

ARTS3660

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7 ci fgY[·]Cj Yfj]Yk

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5`]\\'`>cc	U"îcc4 i bgk "YXi "Ui	H67	H67	H67

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@cWUhjcb. `GW&cc``CZjWYžA cfjYb`6fckb`6i]`X]b[ž@YjY``&ž&),

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5 'ghi XYbh']g'YI dYWYX'nc'UhYbX'U```WUgg'WcbhUWi\ci fg'Zcf'U'ZJWY!nc!ZJWY'fI & E'cf'V`YbXYX'Wci fgY'UbX Wca d`YhY'U```UWjj]hjYg'Zcf'U'V`YbXYX'cf'Z ``micb`]bY'Wci fgY"

5 'ghi XYbhik \c'Uff]j Ygʻa cfYʻh\Ubʻ%) 'a]bi hYgʻ`UhYʻa UmVYʻdYbU`]gYXʻZcfibcb!UhhYbXUbVW'''=Zgi VXʻUʻdYbUihm]gʻ]a dcgYXžh\Yʻghi XYbhia i ghVYʻ]bZcfa YXʻj YfVU``mUhih\YʻYbXʻcZVVUggʻUbXʻUXj]gYXʻ]bik f]h]b[ik]h\]bi&(\ci fg"

ZUʻghi XYbhYI dYf]YbWYgʻ]`bYggža]gUXj Ybhi fYʻcfʻch\YfʻcVWY ffYbWYʻh\Uha U_YgʻUVgYbWYʻZfcaʻU WUgg#UWfjj]hmi bUj c]XUV`YžcfʻYI dYWgʻhcʻVYʻUVgYbhZfcaʻUʻZcfh\Wća]b[`WUgg#UWfjj]hmžh\Ymg\ci`XʻgYY_ dYfa]gg]cbʻZfcaʻh\Yʻ7 ci fgYʻ5i h\cf]hmžUbX`k \YfYʻUdd`]WUV`Yžh\Y]fʻfYei Yghg\ci`X`VYʻUVWća dUb]YX`VmUb cf][]bU`cf`WYffjZJYX`WćdmcZUʻa YX]WU``WYffjZ]WUHYʻcf`ch\YfʻZcfaʻcZUddfcdf]UHYʻYj]XYbWY"

5 '7 ci fgY '5 i h\cf]hma UmYI W gY 'U'gh XYbhZrca 'WUggYg'cf'UW]j]h]Yg 'Zcf'i d'hc'cbY'a cbh\"'< ck Yj Yfž'h Ym a UmUgg][b'UXX]h]cbU``UbX#cf'U'hYfbUh]j Y'HUg_g'hc'Ybgi fY'Wca d`]UbW"''5 '7 ci fgY '5 i h\cf]hmWcbg]XYf]b['h\Y [fUbh]b['cZUVgYbW'a i ghVY'gUh]gZ]YX'U'gh XYbhk]``gh]``VY'UV'Y hc'a YYhh\Y'Wci fgY'g `YUfb]b['ci H\car{y}g UbX#cf'j c`i a Y'cZ`YUfb]b["'5 'gh XYbhgYY_]b['Uddfcj U`'hc'VY'UVgYbhZcf'a cfY'h\Ub'cbY'a cbh\'a i ghUdd`m]b'k f]h]b['hc'h\Y'8YUb'UbX'dfcj]XY'U``cf][]bU``cf'Wfh]Z]YX'gi ddcfh]b['XcW a YbhUh]cb"

: cf'a cfY']bZcfa Uh]cb'UVci hh\Y'UhhYbXUbWY'dfchcWc`g']b'h\Y': UW'`hmicZ5fhg'UbX'GcWJU`

GWJYbWYg. <u>\http://thdg.#k.k.k."Ufhg"ibgk"YXi"Ui #WffYbHghiXYbhg#JWUXYa]W]bZcfaUh]cb#dfchcWc`g![i]XY`]bYg#</u>

5WUXYa]W=bZcfaUh]cb

: cf`YggYbh]U``ghi XYbh]bZcfa Uh]cb`fY`Uh]b[`hc.`fYei Yghg`Zcf`YI hYbg]cb/fYj]Yk `cZa Uf_g/cVWV dUh]cbU``\YU`h UbX`gUZYhm'YI Ua]bUh]cb`dfcWYXi fYg/gdYW]U``Vcbg]XYfUh]cb`]b`h\Y`Yj YbhcZ]``bYgg`cf`a]gUXj Ybhi fY/ ghi XYbhYei]hmUbX`X]gUV]`]hm'UbX`ch\Yf`YggYbh]U``UWUXYa]W]bZcfa Uh]cbž qYY`<u>hhda.#k k "Ufhq"i bak "YXi "Ui #W ffYbhah XYbhq#UWUXYa]W]bZcfa Uh]cb#dfchcWc`a![i]XY`]bYa#</u>

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7 fYX]hDc]bhg^{·*·}

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GiVYWh5fYU. =adMS`EfgV[We

H\]gʻ7 ci fgYʻdfcj]XYgʻUbʻ5 Xj UbWYXʻYj Y``dfc[fUaʻ]bʻ? cfYUbʻ`Ub[i U[Yʻgh XmZfcaʻUʻWca a i b]WUhj YʻUbX HUg_!VUgYXʻUddfcUWX"H\Y`df]a Ufma YX]i aʻcZ]bghfi Whjcbʻ]gʻ? cfYUb"Ghi XYbhgʻWcbhjbi YʻhcʻXYj Y`cdʻUbX YI hYbXʻh\Y]fʻi bXYfgHUbX]b[`UbX`i gYʻcZ? cfYUbʻa cfd\c`c[mž`YI]gʻUbX`gmbHUI 'h\fci [\`fYUX]b[žUbX X]gWi gg]cbʻ]bʻ? cfYUbžcZUi h\YbhjW? cfYUbʻhYI hgʻVmi hj`]g]b['j Uf]ci gʻfYUX]b[`ghfUhY[]Yg"DUfhjWjdUhjcbʻ]bʻU j Uf]YhmcZk f]hjb[žigi W.`UgʻWca dʻYI `YhhYfgž``]hYfUhi fYʻfYgdcbgYgžbchYʻHU_]b[žUbX`YggUmk f]hjb['`+bWi XYg gmghYa UhjWdfUWhjWYʻcZgYa]bUfʻdfYgYbHUhjcbgʻ]bʻUʻk]XYʻfUb[YʻcZWca a i b]WUhj Yʻg]hi Uhjcbgʻgi W.`Ug Vi g]bYggʻUbX`]bhYfj]Yk "

Hcd]Wg`]bWi XYg`]bH/fdYfgcbU``fY`Uh]cbgžYbH/fHJ]ba Ybh]bXi gHfmžWi `h fU``\Yf]HJ[Y`UbX`Vi g]bYgg`dfUWf]W/g"

5 hih Y WobWi g]cb cZih]g Woi fgY h Y ghi XYbhik]``VY UV Y hc

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8YHJ]`g. ::]j Y`g\cfhi[i]XYX`Wca dcg]h]cbg`cb`[]j Yb`hcd]Wg`Uhibc`a cfY`h\Ub`&) \$`k cfXg`YUWXžWca d`YhYX Xi f]b[`WUgg`UbX`gi Va]hhYX`Uhih\Y`YbX`cZh\Y`WUgg"`8YHJ]`g`cZh\Y`Wca dcg]h]cb`hUg_g`UfY`i d`cUXYX`cbhc h\Y`i b]j Yfg]hmfg`@A G`Uhih\Y`Wca a YbWfa YbhcZh\Y`Wci fgY"`K f]hhYb`ZYYXVUW_`k]h\`a Uf_g"

Gi Va]gg]cb bchYg.9UWX Wca dcg]h]cb a i ghVY gi Va]hhYX Uhih Y YbX cZh Y h hcf]U` WUgg"

5ggYgga Ybh& Gdc_Yb HYgh

GHJfhXUhY. &, #\$) #&\$% %\$.\$\$ 5A

@Yb[h\.`) ei Ygh]cbg'l i d'hc'%\$'a]b

8YHJ]`g. '5b`]bX]j]Xi U``HV`_]b['gYgg]cb`k]h\`H\Y`HYUW\]b['gHJZZcf`%\$`a]bi HYg`cb`dfY!UffUb[YX`hcd]Wg" Gdc_Yb`UbX`k f]HYb`ZYYXVUW_'k]h\`a Uf_g"`

Gi Va]gg]cb`bchYg.Nci `a i ghUhhYbX`h\]g`HU`_]b[`gYgg]cb`Zcf`mci f`gdc_Yb`hYgh"

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8YHU]`g. '<Y`X`lk]WY`Zcf`cbY`\cif`YUW\`Xif]b[`gdYW]Z]YX`WUggYg"`9UW\`Wcbg]ghg`cZ[fUa a Uf`dUhhYfb`HUg_gž fYUX]b[`UbX`kf]h]b[`HUg_g`Ug`Wca V]bYX`Wca dcbYbhg`VUgYX`cb`k \Uh'g`WcjYfYX`]b`WUgg"`=bhY[fUhYg`U``h\Y ib]hg`HUi[\hUbX``YUfbYX`id`hc`h\Y`dUfh]W``Uf`dc]bhcZgh Xm'`Kf]hhYb`ZYYXVUW_`k]h`Wca a Ybhg`UbX`a Uf_g" H\]g`]g`h\Y`Z]bU``UggYgga YbhZcf`UhhYbXUbWY`di fdcgYg"

5ggYgga Ybh(. JcWUVi `UfmEi]nnYg

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8YHU]`g. K YY_`mih'b!a]bi h'rei]nnYg`fK YY_g`&!%'Ł'UXa]b]gh'rfYX`]b`WUgg"'H\Y'ei]n``]ghk]``VY'dfcj]XYX'Uh h\Y'Wca a YbW'a YbhcZh\Y'Wci fgY'cf'Uj U]`UV`Y'cb'h\Y'i b]j Yfg]hmfg`@A G"'K f]hh'b`a Uf_g`k]``VY'fYh fbYX`]b WUgg"

Gi Va]gg]cb`bchYg.9UWX`ei]n`]g`HJ_Yb`Xi f]b[`H\Y`gYWcbX`\ci f`cZh\Y``YWi fY`UbX`YUWX`ei]n`dUdYf`a i gh VY`gi Va]HYX`]a a YX]UHY`m]b`H\Y`WUggfcca "

Gi Va]gg]cb cZ5ggYgga YbhHUg_g

Ghi XYbhg UfY YI dYWYX hc di hh\Y]f bUa Yg UbX ghi XYbhbi a VYfg cb Yj YfmdU[Y cZh\Y]f Ugg][ba Ybhg"

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

Zmci YbWci bhYf'U'dfcV'Ya 'k \Yb'UthYa dhjb['hc'gi Va]hmci f'Ugg][ba Ybht\fci [\'Hi fb]hjbž'd'YUgY hY'Yd\cbY'9I hYfbU''Gi ddcfhicb'-',) '' ' %cf'Ya U]`'h\Ya 'cb'<u>YI hYfbU'hY'hgi ddcfh4 i bgk "YXi "Ui</u>"'Gi ddcfh \ci fg'UfY', .\$\$Ua '-'%\$.\$\$da 'cb'k YY_XUmg'UbX'-.\$\$Ua '-') .\$\$da 'cb'k YY_YbXg'fl *) 'XUmg'U'mYUfŁ'' Zmci UfY'i bUV'Y'hc'gi Va]hmci f'Ugg][ba YbhXi Y'hc'U'ZJi `hk]h\'Hi fb]hjb'mci 'a UmUdd`m'Zcf'Ub'YI hYbg]cbžVi hmci a i ghfYhU]b'mci f'hjW_Yhbi a VYf'Zfca '9I hYfbU''Gi ddcfhfU'cb['k]h\ 'Ubmch\Yf'fY'Yj UbhXcW a YbhgŁ'hc]bWi XY'Ug'Yj]XYbWY hc'gi ddcfhimci f'YI hYbg]cb'Udd`]WUhjcb'' Zmci 'Ya U]`'9I hYfbU''Gi ddcfhimci 'k]`` Ui hca UhjWU'`mfYWY]j Y'U'hjW_Yhbi a VYfž'Vi h]Zmci 'hY'Yd\cbY'mci 'k]``bYYX'hc'gdYWJZWU``mUg_'Zcf'cbY" Hi fb]hjb'U`gc'dfcj]XYg'i dXUhYg'cb'h\Y]f'gmghYa 'gfUh g'cb'Hk]hYf"

; YbYfU``mž'UggYgga YbhiHUg_g'a i ghVY'gi Va]HHXXYYWYfcb]WU``mj]U'Y]H\Yf'Hi fb]h]b'cf'U'A ccX`Y Ugg][ba Ybh''=b`]bgHUbWYg'k \YfY'H\]g']g'bchdcgg]V`Yž']hk]``VY'gHUHX'cb'mci f'Wci fgY'g'A ccX`Y'g]HY'k]H\ U`HYfbUh]j Y'gi Va]gg]cb'XYHU]`g''

@UhY 5ggYgga Ybh DYbU`h]Yg

5b'UggYggYX'HUg_']g'XYYa YX'`UHY']Z]h']g'gi Va]HYX'UZHYF'H\Y'gdYW]ZJYX'Ha Y'UbX'XUHY'Ug'gYhici h']b'H\Y Wci fgY'@YUfb]b['A UbU[Ya YbhGmghYa 'f@A GŁ''

H\Y``UhY`dYbU`hm`]g`h\Y``cgg`cZ)ı `cZh\Y`hchU``dcgg]V`Y`aUf_g`Zcf`h\Y`hUg_`Zcf`YUW\`XUm`cf`dUfhih\YfYcZh\Y kcf_`]g``UhY"`@UhYbYgg`k]```]bWiXY`kYY_YbXg`UbX`diV`]W\c`]XUmg"`H\]g`XcYg`bchUdd`mhc`U`hUg_`h\Uh`]g UggYggYX`Vihbc`aUf_`]g`UkUfXYX"

K cf_'gi Va]httX:Zci fhtYb`f%(EXUmg`UZhYf`h\Y`Xi Y`XUhY`k]``VY`a Uf_YX`UbX`ZYYXVUW_`dfcj]XYX`Vi hbc`a Uf_ k]``VY`fYWcfXYX''`=Zh\Y`k cf_`k ci `X`\Uj Y`fYWY]j YX`U`dUgg`a Uf_`Vi hZcf`h\Y``UhYbYgg`UbX`h\Y`k cf_`]g`U Wca di `gcfmWci fgY`Wca dcbYbhzU`gh XYbhk]``VY`XYYa YX`hc`\Uj Y`a Yhh\UhfYei]fYa Ybh'`H\]g`XcYg`bch Udd`mhc`U`hUg_`h\Uhi]g`UggYggYX`Vi hbc`a Uf_`]g`Uk UfXYX''

K cf_`gi Va]hhYX'hk YbhnicbY'f&&:XUmg'UZhYf'h\Y'Xi Y'XUhY'k]``bch'VY'UWW/dhYX'Zcf'a Uf_]b['cf'ZYYXVUW_ UbX'k]``fYWY]j Y'bc'a Uf_`cf'[fUXY"'=Zh\Y'UggYgga Ybh'hUg_`]g'U'Wca di `gcfm'Wca dcbYbhicZh\Y'Wci fgY'U ghi XYbh'k]``Ui hca Uh]WU``m'ZU]``h\Y'Wci fgY"

GdYWJU``7cbg]XYfUh]cb`5dd`]WUh]cbg

 $\label{eq:milling} \end{tabular} Mci `WUb`Udd`millingYgdYWJU`Wcbg]XYfUh]cb`k \Yb`]``bYgg`cf`ch\Yf`WJfW a ghUbWfg`]bhYfZYfY`k]h\`mci f UggYgga YbhidYfZcfa UbWf"$

G]W_bYggža]gUXjYbhifY`cf`ch\Yf`W]fW a gHubWfg`VYmcbX`mcif`Wcbhfc``aUm

ł DfYj Ybhimci i Zfca i Wca d`Yhjb[i U Wci fgY i fYei]fYa Ybhž

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ł `G][b]Z]WUbhmUZYWimci f`dYfZcfa UbWi`]b`UggYggUV`Y`k cf_ž`VY`]hU`Zcfa U``YbX!cZigYa YghYf`YI Ua]bUh]cbž`U WUgg`hYghž`U``UVcfUhcfmhYghž`U`gYa]bUf`dfYgYbhUh]cb`cf`Ubmich\Yf`Zcfa `cZUggYgga Ybh'

: cf'Z fh\Yf'XYHJ]`g`]b`fY`UH]cb`rc`GdYW]U``7 cbg]XYfUH]cb`]bWi X]b[`''K \Yb`rc`5dd`mf'Z''<ck`rc`5dd`mf'UbX "Gi ddcfh]b[`8cW a YbHJh]cb"'d`YUgY`fYZYf'rc'h\Y`GdYW]U``7 cbg]XYfUH]cb`rk YVgh]Y.` \hhdg.##gh XYbH'i bgk "YXi "Ui #gdYW]U`!Wcbg]XYfUH]cb

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D`U[]Uf]ga `]g`i g]b[`h\Y`k cfXg`cf`]XYUg`cZch\Yfg`UbX`dfYgYbh]b[`h\Ya `Ug`mci f`ck b"`=hWUb`hU_Y`a Ubm Zcfa gžZca `XY`]VYfUhY`W\YUh]b[`hc`UWW]XYbhU``mWcdm]b[`Zca `U`gci fWY`k]h\ci hUW_bck `YX[Ya Ybh'

IBGK '[fcidg'd`U[]Uf]ga ']bhc'h\Y'Zc``ck]b['WUhY[cf]Yg.

7 cdm]b[..i g]b[.ih,Y`gUa Y`cf`j Yfmig]a]`Uf`k cfXg`hc`h,Y`cf][.]bU``hYI h`cf`]XYU`k]h\ci hUW_bck `YX[.]b[.ih,Y gci fWY`cf`i g]b[`ei chUh]cb`a Uf_g"`H\]g`U`gc`Udd`]Yg`hc`]a U[.Ygž`Ufh`UbX`XYg][b`dfc`YWfgž`Ug`k Y```Ug dfYgYbhUh]cbg`k \YfY`gca YcbY`dfYgYbhg`Ubch\Yf`g`]XYUg`cf`k cfXg`k]h\ci hWfYX]h"

=bUddfcdf]UhY'dUfUd\fUg]b[.'W\Ub[]b['U'ZYk 'k cfXg'UbX'd\fUgYg'k \]Y'a cghmfYhU]b]b['h\Y'cf][]bU' ghfi Whi fY'UbX']bZcfa Uh]cb'k]h\ci hUW_bck `YX[Ya Ybh''H\]g'U`gc'Udd`]Yg']b'dfYgYbHUh]cbg'k \YfY'gca YcbY dUfUd\fUgYg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci hWfYX]h''=hU`gc'Udd`]Yg'hc'd]YW]b['hc[Yh\Yf'ei chYg'UbX dUfUd\fUgYg']bhc'U'bYk 'k \c`Yž'k]h\ci hfYZYfYbW]b['UbX'U'gh XYbhg'ck b'UbU`mg]g'hc'Vf]b['h\Y'a UhYf]U` hc[Yh\Yf''

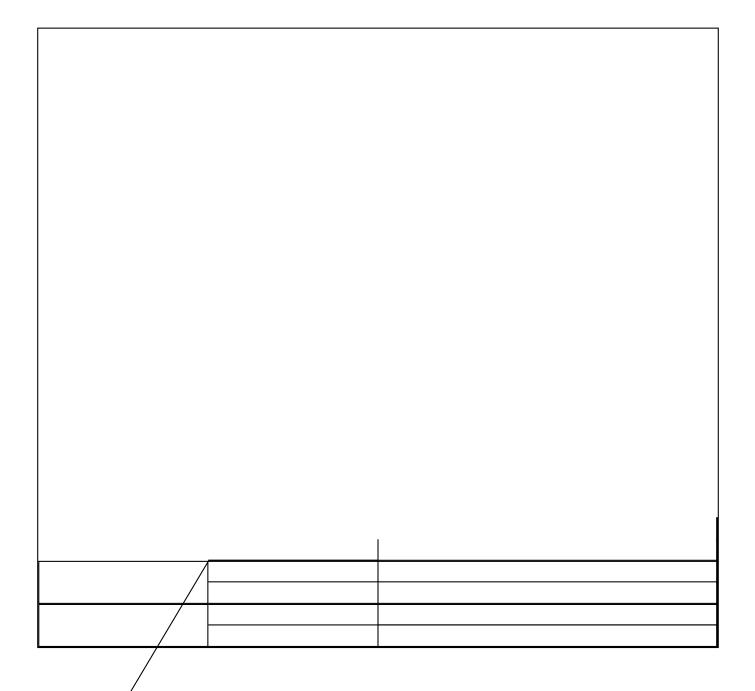
7 c``i g]cb. 'k cf_]b['k]h 'ch Yfg'Vi hdUgg]b['cZh Y'k cf_'Ug'U'dYfgcb'g']bX]j]Xi U``k cf_''7 c``i g]cb'U`gc]bWi XYg'dfcj]X]b['mci f`k cf_'hc'Ubch Yf'gh XYbhVYZcfY'h Y'Xi Y'XUhYzcf'Zcf'h Y'di fdcgY'cZh Ya d`U[]Uf]g]b['UhUbmh]a Yž'dUm]b['Ubch Yf'dYfgcb'hc'dYfZcfa 'Ub'UWUXYa]WhUg_ž'ghYU`]b['cf'UWei]f]b[Ubch Yf'dYfgcb'g'UWUXYa]Wk cf_'UbX'Wcdm]b[']hz'cZYf]b['hc'Wca d`YhY'Ubch Yf'dYfgcb'g'k cf_'cf'gYY_]b[dUma YbhZcf'Wca d`Yh]b['UWUXYa]Wk cf_''

=ÐUddfcdf]UhY`W]hUh]cb. 7]h]b[`gci fWYg`k∖]WX`\Uj Y`bchVYYb`fYUXžk]h\ci hUW_bck`YX[]b[`h\Y`″gYWcbXUfm´ gci fWY`Zfca`k∖]W\`_bck`YX[Y`cZh\Ya`\Ug`VYYb`cVhU]bYX"

8id`]\WUh]cb`fl`gY`ZId`U[]Uf]ga "Ł`gi Va]hhjb[`mcif`ckb`kcf_ž`]b`k\c`Y`cf`]b`dUfhž`k\YfY`]h\Ug`dfYj]cig`m VYYb`dfYdUfYX`cf`gi Va]hhYX`Zcf`Ubch\Yf`UggYggaYbhcf`\\circf`Ucil BGK `cf`Ubch\Yf`ib]jYfg]hm"

7 cffYWhfYZYfYbW]b[dfUWf]WYg.

• VYHYfa UbU[Y'mcifh]a Y



/

FYgci fWg

DfYgWf]VYX F Ygci fWYg

7 ci fgY Vcc_.

Ka`eW[=adWS` &Ž#žVmiVcbgY]'I b]jYfg]m?cfYUb'@Ub[iU[Y`=bgh]hihYžIVcbgY]'I b]jYfg]hmDfYggž&\$\$, `cf h\Y``UhYgh'YX]h]cb"``fBchY.`Jc``(!%Zcf`G%UbX`Jc``(!&`Zcf`G&L''

FYWca a YbXYX FYgci fWYg

= adWS` 9 dS_ _ Sd Xad;`fWd Sf[a`S^>WSd Wde`Vmi≜a ž< cb[`UbX`7 \Ub[žWcbgY]`I b]j Yfg]mžGYci`" I b]j Yfg]mi6cc_g\cd"`@UhYghYX]h]cb"