

7ci fgY'8YHJ]`g

7fYX]hDc]bHg`%&`

Gi a a UfmicZ\hY'7ci fgY

Gi VYWh5fYU.'EaU[S^I ad]

H\]g`Vci fgY`U`ck`g`mci`hc`Udd`mi`h`Y`h`Y`c`f`Y`h`W`U`b`X`g`_`g`V`U`g`Y`X`Y`U`f`b`]`b`U`d`f`U`W`h`W`g`Y`h`]`b`["`M`c`i`k`]"`V`Y`
`]`b`_`Y`X`k`]"`h`U`e`i`U`]"`Z`Y`X`g`c`W`U`k`c`f`_`Y`f`]"`b`U`a`i`a`U`b`g`Y`f`]"`W`g`U`["`Y`b`W`h`c`Z`Y`f`]"`b`["`d`f`U`W`h`W`V`U`g`Y`X`Y`U`f`b`]`b`["`Z`]"`b`
U`W`h`c`f`X`U`b`W`k`]"`h`h`Y`5`5`G`K`" `D`f`U`W`h`W`G`h`U`b`X`U`f`X`g`]"`H`h`g`Y`U`f`b`]`b`["`Y`I`d`Y`f`]"`Y`b`W`h`]"`g`g`i`d`d`c`f`h`Y`X`V`m`g`c`W`U`k`c`f`_`
g`i`d`Y`f`]"`g`]`c`b`d`f`c`a`c`h`]`b`["`W`h`h`W`h`f`Y`Z`Y`W`h`c`b`/`]"`h`k`]"`["`i`]"`X`Y`m`c`i`" `h`f`c`i`["`h`U`X`Y`j`Y`c`d`a`Y`b`h`U`d`f`c`W`g`g`Z`c`W`g`]"`b`["`c`b`
`b`c`k`" `Y`X`["`Y`Z`g``]"`g`U`b`X`j`U`i`Y`g`f`Y`j`U`b`h`h`c`" `h`Y`g`c`W`U`k`c`f`_`d`f`c`Z`Y`g`g`]"`c`b`["`D`U`W`h`a`Y`b`h`U`c`W`h`c`b`]"`g`a`U`b`U`["`Y`X`]"`b`
V`c`b`g`i`" `h`U`h`c`b`k`]"`h`m`c`i`" `Z`g`c`" `h`U`h`d`f`c`f`]"`h`g`Y`g`m`c`i`" `f`Y`U`f`b`]`b`["`["`c`U`g`U`b`X`d`f`c`Z`Y`g`g`]"`c`b`U`]"`b`h`Y`f`Y`g`h`g`]"`D`U`W`h`a`Y`b`h`g`c`W`h`f`
]"`b`X`]"`Y`f`g`Y`V`c`b`h`Y`h`g`c`Z`d`f`U`W`h`W`g`i`V`X`U`g`h`c`g`d`]"`h`U`g`Z`g`h`U`h`Y`" `U`b`X`Z`X`Y`f`U`]"`["`c`j`Y`f`b`a`Y`b`h`X`Y`d`U`f`h`a`Y`b`h`g`Z`U`b`X`b`c`b`!"
["`c`j`Y`f`b`a`Y`b`h`V`c`a`a`i`b`]"`m`V`U`g`Y`X`c`f`["`U`b`]"`g`U`h`c`b`g`]"`G`c`W`U`k`c`f`_`]"`b`h`Y`f`j`Y`b`h`c`b`g`a`U`m`]"`b`W`i`X`Y`d`c`]"`W`h`Z`f`Y`g`Y`U`f`V`X`Z`
V`c`i`b`g`Y`]"`b`["`Z`W`U`g`Y`k`c`f`_`U`b`X`V`c`a`a`i`b`]"`m`k`c`f`_`["`M`c`i`k`]"`X`Y`j`Y`c`d`["`Y`b`Y`f`U`g`c`W`U`k`c`f`_`g`_`]"`g`Z`h`f`U`b`g`Z`Y`f`U`V`Y`h`c`
U`g`c`W`U`k`c`f`_`V`c`b`h`Y`h`g`]"`H`h`Y`d`U`W`h`a`Y`b`h`V`c`a`d`f`g`Y`g`&`" `U`h`Y`b`X`U`b`W`X`U`m`g`f`l`%`*" `h`c`i`f`g`L`U`b`X`]"`g`["`Y`b`Y`f`U`m`
i`b`X`Y`f`U`_`Y`b`Z`c`i`f`X`U`m`g`d`Y`f`k`Y`Y`_`h`f`c`i`["`h`c`i`h`H`Y`f`a`" `%"`h`h`Y`d`U`W`h`a`Y`b`h`]"`g`U`W`h`c`a`d`U`b`]"`Y`X`V`m`U`g`Y`f`]"`Y`g`c`Z`
h`h`Y`["`f`U`h`c`b`G`Y`a`]"`b`U`f`g`h`U`h`g`i`d`d`c`f`h`U`b`X`V`c`a`d`Y`a`Y`b`h`m`c`i`f`Z`Y`X`V`U`g`Y`X`Y`U`f`b`]`b`["`Z`k`]"`h`U`b`Y`a`d`h`U`g`]"`g`c`b`h`Y`c`f`m`
d`f`U`W`h`W`]"`b`h`Y`["`f`U`h`c`b`Z`W`h`h`W`h`g`c`W`U`k`c`f`_`U`b`X`W`h`h`W`h`f`Y`Z`Y`W`h`c`b`]"`H`h`g`V`c`i`f`g`Y`]"`g`D`U`f`h`5`c`Z`m`c`i`f`Z`f`g`h`i`:"`]"`Y`X`
9`X`i`W`h`c`b`d`U`W`h`a`Y`b`h`Z`k`h`W`h`c`b`h`i`Y`g`]"`b`h`c`" `H`Y`f`a`&`Z`U`h`h`Y`g`U`a`Y`U`["`Y`b`W`h`Z`k`]"`h`" `G`c`W`U`k`c`f`_`D`f`U`W`h`W`!"
@`Y`j`Y`" `D`U`W`h`a`Y`b`h`6`Z`U`h`h`Y`Y`b`X`c`Z`k`h`W`h`["`f`U`X`]"`b`["`]"`g`Z`]"`b`U`]"`n`Y`X`Z`c`f`V`c`h`V`c`i`f`g`Y`g`"

7ci fgY`@YUfb]b[`Ci hWc`a Yg

"`5`d`d`m`g`c`W`U`k`c`f`_`_`b`c`k`" `Y`X`["`Y`]"`b`f`Y`g`d`c`b`X`]"`b`["`h`c`" `h`Y`b`Y`Y`X`g`c`Z`W`]"`Y`b`h`g`U`b`X`V`c`a`a`i`b`]"`h`Y`g`]"`b`X`]"`Y`f`g`Y`
Z`Y`X`g`c`Z`d`f`U`W`h`W`"
&`" `X`Y`b`h`Z`m`]"`b`_`g`V`Y`h`k`Y`Y`b`g`c`W`U`k`c`f`_`h`Y`c`f`m`U`b`X`d`f`U`W`h`W`"
'"`5`b`U`m`g`Y`h`c`k`" `h`Y`d`U`W`h`a`Y`b`h`c`f`["`U`b`]"`g`U`h`c`b`Z`]"`b`W`h`c`b`g`k`]"`h`]"`b`h`Y`V`f`c`U`X`Y`f`V`c`a`a`i`b`]"`m`c`Z`d`f`U`W`h`W`"
(`"

Zcfhb] [\hmi\fc i [\ci h\hY'd'UW\ a Ybh'

" ""Mci f'XU]mX]UfmiUbX'k YY_mDfUW]WY'>ci fbU"

' (" '5 'A]X!D'UW\ a Ybh@U]gcb'J]g]hk]h' h\Y'U'cWU\hX'I B G K '@U]gcb'Hi hcf'UbX':]Y'X'9Xi WU\hcf'k \]W\ 'mci k]'dfYdUFY'Zcf'UbX'dUfh]V]dU\Y'UW\j Y'm]b"

') "" '5 'A]X'D'UW\ a YbhF YdcfhXYj Y'cdYX]b'W\bg i 'h]hcb'k]h' h\Y':]Y'X'9Xi WU\hcf"

'* "" \hY' [fU]hcb'GYa]bUfg'Uhi b]j Yfg]hmXi f]b['d'UW\ a Ybh'k \YfY'k cf_k]'VY'gYhUbX'h]a Y'U'cWU\hX'Zcf']hg W\ a d'Y]hcb"

5XX]hcbU`XYhJ]g.

UbX'fYei YghX'hc'fYj]gY'UbX'fYgi Va]hdYf'hY'dfcW'gg'ci h]bYX'VY'ck "'5``d]YW'g'cZk cf_]b'GC 7K ' \$%&
UfY'\i fX'Y'fYei]fYa Ybhg'Xi Y'hc'hY'dfcZ'gg]cbU'dfUW]W'fYei]fYa Ybhg'cZ'hY'6UW'Y'cf'cZGcW]U'K cf_
fk cbg'k'dfc[fUa "'Z'hY'Z'fghgi Va]gg]cb'cZ'hY'@YUfb]b['7cb'fUW]h]g'bchXY'h'fa]bYX'Vm'hY'7ci fgY
7cbj Ybcf'hc'VY'cZU'gUhgZ]W'c'fmg]h]bXU'fX'z'gh'XYb'hg'k]``\Uj Y'cbY'cd'c'f'hi b]m'hc'fYj]gY'UbX'fYgi Va]h'hY
UggYgga Ybh'fUg_]b'W'cbgi 'fU]cb'k]h'hY'7ci fgY'7cbj Ybcf'UbX'z'k \YfY'Udd'f'c'd'f]U'h'z'hY'@]U]gcb'Hi'hc'f

@Yb[h. 'J Uf]UV`Y`dYf`gYa]bUf`Vcc_`Yh

8YhU]`g.

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H\Y'ZfghdUfh]g'U')!%\$'a]bi h' a YYh]b['VYtk YYb'Gh XYbhUbX'@]U]gcb'Hi hcfzH\]g'Vf]YZa YYh]b['dfcj]XYg

i bgUh]gZUWcfn'

Gi Va]gg]cb'bcH'g.D'YUgY'bY[ch]UH' h\Y'YI UWIXUH'k]h' mci f':]Y'X'9Xi WUhc f'UbX'@]U]gcb'Hi hc f

Hi fb]h]b'gYH]b[. H\]g]g'bchU'Hi fb]h]b'Ugg][ba Ybh

5ggYgga Ybh* . A]X!D'UW'a YbhF Ydcfh

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@Yb[h\ . &) \$\$'k cfXg

8YHU]`g. 'H\Y'A]X'D'UW'a YbhF Ydcfh]g'Wca d'YH'X'i g]b['h\Y'gdYW]ZYX'h'a d'UH'Uj U]'UV'Y'cb'A ccX'Y"
K \Yb'dfYdUf]b['h\Y'A]X!D'UW'a YbhF Ydcfh' h\Y'gh XYbhg\ci 'X'XfUZh'WcbH'bhUbX'h\Yb'X]gW'gg'k]h
h\Y]f':]Y'X'9Xi WUhc f']b'UXj UbW'cZ'h\Y'Xi Y'XUH'" 'b'dfYdUf]b['h\]g'XcW'a Ybh'gh XYbh]YUf]Yf'd'UW'a Ybh

5 hYbXUbW F Yei]fYa YbHg

H\Y`GWcc`cZGcWU`GWYbWg[i]XY`]bYg`cb`U hYbXUbW`UfY`Uj U]`UV`Y`Uh
[\hdg.#gcWU`gWYbWg"Ufhg"i bkg "YXi "Ui #gh XYbHg#Ygci fWg#dc`\]WYg!\[i \]XY`\]bYg#](#)

F Ygci fWg

DfYgW]VYX F Ygci fWg

Gi Va]gg]cb`cZ5ggYgga YbhHUg_g

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≠mci`YbWci`bHYf`U`dfcV`Ya`k`Yb`U`HYa`dh]b[`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybh`h`fci`[`\`Hi`fb]hb`z`d`YUgY`
HY`Yd`cbY`9I`HYfbU`Gi`ddcfhcb`-`,`),`"`,`'`,`%`cf`Ya`U]`h`Ya`cb`YI`HYfbU`HY`hgi`ddcfh4`i`bgk`"YXi`"Ui`"Gi`ddcfh`
`ci`fg`UfY`,`.\$\$Ua`-`%\$.\$\$da`cb`k`YY`XUmg`UbX`-`.\$\$Ua`-`,`).\$\$da`cb`k`YY`YbXg`fI`*)`XUmg`U`mY`UfL`≠mci`
UfY`i`bUV`Y`hc`gi`Va`]hmc`i`f`Ugg][`ba`YbhXi`Y`hc`U`ZUi`hik`]h`Hi`fb]hb`mci`a`Um`Udd`mi`Zcf`Ub`YI`HYbg]cb`z`Vi`hmc`i`
a`i`ghfY`hU]b`mci`f`h]W`Yhbi`a`VYf`Zca`9I`HYfbU`Gi`ddcfhU`cb[`k`]h`Ubmc`h`Yf`fY`Yj`UbhXcW`a`Ybhg`L`hc`
]bWi`XY`Ug`Yj`]XYbW`hc`gi`ddcfhmc`i`f`YI`HYbg]cb`Udd`]W]h]cb"≠mci`Ya`U]`9I`HYfbU`Gi`ddcfhmc`i`k`]`
Ui`hca`U]W]m`fYW]j`Y`U`h]W`Yhbi`a`VYf`z`Vi`h]Zmci`HY`Yd`cbY`mci`k`]`b`Y`YX`hc`gd`Y`W]W]m`Ug`_`Zcf`cbY`
Hi`fb]hb`U`gc`dfcj`XYgi`dXU`HY`g`cb`h`Y]f`gmgh`Ya`ghU`h`g`cb`Hk`]HYf"

;`YbYfU`m`z`UggYgga`YbhHUg_g`a`i`ghVY`gi`Va`]hYX`Y`YWfcb]W]m`mj`]U`Y]h`Yf`Hi`fb]hb`cf`U`A`ccX`Y`
Ugg][`ba`Ybh`h`h`]bg`h`UbW`g`k`YfY`h`h`g`]g`bchidcgg]V`Yz`]hk`]`VY`g`h`U`Y`X`cb`mci`f`Wci`fgY`g`A`ccX`Y`g`]h`k`]h`
U`HYfbU]j`Y`gi`Va`]gg]cb`XYhU]g"

:`cf`]bZcf`a`U]cb`cb`\ck`hc`gi`Va`]hUgg][`ba`Ybh`g`cb`]bY`j`]U`A`ccX`Y`.\`h`hdg`#`gh`XYbh`i`bgk`"YXi`"Ui`#ack`!

5 WUXYa]W<c bYghmUbX 'D`U[]Uf]ga

D`U[]Uf]ga]g'i g]b['hY`k cfXg'cf]XYUg'cZchYfg'UbX'dfYgYbh]b['hYa`Ug'mci f'ck b" #WUbb`hU`Y`a Ubm
Zfa gZ`Zca`XY`]VYfUHY`WXU]b['hc`UW]XYbhU`mW`dm]b[`Zca`U`gci fW`k]hCi hUW_bck`YX[Ya`Ybh`

I BGK`[fci dg'd`U[]Uf]ga`]bhc`hY`Z`ck]b[`WU]Y[cf]Yg.

7cdm]b[.`i g]b['hY`gUa`Y`cf`j`Yfmg]a`]Uf`k`cfXg`hc`hY`cf][]bU`hY`hcf`]XYU`k`]hCi hUW_bck`YX[]b['hY`
gci fW`cf`i`g]b[`ei`chU]cb`a`Uf`g`"H\]g`U`gc`Udd`Yg`hc`]a`U[YgZ`UfhUbX`XYg][`b`dfc`YWgZ`Ug`k`Y`"Ug`
dfYgYbhU]cbg`k`YfY`gca`YcbY`dfYgYbh]b[`Ubc`hY`f`g`]XYUg`cf`k`cfXg`k`]hCi hWYX]h`

#Uddfcdf]UHY`dUfUd`fUg]b[.`7`U`b[]b[`U`Z`k`k`cfXg`UbX`d`fUgYg`k`Y`a`cghmifYU]b]b['hY`cf][]bU`
g]fi`W`fY`UbX`#`f`dfc[`fYgg]cb`cZ]XYUg`cZ`hY`cf][]bU`Z`UbX`]bZ`fa`U]cb`k`]hCi hUW_bck`YX[Ya`Ybh`"H\]g`U`gc`
Udd`Yg`]b`dfYgYbhU]cbg`k`YfY`gca`YcbY`dUfUd`fUgYg`UbchYf`g`]XYUg`cf`k`cfXg`k`]hCi hWYX]hUbX`hc`
d]YW]b[`hc[Y`hY`f`ei`chYg`UbX`dUfUd`fUgYg`]bhc`U`bYk`k`Y`c`Y`Z`k`]hCi hUddfcdf]UHY`fYZYfYbW]b["

7c`i`g]cb.`k`cf_]b[`k`]h`chYfg`Vi`hdUgg]b[`cZ`hY`k`cf_]Ug`U`dYfgcb`g`]bX]j`]Xi`U`k`cf_"`7c`i`g]cb`U`gc`
]bW`i`XYg`dfcj`X]b[`mci`f`k`cf_]hc`UbchYf`gh`XYbhVYZ`fY`hY`Xi`Y`XU]Y`Z`cf`Z`f`hY`di`fdcgY`cZ`hY`a`
d`U[]Uf]g]b[`Uh`Ubm]h`a`Y`Z`dUm]b[`UbchYf`dYfgcb`hc`dYfZ`fa`Ub`UWUXYa`]W]Ug`Z`ghYU`]b[`cf`UW`ei`]f]b[
UbchYf`dYfgcb`g`UWUXYa`]Wk`cf_]UbX`W`dm]b[`]h`c`ZY]b[`hc`W`a`d`Y`h`UbchYf`dYfgcb`g`k`cf_]cf`gYY_]b[
dUma`YbhZ`f`W`a`d`Y`h]b[`UWUXYa`]Wk`cf_"

#Uddfcdf]UHY`W]U]cb.`7`h]b[`gci`fW`g`k`]Wk`Uj`Y`bchVYYb`fYUXZ`k`]hCi hUW_bck`YX[]b[`hY`"gYW`bXUfm`
gci`fW`Z`ca`k`]Wk`_bck`YX[Y`cZ`hY`a`U`g`VYYb`cV]U]bYX"

8i`d`]W]h]cb`f`f`gY`Z`d`U[]Uf]ga`"L`gi`Va`]h]b[`mci`f`ck`b`k`cf`Z`]b`k`Y`cf`]b`dUf`Z`k`YfY`]h`Ug`dYj`]ci`g`m`
VYYb`dfYdUfYX`cf`gi`Va`]hYX`Z`f`UbchYf`UggYgga`Ybhcf`W`i`fgY`Uh`I`BGK`cf`UbchYf`i`b]j`Yfg]m`

7cffYW`fYZYfYbW]b[`dfUW]W]g.

- DUfUd`fUg]b[Z`gi`a`a`Uf]g]b[Z`YggUm`k`f]h]b[`UbX`h`a`Y`a`UbU[Ya`Ybh`
- 5ddfcdf]UHY`i`gY`cZ`UbX`U]h]f]Vi`h]cb`Z`f`U`fUb[Y`cZ`a`U]h]f]U`g`]b`\$ % U,

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- VY'Uk UfY'cZd'U[]Uf]ga ž'Wcdmf][\hž' BGK 'Gh XYbh7cXY'cZ7cbXi WñUbX'5WwdfUV'Y'I gY'cZ
I BGK '⇒H'F Ygci fW'g'Dc`]Wñ

5 WUXYa]W]bZcfa Uh]cb`

: cf`YggYbh]U`ghi XYbh]bZcfa Uh]cb`fY`Uh]b[`hc.

- fYei Yghg`ZcfYI hYbg]cb/
- `UhY`gi Va]gg]cbg`[i]XY`]bYg/
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- YI Ua]bUh]cb`dfcVWXi fYg/
- gdYW]U`Vc]bg]XYfUh]cb`]b`hY`Yj Ybhcz]`bYgg`cf`a]gUXj Ybh fY/
- ghi XYbhYei]hmUbX`X]gUV`]`]m/
- UbX`chYf`YggYbh]U`UWUXYa]W]bZcfa Uh]cbz`gYY

[\hfdg.#k k k "Ufmg"i bgk "YXi "Ui #W ffYbhghi XYbh\]bZcfa Uh\]cb`dfc\]Vc`g!\[i \]XY`\]bYg#](#)

⇒ U[Y`7 fYX]h

GmbYf[]Yg`]b`Gci bX`&\$%*`

7F ⇒ CG

7F ⇒ CG`Dfcj]XYf`7 cXY. '\$\$\$- , ;