



ARTS3458

7 \]bYgY '7 Udghc bY. 'F Y!J]g]cb]b['7 \]bU'UbX'7 \]bYgY
Gh X]Yg

HYfa 'H\ fYY'##'&\$%-

7ci fgY`Cj Yfj]Yk

`GHUZZ7cbhUWhi8YHU]`g`

`7cbj Ybcfg`

B Ua Y	9a U]`	5j U]UV]]m	@cWU]hcb	D\cbY
K U\ ; i Ub`@a	k [`]a 4 i bgk "YXi "Ui		A 6 `&()	- ' ,) `% *%

GWXcc``7cbhUWhi`bZcfa Uh]cb

GWXcc``cZ<i a Ub]hYg`UbX`@Jb[i U[Yg

@cWU]hcb. `GWXcc``C Z]W]ZA cfj Yb`6fck b`6i]X]b[ž@Yj Y``&ž&),

C dYb]b[`<ci fg. A cbXUm! : f]XUmž- Ua `!') da

D\cbY. `ž*%&`- ' ,) `%, %

: U! . `ž*%&`- ' ,) ; , +\$)

9a U]: [\U`4 i bgk "YXi "Ui](#)

7 ci fgY'8YHJ`g

7 fYX]hDc]bqg '*`

Gi a a UfmicZ\hY'7 ci fgY

Gi VYWh5fYU.'7\]bYgY'Gh X]Yg

H\]g'Wci fgY Yb[U[Yg'k]h' _Ym]XYUg'UbX']ggi Yg]b'7\]bYgY'Gh X]Yg" 4U'gc'fY!j]g]cbg'UFYUg'hUh\Uj Y VYYb'Wcj YfYX']b'chYf'Wci fgYg]b'hY'A U'cf" H\YgY]bWi XY'7\]bYgY'Ub[i U[Y'ghi X]Ygž']h'fUhi fYžZ'a ž a YX]Už'fUbg'U]cbž'Ubh'fcdc'c[mUbX'[YbXYf'ghi X]Yg" Mci 'UFY'YbWci fU[YX'hc'fYZYWhi dcbž'fYj]Yk 'UbX i gY'hY'_bck 'YX[Y'UbX'Ub[i U[Y'Wca dYh'bw'UWci]fYX'Zca 'hYgY'UFYUg'cZgh XmiUbX'Wcbg]XYf'\ck 'mci WUb' i h']gY'hYa 'Zcf'mci f'UWUXYa]Wcf'WfYf'Z hi fYg" Mci 'k]' [U]b'U'a cfY'hYcfYh]W'UbX'\]g]cf]W' dYfgdYWhj Y'cb'7\]bU'UbX'7\]bYgY'Gh X]Yg" H\Y'YUfb]b['k]' VY'ZUW]]h'X'VmU'fUb[Y'cZUWhj]h'Yg]bWi X]b[]bXYdYbXYbh'fYgYUfW' d'fc'YWh'ž'cfU' d'fYgYb'U]cbg'UbX'YggUm'k f]h]b["'H\fc[[\ 'hY'Wci fgYž'mci UFY'hc''YUfb'UbX'fYZYWh'cb'hY'Wcb'h'f' h'ž'a Y'h'cXg'UbX'\]g]cf]Yg]b'k \]W'7\]bYgY'Gh X]Yg'\Ug'VYYb UddfcUWXYX/hc' [U]b'Ub']bZcfa YX' i bXYfg'U]bX]b['cZ\hY'_Ym]ggi Yg'UbX'XYVUH'g'UVci h'Wcb'h'Ya d'cfUfm'UbX '\]g]cf]W'7\]bU/hc'fYj]Yk 'UbX' i dXUH'g'W'c'Ufg'\d'cb'7\]bYgY'Gh X]Yg'Zca 'Ub']bZcfa YXž'W']h]W'UbX]b'h'fX]gW'd']bUfmidYfgdYWhj Y"

7 ci fgY '@YUfb]b['Ci hWca Yg

%" 5Wci]fY'_bck 'YX[Y']bXYdYbXYbh'mž' i h']g]b['Vch' d'f]a Ufm'UbX'gYW'cbXUfma U'h'f]U'g &" 8Ya cbg'h'UH'W'cbW'dhi U'UbX'dfUW']h]W'g']g'Zcf'W']h]W' Ybei]fm'UbX'dfcV'Ya 'gc'j]b['cb']ggi Yg'cZ XYVUH'g ' " D'Ub'UbX'Wca d'Yh' 'U'fYgYUfW' d'fc'YWh (' 5f]W'UH'gdYWh]U']gYX'_bck 'YX[Y'cZ7\]bU'UbX'UgdYWh'g'cZ7\]bYgY'Gh X]Yg)"

5ggYgga YbhHJg_	K Y][\h	8i Y`8UH	Gh XYbh@YUfb]b[Ci hWta Yg`5ggYggYX
F YgYUfW`9ggUm	(\$i	&- #0%#&\$%-`%&.\$\$`DA	%z&z ž(ž)

5ggYgga Ybh8YHJ]`g

5ggYgga Ybh%`A ccX`Y`Dcghg/`8]gW`gg]cb`@YUXYf

GHUfhXUH. `Bch5dd`]WV`Y

@Yb[h. `) \$\$`k`cfXg

8YHJ]`g. `K`YY_`mA`ccX`Y`Dcghg/`Uh`YUghicbY`k`YY_`h`YUX`X]gW`gg]cb" `!`WUgg`ZYXVUW_`"

Gi Va]gg]cb`bchYg.Gi Va]hcb`A`ccX`Y`Vm: f]XUmbccb`df]cf`h`h`Y`k`YY_`cZX]gW`gg]cb

Hi fb]hb`gYH]b[. `H\]g`]g`bchU`Hi fb]hb`Ugg][`ba`Ybh

5ggYgga Ybh&.`DfYgYbHJ]cb

GHUfhXUH. `

8YHJ]`g. `%`!a`]bi`h`dfYgYbHJ]cbž)`!a`]bi`h`X]gW`gg]cb`YUW`" `!`WUgg`ZYXVUW_`"

5ggYgga Ybh' . `Dfc`YWh`8YgW]dh]cb`#9ggUmDfcdcgU`

GHUfhXUH. `Bch5dd`]WV`Y

8YHJ]`g. `6]V]c[`fUd\mfYgYUfW`/`dfcdcgU`cZ]bU`YggUm`!`WUgg`ZYXVUW_`"

Gi Va]gg]cb`bchYg.<`UfX`Wtdmih`VY`gi`Va`]hYX`]b`WUgg

5ggYgga Ybh(. `F YgYUfW`9ggUm

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@Yb[h. ``) \$\$`k`cfXg

8YHJ]`g. ``) \$\$!k`cfX`YggUm: UW`!`h`!`ZJW`a`YY]b[`k`]h`]bgfi`Wcf`cb`mi`dcb`fYei`YghicZghi`XYbh`"

Hi fb]hb`gYH]b[. `H\]g`Ugg][`ba`Ybh]g`gi`Va`]hYX`h`fci`[`\`Hi fb]hb`UbX`gh`XYbth`Xc`bchgyY`Hi fb]hb`g]a`]Uf]mfYdcfth`"

5 HbXUbW F Yei]fYa Ybhg

5 HbXUbW cZGYa]bUfg]g'a UbXUrcfm]b'h]g'Wci fgY"i bYI W gYX'UVgYbW'Zca 'a cfY'hUb'%\$i 'cZ
 GYa]bUfg'k]'fYgi 'h]b'hY'Uk UfX'U'ZU]'[fUXY"'b'GYa]bUfg'mci 'k]'UW]j Y'mYb[U[Y'k]h'WcfY'Wci fgY
 WcbhYbhzYbUV']b['mci 'rc'UhtU]b.'

%" 5Wci]fY' _bck 'YX[Y']bXYdYbXYbhmi' h']g]b['Vch' df]a UfmUbX'gYWcbXUfma UHf]U'g
 &" 8Ya cbgfhUH'WcbW'dh U'UbX'dfUW]W'g_] 'g'Zcf'W]h]W'Ybei]fmiUbX'dfcVYa 'gc']b['cb']ggi Yg'cZ
 XYVUH'g
 ' " D'Ub'UbX'Wca d'YH' U'fYgYUfW' dfc'YVh
 (" 5fh]W'UH'gdYW]U']gYX' _bck 'YX[Y'cZ7\]bU'UbX'UgdYW]g'cZ7\]bYgY'Gh' X]Yg
)" 9b[U[Y']b'fYUgcbYX'UbX'cdYb!a]bXYX'X]gW gg]cb'UbX'XYVUH'

7 ci fgY'GWXYXi `Y

[J \]yk 'WUgg'Ha YhUV'Y](#)

H]a YhUV'Y'

8UH	HmdY	7cbhYbh
K YY_ '% %* 'GYdhYa VYf! &\$ 'GYdhYa VYf	GYa]bUf	<p>hfcXi W]cb. 'K \Uh]g'h'Y'7\]bYgY'7 UdgfcbY</p> <p>K \Uh]g'h]g'7 UdgfcbY'Wci fgY'U'UVci hB'K \Uh]g fYei]fYX'cZmci 3'K \UhUFY'h'Y'A Ucf'H\Ya Yg]b 7\]bYgY'Gh' X]Yg'h.UhUFY'cZ]bhYfYghfc'mci 3'K Y'k]' X]gW gg'h'Y'cV'YW]j Yg'UbX'gh' W' fY'cZ'h'Y'Wci fgYz \ck 'rc' bY[ch]UH'UbX'XYg][b'U'gi]hUV'Y'fYgYUfW</p>

K YY_-. :%%Bcj Ya VYf! %) 'Bcj Ya VYf	GYa]bUf	K f]h['k cf_g\cd
K YY_%. :% 'Bcj Ya VYf! &&'Bcj Ya VYf	GYa]bUf	Dfc YWidfYgYbHhcbg UbX'X]gW gg]cb
K YY_%% '&) 'Bcj Ya VYf! &- 'Bcj Ya VYf	GYa]bUf	Project presentations and discussi

F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

F Yei]fYX`UbX`fYWta a YbXYX`fYUX]b[g`cb`A ccX`Y

F YWca a YbXYX`F Ygci fWg

- F YZYfYbW]b[`gmgfYa g

[\fhd.##k k "Wi bgk "YXi "Ui #cb`V#fYZ\ra`](#)

- Gi ddcfhiZcf`fYZfYbW]b[`Ugg][ba Ybhg

[\fhdg.##gh XYbhi bgk "YXi "Ui #fYZfYbW\]b\[](#)

7ci fgY`9j U`i Uh]cb`UbX`8Yj Y`cda Ybh

Gi Va]gg]cb`cZ5ggYgga YbhHUg_g

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Hi fb]h]b`Gi Va]gg]cb

≠mci`YbWci bhYf`U`dfcV`Ya`k`Yb`U`H`Ya`dh]b[`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybh`h`fci`[`\`Hi`fb]h]b`z`d`YUgY`
H`Y`d`cb`Y`9I`H`fb`U`Gi`ddcfh`cb`-`,`),`"`,`'`,`%`cf`Ya`U]`h`Ya`cb`YI`H`fb`U`H`h`gi`ddcfh`4`i`bgk`"YXi`"Ui`"Gi`ddcfh`
`ci`fg`UfY`,`.\$\$Ua`-`%\$.\$\$da`cb`k`YY`XUmg`UbX`-`.\$\$Ua`-`).\$\$da`cb`k`YY`YbXg`f`l`*)`XUmg`U`m`Y`Uf`l`"≠mci`
UfY`i`bUV`Y`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybh`Xi`Y`hc`U`Z`U`h`k`]h`Hi`fb]h]b`mci`a`Um`Udd`m`z`f`Ub`YI`H`bg]cb`z`Vi`hmc`i`
a`i`gh`f`Y`h]b`mci`f`h]W`Y`h`bi`a`VY`f`Z`ca`9I`H`fb`U`Gi`ddcfh`f`U`cb[`k`]h`Ub`m`c`h`Y`f`f`Y`j`Ub`h`X`c`W`a`Y`b`h`g`l`hc`
]b`Wi`XY`Ug`Y`j`]X`Y`b`W`hc`gi`ddcfh`mci`f`YI`H`bg]cb`Udd`]W`h]cb`"≠mci`Ya`U]`9I`H`fb`U`Gi`ddcfh`mci`k`]"`

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" `hWUb`hU`Y`a Ubm
Zcfa gž`Zca `XY`]VYfUHY`WXYU]b[`hc`UWV]XYbhU`mW`dm]b[`Zca `U`gci fW`k]h`ci hUW_bck`YX[Ya Ybh`

I BGK `[fci dg`d`U[]Uf]ga `]bhc`hY`Zc`ck]b[`WUHY`[cf]Yg.

7 cdm]b[.`i g]b[`hY`gUa Y`cf`j Yfmg]a]Uf`k cfXg`hc`hY`cf][]bU`hYI hcf]XYU`k]h`ci 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[YgžUfhUbX`XYg][b`dfc`YWgžUg`k Y`Ug
dfYgYbhU]cbg`k \YfY`gca YcbY`dfYgYbh]g`UbchYf`g`]XYUg`cf`k cfXg`k]h`ci hWYX]h`

hUddfcdf]UHY`dUfUd`fUg]b[.`7`Ub[]b[`U`ZYk `k cfXg`UbX`d`fUgYg`k \]Y`a cghmifYU]b]b[`hY`cf][]bU`
ghfi W`i fY`UbX`#`f`dfc[fYgg]cb`cZ]XYUg`cZ`hY`cf][]bU`ž`UbX`]bZcfa U]cb`k]h`ci 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]h`ci hWYX]hU`bX`hc
d]YW]b[`hc[YhYf`ei chYg`UbX`dUfUd`fUgYg`]bhc`U`bYk `k \c`Yž`k]h`ci hUddfcdf]UHY`fYZYfYbW]b["

7 c`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_]7 c`i g]cb`U`gc
]bWi XYg`dfcj]X]b[`mci f`k cf_]hc`UbchYf`gh`XYbhVYZc`fY`hY`Xi Y`XUHYž`cf`Zc`f`hY`di fdcgY`cZ`hY`a

- i bXYfghUbx'mci f'f][\hg'UbX'fYgdcbg]V]h]Yg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[]Uf]ga ž'Wc'dmf][\hž' BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5W'W'dhUV'Y'I gY'cZ I BGK '⇒H'F'Ygci f'W'g'Dc`]W'h
- VY'Uk UfY'cZ'Y'ghUbxUfXg'cZVY\Uj]ci f'YI dY'W'X'cZYj Yfmcby']b'h'Y'I BGK 'W'a a i b]m
- 'cW'W'h'gYfj]W'g'UbX']bZ'fa U]cb'UVci hl BGK 'UbX'I BGK '@]VfUfm

Gca Y'cZ'Y'gY'UfY'Ug'k]''VY'ZJa]]Uf'hc'mci ž'c'h'Yfg'k]''VY'bYk "'; U]b]b['U'gc`]X'i bXYfghUbx]b['cZU''h'Y fY'U'Y'X'UgdY'W'g'cZ9@-G9'k]''\Y'd'mci 'a U_Y'h'Y'a cghicZmci f'gh X]Yg'Uhl BGK ""

[\h'hd.##gi V'Y'W'i \]X'Yg" \]VfUfm'i bgk "YXi "Ui #' \]gY#UVci h' \]gY](#)

5 WUXYa]WbZcfa Uh]cb`

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

- fYei Ygh]Zc`fYI h`bg]cb/
- `Uh]`gi Va]gg]cbg`[i]XY`]bYg/
- fYj]Yk `cZa Uf_g/
- I BGK `<YU`h`UbX`GUZY`midc`]WYg/

