

Beta Unit Geophysical Survey

Criteria Pollutants - Off-Road Sources

Pre-Survey (12 hour/day operations)

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Lbs/BHP-Hour ² | | | | | Pounds/Day | | | | | Days | Tons | | | | |
|--------------------------|--------|-----|--------|--------------------------|-----------|---------------------------|--------|--------|--------|-----------------|-----------------|------|------|-------|-----------------|------|-----------------|-------|-------|-------|-----------------|
| | | | | | | NO _x | ROG | PM10 | CO | SO ₂ | NO _x | ROG | PM10 | CO | SO ₂ | | NO _x | ROG | PM10 | CO | SO ₂ |
| (S/V Jab) - main engines | Diesel | 500 | 2 | 38 | 12 | 0.0112 | 0.0015 | 0.0003 | 0.0082 | 0.0000 | 51.27 | 6.84 | 1.51 | 37.50 | 0.09 | 3 | 0.077 | 0.010 | 0.002 | 0.056 | 0.000 |

| Off-Road Equipment Summary | NO _x | ROG | PM10 | CO | SO ₂ |
|----------------------------|-----------------|------|------|-------|-----------------|
| Pounds/Day | 51.27 | 6.84 | 1.51 | 37.50 | 0.09 |
| Tons | 0.08 | 0.01 | 0.00 | 0.06 | 0.00 |

Notes:

¹ Load Factors for S/V Jab derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"

² Emission Factors obtained from Appendix A - Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

² Emission factor for SO₂ from Port of Long Beach 2005 Air Emissions Inventory, Table 3.7, Page 106. The units g/kW-hr was converted to lb/bhp-hr using the multiplier (conversion) of 0.001644 (knowns: 1 gram = 0.0022046 lb & 1 kw = 1.341 bhp)

**Beta Unit Geophysical Survey
Criteria Pollutants - Off-Road Sources
Mobilization (24 hour/day operations)**

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Lbs/BHP-Hour ² | | | | | Pounds/Day | | | | | Days ³ | Tons | | | | |
|---|--------|------|--------|--------------------------|-----------|---------------------------|--------|--------|--------|-----------------|-----------------|-------|------|-------|-----------------|-------------------|-----------------|-------|-------|-------|-----------------|
| | | | | | | NO _x | ROG | PM10 | CO | SO ₂ | NO _x | ROG | PM10 | CO | SO ₂ | | NO _x | ROG | PM10 | CO | SO ₂ |
| (DSV Clean Ocean) - Cummins QSK 19 (Tier 3) | Diesel | 500 | 3 | 38 | 6 | 0.0112 | 0.0015 | 0.0003 | 0.0082 | 0.0000191 | 38.45 | 5.13 | 1.13 | 28.12 | 0.07 | 1 | 0.019 | 0.003 | 0.001 | 0.014 | 0.000 |
| (DSV Clean Ocean) - generators - John Deere 99Kw (Tier 3) | Diesel | 150 | 2 | 32 | 6 | 0.0112 | 0.0015 | 0.0003 | 0.0082 | 0.0000191 | 6.48 | 0.86 | 0.19 | 4.74 | 0.01 | 1 | 0.003 | 0.000 | 0.000 | 0.002 | 0.000 |
| (DSV Clean Ocean) - bow thruster - Cummins QSL 9 (Tier 3) | Diesel | 405 | 1 | 32 | 2 | 0.0112 | 0.0018 | 0.0003 | 0.0082 | 0.0000191 | 2.91 | 0.46 | 0.09 | 2.13 | 0.00 | 1 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 |
| (M/V Silver Arrow) - CAT 3516C | Diesel | 2000 | 2 | 38 | 6 | 0.0122 | 0.0015 | 0.0004 | 0.0082 | 0.0000191 | 111.19 | 13.67 | 4.02 | 74.99 | 0.17 | 1 | 0.056 | 0.007 | 0.002 | 0.037 | 0.000 |
| (M/V Silver Arrow) - generators - CAT C18 | Diesel | 715 | 3 | 32 | 6 | 0.0112 | 0.0018 | 0.0003 | 0.0082 | 0.0000191 | 46.30 | 7.35 | 1.36 | 33.87 | 0.08 | 1 | 0.023 | 0.004 | 0.001 | 0.017 | 0.000 |
| (S/V Jab) - main engines | Diesel | 500 | 2 | 38 | 4 | 0.0112 | 0.0015 | 0.0003 | 0.0082 | 0.0000191 | 17.09 | 2.28 | 0.50 | 12.50 | 0.03 | 1 | 0.009 | 0.001 | 0.000 | 0.006 | 0.000 |

| Off-Road Equipment Summary | NO _x | ROG | PM10 | CO | SO ₂ |
|----------------------------|-----------------|-------|------|--------|-----------------|
| Pounds/Day | 222.42 | 29.76 | 7.29 | 156.35 | 0.36 |
| Tons | 0.11 | 0.01 | 0.00 | 0.08 | 0.00 |

Notes:

- ¹ Load Factors for DSV Clean Ocean, M/V Silver Arrow, and S/V Jab derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"
- ² Emission Factors obtained from California Air Resources Board (CARB) *Commercial Harbor Craft Regulatory Activities*, Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California
- ³ Emission factor for SO₂ from Port of Long Beach 2005 Air Emissions Inventory, Table 3.7, Page 106. The units g/kW-hr was converted to lb/bhp-hr using the multiplier (conversion) of 0.001644 (knowns: 1 gram = 0.0022046 lb & 1 kw = 1.341 bhp)
- ³ Days estimated travel from 25 miles outside of Project Site

Harborcraft Study Factors - Conversion

| | g/BHP-hr (App. A) | | | | lb/BHP-Hr | | | |
|---|-------------------|------|------|------|-----------------|--------|--------|--------|
| | NO _x | ROG | PM | CO | NO _x | ROG | PM | CO |
| DSV Clean Ocean Main Engine (251-500 BHP) - Year 2004-2013 | 5.1 | 0.68 | 0.15 | 3.73 | 0.0112 | 0.0015 | 0.0003 | 0.0082 |
| M/V Silver Arrow Main Engine (1901-3300 BHP) - Year 2007-2012 | 5.53 | 0.68 | 0.2 | 3.73 | 0.0122 | 0.0015 | 0.0004 | 0.0082 |
| S/V Jab Main Engine (251-500 BHP) - Year 2004-2013 | 5.1 | 0.68 | 0.15 | 3.73 | 0.0112 | 0.0015 | 0.0003 | 0.0082 |
| DSV Clean Ocean Aux Engine (121-175 BHP) - Year 2004-2012 | 5.1 | 0.68 | 0.15 | 3.73 | 0.0112 | 0.0015 | 0.0003 | 0.0082 |
| DSV Clean Ocean Aux Engine (251-500 BHP) - Year 2004-2013 | 5.1 | 0.81 | 0.15 | 3.73 | 0.0112 | 0.0018 | 0.0003 | 0.0082 |
| M/V Silver Arrow Aux Engine (715 BHP) - Year 2007-2012 | 5.1 | 0.81 | 0.15 | 3.73 | 0.0112 | 0.0018 | 0.0003 | 0.0082 |

| | | |
|---|------------------------|------------|
| Sulphur Dioxide Emission Factor | g/BHP-hr => lbs/BHP-hr | lbs/BHP-hr |
| SO ₂ = 0.15 g/kW-hr X 1.341 = 0.20115 g/BHP-hr | 0.20115 X 0.0022046 = | 0.0004435 |

| | | |
|---|---|------------|
| Ultra-Low Sulphur Diesel (ULSD) Fuel Correction Factor = 0.043 | SO ₂ g/kW-hr (ULSD correction) | lbs/BHP-hr |
| Sulphur Dioxide Fuel Correction w/ ULSD | 0.00645 | |
| SO ₂ = 0.00645 g/kW-hr X 1.341 = 0.00864945 g/BHP-hr | 0.00864945 X 0.0022046 = | 0.0000191 |

**Beta Unit Geophysical Survey
Criteria Pollutants - Off-Road Sources
OBS Deployment (12 hour/day operations)**

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Lbs/BHP-Hour ² | | | | | Pounds/Day | | | | | Days | Tons | | | | |
|--|--------|-----|--------|--------------------------|-----------|---------------------------|--------|--------|--------|-----------------|-----------------|-------|------|-------|-----------------|------|-----------------|-------|-------|-------|-----------------|
| | | | | | | NO _x | ROG | PM10 | CO | SO ₂ | NO _x | ROG | PM10 | CO | SO ₂ | | NO _x | ROG | PM10 | CO | SO ₂ |
| Vessel (DSV Clean Ocean) - Cummins QSK 19 (Tier 3) | Diesel | 500 | 3 | 38 | 12 | 0.0112 | 0.0015 | 0.0003 | 0.0000 | 0.000019 | 76.90 | 10.25 | 2.26 | 0.13 | 0.13 | 14 | 0.538 | 0.072 | 0.016 | 0.001 | 0.001 |
| Vessel (DSV Clean Ocean) - generators - John Deere 99Kw (Tier 3) | Diesel | 150 | 2 | 32 | 24 | 0.0112 | 0.0015 | 0.0003 | 0.0082 | 0.000019 | 25.90 | 3.45 | 0.76 | 18.95 | 0.04 | 14 | 0.181 | 0.024 | 0.005 | 0.133 | 0.000 |
| Vessel (DSV Clean Ocean) - bow thruster - Cummins QSL 9 (Tier 3) | Diesel | 405 | 1 | 32 | 12 | 0.0112 | 0.0018 | 0.0003 | 0.0082 | 0.000019 | 17.49 | 2.78 | 0.51 | 12.79 | 0.03 | 14 | 0.122 | 0.019 | 0.004 | 0.090 | 0.000 |

| Off-Road Equipment Summary | NO _x | ROG | PM10 | CO | SO ₂ |
|----------------------------|-----------------|-------|------|-------|-----------------|
| Pounds/Day | 120.30 | 16.49 | 3.54 | 31.87 | 0.20 |
| Tons | 0.84 | 0.12 | 0.02 | 0.22 | 0.00 |

Notes:
¹ Load Factors for DSV Clean Ocean derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"
² Emission Factors obtained from California Air Resources Board (CARB) *Commercial Harbor Craft Regulatory Activities*. Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California
³ Emission factor for SO₂ from Port of Long Beach 2005 Air Emissions Inventory, Table 3.7, Page 106. The units g/kW-hr was converted to lb/bhp-hr using the multiplier (conversion) of 0.001644 (knowns: 1 gram = 0.0022046 lb & 1 kw = 1.341 bhp)

**Beta Unit Geophysical Survey
Criteria Pollutants - Off-Road Sources
Survey (12 hour/day operations)**

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Lbs/BHP-Hour ² | | | | | Pounds/Day | | | | | Days | Tons | | | | |
|--|--------|------|--------|--------------------------|-----------|---------------------------|--------|--------|--------|-----------------|-----------------|-------|------|--------|-----------------|------|-----------------|-------|-------|-------|-----------------|
| | | | | | | NO _x | ROG | PM10 | CO | SO ₂ | NO _x | ROG | PM10 | CO | SO ₂ | | NO _x | ROG | PM10 | CO | SO ₂ |
| Vessel (M/V Silver Arrow) - CAT 3516C | Diesel | 2000 | 2 | 38 | 12 | 0.0122 | 0.0015 | 0.0004 | 0.0082 | 0.000019 | 222.37 | 27.34 | 8.04 | 149.99 | 0.35 | 28 | 3.113 | 0.383 | 0.113 | 2.100 | 0.005 |
| Vessel (M/V Silver Arrow) - generators - CAT C18 | Diesel | 715 | 3 | 32 | 24 | 0.0112 | 0.0018 | 0.0003 | 0.0082 | 0.000019 | 185.22 | 29.42 | 5.45 | 135.46 | 0.31 | 28 | 2.593 | 0.412 | 0.076 | 1.896 | 0.004 |
| (S/V Jab) - main engines | Diesel | 500 | 2 | 38 | 12 | 0.0112 | 0.0015 | 0.0003 | 0.0082 | 0.000019 | 51.27 | 6.84 | 1.51 | 37.50 | 0.09 | 28 | 0.718 | 0.096 | 0.021 | 0.525 | 0.001 |

| Off-Road Equipment Summary | | | | | |
|----------------------------|-----------------|-------|-------|--------|-----------------|
| | NO _x | ROG | PM10 | CO | SO ₂ |
| Pounds/Day | 458.86 | 63.60 | 15.00 | 322.95 | 0.75 |
| Tons | 6.42 | 0.89 | 0.21 | 4.52 | 0.01 |

Notes:

¹ Load Factors for M/V Silver Arrow and S/V Jab derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"

² Emission Factors obtained from Appendix A - Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

² Emission factor for SO₂ from Port of Long Beach 2005 Air Emissions Inventory, Table 3.7, Page 106. The units g/kW-hr was converted to lb/bhp-hr using the multiplier (conversion) of 0.001644 (knowns: 1 gram = 0.0022046 lb & 1 kw = 1.341 bhp)

**Beta Unit Geophysical Survey
Criteria Pollutants - Off-Road Sources
Demobilization (24 hour/day operations)**

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Lbs/BHP-Hour ² | | | | | Pounds/Day | | | | | Days ³ | Tons | | | | |
|---|--------|------|--------|--------------------------|-----------|---------------------------|--------|--------|--------|-----------------|-----------------|-------|------|-------|-----------------|-------------------|-----------------|-------|-------|-------|-----------------|
| | | | | | | NO _x | ROG | PM10 | CO | SO ₂ | NO _x | ROG | PM10 | CO | SO ₂ | | NO _x | ROG | PM10 | CO | SO ₂ |
| (DSV Clean Ocean) - Cummins QSK 19 (Tier 3) | Diesel | 500 | 3 | 38 | 6 | 0.0112 | 0.0015 | 0.0003 | 0.0082 | 0.0000191 | 38.45 | 5.13 | 1.13 | 28.12 | 0.07 | 1 | 0.019 | 0.003 | 0.001 | 0.014 | 0.000 |
| (DSV Clean Ocean) - generators - John Deere 99Kw (Tier 3) | Diesel | 150 | 2 | 32 | 6 | 0.0112 | 0.0015 | 0.0003 | 0.0082 | 0.0000191 | 6.48 | 0.86 | 0.19 | 4.74 | 0.01 | 1 | 0.003 | 0.000 | 0.000 | 0.002 | 0.000 |
| (DSV Clean Ocean) - bow thruster - Cummins QSL 9 (Tier 3) | Diesel | 405 | 1 | 32 | 2 | 0.0112 | 0.0018 | 0.0003 | 0.0082 | 0.0000191 | 2.91 | 0.46 | 0.09 | 2.13 | 0.00 | 1 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 |
| (M/V Silver Arrow) - CAT 3516C | Diesel | 2000 | 2 | 38 | 6 | 0.0122 | 0.0015 | 0.0004 | 0.0082 | 0.0000191 | 111.19 | 13.67 | 4.02 | 74.99 | 0.17 | 1 | 0.056 | 0.007 | 0.002 | 0.037 | 0.000 |
| (M/V Silver Arrow) - generators - CAT C18 | Diesel | 715 | 3 | 32 | 6 | 0.0112 | 0.0018 | 0.0003 | 0.0082 | 0.0000191 | 46.30 | 7.35 | 1.36 | 33.87 | 0.08 | 1 | 0.023 | 0.004 | 0.001 | 0.017 | 0.000 |
| (S/V Jab) - main engines | Diesel | 500 | 2 | 38 | 4 | 0.0112 | 0.0015 | 0.0003 | 0.0082 | 0.0000191 | 17.09 | 2.28 | 0.50 | 12.50 | 0.03 | 1 | 0.009 | 0.001 | 0.000 | 0.006 | 0.000 |

| Off-Road Equipment Summary | | | | | | NO _x | ROG | PM10 | CO | SO ₂ |
|----------------------------|--|--|--|--|--|-----------------|-------|------|--------|-----------------|
| Pounds/Day | | | | | | 222.42 | 29.76 | 7.29 | 156.35 | 0.36 |
| Tons | | | | | | 0.11 | 0.01 | 0.00 | 0.08 | 0.00 |

Notes:

- ¹ Load Factors for DSV Clean Ocean, M/V Silver Arrow, and S/V Jab derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"
- ² Emission Factors obtained from California Air Resources Board (CARB) *Commercial Harbor Craft Regulatory Activities*, Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California
- ³ Emission factor for SO₂ from Port of Long Beach 2005 Air Emissions Inventory, Table 3.7, Page 106. The units g/kw-hr was converted to lb/bhp-hr using the multiplier (conversion) of 0.001644 (knowns: 1 gram = 0.0022046 lb & 1 kw = 1.341 bhp)
- ³ Days estimated travel from 25 miles outside of Project Site

Harborcraft Study Factors - Conversion

| | g/BHP-hr (App. A) | | | | lb/BHP-Hr | | | |
|---|-------------------|------|------|------|-----------------|--------|--------|--------|
| | NO _x | ROG | PM | CO | NO _x | ROG | PM | CO |
| DSV Clean Ocean Main Engine (251-500 BHP) - Year 2004-2013 | 5.1 | 0.68 | 0.15 | 3.73 | 0.0112 | 0.0015 | 0.0003 | 0.0082 |
| M/V Silver Arrow Main Engine (1901-3300 BHP) - Year 2007-2012 | 5.53 | 0.68 | 0.2 | 3.73 | 0.0122 | 0.0015 | 0.0004 | 0.0082 |
| S/V Jab Main Engine (251-500 BHP) - Year 2004-2013 | 5.1 | 0.68 | 0.15 | 3.73 | 0.0112 | 0.0015 | 0.0003 | 0.0082 |
| DSV Clean Ocean Aux Engine (121-175 BHP) - Year 2004-2012 | 5.1 | 0.68 | 0.15 | 3.73 | 0.0112 | 0.0015 | 0.0003 | 0.0082 |
| DSV Clean Ocean Aux Engine (251-500 BHP) - Year 2004-2013 | 5.1 | 0.81 | 0.15 | 3.73 | 0.0112 | 0.0018 | 0.0003 | 0.0082 |
| M/V Silver Arrow Aux Engine (715 BHP) - Year 2007-2012 | 5.1 | 0.81 | 0.15 | 3.73 | 0.0112 | 0.0018 | 0.0003 | 0.0082 |

| | | |
|---|------------------------|------------|
| Sulphur Dioxide Emission Factor | g/BHP-hr => lbs/BHP-hr | lbs/BHP-hr |
| SO ₂ = 0.15 g/kw-hr X 1.341 = 0.20115 g/BHP-hr | 0.20115 X 0.0022046 = | 0.0004435 |

| | | |
|---|---|------------|
| Ultra-Low Sulphur Diesel (ULSD) Fuel Correction Factor = 0.043 | SO ₂ g/kw-hr (ULSD correction) | lbs/BHP-hr |
| Sulphur Dioxide Fuel Correction w/ ULSD | 0.00645 | |
| SO ₂ = 0.00645 g/kw-hr X 1.341 = 0.00864945 g/BHP-hr | 0.00864945 X 0.0022046 = | 0.0000191 |

**Beta Unit Geophysical Survey
Criteria Pollutants - Off-Road Sources
Post-Survey (12 hour/day operations)**

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Lbs/BHP-Hour ² | | | | | Pounds/Day | | | | | Days | Tons | | | | |
|-----------------------------------|--------|-----|--------|--------------------------|-----------|---------------------------|------------|-------------|-----------|-----------------------|-----------------|------|------|-------|-----------------|------|-----------------|-------|-------|-------|-----------------|
| | | | | | | NO _x | ROG | PM10 | CO | SO ₂ | NO _x | ROG | PM10 | CO | SO ₂ | | NO _x | ROG | PM10 | CO | SO ₂ |
| (S/V Jab) - main engines | Diesel | 500 | 2 | 38 | 12 | 0.0112 | 0.0015 | 0.0003 | 0.0082 | 0.000019 | 51.27 | 6.84 | 1.51 | 37.50 | 0.09 | 3 | 0.077 | 0.010 | 0.002 | 0.056 | 0.000 |
| Off-Road Equipment Summary | | | | | | NO_x | ROG | PM10 | CO | SO₂ | | | | | | | | | | | |
| Pounds/Day | | | | | | 51.27 | 6.84 | 1.51 | 37.50 | 0.09 | | | | | | | | | | | |
| Tons | | | | | | 0.08 | 0.01 | 0.00 | 0.06 | 0.00 | | | | | | | | | | | |

Notes:

¹ Load Factors for S/V Jab derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"

² Emission Factors obtained from Appendix A - Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

² Emission factor for SO₂ from Port of Long Beach 2005 Air Emissions Inventory, Table 3.7, Page 106. The units g/kW-hr was converted to lb/bhp-hr using the multiplier (conversion) of 0.001644 (knowns: 1 gram = 0.0022046 lb & 1 kw = 1.341 bhp)

Beta Unit Geophysical Survey Criteria Pollutants - Project Total

| | | NO _x | ROG | PM10 | CO | SO ₂ |
|--|------------|-----------------------|------------|-------------|-----------|-----------------------|
| Pre-Survey | Pounds/Day | 51.27 | 6.84 | 1.51 | 37.50 | 0.09 |
| | Tons | 0.08 | 0.01 | 0.00 | 0.06 | 0.00 |
| Mobilization | Pounds/Day | 222.42 | 29.76 | 7.29 | 156.35 | 0.36 |
| | Tons | 0.11 | 0.01 | 0.00 | 0.08 | 0.00 |
| OBS Deployment | Pounds/Day | 120.30 | 16.49 | 3.54 | 31.87 | 0.20 |
| | Tons | 0.84 | 0.12 | 0.02 | 0.22 | 0.00 |
| Survey | Pounds/Day | 458.86 | 63.60 | 15.00 | 322.95 | 0.75 |
| | Tons | 6.42 | 0.89 | 0.21 | 4.52 | 0.01 |
| Demobilization | Pounds/Day | 222.42 | 29.76 | 7.29 | 156.35 | 0.36 |
| | Tons | 0.11 | 0.01 | 0.00 | 0.08 | 0.00 |
| Post-Survey | Pounds/Day | 51.27 | 6.84 | 1.51 | 37.50 | 0.09 |
| | Tons | 0.08 | 0.01 | 0.00 | 0.06 | 0.00 |
| TOTAL - CRITERIA POLLUTANTS PROJECT AIR EMISSIONS | | NO_x | ROG | PM10 | CO | SO₂ |
| Maximum Pounds/Day | | 458.86 | 63.60 | 15.00 | 322.95 | 0.75 |
| Total Construction Related Emissions/Tons | | 7.64 | 1.06 | 0.25 | 5.01 | 0.01 |

**Beta Unit Geophysical Survey
Greenhouse Gases - Off-Road Sources
Pre-Survey (12 hour/day operations)**

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Emission Factors: g/gallon ² | | | Peak Pounds/Day | | | Days | Tons | | |
|--------------------------|--------|-----|--------|--------------------------|-----------|---|------|------|-----------------|------|------|------|------|-------|-------|
| | | | | | | CO2 | N2O | CH4 | CO2 | N2O | CH4 | | CO2 | N2O | CH4 |
| (S/V Jab) - main engines | Diesel | 500 | 2 | 38 | 12 | 10150.00 | 0.26 | 0.74 | 5612.04 | 0.14 | 0.41 | 3 | 8.42 | 0.000 | 0.001 |

| Off-Road Equipment Summary | CO2 | N2O | CH4 |
|----------------------------|----------|------|------|
| Pounds/Day | 5,612.04 | 0.14 | 0.41 |
| Tons | 8.42 | 0.00 | 0.00 |

Notes:

¹ Load Factor for S/V Jab derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"

² Emission factors from the California Climate Action Registry General Reporting Protocol (Table C.6: Ships & Boats)

**Beta Unit Geophysical Survey
Greenhouse Gases - Off-Road Sources
Mobilization (24 hour/day operations)**

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Emission Factors: g/gallon ² | | | Pounds/Day | | | Days ³ | Tons | | |
|---|--------|------|--------|--------------------------|-----------|---|------|------|------------|------|------|-------------------|------|-------|-------|
| | | | | | | CO2 | N2O | CH4 | CO2 | N2O | CH4 | | CO2 | N2O | CH4 |
| (DSV Clean Ocean) - Cummins QSK 19 (Tier 3) | Diesel | 500 | 3 | 38 | 6 | 10150.00 | 0.26 | 0.74 | 4209.03 | 0.11 | 0.31 | 1 | 2.10 | 0.000 | 0.000 |
| (DSV Clean Ocean) - generators - John Deere 99Kw (Tier 3) | Diesel | 150 | 2 | 32 | 6 | 10150.00 | 0.26 | 0.74 | 708.89 | 0.02 | 0.05 | 1 | 0.35 | 0.000 | 0.000 |
| (DSV Clean Ocean) - bow thruster - Cummins QSL 9 (Tier 3) | Diesel | 405 | 1 | 32 | 2 | 10150.00 | 0.26 | 0.74 | 319.00 | 0.01 | 0.02 | 1 | 0.16 | 0.000 | 0.000 |
| (M/V Silver Arrow) - CAT 3516C | Diesel | 2000 | 2 | 38 | 6 | 10150.00 | 0.26 | 0.74 | 11224.07 | 0.29 | 0.82 | 1 | 5.61 | 0.000 | 0.000 |
| (M/V Silver Arrow) - generators - CAT C18 | Diesel | 715 | 3 | 32 | 6 | 10150.00 | 0.26 | 0.74 | 5068.56 | 0.13 | 0.37 | 1 | 2.53 | 0.000 | 0.000 |
| (S/V Jab) - main engines | Diesel | 500 | 2 | 38 | 4 | 10150.00 | 0.26 | 0.74 | 1870.68 | 0.05 | 0.14 | 1 | 0.94 | 0.000 | 0.000 |

| Off-Road Equipment Summary | | | |
|----------------------------|-----------|------|------|
| | CO2 | N2O | CH4 |
| Pounds/Day | 23,400.23 | 0.60 | 1.71 |
| Tons | 11.70 | 0.00 | 0.00 |

- Notes:
- ¹ Load Factors for DSV Clean Ocean, M/V Silver Arrow, and S/V Jab derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"
 - ² Emission factors from the California Climate Action Registry General Reporting Protocol (Table C.6: Ships & Boats)
 - ³ Days estimated travel from 25 miles outside of Project Site

**Beta Unit Geophysical Survey
Greenhouse Gases - Off-Road Sources
OBS Deployment (12 hour/day operations)**

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Emission Factors: g/gallon ² | | | Pounds/Day | | | Days | Tons | | |
|--|--------|-----|--------|--------------------------|-----------|---|------|------|------------|------|------|------|-------|-------|-------|
| | | | | | | CO2 | N2O | CH4 | CO2 | N2O | CH4 | | CO2 | N2O | CH4 |
| Vessel (DSV Clean Ocean) - Cummins QSK 19 (Tier 3) | Diesel | 500 | 3 | 38 | 12 | 10150.00 | 0.26 | 0.74 | 8418.06 | 0.22 | 0.61 | 14 | 58.93 | 0.002 | 0.004 |
| Vessel (DSV Clean Ocean) - generators - John Deere 99Kw (Tier 3) | Diesel | 150 | 2 | 32 | 24 | 10150.00 | 0.26 | 0.74 | 2835.56 | 0.07 | 0.21 | 14 | 19.85 | 0.001 | 0.001 |
| Vessel (DSV Clean Ocean) - bow thruster - Cummins QSL 9 (Tier 3) | Diesel | 405 | 1 | 32 | 12 | 10150.00 | 0.26 | 0.74 | 1914.00 | 0.05 | 0.14 | 14 | 13.40 | 0.000 | 0.001 |

| Off-Road Equipment Summary | | | | | | CO2 | N2O | CH4 |
|----------------------------|--|--|--|--|--|-----------|------|------|
| Pounds/Day | | | | | | 13,167.61 | 0.34 | 0.96 |
| Tons | | | | | | 92.17 | 0.00 | 0.01 |

Notes:

¹ Load Factors for DSV Clean Ocean derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"

² Emission factors from the California Climate Action Registry General Reporting Protocol (Table C.6: Ships & Boats)

**Beta Unit Geophysical Survey
Greenhouse Gases - Off-Road Sources
Survey (12 hour/day operations)**

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Emission Factors: g/gallon ² | | | Pounds/Day | | | Days | Tons | | |
|--|--------|------|--------|--------------------------|-----------|---|------|------|------------|------|------|------|--------|-------|-------|
| | | | | | | CO2 | N2O | CH4 | CO2 | N2O | CH4 | | CO2 | N2O | CH4 |
| Vessel (M/V Silver Arrow) - CAT 3516C | Diesel | 2000 | 2 | 38 | 12 | 10150.00 | 0.26 | 0.74 | 22448.15 | 0.58 | 1.64 | 28 | 314.27 | 0.008 | 0.023 |
| Vessel (M/V Silver Arrow) - generators - CAT C18 | Diesel | 715 | 3 | 32 | 24 | 10150.00 | 0.26 | 0.74 | 20274.22 | 0.52 | 1.48 | 28 | 283.84 | 0.007 | 0.021 |
| (S/V Jab) - main engines | Diesel | 500 | 2 | 38 | 12 | 10150.00 | 0.26 | 0.74 | 5612.04 | 0.14 | 0.41 | 28 | 78.57 | 0.002 | 0.006 |

| Off-Road Equipment Summary | CO2 | N2O | CH4 |
|----------------------------|-----------|------|------|
| Pounds/Day | 48,334.41 | 1.24 | 3.52 |
| Tons | 676.68 | 0.02 | 0.05 |

Notes:

¹ Load Factors for M/V Silver Arrow and S/V Jab derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"

² Emission factors from the California Climate Action Registry General Reporting Protocol (Table C.6: Ships & Boats)

**Beta Unit Geophysical Survey
Greenhouse Gases - Off-Road Sources
Demobilization (24 hour/day operations)**

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Emission Factors: g/gallon ² | | | Pounds/Day | | | Days ³ | Tons | | |
|---|--------|------|--------|--------------------------|-----------|---|------------|------------|------------|------|------|-------------------|------|-------|-------|
| | | | | | | CO2 | N2O | CH4 | CO2 | N2O | CH4 | | CO2 | N2O | CH4 |
| (DSV Clean Ocean) - Cummins QSK 19 (Tier 3) | Diesel | 500 | 3 | 38 | 6 | 10150.00 | 0.26 | 0.74 | 4209.03 | 0.11 | 0.31 | 1 | 2.10 | 0.000 | 0.000 |
| (DSV Clean Ocean) - generators - John Deere 99Kw (Tier 3) | Diesel | 150 | 2 | 32 | 6 | 10150.00 | 0.26 | 0.74 | 708.89 | 0.02 | 0.05 | 1 | 0.35 | 0.000 | 0.000 |
| (DSV Clean Ocean) - bow thruster - Cummins QSL 9 (Tier 3) | Diesel | 405 | 1 | 32 | 2 | 10150.00 | 0.26 | 0.74 | 319.00 | 0.01 | 0.02 | 1 | 0.16 | 0.000 | 0.000 |
| (M/V Silver Arrow) - CAT 3516C | Diesel | 2000 | 2 | 38 | 6 | 10150.00 | 0.26 | 0.74 | 11224.07 | 0.29 | 0.82 | 1 | 5.61 | 0.000 | 0.000 |
| (M/V Silver Arrow) - generators - CAT C18 | Diesel | 715 | 3 | 32 | 6 | 10150.00 | 0.26 | 0.74 | 5068.56 | 0.13 | 0.37 | 1 | 2.53 | 0.000 | 0.000 |
| (S/V Jab) - main engines | Diesel | 500 | 2 | 38 | 4 | 10150.00 | 0.26 | 0.74 | 1870.68 | 0.05 | 0.14 | 1 | 0.94 | 0.000 | 0.000 |
| Off-Road Equipment Summary | | | | | | CO2 | N2O | CH4 | | | | | | | |
| Pounds/Day | | | | | | 23,400.23 | 0.60 | 1.71 | | | | | | | |
| Tons | | | | | | 11.70 | 0.00 | 0.00 | | | | | | | |

Notes:

¹ Load Factors for DSV Clean Ocean, M/V Silver Arrow, and S/V Jab derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"

² Emission factors from the California Climate Action Registry General Reporting Protocol (Table C.6: Ships & Boats)

³ Days estimated travel from 25 miles outside of Project Site

**Beta Unit Geophysical Survey
Greenhouse Gases - Off-Road Sources
Post Survey (12 hour/day operations)**

| Source | Fuel | BHP | Number | Load Factor ¹ | Hours/Day | Emission Factors: g/gallon ² | | | Pounds/Day | | | Days | Tons | | |
|--------------------------|--------|-----|--------|--------------------------|-----------|---|------|------|------------|------|------|------|------|-------|-------|
| | | | | | | CO2 | N2O | CH4 | CO2 | N2O | CH4 | | CO2 | N2O | CH4 |
| (S/V Jab) - main engines | Diesel | 500 | 2 | 38 | 12 | 10150.00 | 0.26 | 0.74 | 5612.04 | 0.14 | 0.41 | 3 | 8.42 | 0.000 | 0.001 |

| Off-Road Equipment Summary | CO2 | N2O | CH4 |
|----------------------------|----------|------|------|
| Pounds/Day | 5,612.04 | 0.14 | 0.41 |
| Tons | 8.42 | 0.00 | 0.00 |

Notes:

¹ Load Factor for S/V Jab derived from Port of Long Beach 2013 Air Emissions Inventory, assuming Work boat within Table 3.4, page 52 "Harbor Craft Engine Load Factors"

² Emission factors from the California Climate Action Registry General Reporting Protocol (Table C.6: Ships & Boats)

| Beta Unit Geophysical Survey | | CO2 | N2O | CH4 | MTCO2E |
|-------------------------------------|------------|------------|------------|------------|---------------|
| Pre-Survey | Pounds/Day | 5,612.04 | 0.14 | 0.41 | |
| | Tons | 8.42 | 0.00 | 0.00 | 0.00 |
| Mobilization | Pounds/Day | 23,400.23 | 0.60 | 1.71 | |
| | Tons | 11.70 | 0.00 | 0.00 | 10.71 |
| OBS Deployment | Pounds/Day | 13,167.61 | 0.34 | 0.96 | |
| | Tons | 92.17 | 0.00 | 0.01 | 84.41 |
| Survey | Pounds/Day | 48,334.41 | 1.24 | 3.52 | |
| | Tons | 676.68 | 0.02 | 0.05 | 619.70 |
| Demobilization | Pounds/Day | 23,400.23 | 0.60 | 1.71 | |
| | Tons | 11.70 | 0.00 | 0.00 | 10.71 |
| Post-Survey | Pounds/Day | 5,612.04 | 0.14 | 0.41 | |
| | Tons | 8.42 | 0.00 | 0.00 | 7.71 |

| TOTAL - GHG PROJECT AIR EMISSIONS | | CO2 | N2O | CH4 | MTCO2E |
|---|--|------------|------------|------------|---------------|
| Maximum Pounds/Day | | 48,334.41 | 1.24 | 3.52 | |
| Total Construction Related Emissions/Tons | | 809.09 | 0.02 | 0.06 | 733.25 |