

Company: L-DEO - Lamont - Doherty Earth Observatory

Vessel: Marcus G. Langseth

Client: Lizarralde / NSF

Project: MGL2005

Area: Adak Alaska / Andreanof Experiment

Start Date: 1-Sep-20

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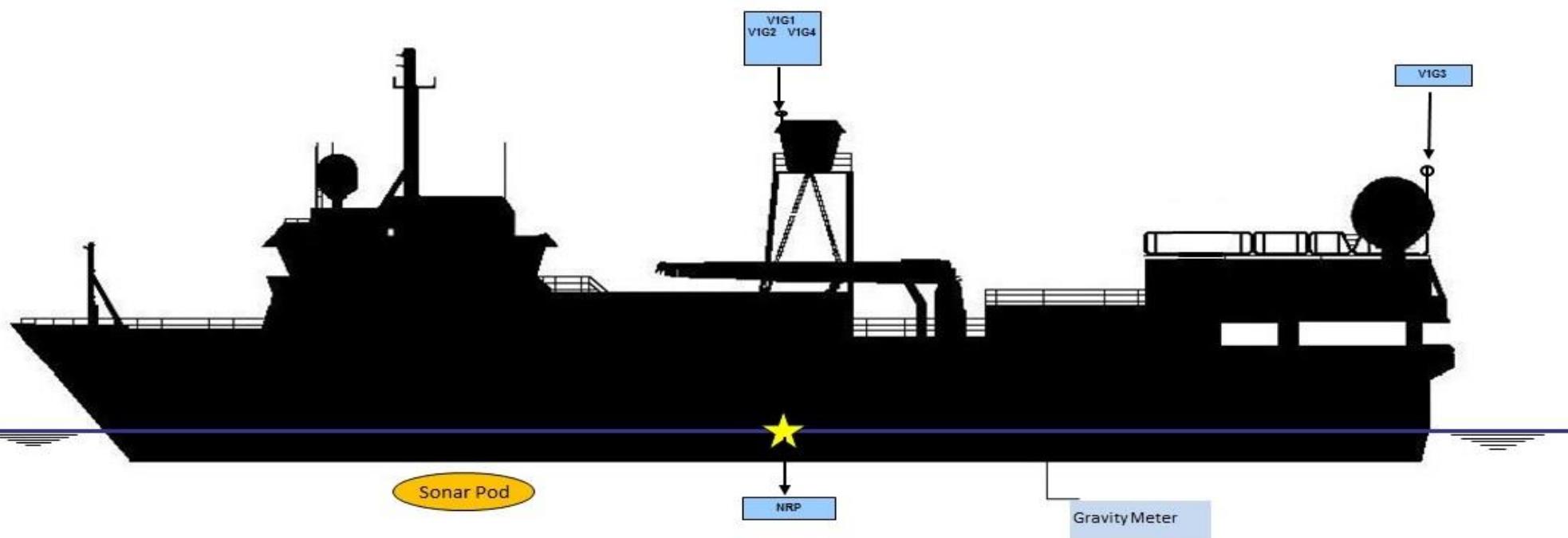
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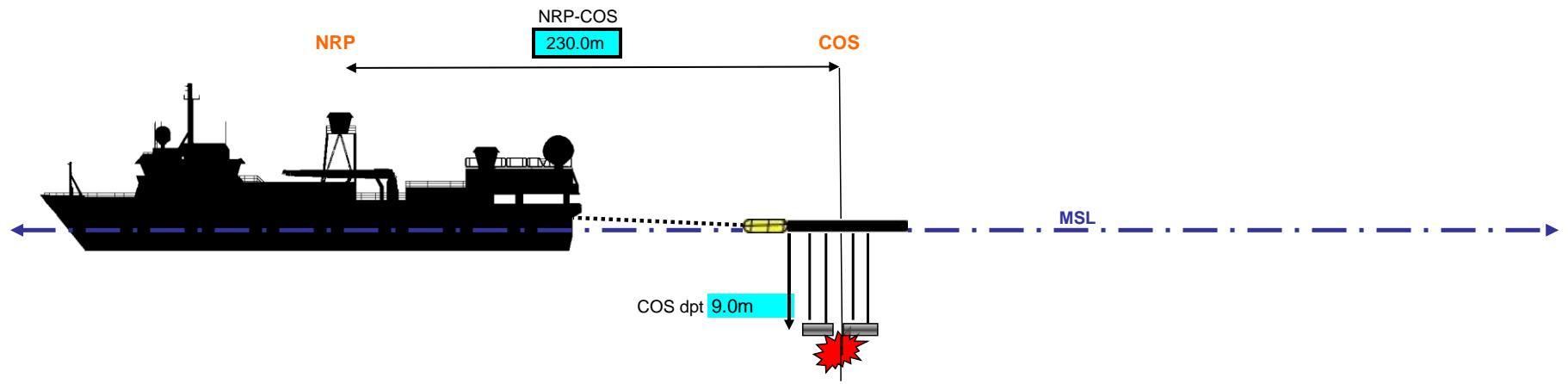
## R/V Marcus G. Langseth - Vessel Sensor Offsets



Negative values are above water line  
All measurements in meters

|                  |                                       | STBD/PORT (X) | FORE/AFT (Y) | UP/DOWN (Z) |
|------------------|---------------------------------------|---------------|--------------|-------------|
| <b>NRP</b>       | NAVIGATION REFERENCE POINT            | 0.00          | 0.00         | 0.00        |
| <b>V1G1</b>      | C-Nav 3050                            | 0.00          | 0.00         | -16.90      |
| <b>V1G2</b>      | SeaPath 330                           | 0.00          | 1.50         | -16.90      |
| <b>V1G3</b>      | C-Nav 2000                            | -2.10         | -29.20       | -14.50      |
| <b>V1G4</b>      | Pos MV                                | -1.30         | 1.20         | -16.90      |
| <b>V1R1</b>      | PosNet                                | -1.30         | 0.00         | -16.90      |
| <b>Sonar Pod</b> | EM122 Knudsen ADCP                    | 0.00          | 20.20        | 7.49        |
|                  | EM122 Center Beam offset (in Spectra) | 0/00          | 13.4         | 7.49        |
| <b>MRU</b>       | Seapath MRU                           | 2.30          | 14.16        | -4.30       |
| <b>BGM</b>       | Bell Gravity Meter                    | 0.00          | -13.10       | 1.10        |

## R/V Marcus G. Langseth - Towing Offsets



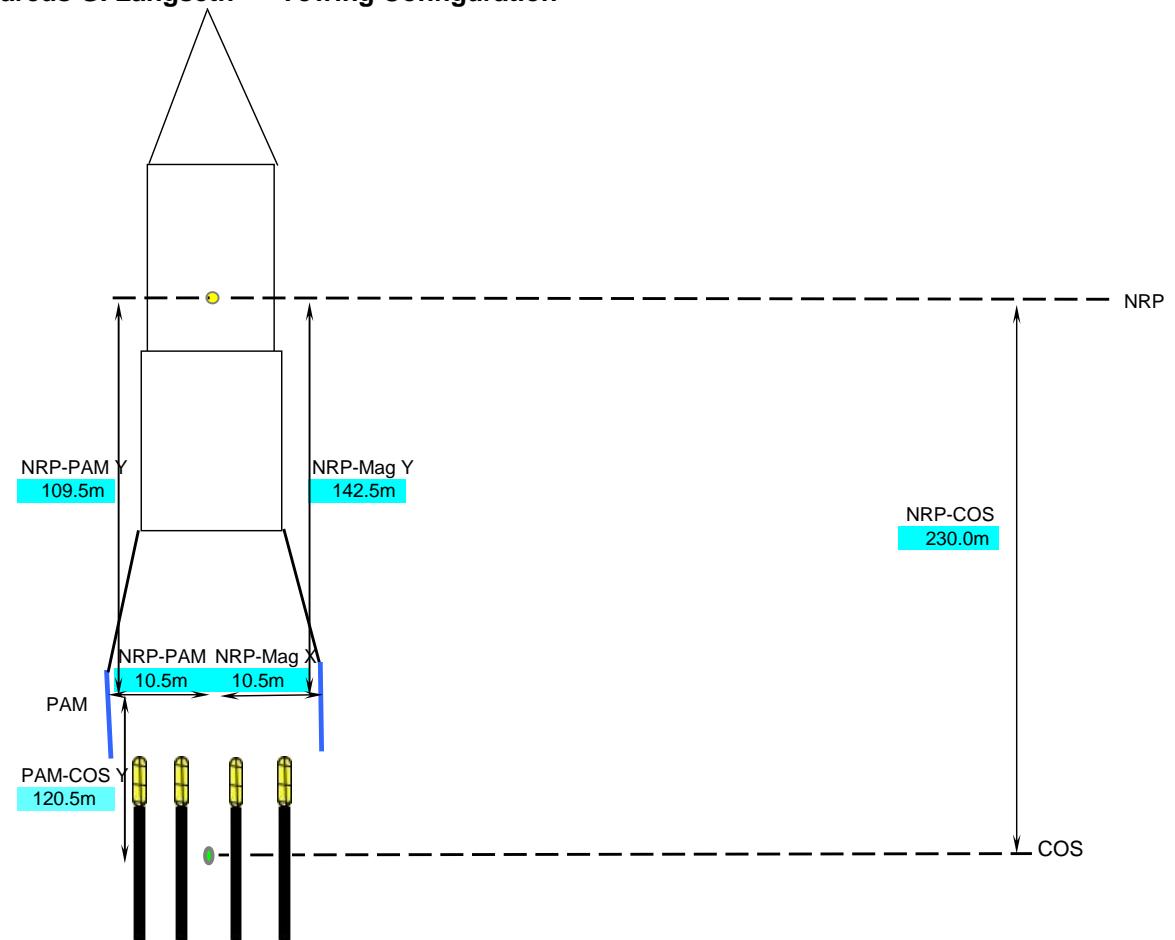
|           |                     |
|-----------|---------------------|
| NRP       | Nav Reference Point |
| COS       | Centre of Source    |
| CMP       | Common Mid-Point    |
| MSL       | Mean Sea Level      |
| NRP-Stern | 29.5m               |
| NRP-COS   | 230.0m              |

All measurements in meters

Cell contents referenced from Config\_offsets tab

| # Streamers        | Length | Channels   | Spacing |
|--------------------|--------|------------|---------|
| # Gun Strings Used |        | Vol (in^3) | 6600    |

### R/V Marcus G. Langseth - Towing Configuration



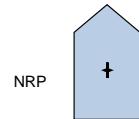
NOT to Scale



Cell contents referenced from Config\_offsets tab

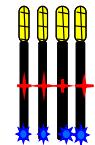
CNG

## R/V Marcus G. Langseth - Acoustic Offsets



cng  
acoustic

Source acoustic offsets are referenced to COS on individual gun string

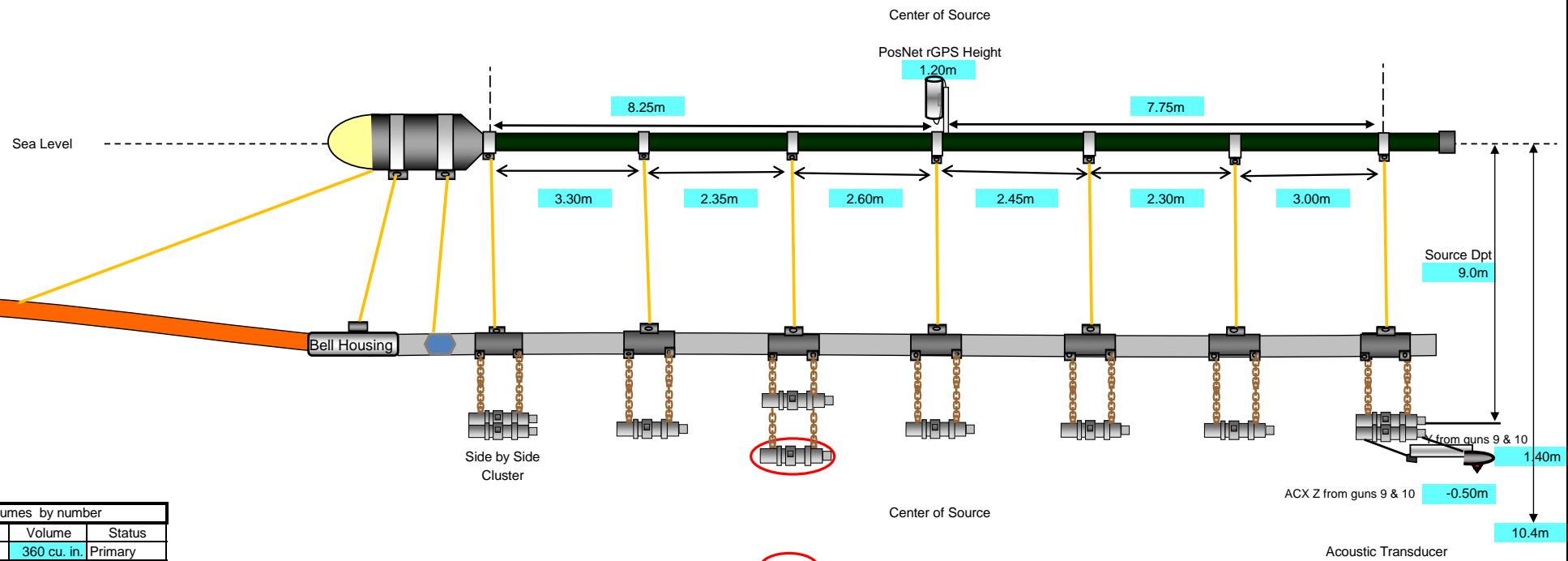


G1T1 : -9.2m  
G2T1 : -9.2m  
G3T1 : -9.2m  
G4T1 : -9.2m

Streamer acoustic offsets are referenced to CNG on individual streamer

Cell contents referenced from Config\_offsets tab

## R/V Marcus G. Langseth - Gun Array Offsets



| Gun volumes by number |             |                      |
|-----------------------|-------------|----------------------|
| Gun                   | Volume      | Status               |
| Gun 1                 | 360 cu. in. | Primary              |
| Gun 2                 | 360 cu. in. | Primary              |
| Gun 3                 | 40 cu. in.  | Primary & Mitigation |
| Gun 4                 | 180 cu. in. | Primary              |
| Gun 5                 | 180 cu. in. | Spare                |
| Gun 6                 | 90 cu. in.  | Primary              |
| Gun 7                 | 120 cu. in. | Primary              |
| Gun 8                 | 60 cu. in.  | Primary              |
| Gun 9                 | 220 cu. in. | Primary              |
| Gun 10                | 220 cu. in. | Primary              |

Array total volume (without spares) is 6600 cu. in.

Total volume/string (without spare) 1650 cu. in.

Guns (1 &2) & (9&10) in a horizontal cluster. Guns (5 & 6 ) in a vertical cluster but #6 is spare only

Gun clusters have 0.75m between guns and hang 0.95m from center of hanger

Horizontal Clusters are 1m from gun port to gun port

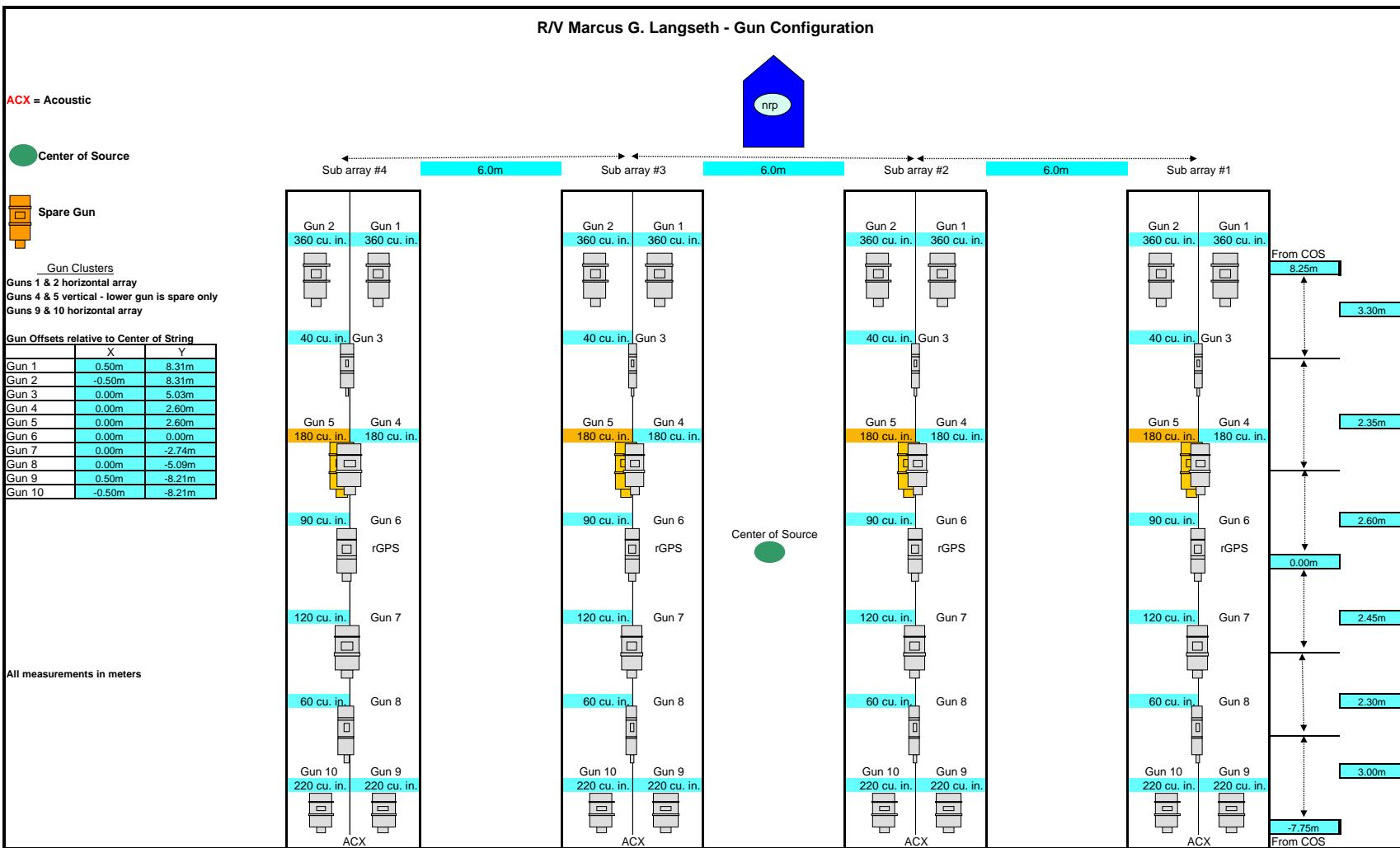
Single guns hang from hanger 1.15m

All gun volumes, numbering, locations, and offsets were inspected and verified by Chief Source Mechanic.

All measurements in meters

NOTE: drawing not to scale

Cell contents referenced from Config\_offsets tab



| Job Specific                       |      |
|------------------------------------|------|
| MRP to COS Y                       | 230  |
| NRP to COS X                       | 0    |
| Source Depth                       | 9    |
| Streamer Depth                     |      |
| # streamer sections                |      |
| # channels                         |      |
| CNG Channel #                      |      |
| CFG Channel #                      |      |
| # MICS stations                    |      |
| Lead-in stream to low point at sea |      |
| MICS Stream Separator              |      |
| Gun volume total                   | 6500 |
| Volume per string                  | 1500 |
| # of gun used                      | 36   |
| # Gun strings                      | 4    |
| gun string separation              | 6    |
| PAM V from elem                    | 80   |
| PAM X - (outside of gun string)    |      |
| PAM Y - (inside of gun string)     |      |
| Max X - (inside of gun string)     | 113  |
| Max Y - (inside of gun string)     | 3    |

| Derived Offsets (Inches)                   |      |
|--------------------------------------------|------|
| Towing Offsets Tab                         |      |
| NRP-COS                                    | 23   |
| NRP-CNG                                    | 89   |
| NRP-CMP                                    | 159  |
| COS-CNG                                    | -140 |
| CNG Channel #                              |      |
| NRP-Stem                                   | 29   |
| Distance from Head of first section to CNG | 7    |
| Source Depth                               |      |
| Streamer Depth                             |      |
| Front End Length                           | 39   |

| Detail Objects (Windows)  | Ac    |
|---------------------------|-------|
| Testing Configuration Tab |       |
| NPB-CDS                   | 236   |
| NPB-CNG                   | 882   |
| CDS-CNG                   | -1463 |
| NPB-Probe                 | 0     |
| CNG-Probe                 | 0     |
| P-Cable                   | 0     |
| Streamer Spec.            | 9     |
| NPB-PMY                   | 105.5 |
| NPB-PMX                   | 18.5  |
| PMX-CDS                   | 120.5 |
| PMX-CDS X                 | 15.5  |
| # Gun String              | 4     |
| gun volume                | 6600  |
| Gun separation            | 6     |
| # Poles                   | 0     |
| # Streamer                | 0     |
| 2D Streamer               | 12.5  |
| 3D Streaming              | 0     |

| overhead<br>a | Gun array offsets     |       |
|---------------|-----------------------|-------|
|               | Bracket distance 1-2  | 0     |
| -0.15         | Bracket distance 2-3  | 3.3   |
| -0.15         | Bracket distance 3-4  | 2.35  |
| -0.15         | Bracket distance 4-5  | 2.45  |
| -16.25        | Bracket distance 5-6  | 2.46  |
| -167.25       | Bracket distance 6-7  | 2.3   |
| -780.25       | Bracket distance 7-8  | 3     |
| -7970.50      | BraceWFL-CD201 Y      |       |
| -1            | CDS - Acoustic Y      | -5.47 |
| 0             | CDS/FP height above 0 | 1.2   |
| 0             | C1 Volume             | 360   |
| 0             | C2 Volume             | 380   |
| 0             | C3 Volume             | 60    |
| 0             | C4 Volume             | 180   |
| 0             | C5 Volume             | 180   |

| Current Status                           |         |
|------------------------------------------|---------|
| Streamer Front End                       | Green   |
| Keep-to-point as sea                     | 0       |
| Keep-to-point as sea to end of day       | 12.5    |
| SWS Length                               | 6       |
| rvm length                               | 17.5    |
| HAWSTU length                            | 0.4     |
| HESA length                              | 10      |
| Feed Coll. Col                           | 100     |
| Head to Feed BK                          | 7.5     |
| Feed Coll to CNG                         | -16.423 |
| Head to CNG                              | 24.223  |
| Tell to AR Coll                          | 25.777  |
| CNG Channel #                            | 0       |
| Center of streamer as Acq. in transducer | -0.2    |
| First Section #                          | 1       |
| # channels                               | 0       |

| Demand Checks          |        |
|------------------------|--------|
| Streamer               | End    |
| Lead to Col            | 24,223 |
| Col to Alt<br>Col      | 25,777 |
| Lead to G              | 145,3  |
| Col to Col             | 100    |
| GPU with               | 0,45   |
| Watch length           | 55     |
| Overall                | 0,3    |
| IC count               | 150    |
| Set active             | 0      |
| Channels               | 0      |
| Actions                | 0      |
| Location with          | 0      |
| Start to               | -12,5  |
| Watch                  | 0,1    |
| Center of<br>Attention | -0,2   |
| Act. indicator         | -0,2   |

| Surveyed Officials             |      |
|--------------------------------|------|
| Number of survey responses     |      |
| Number of responses            | 6    |
| Number of incomplete responses | 0    |
| Mean response time (in days)   | 12.5 |
| Median response time (in days) | 0    |

| Derived Criteria          |      |
|---------------------------|------|
| Tailbox offsets           |      |
| Hinge height above center | 1.2  |
| TB length                 | 2.4  |
| TB height                 | 1.6  |
| RGIPS-ACX                 | 1.0  |
| Bridge-RGIPS              | 2.21 |
| Top Leg                   | 1.51 |
| Bottom Leg                | 1.1  |
| STIC                      | 1.51 |
| ACX below center line     | 1.2  |

| Feed Factors                       |        |
|------------------------------------|--------|
| NDF in Stems                       | 29.5   |
| late point at sea to end of season | 0.4    |
| ST/MEAN length                     | 0.4    |
| Mean                               | 0.06   |
| Height of section to cut           | 24.223 |
| stiffness of section to cut        | 25.777 |
| channel spacing                    | 12.5   |
| Mean of Pore/BSD                   | 7.5    |
| Head to First RX                   | 14.3   |
| Head to Last RX                    | 140.3  |
| Chamfer per section                |        |
| Corner of section to cut           | -0.2   |
| Mean of section to cut             | 0.0    |
| Frontal Section Number             | 1      |
| Max [HSAT] Length                  | 0.4    |
| HSAT Lengths                       | 6      |
| HUM length                         |        |
| HSAT Length                        | 10     |
| Action Section Lengths (SSAS)      | 150    |
| TFSI set stretch                   |        |
| 45°FC                              | 160    |
| 45°AC                              | 160    |
| 45°BC                              | 47.0   |
| HSAT as Cut                        | 6.45   |

| Tailbox offsets         |      |
|-------------------------|------|
| RGPS height above water | 1.3  |
| TR length               | 2.8  |
| TR height               | 1.83 |
| RGPS-ACX                | 1    |
| Bridge-INGR             | 2.25 |
| Top Leg                 | 1.55 |
| Bottom Leg              | 1.6  |
| STIC                    | 150  |
| ACX below water line    | 1.3  |