| MAGNET  | ICS   |          |      |      |      |      |      |      |          |      |        |       |          |                     |                       |
|---|-------|----------|------|------|------|------|------|------|----------|------|--------|-------|----------|---------------------|-----------------------|
|   |       |          |      |      |      |      |      |      |          |      |        |       |          | FY02                | <u>rates</u>          |
| WBS 31  | RRM   | EEEM     | ECEM | EMEM | ERSM | EESM | ECTB | EETB | D*DM     | EMSM | TRAVEL | STKRM | M&S      | Unloaded            | Loaded                |
| In-ves sensors (no day-1 in-vessel se   | 0     | 0        | 0    | 0    | 0    | 0    | 0    | 0    | 0        | 0    | \$0    | \$0   | #REF!    | \$0                 | 0.00                  |
|   |       |          |      |      |      |      |      |      |          |      |        |       |          |                     |                       |
|   | RRM   | EEEM     | ECEM | EMEM | ERSM | EESM | ECTB | EETB | D*DM     | EMSM | TRAVEL | STKRM | M&S      | Unloaded            | Loaded                |
| Magnetics - Ex ves saddle loops (200  | 108   | 391      | 0    | 0    | 0    | 725  | 0    | 0    | 0        | 0    | \$0    | \$0   | \$19,100 | \$96,627            | 152,744.69            |
| Final design (Title II)   |       |          |      |      |      |      |      |      |          |      |        |       |          |                     |                       |
| design ex vessel saddle loop layout   | 40    | 40       |      |      |      |      |      |      |          |      |        |       |          | \$6,624             | 11,011.41             |
| design lead routing   | 20    | 40       |      |      |      |      |      |      |          |      |        |       |          | \$4,824             | 8,019.36              |
| design ex vessel saddle clamps  | 8     | 16       |      |      |      |      |      |      |          |      |        |       |          | \$1,930             | 3,207.74              |
| design terminal blocks, mounts & covers   | 20    | 40       |      |      |      |      |      |      |          |      |        |       |          | \$4,824             | 8,019.36              |
| prepare design review package   | 20    | 40       |      |      |      |      |      |      |          |      |        |       |          | \$4,824             | 8,019.36              |
| Lab Fab (A a a such ballus de Hadi a sa /Tidla H  |       |          |      |      |      |      |      |      |          |      |        |       |          | \$0                 | 0.00                  |
| Lab Fab/Assembly/Installation (Title II   | I)    | 40       |      |      |      |      |      |      |          |      |        |       | £40.000  | \$0                 | 0.00                  |
| procure MI cable (210x12x\$7.38)  |       | 40<br>20 |      |      |      | 80   |      |      |          |      |        |       | \$18,600 | \$21,624<br>\$5,732 | 28,277.31<br>9,528.35 |
| fab clamps  |       | 20       |      |      |      | 60   |      |      |          |      |        |       | \$500    | \$5,732<br>\$500    | 625.00                |
| rocure bulkhead connectors for termination boxes  |       | 20       |      |      |      | 80   |      |      |          |      |        |       | φυσσ     | \$5,732             | 9,528.35              |
| fab terminal blocks, mounts, covers (6 sets) fab marking templates (4)                  |       | 20       |      |      |      | 80   |      |      |          |      |        |       |          | \$4,220             | 7,014.70              |
| mark coil paths on vessel (all 3 segments)  |       | 40       |      |      |      | 80   |      |      |          |      |        |       |          | \$7,244             | 12,042.00             |
| stall saddle loops on outer vessel (all 3 segments)                                     |       | 50       |      |      |      | 200  |      |      |          |      |        |       |          | \$14,331            | 23,820.87             |
| install terminal boxes  |       | 25       |      |      |      | 25   |      |      |          |      |        |       |          | \$3,209             | 5,334.16              |
| terminate MI cable in boxes   |       | 20       |      |      |      | 100  |      |      |          |      |        |       |          | \$6,787             | 11,282.02             |
| test sensor resistences   |       |          |      |      |      | 20   |      |      |          |      |        |       |          | \$1,055             | 1,753.67              |
| diate resistence checks during heating tube install                                     |       |          |      |      |      | 40   |      |      |          |      |        |       |          | \$2,110             | 3,507.35              |
| check after MC installation over vessel segments  |       |          |      |      |      | 20   |      |      |          |      |        |       |          | \$1,055             | 1,753.67              |
| _   |       |          |      |      |      |      |      |      |          |      |        |       |          |                     |                       |
|   | RRM   | EEEM     | ECEM | EMEM | ERSM | EESM | ECTB | EETB | D*DM     | EMSM | TRAVEL | STKRM | M&S      | Unloaded            | Loaded                |
| Other Ex-Vessel Sensors   | 20    | 652      | 0    | 0    | 0    | 0    | 0    | 0    | 560      | 472  | 0      | 0     | 11570    | \$113,542           | \$185,834             |
| 2 cowound loops for each MC, TF, PF   |       |          |      |      |      |      |      |      |          |      |        |       |          |                     |                       |
| TC coils + 2 external rogowskis + 2 di  | amagr | 1.       |      |      |      |      |      |      |          |      |        |       |          |                     |                       |
| Final design (Title II)   |       |          |      |      |      |      |      |      |          |      |        |       |          |                     |                       |
| co-wound loop layout, integrate into clamp design                                       |       | 20       |      |      |      |      |      |      | 20       |      |        |       |          | \$2,473             | 4,183.66              |
| design MC co-wound loop lead routing  |       | 40       |      |      |      |      |      |      | 40       |      |        |       |          | \$4,946             | 8,367.32              |
| design MC co-wound termination assembly   |       | 40       |      |      |      |      |      |      | 40       |      |        |       |          | \$4,946             | 8,367.32              |
| design TF co-wound loop layout  |       | 10<br>10 |      |      |      |      |      |      | 10<br>10 |      |        |       |          | \$1,236             | 2,091.83<br>2,091.83  |
| design TF co-wound loop lead routing  |       | 20       |      |      |      |      |      |      | 20       |      |        |       |          | \$1,236             | 4,183.66              |
| design TF co-wound termination assembly  design PF co-wound loop layout                 |       | 10       |      |      |      |      |      |      | 10       |      |        |       |          | \$2,473<br>\$1,236  | 2,091.83              |
| design PF co-wound loop lead routing  |       | 20       |      |      |      |      |      |      | 20       |      |        |       |          | \$2,473             | 4,183.66              |
| design PF co-wound termination assembly   |       | 20       |      |      |      |      |      |      | 20       |      |        |       |          | \$2,473             | 4,183.66              |
| design OH co-wound loop layout  |       | 10       |      |      |      |      |      |      | 10       |      |        |       |          | \$1,236             | 2,091.83              |
| design OH co-wound loop lead routing  |       | 20       |      |      |      |      |      |      | 20       |      |        |       |          | \$2,473             | 4,183.66              |
| design OH co-wound termination assembly   |       | 20       |      |      |      |      |      |      | 20       |      |        |       |          | \$2,473             | 4,183.66              |
| design ext. TC co-wound loop layout   |       | 10       |      |      |      |      |      |      | 10       |      |        |       |          | \$1,236             | 2,091.83              |
| design ext. TC co-wound loop lead routing   |       | 20       |      |      |      |      |      |      | 20       |      |        |       |          | \$2,473             | 4,183.66              |
| design ext. TC co-wound termination assembly  |       | 20       |      |      |      |      |      |      | 20       |      |        |       |          | \$2,473             | 4,183.66              |
| design shell saddle loop layout   |       | 80       |      |      |      |      |      |      | 80       |      |        |       |          | \$9,891             | 16,734.63             |
| design loop clamps  |       | 10       |      |      |      |      |      |      | 10       |      |        |       |          | \$1,236             | 2,091.83              |
| design shell saddle loop lead routing   |       | 20       |      |      |      |      |      |      | 20       |      |        |       |          | \$2,473             | 4,183.66              |
| design shell saddle termination assembly  |       | 20       |      |      |      |      |      |      | 20       |      |        |       |          | \$2,473             | 4,183.66              |
| design external rogowski coil   |       | 40       |      |      |      |      |      |      | 40       |      |        |       |          | \$4,946             | 8,367.32              |
| design ext. rogowski clamps   |       | 10       |      |      |      |      |      |      | 10       |      |        |       |          | \$1,236             | 2,091.83              |
| design ext. rogowski termination  |       | 10       |      |      |      |      |      |      | 10       |      |        |       |          | \$1,236             | 2,091.83              |
| design external diamagnetic loop  |       | 40       |      |      |      |      |      |      | 40       |      |        |       |          | \$4,946             | 8,367.32              |
| design diamagnetic loop clamps  |       | 10<br>10 |      |      |      |      |      |      | 10<br>10 |      |        |       |          | \$1,236<br>\$1,236  | 2,091.83              |
| design diamagnetic loop termination design review psckage are presented to the 10th law | 20    | 40       |      |      |      |      |      |      | 20       |      | 1      |       |          | \$1,236<br>\$5,785  | 2,091.83<br>9,689.36  |
| nesign review Brown and a but but by Brown (10) way                                     | 20    | 40       |      |      |      |      |      |      | 20       |      | 1      |       |          | φυ,1 ου             | 5,005.30              |

|  |       |         |          |         |             |      |      |      |                                  |  |  |   |   | \$0                     | 0.00   |
|--|-------|---------|----------|---------|-------------|------|------|------|----------------------------------|--|--|---|---|-------------------------|--|
| Lab Fab/Assembly/Installation (Title I   | 11)   |         |          |         |             |      |      |      |                                  |  |  |   | £44.070   | \$0                     | 0.00   |
| procure MI cable (100x15x\$7.38)   |       | 00      |          |         |             |      |      |      |                                  | 00   |  |   | \$11,070  | \$11,070                | 13,837.5   |
| fab clamps   |       | 20      |          |         |             |      |      |      |                                  | 80   |  |   | <b>¢</b> 500  | \$5,576                 | 9,238.0  |
| rocure bulkhead connectors for termination boxes   |       | 20      |          |         |             |      |      |      |                                  | 80   |  |   | \$500   | \$500<br>\$5,576        | 625.00<br>9,238.00                               |
| fab terminal blocks, mounts, covers (102 sets)   |       | 4       |          |         |             |      |      |      |                                  | 48   |  |   |   | \$2,741                 | 4,537.3  |
| naterials & assist for MC cowound loops (18 sets) materials & assist for TF cowound loops (18 sets)                    |       | 4       |          |         |             |      |      |      |                                  | 48   |  |   |   | \$2,741                 | 4,537.3  |
| e materials & assist for PF cowound loops (8 sets)   |       | 4       |          |         |             |      |      |      |                                  | 32   |  |   |   | \$1,928                 | 3,192.4  |
| materials & assist for OH cowound loops (4 sets)   |       | 4       | 1        |         |             |      |      |      |                                  | 32   |  |   |   | \$1,928                 | 3,192.4  |
| e materials & assist for Tc cowound loops (4 sets)   |       | 4       |          |         |             |      |      |      |                                  | 32   |  |   |   | \$1,928                 | 3,192.4  |
| terminate MI cable at termination boxes  |       | 8       | 1        |         |             |      |      |      |                                  | 100  |  |   |   | \$5,685                 | 9,410.9  |
| test resistance of loops   |       | 4       |          |         |             |      |      |      |                                  | 20   |  |   |   | \$1,318                 | 2.183.83   |
| test resistance of loops   |       |         |          |         |             |      |      |      |                                  |  |  |   |   | Ψ1,010                  | 2,100.00   |
|  | RRM   | EEEM    | ECEM     | EMEM    | ERSM        | EESM | ECTB | EETB | D*DM                             | EMSM   | TRAVEL   | STKRM   | M&S   | Unloaded                | Loade  |
| Magnetics - Integrators (8ch)  | 0     | 40      | 0        | 0       | 0           | 127  | 0    | 24   | 0                                | 0  | 0  | 0   | \$10,750  | \$21,372                | 31,093.87  |
| Final design (Title II)  |       |         |          |         |             |      |      |      |                                  |  |  |   |   |                         |  |
| n integrator mods (based on 2003 NSTX implem.)   |       | 32      |          |         |             |      |      |      |                                  |  |  |   |   | \$2,420                 | 4,021.8  |
| I ab Fab/Accombby/Inchallation /Title I  | III\  |         |          |         |             |      |      |      |                                  |  |  |   |   |                         |  |
| Lab Fab/Assembly/Installation (Title I   | 11)   |         |          |         |             | 32   |      |      |                                  |  |  |   | \$10,000  | \$11,688                | 15,305.88  |
| procure boards and populate boards   |       | 8       |          |         |             | 32   |      | 24   |                                  |  |  |   | \$10,000  | \$1,503                 | 2,498.69   |
| test integrators   |       | 0       |          |         |             | 75   |      | 24   |                                  |  |  |   |   | \$3,956                 | 6,576.28   |
| fab nests  |       |         |          |         |             | 20   |      |      |                                  |  |  |   | <b>Ф7</b> ГО  |                         | 2,691.17   |
| fab integrator cables  |       |         |          |         |             | 20   |      |      |                                  |  |  |   | \$750   | \$1,805<br>FY02         |  |
|  | RRM   | EEEM    | ECEM     | EMEM    | ERSM        | EESM | ECTB | EETB | D*DM                             | EMSM   | TRAVEL   | STKRM   | M&S   | Unloaded                | Loaded   |
| Total PPPL Resources   | 128   | 1083    | O ECEM   | 0       | ERSIVI<br>0 |      | 0    | 24   | 560                              | 472  | 0  | 0   | #REF!   | \$231,541               | \$369,672  |
|  |       |         |          |         |             |      |      |      |                                  |  |  |   |   | +== :,= ::              | <del>+++++++++++++++++++++++++++++++++++++</del> |
|  |       |         |          |         |             |      |      |      |                                  |  |  |   |   |                         |  |
|  |       |         |          |         |             |      |      |      |                                  |  |  |   |   |                         |  |
|  |       |         |          |         |             |      |      |      |                                  |  |  |   |   |                         |  |
|  |       |         |          |         |             |      |      |      |                                  |  |  |   | _   |                         |  |
|  |       |         |          |         |             |      |      |      |                                  |  | 2 RATES  | DEMOG   | Base  |                         | DEMOG  |
| Accumptions  |       |         |          |         |             |      |      |      | 0                                |  | v Engineer   | EAEM  | \$76.28   | \$132.61                |  |
| Assumptions:   | 1     |         |          |         |             |      |      |      | Computer Div Engineer            |  | ECEM   | \$71.23   | \$118.95  |                         |  |
| 1) no in-vessel sensors budgeted for day 1   |       | od      |          |         |             |      |      |      | Computer Div SL&S                |  | ECSM   | \$50.18   | \$83.79   |                         |  |
| <ul><li>2) Field cabling and junction boxes not budget</li><li>3) Cable trays for field cabling not budgeted</li></ul> |       | eu      |          |         |             |      |      |      | Computer DivTech EE Div Engineer |  | ECTB<br>EEEM   | \$36.18<br>\$75.61  | \$60.42   | TECIR                   |  |
| 4) Rack installation (3 racks) not budgeted  |       |         |          |         |             |      |      |      |                                  |  | Div SL&S   | EESM  | \$52.75   | \$125.68<br>\$87.68     |  |
| 5) AC power installation to racks not but  |       |         |          |         |             |      |      |      |                                  |  | E DivTech  | EETB  | \$37.43   | \$62.22                 |  |
| Ground isolation of racks and ground   |       |         | nitorina | not hud | neted       |      |      |      |                                  |  | physics  | RRM   | \$90.00   | \$149.60                |  |
| 7) digitizers and crates not budgeted (10  |       |         |          |         |             | 4)   |      |      |                                  |  | RF SL&S  | ERSM  | \$50.18   | \$83.41                 |  |
| 8) MI cable used throughout (0.61 diame  |       | Ciate 5 | peca o   | lamicio | necace      |      |      |      |                                  |  | RF Tech  | ERTB  | \$36.18   | \$60.14                 |  |
| o) wir cable asea tilloaghout (0.01 diami  | otor) |         |          |         |             |      |      |      |                                  | М  | E Engineer   | EMEM  | \$78.43   | \$129.77                |  |
|  |       |         |          |         |             |      |      |      |                                  |  | E Machinist  | EMNB  | \$50.80   | \$84.05                 |  |
|  |       |         |          |         |             |      |      |      |                                  | 1012   | ME SL&S  | EMSM  | \$50.80   | \$84.05                 |  |
|  |       |         |          |         |             |      |      |      |                                  |  | ME Tech  | EMTB  | \$33.49   |                         | LEMTB  |
|  |       |         |          |         |             |      |      |      |                                  |  |  |   |   | \$55.41                 |  |
|  |       |         |          |         |             |      |      |      |                                  | Drafti   |  |   |   |                         |  |
|  |       |         |          |         |             |      |      |      |                                  |  | ng Monthly   | D_DM  | \$48.03   | \$83.50                 | LD_DM  |
|  |       |         |          |         |             |      |      |      | Stor                             | M&S  | ng Monthly<br>Purchases  | D_DM<br>MS(41)  | \$48.03<br>M&S \$\$   | \$83.50<br>1.25         | LD_DM<br>MSGA                                    |
|  |       |         |          |         |             |      |      |      | Stoo                             | M&S  | ng Monthly<br>Purchases<br>/ithdrawals   | D_DM<br>MS(41)<br>STKR(37)  | \$48.03<br>M&S \$\$<br>STKR\$\$   | \$83.50<br>1.25<br>1.19 | LD_DM<br>MSGA<br>SRGA                            |
|  |       |         |          |         |             |      |      |      |                                  | M&S<br>ckroom W  | ng Monthly<br>Purchases<br>/ithdrawals<br>Travel   | D_DM<br>MS(41)<br>STKR(37)<br>TVL(35)                                     | \$48.03<br>M&S \$\$<br>STKR\$\$<br>TVL\$\$                                      | \$83.50<br>1.25<br>1.19 | LD_DM<br>MSGA                                    |
|  |       |         |          |         |             |      |      |      | Des a                            | M&S<br>ckroom W<br>& Anlys I                             | ng Monthly<br>Purchases<br>/ithdrawals<br>Travel<br>Div Burden   | D_DM<br>MS(41)<br>STKR(37)<br>TVL(35)<br>EABUR                            | \$48.03<br>M&S \$\$<br>STKR\$\$<br>TVL\$\$<br>14.00%                            | \$83.50<br>1.25<br>1.19 | LD_DM<br>MSGA<br>SRGA                            |
|  |       |         |          |         |             |      |      |      | Des &                            | M&S<br>ckroom W<br>& Anlys I<br>omp Sys I                | ng Monthly<br>Purchases<br>/ithdrawals<br>Travel<br>Div Burden<br>Div Burden                             | D_DM<br>MS(41)<br>STKR(37)<br>TVL(35)<br>EABUR<br>ECBUR                   | \$48.03<br>M&S \$\$<br>STKR\$\$<br>TVL\$\$<br>14.00%<br>9.50%                   | \$83.50<br>1.25<br>1.19 | LD_DM<br>MSGA<br>SRGA                            |
|  |       |         |          |         |             |      |      |      | Des &                            | M&S ckroom W & Anlys I omp Sys I                         | ng Monthly<br>Purchases<br>/ithdrawals<br>Travel<br>Div Burden<br>Div Burden<br>Div Burden               | D_DM<br>MS(41)<br>STKR(37)<br>TVL(35)<br>EABUR<br>ECBUR<br>EEBUR          | \$48.03<br>M&S \$\$<br>STKR\$\$<br>TVL\$\$<br>14.00%<br>9.50%<br>9.00%          | \$83.50<br>1.25<br>1.19 | LD_DM<br>MSGA<br>SRGA                            |
|  |       |         |          |         |             |      |      |      | Des &                            | M&S ckroom W & Anlys I omp Sys I ech Sys I fab Eng I     | ng Monthly<br>Purchases<br>/ithdrawals<br>Travel<br>Div Burden<br>Div Burden<br>Div Burden<br>Div Burden | D_DM<br>MS(41)<br>STKR(37)<br>TVL(35)<br>EABUR<br>ECBUR<br>EEBUR<br>EMBUR | \$48.03<br>M&S \$\$<br>STKR\$\$<br>TVL\$\$<br>14.00%<br>9.50%<br>9.00%<br>8.50% | \$83.50<br>1.25<br>1.19 | LD_DM<br>MSGA<br>SRGA                            |
|  |       |         |          |         |             |      |      |      | Des a                            | M&S ckroom W  & Anlys I omp Sys I ech Sys I ab Eng I Ope | ng Monthly<br>Purchases<br>/ithdrawals<br>Travel<br>Div Burden<br>Div Burden<br>Div Burden               | D_DM<br>MS(41)<br>STKR(37)<br>TVL(35)<br>EABUR<br>ECBUR<br>EEBUR          | \$48.03<br>M&S \$\$<br>STKR\$\$<br>TVL\$\$<br>14.00%<br>9.50%<br>9.00%          | \$83.50<br>1.25<br>1.19 | LD_DM<br>MSGA<br>SRGA                            |