

; YhfY]XYUbVUi Z`ÀW`Y`]b`8Yi hgW`UbX
g]b`_h`Ui Z`F`Y`_c`f`X`h]YZ. `8`F`J`!`D`f`c`[`b`c`g`Y`&`\$`&(`

9fZU`fYb`G]Y`]b`X]YgYa`5fh]_Y`XYg`8Yi hgW`Yb
F`U]ZZY]gYbj`YfVUbXg`fB`F`J`ł`ž`k`Ufi`a`X]Y`];`YhfY]XYUbVUi`Z`ÀW`Y`
]b`8Yi`hgW`UbX`Yfgha`U`g`i`bhYf`gYW`g`A`]`cbYb`<`Y`_hUf`ZU`Yb`
k`]fX`i`bX`k`Y`W`Y`;`f0bXY`XUni`Z0`fYb`5i`»`YfXYa`]bZcfa`]Yfh
XYf`8FJ`0VYf`X]Y`ni`bY`a`YbXY`:`ÀW`Yb`_cb`_i`ffYbn`i`bX`X]Y
<`YfUi`gZc`fXYfi`b`[`Yb`Z0f`X]Y`@UbXk`]fhgW`UZh`@YgYb`G]Y`a`Y`f`
0VYf`X]Y`5i`gk`]f`_i`b`[`Yb`j`cb`B]YXYfgW`À`[`Yb`Ui`Z`X]Y
;`YhfY]XYVYgh`AbXY`i`bX`X]Y`Dfc`[`bcgY`Z0f`X]Y`;`YhfY]XY`!`i`bX`
F`Udg!`9fbhY`"?`cbhU`_h]YfYb`G]Y`;`i`]Xc`GYX`Yf`Z0f`k`Y]hYfY
`bZcfa`Uh]cbYb`9fZU`fYb`G]Y`a`Y`f`0VYf`XYb`8FJ`U`g`
J`YfYfYhYf`XYf`5`[`fUf`!`i`bX`9fb`À`fi`b`[`gk`]fhgW`UZh`]b`
8Yi`hgW`UbX`"

8]Y`;`YhfY]XYUbVUi`Z`ÀW`Y`]b`8Yi`hgW`UbX`k`]fX`Ui`h`Y]bYf`
U`_hi`Y`Yb`9]bgW`À`hni`b`[`XYg`8Yi`hgW`Yb`F`U]ZZY]gYbj`YfVUbXg`fB`F`J`ł`
]b`X]YgYa`]`f`Yfgha`U`g`Ui`Z`i`bhYf`gYW`g`A`]`cbYb`<`Y`_hUf`ZU`Yb`
8Yf`;`YhfY]XYa`Uf`_hYi`dYfhY`XYg`J`YfVUbXgž`;`i`]Xc`GYX`Yfž`VYhcbhž`
XUgg`X]Yg`Y]b`bYi`Yf`H]Y`ZghUbX`gY`"8]YgY`9b`hk`]W`_i`b`[`k`]fX`Ui`Z`
j`YfgW`]YXYbY`:`U`_hc`fYb`ni`f0W`[`Y`Z0`fh`Ni`a`Y]bYb`bY`a`Yb`
6Ui`a`U`»`bU`a`Yb`i`bX`X]Y`9ff]W`hi`b`[`j`cb`:`chc`j`c`hU]`_Ub`U`[`Yb`
k`Y]hYf`]b`5W`YfZ`ÀW`Yb`]b`5bgdfi`W`"Ni`g`À`h`i]W`a`0ggYb`
@UbXk`]fhY`[`Ya`À`»`XYb`J`cf`[`UVYb`XYf`9i`fcd`À]gW`Yb`5`[`fUf`dc`]h`_`
a`]bXYghYbg`j`]Yf`Dfc`nYbh`]`fYf`:`ÀW`Yb`Ui`g`0`c`c`[`]gW`Yb`;`f0bXYb`
gh]`Y`[`Yb`"5`g`?`cbgYei`Ybn`Yfk`UfhYh`XYf`8FJ`Y]bY`f0W`_`Ài`Z`[`Y`
;`YhfY]XYfYb`hY`]a`]`f`&`\$`&(`"

8Yf`8FJ`d`f`c`[`bcgh]n]Yfhž`XUgg`g]W`X]Y`?`cb`_i`ffYbn`i`a`
5W`YfZ`ÀW`Yb`]b`XYb`_ca`a`YbXYb`]`f`Yb`k`Y]hYf`j`YfgW`ÀfZYb`k`]fX`
i`bX`X]Y`5bVUi`Z`ÀW`Y`XYi`h]W`gh`À`_Yf`UVbY`a`Yb`k`]fX`"@Ui`h`Y]bYf`
Ghi`X]Y`XYg`H`0bYb`!`bgh]hi`hg`_0bbhYb`V]g`ni`a`]`f`&`\$`\$`\$`

]bg[YgUa hV]g'ni '* \$\$\$<Y_hUf`UbXk]fhgWUZh]WXY`Bi hnZÅWY
Xi fW`6YVUi i b[`cXYf`X]Y`l a gYhni b[`j cb
?`ja UgW`i hna U» bU`a Yb`j Yf`cYb` [Y`Yb`"8]Yg`Ybhgd]W`h`WfWU
XfY]`DfcnYbh`XYf` [YgUa hYb`UbXk]fhgWUZh]WXYb`Bi hnZÅWY`]b
8Yi hgW`UbX`"8Yf`8FJ`VYhcb`h`XU`Yf`X]Y`B`chk YbX][`_Y]hž
a Ò[`]W`ghj]Y`Y: `ÅWYb`ZØf`X]Y`@UbXk]fhgWUZh`ni `g]WYfb`i bX`X]Y
DfcXi`_hj]h`h`bUW`U`h][`ni`ghY][`Yfbž`i a`XYb`k`Y`hk`Y]hYb`<`i b[Yf
ni`VY`_Åa`dZYb`"8]Y`k`Y`hk`Y]hY`BUW`ZfU[Y`bUW`BU`fi b[ga`]hY`b
k]fX`V]g`&\$) \$`j`cfUi`gg]W`h]W`i a`WfWU`) \$`DfcnYbh`ghY][`Yb`"

8]Y`U`_hi`Y`Y` ; YhfY]XYg]hi`Uh]cb`k]fX`Xi`fW`X]Y`B]YXYfgW`À[Y`XYf
`YhnhYb`A`cbUhY`VYY]bZi`ggh`K`Å`fYbX` : fcghgW`ÅXYb`bi`f`VY[fYb`nh
Ui`Z[YhfYhYb`g]bXž`UVYb`c`Y`K`UggYfg`Åhh][`i b[`XYf`6ØXYb`i bX
, VYfgW`k`Ya`a`i b[Yb`]b`j]Y`Yb`F`Y[]cbYb`ni`DfcV`Ya`Yb`[YZØ`fh`
`b`Y]b][`Yb` ; YV]YhYb`_cbbhY`Ui`Z[fi`bX`XYf`B`ÅggY`_Y]b` ; YhfY]XY
Ui`g[Yg`Å`h`k`YfX`Yb`"6Ygcb`XYfg`VYhfc`ZZYb`g]bX`B]YXYfgUW`gYb`i bX
HY]Y`GW`Y`gk][!<c`ghY]bg`"8]Y`6Ygh`ÅbXY`g]bX`[YgW`k`ÅW`h`Ui`g
XYa`K`]bhYf`[Y`_ca`a`Yb`i bX`hY]`k`Y]gY`a`i`gg`b`Yi`Yg` ; YhfY]XY
Ui`g[Yg`Å`h`k`YfX`Yb`"8Ub`_`XYg`ZfØ`]b[g`UZhYb`K`YhYfg`U`h`g]W`X]Y
@U[Y`a`]h`h`Yfk`Y]Y`Y`hk`Ug`Y`bhgd`Ubb`hž`Y`XcW`g]bX`gW`k`YfY`6ØXYb
]b`B`cfXXYi`hgW`UbX`k`Y]hYf`]b`_Ui`a`VYZU`fVUf`"

8Yf`8FJ`d`fc[`bcgh]n]Yfh`VY]`Xi`fW`gW`b]h]WXYb`9fhf`À[Yb`Y]bY
 ; YhfY]XYfYb`hY`j`cb`(`%A`j`)]cbYb`HcbbYbž`k`Ug`Y]bYa`FØW`[Ub[
j`cb`[i`h`ž) `DfcnYbh]a`J`Yf[`Y]W`ni`a`J`cf`U`f`Y`bhgd]W`h`
6YnØ[`]W`XYg`F`UdgY`g`k]fX`Y]bY`9fb`hY`j`cb`' ž`A`j`)]cbYb`HcbbYb
Yfk`UfhYhž`k`Ug`i`bhYf`XYa`J`cf`U`f`Y`gb]j`YUi`]]Y[`h`"

⇒ a` : c`[YbXYb`Z]bXYb`G]Y`5b[UVYb`ni`f` ; YhfY]XYd`fcXi`_h]cb`]b`XYb
`YhnhYb`U`fYb`]b`8Yi`hgW`UbX`.

p`U`f`p ; YhfY]XYd`fcXi`_h]cb`]b`A`j`)]cbYb`HcbbYb`p
p`!`p .p
p`&\$`%-`p`(`) ž&`p
p`&\$`&\$`p`(`&ž) `p
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p`&\$`&`p`(`&ž&`p

p&\$&('p(%ž\$ 'p

E i Y`Y. '8 Yi hgW\ Yf`F U]ZZY]gYbj YfVUbX

8 Yf`8 Yi hgW\ Y`F U]ZZY]gYbj YfVUbX`]gh`XYf`dc`h]gW\ Y
Gd]hnYbj YfVUbX`U`Yf`; YbcggYbgW\ UZhYb`i bX`[YbcggYbgW\ UZh`W\
cf]Ybh]YfhYb`l bhYfbY\ a Yb`XYf`XYi hgW\ Yb`5 [fUf!`i bX
9fbÀ\fi b[gk]fhgW\ UZh`'8]Y`A]h[`]YXgi bhYfbY\ a Yb`Yfn]Y`Yb`]b`XYf
9fnYi [i b[ž]a `<UbXY`i bX`]b`XYf`J YfUfVY]hi b[`dZUb`n`W\ Yf`i bX
h]Yf]gW\ Yf`DfcXi _hY`Y]bYb`l a gUhn`j cb`,) ž* `A]`]UfXYb`9i fc"
@UbXk]fhYž; ĀfhbYf`i bX`K]bnYf`g]bX`X]Y`A]h[`]YXYf`i bX
9][YbhØa Yf`XYf`; YbcggYbgW\ UZhYb`"8 Yf`8 F J `]gh`U`g`fY[]ghf]YfhYf
=bhYfYggYbj YfhfYhYf`UbYf_Ubbhi bX`\Uh`XYb`J Yf`U`hYbg_cXYI `XYg
8 Yi hgW\ Yb`6i bXYghU[Yg`i bX`XYf`6i bXYgfY[]Yfi b[`U_nYdh]Yfh"

6Y]`k Y]hYfYb`: fU[Yb`ghY\Yb`; i]Xc`GYX`Yfž`8 F J!
K UfYbk]fhgW\ UZhž`i bhYf`XYf`HY`YZcbbi a a Yf`\$' \$',) * &%(! (%\$
cXYf`dYf`9!A U]`i bhYf`gYX`Yf4 Xfj "fU]ZZY]gYb"XY`ni f`J YfZØ[i b["

E i Y`Y. '8 Yi hgW\ Yf`F U]ZZY]gYbj YfVUbX`#c hg

8 YhU]`g

6Ygi W\ Yb`G]Y`i bg`Ui Z. `a Y]b!VYf`]b`bYh