"0\%(\%)07\$"e<'7,.8'("8@",\$\"<'./\%0(.,1C" #\$\"&+-"4.50)01"+1(,\%6"78'(.(,("8@",*8">\%K)0,6\%',(L"M\%K)0,6\%',"8@"=<59.7"+\%0/.7\%(")'>"M\%K)0,6\%',"8@"4.50)01"N\%(8<07\%(C")")'>"$

A(M%)'"

#\$%"M%)'".(",\$%"7\$.%0")>6.'.(,0),./%"800.7%0"80",\$%"4.50)01"+1(,%60"#\$%"M%)'"\$)(",\$%"0%(K8'(.5.9,.%(")'>")<,\$80.,1"(K%7.0.%>"51",\$%"08)0>"80"N%:%',(")'>">%9%:),%>"51",\$%"08/8(.0")"

Of A((.(,)',PA((87.),%''M%)''2(3'')

R(M%K)0,6%',"R\$).0("

+%%")9(8"N%(,0.7,.8'("8'"+\%0/.7\%J"A0,.7\%"S?C"+\%7,.8'"ICMC"

+%7,.8'"!("4.50)01"D)7<9,1"R8<'7.9"24DR3"

#\$%"4.50)01"D)7<9,1"R8<'7.9".(",\$%"R899%: %"D)7<9,1"R8<'7.9"2RDR3"%T<./)9%',")'>"(%0/%(",\$%" 4.50)01"+1(,%6"(.6.9)0",8"8,\$%0"&+-")7)>%6.7"7899%: %("*.,\$"680%",\$)'"8'%">%K)0,6%',C" 2-'./%0(.,1"E)'>588F"GHGG;GI"ICUCO3"#\$%"4.50)01"D)7<9,1"R8<'7.9"6%%,(",8">%,%06.'%",\$%"

!"

):%'>)"@80",\$%"4.50)01"D)7<9,1"A((%65910"#\$%"4.50)01"D)7<9,1"A((%6591"78'(.(,("80")99"@)7<9,1" @086",\$%"9.50)01"(1(,%60")

At V%65%0(\$.K")

- !C R\$).0"
- GC ?.7%"R\$).0PR\$).0;W9%7,"
- IC #\$%"R\$).0("8@",\$%"+,)'>.':"R866.,,%%("8'"
 - .0 4.50)01"D)7<9,1"B0:)'.X),.8'")'>"Q8/%0')'7%"
 - ...(4.50)01"D)7<9,1"Y86.'),.8'(")'>"W9%7,.8'(")
 - ... (4.50)01"D)7<9,1"M%/%98K6%',"R866.,,%%"
 - ./(0.4.50)01"+1(,%6"=0868,.8'"AKK%)9("R866.,,%%""
 - /C M%K)0,6%',"=0868,.8'"R866.,,%%("

 \mathbf{Z}^{\complement}

- .0 #8"(%,") '>">.(,0.5<,%",\$%"):% '>)"@80"4.50)01"D)7<9,1"R8<'7.9"6%%,.':(") '>" 4.50)01"D)7<9,1"A((%6591"6%,.':(0"
- ..¢ #8" 0%780>" 6 . '<,%(" 8@" 4.50)01" D)7<9,1" R8<'7.9" 6%%,. ' : (") '>")07\$./%")KK08/%>"6 . '<,%(". '")"987),.8 '")77%((.59%",8")99"9.50)01"@)7<9,1" 6 % 6 5%0(¢"
- ...0 #8")''8<'7%" 6%%,.':("8@",\$%" 4.50)01"D)7<9,1" A((%6591")'>"D)7<9,1" R8<'7.90"
- ./C #8" 0%780>" 6 . '<,%(" 80" 4.50)01" D)7<9,1" A((% 6 591" 6 %%,. ':(") '>")07\$./%")KK08/%>"6 . '<,%(".'")"987),.8 '")77%((.59%",8")99"9.50)01"@)7<9,1" 6 % 6 5%0(C"
- /C #8">%9%:),%",\$%"@806),.8'"8@"K087%><0)9")'>"K89.71">87<6%',(".((<.':" @086"4.50)01"D)7<9,1"R8<'7.9"80"4.50)01"D)7<9,1"A((%6591")'>",8">0)@," (<7\$">87<6%',("*\$%'"'%7%(()01C"

70 M<,.%("8@",\$%"R\$).0"

- .C #8"K0%(.>%"8/%0"6%%,.':("8@",\$%"4.50)01"D)7<9,1"A((%6591")'>"D)7<9,1" R8<'7.9C"
- ..0 #8"),%'>"6%,.':("80",\$%"4.50)01"+1(,%6"4%)>%0(\$.K"#%)60"
- ...C #8"),,%'>"6%%,.':("80",\$%"D)7<9,1"4.50)01"A>/.(801"R866.,,%%0"
- $> \emptyset \quad M<,.\%("80",\$\%"?.7\%"R\$).0"P"R\$).0; W9\%7,"$

.0

+%7,.8' "GC"+,) '>. ': "R866.,,\%("

A(+,)'>.':"R866.,,%%"R\$)0:%("

!

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O(+,)'>.':"R866.,,\%"R86K8(...8'"
```

- .0 #\$\"4.50)01"+1(,\%6"=0868,.8'"AKK\))9("R866.,,\%\"(\$)99"5\"786K8(\%>"80"8'\"80",*8"0)7<9,1"6\%65\%0("\@086"\%)7\$"M\%K)0,6\%',")(">\%(70.5\%>".'",\$\%"4.50)01" +1(,\%6"O19)*("2,\$\%0\"6<(,"5\",\$\\"()6\"'<65\%0"80"\)7<\"\%K)0,6\%',".'",\$\\"4.50)01"+1(,\%6\".0\"6\".0\"6\"80"\)8'"\\$\\(6\".0\"6\".0\"6\".0\"6\".0\"8\".\"\\(7\".0\".0\".\"8\".\"8\".\"6\".\"8\".\"8\"086\".\"8\".\"8\"086\".\"8\".\"8\"086\".\"8\".\"8\"0.8\".\"8\".\"8\"0.8\".\"8\"0.8\".\"8\".\"8\"0.8\".\"8\".\"8\"0.8\".\"8\"0.8\".\"8\".\"8\"0.8\".\"8\".\"8\"0.8\".\"8\".\"8\"0.8\".\"8\".\"8\"0.8\".\"8\".\"8\"0.8\".\"8\".\"8\"0.8\".\"8\".\"8\"0.8\".\"8\".\"8\"0.8\".\"
- ...0 =0868,.8' "AKK%)9("R866.,,%%J"%)7\$"7866.,,%%"(\$)99"\$)/%")"6.'.6<6"80"

%>",8"(%0/%"8'">%(.:'),%>"K08`%7,(")("

,\$%"%c.(,.':"6%65%0(C"

/C %("8@",\$%"(,)'>.':"7866...,%%("

+%7,.8'"I("A>"E87"

#\$%"4.50)01"D)7<9,1"R8<'7.9"6)1"70%),%")'>"7\$)0:%")>"\$87"7866.,,%%(")("'%%>%>"K08/.>%>",\$%" 4.50)01"D)7<9,1"R8<'7.9"'8,.@1",\$%"M%)'"8@",\$%"%c.(,%'7%"8@",\$%")>"\$87"7866.,,%%(C"V%65%0(\$.K"8@"

A9(8J",\$%"M%) 'J") '>P80",\$%"A((.(,) ',PA((87.),%"M%) '2(3J") '>P80",\$%"M%K)0,6%',"R\$).0("6)1"70%),%J"

9.50)01"@)7<9,1"8@",\$%"%c.(,%'7%"8@",\$%")>"\$87"7866.,,%%(C"

["

+%7..8'"!("4.50)01"D)7<9,1"A((%6591"V%,.':("

- .C O<(.'%(("6%%,.':(")0%">.(7<((.8'("8@".,%6("K0%(%',%>"51",\$%"4.50)01"D)7<9,1" R8<'7.9C"
- ..c #8K.7)9"6%%,.':(")0%"

!

- ..¢ R\$).0("8@",\$%"4.50)01"D)7<9,1"+,)'>.':"R866.,,%%("8'"B0:)'.X),.8'")'>"
 Q8/%0')'7%J"Y86.'),.8'(")'>"W9%7,.8'(J")'>"=08@%((.8')9"M%/%98K6%',¢"
- ...C #\$%" 6 % 6 5%0("8@",\$%"4.50)01"D)7<9,1"AKK%)9("R8 6 6.,,%%"@80"58,\$">%K)0, 6 % ',(C"

"

Of N%K0%(%',),./%("

- .C D)7<9,1"+%'),%"(\$)99"\$)/%")"@)7<9,1"0%K0%(%',),./%"@086"%)7\$"&+ "4.50)01"+1(,%6" M%K)0,6%'.C"
- ...C '>%0:0)><),%"=89.7.%(") '>"R<00.7<9<6"R866.,,%%"(\$)99"\$)/%"8'%"9.50)01"@)7<9,1" 0%K0%(%',),./%C"

"

RC #%06("8@"B@@.7%"

- .C #\$%"?.7%"R\$).0"P"R\$).0;W9%7,".("%9%7,%>",8")",*8;1%)0",%06C"#\$%"@.0(,"1%)0".("(%0/%>")("?.7%"R\$).0;P"R\$).0;W9%7,")'>",\$%"(%78'>")("R\$).0C"
- ..0 R\$).0("80",\$%"4.50)01"D)7<9,1"R866.,,%%("080"B0:)'.X),.8'")'>"Q8/%0')'7%J" Y86.'),.8'(")'>"W9%7,.8'(J")'>"D)7<9,1"M%/%98K6%',")0%"%9%7,%>",8"8'%;1%)0",%06(0"
- ...0 4.50)01"+1(,%6"=0868,.8'"AKK%)9("R866.,,%%"6%65%0("(%0/%"(,)::%0%>",*8;1%)0", %06(0"#\$\"4.50)01"+1(,%6"=0868,.8'"AKK\)9("R866.,,%\"*.99"\%7,",\$\%.0"7\$).0",8" (\%0/\%")"8'\%;1\%)0",\%060" a \$\%'"K8((.59\)J",\$\%"R\$).0"6<(,"5\)""(\%78'>;1\%)0"6\%65\%00"
- ./C #\$%"D)7<9,1"+%'),%"0%K0%(%',),./%(")0%"%9%7,%>"@80",\$0%%;1%)0",%06(C"
- /C #\$%"-'>%0:0)><),%"=89.7.%(")'>"R<00.7<9<6"R866.,,%%"0%K0%(%',),./%".("%9%7,%>"@80")",\$0%;1%)0",%06C"

"

+%7,.8' "GC"R8'><7,"8@"W9%7,.8'("

"

- AC A99"%9%7,.8'(")'>"7)99("080"/89<',%%0("(\$)99"5%"78'><7,%>"51",\$%"4.50)01"D)7<9,1"Y86.'),.8'(")'>"W9%7,.8'("R866.,,%%")7780>.':",8"Y86.'),.8'(")'>"W9%7,.8'("=087%><0%(">%/%98K%>"080",\$.("K<0K8(%C"
- RC W9%7,.8'(")0%"\$%9>".'",\$%"()6%"80>%0"%)7\$"1%)0J")7780>.':",8",\$%"Y86.'),.8'(")'>"W9%7,.8'(" =087%><0%(C"

"

+%7,.8'"I("N%(,0.7,.8'("8'"+%0/.7%"

"

- AC Y8"9.50)01"@)7<9,1"6%65%0"7) '"(%0/%". '"680%",\$) '"8 '%"%9%7,%>"K8(.,.8 '"(.6<9,) '%8<(910"
- O(\$'>./.><)9("\$89>.':")'"%9%7,%>"K8(...8'"6)1"(.6<9.)'%8<(91"\$89>"/89<',%%0"K8(...8'(0"

!

- RC #\$%0%".("'8"0%(,0.7,.8'"8'",\$%"'<65%0"8@",.6%(")'".'>./.><)9"6)1"(%0/%".'")'"%9%7,%>"80" /89<',%%0"K8(.,.8'",\$08<:\$8<,"\$%0"80"\$.("7)0%%0")(")"9.50)01"@)7<9,1"6%65%0"5<,"6)1"'8,"(%0/%"680",\$)'",*8",%06("78'(%7<,./%91C"
- MC Y8"9.50)01"@)7<9,1"6%65%0"*.,\$")'")>6.'.(,0),./%")KK8.',6%',"8@"[Hg"80"680%"6)1"(%0/%")("R\$).0"80"?.7%"R\$).0PR\$).0;W9%7,C"2D)7<9,1"E)'>588F"GHG!;GHGGJ"!(!")'>"IC!!3"

+%7,.8'"Z("4.50)01"D)7<9,1"+,)'>.':"R866..,%%"?89<',%%0("

AC D8998*.':",\$%")''<)9"%9%7,.8'J",\$%"4.50)01"D)7<9,1"Y86.'),.8'(")'>"W9%7,.8'("R866.,,%%"*.99" 7)99"@80"/89<',%%0("@80")99"9.50)01"@)7<9,1"(,)'>.':"7866.,,%%("%c7%K,"@80",\$%"4.50)01"+1(,%6" = 0868,.8'"AKK%)9("R866.,,%%("

- OC 4.50)01 °(0) 7 < 9,1 °(1) '>. ': "78 6.6...%" 6%65%0 ("(%0/%"(1)::\%0\%>", *8;1\%)0",\%06 (C"
- RC S@")"/89<',%%0".("(<5(%T<%',91"%9%7,%>")("7\$).0"8@",\$%"7866.,,%%"><0.': "\$.(P\$%0",*8;1%)0",%06J",\$.("(%0/.7%".(".'79<>%>")("K)0,"8@",\$%",*8;1%)0",%06C"

- AC A99" 6 % 6 5%0("80",\$%"4.50)01"+1(,% 6"=08 6 8,.8' "AKK%)9("R8 6 6.,,%%")0%"%9%7,%>C"
- OC R866.,,%%"6%65%0("(%0/%",*8;1%)0",%06(J"(,)::%0%>"(8",\$),")KK08c.6),%91"\$)9@",\$%" 7866.,,%%"6%65%0(\$.K".("0%K9)7%>"%)7\$"1%)0C"
- RC D8998*.':",\$%"%9%7,.8'J",\$%"7866.,,%%"6%65%0("(%9%7,")"7\$).0"@086")68':",\$%.0"'<65%0C" a \$%'"K8((.59%J",\$%"R\$).0"6<(,"5%")"(%78'>;1%)0"6%65%0C"#\$%"R\$).0")9(8"(%0/%("8'",\$%" D)7<9,1"R8<'7.9C"
- WC \$'>./.><)9("(%0/.':"8'",\$%"4.50)01"+1(,%6"=0868,.8'"AKK%)9("R866.,,%%"*\$8">%7.>%",8"
)KK91"@80"K0868,.8'"><0.':",\$%.0",%'<0%"8'",\$%"7866.,,%%")0%"0%T<.0%>",8"/)7),%",\$%.0"
 6%65%0(\$.K"8'",\$%"7866.,,%%J")'>")"0%K9)7%6%',"*.99"5%"%9%7,%>")("(%,"@80,\$".'"+%7,.8'"UC"

+%7,.8'"UC" V .>,%0 6" ?)7) '7.%("

AC S'",\$%"%/%',",\$%"R\$).0"80",\$%"4.50)01"D)7<9,1"R8<'7.9".("<')59%",8",)F%"800.7%"80"786K9%,%")" 0<99",%06J",\$%"?.7%"R\$).0"P"R\$).0;W9%7,"*.99")((<6%",\$%"089%"80"R\$).0")'>")"/)7)'71" %9%7,.8'"080"?.7%"R\$).0"P"R\$).0;W9%7,"*.99"5%"78'><7,%>"51",\$%"4.50)01"D)7<9,1" Y86.'),.8'(")'>"W9%7,.8'("R866.,,%%0"

O(

]"

 $4.50)01\text{"D})7 < 9.1\text{"Y86.'}),.8\text{'(")'} > \text{W9\%7},.8\text{'("R866.,,\%\"*.99"78'><7,")"/)7}\text{'71"\%9\%7},.8\text{'''} \\ @80\text{",}\%\text{"K8}(.,.8\text{'C"}\#\$\%\text{"'}\%*91\text{"}\%\%7,\%>\text{".'}>./.><)9\text{"}*.99\text{"}(\%0/\%\text{",}$\%\text{"}0\%6).'>\%0\text{"}8\text{@",}$\%"7<00\%',$\%06J\"*$.7$\"*.99\")9(8\"5\"78'(.>\%0\%>\",$\%.0\"0.0(,\"8\00.7.)9\",\%06\"8\00.7\%\"$

Λ"

- !C Y8,\$.':".'",\$%(%"519) * ("(\$8<9>"5%"78'(,0<%>",8"(<K%0(%>%"K08/.(.8'("80",\$%"(,),<,%("80" &%'''%() *"+,),%"-'./%0(.,1")(">%(70.5%>".'",\$%"D)7<9,1"E)'>588F")'>"8,\$%0"6),%0.)9("

 K08/.>%>"51",\$%"B@0.7%"80",\$%"=08/8(,")'>"?.7%"=0%(.>%',"080"A7)>%6.7"A@0).0(J")'>",\$%"O8)0>"

 80"N%: %',("80",\$%"-'./%0(.,1"+1(,%6"80"Q%80:.)C"

..

```
\%''\()*"+,),%"-'./\(0(.,1"AKK08/)9"D806"\(080"\&\%''\()*"+,),\%"-'./\(0(.,1"4.50)01"+1(,\%6"A"))
 78K1"80", $.("0806J"786K9%, %>J"6<(,"5%"),,)7$%>",8",$%">%K)0,6%',"519)*(("5\%),
S"78'@.06",$),",$%"),,)7$%>"519)*(J">),%>"!HPGIPGHGHJ"*%0%")KK08/%>"51",$%"@)7<9,1"8@"&%''%()*"
 +,),\%" - './\%0(.,1"4.50)01"+1(,\%6".'")7780>) '7\%" * .,$">\%K)0,6\%',"K89.7.\%(") '>"K087\%><0\%(L"
       D)7<9,1"B0:)'.X),.8'")'>"Q8/%0')'7%"R866.,,%%"R$).0"AKK08/)9"h"S")KK08/%",$%"),,)7$%>"
        519) * (L"
                                                                                                                                         a. Carey Huddlestun
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               November 12, 2020
  R)0\%1"E <>>9\%(,<''')
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      +.:'),<0\%P"M),\%"
         R899\%: \text{``D'})7 < 9,1 \text{``RS$-0.6} \text{`AKK08/}) \text{''h"S"}) \text{KK08/} \text{``,$} \text{``,}),)7\$\% > \text{``519}) * (L") \text{``L'} \text{``,} \text{``,}) \text{``,}) \text{``,} \text{``,}) \text{``,}) \text{``,} \text{``,}) \text{``,} \text{``,}) \text{``,})
                                                                                                                                                Charles The Control of the Control o
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               November 12, 2020
  R$0.("V800.(" "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      +.:'),<0%P"M),%"
David Evans
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  November 12, 2020
 M00"M)/.>"W/)'("
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      +.:'),<0%P"M),%"
 =08/8(,"AKK08/)9";"S")KK08/%",$%"),,)7$%>"519) * (L"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           November 13, 2020
 M00"\&),$1"+7$*).:"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      +.:'),<0\%P"M),\%"
```

!!"