"#\$%&'\$(&)!\*+,!-+. /'\$0(-&!1\$23!23&! 2&-3(+'+"4!0--&/205'&!#)&!/+'\$-4! !

## 205'&!+\*!-+(2&(2)!

- [

Ţ

 $-A < LG @ MB!: CD! \C B> => JBF: \\ \pm/GA <> GBL \\ \colored{TITTMINIMALITY} 1 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 24000. 2414. 2587. 96 cm \\ \colored{TITTMINIMALITY} 2 Tf(!) TjETQQO. 240000. 2414. 2587. 259000. 259000. 259000. 259000. 259000. 259000. 259000. 259000. 259000$ 

4/8/2019 5:55 PM Page **2** of **36** 

ļ

4/8/2019 5:55 PM Page **3** of **36** 

!

ļ

ļ

4/8/2019 5:55 PM Page **4** of **36** 

2M>?>!I F@>=@C>?!". G>!@CB>CD>D!BA!M>=<!+FG!': DL!AP!BM>!': Q>!#C@N>G?@L!T+''#U!?BFD>CB?\_!P: JF=BL\_!?B: PP\_!
:=F; C@!IF>?B?\_!: CD!ABM>G!: PP@@ B>?!K>BB>G!JA; <=L!] @M!BM>!@CB>CB!AP!BM>!#C@N>G?@LU?!2>JMCA=AIL!
OJJ><B: K=>!#?>!/A=@L!TO#/U7!

+''#0?!@CPAG; :B@AC!B>JMCA=AIL!G>?AFGJ>?!: CD!BM>!: JJ>??!<GAN@)>D!KL!BM>!#C@N>G?@L!BA!I=AK: ±C>B] AGQ?!
:CD!C>B] AGQ>D!: CD!D@ @: ±G>?AFGJ>?!: G>!I AN>GC>D!KL!#C@N>G?@L!I>C>G: ±<A=@@>?!: CD!JAG>!N: ±F>??!!2M>!

<G@CJ@<=>?!: CD!>9<>JB: B@AC?!?>B!PAGBM!@!BM>?>!DAJF; >CB?!BM: B!: <<±!BA!<GA<>GBL\_!<G@N: JL\_!J@N@BL!: CD!

<FK=@: B@AC!@!BM>!<ML?@!: ±?>C?>!: =?A!: <<±!BA!BMA?>!: G>: ?!] M>C!BM>L!@CNA=N>!JA; <FB>G?!AG!; AK@>!

D>N@J>?b!] M>C!BM>L!>CB: @!F?>!AP\_!AG!</br>

D>N@J>?b!] M>C!BM>L!>CB: @!F?>!AP\_!AG!</br>

FK=@: B@AC!N@!BM>! 1 AG=D! 1 @D>! 1 >K\_!@CJ=FD@CI\_!KFB!CAB!=@ &>D!BA\_!

] >K?@>?!; >??! I>!KA: GD?\_!B] >>B?\_!] @@\_!JM: B!GAA; ?\_!?AJ@ ±C>B] AGQ?\_!; >D@ R?M: G@C!!?@>?\_!: CD!ABM>G!

@ @: G!>=>JBGAC@!N>CF>?b!] M>C!BM>L!@CNA=N>!<: GB@@@: B@AC!@!. ++-?!AG!N@BF: ±G>: =BL!AG!I:; @CI!

>CN@AC; >CB?\_!: FI; >CB>D!G>: =BL\_!AG!] M>BM>G!BM>!B>JMCA=AIL!@CNA=N>D!@!?A; >BM@CI!=Q>!; F=B@F?>G!

I:; @CI\_!#C@N>G?@LR<GAN@D>D!NA@J>!B>JMCA=AIL!?FJM!: ?!B>=><MACL!#C@@D!. >???: I@I\_!=AJ: =LR<GADFJ>D!: CD!

KGA: DJ: ?B!N@>A\_!AG!4AF2FK>!AG!ABM>G!<FK=@!: G>C:!N@>A?!AG!@ :I>?!@CNA=N@CI!#C@N>G?@L!: JB@N@@?!AG!

A<>G: B@AC??!!\$CD@N@F: =?!: =?A!: G>!>9<>JB>D!BA!K>!P:; @@ G!] @M!: CD!JA; <=L!] @M!BM>!G>CF@S>; >CB?!AP!BM>!

#C@N>G?@L0?!\$CPAG; :B@AC!)>JFG@L!/GAIG:; 7!

2M>!#C4N>G?&L!@!:!eJ:GG@Ge!AP!@CPAG; :B@AC!N@!>=>JBGAC@!JM:CC>=?!G:BM>G!BM:C!:!e<FK-@M>Ge!:CD!M>CJ>!

4/8/2019 5:55 PM Page **5** of **36** 

## 6\$+'02\$+()!0(%!/&(0'2\$&)!

O=P: JF-BL\_!?BFD>CB?\_!?B: PP\_!: =F; C@!: FBMAG@>D!N@GAG?\_!: CD!ABM>G?!] MA!; : L!K>!1G: CB>D!F?>!AP!BM>!

#C@N>G?@LU?!?L?B>; ?!: CD!C>B] AGQ!?>GN@J>?!AG!#C@N>G?@LRJACBG: JB>D!?>GN@J>?!; F?B!JA; <=L!] @M!BM>!

#C@N>G?@LU?!<A=@@>?!1 M>C!:!; >; K>G!AP!BM>!#C@N>G?@L!JA; ; FC@L!@!PAFCD!BA!K>!@C!N@A=: B@AC!AP!?FJM!

<A=@@?\_!D@J@<=C: GL!: JB@AC!@!M: CD=>D!KL!BM>!CAG; : =#C@N>G?@L!: FBMAG@L!: CD!N@!BM>!CAG; : =#D@J@<=C: GL!

<GAJ>??!BM: B!] AF=D!: <<=L!PAG!ABM>G!BL<>?!AP!@CPG: JB@AC?7! 1 M>C!: C!: FBMAG@>D!N@GAG!@!@!N@A=: B@AC!AP!?FJM!

<A=@@\$?\_!BM>!#C@N>G?@L!?<AC?AG!AG!MA?B!; : L!K>!M>=D!: JJAFCB: K=>7!!\$P!BM>!; : BB>G!@CNA=N>?!@=>1: =!: JB@N@@>?\_!

=: ]!>CPAGJ>; >CB!: I>CJ@?!; : L!K>JA; >!@CNA=N>D\_!: ?!BM>L!] AF=D!PAG!J:; <F?!: JB@AC?!BM: B!

4/8/2019 5:55 PM Page **6** of **36** 

!

4/8/2019 5:55 PM Page **7** of **36** 

4/8/2019 5:55 PM Page **8** of **36** 

İ

ļ

4/8/2019 5:55 PM Page **9** of **36** 

>R; :@!?MAF=D!G>B:@!JA<@?!AP!BM>!] AGQ!FCB@!J>GB:@!BM:B!BM>!@C?BGFJBAG!M:?!G>J>@N>D!:!=>1@K=>!JA<L7!!
OJQCA] =>DI>; >CB!KL!BM>!@C?BGFJBAG!AP!G>J>@\B!AP!:!=>1@K=>!JA<L!] AF=D!K>!JAFGB>AF?!: CD!@!>CJAFG: I>D7!

## +#2)\$%&!&R. O\$'!

Ţ

\*: JF=BL\_!?B: PP!: CD!?BFD>CB?!] MA!M: N>!<>G?AC: =!>R; : @!: JJAFCB?!] @M!?>GN@>?!AFB?@>!BM>!#C@N>G?@L!?MAF=D!F?>!AC=L!
BM>@!#C@N>G?@LR<GAN@D>D!>R; : @!: JJAFCB?!PAG!JA; ; FC@!: B@AC?!G>I:: GD@CI!#C@N>G?@L!; : BB>G??!#?@CI!#C@N>G?@L!>R
; : @!<GAB>JB?!BM>!<G@N: JL!: CD!?>JFG@L!AP!#C@N>G?@L!D:: B:: b!: =A] ?!PAG!N>G@@!: B@AC!AP!?>CD@CI!: CD!G>J>@B!AP!JG@@!: =!
JAGG>?<ACD>CJ>!G>I:: GD@CI!: J:: D>; @!!: CD!ABM>G!; : BB>G?b!: CD!P: J@@:: B>?!G>?<AC?>?!BA!?FK<A>C: ?!: CD!ABM>G!
?@F:: B@AC?!BM:: B!; : L!G>CF@S!BM>!G>BG@N:=!@C?<>JB@AC!AG!</a>GADFJB@AC!AP!DAJF; >CB?!@CJ=FD@CI!>R; : @I!

+''#!:JJAFCBRMA=D>G?!] MA!M: N>!BM>G!>R; :@JA<@D!AG!PAG]:GD>D!BA!: C!AFB?D>!:JJAFCB!; F?B!B: Q>!J: G>!BA!: NAD!
M: N@C1!BM>?>!; >??:1>?!P=:11>D!:?!?<:; !KL!BM>G!AFB?D>!>; :@!?>GN@>!<GAND>G?!. : ^AG!\$CB>GC>B!?>GN@>!<GAND>G?!
<AB>CB@=L!JAF=D!K:G!:=!>R; :@!JA; @C1!AFB!PGA; !BM>!+''#!DA; :@!] M>C!BM>!<GAND>G?!JF?BA; >G?!M:N>!; :GQ>D!:?!
?<:; !] M: B!BM>!<GAND>G!<>GJ>@N>?!BA!K>!:?!BAA!; :CL!?F?<@@AF?!; >??:1>??!) FJM!@CJ@>CB?!J:C!@CB>GP>G>!] @M!BM>!
KF?@C>??!AP!BM>!#C@N>G?@L!:?!] >=!:?!@ <>D>!JA; ; FC@!:B@AC!PAG!ABM>G!; >; K>G?!AP!BM>!#C@N>G?@L!JA; ; FC@LT!

4/8/2019 5:55 PM Page **10** of **36** 

į.

 $$P!BM>!@CD@N@F: \exists ?F?<>JB?!BM>!KG>: JM!@CNA=N>?!@\Rightarrow I: \exists : JB@AC!KL!: !; >; K>G!AP!BM>!\#C@N>G?@L!JA; ; FC@L_!BM>!\#C@N>G?@Ld?!<A=@L!AC!G><AGB@CI!<AB>CB@==L!@=>I: <math>\exists : JB@N@L!?MAF=D!K>!PA=A] > D7!$ 

\$2)0?!M>=<!=C>!TZWXR\[WR[VXS!KL!B>=><MAC>!AG!M>=<D>?Qk A=F?:7>DF!N@!>R; :@U!@!BM>!K>?B!<=: J>!BA!?B: GB!] M>C!
G><AGB@C!!:!<AB>CB@ =ID:B:!KG>:JM?!\$P!:!G>=:B>D!D>N@>!@!=A?B!AG!?BA=>C\_!:!G><AGB!?MAF=D!K>!P@>D!:?!?AACI:?!<A??@K=>!
] @BM!:<<GA<G@ B>!=:]!>CPAGJ>; >CB?!!\$P!BM>!@CJ@D>CB!AJJFGG>D!APPRJ:; <F?\_!>N>C!AFB?@D>!BM>!#7)7\_!:!JA<L!AP!BM>!
G>=>N:CB!<A=@J>!G><AGB!:=?A!?MAF=D!K>!AKB:@C>D!:CD!<GAN@D>D!BA!#C@N>G?@L!/A=@J>?!

4/8/2019 5:55 PM Page **11** of **36** 

2MA?>!] MA!<: GB@@<: B>!@C!?AJ@.=!; >D@!: ?!G><G>?>CB: B@N>?!AG!: I>CB?!AP!BM>!#C@N>G?@BL!?MAF=D!JAC?F=B!BM>!+PP@J>!AP!

## #)&!+\*!23&!#(\$6&,)\$240)!(O. &!O(%!. O,g)!

. : GQ>B@C|!: CD!-A; ; FC@|: B@AC?!?AJ@|=!; >D@|!<A=@|@>?!PAG!: DD@B@AC:|=||F@D: CJ>7!

(A!@CDeN@DF: =|AG!AGI: C@: B@AC!AP!BM>!#C@N>G?@L!; : L!F?>!+''#0?!C:; >\_!=AIA?!AG!ABM>G!@D>CB@@>G?!Th; : GQ?!U\_!AG!: CL!; : GQ?!BM: B!?FII>?B!+''#!AGI: C@: B@AC\_!>9J><B!BA!BM>!>9B>CB!BM: B!?FJM!@CDeN@DF: =|AG!AGI: C@: B@AC!M: ?!

K>>C!: FBMAG@>D!KL!BM>!<GA<>G!#C@N>G?@L!: FBMAG@@>?!AG!: ?!<>G; @B>D!FCD>G!BG: D>; : GQ!=: ] 7!%>=@K>G: B>!; @F?>!AP!

BM>!C:; >!AP!BM>!#C@N>G?@L!AG!ABM>G!; : GQ?!KL!: CL!; >; K>G!AP!BM>!#C@N>G?@L!JA; ; FC@L!] @=!K>!GD>D!: ?!:!

?>G@AF?!APP>C?>7!

#### %, & -2+, 4!#)&!

ļ

\$CPAG; : B\(\alpha\)C!\(\cdot\)' #0?!\(\alpha\)CR\(\cdot\)C\(\cdot\)!; \(\cdot\)CPAG\(\cdot\)?\(\cdot\)CPAG; : B\(\alpha\)C!\(\cdot\)C!\(\cdot\)CPAG; : \(\cdot\)CPAG!\(\cdot\); \(\cdot\); \(\cdot\)CPAG; : \(\cdot\)CPAG!\(\cdot\)CPAG; : \(\cdot\)CPAG!\(\cdot\)CPAG; : \(\cdot\)CPAG!\(\cdot\)CPAG; : \(\cdot\)CPAG!\(\cdot\)CPAG; : \(\cdot\)CPAG!\(\cdot\)CPAG; : \(\cdot\)CPAG!\(\cdo

## &(05'\$("!+23&,)!

2M>!<GA\@>| >!AP!F?@[!#C\A\>G?\BL!>CF\@\; >CB\_!] \&\Cl\_!] \&\S??!!JJ>??!JJ>; \SP\G!: CD!C>B] \AGQ!?L?B>; ?!: CD!?>GN>G?\_! \KGA: DJ: ?B!; >D@\_!: CD!: JJ>??!BA!1=AK: ±JA; ; FC\@!: B\AC?!: CD!\CPAG; : B\AC!G>?AFGJ>?!\@!<GA\n\D>D!BA!; >; K>G?!AP!BM>! #C\A\>G?\BL!JA; ; FC\BL!: CD!; : L!CAB!K>!B\G: C?P>GG>D!AG!>9B>CD>D!KL!; >; K>G?!AP!BM>!J:; <F?!JA; ; FC\BL!: CD!; : L!CAB!K>!B\G: C?P>GG>D!AG!>9B>CD>D!KL!; >; K>G?!AP!BM>!J:; <F?!JA; ; FC\BL!BA!<>A<=>! AG!!GAF<?!AFB?\D>!BM>!#C\A\>G?\BL!] \BMAFB!: FBMAG\@: B\AC7!2M\@!\CJ=FD>?!<GAN\D\CI!C>B] \AGQ!?>G\Q|>!BA!ABM>G?!BMGAFIM! LAFG!A] C!#C\A\>G?\BL!C>B] \AGQ!JACC>JB\AC7!!

4/8/2019 5:55 PM Page **12** of **36** 

ļ

ļ

4/8/2019 5:55 PM Page **13** of **36** 

## -+. . &, -&!

 $.>; K>G?!AP!BM>!\#C@N>G?@L!JA; ; FC@L!:G>!<GAM@K@>D!PGA; !F?@CI!\#C@N>G?@L!@CPAG; :B@AC!B>JMCA=AIL!:CD!D@ @: <math>\pm$ G>?AFGJ>?!PAG!JA; ; >GJ@  $\pm$ <FG<A?>?7!-:; <F?RK:?>D!AGI:C@:B@AC?!J=: @ @CI!C:B@AC: $\pm$ AG!G>I@AC: $\pm$ ?B:BF?!; F?B!F?>! CACR#C@N>G?@L!\$2!AG!D@ @:  $\pm$ G>?AFGJ>? $\pm$ CJ=FD@CI!\$CB>GC>B!:JJ>?? $\pm$ PAG!CACR#C@N>G?@L!\$2BA@@e?7!

#C«N>G?«BL!D><:GB; >CB?!:CD!IGAF<?!BM:B!:G>!:FBMAG@>D!BA!JACDFJB!J>GB: @:!Q@CD?!AP!JA; ; >GJ>!:CD!] MA!B:Q>!JG>D&!

J:GD!@CPAG; :B@AC!AN>G!BM>!<MAC>\_!AN>G!BM>!J:; <F?!C>B] AGQ\_!AG!AN>G!BM>!\$CB>GC>B!; F?B!JA; <=L!] &M!BM>!#C«N>G?&L!

\$CPAG; :B@AC!)>JFG&L!/GAIG:; !:CD!ABM>G!?B:CD:GD?!G>=:B>D!BA!?FJM!>RJA; ; >GJ>7!!

## )+'\$-\$202\$+(!

4/8/2019 5:55 PM Page **14** of **36** 

ļ

ļ

4/8/2019 5:55 PM Page **15** of **36** 

!

ļ

4/8/2019 5:55 PM Page **16** of **36** 

4/8/2019 5:55 PM Page **17** of **36** 

!

ļ

2M>!B>JMCA=A1@J: ±G>?

4/8/2019 5:55 PM Page **18** of **36** 

ı

ļ

-+''05+,02\$6&!/,+Y&-2)

4/8/2019 5:55 PM Page **19** of **36** 

ļ

4AF!; F?B!G>PG: @C!PGA; !GFCC@CT!?>GN>G?!AG!D:>; AC?!] &MAFB!<G@AG!<>G; @?@AC!AC!?M:G>D!?L?B>; ?!LAF!DA!CAB!:D; @C@B>G?!

4AF!; F?B!K>!?>C?&&N>!BA!?<>J@ =!C>>D?!PAG!?APB] : G>!: CD!?>GN@J>?!: N: @: K=>!@C!AC=L!AC>!=AJ: B@AC\_!: CD!J>D>!: JJ>??!BA! BMA?>!] MA?>!] AGQ!G>cF&5>?!BM>!?<>J@ =!@S>; ??!

2MA?>!] &M!D@: K@&@?!G>cF&&C!!: JJA; ; AD: B@AC!BMGAFIM!?<>J@ =@>D!M: GD] : G>\_!?APB] : G>\_!AG!ABM>G!B>JMCA=A1L! ; F?B!M: N>!<G@AG&L!@C!BM>!F?>!AP!?FJM!&>; ??!!\$P!ABM>G?!: G>!: ?Q>D!BA!J>D>!: JJ>??\_!BM>L!; F?B!DA!?A7!

4AF!; F?B!CAB!<6>N>CB!ABM>6?!PGA; !F?@CI!?M: G>D!G>?AFGJ>?!KL!GFCC@CI!FC: BB>CD>D!<CGAJ>??>?!AG!<=: J@CI!?@ C?!AC!
D>N@J>?!BA!eG>?>GN>e!BM>; !] @MAFB!: FBMAG@: B@AC7!!4AFG!: K?>CJ>!PGA; !:!<FK=@!JA; <FB>G!AG!] AGQ?B: B@AC!BM: B!LAF!
] @M!BA!JACB@CF>!F?@CI!?MAF=D!K>!CA!=ACI>G!BM: C!] : GG: CB>D!KL!: !N@@!BA!BM>!C>: G>?B!G>?BGAA; 7!!O!D>N@J>!
FC: BB>CD>D!PAG!; AG>!BM: C!P@B>>C!; @CFB>?!; : L!K>!: ??F; >D!BA!K>!: N: @: K=>!PAG!F?>\_!: CD!: CL!<GAJ>??>?!GFCC@CI!AC!
BM: B!D>N@J>!; : L!K>!B>G; @C: B>D7!!!

1 M>G>!BM>!#C�N>G?�BL!M: ?!AKB: �C>D!N>GL!=@ �B>D!=@J>C?>?!PAG!?APB] : G>\_!LAF!; F?B!F?>!AC=L!AC>!?M: G>\_!CAB!?>N>G: = JACJFGG>CB=L7!

4AF!; F?B!: NA@!BL@CI!F<!?M: G>D!JA; <FB@CI!G>?AFGJ>?!PAG!>9J>??@N>!I:; >!<=: L@CI!AG!ABM>G!BG@N@ ±!:<<=@J: B@AC?I

4/8/2019 5:55 PM Page **20** of **36** 

!

ļ

4/8/2019 5:55 PM Page **21** of **36** 

 $2M>!\#C\P>G?\PL_!@J=FD@CI!\P?!P:JF=L_!?B:PP!:CD!?BFD>CB?_!; F?B!JA; <= L! ] @M!=AJ:=_!?B:B>!:CD!P>D>G:= !=: ] _!@J=FD@CI! JA<LG@IMB!=: ] ?!$ 

 $. >; K>G?!AP!BM>!\#C\PA>G?\&L!JA; ; FC\&L!; : L!CAB!QCA] @CI=L!:??@B!ABM>G?!] \&M!F?>!AP!BM>!\#C\PA>G?\&L0?!@CPAG; : B@AC!$ 

4/8/2019 5:55 PM Page **22** of **36** 

I

4/8/2019 5:55 PM Page **24** of **36** 

.

 $\label{localize} $$JG>: B>!C>] !: GB_!=@S-G: BFG>_!?JMA=: G?M@<!>BJ7_!] @MAFB!<>G; @??@AC!PGA; !BM>!JA<LG@ MB!MA=D>G7!!*AG!; AG>!@CPAG; : B@AC! : KAFB!MA] !BA!: <<=L!BM>!PAFG!P: @!F?>!P: JBAG?_!<=>: ?>!JACB: JB!BM>!+' '#!' @KG: GL7!$ 

 $1 \text{ M} > \text{C!DA@CI!: J: D} > \text{: } \text{B} > \text{G@.:LAFI: G} > \text{!G} > \text{?<AC?@K} \Rightarrow \text{!PAG!} < \text{GA} < \text{>GL!: BBG@KFB@CI!: } : B > \text{G@.} = \text{RRD: B: } \text{!} \text{@} : I > \text{?} = \text{!} \text{@} > \text{: } \text{?} = \text{!} \text{?} = \text{!} \text{AFCD?} = \text{!} \text{AFCD.} = \text{!} \text{AF$ 

4/8/2019 5:55 PM Page **25** of **36** 

4/8/2019 5:55 PM Page

4/8/2019 5:55 PM Page **27** of **36** 

!

ļ

4/8/2019 5:55 PM Page **28** of **36** 

ļ

 $2M>!\#C\P>G?@L0?!<A=UL!AC!G><AGB@CI_!CAB>CB@=L!@>I: \exists: JBPNBL!D>?JGPK>?!<GAJ>DFG>?!PAG!G><AGB@CI_!CJ=FD@CI!BM>!\\BM@GDR<: GBLR; : C: I>D!3AB=@C>!PAG!BMA?>!] MA!P>>=JBM>!J@JF; ?B: CJ>?!]: GG: CB!: CACL; @L7!$ 

4/8/2019 5:55 PM Page **29** of **36** 

ļ

ļ

4/8/2019 5:55 PM Page **30** of **36** 

4/8/2019 5:55 PM Page **31** of **36** 

4/8/2019 5:55 PM Page **32** of **36** 

ļ

OJJ><B: K=>!K>M: N@AGj!!4AF!JG>: B>!: CD!GFC!: !?JG@B!BM: B!: JJ><B?!@CPAG; : B@AC!PGA; !:!] >K!PAG; !: CD!?>CD?!BM>! @CPAG; : B@AC!BA!: !?@C|=>!: DDG>??!AG!P@>>D!?>B!AP!G>J@@>CB!: DDG>??>?!!

64A=: B4ACj!!4AF!JG>: B>!: CD`AG!GFC!>R; :@!?>GN>G!?APB]: G>!JACP@ FG>D!BA!: JJ><B!>R; :@!; >??: I >?!PGA; !: GK&G: GL!?>CD>G?!: CD!D>=4N>G!BA!: GL!G>J&&CB?!T: C!A<>C!G>=: LU7!

64=: B4Cj!)A; >AC>!M:?!e?<:;; >De!?>N>6: =!>=>JBGAC@!; : @CI!=9B?!BA!] M@M!LAF!?FK?JG4K>\_!?A!LAF!eI>B!M@ !K:JQe! KL!?>CD@CI!?>N>C!MFCDG>D!@>CB@:=!D>G@4N>!; : @!; >??:I>?!BA!BM>!<>G?ACf?!>R; : @!:DDG>???!

 $OKAFB!G>B: = B \bullet Cj!!, >B: = B \bullet C!C!C!CCD!Q!CAB!: <<GA<GQ B>!K>M: N \bullet G_!:?! \bullet B!ACBCF>?!BA!NQBQ QS-!ABM>G!<>A<=>7!!2M>G>!: G>!: <<GA<GQ B>!: N>CF>?!PAG!<GAB>?B_!] MQM!] = CAB!N \bullet A=: B>!#C \bullet N>G? \ BL!<A=QL7!!)>>!h 1 M>G>!BA!BFGCe! \ C!BM>!?>JB \ AC!AP!BMQ!<A=QL1!J: =>D!e/GAB>JB \ AC!PAG!LAF7e!!$ 

# -+. . &, -&!

OJJ><B: K=>!K>M: N@AGj!!4AFG!G>JAI C@>D!J:; <F?!AGI: C@: B@AC!<FK=@M>?!1 > K!<: I > ??!!2M>!I GAF<d?!MA; >!<: I >! JACB: @C?!BM@!: JJFG: B>!@CPAG; : B@ACj!e. >; K>G?M@<!@C!IC:; >!AP!I GAF<n!G>CFd6>?!<: L; >CB!AP!B] >CBL!DA=: G?!: CCF: \(\frac{1}{2}\) DF>??e!

OJJ><B: K=>!K>M: N@AG|!!4AF!F?>!>R; :@!BA!: <<=L!PAG!:!IG: CB!BM: B!] @HN>=<!<: L!PAG!LAFG!B>9BKAAQ?!: CD!BG: N>=!!

OJJ><B: K=>!K>M: N@AGJ!!4AFG!JM@D!M: ?!AFBIGA] C!: C!@CP: CB!?BGA=>G!: CD!LAF!] : CB!BA!?>=!@7!!4AF!F?>!LAFG!#C@N>G?@L! : JJ>??!BA!<A?B!: !ePAG!?: =>e!CAB@>!BA!: !JA; ; FC@L!; >??: I >!KA: GD7!T#?>!AP!LAFG!#C@N>G?@L!>; :@!: DDG>??!@C!<A?B@CI! ?FJM!: !CAB@>!BA!: C!AFB?@D>!; >??: I >!KA: GD!] AF=D!CAB!K>!: <<GA<G@ B>!FCD>G!#C@N>G?@L!<A=@L7U!

OJJ><B: K=>!K>M: N@AGj!!4AF!:G>!: KAFB!BA!IG: DF:B>!PGA; !+''#!: CD!F?>!>R; :@!BA!JA; ; FC@:B>!] @M!<AB>CB@ =! >; <=AL>G?7!

OJJ><B: K=>!K>M: N@AGJ!!4AF!:G>!:IP: JF=BL!; >; K>G!] MA?>!?JMA=:G=L!<FK=@:B@AC!@!J:GG@>D!KL!:C!ACR=@C>!KAAQ?>=>Gb! LAF!; :Q>!BM>!KAAQ!B@=>!AC!LAFG!] > K!<:I>!?>GN>!:?!:leMAB!=@CQe!BA!BM>!<A@CB!AP!?:=>7!

OJJ><B: K=>!K>M: N@AGj!!4AFG!G>JAI C@>D!?BFD>CB!AGI: C@: B@AC!M: ?!:!-%!BM: B!BM>!IGAF<!M: ?!K>>C!: FBMAG@>D!BA!?>=!N@!
BM>!1 AG=D!1 @D>!1 >K7!!4AF!APP>G!@!PAG!?:=>!PA=A] @CI!BM>!G>IF=: B@AC?!PAG!>RJA; ; >GJ>!>?B: K=@M>D!KL!BM>!\*@C: CJ>!
+PP@|>7!

66A=: BACj!4AF!: G>!: C!APP@J>G!@C!: !G>JAIC@J>D!#CAU>G?&L!AGI: C@: BAC!BM: B!@!?F<<AGB>D!KL!P>>?!PGA; !; >; K>G?!: CD! ePG&CD?!APe!BM>!AGI: C@: BAC7!!2M>!AGI: C@: BAC!M: ?!:!] >K?>GN>G!<: I >!>9<=: @C@CI!&?!: JBAU&&??!!, : BM>G!BM: C!^F?B! ?B: B@CI!BM: B!?F<<AGB!@!KL!?FK?JG@BAC!PGA; !; >; K>G?!: CD!PG&CD?!: CD!?B: B@CI!P: JBF: \(\delta\)@CPAG; : BAC!G>I: GD@CI!P>>?! LAF!<A?B!: C!: <<>:=!e)>CD!LAFG!DA=: G?!@C!CA] s!!) F<<AGB!BM@!J: F?>!: B!+''#7e!

6@A=: B@

4/8/2019 5:55 PM Page **33** of **36** 

\*\$, &!R!\*AFCD: B@AC!PAG!\$CD@N@DF: =!, @I MB?!@C!&DFJ: B@AC!

 $/\&O-\&^{,}\&!R!2>>C!(>B!OCB@R->C?AG?M@<!O=@CJ>!$ 

#)!-A<LG@\\MB!+PP@\>!\MA;\\\><:\\\

#)!%><:GB; >CB!AP!YF?B@>!-A; <FB>G!-G@; >!:CD!\$CB>=>JBF:=!/GA<>GBL!)>JB@AC!

 $\P+''\#! \\ \texttt{IG: B>PF=L!: JQCA]} \Rightarrow \texttt{DI>?!BM>!<>G: @?:@AC!BA!F?>!JACB>CB!: CD!?BGFJBFG>!PGA; !/G@CJ>BAC!\#C@N>G?:@L!BA!D>N>=A<!$ 

4/8/2019 5:55 PM Page **36** of **36**