## Jefferson Lab Alignment Group Data Transmittal

TO：C．Luongo，D．Kashy，O．Pastor
DATE：06／10／2015
FROM：Kelly Tremblay

## DETAILS：

Checked：（cwg）
\＃：B1650
data ：step2a\hallbltorus12\150610A
Coils B，C D，E and F were checked in Hall B on June 8 ${ }^{\text {th }}$ and 9 ${ }^{\text {th }}, 2015$.
Coil F was installed approximately horizontal（ $270^{\circ}$ clockwise looking downstream），coil E at $210^{\circ}$ ，coil D at $150^{\circ}$ ，Coil C at $90^{\circ}$ and coil B at $30^{\circ}$ ．The two survey ball holes on the outer edge away from the hub were used to determine the angles formed between the coils．The data below marked＇US＇and＇DS＇are the upstream and downstream prisms．

The ideal coordinates based on drawing B00000－04－01－1101 rev D and the found locations （note offset $5 / 16$＂due to the survey prism used）are：

|  | Ideal |  |  | Found |  |  | deltas |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | X［mm］ | Y ［mm］ | Z［mm］ | X［mm］ | Y ［mm］ | Z［mm］ | dx ［mm］ | dy［mm］ | dz ［mm］ |
| Coil F－US | 3207.20 | 0.00 | －506．95 | 3206.30 | －8．99 | －505．79 | －0．90 | －8．99 | 1.15 |
| Coil F－DS | 4212.84 | 0.00 | 878.25 | 4212.72 | －12．84 | 878.77 | －0．12 | －12．84 | 0.52 |
| Coil E－US | 1603.62 | －2777．52 | －506．95 | 1595.05 | －2782．14 | －503．99 | －8．57 | －4．62 | 2.96 |
| Coil E－DS | 2106.42 | －3648．43 | 878.25 | 2095.06 | －3654．56 | 881.16 | －11．36 | －6．13 | 2.91 |
| Coil D－US | －1603．62 | －2777．52 | －506．95 | －1611．59 | －2774．00 | －502．42 | －7．97 | 3.52 | 4.52 |
| Coil D－DS | －2106．42 | －3648．43 | 878.25 | －2117．61 | －3642．13 | 883.32 | －11．19 | 6.30 | 5.07 |
| Coil C－US | －3207．20 | 0.00 | －506．95 | －3208．18 | 9.3105 | －504．207 | －0．98 | 9.31 | 2.74 |
| Coil C－DS | －4212．84 | 0.00 | 878.25 | －4213．86 | 11.26667 | 880.8299 | －1．02 | 11.27 | 2.58 |
| Coil B－US | －1603．62 | 2777.52 | －506．95 | －1596．99 | 2781.741 | －506．901 | 6.63 | 4.22 | 0.04 |
| Coil B－DS | －2106．42 | 3648.43 | 878.25 | －2097．47 | 3654.529 | 877.1368 | 8.95 | 6.10 | －1．11 |

Angles from the hub to the prism locations（relative to beam following coordinate system）

| Angles from Hub（degrees） |  |  |  |
| :--- | :--- | :--- | :--- |
|  | Ideal | Found | Delta |
| Coil F－US | 270.0000 | 269.8766 | 0.1234 |
| Coil F－DS | 270.0000 | 269.8322 | 0.1678 |
|  |  |  |  |
| Coil E－US | 210.0000 | 209.8900 | 0.1100 |
| Coil E－DS | 210.0000 | 209.8495 | 0.1505 |
|  |  |  |  |
| Coil D－US | 150.0000 | 149.8713 | 0.1287 |
| Coil D－DS | 150.0000 | 149.8435 | 0.1565 |


| Angles from Hub (degrees) |  |  |  |
| :--- | :--- | :--- | :--- |
|  | Ideal | Found | Delta |
| Coil C- US | 90.0000 | 89.7963 | 0.2037 |
| Coil C- DS | 90.0000 | 89.8399 | 0.1601 |
|  |  |  |  |
| Coil B - US | 30.0000 | 29.7965 | 0.2035 |
| Coil B - DS | 30.0000 | 29.8281 | 0.1719 |

Angles coil to coil:

| Angle Between Coils |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  |  | Ideal | Found | Delta |
| F to E | US | 60.0000 | 59.9866 | 0.0134 |
|  | DS | 60.0000 | 59.9827 | 0.0173 |
|  |  |  |  |  |
| E to D | US | 60.0000 | 60.0187 | -0.0187 |
|  | DS | 60.0000 | 60.0059 | -0.0059 |
|  |  |  |  |  |
| D to C | US | 60.0000 | 60.0749 | -0.0749 |
|  | DS | 60.0000 | 60.0037 | -0.0037 |
|  |  |  |  |  |
| C to B | US | 60.0000 | 59.9998 | 0.0002 |
|  | DS | 60.0000 | 60.0118 | -0.0118 |
|  |  |  |  |  |
|  |  |  |  |  |
| F to D | US | 120.0000 | 120.0053 | -0.0053 |
|  | DS | 120.0000 | 119.9886 | 0.0114 |
|  |  |  |  |  |
| F to C | US | 180.0000 | 180.0802 | -0.0802 |
|  | DS | 180.0000 | 179.9923 | 0.0077 |
|  |  |  |  |  |
| F to B | US | 240.0000 | 240.0801 | -0.080 |
|  | DS | 240.0000 | 240.0041 | -0.0041 |
|  |  |  |  |  |
| E to C | US | 120.0000 | 120.0936 | -0.0936 |
|  | DS | 120.0000 | 120.0096 | -0.0096 |
|  |  |  |  |  |
| E to B | US | 180.0000 | 180.0935 | -0.0935 |
|  | DS | 180.0000 | 180.0214 | -0.0214 |
|  |  |  |  |  |

Distances between prism locations:

| Distances between Prism (tooling ball centers) (mm) |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: |
|  |  | ideal (mm) | Found (mm) | Delta (mm) |
| Coil F-E | US | 3207.2 | 3207.2 | 0.06 |
|  | DS | 4212.8 | 4212.7 | -0.17 |
|  |  |  |  |  |


| Coil E-D | US | 3207.2 | 3206.7 | -0.58 |
| ---: | ---: | ---: | ---: | ---: |
|  | DS | 4212.8 | 4212.7 | -0.15 |
|  |  |  |  |  |
| Coil D-C | US | 3207.2 | 3208.7 | 1.53 |
|  | DS | 4212.8 | 4212.1 | -0.77 |
|  |  |  |  |  |
| Coil C -B | US | 3207.2 | 3206.6 | -0.59 |
|  | DS | 4212.8 | 4213.4 | 0.53 |

Hub Centers (note $Z$ is where the plane to form the circle was taken - not relevant:

| Hub Centers locations (mm - beam following) |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: |
|  | $x$ | $y$ | $z$ |  |
| US | -2.4 | -1.3 | 200 |  |
| DS |  | -0.5 | 1.5 | 2639 |

