**FREEPORT-MCMORAN OIL & GAS**

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, CA 93455

Telephone: 805-739-9111

September 16, 2014

Mr. Jared Blumenfeld
Regional Administrator
EPA, Region 9
NPDES/DMR, WTR-7
75 Hawthorne Street
San Francisco, CA 94105-3901

Re: Quarterly Discharge Monitoring Report - Platform Hidalgo NPDES Permit CAG280000

Dear Mr. Blumenfeld:

This letter and its attachments represent the Discharge Monitoring Report (DMR) for the reporting period of June, July, and August 2014 for Platform Hidalgo.

Included herein are the following attachments:

Attachment 1 is comprised of the EPA DMR forms (3320-1).

Attachment 2 is a listing of the chemical inventory for miscellaneous discharges (specifically non-contact cooling and fire water) as required by II.F. of the subject permit.

Attachment 3 provides required pre-dilution and post dilution chlorine results for fire water discharges in accordance with Appendix C of the permit.

Attachment 4 includes copies of the official state certified lab reports for O & G and miscellaneous NPDES monitoring, and Chronic Whole Effluent Toxicity (WET) Testing on red abalone, giant kelp, and topsmelt. Also included are the laboratory quality control reports for the lab reports and other required information (MLs, MDLs, EPA Methods, chains-of-custody, sample dates, etc.).

The following is a brief summary of some of the monitoring and reporting parameters affecting the various discharges:

Drilling Muds and Cuttings (001):

There were no drilling related discharges for this reporting period.

Produced Water (002):

Produced water was discharged throughout this reporting period. Weekly O & G results are summarized in the DMR as end of pipe values. An EPA Plumes UM dilution of 4299:1 was derived using the average flow rate from the previous quarter, as defined in Part V of the permit. The dilution calculated for this reporting quarter is applied to quarterly and annual testing results, when applicable, and the numeric values reported in the DMR are post dilution values for comparison to the limits listed in Appendix B of the NPDES permit.

Non-Contact Cooling Water and Fire Water (008,009):

Seawater is slightly chlorinated as it is pumped up onto the platform for both the non-contact cooling water loop and the fire water system as needed. Attachment 3 summarizes the official quarterly chlorine results including post dilution and end of pipe results. Firewater deluge is commingled and discharged with deck drains. Volumes are estimated based on weekly firewater pump tests. Dilution modeling is estimated to be the same for both fire water and non-contact cooling water since the pump rates are similar and outfall dimensions are the same.

The quarterly testing results and the numeric values for chlorine reported in the DMR are post dilution values for comparison to the permit limits listed in Appendix C of the NPDES permit.

Freeport-McMoRan Oil & Gas uses a contractor to collect NPDES compliance monitoring samples at our offshore platforms. EPA sampling, preservation and documentation protocol is a strict requirement of our monitoring program.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. See 18 U.S.C & 1001 and 33 U.S.C. & 1319. (Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years)

If you should have any questions or require additional information, please contact me at (805) 934-8220.

Sincerely,

David Rose
Manager
Environmental, Health & Safety

Attachments

cc: Ms. Susan Zaleski, Bureau of Ocean Energy Management
Ms. Alison Dettmer, California Coastal Commission
Mr. James Salmons, Bureau of Safety Environmental Enforcement

# Platform Hidalgo

# Attachment 1

# EPA DMR
# PERMIT NO. CAG280000

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# WELL DISCHARGE MONITORING REPORT (Well DMR)

| CAG280000 | 001 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| **From:** 14 | 06 | 01 | **To:** 14 | 08 | 31 |

**DRILLING FLUIDS AND DRILL CUTTINGS (001)**

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Average | Maximum | Units | | | |
| **DRILLING FLUIDS VOLUME** Well # N / A June | Sample Measurement | | No Discharge | Barrels/ Well | | | | | | | |
| | Permit Requirement | | Report | | | | | | | 1/well 1/day | Estimate |
| Well # N / A July | Sample Measurement | | No Discharge | Barrels/ Well | | | | | | | |
| | Permit Requirement | | Report | | | | | | | 1/well 1/day | Estimate |
| Well # N / A August | Sample Measurement | | No Discharge | Barrels/ Well | | | | | | | |
| | Permit Requirement | | Report | | | | | | | 1/well 1/day | Estimate |
| Well # N / A **Quarterly Total** 06/01/14 - 08/31/14 | Sample Measurement | | 0 | Barrels/ Quarter | | | | | 0 | | |
| | Permit Requirement | | Report | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| **Annual Cumulative Volume Limit** 03/01/14 -02/28/15 | Sample Measurement | | 0 | Barrels/ Year | | | | | 0 | | |
| | Permit Requirement | | 23,000 | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

Annual cumulative volume limit is applied to the cumulative volumes for the period of March 2014 through February 2015.

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# WELL DISCHARGE MONITORING REPORT (Well DMR)

| CAG280000 | 001 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 01 | To: | 14 | 08 31 |

**DRILLING FLUIDS AND DRILL CUTTINGS (001)**

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Average | Maximum | Units | | | |
| **DRILL CUTTINGS VOLUME** Well # N / A | Sample Measurement | | No Discharge | Barrels/ Month | | | | | | | |
| June | Permit Requirement | | Report | | | | | | | 1/well 1/day | Estimate Grab |
| Well # N / A | Sample Measurement | | No Discharge | Barrels/ Month | | | | | | | |
| July | Permit Requirement | | Report | | | | | | | 1/well 1/day | Estimate Grab |
| Well # N / A | Sample Measurement | | No Discharge | Barrels/ Month | | | | | | | |
| August | Permit Requirement | | Report | | | | | | | 1/well 1/day | Estimate Grab |
| **Quarterly Cumulative Volume Limit** 06/01/14 - 08/31/14 | Sample Measurement | | 0 | Barrels/ Year | | | | | 0 | | |
| | Permit Requirement | | 6,000 | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| **Annual Cumulative Volume Limit** 03/01/14 -02/28/14 | Sample Measurement | | 0 | Barrels/ Year | | | | | 0 | | |
| | Permit Requirement | | 6,000 | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

Annual cumulative volume limit is applied to the cumulative volumes for the period of March 2014 through February 2015.

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# WELL DISCHARGE MONITORING REPORT (Well DMR)

| CAG280000 | 001 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: 14 | 06 | 01 | To: 14 | 08 | 31 |

**DRILLING FLUIDS AND DRILL CUTTINGS (001)**

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Average | Maximum | Units | | | |
| **DRILL FLUIDS/CUTTINGS FREE OIL** | Sample Measurement | | | | No Discharge | | | # Days Sheen Observed | | | |
| June | Permit Requirement | | | | Negative Static Sheen Test/Free Oil | | | | | 1/well 1/day | Visual Visual |
| | Sample Measurement | | | | No Discharge | | | # Days Sheen Observed | | | |
| July | Permit Requirement | | | | Negative Static Sheen Test/Free Oil | | | | | 1/well 1/day | Visual Visual |
| | Sample Measurement | | | | **No Discharge** | | | # Days Sheen Observed | | | |
| August | Permit Requirement | | | | Negative Static Sheen Test/Free Oil | | | | | 1/well 1/day | Visual Visual |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319 (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# WELL DISCHARGE MONITORING REPORT (Well DMR)

| CAG280000 | 001 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

**DRILLING FLUIDS AND DRILL CUTTINGS (001)**

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Maximum | Units | | | |
| **DRILLING FLUIDS TOXICITY** Well # N / A | Sample Measurement | | | | N / A | % by Volume | | | |
| | Permit Requirement | | | | LC50 > 3% SPP | | | (0-80%) Well Footage | Grab |
| **DRILLING FLUIDS TOXICITY** Well # N / A | Sample Measurement | | | | N / A | % by Volume | | | |
| | Permit Requirement | | | | LC50 > 3% SPP | | | (80-100%) Well Footage | Grab |
| **BARITE MERCURY** | Sample Measurement | | | | N / A | mg / kg | | | |
| | Permit Requirement | | | | 1 mg / kg | | | Stock Barite | Grab |
| **BARITE CADMIUM** | Sample Measurement | | | | N / A | mg / kg | | | |
| | Permit Requirement | | | | 3 mg / kg | | | Stock Barite | Grab |
| **DRILL FLUIDS CHEMICAL INVENTORY** Well # N / A | | | | | N / A | | | | |
| | | | | | Report | | | Each Mud System | |
| **No. DAYS DISCHARGE FOR EACH DRILLING FLUID** | | | | | N / A | | | | |
| | | | | | Report | | | # Days Each | |
| **PROHIBITED DISCHARGE** 1. Oil-based Fluids | | | | | | | | N/A | |
| 2. Diesel Oil 3. Non-aqueous based drilling fluids or cuttings | | | | | No Discharge | | | N/A | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

N / A: No drilling discharges

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT (DMR)

| CAG280000 | 002 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

**PRODUCED WATER (002)**

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Average | Maximum | Units | | | |
| **PRODUCED WATER FLOW RATE** (Commingled with WTCF) June | Sample Measurement | 5,280 | | Monthly Average bbl/Day | | | | | 0 | 1/day | Estimate |
| | Permit Requirement | | | | | | | | | 1/day | Estimate |
| July | Sample Measurement | 5,386 | | Monthly Average bbl/Day | | | | | 0 | 1/day | Estimate |
| | Permit Requirement | | | | | | | | | 1/day | Estimate |
| August | Sample Measurement | 6,549 | | Monthly Average bbl/Day | | | | | 0 | 1/day | Estimate |
| | Permit Requirement | | | | | | | | | 1/day | Estimate |
| **QUARTERLY AVERAGE Volume** 06/01/14 - 08/31/14 | | 5,738 | | Quarterly Average bbl/Day | | | | | 0 | 1/quarter | Estimate |
| | | | | | | | | | | 1/quarter | Estimate |
| ANNUAL CUMULATIVE **Volume** 03/01/14 -02/28/15 | Sample Measurement | | 918,866 | Barrels/ Year | | | | | 0 | 1/quarter | Estimate |
| | Permit Requirement | | 18,250,000 | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319 (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

Annual cumulative volume limit is applied to the cumulative volumes for the period of March 2014 through February 2015.

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT (DMR)

| CAG280000 | 002 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

**PRODUCED WATER (002)**

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Monthly Average | Daily Maximum | Units | | | |
| **PRODUCED WATER OIL & GREASE** (Commingled with WTCF) June | Sample Measurement | | | | | 7.7 | 11.0 | mg/L | 0 | 1/week | Grab |
| | Permit Requirement | | | | | 29.0 | 42.0 | | | 1/week | Grab/ Composite |
| July | Sample Measurement | | | | | 7.5 | 12.0 | mg/L | 0 | 1/week | Grab |
| | Permit Requirement | | | | | 29.0 | 42.0 | | | 1/week | Grab/ Composite |
| August | Sample Measurement | | | | | 10.5 | 18.0 | mg/L | 0 | 1/week | Grab |
| | Permit Requirement | | | | | 29.0 | 42.0 | | | 1/week | Grab/ Composite |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT (DMR)

| CAG280000 | 002 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

**PRODUCED WATER (002)**
**Quarterly**

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Monthly Average | Daily Maximum | Units | | | |
| **PRODUCED WATER QUARTERLY CONSTITUENTS** | Sample Measurement | | | | | P A S S | | | 0 | 1 / quarter | Composite |
| 3-SPECIES TOXICITY | Permit Requirement | | | | | Pass / Fail | | | | 1 / quarter | Composite |
| | Sample Measurement | | | | | | | | | | |
| | Permit Requirement | | | | | | | | | | |
| **PRODUCED WATER ANNUAL CONSTITUENTS** [1] | Sample Measurement | | | | | N / A | N / A | mg/L | | | |
| BENZENE | Permit Requirement | | | | | N / A | N / A | | | 1 / year | Grab |
| | Sample Measurement | | | | | N / A | N / A | mg/L | | | |
| BENZO (k) FLUORANTHENE | Permit Requirement | | | | | N / A | N / A | | | 1 / year | Grab |
| | Sample Measurement | | | | | N / A | N / A | mg/L | | | |
| BENZO (b) FLUORANTHENE | Permit Requirement | | | | | N / A | N / A | | | 1 / year | Grab |
| | Sample Measurement | | | | | N / A | N / A | mg/L | | | |
| CHRYSENE | Permit Requirement | | | | | N / A | N / A | | | 1 / year | Grab |
| | Sample Measurement | | | | | N / A | N / A | mg/L | | | |
| UNDISSOCIATED SULFIDE | Permit Requirement | | | | | N / A | N / A | | | 1 / year | Grab |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

[1] Results are post-dilution.

N / A: There are no limits, when reported, in the Permit, Appendix B. The annual sampling was completed in March 2014 and the results were reported in a previous DMR.

NODI(B): below MDL . The maximum value of the analytical result is less than the laboratory's MDL (below detection level).

NODI(Q): equal to or above the MDL, but less than the ML or PQL. (Refer to Attachment 6 for MDLs or PQLs).

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT (DMR)

| CAG280000 | 003 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

**WELL TREATMENT, COMPLETION AND WORKOVER FLUIDS (003)**
(Commingled with produced water)
NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Average | Maximum | Units | | | |
| WELL TREATMENT. COMPLETION AND WORKOVER FLUIDS FLOW 1 | Sample Measurement | | No Discharge | Barrels / Job | | | | | | | |
| June | Permit Requirement | | Report | | | | | | | 1 / job | Estimate |
| | Sample Measurement | | No Discharge | Barrels / Job | | | | | | | |
| July | Permit Requirement | | Report | | | | | | | 1 / job | Estimate |
| | Sample Measurement | | No Discharge | Barrels / Job | | | | | | | |
| August | Permit Requirement | | Report | | | | | | | 1 / job | Estimate |
| WELL TREATMENT. COMPLETION AND WORKOVER FLUIDS 1 | | | | | | | | | | | |
| OIL AND GREASE | | | | | | MONTHLY AVERAGE | DAILY MAXIMUM | | | | |
| | Sample Measurement | | | | | No Discharge | No Discharge | | | | |
| June | Permit Requirement | | | | | 29.0 | 42.0 | mg/L | | 1/job | Grab |
| | Sample Measurement | | | | | No Discharge | No Discharge | | | | |
| July | Permit Requirement | | | | | 29.0 | 42.0 | mg/L | | 1/job | Grab |
| | Sample Measurement | | | | | No Discharge | No Discharge | | | | |
| August | Permit Requirement | | | | | 29.0 | 42.0 | mg/L | | 1/job | Grab |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

WTCF are injected or comminged with produced water, when present (refer to produced water monitoring requirements).
N / A: Refers to the presence of WTCF discharge with produced water for a given month.

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT (DMR)

| CAG280000 | 003 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | |
|---|---|
| YR MO DAY | YR MO DAY |
| From: 14 06 01 | To: 14 08 31 |

**WELL TREATMENT, COMPLETION AND WORKOVER FLUIDS (003)**
(Commingled with produced water)
NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Average | Maximum | Units | | | |
| WELL TREATMENT, COMPLETION AND WORKOVER FLUIDS TOTAL NUMBER AND TYPE OF JOBS | Sample Measurement | | 0 | Number of Jobs | | | | | | | |
| | Permit Requirement | | Report | | | | | | | | |
| WELL TREATMENT, COMPLETION AND WORKOVER FLUIDS STATIC SHEEN June | Sample Measurement | | | | | No Discharge | | # Times Sheen Observed | | | |
| | Permit Requirement | | | | | Negative Static Sheen Test - # Times observed-None | | | | 1/discharge | Grab |
| WELL TREATMENT, COMPLETION AND WORKOVER FLUIDS STATIC SHEEN July | Sample Measurement | | | | | No Discharge | | # Times Sheen Observed | | | |
| | Permit Requirement | | | | | Negative Static Sheen Test - # Times observed-None | | | | 1/discharge | Grab |
| WELL TREATMENT, COMPLETION AND WORKOVER FLUIDS STATIC SHEEN August | Sample Measurement | | | | | No Discharge | | # Times Sheen Observed | | | |
| | Permit Requirement | | | | | Negative Static Sheen Test - # Times observed-None | | | | 1/discharge | Grab |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| WELL TREATMENT, COMPLETION AND WORKOVER FLUIDS **Chemical Inventory** June - August | Sample Measurement | | | | | N / A | | | | | |
| | Permit Requirement | | | | | Report | | | | 1/job | Report |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

WTCF are injected or comminged with produced water, when present (refer to produced water monitoring requirements).
N / A: No WTCF this quarter.

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT (DMR)

| CAG280000 | 004 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: 14 | 06 | 01 | To: 14 | 08 | 31 |

**DECK DRAINAGE (004)**

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Average | Units | Minimum | Average | Maximum | Units | | | |
| **DECK DRAINAGE VOLUME-FLOW RATE** | Sample Measurement | | 5.8 | Mo. Avg. bbl/day | | | | | 0 | 1/month | Estimate |
| June | Permit Requirement | | Report | | | | | | | 1/month | Estimate |
| | Sample Measurement | | 6.0 | Mo. Avg. bbl/day | | | | | 0 | 1/month | Estimate |
| July | Permit Requirement | | Report | | | | | | | 1/month | Estimate |
| | Sample Measurement | | 7.3 | Mo. Avg. bbl/day | | | | | 0 | 1/month | Estimate |
| August | Permit Requirement | | Report | | | | | | | 1/month | Estimate |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| **DECK DRAINAGE FREE OIL** | Sample Measurement | | 0 | # Days Sheen Observed | No free oil/visual sheen on the receiving water. | | | | 0 | 1/day | Visual - Daylight |
| June | Permit Requirement | | 0 | | No free oil/visual sheen on the receiving water. | | | | | 1/day | Visual - Daylight |
| | Sample Measurement | | 0 | # Days Sheen Observed | No free oil/visual sheen on the receiving water. | | | | 0 | 1/day | Visual - Daylight |
| July | Permit Requirement | | 0 | | No free oil/visual sheen on the receiving water. | | | | | 1/day | Visual - Daylight |
| | Sample Measurement | | 0 | # Days Sheen Observed | No free oil/visual sheen on the receiving water. | | | | 0 | 1/day | Visual - Daylight |
| August | Permit Requirement | | 0 | | No free oil/visual sheen on the receiving water. | | | | | 1/day | Visual - Daylight |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT (DMR)

| CAG280000 | 005 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

**SANITARY & DOMESTIC WASTES (005)**
(Commingled)

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Average | Maximum | Units | | | |
| SANITARY & DOMESTIC WASTES FLOW RATE (Commingled) June | Sample Measurement | 41.0 | | Monthly Average bbl/day | | | | | 0 | 1/day | Estimate |
| | Permit Requirement | Report | | | | | | | | 1/month | Estimate |
| July | Sample Measurement | 52.0 | | Monthly Average bbl/day | | | | | 0 | 1/day | Estimate |
| | Permit Requirement | Report | | | | | | | | 1/month | Estimate |
| August | Sample Measurement | 45.0 | | Monthly Average bbl/day | | | | | 0 | 1/day | Estimate |
| | Permit Requirement | Report | | | | | | | | 1/month | Estimate |
| SANITARY & DOMESTIC WASTES FOAM & FLOATING SOLIDS (Commingled) June | Sample Measurement | | 0 | # days observed | No foam or floating solids in the receiving waters. | | | | 0 | 1/day | Visual - Daylight |
| | Permit Requirement | | 0 | | No foam or floating solids in the receiving waters. | | | | | 1/day | Visual - Daylight |
| July | Sample Measurement | | 0 | # days observed | No foam or floating solids in the receiving waters. | | | | 0 | 1/day | Visual - Daylight |
| | Permit Requirement | | 0 | | No foam or floating solids in the receiving waters. | | | | | 1/day | Visual - Daylight |
| August | Sample Measurement | | 0 | # days observed | No foam or floating solids in the receiving waters. | | | | 0 | 1/day | Visual - Daylight |
| | Permit Requirement | | 0 | | No foam or floating solids in the receiving waters. | | | | | 1/day | Visual - Daylight |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT (DMR)

| CAG280000 | 005 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

**SANITARY & DOMESTIC WASTES (005)**
(Commingled)

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Average | Maximum | Units | | | |
| SANITARY /DOMESTIC WASTE RESIDUAL CHLORINE [1] (Commingled) June | Sample Measurement | | | | N / A | N / A | N / A | mg/l | 0 | | |
| | Permit Requirement | | | | 1 mg/l | N / A | 10 mg/l | | | Monthly | Grab |
| July | Sample Measurement | | | | N / A | N / A | N / A | mg/l | 0 | | |
| | Permit Requirement | | | | 1 mg/l | N / A | 10 mg/l | | | Monthly | Grab |
| August | Sample Measurement | | | | N / A | N / A | N / A | mg/l | 0 | | |
| | Permit Requirement | | | | 1 mg/l | N / A | 10 mg/l | | | Monthly | Grab |
| DOMESTIC WASTE FOAM [2] (Commingled with Sanitary) June | Sample Measurement | N / A | N / A | # days observed | | | | | | | |
| | Permit Requirement | None | None | | | | | | | 1/month | Estimate |
| July | Sample Measurement | N / A | N / A | # days observed | | | | | | | |
| | Permit Requirement | None | None | | | | | | | 1/month | Estimate |
| August | Sample Measurement | N / A | N / A | # days observed | | | | | | | |
| | Permit Requirement | None | None | | | | | | | 1/month | Estimate |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

[1] The sewage treatment unit is a marine sanitation device that complies with pollution control standards and regulations under Section 312 of the Clean Water Act. Thus, it is deemed to be in compliance with permit limitations for sanitary waste discharges (as per Condition II.E.1 Footnote 2 of CAG280000)

[2] Reported with sanitary discharges.

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT (DMR)

| CAG280000 | 008 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

**FIRE CONTROL WATER (008)**
(Deluge commingled with deck drains)

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Average | Units | Minimum | Average | Maximum | Units | | | |
| FIRE CONTROL SYSTEM TEST WATER[1] (008) - FOAM, FLOATING SOLIDS | Sample Measurement | | 0 | # Days Observed | No floating solids in the receiving water. No foam in the receiving water. | | | | 0 | 1/day | Visual - Daylight |
| June | Permit Requirement | | None | | No floating solids in the receiving water. No foam in the receiving water. | | | | | 1/day | Visual - Daylight |
| | Sample Measurement | | 0 | # Days Observed | No floating solids in the receiving water. No foam in the receiving water. | | | | 0 | 1/day | Visual - Daylight |
| July | Permit Requirement | | None | | No floating solids in the receiving water. No foam in the receiving water. | | | | | 1/day | Visual - Daylight |
| | Sample Measurement | | 0 | # Days Observed | No floating solids in the receiving water. No foam in the receiving water. | | | | 0 | 1/day | Visual - Daylight |
| August | Permit Requirement | | None | | No floating solids in the receiving water. No foam in the receiving water. | | | | | 1/day | Visual - Daylight |
| | | | | | | **Monthly Average** | **Daily Maximum** | | | | |
| **FIRE CONTROL SYSTEM TEST WATER (008) CHLORINE[1,2]** | Sample Measurement | | | | | 0.00098 | 0.00098 | mg/L | 0 | 1/quarter | Grab |
| June | Permit Requirement | | | | | 0.0057 | 0.0114 | | | 1/quarter | Grab |
| | Sample Measurement | | | | | N / A | N / A | | | | |
| July | Permit Requirement | | | | | 0.0057 | 0.0114 | | | 1/quarter | Grab |
| | Sample Measurement | | | | | N / A | N / A | | | | |
| August | Permit Requirement | | | | | 0.0057 | 0.0114 | | | 1/quarter | Grab |
| | | | | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

[1] Firewater discharges are infrequent and daily receiving water visual observations have shown no foam or floating solids.

[2] Chlorine values reported above are post-dilution per EPA Plumes UM. Chlorine limits are post-dilution as listed in the permit, Appendix C (end-of-pipe and post-dilution values are included on Attachment 3).

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT (DMR)

| CAG280000 | 009 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**FIRE CONTROL WATER (008)**
(Deluge commingled with deck drains)
**NON-CONTACT COOLING WATER (009)**

PLATFORM HIDALGO
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Average | Units | Minimum | Average | Maximum | Units | | | |
| FIRE CONTROL SYSTEM TEST WATER (008) - CHEMICAL INVENTORY | Sample Measurement | | | | See Attachment #2 Chemical Inventory | | | | 0 | 1/month | List |
| June - August | Permit Requirement | | | | Report | | | | | 1/month | List |
| **NON-CONTACT COOLING WATER (009) - FLOW VOLUME** | Sample Measurement | | 102,857 | Barrels/ Day | | | | | 0 | 1/month | Estimate |
| June | Permit Requirement | | Report | | | | | | | 1/month | Estimate |
| | Sample Measurement | | 102,857 | Barrels/ Day | | | | | 0 | 1/month | Estimate |
| July | Permit Requirement | | Report | | | | | | | 1/month | Estimate |
| | Sample Measurement | | 102,857 | Barrels/ Day | | | | | 0 | 1/month | Estimate |
| August | Permit Requirement | | Report | | | | | | | 1/month | Estimate |
| **NON-CONTACT COOLING WATER (009) - FOAM FLOATING SOLIDS** | Sample Measurement | | 0 | # Days Observed | No floating solids in the receiving water. No foam in the receiving water. | | | | 0 | 1/day | Visual - Daylight |
| June | Permit Requirement | | None | | No floating solids in the receiving water. No foam in the receiving water. | | | | | 1/day | Visual - Daylight |
| | Sample Measurement | | 0 | # Days Observed | No floating solids in the receiving water. No foam in the receiving water. | | | | 0 | 1/day | Visual - Daylight |
| July | Permit Requirement | | None | | No floating solids in the receiving water. No foam in the receiving water. | | | | | 1/day | Visual - Daylight |
| | Sample Measurement | | 0 | # Days Observed | No floating solids in the receiving water. No foam in the receiving water. | | | | 0 | 1/day | Visual - Daylight |
| August | Permit Requirement | | None | | No floating solids in the receiving water. No foam in the receiving water. | | | | | 1/day | Visual - Daylight |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | TELEPHONE | DATE |
|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT (DMR)

| CAG280000 | 009 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

**NON-CONTACT COOLING WATER (009)**

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Average | Units | Minimum | Monthly Average | Daily Maximum | Units | | | |
| **NON-CONTACT COOLING WATER (009) ANNUAL CHLORINE[1]** | Sample Measurement | | | | | N / A | N / A | mg/L | | | |
| | Permit Requirement | | | | | N / A | N / A | | | 1/year | Grab |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| **NON-CONTACT COOLING WATER (009) CHEMICAL INVENTORY** June - August | Sample Measurement | | | | See Attachment #2 Chemical Inventory | | | | 0 | 1/month | List |
| | Permit Requirement | | | | Report | | | | | 1/month | List |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. (SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319 (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

[1] Chlorine values reported above are post-dilution per EPA Plumes UM (end-of-pipe and post-dilution values are included on Attachment 4).
N / A: There is no limit in the permit, Appendix C. The annual chlorine sampling was completed in March 2014 and the result was reported in a previous DMR.

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT

| CAG280000 | 019 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

**EXCESS CEMENT SLURRY (019)**

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Average | Units | Minimum | Average | Maximum | Units | | | |
| EXCESS CEMENT SLURRY (019) FLOW VOLUME | Sample Measurement | | No Discharge | Monthly Average bbl/day | | | | | | | |
| June | Permit Requirement | | Report | | | | | | | 1/month | Estimate |
| | Sample Measurement | | No Discharge | Monthly Average bbl/day | | | | | | | |
| July | Permit Requirement | | Report | | | | | | | 1/month | Estimate |
| | Sample Measurement | | No Discharge | Monthly Average bbl/day | | | | | | | |
| August | Permit Requirement | | Report | | | | | | | 1/month | Estimate |
| EXCESS CEMENT SLURRY ANNUAL CUMULATIVE VOLUME 1 | Sample Measurement | | 0 | Barrels/ Year | | | | | 0 | 1/year | Estimate |
| 03/01/14 - 02/28/15 | Permit 1 Requirement | | 2,000 | | | | | | | 1/year | Estimate |
| EXCESS CEMENT SLURRY SHEEN TEST/FREE OIL FOAM, FLOATING SOLIDS | Sample Measurement | | No Discharge | # Days Sheen Observed | **No Discharge** | | | | | | |
| June | Permit Requirement | | None | | No foam or floating solids No Oil | | | | | 1/well 1/day | Visual Rec. Water |
| | Sample Measurement | | No Discharge | # Days Sheen Observed | **No Discharge** | | | | | | |
| July | Permit Requirement | | None | | No foam or floating solids No Oil | | | | | 1/well 1/day | Visual Rec. Water |
| | Sample Measurement | | No Discharge | # Days Sheen Observed | **No Discharge** | | | | | | |
| August | Permit Requirement | | None | | No foam or floating solids No Oil | | | | | 1/well 1/day | Visual Rec. Water |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | TELEPHONE | DATE |
|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

Annual cumulative volume limit is applied to the cumulative volumes for the period of March 2014 through February 2015.

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT

(2-16)

| | |
|---|---|
| CAG280000 | 006,007,010,011,012,013,014 |
| PERMIT NO. | DISCHARGE NO. |

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 01 | To: | 14 | 08 31 |

Approved Form
OMB No. 2000-0015

**Blowout Preventer Fluids**
**Desalination Unit**
**Ballast/Storage Displacement**
**Bilge Water**
**Boiler Blowdown**
**Test Fluids**
**Diatomaceous Earth Filter Media**

NOTE: Read instructions before completing this form.

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type (69-70) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Average | Maximum | Units | | | |
| (006) Blowout Preventer Fluids FREE OIL, FOAM, FLOATING SOLIDS June - August | Sample Measurement | | | | **No Discharge** | | | | | | |
| | Permit Requirement | | | | No free oil or floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Visual Rec. Water |
| (007) Desalination Unit FOAM, FLOATING SOLIDS June - August | Sample Measurement | | | | No floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | 0 | 1/day 1/discharge | Visual Rec. Water |
| | Permit Requirement | | | | No floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Visual Rec. Water |
| (010) Ballast/Storage Displacement Water - FLOW RATE FREE OIL, FOAM, FLOATING SOLIDS June - August | Sample Measurement | **No** Discharge | | Monthly Average bbl/day | **No Discharge** | | | | | | |
| | Permit Requirement | Report | | | No free oil or floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Estimate / Visual Daylight |
| (011) Bilge Water FLOW RATE June - August | Sample Measurement | **No** Discharge | | Monthly Average bbl/day | **No Discharge** | | | | | | |
| | Permit Requirement | Report | | | No free oil or floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Estimate |
| (012) Boiler Blowdown FOAM, FLOATING SOLIDS June - August | Sample Measurement | | | | **No Discharge** | | | | | | |
| | Permit Requirement | | | | No floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Visual Rec. Water |
| (013) Test Fluids * FLOW RATE FREE OIL, FOAM, FLOATING SOLIDS June - August | Sample Measurement | **No** Discharge | | Monthly Average bbl/day | **No Discharge** | | | | | | |
| | Permit Requirement | Report | | | No free oil or floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Estimate / Visual Daylight |
| (014) Diatomaceous Earth Filter Media FREE OIL, FOAM, FLOATING SOLIDS June - August | Sample Measurement | | | | **No Discharge** | | | | | | |
| | Permit Requirement | | | | No free oil or floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Visual Rec. Water |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

* See Attachment 2 for Chemical Inventory, if applicable.

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT

Approved Form
OMB No. 2000-0015

| CAG280000 | 015, 016, 017, 018, 020, 021 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Bulk Water Transfer Overflow
Uncontaminated Water
Water Flooding Discharges
Laboratory Wastes
Muds, Cuttings, Cement at Sea
Hydrotest Water

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 | 01 | To: 14 | 08 31 |

NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Average | Units | Minimum | Average | Maximum | Units | | | |
| (015) Bulk Transfer Water Overflow FOAM, FLOATING SOLIDS | Sample Measurement | | | | No Discharge | | | | | | |
| June - August | Permit Requirement | | | | No floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Visual Rec. Water |
| (016) Uncontaminated Water FOAM, FLOATING SOLIDS | Sample Measurement | | | | No Discharge | | | | | | |
| June - August | Permit Requirement | | | | No free oil or floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Visual Rec. Water |
| (017) Water Flooding Discharges FREE OIL, FOAM, FLOATING SOLIDS* | Sample Measurement | | | | No Discharge | | | | | | |
| June - August | Permit Requirement | | | | No free oil or floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Visual Rec. Water |
| (018) Laboratory Wastes FREE OIL, FOAM, FLOATING SOLIDS (commingled with produced water) | Sample Measurement | | | | N / A (refer to produced water requirements) | | | | 0 | 1/day 1/discharge | Visual Rec. Water |
| June - August | Permit Requirement | | | | No free oil or floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Visual Rec. Water |
| (020) Muds, Cuttings, Cement at Sea Floor FLOOR FREE OIL, FOAM, FLOATING SOLIDS | Sample Measurement | | | | No Discharge | | | | | | |
| June - August | Permit Requirement | | | | No free oil or floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Visual Rec. Water |
| (021) Hydrotest Water * FLOW RATE /FREE OIL, FOAM FLOATING SOLIDS | Sample Measurement | No Discharge | | Monthly Average bbl/day | No Discharge | | | | | | |
| June - August | Permit Requirement | Report | | | No free oil or floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/month 1/discharge | Estimate / Visual Daylight |
| **(021) HYDROTEST WATER CHLORINE** | Sample Measurement | | | | | No Discharge | No Discharge | ug/L | | | |
| June - August | Permit Requirement | | | | | * 7.5 | * 13 | | | 1/month 1/discharge | Grab |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319 (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

* See Attachment 2 for Chemical Inventory, if applicable.

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, Ca 93455

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

# DISCHARGE MONITORING REPORT

| CAG280000 | 022 |
|---|---|
| PERMIT NO. | DISCHARGE NO. |

Approved Form
OMB No. 2000-0015

**PLATFORM HIDALGO**
LOCATION: 34° 29' 12" , 120° 42' 12"

| MONITORING PERIOD | | | | | |
|---|---|---|---|---|---|
| YR | MO | DAY | YR | MO | DAY |
| From: | 14 | 06 01 | To: | 14 | 08 31 |

**H2S Gas Processing Waste Water**
**Surfactants, Detergents, Dispersants**
NOTE: Read instructions before completing this form.

| PARAMETER | | Quantity or Loading | | | Quality or Concentration | | | | NO. EX. | Frequency Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Maximum | Units | Minimum | Average | Maximum | Units | | | |
| [022] H2S Gas Processing Waste Water FLOW RATE | Sample Measurement | **No** Discharge | | Monthly Average bbl/day | | | | | | | |
| June - August | Permit Requirement | Report | | | | | | | | 1/discharge | Estimate |
| [022] H2S Gas Processing Waste Water FREE OIL, FOAM, FLOATING SOLIDS | Sample Measurement | | | | **No Discharge** | | | | | | |
| June - August | Permit Requirement | | | | No free oil or floating solids in the receiving water. No foam, in other than trace amounts, in the receiving water. | | | | | 1/discharge | Visual - Daylight |
| Surfactants, Detergents, Dispersants | Sample Measurement | | | | Minimized | | | | 0 | | |
| | Permit Requirement | | | | Minimize | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| David Rose<br>Manager, Environmental, Health and Safety | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319. (PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000 AND OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS) | David Rose | (805) 934-8220 | 09 16 2014 |
| TYPED OR PRINTED | | Signature of PRINCIPAL EXECUTIVE OFFICER or AUTHORIZED AGENT | Area Code Number | MONTH/DAY/YEAR |

COMMENT AND EXPLANATION OF ANY VIOLATION (Reference all attachments here.)

# Attachment 2

# Chemical Inventory

**ATTACHMENT 2**
**PLATFORM HIDALGO**
**MISCELLANEOUS DISCHARGES**
**CHEMICAL INVENTORY**
**June 1, 2014 through August 31, 2014**

| Fluid Type | Volume (Monthly avg bbls per day) | Product Name | Estimated Chemical Quantity [2] (Monthly avg gal per day) | Average End-of-Pipe Concentration (mg/l) |
|---|---|---|---|---|
| 009 Non-contact Cooling Water[2] | | Chlorine | | |
| June | 102,857 | | 1.17 | 0.27 |
| July | 102,857 | | 1.08 | 0.25 |
| August | 102,857 | | 1.34 | 0.31 |
| 008 Fire Control System Water[1,2] | | Chlorine | | |
| June | 489 | | 0.0051 | 0.25 |
| July | 454 | | 0.004 | 0.23 |
| August | 402 | | 0.0046 | 0.27 |
| 013 Test Fluids | No Discharge | No Discharge | None | None |
| 017 Water Flooding Discharges | No Discharge | No Discharge | None | None |
| 021 Hydrotest Water | No Discharge | No Discharge | None | None |

[1] Firewater volumes are estimated based on one 30 minute test approximately every 4 days (refer to cover letter).

[2] End-of-pipe concentration and chemical quantity calculated with Operations daily monitoring results using a non-EPA chlorine test method (Hach DPD Color Wheel). This method is not an official EPA test method, but using this data better represents the chemical inventory values from month to month since the official EPA test method is required only quarterly or annually.

# Attachment 3

# Fire Water

# Chlorine Residual Results

# LTS ENVIRONMENTAL, INC.

Freeport McMoRan Oil and Gas
201 S. Broadway
Orcutt, Ca 93455

June 19, 2014

**Attn: Ruth Juris**

Quarterly NPDES chlorine residual on the fire water outlet was as follows:

| **Sample Date / Time** | **Location** | **Total Chlorine Residual** *(EPA Method 330.5)* End of Pipe |
|---|---|---|
| June 11, 2014 @ 0830 | Platform Hidalgo<br>Firewater Outlet | 0.17 mg/l |
| LTS Meter S/N: 12040E195572<br>Technician: Mike Apple | | Method Blank < 0.05 mg/l (MDL) |

**S.G. Lawry**
***Environmental Specialist / LTS***

704 Adirondack Ave. • Ventura, Ca 93003 • (805) 644-4560 • Fax (805) 644-4560

# LTS ENVIRONMENTAL, INC.

August 13, 2013

## Quality Control

As part of the annual in-house quality control chlorine meter check and to ensure proper operation of the meters, LTS Environmental performed a total residual chlorine test with a known value obtained from RT Corporation. Results of this test are as follows:

| **Test Date**<br>August 12, 2013 | **Total Residual Chlorine**<br>*(EPA Method 330.5)* |
|---|---|
| LTS meter (SN 041200088375) | **2.78 mg/l** |
| LTS meter (SN 12040E195572) | **2.74 mg/l** |
| RT Corporation test sample: | |
| Certified Value | 2.35 mg/l (+/-.0508) |
| Standard Deviation | 0.208 mg/l |
| **Acceptance Limits** | **1.73 – 2.98 mg/l** |
| | Method Blank < 0.05 mg/l |
| LTS Lead Technician: Mike Apple | |

**S.G. Lawry**
***Environmental Specialist***
***President, LTS***

704 Adirondack Ave. • Ventura, Ca 93003 • (805) 644-4560 • Fax (805) 644-4560

# ATTACHMENT 3
# PLATFORM HIDALGO
# FIRE WATER CHLORINE RESULTS
# June 1, 2014 through August 31, 2014

| Discharge | Measurement Frequency | Average Monthly Limit* Post Dilution (mg/l) | Maximum Daily Limit* Post Dilution (mg/l) | Result Post Dilution (mg/l) | End-of-Pipe Concentration (mg/l) | EPA Plumes Dilution |
|---|---|---|---|---|---|---|
| 008 Fire Control System Water Sampled 06/11/14 | Once/Quarter | 0.0057 | 0.0114 | 0.00098 | EP A Method 330.5 0.17 | 172:1 |

* Post-dilution limits are listed in the permit, Appendix C.

# Attachment 4

# Laboratory Reports for Oil and Grease, Chlorine Residuals, and Quarterly NPDES Results

# Laboratory Quality Control Reports

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport McMoRan O&G
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** June 16, 2014
**Laboratory Number:** 141509
**Project Name:** PF Hidalgo NPDES Produced Water Weekly
**Sampled by:** Client

On June 9, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| PRODUCED WATER T-31 | 141509-01 |
| PRODUCED WATER T-31 | 141509-02* |
| PRODUCED WATER T-31 | 141509-03* |
| PRODUCED WATER T-31 | 141509-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT

If you have any further questions or concerns, please contact me at your convenience. This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.
Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport McMoRan O&G (PF Hidalgo)
CAS LAB NO: 141509
Analyst: GM

Date Sampled: 06/05/14
Date Received: 06/09/14
Date Analyzed: 06/11/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 141509-01 | Produced Water T-31 | 11 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 141509-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

141509

| LTS ENVIRONMENTAL, INC.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | **Report to:** FM O&G c/o Steve Lawry | **Bill to:** FM O&G<br>Accounts Payable<br>700 Milam Ste 3100<br>Houston, TX, 77002 6/16 6/17 |
|---|---|---|

FACILITY: Pl. Hidalgo
COLLECTOR: LTS / C. Jenkins
PROJECT/CHARGE #: NPDES Produced Water Weeklu
RESULTS REQUIRED: Standard
RESULTS BY: PHONE: _____ FAX: _____

SUBMITTED TO: Capco Analytical
REPORT TO: _____ PHONE: _____
FAX: _____
COPIES TO: Platform Supervisor PHONE: 644-4560
201 S. Broadway PHONE: _____
Orcutt, CA 93455 cc: Ruth Juris

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | PRE-SERV. | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | Produced water T-31 | Grab | 1 | 06/05/14 1300 | HCl | O&G (EPA 1664) |
| 2 | ↓ | | | 1330 | ↓ | |
| 3 | | | | 1400 | | |
| 4 | | | | 1430 | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Comments: Run #1; Hold 2-4 #: Abs (0+6); 1: 13 (16); 2: 15 (19); 3: 19 (23); 4: 11 (14)

| Relinquished by: | Date: 6/9/14 |
|---|---|
| Received by: | Time: 240 |

| Relinquished by: | Date: |
|---|---|
| Received by: | Time: |

| Relinquished by: | Date: |
|---|---|
| Received by: | Time: |

| Relinquished by: | Date: |
|---|---|
| Received by: | Time: |

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport McMoRan O&G
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** June 16, 2014
**Laboratory Number:** 141549
**Project Name:** PF Hidalgo wk(2) weekly NPDES
**Sampled by:** Client

On June 12, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| T-31 | 141549-01 |
| T-31 | 141549-02* |
| T-31 | 141549-03* |
| T-31 | 141549-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT

If you have any further questions or concerns, please contact me at your convenience. This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.
Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport McMoRan O&G (PF Hidalgo)
CAS LAB NO: 141549
Analyst: GM

Date Sampled: 06/10/14
Date Received: 06/12/14
Date Analyzed: 06/12/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 141549-01 | T-31 | 6.3 | 1 | 1 | 5 |

**QUALITY CONTROL DATA**

| | | | | | |
|---|---|---|---|---|---|
| 141549-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

141549

Chain of Custody

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | Report to FM O&G c/o Steve Lawry | Bill to: Accounts Payable<br>700 Milam Ste 3100<br>Houston, TX, 77002 6/18 6/19 |
|---|---|---|

FACILITY: Hidalgo wk (2)
COLLECTOR: LTS
PROJECT/CHARGE #: Weekly NPDES
RESULTS REQUIRED: Normal
RESULTS BY: PHONE: FAX:

SUBMITTED TO: Capco Analytical Services
REPORT TO: PHONE:
COPIES TO: Platform Supervisor PHONE: 644-4560
201 S. Broadway, PHONE:
Orcutt, CA 93455
Ruth Juris

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | Pre-serv | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | T-31 | grab | 1 | Date: 6/10/14<br>Time: 1700 | HCl | EPA 1664 Abs (10) IR (13) |
| 2 | | grab | 1 | 1730 | | online ntu: 2.4<br>2100Q: 4.24 |
| 3 | | grab | 1 | 1800 | | 2100Q calibrated. |
| 4 | | grab | 1 | 1830 | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Comments: **Run #1. Hold rest.**

| | | |
|---|---|---|
| Relinquished by: | | Date: 06/11/14 |
| Received by: | | Time: 2200 |
| Relinquished by: | | Date: 6/12/14 |
| Received by: | | Time: 9:42 |

| | |
|---|---|
| Relinquished by: | Date: |
| Received by: | Time: |
| Relinquished by: | Date: |
| Received by: | Time: |

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport McMoRan O&G
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** June 25, 2014
**Laboratory Number:** 141618
**Project Name:** PF Hidalgo NPDES Produced Water-weekly
**Sampled by:** Client

On June 20, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| PRODUCED WATER | 141618-01 |
| PRODUCED WATER | 141618-02* |
| PRODUCED WATER | 141618-03* |
| PRODUCED WATER | 141618-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT

If you have any further questions or concerns, please contact me at your convenience. This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.
Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport McMoRan O&G (PF Hidalgo)
CAS LAB NO: 141618
Analyst: GM

Date Sampled: 06/19/14
Date Received: 06/20/14
Date Analyzed: 06/24/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 141618-01 | Produced Water | 10 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 141618-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

141618

| LTS ENVIRONMENTAL, INC.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | **Report to:** FM O&G c/o Steve Lawry | **Bill to:** FM O&G<br>Accounts Payable<br>700 Milam Ste 3100<br>Houston, TX, 77002 6/27 6/20 |
|---|---|---|

FACILITY:
COLLECTOR: LTS (PF Hidalgo)
PROJECT/CHARGE #: NPDES Produced Water Weeklu
RESULTS REQUIRED: Standard
RESULTS BY: PHONE: FAX:

SUBMITTED TO: Capco Analytical
REPORT TO: PHONE:
FAX:
COPIES TO: Platform Supervisor PHONE: 644-4560
201 S. Broadway PHONE:
Orcutt, CA 93455 cc: Ruth Juris

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | PRE-SERV. | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | Produced water | Grab | 1 | 06/19/14 0445 | HCl | O&G (EPA 1664) |
| 2 | | | | 0515 | | |
| 3 | | | | 0545 | | |
| 4 | | | | 0600 | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Comments: Run #1; Hold 2-4 H: Abs (0+6); 1: 14 (17); 2: 10 (23);

| Relinquished by: | Date: 6/20/14 |
|---|---|
| Received by: | Time: 9:30 |

| Relinquished by: | Date: |
|---|---|
| Received by: | Time: |

| Relinquished by: | Date: |
|---|---|
| Received by: | Time: |

| Relinquished by: | Date: |
|---|---|
| Received by: | Time: |

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport-McMoRan Oil & Gas
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** July 1, 2014
**Laboratory Number:** 141667
**Project Name:** PF Hidalgo wk(4) Weekly NPDES
**Sampled by:** Client

On June 26, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| T-31 | 141667-01 |
| T-31 | 141667-02* |
| T-31 | 141667-03* |
| T-31 | 141667-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT

If you have any further questions or concerns, please contact me at your convenience. This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.
Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport-McMoRan Oil & Gas (PF Hidalgo)
CAS LAB NO: 141667
Analyst: GM

Date Sampled: 06/23/14
Date Received: 06/26/14
Date Analyzed: 06/30/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 141667-01 | T-31 | 3.6 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 141667-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

Chain of Custody

141667

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | Report to FM O&G c/o S. Lawry | Bill to: Accounts Payable<br>700 Milam Ste 3100<br>Houston, TX, 77002 |
|---|---|---|

FACILITY: Hidalgo wk (4)
COLLECTOR: M. Apple
PROJECT/CHARGE #: Weekly NPDES
RESULTS REQUIRED: Normal
RESULTS BY: PHONE: _____ FAX: _____

SUBMITTED TO: Capco Analytical Services
REPORT TO: _____ PHONE: _____
COPIES TO: Platform Supervisor, 201 S. Broadway, Orcutt, CA 93455, Ruth Juris — PHONE: 644-4560
PHONE: _____

7/3 7/4

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | Pre-serv | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | T-31 | grab | 1 | Date: 6-23-14<br>Time: 2000 | HCl | EPA 1664 Abs (14) IR (17) |
| 2 | | grab | 1 | 2015 | | ntu: 3 (online) |
| 3 | | grab | 1 | 2030 | | |
| 4 | | grab | 1 | 2045 | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Comments: **Run #1. Hold rest.** ntu: 3 (online) 2100 @ : 6.53

| | | |
|---|---|---|
| Relinquished by: | | Date: 6-26-14 |
| Received by: | | Time: 1120 |

| | | |
|---|---|---|
| Relinquished by: | | Date: |
| Received by: | | Time: |

| | | |
|---|---|---|
| Relinquished by: | | Date: |
| Received by: | | Time: |

| | | |
|---|---|---|
| Relinquished by: | | Date: |
| Received by: | | Time: |

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport-McMoRan Oil & Gas
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** July 9, 2014
**Laboratory Number:** 141729
**Project Name:** PF Hidalgo wk(1) weekly NPDES
**Sampled by:** Client

On July 3, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| T-31 | 141729-01 |
| T-31 | 141729-02* |
| T-31 | 141729-03* |
| T-31 | 141729-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT

If you have any further questions or concerns, please contact me at your convenience. This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.
Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport-McMoRan Oil & Gas (PF Hidalgo)
CAS LAB NO: 141729
Analyst: GM

Date Sampled: 07/02/14
Date Received: 07/03/14
Date Analyzed: 07/07/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 141729-01 | T-31 | 7.2 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 141729-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

141729 | 141729

Chain of Custody

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | Report to: FM O&G s c/o S. Lawry | Bill to: Accounts Payable<br>700 Milam Ste 3100<br>Houston, TX, 77002 |
|---|---|---|

FACILITY: Hidalgo wk (1)
COLLECTOR: LTS
PROJECT/CHARGE #: Weekly NPDES
RESULTS REQUIRED: Normal
RESULTS BY: PHONE: _____ FAX: _____

SUBMITTED TO: Capco Analytical Services
REPORT TO: _____ PHONE: _____
COPIES TO: Platform Supervisor, 201 S. Broadway, Orcutt, CA 93455, Ruth Juris — PHONE: 644-4560 — PHONE: _____

7/10 7/11

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | Pre-serv | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | T-31 | grab | 1 | Date: 7-2-14 Time: 1230 | HCl | EPA 1664 Abs (14) IR (17) |
| 2 | | grab | 1 | 1245 | HCl | |
| 3 | | grab | 1 | 1300 | HCl | |
| 4 | | grab | 1 | 1315 | HCl | |
| | | | | | | |
| | | | | | | **Field notes** |
| | | | | | | Hach: 4 2100Q: 6.53 |
| | | | | | | IR re-calibration: +/-20% for |
| | | | | | | 10/20/30 ppm stan. |

Comments: **Run #1. Hold rest.**

Relinquished by: [signature] Date: 7-3-14
Received by: [signature] Time: 1240

Relinquished by: _____ Date: _____
Received by: _____ Time: _____

Relinquished by: _____ Date: _____
Received by: _____ Time: _____

Relinquished by: _____ Date: _____
Received by: _____ Time: _____

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport-McMoRan Oil & Gas
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** July 15, 2014
**Laboratory Number:** 141798
**Project Name:** PF Hidalgo wk(2) weekly NPDES
**Sampled by:** Client

On July 9, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| T-31 | 141798-01 |
| T-31 | 141798-02* |
| T-31 | 141798-03* |
| T-31 | 141798-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT

If you have any further questions or concerns, please contact me at your convenience. This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport-McMoRan Oil & Gas (PF Hidalgo)
CAS LAB NO: 141798
Analyst: GM

Date Sampled: 07/08/14
Date Received: 07/09/14
Date Analyzed: 07/14/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 141798-01 | T-31 | 8.9 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 141798-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

141798

Chain of Custody

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | Report to FM O&G s c/o S. Lawry | Bill to: Accounts Payable<br>700 Milam Ste 3100<br>Houston, TX, 77002 |
|---|---|---|

FACILITY: Hidalgo wk(2)
COLLECTOR: LTS
PROJECT/CHARGE #: Weekly NPDES
RESULTS REQUIRED: Normal
RESULTS BY: PHONE: _____ FAX: _____

SUBMITTED TO: Capco Analytical Services
REPORT TO: _____ PHONE: _____
COPIES TO: Platform Supervisor PHONE: 644-4560
201 S. Broadway, PHONE: _____
Orcutt, CA 93455
Ruth Juris 7/16 7/17

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | Pre-serv | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | T-31 | grab | 1 | Date: 7/8/2014<br>Time: 1530 | HCl | EPA 1664 Abs (11) IR (14) |
| 2 | | grab | 1 | 1545 | | |
| 3 | | grab | 1 | 1600 | | |
| 4 | | grab | 1 | | | Sample destroyed: heat cracking |
| | | | | | | |
| | | | | | | **Field notes**<br>4.5 (ntu) |
| | | | | | | We are back to the old style bottles, which are more fragile. |
| | | | | | | |
| | | | | | | |

Comments: **Run #1. Hold rest.**

| | | | |
|---|---|---|---|
| Relinquished by: | Date: 7-9-14 | Relinquished by: | Date: |
| Received by: | Time: 1305 | Received by: | Time: |
| Relinquished by: | Date: | Relinquished by: | Date: |
| Received by: | Time: | Received by: | Time: |

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport-McMoRan Oil & Gas
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** July 24, 2014
**Laboratory Number:** 141860
**Project Name:** PF Hidalgo Weekly NPDES
**Sampled by:** Client

On July 17, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| T-31 | 141860-01 |
| T-31 | 141860-02* |
| T-31 | 141860-03* |
| T-31 | 141860-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT

If you have any further questions or concerns, please contact me at your convenience.
This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.
Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport-McMoRan Oil & Gas (PF Hidalgo)
CAS LAB NO: 141860
Analyst: GM

Date Sampled: 07/16/14
Date Received: 07/17/14
Date Analyzed: 07/21/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 141860-01 | T-31 | 12 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 141860-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

Chain of Custody

141860

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | Report to: FM O&G c/o S. Lawry | Bill to: Accounts Payable<br>700 Milam Ste 3100<br>Houston, TX, 77002 7/24 |
|---|---|---|

7/25

FACILITY: Hidalgo
COLLECTOR: LTS
PROJECT/CHARGE #: Weekly NPDES
RESULTS REQUIRED: Normal
RESULTS BY: PHONE: FAX:

SUBMITTED TO: Capco Analytical Services
REPORT TO: PHONE:
COPIES TO: Platform Supervisor PHONE: 644-4560
201 S. Broadway, PHONE:
Orcutt, CA 93455
Ruth Juris

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | Pre-serv | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | T-31 | grab | 1 | Date: 7-16-14<br>Time: 800 | HCl | EPA 1664 Abs (12) IR (15) |
| 2 | | grab | 1 | 815 | | |
| 3 | | grab | 1 | 830 | | |
| 4 | | grab | 1 | 845 | | |
| | | | | | | - Comments - |
| | | | | | | 2.9 ntu : 7.00 2100Q |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Comments: **Run #1. Hold #2-4.**

| | | |
|---|---|---|
| Relinquished by: | | Date: 7-17-14 |
| Received by: | | Time: 1550 |

| | | |
|---|---|---|
| Relinquished by: | | Date: |
| Received by: | | Time: |

| | | |
|---|---|---|
| Relinquished by: | | Date: |
| Received by: | | Time: |

| | | |
|---|---|---|
| Relinquished by: | | Date: |
| Received by: | | Time: |

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport-McMoRan Oil & Gas
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** July 31, 2014
**Laboratory Number:** 141911
**Project Name:** PF Hidalgo Weekly NPDES
**Sampled by:** Client

On July 24, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| T-31 | 141911-01 |
| T-31 | 141911-02* |
| T-31 | 141911-03* |
| T-31 | 141911-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT

If you have any further questions or concerns, please contact me at your convenience. This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.
Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport-McMoRan Oil & Gas (PF Hidalgo)
CAS LAB NO: 141911
Analyst: GM

Date Sampled: 07/22/14
Date Received: 07/24/14
Date Analyzed: 07/30/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 141911-01 | T-31 | 3.9 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 141911-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

141911

Chain of Custody

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | Report to FM O&G s c/o S. Lawry | Bill to: Accounts Payable<br>700 Milam Ste 3100<br>Houston, TX, 77002 7/31 |
|---|---|---|

FACILITY: Hidalgo
COLLECTOR: LTS
PROJECT/CHARGE #: Weekly NPDES
RESULTS REQUIRED: Normal
RESULTS BY: PHONE: _____ FAX: _____

SUBMITTED TO: Capco Analytical Services 8/
REPORT TO: _____ PHONE: _____
COPIES TO: Platform Supervisor PHONE: 644-4560
201 S. Broadway, PHONE: _____
Orcutt, CA 93455
Ruth Juris

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | Pre-serv | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | T-31 | grab | 1 | Date: 7-29-14<br>Time: 2100 | HCl | EPA 1664 Abs (6) IR (9) |
| 2 | | grab | 1 | 2115 | | |
| 3 | | grab | 1 | 2130 | | |
| 4 | | grab | 1 | 2145 | | |
| | | | | | | |
| | | | | | | Field notes |
| | | | | | | Online Hach : .92 |
| | | | | | | 2000 Q : 5.75 |
| | | | | | | |

Comments: **Run #1. Hold rest.**

| | | | |
|---|---|---|---|
| Relinquished by: | Date: 7.24.14 | Relinquished by: | Date: |
| Received by: | Time: 955 | Received by: | Time: |
| Relinquished by: | Date: | Relinquished by: | Date: |
| Received by: | Time: | Received by: | Time: |

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport-McMoRan Oil & Gas
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** August 1, 2014
**Laboratory Number:** 141955
**Project Name:** PF Hidalgo Weekly NPDES
**Sampled by:** Client

On July 30, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| T-31 | 141955-01 |
| T-31 | 141955-02* |
| T-31 | 141955-03* |
| T-31 | 141955-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT

If you have any further questions or concerns, please contact me at your convenience. This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.
Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport-McMoRan Oil & Gas (PF Hidalgo)
CAS LAB NO: 141955
Analyst: GM

Date Sampled: 07/28/14
Date Received: 07/30/14
Date Analyzed: 07/31/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 141955-01 | T-31 | 5.5 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 141955-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

141955

Chain of Custody

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | Report to FM O&G s c/o S. Lawry | Bill to: Accounts Payable<br>700 Milam Ste 3100<br>Houston, TX, 77002 |
|---|---|---|

8/6

FACILITY: Hidalgo
COLLECTOR: LTS
PROJECT/CHARGE # Weekly NPDES
RESULTS REQUIRED: Normal
RESULTS BY: PHONE: _____ FAX: _____

SUBMITTED TO: Capco Analytical Services
REPORT TO: _____ PHONE: _____
COPIES TO: Platform Supervisor PHONE: 644-4560
201 S. Broadway, PHONE: _____
Orcutt, CA 93455
Ruth Juris

8/7

5.1°C

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | Pre-serv | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | T-31 | grab | 1 | Date: 7/28/14<br>Time: 1530 | HCl | EPA 1664 Abs (8) IR (11) |
| 2 | | grab | 1 | 1545 | | |
| 3 | | grab | 1 | 1600 | | |
| 4 | | grab | 1 | 1615 | | |
| | | | | | | |
| | | | | | | **Field notes** |
| | | | | | | 2100Q: 2.97 2 (online) |
| | | | | | | 10 ntu: 10 ntu 20 ntu: 21 ntu<br>100 ntu: 107 ntu 800: 752 ntu |
| | | | | | | |

Comments: **Run #1. Hold rest.**

| | |
|---|---|
| Relinquished by: | Date: 7·30·14 |
| Received by: | Time: 1100 |
| Relinquished by: | Date: |
| Received by: | Time: |
| Relinquished by: | Date: |
| Received by: | Time: |
| Relinquished by: | Date: |
| Received by: | Time: |

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport-McMoRan Oil & Gas
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** August 13, 2014
**Laboratory Number:** 142035
**Project Name:** PF Hidalgo wk(1) Weekly NPDES
**Sampled by:** Client

On August 7, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| T-31 | 142035-01 |
| T-31 | 142035-02* |
| T-31 | 142035-03* |
| T-31 | 142035-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT

If you have any further questions or concerns, please contact me at your convenience.
This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.
Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport-McMoRan Oil & Gas (PF Hidalgo)
CAS LAB NO: 142035
Analyst: GM

Date Sampled: 08/05/14
Date Received: 08/07/14
Date Analyzed: 08/11/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 142035-01 | T-31 | 8.6 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 142035-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

142035

Chain of Custody

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | Report to FM O&G s c/o S. Lawry | Bill to: Accounts Payable<br>700 Milam Ste 3100<br>Houston, TX, 77002 8/14 |
|---|---|---|

FACILITY: *Hidalgo wk(1) NPDES*
COLLECTOR: LTS
PROJECT/CHARGE #: Weekly NPDES
RESULTS REQUIRED: Normal
RESULTS BY: PHONE: _____ FAX: _____

SUBMITTED TO: *Capco Analytical Services* 8/15
REPORT TO: _____ PHONE: _____
COPIES TO: *Platform Supervisor* PHONE: *644-4560*
*201 S. Broadway,* PHONE: _____
*Orcutt, CA 93455*
Ruth Juris

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | Pre-serv | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | *T-31* | *grab* | *1* | Date: 8/5/14<br>Time: 1830 | *HCl* | *EPA 1664 Abs (11) IR (14)* |
| 2 | | *grab* | *1* | *1845* | | |
| 3 | | *grab* | *1* | *1900* | | |
| 4 | | *grab* | *1* | *1915* | | |
| | | | | | | |
| | | | | | | **Field notes**<br>*Hach: 8.97 2100Q: 8.87* |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Comments: **Run #1. Hold rest.**

| | | | |
|---|---|---|---|
| Relinquished by: | | Date: 8.7.14 | |
| Received by: | | Time: 1310 | |
| Relinquished by: | | Date: | |
| Received by: | | Time: | |
| Relinquished by: | | Date: | |
| Received by: | | Time: | |
| Relinquished by: | | Date: | |
| Received by: | | Time: | |

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport-McMoRan Oil & Gas
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** August 21, 2014
**Laboratory Number:** 142113
**Project Name:** PF Hidalgo Weekly NPDES
**Sampled by:** Client

On August 15, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| T-31 | 142113-01 |
| T-31 | 142113-02* |
| T-31 | 142113-03* |
| T-31 | 142113-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

FOR.
Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT
Mike Apple @-EDT

If you have any further questions or concerns, please contact me at your convenience. This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.
Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport-McMoRan Oil & Gas (PF Hidalgo)
CAS LAB NO: 142113
Analyst: GM

Date Sampled: 08/13/14
Date Received: 08/15/14
Date Analyzed: 08/20/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 142113-01 | T-31 | 7.0 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 142113-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

142113

Chain of Custody

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | **Report to:** FM O&G c/o S. Lawry | **Bill to:** Accounts Payable<br>700 Milam Ste 3100 8/22<br>Houston, TX, 77002 |
|---|---|---|

FACILITY: Hidalgo (NPDES)
COLLECTOR: LTS
PROJECT/CHARGE # Weekly NPDES
RESULTS REQUIRED: Normal
RESULTS BY: PHONE: FAX:

SUBMITTED TO: Capco Analytical Services 8/25
REPORT TO: PHONE:
COPIES TO: Platform Supervisor PHONE: 644-4560
201 S. Broadway, PHONE:
Orcutt, CA 93455
cc: Ruth Juris

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | Pre-serv | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | T-31 | grab | 1 | Date: 8.13.14<br>Time: 1600 | HCl | EPA 1664 Abs (14) IR(17) |
| 2 | | grab | 1 | 1615 | | Abs (12) IR(15) |
| 3 | | grab | 1 | 1630 | | |
| 4 | | grab | 1 | 1645 | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Comments: **Run #1, Hold rest**

| | | | |
|---|---|---|---|
| Relinquished by: | Date: 8.15.14 | Relinquished by: | Date: |
| Received by: | Time: 1145 | Received by: | Time: |
| Relinquished by: | Date: | Relinquished by: | Date: |
| Received by: | Time: | Received by: | Time: |

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport-McMoRan Oil & Gas
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** August 25, 2014
**Laboratory Number:** 142148
**Project Name:** PF Hidalgo Weekly NPDES
**Sampled by:** Client

On August 20, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| T-31 | 142148-01 |
| T-31 | 142148-02* |
| T-31 | 142148-03* |
| T-31 | 142148-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT
Mike Apple @-EDT

If you have any further questions or concerns, please contact me at your convenience.
This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport-McMoRan Oil & Gas (PF Hidalgo)
CAS LAB NO: 142148
Analyst: GM

Date Sampled: 08/19/14
Date Received: 08/20/14
Date Analyzed: 08/21/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 142148-01 | T-31 | 18 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 142148-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

Chain of Custody

142148

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | **Report to:** FM O&G c/o S. Lawry | **Bill to:** Accounts Payable<br>700 Milam Ste 3100<br>Houston, TX, 77002 8/27 |
|---|---|---|

FACILITY: Hidalgo (NPDES)
COLLECTOR: LTS
PROJECT/CHARGE #: Weekly NPDES
RESULTS REQUIRED: Normal
RESULTS BY: PHONE: FAX:

SUBMITTED TO: Capco Analytical Services 8/28
REPORT TO: PHONE:
COPIES TO: Platform Supervisor PHONE: 644-4560
201 S. Broadway, PHONE:
Orcutt, CA 93455
cc: Ruth Juris

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | Pre-serv | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | T-31 | grab | 1 | Date: 8-19-14<br>Time: 1600 | HCl | EPA 1664 Abs (15) IR (19) |
| 2 | | grab | 1 | 1615 | | |
| 3 | | grab | 1 | 1630 | | Abs (10) IR (13) |
| 4 | | grab | 1 | 1645 | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Comments: **Run #1, Hold rest**

| | | |
|---|---|---|
| Relinquished by: | | Date: 8-20-14 |
| Received by: | | Time: 1450 |
| Relinquished by: | | Date: |
| Received by: | | Time: |
| Relinquished by: | | Date: |
| Received by: | | Time: |
| Relinquished by: | | Date: |
| Received by: | | Time: |

CAPCO
Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

**Prepared for:** Freeport-McMoRan Oil & Gas
C/O: LTS environmental, Inc.
704 Adirondack Avenue
Ventura, CA 93003
Attn: Steve Lawry

**Report Date:** September 3, 2014
**Laboratory Number:** 142206
**Project Name:** PF Hidalgo Weekly NPDES
**Sampled by:** Client

On August 28, 2014, Capco Analytical Services, Inc.(CAS), received four(4) samples to be analyzed. The samples were identified and assigned the laboratory ID numbers listed below:

| SAMPLE DESCRIPTION | CAS LAB NUMBER ID |
|---|---|
| T-31 | 142206-01 |
| T-31 | 142206-02* |
| T-31 | 142206-03* |
| T-31 | 142206-04* |

*HOLD PER CUSTOMER'S REQUEST

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Keith Chin-Yuan Chang, Ph.D.
Director - Analytical Operations

cc: PF Hidalgo @-Orcutt
Ruth Juris @-EDT
Mike Apple @-EDT

If you have any further questions or concerns, please contact me at your convenience.
This report consists of 1 page excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.

CAPCO
Analytical Services, Inc.
Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

# CERTIFICATE OF ANALYSIS

Client: Freeport-McMoRan Oil & Gas (PF Hidalgo)
CAS LAB NO: 142206
Analyst: GM

Date Sampled: 08/27/14
Date Received: 08/28/14
Date Analyzed: 09/02/14
Sample Matrix: Water

## OIL & GREASE ANALYSIS
## EPA METHOD 1664

| CAS LAB # | Sample ID | RESULTS (mg/L) | DF | MDL (mg/L) | PQL (mg/L) |
|---|---|---|---|---|---|
| 142206-01 | T-31 | 8.5 | 1 | 1 | 5 |

QUALITY CONTROL DATA

| | | | | | |
|---|---|---|---|---|---|
| 142206-MB | Method Blank | ND | 1 | 1 | 5 |

1536 Eastman Ave. Suite B, Ventura, California 93003 Ph: (805)644-1095 FAX: (805)644-9947
www.capcoenv.com

142206

Chain of Custody

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | Report to: FM O&G c/o Steve Lawry | Bill to: Accounts Payable<br>700 Milam Ste 3100 9/4<br>Houston, TX, 77002 |
|---|---|---|

FACILITY: Hidalgo
COLLECTOR: LTS
PROJECT/CHARGE #: Weekly NPDES
RESULTS REQUIRED: Normal
RESULTS BY: PHONE: FAX:

SUBMITTED TO: Capco Analytical Services 9/5
REPORT TO: PHONE:
COPIES TO: Platform Supervisor PHONE: 644-4560
201 S. Broadway, PHONE:
Orcutt, CA 93455

| SAMPLE NO. | SAMPLE ID/LOCATION | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | Pre-serv | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | T-31 | grab | 1 | Date: 8-27-14 Time: 1000 | HCl | EPA 1664 AbS (15) IR(19) |
| 2 | | grab | 1 | 1030 | | (14) IR(17) |
| 3 | | grab | 1 | 1100 | | (15) IR(19) |
| 4 | | grab | 1 | 1130 | | |
| | | | | | | Field notes: |
| | | | | | | online hach 10.5 |
| | | | | | | 2100Q 11.02 |
| | | | | | | Cleaned up to 2. (IR10) by 1800 |
| | | | | | | |

Comments: Run # 1. Hold #2-4

| Relinquished by: | Date: 8-28-14 |
|---|---|
| Received by: | Time: 1535 |

| Relinquished by: | Date: 08/28/14 |
|---|---|
| Received by: | Time: |

| Relinquished by: | Date: |
|---|---|
| Received by: | Time: |

| Relinquished by: | Date: |
|---|---|
| Received by: | Time: |

aquatic bioassay & consulting laboratories, inc

August 5, 2014

Freeport- McMoRan Oil &Gas
Attn: Ruth Juris
201 S. Broadway
Orcutt, CA 93455

Dear Ms. Juris:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms EPA/600/R-95-136, 1995* "All acceptability criteria were met. This is a valid test." Results were as follows:

| | |
|---|---|
| CLIENT: | Freeport- McMoRan Oil &Gas |
| SAMPLE I.D.: | T31 Produced Water (Platform Hidalgo) |
| DATE RECEIVED: | 17 July - 14 |
| ABC LAB. NO.: | LTS0714.173 |

**CHRONIC ABALONE LARVAL DEVELOPMENT BIOASSAY**

IWC CONCENTRATION = 0.0233%

**TST RESULT**

PASS

Yours very truly,

Scott Johnson
Laboratory Director

29 north olive st. ventura, ca 93001 (805) 643 5621 www.aquabio.org

# CETIS Summary Report

Report Date: 05 Aug-14 07:48 (p 1 of 1)
Test Code: LTS0714.173 | 04-8922-8360

**Red Abalone Larval Development Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 08-0887-4763 | **Test Type:** | Development | **Analyst:** | |
| **Start Date:** | 17 Jul-14 12:31 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 19 Jul-14 12:30 | **Species:** | Haliotis rufescens | **Brine:** | Not Applicable |
| **Duration:** | 48h | **Source:** | Cultured Abalone | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 04-9165-4462 | **Code:** | LTS0714.173 | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 16 Jul-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 17 Jul-14 09:10 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 23h (3.9 °C) | **Station:** | T31 Produced Water (Platform Hidalgo) | | |

**Comparison Summary**

| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method |
|---|---|---|---|---|---|---|---|
| 05-1481-0879 | Proportion Normal | 0.0349 | >0.0349 | NA | NA | 2865 | Steel Many-One Rank Sum Test |

**Point Estimate Summary**

| Analysis ID | Endpoint | Level | % | 95% LCL | 95% UCL | TU | Method |
|---|---|---|---|---|---|---|---|
| 11-3915-8979 | Proportion Normal | EC5 | >0.0349 | N/A | N/A | <2865 | Linear Interpolation (ICPIN) |
| | | EC10 | >0.0349 | N/A | N/A | <2865 | |
| | | EC15 | >0.0349 | N/A | N/A | <2865 | |
| | | EC20 | >0.0349 | N/A | N/A | <2865 | |
| | | EC25 | >0.0349 | N/A | N/A | <2865 | |
| | | EC40 | >0.0349 | N/A | N/A | <2865 | |
| | | EC50 | >0.0349 | N/A | N/A | <2865 | |

**Test Acceptability**

| Analysis ID | Endpoint | Attribute | Test Stat | TAC Limits | Overlap | Decision |
|---|---|---|---|---|---|---|
| 05-1481-0879 | Proportion Normal | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |
| 11-3915-8979 | Proportion Normal | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |

**Proportion Normal Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 0.0116 | | 5 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 0.0233 | | 5 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 0.0349 | | 5 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |

**Proportion Normal Detail**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 0.0116 | | 1 | 1 | 1 | 1 | 1 |
| 0.0233 | | 1 | 1 | 1 | 1 | 1 |
| 0.0349 | | 1 | 1 | 1 | 1 | 1 |

**Proportion Normal Binomials**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 0.0116 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 0.0233 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 0.0349 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |

# CETIS Analytical Report

Report Date: 05 Aug-14 07:48 (p 1 of 2)
Test Code: LTS0714.173 | 04-8922-8360

**Red Abalone Larval Development Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 05-1481-0879 | **Endpoint:** | Proportion Normal | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 05 Aug-14 7:48 | **Analysis:** | Nonparametric-Control vs Treatments | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 04-9165-4462 | **Code:** | LTS0714.173 | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 16 Jul-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 17 Jul-14 09:10 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 23h (3.9 °C) | **Station:** | T31 Produced Water (Platform Hidalgo) | | |

| Data Transform | Zeta | Alt Hyp | Trials | Seed | NOEL | LOEL | TOEL | TU |
|---|---|---|---|---|---|---|---|---|
| Angular (Corrected) | NA | C > T | NA | NA | 0.0349 | >0.0349 | NA | 2865 |

**Steel Many-One Rank Sum Test**

| Control | vs | C-% | Test Stat | Critical | Ties | DF | P-Value | P-Type | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Negative Control | | 0.0116 | 27.5 | 17 | 1 | 8 | 0.7500 | Asymp | Non-Significant Effect |
| | | 0.0233 | 27.5 | 17 | 1 | 8 | 0.7500 | Asymp | Non-Significant Effect |
| | | 0.0349 | 27.5 | 17 | 1 | 8 | 0.7500 | Asymp | Non-Significant Effect |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0 | 0 | 3 | 65540 | <0.0001 | Significant Effect |
| Error | 0 | 0 | 16 | | | |
| Total | 0 | | 19 | | | |

**Proportion Normal Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.0% | 0.0% |
| 0.0116 | | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.0% | 0.0% |
| 0.0233 | | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.0% | 0.0% |
| 0.0349 | | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.0% | 0.0% |

**Angular (Corrected) Transformed Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 5 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 0 | 0.0% | 0.0% |
| 0.0116 | | 5 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 0 | 0.0% | 0.0% |
| 0.0233 | | 5 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 0 | 0.0% | 0.0% |
| 0.0349 | | 5 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 0 | 0.0% | 0.0% |

**Proportion Normal Detail**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 0.0116 | | 1 | 1 | 1 | 1 | 1 |
| 0.0233 | | 1 | 1 | 1 | 1 | 1 |
| 0.0349 | | 1 | 1 | 1 | 1 | 1 |

**Angular (Corrected) Transformed Detail**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 |
| 0.0116 | | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 |
| 0.0233 | | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 |
| 0.0349 | | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 |

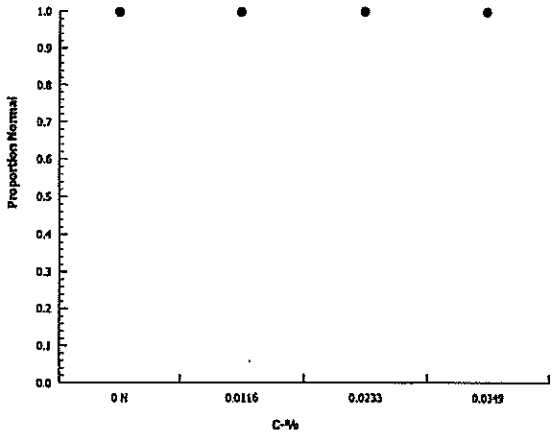
**Proportion Normal Binomials**

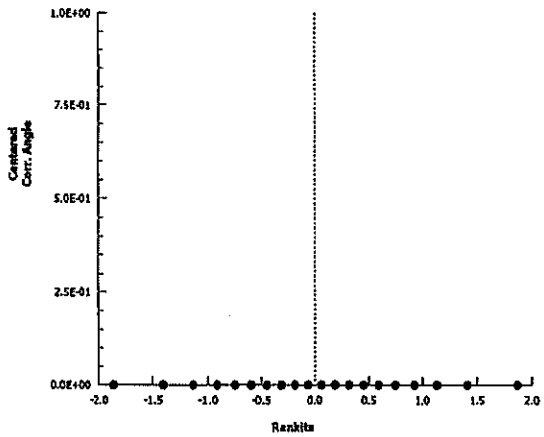
| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 0.0116 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 0.0233 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 0.0349 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |

**Red Abalone Larval Development Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 05-1481-0879 | **Endpoint:** | Proportion Normal | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 05 Aug-14 7:48 | **Analysis:** | Nonparametric-Control vs Treatments | **Official Results:** | Yes |

**Graphics**



# CETIS Analytical Report

Report Date: 05 Aug-14 07:48 (p 1 of 2)
Test Code: LTS0714.173 | 04-8922-8360

**Red Abalone Larval Development Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 11-3915-8979 | **Endpoint:** | Proportion Normal | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 05 Aug-14 7:48 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 04-9165-4462 | **Code:** | LTS0714.173 | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 16 Jul-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 17 Jul-14 09:10 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 23h (3.9 °C) | **Station:** | T31 Produced Water (Platform Hidalgo) | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 0 | 280 | Yes | Two-Point Interpolation |

**Point Estimates**

| Level | % | 95% LCL | 95% UCL | TU | 95% LCL | 95% UCL |
|---|---|---|---|---|---|---|
| EC5 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC10 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC15 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC20 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC25 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC40 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC50 | >0.0349 | N/A | N/A | <2865 | NA | NA |

**Proportion Normal Summary**

| | | | Calculated Variate(A/B) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-% | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect | A | B |
| 0 | Negative Control | 5 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 500 | 500 |
| 0.0116 | | 5 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 500 | 500 |
| 0.0233 | | 5 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 500 | 500 |
| 0.0349 | | 5 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 500 | 500 |

**Proportion Normal Detail**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 0.0116 | | 1 | 1 | 1 | 1 | 1 |
| 0.0233 | | 1 | 1 | 1 | 1 | 1 |
| 0.0349 | | 1 | 1 | 1 | 1 | 1 |

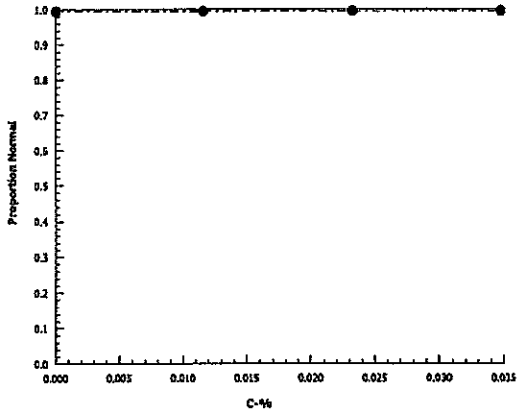
**Proportion Normal Binomials**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 0.0116 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 0.0233 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 0.0349 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |

**Red Abalone Larval Development Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 11-3915-8979 | **Endpoint:** | Proportion Normal | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 05 Aug-14 7:48 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

**Graphics**



# CETIS Measurement Report



**Red Abalone Larval Development Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 08-0887-4763 | **Test Type:** | Development | **Analyst:** | |
| **Start Date:** | 17 Jul-14 12:31 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 19 Jul-14 12:30 | **Species:** | Haliotis rufescens | **Brine:** | Not Applicable |
| **Duration:** | 48h | **Source:** | Cultured Abalone | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 04-9165-4462 | **Code:** | LTS0714.173 | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 16 Jul-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 17 Jul-14 09:10 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 23h (3.9 °C) | **Station:** | T31 Produced Water (Platform Hidalgo) | | |

**Parameter Acceptability Criteria**

| Parameter | Min | Max | Acceptability Limits | Overlap | Decision |
|---|---|---|---|---|---|
| Salinity-ppt | 34 | 34 | 32 - 36 | Yes | Results Within Limits |
| Temperature-°C | 14.6 | 14.8 | 14 - 16 | Yes | Results Within Limits |

**Dissolved Oxygen-mg/L**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 6.9 | 1.818 | 11.98 | 6.5 | 7.3 | 0.4 | 0.5657 | 8.2% | 0 |
| 0.0116 | | 2 | 6.85 | 2.403 | 11.3 | 6.5 | 7.2 | 0.35 | 0.495 | 7.23% | 0 |
| 0.0233 | | 2 | 7 | 3.188 | 10.81 | 6.7 | 7.3 | 0.3 | 0.4243 | 6.06% | 0 |
| 0.0349 | | 2 | 7.1 | 3.288 | 10.91 | 6.8 | 7.4 | 0.3 | 0.4243 | 5.98% | 0 |
| Overall | | 8 | 6.963 | | | 6.5 | 7.4 | | | | 0 (0%) |

**pH-Units**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 7.45 | 6.815 | 8.085 | 7.4 | 7.5 | 0.05 | 0.07072 | 0.95% | 0 |
| 0.0116 | | 2 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 0 | 0 | 0.0% | 0 |
| 0.0233 | | 2 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 0 | 0 | 0.0% | 0 |
| 0.0349 | | 2 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 0 | 0 | 0.0% | 0 |
| Overall | | 8 | 7.488 | | | 7.4 | 7.5 | | | | 0 (0%) |

**Salinity-ppt**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 0.0116 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 0.0233 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 0.0349 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| Overall | | 8 | 34 | | | 34 | 34 | | | | 0 (0%) |

**Temperature-°C**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 0.0116 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 0.0233 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 0.0349 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| Overall | | 8 | 14.7 | | | 14.6 | 14.8 | | | | 0 (0%) |

**Dissolved Oxygen-mg/L**

| C-% | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 7.3 | 6.5 |
| 0.0116 | | 7.2 | 6.5 |
| 0.0233 | | 7.3 | 6.7 |
| 0.0349 | | 7.4 | 6.8 |

**pH-Units**

| C-% | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 7.4 | 7.5 |
| 0.0116 | | 7.5 | 7.5 |
| 0.0233 | | 7.5 | 7.5 |
| 0.0349 | | 7.5 | 7.5 |

**Salinity-ppt**

| C-% | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 34 | 34 |
| 0.0116 | | 34 | 34 |
| 0.0233 | | 34 | 34 |
| 0.0349 | | 34 | 34 |

**Temperature-°C**

| C-% | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 14.6 | 14.8 |
| 0.0116 | | 14.6 | 14.8 |
| 0.0233 | | 14.6 | 14.8 |
| 0.0349 | | 14.6 | 14.8 |

aquatic bioassay & consulting laboratories, inc

**CHRONIC ABALONE DEVELOPMENT BIOASSAY**

DATE: 17 July 2014

STANDARD TOXICANT: Zinc

NOEC = 18.00 ug/l

EC25 = 22.38 ug/l
EC50 = 26.75 ug/l

Yours very truly,

Scott Johnson
Laboratory Director

29 north olive st. ventura, ca 93001 (805) 643 5621 www.aquabio.org

# CETIS Summary Report

Report Date: 05 Aug-14 08:01 (p 1 of 1)
Test Code: ABS071714 | 06-7494-8136

**Red Abalone Larval Development Test** — Aquatic Bioassay & Consulting Labs, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 06-2860-0472 | **Test Type:** | Development | **Analyst:** | |
| **Start Date:** | 17 Jul-14 12:30 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 19 Jul-14 12:30 | **Species:** | Haliotis rufescens | **Brine:** | Not Applicable |
| **Duration:** | 48h | **Source:** | Cultured Abalone | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 03-2487-2226 | **Code:** | ABS071714 | **Client:** | Internal Lab |
| **Sample Date:** | 17 Jul-14 12:30 | **Material:** | Zinc | **Project:** | REF TOX |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

**Comparison Summary**

| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method |
|---|---|---|---|---|---|---|---|
| 19-2344-1017 | Proportion Normal | 18 | 32 | 24 | 27.9% | | Steel Many-One Rank Sum Test |

**Point Estimate Summary**

| Analysis ID | Endpoint | Level | µg/L | 95% LCL | 95% UCL | TU | Method |
|---|---|---|---|---|---|---|---|
| 15-5247-2509 | Proportion Normal | EC5 | 18.88 | 18.61 | 20.19 | | Linear Interpolation (ICPIN) |
| | | EC10 | 19.75 | 19.22 | 22.38 | | |
| | | EC15 | 20.63 | 19.84 | 24.56 | | |
| | | EC20 | 21.5 | 20.45 | 26.75 | | |
| | | EC25 | 22.38 | 21.06 | 28.94 | | |
| | | EC40 | 25 | 22.9 | 35.5 | | |
| | | EC50 | 26.75 | 24.13 | 40.63 | | |

**Test Acceptability**

| Analysis ID | Endpoint | Attribute | Test Stat | TAC Limits | Overlap | Decision |
|---|---|---|---|---|---|---|
| 15-5247-2509 | Proportion Normal | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |
| 19-2344-1017 | Proportion Normal | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |
| 19-2344-1017 | Proportion Normal | NOEL | 18 | NL - 56 | No | Passes Acceptability Criteria |
| 19-2344-1017 | Proportion Normal | PMSD | 0.2789 | NL - 0.2 | No | Above Acceptability Criteria |

**Proportion Normal Summary**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 18 | | 5 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 32 | | 5 | 0.2 | 0 | 0.7553 | 0 | 1 | 0.2 | 0.4472 | 223.6% | 80.0% |
| 56 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 100 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 180 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

**Proportion Normal Detail**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 18 | | 1 | 1 | 1 | 1 | 1 |
| 32 | | 0 | 1 | 0 | 0 | 0 |
| 56 | | 0 | 0 | 0 | 0 | 0 |
| 100 | | 0 | 0 | 0 | 0 | 0 |
| 180 | | 0 | 0 | 0 | 0 | 0 |

**Proportion Normal Binomials**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 18 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 32 | | 0/100 | 100/100 | 0/100 | 0/100 | 0/100 |
| 56 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |
| 100 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |
| 180 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |

# CETIS Analytical Report

Report Date: 05 Aug-14 08:00 (p 1 of 2)
Test Code: ABS071714 | 06-7494-8136

**Red Abalone Larval Development Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 19-2344-1017 | **Endpoint:** | Proportion Normal | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 05 Aug-14 8:00 | **Analysis:** | Nonparametric-Control vs Treatments | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 03-2487-2226 | **Code:** | ABS071714 | **Client:** | Internal Lab |
| **Sample Date:** | 17 Jul-14 12:30 | **Material:** | Zinc | **Project:** | REF TOX |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

| Data Transform | Zeta | Alt Hyp | Trials | Seed | PMSD | NOEL | LOEL | TOEL | TU |
|---|---|---|---|---|---|---|---|---|---|
| Angular (Corrected) | NA | C > T | NA | NA | 27.9% | 18 | 32 | 24 | |

**Steel Many-One Rank Sum Test**

| Control | vs | C-µg/L | Test Stat | Critical | Ties | DF | P-Value | P-Type | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Negative Control | | 18 | 27.5 | 18 | 1 | 8 | 0.6667 | Asymp | Non-Significant Effect |
| | | 32* | 17.5 | 18 | 1 | 8 | 0.0337 | Asymp | Significant Effect |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 4.614654 | 2.307327 | 2 | 16 | 0.0004 | Significant Effect |
| Error | 1.730495 | 0.1442079 | 12 | | | |
| Total | 6.34515 | | 14 | | | |

**Distributional Tests**

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variances | Mod Levene Equality of Variance | 1 | 8.022 | 0.4053 | Equal Variances |
| Variances | Levene Equality of Variance | 7.111 | 6.927 | 0.0092 | Unequal Variances |
| Distribution | Shapiro-Wilk W Normality | 0.5586 | 0.8328 | <0.0001 | Non-normal Distribution |
| Distribution | Kolmogorov-Smirnov D | 0.4333 | 0.2542 | <0.0001 | Non-normal Distribution |
| Distribution | D'Agostino Skewness | 3.998 | 2.576 | <0.0001 | Non-normal Distribution |
| Distribution | Anderson-Darling A2 Normality | 3.065 | 3.878 | <0.0001 | Non-normal Distribution |

**Proportion Normal Summary**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.0% | 0.0% |
| 18 | | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.0% | 0.0% |
| 32 | | 5 | 0.2 | 0 | 0.7553 | 0 | 0 | 1 | 0.2 | 223.6% | 80.0% |
| 56 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 100 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 180 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

**Angular (Corrected) Transformed Summary**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 5 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 0 | 0.0% | 0.0% |
| 18 | | 5 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 | 0 | 0.0% | 0.0% |
| 32 | | 5 | 0.3442 | -0.4725 | 1.161 | 0.05002 | 0.05002 | 1.521 | 0.2942 | 191.1% | 77.37% |
| 56 | | 5 | 0.05002 | 0.05001 | 0.05003 | 0.05002 | 0.05002 | 0.05002 | 0 | 0.0% | 96.71% |
| 100 | | 5 | 0.05002 | 0.05001 | 0.05003 | 0.05002 | 0.05002 | 0.05002 | 0 | 0.0% | 96.71% |
| 180 | | 5 | 0.05002 | 0.05001 | 0.05003 | 0.05002 | 0.05002 | 0.05002 | 0 | 0.0% | 96.71% |

**Proportion Normal Detail**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 18 | | 1 | 1 | 1 | 1 | 1 |
| 32 | | 0 | 1 | 0 | 0 | 0 |
| 56 | | 0 | 0 | 0 | 0 | 0 |
| 100 | | 0 | 0 | 0 | 0 | 0 |
| 180 | | 0 | 0 | 0 | 0 | 0 |

**Red Abalone Larval Development Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 19-2344-1017 | **Endpoint:** | Proportion Normal | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 05 Aug-14 8:00 | **Analysis:** | Nonparametric-Control vs Treatments | **Official Results:** | Yes |

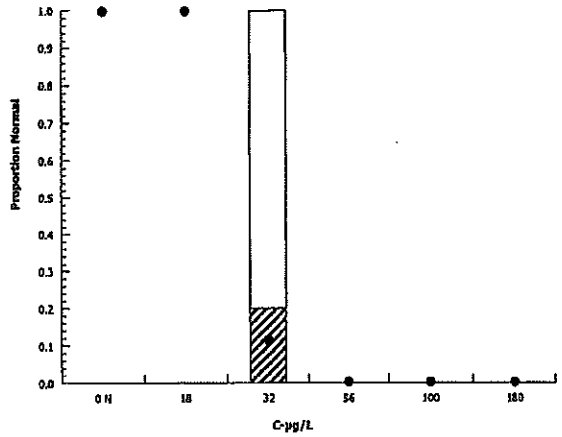
### Angular (Corrected) Transformed Detail

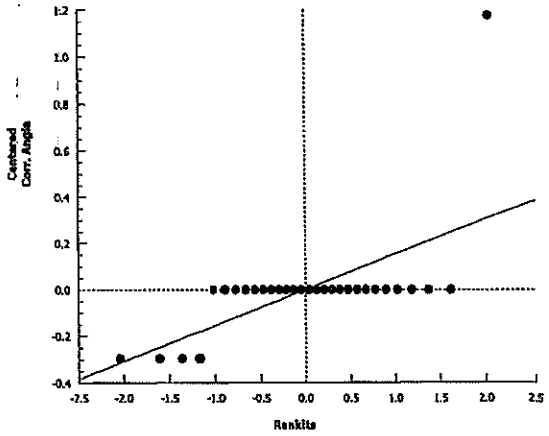
| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 |
| 18 | | 1.521 | 1.521 | 1.521 | 1.521 | 1.521 |
| 32 | | 0.05002 | 1.521 | 0.05002 | 0.05002 | 0.05002 |
| 56 | | 0.05002 | 0.05002 | 0.05002 | 0.05002 | 0.05002 |
| 100 | | 0.05002 | 0.05002 | 0.05002 | 0.05002 | 0.05002 |
| 180 | | 0.05002 | 0.05002 | 0.05002 | 0.05002 | 0.05002 |

### Proportion Normal Binomials

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 18 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 32 | | 0/100 | 100/100 | 0/100 | 0/100 | 0/100 |
| 56 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |
| 100 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |
| 180 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |

### Graphics



# CETIS Analytical Report

Report Date: 05 Aug-14 08:01 (p 1 of 2)
Test Code: ABS071714 | 06-7494-8136

**Red Abalone Larval Development Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 15-5247-2509 | **Endpoint:** | Proportion Normal | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 05 Aug-14 8:00 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 03-2487-2226 | **Code:** | ABS071714 | **Client:** | Internal Lab |
| **Sample Date:** | 17 Jul-14 12:30 | **Material:** | Zinc | **Project:** | REF TOX |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 0 | 280 | Yes | Two-Point Interpolation |

**Point Estimates**

| Level | µg/L | 95% LCL | 95% UCL |
|---|---|---|---|
| EC5 | 18.88 | 18.61 | 20.19 |
| EC10 | 19.75 | 19.22 | 22.38 |
| EC15 | 20.63 | 19.84 | 24.56 |
| EC20 | 21.5 | 20.45 | 26.75 |
| EC25 | 22.38 | 21.06 | 28.94 |
| EC40 | 25 | 22.9 | 35.5 |
| EC50 | 26.75 | 24.13 | 40.63 |

**Proportion Normal Summary**

| | | | Calculated Variate(A/B) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-µg/L | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect | A | B |
| 0 | Negative Control | 5 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 500 | 500 |
| 18 | | 5 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 500 | 500 |
| 32 | | 5 | 0.2 | 0 | 1 | 0.2 | 0.4472 | 223.6% | 80.0% | 100 | 500 |
| 56 | | 5 | 0 | 0 | 0 | 0 | 0 | | 100.0% | 0 | 500 |
| 100 | | 5 | 0 | 0 | 0 | 0 | 0 | | 100.0% | 0 | 500 |
| 180 | | 5 | 0 | 0 | 0 | 0 | 0 | | 100.0% | 0 | 500 |

**Proportion Normal Detail**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 18 | | 1 | 1 | 1 | 1 | 1 |
| 32 | | 0 | 1 | 0 | 0 | 0 |
| 56 | | 0 | 0 | 0 | 0 | 0 |
| 100 | | 0 | 0 | 0 | 0 | 0 |
| 180 | | 0 | 0 | 0 | 0 | 0 |

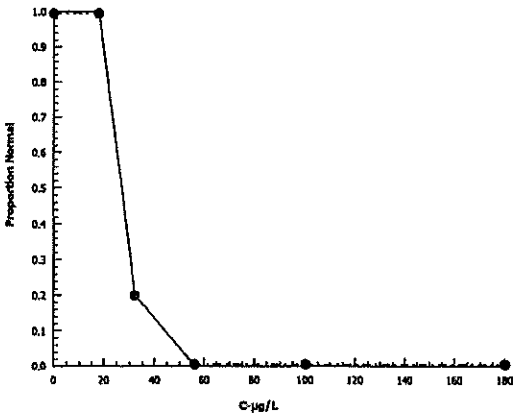
**Proportion Normal Binomials**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 18 | | 100/100 | 100/100 | 100/100 | 100/100 | 100/100 |
| 32 | | 0/100 | 100/100 | 0/100 | 0/100 | 0/100 |
| 56 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |
| 100 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |
| 180 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |

**Red Abalone Larval Development Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 15-5247-2509 | **Endpoint:** | Proportion Normal | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 05 Aug-14 8:00 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

### Graphics



# CETIS Measurement Report



**Red Abalone Larval Development Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 06-2860-0472 | **Test Type:** | Development | **Analyst:** | |
| **Start Date:** | 17 Jul-14 12:30 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 19 Jul-14 12:30 | **Species:** | Haliotis rufescens | **Brine:** | Not Applicable |
| **Duration:** | 48h | **Source:** | Cultured Abalone | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 03-2487-2226 | **Code:** | ABS071714 | **Client:** | Internal Lab |
| **Sample Date:** | 17 Jul-14 12:30 | **Material:** | Zinc | **Project:** | REF TOX |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

**Parameter Acceptability Criteria**

| Parameter | Min | Max | Acceptability Limits | Overlap | Decision |
|---|---|---|---|---|---|
| Salinity-ppt | 34 | 34 | 32 - 36 | Yes | Results Within Limits |
| Temperature-°C | 14.6 | 14.8 | 14 - 16 | Yes | Results Within Limits |

**Dissolved Oxygen-mg/L**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 6.9 | 1.818 | 11.98 | 6.5 | 7.3 | 0.4 | 0.5657 | 8.2% | 0 |
| 18 | | 2 | 7.15 | 2.703 | 11.6 | 6.8 | 7.5 | 0.35 | 0.495 | 6.92% | 0 |
| 32 | | 2 | 7.15 | 2.703 | 11.6 | 6.8 | 7.5 | 0.35 | 0.495 | 6.92% | 0 |
| 56 | | 2 | 7.15 | 2.703 | 11.6 | 6.8 | 7.5 | 0.35 | 0.495 | 6.92% | 0 |
| 100 | | 2 | 7.15 | 2.703 | 11.6 | 6.8 | 7.5 | 0.35 | 0.495 | 6.92% | 0 |
| 180 | | 2 | 7.15 | 2.703 | 11.6 | 6.8 | 7.5 | 0.35 | 0.495 | 6.92% | 0 |
| Overall | | 12 | 7.108 | | | 6.5 | 7.5 | | | | 0 (0%) |

**pH-Units**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 7.45 | 6.815 | 8.085 | 7.4 | 7.5 | 0.05 | 0.07072 | 0.95% | 0 |
| 18 | | 2 | 7.45 | 6.815 | 8.085 | 7.4 | 7.5 | 0.05 | 0.07072 | 0.95% | 0 |
| 32 | | 2 | 7.45 | 6.815 | 8.085 | 7.4 | 7.5 | 0.05 | 0.07072 | 0.95% | 0 |
| 56 | | 2 | 7.45 | 6.815 | 8.085 | 7.4 | 7.5 | 0.05 | 0.07072 | 0.95% | 0 |
| 100 | | 2 | 7.45 | 6.815 | 8.085 | 7.4 | 7.5 | 0.05 | 0.07072 | 0.95% | 0 |
| 180 | | 2 | 7.45 | 6.815 | 8.085 | 7.4 | 7.5 | 0.05 | 0.07072 | 0.95% | 0 |
| Overall | | 12 | 7.45 | | | 7.4 | 7.5 | | | | 0 (0%) |

**Salinity-ppt**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 18 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 32 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 56 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 100 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 180 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| Overall | | 12 | 34 | | | 34 | 34 | | | | 0 (0%) |

**Temperature-°C**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 18 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 32 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 56 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 100 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 180 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| Overall | | 12 | 14.7 | | | 14.6 | 14.8 | | | | 0 (0%) |

**Dissolved Oxygen-mg/L**

| C-µg/L | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 7.3 | 6.5 |
| 18 | | 7.5 | 6.8 |
| 32 | | 7.5 | 6.8 |
| 56 | | 7.5 | 6.8 |
| 100 | | 7.5 | 6.8 |
| 180 | | 7.5 | 6.8 |

**pH-Units**

| C-µg/L | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 7.4 | 7.5 |
| 18 | | 7.4 | 7.5 |
| 32 | | 7.4 | 7.5 |
| 56 | | 7.4 | 7.5 |
| 100 | | 7.4 | 7.5 |
| 180 | | 7.4 | 7.5 |

**Salinity-ppt**

| C-µg/L | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 34 | 34 |
| 18 | | 34 | 34 |
| 32 | | 34 | 34 |
| 56 | | 34 | 34 |
| 100 | | 34 | 34 |
| 180 | | 34 | 34 |

**Temperature-°C**

| C-µg/L | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 14.6 | 14.8 |
| 18 | | 14.6 | 14.8 |
| 32 | | 14.6 | 14.8 |
| 56 | | 14.6 | 14.8 |
| 100 | | 14.6 | 14.8 |
| 180 | | 14.6 | 14.8 |

aquatic bioassay & consulting laboratories, inc

July 8, 2014

Freeport McMoRan O&G
c/o LTS
704 Adirondack Ave.
Ventura, CA 93003

Dear Mr. Lawry:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms EPA/600/R-95-136, 1995* "All acceptability criteria were met. This is a valid test." Results were as follows:

| | |
|---|---|
| CLIENT: | Freeport McMoRan O&G |
| SAMPLE I.D.: | T-31 NPDES (Platform Hidalgo) |
| DATE RECEIVED: | 12 June - 14 |
| ABC LAB. NO.: | LTS0614.082 |

**CHRONIC TOPSMELT SURVIVAL & GROWTH BIOASSAY**

IWC CONCENTRATION = 0.0233%

**TST RESULT**

| | |
|---|---|
| SURVIVAL | PASS |
| GROWTH | PASS |

Yours very truly,

Scott Johnson
Laboratory Director

29 north olive st. ventura, ca 93001 (805) 643 5621 www.aquabio.org

# CETIS Summary Report

Report Date: 01 Jul-14 15:19 (p 1 of 2)
Test Code: LTS0614.082tops | 13-6520-8876

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 18-8961-0932 | **Test Type:** | Growth-Survival (7d) | **Analyst:** | |
| **Start Date:** | 12 Jun-14 13:25 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 19 Jun-14 11:35 | **Species:** | Atherinops affinis | **Brine:** | Not Applicable |
| **Duration:** | 6d 22h | **Source:** | Aquatic Biosystems, CO | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 18-5050-7459 | **Code:** | LTS0614.082tops | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 23h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

**Comparison Summary**

| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method |
|---|---|---|---|---|---|---|---|
| 00-1762-0230 | 7d Survival Rate | 0.0349 | >0.0349 | NA | 8.76% | 2865 | Steel Many-One Rank Sum Test |
| 08-4303-7276 | Mean Dry Biomass-mg | 0.0349 | >0.0349 | NA | 37.8% | 2865 | Dunnett Multiple Comparison Test |

**Point Estimate Summary**

| Analysis ID | Endpoint | Level | % | 95% LCL | 95% UCL | TU | Method |
|---|---|---|---|---|---|---|---|
| 01-9622-8150 | 7d Survival Rate | EC5 | >0.0349 | N/A | N/A | <2865 | Linear Interpolation (ICPIN) |
| | | EC10 | >0.0349 | N/A | N/A | <2865 | |
| | | EC15 | >0.0349 | N/A | N/A | <2865 | |
| | | EC20 | >0.0349 | N/A | N/A | <2865 | |
| | | EC25 | >0.0349 | N/A | N/A | <2865 | |
| | | EC40 | >0.0349 | N/A | N/A | <2865 | |
| | | EC50 | >0.0349 | N/A | N/A | <2865 | |
| 16-2122-3008 | Mean Dry Biomass-mg | IC5 | >0.0349 | N/A | N/A | <2865 | Linear Interpolation (ICPIN) |
| | | IC10 | >0.0349 | N/A | N/A | <2865 | |
| | | IC15 | >0.0349 | N/A | N/A | <2865 | |
| | | IC20 | >0.0349 | N/A | N/A | <2865 | |
| | | IC25 | >0.0349 | N/A | N/A | <2865 | |
| | | IC40 | >0.0349 | N/A | N/A | <2865 | |
| | | IC50 | >0.0349 | N/A | N/A | <2865 | |

**Test Acceptability**

| Analysis ID | Endpoint | Attribute | Test Stat | TAC Limits | Overlap | Decision |
|---|---|---|---|---|---|---|
| 00-1762-0230 | 7d Survival Rate | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |
| 01-9622-8150 | 7d Survival Rate | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |
| 08-4303-7276 | Mean Dry Biomass-mg | Control Resp | 1.568 | 0.85 - NL | Yes | Passes Acceptability Criteria |
| 16-2122-3008 | Mean Dry Biomass-mg | Control Resp | 1.568 | 0.85 - NL | Yes | Passes Acceptability Criteria |
| 00-1762-0230 | 7d Survival Rate | PMSD | 0.08762 | NL - 0.25 | No | Passes Acceptability Criteria |
| 08-4303-7276 | Mean Dry Biomass-mg | PMSD | 0.3783 | NL - 0.5 | No | Passes Acceptability Criteria |

**7d Survival Rate Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 0.0116 | | 5 | 0.96 | 0.8489 | 1 | 0.8 | 1 | 0.04 | 0.08944 | 9.32% | 4.0% |
| 0.0233 | | 5 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 0.0349 | | 5 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |

**Mean Dry Biomass-mg Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1.568 | 0.7715 | 2.364 | 1.02 | 2.49 | 0.2869 | 0.6414 | 40.91% | 0.0% |
| 0.0116 | | 5 | 1.948 | 1.668 | 2.227 | 1.658 | 2.246 | 0.1005 | 0.2248 | 11.54% | -24.21% |
| 0.0233 | | 5 | 1.894 | 1.67 | 2.117 | 1.68 | 2.132 | 0.08041 | 0.1798 | 9.5% | -20.77% |
| 0.0349 | | 5 | 1.805 | 1.229 | 2.381 | 1.118 | 2.324 | 0.2074 | 0.4637 | 25.69% | -15.13% |

### 7d Survival Rate Detail

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 0.0116 | | 1 | 0.8 | 1 | 1 | 1 |
| 0.0233 | | 1 | 1 | 1 | 1 | 1 |
| 0.0349 | | 1 | 1 | 1 | 1 | 1 |

### Mean Dry Biomass-mg Detail

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.02 | 1.186 | 1.154 | 2.49 | 1.99 |
| 0.0116 | | 1.962 | 2.246 | 1.816 | 2.056 | 1.658 |
| 0.0233 | | 1.68 | 1.808 | 1.83 | 2.018 | 2.132 |
| 0.0349 | | 2.028 | 1.962 | 2.324 | 1.594 | 1.118 |

### 7d Survival Rate Binomials

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |
| 0.0116 | | 5/5 | 4/5 | 5/5 | 5/5 | 5/5 |
| 0.0233 | | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |
| 0.0349 | | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |

# CETIS Analytical Report

Report Date: 01 Jul-14 15:19 (p 1 of 4)
Test Code: LTS0614.082tops | 13-6520-8876

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 00-1762-0230 | **Endpoint:** | 7d Survival Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 01 Jul-14 15:18 | **Analysis:** | Nonparametric-Control vs Treatments | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 18-5050-7459 | **Code:** | LTS0614.082tops | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 23h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

| Data Transform | Zeta | Alt Hyp | Trials | Seed | PMSD | NOEL | LOEL | TOEL | TU |
|---|---|---|---|---|---|---|---|---|---|
| Angular (Corrected) | NA | C > T | NA | NA | 8.76% | 0.0349 | >0.0349 | NA | 2865 |

**Steel Many-One Rank Sum Test**

| Control | vs | C-% | Test Stat | Critical | Ties | DF | P-Value | P-Type | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Negative Control | | 0.0116 | 25 | 17 | 1 | 8 | 0.5314 | Asymp | Non-Significant Effect |
| | | 0.0233 | 27.5 | 17 | 1 | 8 | 0.7500 | Asymp | Non-Significant Effect |
| | | 0.0349 | 27.5 | 17 | 1 | 8 | 0.7500 | Asymp | Non-Significant Effect |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.008506184 | 0.002835395 | 3 | 1 | 0.4182 | Non-Significant Effect |
| Error | 0.04536632 | 0.002835395 | 16 | | | |
| Total | 0.0538725 | | 19 | | | |

**Distributional Tests**

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variances | Mod Levene Equality of Variance | 1 | 5.953 | 0.4262 | Equal Variances |
| Variances | Levene Equality of Variance | 7.111 | 5.292 | 0.0030 | Unequal Variances |
| Distribution | Shapiro-Wilk W Normality | 0.4969 | 0.866 | <0.0001 | Non-normal Distribution |
| Distribution | Kolmogorov-Smirnov D | 0.45 | 0.2235 | <0.0001 | Non-normal Distribution |
| Distribution | D'Agostino Skewness | 4.576 | 2.576 | <0.0001 | Non-normal Distribution |
| Distribution | D'Agostino Kurtosis | 4.175 | 2.576 | <0.0001 | Non-normal Distribution |
| Distribution | D'Agostino-Pearson K2 Omnibus | 38.38 | 9.21 | <0.0001 | Non-normal Distribution |
| Distribution | Anderson-Darling A2 Normality | 4.585 | 3.878 | <0.0001 | Non-normal Distribution |

**7d Survival Rate Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.0% | 0.0% |
| 0.0116 | | 5 | 0.96 | 0.8489 | 1 | 1 | 0.8 | 1 | 0.04 | 9.32% | 4.0% |
| 0.0233 | | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.0% | 0.0% |
| 0.0349 | | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.0% | 0.0% |

**Angular (Corrected) Transformed Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 5 | 1.345 | 1.345 | 1.346 | 1.345 | 1.345 | 1.345 | 0 | 0.0% | 0.0% |
| 0.0116 | | 5 | 1.298 | 1.165 | 1.43 | 1.345 | 1.107 | 1.345 | 0.04763 | 8.21% | 3.54% |
| 0.0233 | | 5 | 1.345 | 1.345 | 1.346 | 1.345 | 1.345 | 1.345 | 0 | 0.0% | 0.0% |
| 0.0349 | | 5 | 1.345 | 1.345 | 1.346 | 1.345 | 1.345 | 1.345 | 0 | 0.0% | 0.0% |

**7d Survival Rate Detail**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 0.0116 | | 1 | 0.8 | 1 | 1 | 1 |
| 0.0233 | | 1 | 1 | 1 | 1 | 1 |
| 0.0349 | | 1 | 1 | 1 | 1 | 1 |

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 00-1762-0230 | **Endpoint:** | 7d Survival Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 01 Jul-14 15:18 | **Analysis:** | Nonparametric-Control vs Treatments | **Official Results:** | Yes |

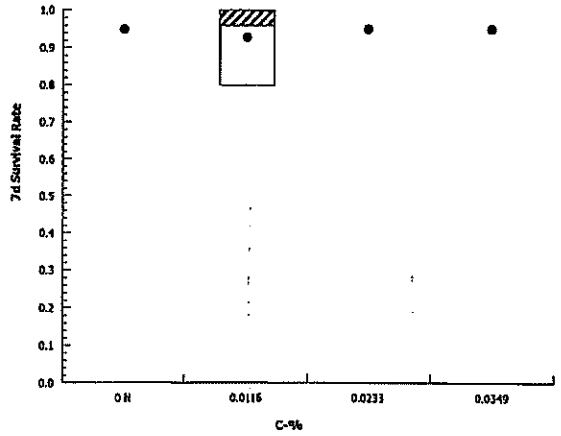
## Angular (Corrected) Transformed Detail

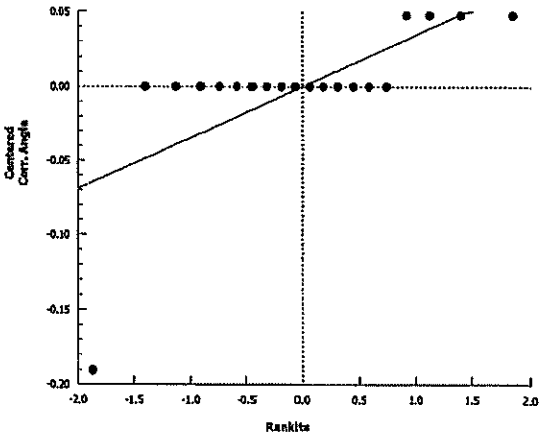
| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.345 | 1.345 | 1.345 | 1.345 | 1.345 |
| 0.0116 | | 1.345 | 1.107 | 1.345 | 1.345 | 1.345 |
| 0.0233 | | 1.345 | 1.345 | 1.345 | 1.345 | 1.345 |
| 0.0349 | | 1.345 | 1.345 | 1.345 | 1.345 | 1.345 |

## 7d Survival Rate Binomials

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |
| 0.0116 | | 5/5 | 4/5 | 5/5 | 5/5 | 5/5 |
| 0.0233 | | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |
| 0.0349 | | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |

## Graphics



**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 08-4303-7276 | **Endpoint:** | Mean Dry Biomass-mg | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 01 Jul-14 15:18 | **Analysis:** | Parametric-Control vs Treatments | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 18-5050-7459 | **Code:** | LTS0614.082tops | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 23h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

| Data Transform | Zeta | Alt Hyp | Trials | Seed | PMSD | NOEL | LOEL | TOEL | TU |
|---|---|---|---|---|---|---|---|---|---|
| Untransformed | NA | C > T | NA | NA | 37.8% | 0.0349 | >0.0349 | NA | 2865 |

**Dunnett Multiple Comparison Test**

| Control vs | C-% | Test Stat | Critical | MSD | DF | P-Value | P-Type | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|
| Negative Control | 0.0116 | -1.425 | 2.227 | 0.593 | 8 | 0.9864 | CDF | Non-Significant Effect |
| | 0.0233 | -1.222 | 2.227 | 0.593 | 8 | 0.9775 | CDF | Non-Significant Effect |
| | 0.0349 | -0.8906 | 2.227 | 0.593 | 8 | 0.9514 | CDF | Non-Significant Effect |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.4217295 | 0.1405765 | 3 | 0.7927 | 0.5156 | Non-Significant Effect |
| Error | 2.837515 | 0.1773447 | 16 | | | |
| Total | 3.259245 | | 19 | | | |

**Distributional Tests**

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variances | Bartlett Equality of Variance | 6.966 | 11.34 | 0.0730 | Equal Variances |
| Variances | Mod Levene Equality of Variance | 1.22 | 5.953 | 0.3447 | Equal Variances |
| Variances | Levene Equality of Variance | 5.404 | 5.292 | 0.0092 | Unequal Variances |
| Distribution | Shapiro-Wilk W Normality | 0.986 | 0.866 | 0.9871 | Normal Distribution |
| Distribution | Kolmogorov-Smirnov D | 0.07001 | 0.2235 | 1.0000 | Normal Distribution |
| Distribution | D'Agostino Skewness | 0.8185 | 2.576 | 0.4131 | Normal Distribution |
| Distribution | D'Agostino Kurtosis | 0.6339 | 2.576 | 0.5261 | Normal Distribution |
| Distribution | D'Agostino-Pearson K2 Omnibus | 1.072 | 9.21 | 0.5851 | Normal Distribution |
| Distribution | Anderson-Darling A2 Normality | 0.1386 | 3.878 | 1.0000 | Normal Distribution |

**Mean Dry Biomass-mg Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1.568 | 0.7715 | 2.364 | 1.186 | 1.02 | 2.49 | 0.2869 | 40.91% | 0.0% |
| 0.0116 | | 5 | 1.948 | 1.668 | 2.227 | 1.962 | 1.658 | 2.246 | 0.1005 | 11.54% | -24.21% |
| 0.0233 | | 5 | 1.894 | 1.67 | 2.117 | 1.83 | 1.68 | 2.132 | 0.08041 | 9.5% | -20.77% |
| 0.0349 | | 5 | 1.805 | 1.229 | 2.381 | 1.962 | 1.118 | 2.324 | 0.2074 | 25.69% | -15.13% |

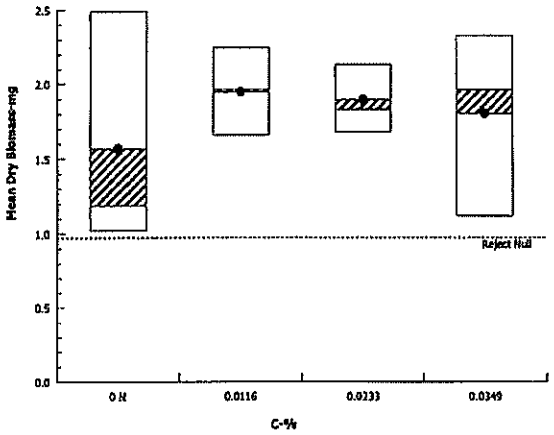
**Mean Dry Biomass-mg Detail**

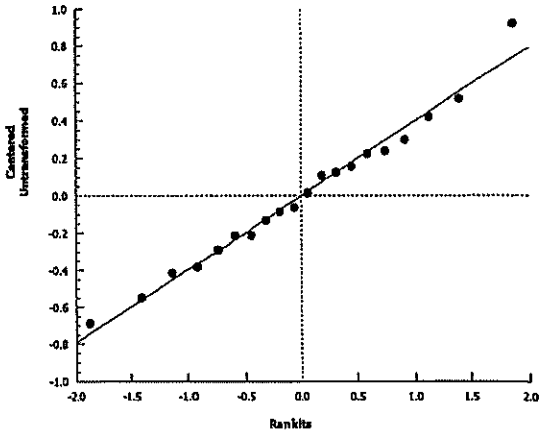
| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.02 | 1.186 | 1.154 | 2.49 | 1.99 |
| 0.0116 | | 1.962 | 2.246 | 1.816 | 2.056 | 1.658 |
| 0.0233 | | 1.68 | 1.808 | 1.83 | 2.018 | 2.132 |
| 0.0349 | | 2.028 | 1.962 | 2.324 | 1.594 | 1.118 |

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 08-4303-7276 | **Endpoint:** | Mean Dry Biomass-mg | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 01 Jul-14 15:18 | **Analysis:** | Parametric-Control vs Treatments | **Official Results:** | Yes |

**Graphics**



# CETIS Analytical Report

Report Date: 01 Jul-14 15:19 (p 1 of 3)
Test Code: LTS0614.082tops | 13-6520-8876

**Pacific Topsmelt 7-d Survival and Growth Test** — Aquatic Bioassay & Consulting Labs, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 01-9622-8150 | **Endpoint:** | 7d Survival Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 01 Jul-14 15:18 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 18-5050-7459 | **Code:** | LTS0614.082tops | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 23h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 0 | 280 | Yes | Two-Point Interpolation |

**Point Estimates**

| Level | % | 95% LCL | 95% UCL | TU | 95% LCL | 95% UCL |
|---|---|---|---|---|---|---|
| EC5 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC10 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC15 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC20 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC25 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC40 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC50 | >0.0349 | N/A | N/A | <2865 | NA | NA |

**7d Survival Rate Summary**

| | | | Calculated Variate(A/B) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-% | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect | A | B |
| 0 | Negative Control | 5 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 25 | 25 |
| 0.0116 | | 5 | 0.96 | 0.8 | 1 | 0.04 | 0.08944 | 9.32% | 4.0% | 24 | 25 |
| 0.0233 | | 5 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 25 | 25 |
| 0.0349 | | 5 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 25 | 25 |

**7d Survival Rate Detail**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 0.0116 | | 1 | 0.8 | 1 | 1 | 1 |
| 0.0233 | | 1 | 1 | 1 | 1 | 1 |
| 0.0349 | | 1 | 1 | 1 | 1 | 1 |

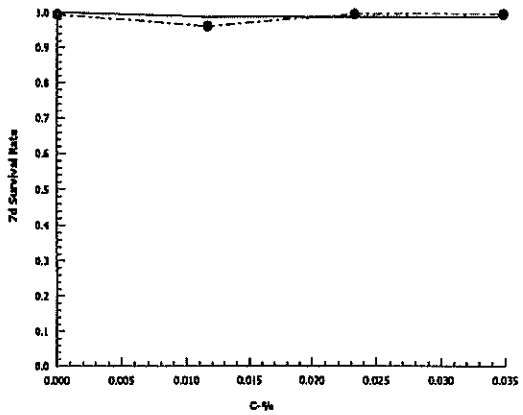
**7d Survival Rate Binomials**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |
| 0.0116 | | 5/5 | 4/5 | 5/5 | 5/5 | 5/5 |
| 0.0233 | | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |
| 0.0349 | | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 01-9622-8150 | **Endpoint:** | 7d Survival Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 01 Jul-14 15:18 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

**Graphics**



**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 16-2122-3008 | **Endpoint:** | Mean Dry Biomass-mg | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 01 Jul-14 15:18 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 18-5050-7459 | **Code:** | LTS0614.082tops | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 23h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 639448 | 280 | Yes | Two-Point Interpolation |

**Point Estimates**

| Level | % | 95% LCL | 95% UCL | TU | 95% LCL | 95% UCL |
|---|---|---|---|---|---|---|
| IC5 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC10 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC15 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC20 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC25 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC40 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC50 | >0.0349 | N/A | N/A | <2865 | NA | NA |

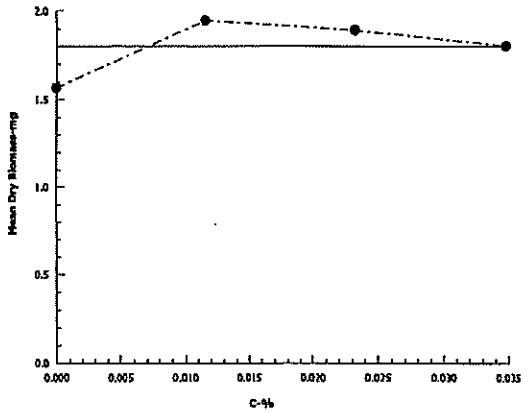
**Mean Dry Biomass-mg Summary**

| | | | Calculated Variate | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C-% | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Negative Control | 5 | 1.568 | 1.02 | 2.49 | 0.2869 | 0.6414 | 40.91% | 0.0% |
| 0.0116 | | 5 | 1.948 | 1.658 | 2.246 | 0.1005 | 0.2248 | 11.54% | -24.21% |
| 0.0233 | | 5 | 1.894 | 1.68 | 2.132 | 0.08041 | 0.1798 | 9.5% | -20.77% |
| 0.0349 | | 5 | 1.805 | 1.118 | 2.324 | 0.2074 | 0.4637 | 25.69% | -15.13% |

**Mean Dry Biomass-mg Detail**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.02 | 1.186 | 1.154 | 2.49 | 1.99 |
| 0.0116 | | 1.962 | 2.246 | 1.816 | 2.056 | 1.658 |
| 0.0233 | | 1.68 | 1.808 | 1.83 | 2.018 | 2.132 |
| 0.0349 | | 2.028 | 1.962 | 2.324 | 1.594 | 1.118 |

**Graphics**



# CETIS Measurement Report



**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 18-8961-0932 | **Test Type:** | Growth-Survival (7d) | **Analyst:** | |
| **Start Date:** | 12 Jun-14 13:25 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 19 Jun-14 11:35 | **Species:** | Atherinops affinis | **Brine:** | Not Applicable |
| **Duration:** | 6d 22h | **Source:** | Aquatic Biosystems, CO | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 18-5050-7459 | **Code:** | LTS0614.082tops | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 23h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

**Dissolved Oxygen-mg/L**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 8 | 6.838 | 6.294 | 7.381 | 5.9 | 7.9 | 0.2299 | 0.6501 | 9.51% | 0 |
| 0.0116 | | 8 | 6.575 | 5.966 | 7.184 | 5 | 7.2 | 0.2576 | 0.7285 | 11.08% | 0 |
| 0.0233 | | 8 | 6.625 | 6.039 | 7.211 | 5.1 | 7.2 | 0.2477 | 0.7005 | 10.57% | 0 |
| 0.0349 | | 8 | 6.613 | 6.094 | 7.131 | 5.4 | 7.1 | 0.2191 | 0.6198 | 9.37% | 0 |
| Overall | | 32 | 6.663 | | | 5 | 7.9 | | | | 0 (0%) |

**pH-Units**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 8 | 7.688 | 7.566 | 7.809 | 7.6 | 8 | 0.05154 | 0.1458 | 1.9% | 0 |
| 0.0116 | | 8 | 7.713 | 7.63 | 7.795 | 7.6 | 7.9 | 0.03504 | 0.0991 | 1.29% | 0 |
| 0.0233 | | 8 | 7.7 | 7.637 | 7.763 | 7.6 | 7.8 | 0.02673 | 0.07559 | 0.98% | 0 |
| 0.0349 | | 8 | 7.7 | 7.637 | 7.763 | 7.6 | 7.8 | 0.02673 | 0.07559 | 0.98% | 0 |
| Overall | | 32 | 7.7 | | | 7.6 | 8 | | | | 0 (0%) |

**Salinity-ppt**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 8 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 0.0116 | | 8 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 0.0233 | | 8 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 0.0349 | | 8 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| Overall | | 32 | 34 | | | 34 | 34 | | | | 0 (0%) |

**Temperature-°C**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 8 | 21 | 21 | 21 | 21 | 21 | 0 | 0 | 0.0% | 0 |
| 0.0116 | | 8 | 21 | 21 | 21 | 21 | 21 | 0 | 0 | 0.0% | 0 |
| 0.0233 | | 8 | 21 | 21 | 21 | 21 | 21 | 0 | 0 | 0.0% | 0 |
| 0.0349 | | 8 | 21 | 21 | 21 | 21 | 21 | 0 | 0 | 0.0% | 0 |
| Overall | | 32 | 21 | | | 21 | 21 | | | | 0 (0%) |

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

**Dissolved Oxygen-mg/L**

| C-% | Control Type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 7.9 | 6.7 | 6.9 | 7 | 7.2 | 6 | 7.1 | 5.9 |
| 0.0116 | | 6.5 | 7 | 6.8 | 6.9 | 7.1 | 6.1 | 7.2 | 5 |
| 0.0233 | | 6.8 | 7 | 6.8 | 6.9 | 7.1 | 6.1 | 7.2 | 5.1 |
| 0.0349 | | 6.8 | 6.9 | 6.8 | 6.9 | 7.1 | 5.9 | 7.1 | 5.4 |

**pH-Units**

| C-% | Control Type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 8 | 7.6 | 7.6 | 7.6 | 7.6 | 7.8 | 7.7 | 7.6 |
| 0.0116 | | 7.7 | 7.6 | 7.7 | 7.7 | 7.7 | 7.9 | 7.8 | 7.6 |
| 0.0233 | | 7.7 | 7.6 | 7.7 | 7.7 | 7.7 | 7.8 | 7.8 | 7.6 |
| 0.0349 | | 7.7 | 7.6 | 7.7 | 7.7 | 7.7 | 7.8 | 7.8 | 7.6 |

**Salinity-ppt**

| C-% | Control Type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| 0.0116 | | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| 0.0233 | | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| 0.0349 | | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |

**Temperature-°C**

| C-% | Control Type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 0.0116 | | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 0.0233 | | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 0.0349 | | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |

aquatic bioassay & consulting laboratories, inc

July 8, 2014

Freeport McMoRan O&G
c/o LTS
704 Adirondack Ave.
Ventura, CA 93003

Dear Mr. Lawry:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receving Waters to West Coast Estuarine Organisms, EPA/R-95/136.* "All acceptability criteria were met. This is a valid test." Results were as follows:

| | |
|---|---|
| CLIENT: | Freeport McMoRan O&G |
| SAMPLE I.D.: | T-31 NPDES (Platform Hidalgo) |
| DATE RECEIVED: | 12 June - 14 |
| ABC LAB. NO.: | LTS0614.082 |

**CHRONIC KELP GERMINATION AND GROWTH BIOASSAY**

IWC CONCENTRATION = 0.0233%

**TST RESULT**

| | |
|---|---|
| Germination | PASS |
| Tube Length | PASS |

Yours very truly,

Scott Johnson
Laboratory Director

# CETIS Summary Report

Report Date: 02 Jul-14 14:26 (p 1 of 2)
Test Code: LTS0614.082klp | 05-0713-0208

**Macrocystis Germination and Germ Tube Growth Test** — Aquatic Bioassay & Consulting Labs, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 09-6563-9829 | **Test Type:** | Growth-Germination | **Analyst:** | |
| **Start Date:** | 12 Jun-14 16:12 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 14 Jun-14 16:12 | **Species:** | Macrocystis pyrifera | **Brine:** | Not Applicable |
| **Duration:** | 48h | **Source:** | Aquatic Bioassay Labs Collection | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 15-1214-3958 | **Code:** | LTS0614.082klp | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 26h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

**Comparison Summary**

| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method |
|---|---|---|---|---|---|---|---|
| 05-7649-1252 | Germination Rate | 0.0349 | >0.0349 | NA | 1.8% | 2865 | Dunnett Multiple Comparison Test |
| 20-5226-8106 | Mean Length | 0.0349 | >0.0349 | NA | 2.71% | 2865 | Dunnett Multiple Comparison Test |

**Point Estimate Summary**

| Analysis ID | Endpoint | Level | % | 95% LCL | 95% UCL | TU | Method |
|---|---|---|---|---|---|---|---|
| 07-9756-1817 | Germination Rate | EC5 | >0.0349 | N/A | N/A | <2865 | Linear Interpolation (ICPIN) |
| | | EC10 | >0.0349 | N/A | N/A | <2865 | |
| | | EC15 | >0.0349 | N/A | N/A | <2865 | |
| | | EC20 | >0.0349 | N/A | N/A | <2865 | |
| | | EC25 | >0.0349 | N/A | N/A | <2865 | |
| | | EC40 | >0.0349 | N/A | N/A | <2865 | |
| | | EC50 | >0.0349 | N/A | N/A | <2865 | |
| 09-9917-0534 | Mean Length | IC5 | >0.0349 | N/A | N/A | <2865 | Linear Interpolation (ICPIN) |
| | | IC10 | >0.0349 | N/A | N/A | <2865 | |
| | | IC15 | >0.0349 | N/A | N/A | <2865 | |
| | | IC20 | >0.0349 | N/A | N/A | <2865 | |
| | | IC25 | >0.0349 | N/A | N/A | <2865 | |
| | | IC40 | >0.0349 | N/A | N/A | <2865 | |
| | | IC50 | >0.0349 | N/A | N/A | <2865 | |

**Test Acceptability**

| Analysis ID | Endpoint | Attribute | Test Stat | TAC Limits | Overlap | Decision |
|---|---|---|---|---|---|---|
| 05-7649-1252 | Germination Rate | Control Resp | 0.91 | 0.7 - NL | Yes | Passes Acceptability Criteria |
| 07-9756-1817 | Germination Rate | Control Resp | 0.91 | 0.7 - NL | Yes | Passes Acceptability Criteria |
| 09-9917-0534 | Mean Length | Control Resp | 15.64 | 10 - NL | Yes | Passes Acceptability Criteria |
| 20-5226-8106 | Mean Length | Control Resp | 15.64 | 10 - NL | Yes | Passes Acceptability Criteria |
| 05-7649-1252 | Germination Rate | PMSD | 0.01802 | NL - 0.2 | No | Passes Acceptability Criteria |
| 20-5226-8106 | Mean Length | PMSD | 0.02706 | NL - 0.2 | No | Passes Acceptability Criteria |

**Germination Rate Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 0.91 | 0.9012 | 0.9188 | 0.9 | 0.92 | 0.003162 | 0.007071 | 0.78% | 0.0% |
| 0.0116 | | 5 | 0.92 | 0.9076 | 0.9324 | 0.91 | 0.93 | 0.004472 | 0.01 | 1.09% | -1.1% |
| 0.0233 | | 5 | 0.904 | 0.8898 | 0.9182 | 0.89 | 0.92 | 0.005099 | 0.0114 | 1.26% | 0.66% |
| 0.0349 | | 5 | 0.912 | 0.8936 | 0.9304 | 0.89 | 0.93 | 0.006633 | 0.01483 | 1.63% | -0.22% |

**Mean Length Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 15.64 | 15.32 | 15.96 | 15.3 | 15.9 | 0.1166 | 0.2608 | 1.67% | 0.0% |
| 0.0116 | | 5 | 15.86 | 15.37 | 16.35 | 15.6 | 16.5 | 0.1778 | 0.3975 | 2.51% | -1.41% |
| 0.0233 | | 5 | 16.24 | 15.95 | 16.53 | 16 | 16.5 | 0.103 | 0.2302 | 1.42% | -3.84% |
| 0.0349 | | 5 | 15.52 | 15.16 | 15.88 | 15.2 | 15.9 | 0.1281 | 0.2864 | 1.85% | 0.77% |

### Germination Rate Detail

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 0.92 | 0.9 | 0.91 | 0.91 | 0.91 |
| 0.0116 | | 0.91 | 0.92 | 0.93 | 0.91 | 0.93 |
| 0.0233 | | 0.9 | 0.92 | 0.91 | 0.9 | 0.89 |
| 0.0349 | | 0.91 | 0.92 | 0.89 | 0.91 | 0.93 |

### Mean Length Detail

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 15.3 | 15.5 | 15.9 | 15.9 | 15.6 |
| 0.0116 | | 16.5 | 15.6 | 15.6 | 16 | 15.6 |
| 0.0233 | | 16.3 | 16 | 16.4 | 16.5 | 16 |
| 0.0349 | | 15.9 | 15.2 | 15.7 | 15.5 | 15.3 |

### Germination Rate Binomials

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 92/100 | 90/100 | 91/100 | 91/100 | 91/100 |
| 0.0116 | | 91/100 | 92/100 | 93/100 | 91/100 | 93/100 |
| 0.0233 | | 90/100 | 92/100 | 91/100 | 90/100 | 89/100 |
| 0.0349 | | 91/100 | 92/100 | 89/100 | 91/100 | 93/100 |

# CETIS Analytical Report

Report Date: 02 Jul-14 14:26 (p 1 of 4)
Test Code: LTS0614.082klp | 05-0713-0208

**Macrocystis Germination and Germ Tube Growth Test** — Aquatic Bioassay & Consulting Labs, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 05-7649-1252 | **Endpoint:** | Germination Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:25 | **Analysis:** | Parametric-Control vs Treatments | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 15-1214-3958 | **Code:** | LTS0614.082klp | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 26h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

| Data Transform | Zeta | Alt Hyp | Trials | Seed | PMSD | NOEL | LOEL | TOEL | TU |
|---|---|---|---|---|---|---|---|---|---|
| Angular (Corrected) | NA | C > T | NA | NA | 1.8% | 0.0349 | >0.0349 | NA | 2865 |

**Dunnett Multiple Comparison Test**

| Control vs | C-% | Test Stat | Critical | MSD | DF | P-Value | P-Type | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|
| Negative Control | 0.0116 | -1.459 | 2.227 | 0.028 | 8 | 0.9875 | CDF | Non-Significant Effect |
| | 0.0233 | 0.8095 | 2.227 | 0.028 | 8 | 0.4094 | CDF | Non-Significant Effect |
| | 0.0349 | -0.3309 | 2.227 | 0.028 | 8 | 0.8523 | CDF | Non-Significant Effect |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.002060139 | 0.000686713 | 3 | 1.769 | 0.1935 | Non-Significant Effect |
| Error | 0.006209633 | 0.0003881021 | 16 | | | |
| Total | 0.008269772 | | 19 | | | |

**Distributional Tests**

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variances | Bartlett Equality of Variance | 1.885 | 11.34 | 0.5966 | Equal Variances |
| Variances | Mod Levene Equality of Variance | 0.8586 | 5.953 | 0.4889 | Equal Variances |
| Variances | Levene Equality of Variance | 0.93 | 5.292 | 0.4490 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality | 0.9748 | 0.866 | 0.8509 | Normal Distribution |
| Distribution | Kolmogorov-Smirnov D | 0.1539 | 0.2235 | 0.2460 | Normal Distribution |
| Distribution | D'Agostino Skewness | 0.1335 | 2.576 | 0.8938 | Normal Distribution |
| Distribution | D'Agostino Kurtosis | 0.1535 | 2.576 | 0.8780 | Normal Distribution |
| Distribution | D'Agostino-Pearson K2 Omnibus | 0.04138 | 9.21 | 0.9795 | Normal Distribution |
| Distribution | Anderson-Darling A2 Normality | 0.3073 | 3.878 | 0.5906 | Normal Distribution |

**Germination Rate Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 0.91 | 0.9012 | 0.9188 | 0.91 | 0.9 | 0.92 | 0.003162 | 0.78% | 0.0% |
| 0.0116 | | 5 | 0.92 | 0.9076 | 0.9324 | 0.92 | 0.91 | 0.93 | 0.004472 | 1.09% | -1.1% |
| 0.0233 | | 5 | 0.904 | 0.8898 | 0.9182 | 0.9 | 0.89 | 0.92 | 0.005099 | 1.26% | 0.66% |
| 0.0349 | | 5 | 0.912 | 0.8936 | 0.9304 | 0.91 | 0.89 | 0.93 | 0.006633 | 1.63% | -0.22% |

**Angular (Corrected) Transformed Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 5 | 1.266 | 1.251 | 1.282 | 1.266 | 1.249 | 1.284 | 0.005534 | 0.98% | 0.0% |
| 0.0116 | | 5 | 1.284 | 1.262 | 1.307 | 1.284 | 1.266 | 1.303 | 0.008258 | 1.44% | -1.44% |
| 0.0233 | | 5 | 1.256 | 1.232 | 1.28 | 1.249 | 1.233 | 1.284 | 0.008736 | 1.56% | 0.8% |
| 0.0349 | | 5 | 1.27 | 1.238 | 1.303 | 1.266 | 1.233 | 1.303 | 0.01163 | 2.05% | -0.33% |

**Germination Rate Detail**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 0.92 | 0.9 | 0.91 | 0.91 | 0.91 |
| 0.0116 | | 0.91 | 0.92 | 0.93 | 0.91 | 0.93 |
| 0.0233 | | 0.9 | 0.92 | 0.91 | 0.9 | 0.89 |
| 0.0349 | | 0.91 | 0.92 | 0.89 | 0.91 | 0.93 |

**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 05-7649-1252 | **Endpoint:** | Germination Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:25 | **Analysis:** | Parametric-Control vs Treatments | **Official Results:** | Yes |

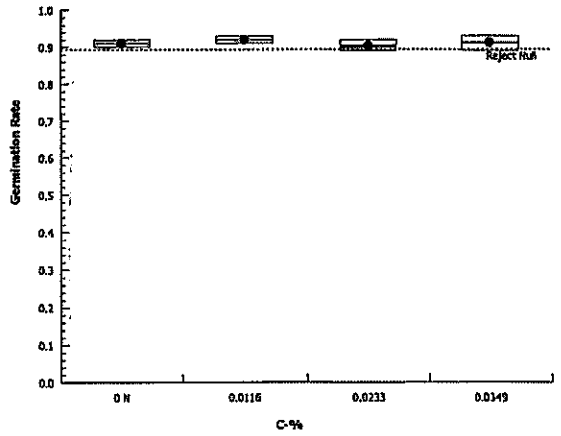
### Angular (Corrected) Transformed Detail

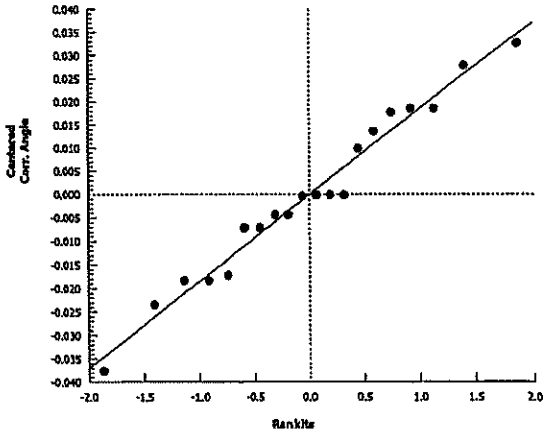
| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.284 | 1.249 | 1.266 | 1.266 | 1.266 |
| 0.0116 | | 1.266 | 1.284 | 1.303 | 1.266 | 1.303 |
| 0.0233 | | 1.249 | 1.284 | 1.266 | 1.249 | 1.233 |
| 0.0349 | | 1.266 | 1.284 | 1.233 | 1.266 | 1.303 |

### Germination Rate Binomials

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 92/100 | 90/100 | 91/100 | 91/100 | 91/100 |
| 0.0116 | | 91/100 | 92/100 | 93/100 | 91/100 | 93/100 |
| 0.0233 | | 90/100 | 92/100 | 91/100 | 90/100 | 89/100 |
| 0.0349 | | 91/100 | 92/100 | 89/100 | 91/100 | 93/100 |

### Graphics



**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 20-5226-8106 | **Endpoint:** | Mean Length | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:25 | **Analysis:** | Parametric-Control vs Treatments | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 15-1214-3958 | **Code:** | LTS0614.082klp | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 26h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

| Data Transform | Zeta | Alt Hyp | Trials | Seed | PMSD | NOEL | LOEL | TOEL | TU |
|---|---|---|---|---|---|---|---|---|---|
| Untransformed | NA | C > T | NA | NA | 2.71% | 0.0349 | >0.0349 | NA | 2865 |

**Dunnett Multiple Comparison Test**

| Control | vs | C-% | Test Stat | Critical | MSD | DF | P-Value | P-Type | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Negative Control | | 0.0116 | -1.158 | 2.227 | 0.423 | 8 | 0.9737 | CDF | Non-Significant Effect |
| | | 0.0233 | -3.158 | 2.227 | 0.423 | 8 | 0.9999 | CDF | Non-Significant Effect |
| | | 0.0349 | 0.6316 | 2.227 | 0.423 | 8 | 0.4866 | CDF | Non-Significant Effect |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 1.5015 | 0.5004998 | 3 | 5.546 | 0.0084 | Significant Effect |
| Error | 1.443998 | 0.0902499 | 16 | | | |
| Total | 2.945498 | | 19 | | | |

**Distributional Tests**

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variances | Bartlett Equality of Variance | 1.272 | 11.34 | 0.7357 | Equal Variances |
| Variances | Mod Levene Equality of Variance | 0.1383 | 5.953 | 0.9352 | Equal Variances |
| Variances | Levene Equality of Variance | 0.7521 | 5.292 | 0.5370 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality | 0.9146 | 0.866 | 0.0779 | Normal Distribution |
| Distribution | Kolmogorov-Smirnov D | 0.1876 | 0.2235 | 0.0634 | Normal Distribution |
| Distribution | D'Agostino Skewness | 1.219 | 2.576 | 0.2228 | Normal Distribution |
| Distribution | D'Agostino Kurtosis | 0.2494 | 2.576 | 0.8030 | Normal Distribution |
| Distribution | D'Agostino-Pearson K2 Omnibus | 1.548 | 9.21 | 0.4611 | Normal Distribution |
| Distribution | Anderson-Darling A2 Normality | 0.7353 | 3.878 | 0.0551 | Normal Distribution |

**Mean Length Summary**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 15.64 | 15.32 | 15.96 | 15.6 | 15.3 | 15.9 | 0.1166 | 1.67% | 0.0% |
| 0.0116 | | 5 | 15.86 | 15.37 | 16.35 | 15.6 | 15.6 | 16.5 | 0.1778 | 2.51% | -1.41% |
| 0.0233 | | 5 | 16.24 | 15.95 | 16.53 | 16.3 | 16 | 16.5 | 0.103 | 1.42% | -3.84% |
| 0.0349 | | 5 | 15.52 | 15.16 | 15.88 | 15.5 | 15.2 | 15.9 | 0.1281 | 1.85% | 0.77% |

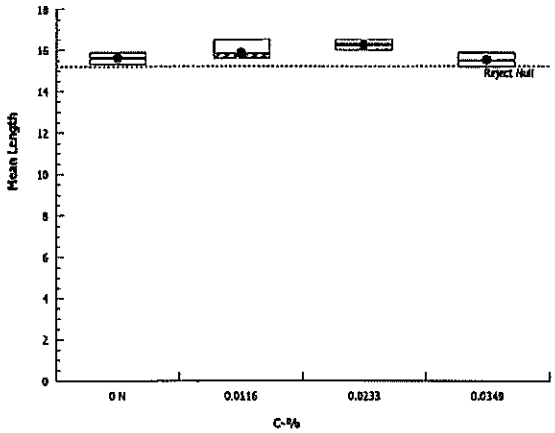
**Mean Length Detail**

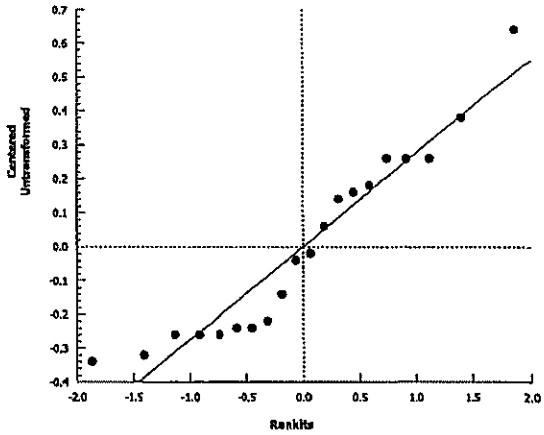
| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 15.3 | 15.5 | 15.9 | 15.9 | 15.6 |
| 0.0116 | | 16.5 | 15.6 | 15.6 | 16 | 15.6 |
| 0.0233 | | 16.3 | 16 | 16.4 | 16.5 | 16 |
| 0.0349 | | 15.9 | 15.2 | 15.7 | 15.5 | 15.3 |

**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 20-5226-8106 | **Endpoint:** | Mean Length | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:25 | **Analysis:** | Parametric-Control vs Treatments | **Official Results:** | Yes |

### Graphics



# CETIS Analytical Report

Report Date: 02 Jul-14 14:26 (p 1 of 3)
Test Code: LTS0614.082klp | 05-0713-0208

**Macrocystis Germination and Germ Tube Growth Test** — Aquatic Bioassay & Consulting Labs, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 07-9756-1817 | **Endpoint:** | Germination Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:26 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 15-1214-3958 | **Code:** | LTS0614.082klp | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 26h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 0 | 280 | Yes | Two-Point Interpolation |

**Point Estimates**

| Level | % | 95% LCL | 95% UCL | TU | 95% LCL | 95% UCL |
|---|---|---|---|---|---|---|
| EC5 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC10 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC15 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC20 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC25 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC40 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| EC50 | >0.0349 | N/A | N/A | <2865 | NA | NA |

**Germination Rate Summary**

| | | | Calculated Variate(A/B) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-% | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect | A | B |
| 0 | Negative Control | 5 | 0.91 | 0.9 | 0.92 | 0.003162 | 0.00707 | 0.78% | 0.0% | 455 | 500 |
| 0.0116 | | 5 | 0.92 | 0.91 | 0.93 | 0.004472 | 0.009999 | 1.09% | -1.1% | 460 | 500 |
| 0.0233 | | 5 | 0.904 | 0.89 | 0.92 | 0.005099 | 0.0114 | 1.26% | 0.66% | 452 | 500 |
| 0.0349 | | 5 | 0.912 | 0.89 | 0.93 | 0.006633 | 0.01483 | 1.63% | -0.22% | 456 | 500 |

**Germination Rate Detail**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 0.92 | 0.9 | 0.91 | 0.91 | 0.91 |
| 0.0116 | | 0.91 | 0.92 | 0.93 | 0.91 | 0.93 |
| 0.0233 | | 0.9 | 0.92 | 0.91 | 0.9 | 0.89 |
| 0.0349 | | 0.91 | 0.92 | 0.89 | 0.91 | 0.93 |

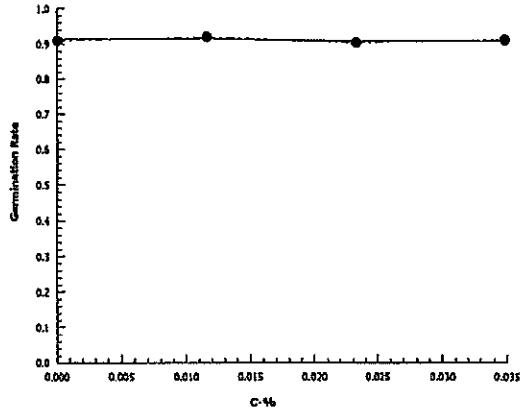
**Germination Rate Binomials**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 92/100 | 90/100 | 91/100 | 91/100 | 91/100 |
| 0.0116 | | 91/100 | 92/100 | 93/100 | 91/100 | 93/100 |
| 0.0233 | | 90/100 | 92/100 | 91/100 | 90/100 | 89/100 |
| 0.0349 | | 91/100 | 92/100 | 89/100 | 91/100 | 93/100 |

**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 07-9756-1817 | **Endpoint:** | Germination Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:26 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

**Graphics**



# CETIS Analytical Report

Report Date: 02 Jul-14 14:26 (p 3 of 3)
Test Code: LTS0614.082klp | 05-0713-0208

**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 09-9917-0534 | **Endpoint:** | Mean Length | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:25 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 15-1214-3958 | **Code:** | LTS0614.082klp | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 26h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 1397829 | 280 | Yes | Two-Point Interpolation |

**Point Estimates**

| Level | % | 95% LCL | 95% UCL | TU | 95% LCL | 95% UCL |
|---|---|---|---|---|---|---|
| IC5 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC10 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC15 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC20 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC25 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC40 | >0.0349 | N/A | N/A | <2865 | NA | NA |
| IC50 | >0.0349 | N/A | N/A | <2865 | NA | NA |

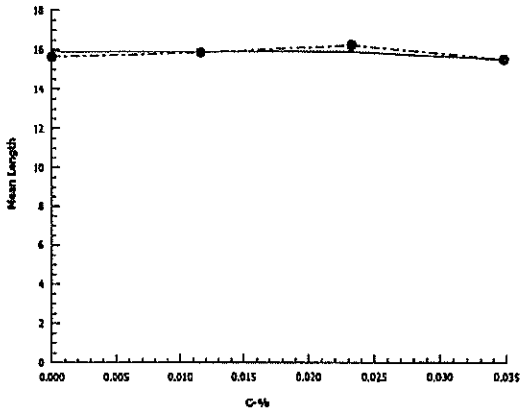
**Mean Length Summary**

| | | | Calculated Variate | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C-% | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Negative Control | 5 | 15.64 | 15.3 | 15.9 | 0.1166 | 0.2608 | 1.67% | 0.0% |
| 0.0116 | | 5 | 15.86 | 15.6 | 16.5 | 0.1778 | 0.3975 | 2.51% | -1.41% |
| 0.0233 | | 5 | 16.24 | 16 | 16.5 | 0.103 | 0.2302 | 1.42% | -3.84% |
| 0.0349 | | 5 | 15.52 | 15.2 | 15.9 | 0.1281 | 0.2864 | 1.85% | 0.77% |

**Mean Length Detail**

| C-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 15.3 | 15.5 | 15.9 | 15.9 | 15.6 |
| 0.0116 | | 16.5 | 15.6 | 15.6 | 16 | 15.6 |
| 0.0233 | | 16.3 | 16 | 16.4 | 16.5 | 16 |
| 0.0349 | | 15.9 | 15.2 | 15.7 | 15.5 | 15.3 |

**Graphics**



# CETIS Measurement Report



**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 09-6563-9829 | **Test Type:** | Growth-Germination | **Analyst:** | |
| **Start Date:** | 12 Jun-14 16:12 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 14 Jun-14 16:12 | **Species:** | Macrocystis pyrifera | **Brine:** | Not Applicable |
| **Duration:** | 48h | **Source:** | Aquatic Bioassay Labs Collection | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 15-1214-3958 | **Code:** | LTS0614.082klp | **Client:** | LTS Environmental, Inc. |
| **Sample Date:** | 11 Jun-14 14:00 | **Material:** | Sample Water | **Project:** | |
| **Receive Date:** | 12 Jun-14 08:50 | **Source:** | Bioassay Report | | |
| **Sample Age:** | 26h (21.3 °C) | **Station:** | T-31 NPDES (Platform Hidalgo) | | |

**Dissolved Oxygen-mg/L**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 6.5 | 2.688 | 10.31 | 6.2 | 6.8 | 0.3 | 0.4243 | 6.53% | 0 |
| 0.0116 | | 2 | 6.25 | 5.615 | 6.885 | 6.2 | 6.3 | 0.05001 | 0.07072 | 1.13% | 0 |
| 0.0233 | | 2 | 6.05 | 4.144 | 7.956 | 5.9 | 6.2 | 0.15 | 0.2121 | 3.51% | 0 |
| 0.0349 | | 2 | 5.95 | 4.044 | 7.856 | 5.8 | 6.1 | 0.15 | 0.2121 | 3.57% | 0 |
| Overall | | 8 | 6.188 | | | 5.8 | 6.8 | | | | 0 (0%) |

**pH-Units**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 7.9 | 7.884 | 7.916 | 7.9 | 7.9 | 0 | 0 | 0.0% | 0 |
| 0.0116 | | 2 | 7.8 | 7.787 | 7.813 | 7.8 | 7.8 | 0 | 0 | 0.0% | 0 |
| 0.0233 | | 2 | 7.75 | 7.115 | 8.385 | 7.7 | 7.8 | 0.05001 | 0.07072 | 0.91% | 0 |
| 0.0349 | | 2 | 7.7 | 7.698 | 7.702 | 7.7 | 7.7 | 0 | 0 | 0.0% | 0 |
| Overall | | 8 | 7.788 | | | 7.7 | 7.9 | | | | 0 (0%) |

**Salinity-ppt**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 0.0116 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 0.0233 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 0.0349 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| Overall | | 8 | 34 | | | 34 | 34 | | | | 0 (0%) |

**Temperature-°C**

| C-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 0.0116 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 0.0233 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 0.0349 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| Overall | | 8 | 14.7 | | | 14.6 | 14.8 | | | | 0 (0%) |

**Dissolved Oxygen-mg/L**

| C-% | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 6.8 | 6.2 |
| 0.0116 | | 6.3 | 6.2 |
| 0.0233 | | 6.2 | 5.9 |
| 0.0349 | | 6.1 | 5.8 |

**pH-Units**

| C-% | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 7.9 | 7.9 |
| 0.0116 | | 7.8 | 7.8 |
| 0.0233 | | 7.8 | 7.7 |
| 0.0349 | | 7.7 | 7.7 |

**Salinity-ppt**

| C-% | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 34 | 34 |
| 0.0116 | | 34 | 34 |
| 0.0233 | | 34 | 34 |
| 0.0349 | | 34 | 34 |

**Temperature-°C**

| C-% | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 14.8 | 14.6 |
| 0.0116 | | 14.8 | 14.6 |
| 0.0233 | | 14.8 | 14.6 |
| 0.0349 | | 14.8 | 14.6 |

| LTS Environmental, Inc.<br>704 Adirondack Avenue<br>Ventura, CA 93003<br>805-644-4560 | **Report to:** Freeport McMoRan O&G<br>c/o LTS, 704 Adirondack Ave<br>Ventura, CA 93003 | **Bill to:** Freeport McMoRan O&G<br>700 Milam, Ste. 3100<br>Houston, Tx 77002 |
|---|---|---|

FACILITY: Platform Hidalgo
COLLECTOR: LTS /
PROJECT/CHARGE # Quarterly 3-species chronic toxicity
RESULTS REQUIRED: normal
RESULTS BY: PHONE: _____ FAX: _____

SUBMITTED TO: ABC labs
REPORT TO: S.G. Lawry @ LTS PHONE: 644-4560
COPIES TO: Platform Supervisor (201 S Broadway, Orcutt)
Ruth Juris (email) PHONE: _____

| SAMPLE NO. | SAMPLE ID | GRAB/ COMP. | VOLUME | DATE/TIME COLLECTED | PRESERV. | ANALYSES REQUESTED (METHOD) |
|---|---|---|---|---|---|---|
| 1 | T-31<br>NPDES | COMP. | 1 | 6/10-11/14<br>*see comments | * ice | Red Abalone, Top Smelt, Giant Kelp |
| | | | | | --- | **1/2 IWC: .0116**<br>**IWC: .0233**<br>**1.5 IWC: .0349** |
| | | | | | | Sample started: 1700 (6/10). 2000/2300/0200/0500/0800/ 1100/1400. |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Comments:

| | | | |
|---|---|---|---|
| Relinquished by: | | Date: 06/11/14 | |
| Received by: | | Time: 2230 | |
| Relinquished by: | | Date: 6-12-14 | |
| Received by: | | Time: 0811 | |

| | |
|---|---|
| Relinquished by: | Date: |
| Received by: | Time: |
| Relinquished by: | Date: |
| Received by: | Time: |

TEMP = 21.3°C
CHLORINE = <0.1
AMMONIA = >10

aquatic bioassay & consulting laboratories, inc

**CHRONIC TOPSMELT SURVIVAL AND GROWTH BIOASSAY**

DATE: 10 June - 2014

STANDARD TOXICANT: Copper Chloride

ENDPOINT: SURVIVAL

NOEC = 56.00 ug/l

EC25 = 101.10 ug/l
EC50 = 128.90 ug/l

ENDPOINT: GROWTH

NOEC = 100.00 ug/l

IC25 = 103.70 ug/l
IC50 = 131.10 ug/l

Yours very truly,

Scott Johnson
Laboratory Director

29 north olive ventura, ca 93001 (805) 643 5621 www.aquabio.org

# CETIS Summary Report

Report Date: 26 Jun-14 13:58 (p 1 of 2)
Test Code: TOPS061014 | 20-8476-0446

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 10-7206-2568 | **Test Type:** | Growth-Survival (7d) | **Analyst:** | |
| **Start Date:** | 10 Jun-14 14:29 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 17 Jun-14 12:35 | **Species:** | Atherinops affinis | **Brine:** | Not Applicable |
| **Duration:** | 6d 22h | **Source:** | Aquatic Biosystems, CO | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 02-5104-0705 | **Code:** | TOPS061014 | **Client:** | ABC Labs |
| **Sample Date:** | 10 Jun-14 14:29 | **Material:** | Copper chloride | **Project:** | REF TOX |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

**Comparison Summary**

| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method |
|---|---|---|---|---|---|---|---|
| 12-8291-5698 | 7d Survival Rate | 56 | 100 | 74.83 | 14.9% | | Dunnett Multiple Comparison Test |
| 17-8953-2008 | Mean Dry Biomass-mg | 100 | 180 | 134.2 | 20.4% | | Dunnett Multiple Comparison Test |

**Point Estimate Summary**

| Analysis ID | Endpoint | Level | µg/L | 95% LCL | 95% UCL | TU | Method |
|---|---|---|---|---|---|---|---|
| 21-1299-2147 | 7d Survival Rate | EC5 | 58.2 | 5.9 | 75.53 | | Linear Interpolation (ICPIN) |
| | | EC10 | 69.2 | 35.4 | 98.9 | | |
| | | EC15 | 80.2 | 60.4 | 114.2 | | |
| | | EC20 | 91.2 | 71.4 | 115.8 | | |
| | | EC25 | 101.1 | 76.76 | 118 | | |
| | | EC40 | 117.8 | 98.61 | 131.1 | | |
| | | EC50 | 128.9 | 111.8 | 141.8 | | |
| 12-3992-2526 | Mean Dry Biomass-mg | IC5 | 66.18 | 44.45 | 87.07 | | Linear Interpolation (ICPIN) |
| | | IC10 | 76.37 | 62.88 | 113.4 | | |
| | | IC15 | 86.55 | 69.94 | 115.5 | | |
| | | IC20 | 96.74 | 75.92 | 117.4 | | |
| | | IC25 | 103.7 | 83.54 | 120.7 | | |
| | | IC40 | 120.2 | 104.7 | 134.1 | | |
| | | IC50 | 131.1 | 117.1 | 145 | | |

**Test Acceptability**

| Analysis ID | Endpoint | Attribute | Test Stat | TAC Limits | Overlap | Decision |
|---|---|---|---|---|---|---|
| 12-8291-5698 | 7d Survival Rate | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |
| 21-1299-2147 | 7d Survival Rate | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |
| 12-3992-2526 | Mean Dry Biomass-mg | Control Resp | 1.088 | 0.85 - NL | Yes | Passes Acceptability Criteria |
| 17-8953-2008 | Mean Dry Biomass-mg | Control Resp | 1.088 | 0.85 - NL | Yes | Passes Acceptability Criteria |
| 12-8291-5698 | 7d Survival Rate | PMSD | 0.1494 | NL - 0.25 | No | Passes Acceptability Criteria |
| 17-8953-2008 | Mean Dry Biomass-mg | PMSD | 0.2041 | NL - 0.5 | No | Passes Acceptability Criteria |

**7d Survival Rate Summary**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 56 | | 5 | 0.96 | 0.8489 | 1 | 0.8 | 1 | 0.04 | 0.08944 | 9.32% | 4.0% |
| 100 | | 5 | 0.76 | 0.5522 | 0.9678 | 0.6 | 1 | 0.07483 | 0.1673 | 22.02% | 24.0% |
| 180 | | 5 | 0.04 | 0 | 0.1511 | 0 | 0.2 | 0.04 | 0.08944 | 223.6% | 96.0% |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 560 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

**Mean Dry Biomass-mg Summary**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1.088 | 0.9357 | 1.24 | 1.016 | 1.306 | 0.05486 | 0.1227 | 11.27% | 0.0% |
| 56 | | 5 | 1.208 | 0.9545 | 1.461 | 0.964 | 1.468 | 0.09129 | 0.2041 | 16.9% | -11.03% |
| 100 | | 5 | 0.9 | 0.7097 | 1.09 | 0.746 | 1.06 | 0.06856 | 0.1533 | 17.03% | 17.28% |
| 180 | | 5 | 0.062 | -0.1101 | 0.2341 | 0 | 0.31 | 0.062 | 0.1386 | 223.6% | 94.3% |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 560 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |



Analyst: LM QA: Pass

## 7d Survival Rate Detail

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 56 | | 1 | 1 | 1 | 1 | 0.8 |
| 100 | | 0.6 | 0.8 | 0.8 | 0.6 | 1 |
| 180 | | 0 | 0.2 | 0 | 0 | 0 |
| 320 | | 0 | 0 | 0 | 0 | 0 |
| 560 | | 0 | 0 | 0 | 0 | 0 |

## Mean Dry Biomass-mg Detail

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.05 | 1.306 | 1.016 | 1.024 | 1.044 |
| 56 | | 1.226 | 1.33 | 1.052 | 1.468 | 0.964 |
| 100 | | 0.746 | 0.874 | 1.058 | 0.762 | 1.06 |
| 180 | | 0 | 0.31 | 0 | 0 | 0 |
| 320 | | 0 | 0 | 0 | 0 | 0 |
| 560 | | 0 | 0 | 0 | 0 | 0 |

## 7d Survival Rate Binomials

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |
| 56 | | 5/5 | 5/5 | 5/5 | 5/5 | 4/5 |
| 100 | | 3/5 | 4/5 | 4/5 | 3/5 | 5/5 |
| 180 | | 0/5 | 1/5 | 0/5 | 0/5 | 0/5 |
| 320 | | 0/5 | 0/5 | 0/5 | 0/5 | 0/5 |
| 560 | | 0/5 | 0/5 | 0/5 | 0/5 | 0/5 |

# CETIS Analytical Report

Report Date: 26 Jun-14 13:58 (p 1 of 4)
Test Code: TOPS061014 | 20-8476-0446

**Pacific Topsmelt 7-d Survival and Growth Test** — Aquatic Bioassay & Consulting Labs, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 12-8291-5698 | **Endpoint:** | 7d Survival Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 26 Jun-14 13:46 | **Analysis:** | Parametric-Control vs Treatments | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 10-7206-2568 | **Test Type:** | Growth-Survival (7d) | **Analyst:** | |
| **Start Date:** | 10 Jun-14 14:29 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 17 Jun-14 12:35 | **Species:** | Atherinops affinis | **Brine:** | Not Applicable |
| **Duration:** | 6d 22h | **Source:** | Aquatic Biosystems, CO | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 02-5104-0705 | **Code:** | TOPS061014 | **Client:** | ABC Labs |
| **Sample Date:** | 10 Jun-14 14:29 | **Material:** | Copper chloride | **Project:** | REF TOX |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

| Data Transform | Zeta | Alt Hyp | Trials | Seed | PMSD | NOEL | LOEL | TOEL | TU |
|---|---|---|---|---|---|---|---|---|---|
| Angular (Corrected) | NA | C > T | NA | NA | 14.9% | 56 | 100 | 74.83 | |

**Dunnett Multiple Comparison Test**

| Control vs | C-µg/L | Test Stat | Critical | MSD | DF | P-Value | P-Type | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|
| Negative Control | 56 | 0.6189 | 2.227 | 0.171 | 8 | 0.4921 | CDF | Non-Significant Effect |
| | 100* | 3.625 | 2.227 | 0.171 | 8 | 0.0031 | CDF | Significant Effect |
| | 180* | 13.93 | 2.227 | 0.171 | 8 | <0.0001 | CDF | Significant Effect |

**Test Acceptability Criteria**

| Attribute | Test Stat | TAC Limits | Overlap | Decision |
|---|---|---|---|---|
| Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |
| PMSD | 0.1494 | NL - 0.25 | No | Passes Acceptability Criteria |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 3.702346 | 1.234115 | 3 | 83.36 | <0.0001 | Significant Effect |
| Error | 0.2368619 | 0.01480387 | 16 | | | |
| Total | 3.939208 | | 19 | | | |

**Distributional Tests**

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variances | Mod Levene Equality of Variance | 1.953 | 5.953 | 0.1750 | Equal Variances |
| Variances | Levene Equality of Variance | 3.713 | 5.292 | 0.0335 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality | 0.8945 | 0.866 | 0.0325 | Normal Distribution |
| Distribution | Kolmogorov-Smirnov D | 0.2348 | 0.2235 | 0.0051 | Non-normal Distribution |
| Distribution | D'Agostino Skewness | 0.8695 | 2.576 | 0.3846 | Normal Distribution |
| Distribution | D'Agostino Kurtosis | 1.446 | 2.576 | 0.1481 | Normal Distribution |
| Distribution | D'Agostino-Pearson K2 Omnibus | 2.847 | 9.21 | 0.2408 | Normal Distribution |
| Distribution | Anderson-Darling A2 Normality | 1.079 | 3.878 | 0.0080 | Non-normal Distribution |

**7d Survival Rate Summary**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.0% | 0.0% |
| 56 | | 5 | 0.96 | 0.8489 | 1 | 1 | 0.8 | 1 | 0.04 | 9.32% | 4.0% |
| 100 | | 5 | 0.76 | 0.5522 | 0.9678 | 0.8 | 0.6 | 1 | 0.07483 | 22.02% | 24.0% |
| 180 | | 5 | 0.04 | 0 | 0.1511 | 0 | 0 | 0.2 | 0.04 | 223.6% | 96.0% |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 560 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 12-8291-5698 | **Endpoint:** | 7d Survival Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 26 Jun-14 13:46 | **Analysis:** | Parametric-Control vs Treatments | **Official Results:** | Yes |

## Angular (Corrected) Transformed Summary

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 5 | 1.345 | 1.345 | 1.346 | 1.345 | 1.345 | 1.345 | 0 | 0.0% | 0.0% |
| 56 | | 5 | 1.298 | 1.165 | 1.43 | 1.345 | 1.107 | 1.345 | 0.04763 | 8.21% | 3.54% |
| 100 | | 5 | 1.066 | 0.829 | 1.304 | 1.107 | 0.8861 | 1.345 | 0.08548 | 17.92% | 20.73% |
| 180 | | 5 | 0.2731 | 0.1409 | 0.4054 | 0.2255 | 0.2255 | 0.4636 | 0.04763 | 38.99% | 79.7% |
| 320 | | 5 | 0.2255 | 0.2255 | 0.2256 | 0.2255 | 0.2255 | 0.2255 | 0 | 0.0% | 83.24% |
| 560 | | 5 | 0.2255 | 0.2255 | 0.2256 | 0.2255 | 0.2255 | 0.2255 | 0 | 0.0% | 83.24% |

## 7d Survival Rate Detail

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 56 | | 1 | 1 | 1 | 1 | 0.8 |
| 100 | | 0.6 | 0.8 | 0.8 | 0.6 | 1 |
| 180 | | 0 | 0.2 | 0 | 0 | 0 |
| 320 | | 0 | 0 | 0 | 0 | 0 |
| 560 | | 0 | 0 | 0 | 0 | 0 |

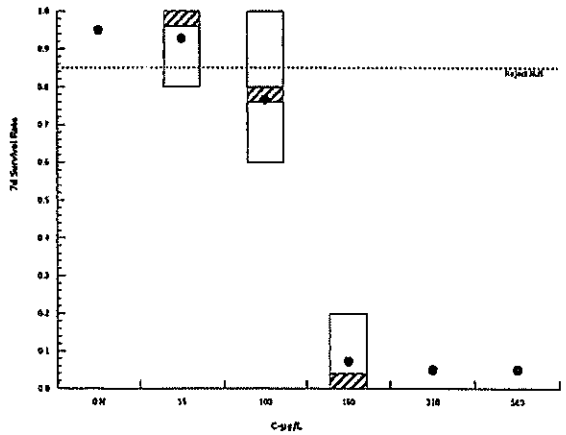
## Angular (Corrected) Transformed Detail

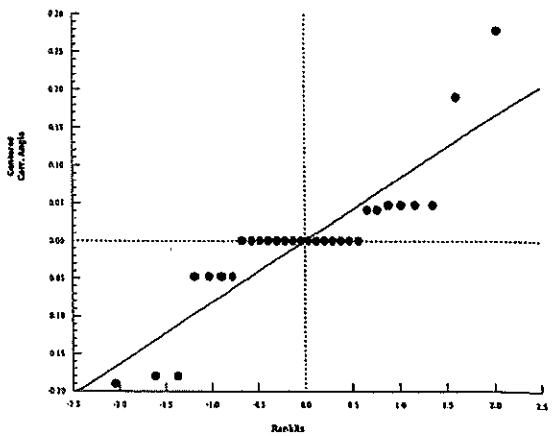
| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.345 | 1.345 | 1.345 | 1.345 | 1.345 |
| 56 | | 1.345 | 1.345 | 1.345 | 1.345 | 1.107 |
| 100 | | 0.8861 | 1.107 | 1.107 | 0.8861 | 1.345 |
| 180 | | 0.2255 | 0.4636 | 0.2255 | 0.2255 | 0.2255 |
| 320 | | 0.2255 | 0.2255 | 0.2255 | 0.2255 | 0.2255 |
| 560 | | 0.2255 | 0.2255 | 0.2255 | 0.2255 | 0.2255 |

## 7d Survival Rate Binomials

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |
| 56 | | 5/5 | 5/5 | 5/5 | 5/5 | 4/5 |
| 100 | | 3/5 | 4/5 | 4/5 | 3/5 | 5/5 |
| 180 | | 0/5 | 1/5 | 0/5 | 0/5 | 0/5 |
| 320 | | 0/5 | 0/5 | 0/5 | 0/5 | 0/5 |
| 560 | | 0/5 | 0/5 | 0/5 | 0/5 | 0/5 |

## Graphics





# CETIS Analytical Report

Report Date: 26 Jun-14 13:58 (p 3 of 4)
Test Code: TOPS061014 | 20-8476-0446

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 17-8953-2008 | **Endpoint:** | Mean Dry Biomass-mg | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 26 Jun-14 13:46 | **Analysis:** | Parametric-Control vs Treatments | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 10-7206-2568 | **Test Type:** | Growth-Survival (7d) | **Analyst:** | |
| **Start Date:** | 10 Jun-14 14:29 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 17 Jun-14 12:35 | **Species:** | Atherinops affinis | **Brine:** | Not Applicable |
| **Duration:** | 6d 22h | **Source:** | Aquatic Biosystems, CO | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 02-5104-0705 | **Code:** | TOPS061014 | **Client:** | ABC Labs |
| **Sample Date:** | 10 Jun-14 14:29 | **Material:** | Copper chloride | **Project:** | REF TOX |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

| Data Transform | Zeta | Alt Hyp | Trials | Seed | PMSD | NOEL | LOEL | TOEL | TU |
|---|---|---|---|---|---|---|---|---|---|
| Untransformed | NA | C > T | NA | NA | 20.4% | 100 | 180 | 134.2 | |

**Dunnett Multiple Comparison Test**

| Control | vs | C-µg/L | Test Stat | Critical | MSD | DF | P-Value | P-Type | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Negative Control | | 56 | -1.203 | 2.227 | 0.222 | 8 | 0.9764 | CDF | Non-Significant Effect |
| | | 100 | 1.885 | 2.227 | 0.222 | 8 | 0.0916 | CDF | Non-Significant Effect |
| | | 180* | 10.29 | 2.227 | 0.222 | 8 | <0.0001 | CDF | Significant Effect |

**Test Acceptability Criteria**

| Attribute | Test Stat | TAC Limits | Overlap | Decision |
|---|---|---|---|---|
| Control Resp | 1.088 | 0.85 - NL | Yes | Passes Acceptability Criteria |
| PMSD | 0.2041 | NL - 0.5 | No | Passes Acceptability Criteria |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 4.016055 | 1.338685 | 3 | 53.85 | <0.0001 | Significant Effect |
| Error | 0.397744 | 0.024859 | 16 | | | |
| Total | 4.413799 | | 19 | | | |

**Distributional Tests**

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variances | Bartlett Equality of Variance | 1.083 | 11.34 | 0.7811 | Equal Variances |
| Variances | Mod Levene Equality of Variance | 1.181 | 5.953 | 0.3580 | Equal Variances |
| Variances | Levene Equality of Variance | 0.8266 | 5.292 | 0.4983 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality | 0.9091 | 0.866 | 0.0613 | Normal Distribution |
| Distribution | Kolmogorov-Smirnov D | 0.2213 | 0.2235 | 0.0113 | Normal Distribution |
| Distribution | D'Agostino Skewness | 1.047 | 2.576 | 0.2951 | Normal Distribution |
| Distribution | D'Agostino Kurtosis | 0.6892 | 2.576 | 0.4907 | Normal Distribution |
| Distribution | D'Agostino-Pearson K2 Omnibus | 1.571 | 9.21 | 0.4558 | Normal Distribution |
| Distribution | Anderson-Darling A2 Normality | 1.007 | 3.878 | 0.0120 | Normal Distribution |

**Mean Dry Biomass-mg Summary**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 1.088 | 0.9357 | 1.24 | 1.044 | 1.016 | 1.306 | 0.05486 | 11.27% | 0.0% |
| 56 | | 5 | 1.208 | 0.9545 | 1.461 | 1.226 | 0.964 | 1.468 | 0.09129 | 16.9% | -11.03% |
| 100 | | 5 | 0.9 | 0.7097 | 1.09 | 0.874 | 0.746 | 1.06 | 0.06856 | 17.03% | 17.28% |
| 180 | | 5 | 0.062 | -0.1101 | 0.2341 | 0 | 0 | 0.31 | 0.062 | 223.6% | 94.3% |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 560 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

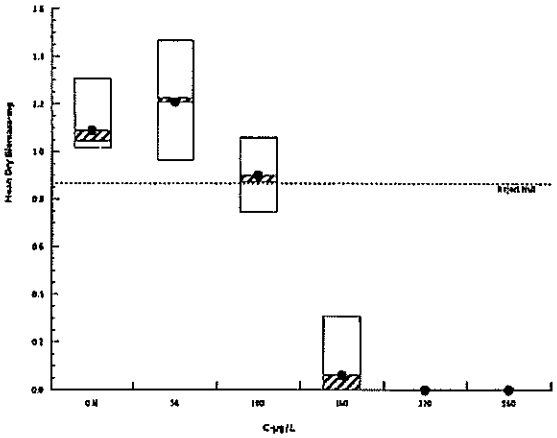
**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

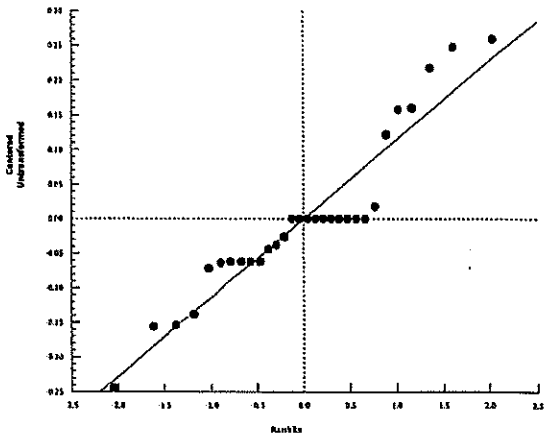
| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 17-8953-2008 | **Endpoint:** | Mean Dry Biomass-mg | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 26 Jun-14 13:46 | **Analysis:** | Parametric-Control vs Treatments | **Official Results:** | Yes |

## Mean Dry Biomass-mg Detail

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.05 | 1.306 | 1.016 | 1.024 | 1.044 |
| 56 | | 1.226 | 1.33 | 1.052 | 1.468 | 0.964 |
| 100 | | 0.746 | 0.874 | 1.058 | 0.762 | 1.06 |
| 180 | | 0 | 0.31 | 0 | 0 | 0 |
| 320 | | 0 | 0 | 0 | 0 | 0 |
| 560 | | 0 | 0 | 0 | 0 | 0 |

## Graphics





# CETIS Analytical Report

Report Date: 26 Jun-14 13:58 (p 1 of 4)
Test Code: TOPS061014 | 20-8476-0446

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 21-1299-2147 | **Endpoint:** | 7d Survival Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 26 Jun-14 13:46 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 10-7206-2568 | **Test Type:** | Growth-Survival (7d) | **Analyst:** | |
| **Start Date:** | 10 Jun-14 14:29 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 17 Jun-14 12:35 | **Species:** | Atherinops affinis | **Brine:** | Not Applicable |
| **Duration:** | 6d 22h | **Source:** | Aquatic Biosystems, CO | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 02-5104-0705 | **Code:** | TOPS061014 | **Client:** | ABC Labs |
| **Sample Date:** | 10 Jun-14 14:29 | **Material:** | Copper chloride | **Project:** | REF TOX |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 0 | 280 | Yes | Two-Point Interpolation |

**Test Acceptability Criteria**

| Attribute | Test Stat | TAC Limits | Overlap | Decision |
|---|---|---|---|---|
| Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |

**Point Estimates**

| Level | µg/L | 95% LCL | 95% UCL |
|---|---|---|---|
| EC5 | 58.2 | 5.9 | 75.53 |
| EC10 | 69.2 | 35.4 | 98.9 |
| EC15 | 80.2 | 60.4 | 114.2 |
| EC20 | 91.2 | 71.4 | 115.8 |
| EC25 | 101.1 | 76.76 | 118 |
| EC40 | 117.8 | 98.61 | 131.1 |
| EC50 | 128.9 | 111.8 | 141.8 |

**7d Survival Rate Summary**

| | | | | | | | | Calculated Variate(A/B) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-µg/L | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect | A | B |
| 0 | Negative Control | 5 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 25 | 25 |
| 56 | | 5 | 0.96 | 0.8 | 1 | 0.04 | 0.08944 | 9.32% | 4.0% | 24 | 25 |
| 100 | | 5 | 0.76 | 0.6 | 1 | 0.07483 | 0.1673 | 22.02% | 24.0% | 19 | 25 |
| 180 | | 5 | 0.04 | 0 | 0.2 | 0.04 | 0.08944 | 223.6% | 96.0% | 1 | 25 |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | | 100.0% | 0 | 25 |
| 560 | | 5 | 0 | 0 | 0 | 0 | 0 | | 100.0% | 0 | 25 |

**7d Survival Rate Detail**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1 | 1 | 1 | 1 | 1 |
| 56 | | 1 | 1 | 1 | 1 | 0.8 |
| 100 | | 0.6 | 0.8 | 0.8 | 0.6 | 1 |
| 180 | | 0 | 0.2 | 0 | 0 | 0 |
| 320 | | 0 | 0 | 0 | 0 | 0 |
| 560 | | 0 | 0 | 0 | 0 | 0 |

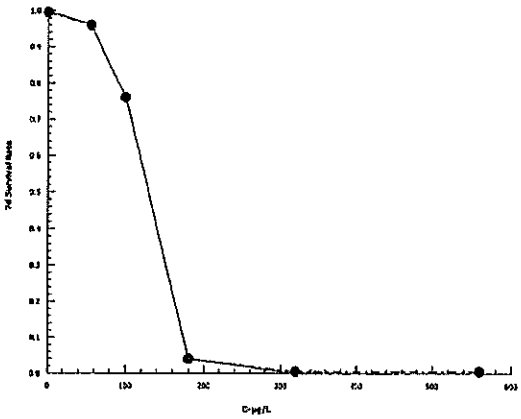
**7d Survival Rate Binomials**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 5/5 | 5/5 | 5/5 | 5/5 | 5/5 |
| 56 | | 5/5 | 5/5 | 5/5 | 5/5 | 4/5 |
| 100 | | 3/5 | 4/5 | 4/5 | 3/5 | 5/5 |
| 180 | | 0/5 | 1/5 | 0/5 | 0/5 | 0/5 |
| 320 | | 0/5 | 0/5 | 0/5 | 0/5 | 0/5 |
| 560 | | 0/5 | 0/5 | 0/5 | 0/5 | 0/5 |

Pacific Topsmelt 7-d Survival and Growth Test — Aquatic Bioassay & Consulting Labs, Inc.

| | | | | | |
|---|---|---|---|---|---|
| Analysis ID: | 21-1299-2147 | Endpoint: | 7d Survival Rate | CETIS Version: | CETISv1.8.7 |
| Analyzed: | 26 Jun-14 13:46 | Analysis: | Linear Interpolation (ICPIN) | Official Results: | Yes |

Graphics



**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 12-3992-2526 | **Endpoint:** | Mean Dry Biomass-mg | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 26 Jun-14 13:46 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 10-7206-2568 | **Test Type:** | Growth-Survival (7d) | **Analyst:** | |
| **Start Date:** | 10 Jun-14 14:29 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 17 Jun-14 12:35 | **Species:** | Atherinops affinis | **Brine:** | Not Applicable |
| **Duration:** | 6d 22h | **Source:** | Aquatic Biosystems, CO | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 02-5104-0705 | **Code:** | TOPS061014 | **Client:** | ABC Labs |
| **Sample Date:** | 10 Jun-14 14:29 | **Material:** | Copper chloride | **Project:** | REF TOX |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 1249152 | 280 | Yes | Two-Point Interpolation |

**Test Acceptability Criteria**

| Attribute | Test Stat | TAC Limits | Overlap | Decision |
|---|---|---|---|---|
| Control Resp | 1.088 | 0.85 - NL | Yes | Passes Acceptability Criteria |

**Point Estimates**

| Level | µg/L | 95% LCL | 95% UCL |
|---|---|---|---|
| IC5 | 66.18 | 44.45 | 87.07 |
| IC10 | 76.37 | 62.88 | 113.4 |
| IC15 | 86.55 | 69.94 | 115.5 |
| IC20 | 96.74 | 75.92 | 117.4 |
| IC25 | 103.7 | 83.54 | 120.7 |
| IC40 | 120.2 | 104.7 | 134.1 |
| IC50 | 131.1 | 117.1 | 145 |

**Mean Dry Biomass-mg Summary**

| | | | Calculated Variate | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C-µg/L | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Negative Control | 5 | 1.088 | 1.016 | 1.306 | 0.05486 | 0.1227 | 11.27% | 0.0% |
| 56 | | 5 | 1.208 | 0.964 | 1.468 | 0.09129 | 0.2041 | 16.9% | -11.03% |
| 100 | | 5 | 0.9 | 0.746 | 1.06 | 0.06856 | 0.1533 | 17.03% | 17.28% |
| 180 | | 5 | 0.062 | 0 | 0.31 | 0.062 | 0.1386 | 223.6% | 94.3% |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 560 | | 5 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

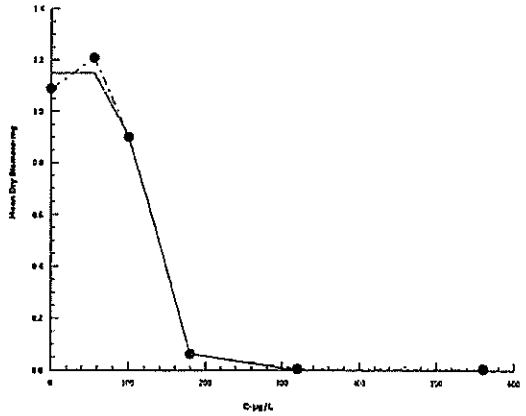
**Mean Dry Biomass-mg Detail**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.05 | 1.306 | 1.016 | 1.024 | 1.044 |
| 56 | | 1.226 | 1.33 | 1.052 | 1.468 | 0.964 |
| 100 | | 0.746 | 0.874 | 1.058 | 0.762 | 1.06 |
| 180 | | 0 | 0.31 | 0 | 0 | 0 |
| 320 | | 0 | 0 | 0 | 0 | 0 |
| 560 | | 0 | 0 | 0 | 0 | 0 |

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 12-3992-2526 | **Endpoint:** | Mean Dry Biomass-mg | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 26 Jun-14 13:46 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

**Graphics**



# CETIS Measurement Report

Report Date: 26 Jun-14 13:58 (p 1 of 2)
Test Code: TOPS061014 | 20-8476-0446

**Pacific Topsmelt 7-d Survival and Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 10-7206-2568 | **Test Type:** | Growth-Survival (7d) | **Analyst:** | |
| **Start Date:** | 10 Jun-14 14:29 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | 17 Jun-14 12:35 | **Species:** | Atherinops affinis | **Brine:** | Not Applicable |
| **Duration:** | 6d 22h | **Source:** | Aquatic Biosystems, CO | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 02-5104-0705 | **Code:** | TOPS061014 | **Client:** | ABC Labs |
| **Sample Date:** | 10 Jun-14 14:29 | **Material:** | Copper chloride | **Project:** | REF TOX |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

**Dissolved Oxygen-mg/L**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 8 | 6.625 | 6.05 | 7.2 | 5.1 | 7.2 | 0.2433 | 0.6882 | 10.39% | 0 |
| 56 | | 8 | 6.363 | 5.859 | 6.866 | 5.6 | 7.1 | 0.2129 | 0.6022 | 9.47% | 0 |
| 100 | | 8 | 6.4 | 5.955 | 6.845 | 5.7 | 7.1 | 0.188 | 0.5318 | 8.31% | 0 |
| 180 | | 8 | 6.363 | 5.932 | 6.793 | 5.7 | 7.1 | 0.1822 | 0.5153 | 8.1% | 0 |
| 320 | | 4 | 6.2 | 5.513 | 6.887 | 5.8 | 6.8 | 0.216 | 0.432 | 6.97% | 0 |
| 560 | | 2 | 6.95 | 6.315 | 7.585 | 6.9 | 7 | 0.05 | 0.07071 | 1.02% | 0 |
| Overall | | 38 | 6.483 | | | 5.1 | 7.2 | | | | 0 (0%) |

**Total Ammonia (N)-mg/L**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 56 | | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 100 | | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 180 | | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 320 | | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 560 | | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| Overall | | 38 | 0 | | | 0 | 0 | | | | 0 (0%) |

**pH-Units**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 8 | 7.55 | 7.441 | 7.659 | 7.3 | 7.7 | 0.04629 | 0.1309 | 1.73% | 0 |
| 56 | | 8 | 7.525 | 7.428 | 7.622 | 7.4 | 7.7 | 0.04119 | 0.1165 | 1.55% | 0 |
| 100 | | 8 | 7.525 | 7.428 | 7.622 | 7.4 | 7.7 | 0.04119 | 0.1165 | 1.55% | 0 |
| 180 | | 8 | 7.538 | 7.438 | 7.637 | 7.4 | 7.7 | 0.04199 | 0.1188 | 1.58% | 0 |
| 320 | | 4 | 7.45 | 7.291 | 7.609 | 7.4 | 7.6 | 0.05 | 0.1 | 1.34% | 0 |
| 560 | | 2 | 7.45 | 6.815 | 8.085 | 7.4 | 7.5 | 0.05 | 0.07072 | 0.95% | 0 |
| Overall | | 38 | 7.506 | | | 7.3 | 7.7 | | | | 0 (0%) |

**Salinity-ppt**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 8 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 56 | | 8 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 100 | | 8 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 180 | | 8 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 320 | | 4 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 560 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| Overall | | 38 | 34 | | | 34 | 34 | | | | 0 (0%) |

**Temperature-°C**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 8 | 21 | 21 | 21 | 21 | 21 | 0 | 0 | 0.0% | 0 |
| 56 | | 8 | 21 | 21 | 21 | 21 | 21 | 0 | 0 | 0.0% | 0 |
| 100 | | 8 | 21 | 21 | 21 | 21 | 21 | 0 | 0 | 0.0% | 0 |
| 180 | | 8 | 21 | 21 | 21 | 21 | 21 | 0 | 0 | 0.0% | 0 |
| 320 | | 4 | 21 | 21 | 21 | 21 | 21 | 0 | 0 | 0.0% | 0 |
| 560 | | 2 | 21 | 21 | 21 | 21 | 21 | 0 | 0 | 0.0% | 0 |
| Overall | | 38 | 21 | | | 21 | 21 | | | | 0 (0%) |

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

**Dissolved Oxygen-mg/L**

| C-µg/L | Control Type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 6.8 | 6.2 | 7.1 | 6.7 | 6.9 | 7 | 7.2 | 5.1 |
| 56 | | 6.8 | 6 | 6 | 5.7 | 6.7 | 7 | 7.1 | 5.6 |
| 100 | | 6.8 | 6.1 | 6 | 5.9 | 6.7 | 6.9 | 7.1 | 5.7 |
| 180 | | 6.8 | 6.2 | 6 | 5.8 | 6.5 | 6.8 | 7.1 | 5.7 |
| 320 | | 6.8 | 6.2 | 6 | 5.8 | | | | |
| 560 | | 6.9 | 7 | | | | | | |

**Total Ammonia (N)-mg/L**

| C-µg/L | Control Type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 56 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 100 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 180 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 320 | | 0 | 0 | 0 | 0 | | | | |
| 560 | | 0 | 0 | | | | | | |

**pH-Units**

| C-µg/L | Control Type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 7.4 | 7.3 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.7 |
| 56 | | 7.4 | 7.4 | 7.4 | 7.5 | 7.6 | 7.6 | 7.6 | 7.7 |
| 100 | | 7.4 | 7.4 | 7.4 | 7.5 | 7.6 | 7.6 | 7.6 | 7.7 |
| 180 | | 7.4 | 7.4 | 7.4 | 7.6 | 7.6 | 7.6 | 7.6 | 7.7 |
| 320 | | 7.4 | 7.4 | 7.4 | 7.6 | | | | |
| 560 | | 7.4 | 7.5 | | | | | | |

**Salinity-ppt**

| C-µg/L | Control Type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| 56 | | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| 100 | | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| 180 | | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| 320 | | 34 | 34 | 34 | 34 | | | | |
| 560 | | 34 | 34 | | | | | | |

**Temperature-°C**

| C-µg/L | Control Type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 56 | | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 100 | | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 180 | | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 320 | | 21 | 21 | 21 | 21 | | | | |
| 560 | | 21 | 21 | | | | | | |

**CHRONIC KELP GERMINATION & GROWTH BIOASSAY**

DATE: 12 June - 14

STANDARD TOXICANT: Copper Chloride

ENDPOINT: GERMINATION

NOEC = 100.00 ug/l

EC25 = 170.00 ug/l
EC50 = 222.50 ug/l

ENDPOINT: GROWTH-LENGTH

NOEC = 100.00 ug/l

IC25 = 174.60 ug/l
IC50 = 224.90 ug/l

Yours very truly,

Scott Johnson
Laboratory Director

# CETIS Summary Report

Report Date: 02 Jul-14 14:10 (p 1 of 2)
Test Code: KLP061214 | 04-4614-2470

**Macrocystis Germination and Germ Tube Growth Test** — Aquatic Bioassay & Consulting Labs, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 15-5921-0113 | **Test Type:** | Growth-Germination | **Analyst:** | |
| **Start Date:** | 12 Jun-14 16:10 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | | **Species:** | Macrocystis pyrifera | **Brine:** | Not Applicable |
| **Duration:** | NA | **Source:** | David Gutoff | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 13-1300-4078 | **Code:** | KLP061214 | **Client:** | Internal Lab |
| **Sample Date:** | 12 Jun-14 16:10 | **Material:** | Copper chloride | **Project:** | |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

**Comparison Summary**

| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method |
|---|---|---|---|---|---|---|---|
| 11-1004-6513 | Germination Rate | 100 | 180 | 134.2 | 17.8% | | Steel Many-One Rank Sum Test |
| 19-5459-9104 | Mean Length | 100 | 180 | 134.2 | 9.29% | | Steel Many-One Rank Sum Test |

**Point Estimate Summary**

| Analysis ID | Endpoint | Level | µg/L | 95% LCL | 95% UCL | TU | Method |
|---|---|---|---|---|---|---|---|
| 14-0406-5345 | Germination Rate | EC5 | 107.7 | 4.071 | 140.2 | | Linear Interpolation (ICPIN) |
| | | EC10 | 123.3 | 97.09 | 193.8 | | |
| | | EC15 | 138.9 | 105.9 | 210 | | |
| | | EC20 | 154.5 | 109.7 | 214 | | |
| | | EC25 | 170 | 112.2 | 218 | | |
| | | EC40 | 203 | 127 | 236.9 | | |
| | | EC50 | 222.5 | 138.1 | 250.7 | | |
| 01-8695-2064 | Mean Length | IC5 | 29.46 | 19.21 | 153.3 | | Linear Interpolation (ICPIN) |
| | | IC10 | 115.8 | N/A | 133.7 | | |
| | | IC15 | 135.4 | 63.46 | 149.1 | | |
| | | IC20 | 155 | 112.2 | 164.6 | | |
| | | IC25 | 174.6 | 157.9 | 183.5 | | |
| | | IC40 | 205.9 | 202.5 | 209.7 | | |
| | | IC50 | 224.9 | 222.1 | 228.1 | | |

**Test Acceptability**

| Analysis ID | Endpoint | Attribute | Test Stat | TAC Limits | Overlap | Decision |
|---|---|---|---|---|---|---|
| 11-1004-6513 | Germination Rate | Control Resp | 0.908 | 0.7 - NL | Yes | Passes Acceptability Criteria |
| 14-0406-5345 | Germination Rate | Control Resp | 0.908 | 0.7 - NL | Yes | Passes Acceptability Criteria |
| 01-8695-2064 | Mean Length | Control Resp | 15.64 | 10 - NL | Yes | Passes Acceptability Criteria |
| 19-5459-9104 | Mean Length | Control Resp | 15.64 | 10 - NL | Yes | Passes Acceptability Criteria |
| 19-5459-9104 | Mean Length | NOEL | 100 | NL - 35 | No | Above Acceptability Criteria |
| 11-1004-6513 | Germination Rate | PMSD | 0.1779 | NL - 0.2 | No | Passes Acceptability Criteria |
| 19-5459-9104 | Mean Length | PMSD | 0.09292 | NL - 0.2 | No | Passes Acceptability Criteria |

**Macrocystis Germination and Germ Tube Growth Test** — Aquatic Bioassay & Consulting Labs, Inc.

### Germination Rate Summary

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 0.908 | 0.9024 | 0.9136 | 0.9 | 0.91 | 0.002 | 0.004472 | 0.49% | 0.0% |
| 5.6 | | 5 | 0.9 | 0.8912 | 0.9088 | 0.89 | 0.91 | 0.003162 | 0.007071 | 0.79% | 0.88% |
| 10 | | 5 | 0.91 | 0.8948 | 0.9252 | 0.89 | 0.92 | 0.005477 | 0.01225 | 1.35% | -0.22% |
| 18 | | 5 | 0.902 | 0.8816 | 0.9224 | 0.88 | 0.92 | 0.007348 | 0.01643 | 1.82% | 0.66% |
| 32 | | 5 | 0.884 | 0.8362 | 0.9318 | 0.82 | 0.92 | 0.0172 | 0.03847 | 4.35% | 2.64% |
| 100 | | 5 | 0.886 | 0.8117 | 0.9603 | 0.78 | 0.92 | 0.02676 | 0.05983 | 6.75% | 2.42% |
| 180 | | 5 | 0.652 | 0.254 | 1 | 0.08 | 0.82 | 0.1434 | 0.3206 | 49.17% | 28.19% |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

### Mean Length Summary

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 15.64 | 15.32 | 15.96 | 15.3 | 15.9 | 0.1166 | 0.2608 | 1.67% | 0.0% |
| 5.6 | | 5 | 16.1 | 15.69 | 16.51 | 15.6 | 16.5 | 0.1483 | 0.3317 | 2.06% | -2.94% |
| 10 | | 5 | 16.02 | 15.65 | 16.39 | 15.7 | 16.5 | 0.1319 | 0.295 | 1.84% | -2.43% |
| 18 | | 5 | 15.82 | 15.22 | 16.42 | 15.3 | 16.4 | 0.2154 | 0.4817 | 3.05% | -1.15% |
| 32 | | 5 | 14.8 | 13.26 | 16.34 | 12.6 | 15.6 | 0.5559 | 1.243 | 8.4% | 5.37% |
| 100 | | 5 | 15.14 | 12.59 | 17.69 | 11.5 | 16.3 | 0.919 | 2.055 | 13.57% | 3.2% |
| 180 | | 5 | 11.72 | 11.3 | 12.14 | 11.5 | 12.3 | 0.1497 | 0.3347 | 2.86% | 25.06% |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

### Germination Rate Detail

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 0.91 | 0.9 | 0.91 | 0.91 | 0.91 |
| 5.6 | | 0.9 | 0.89 | 0.9 | 0.9 | 0.91 |
| 10 | | 0.92 | 0.91 | 0.89 | 0.92 | 0.91 |
| 18 | | 0.88 | 0.91 | 0.89 | 0.92 | 0.91 |
| 32 | | 0.9 | 0.9 | 0.88 | 0.92 | 0.82 |
| 100 | | 0.92 | 0.91 | 0.9 | 0.92 | 0.78 |
| 180 | | 0.76 | 0.82 | 0.79 | 0.81 | 0.08 |
| 320 | | 0 | 0 | 0 | 0 | 0 |

### Mean Length Detail

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 15.3 | 15.5 | 15.9 | 15.9 | 15.6 |
| 5.6 | | 16.2 | 15.6 | 16.5 | 16.2 | 16 |
| 10 | | 16 | 15.7 | 16.5 | 16 | 15.9 |
| 18 | | 15.8 | 15.3 | 16.4 | 16.2 | 15.4 |
| 32 | | 15.1 | 15.6 | 15.4 | 15.3 | 12.6 |
| 100 | | 16.3 | 16.3 | 16 | 15.6 | 11.5 |
| 180 | | 12.3 | 11.7 | 11.5 | 11.5 | 11.6 |
| 320 | | 0 | 0 | 0 | 0 | 0 |

### Germination Rate Binomials

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 91/100 | 90/100 | 91/100 | 91/100 | 91/100 |
| 5.6 | | 90/100 | 89/100 | 90/100 | 90/100 | 91/100 |
| 10 | | 92/100 | 91/100 | 89/100 | 92/100 | 91/100 |
| 18 | | 88/100 | 91/100 | 89/100 | 92/100 | 91/100 |
| 32 | | 90/100 | 90/100 | 88/100 | 92/100 | 82/100 |
| 100 | | 92/100 | 91/100 | 90/100 | 92/100 | 78/100 |
| 180 | | 76/100 | 82/100 | 79/100 | 81/100 | 8/100 |
| 320 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |

# CETIS Analytical Report

Report Date: 02 Jul-14 14:10 (p 1 of 4)
Test Code: KLP061214 | 04-4614-2470

**Macrocystis Germination and Germ Tube Growth Test** — Aquatic Bioassay & Consulting Labs, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 11-1004-6513 | **Endpoint:** | Germination Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:10 | **Analysis:** | Nonparametric-Control vs Treatments | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 13-1300-4078 | **Code:** | KLP061214 | **Client:** | Internal Lab |
| **Sample Date:** | 12 Jun-14 16:10 | **Material:** | Copper chloride | **Project:** | |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

| Data Transform | Zeta | Alt Hyp | Trials | Seed | PMSD | NOEL | LOEL | TOEL | TU |
|---|---|---|---|---|---|---|---|---|---|
| Angular (Corrected) | NA | C > T | NA | NA | 17.8% | 100 | 180 | 134.2 | |

**Steel Many-One Rank Sum Test**

| Control vs | C-µg/L | Test Stat | Critical | Ties | DF | P-Value | P-Type | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|
| Negative Control | 5.6 | 19.5 | 16 | 2 | 8 | 0.1778 | Asymp | Non-Significant Effect |
| | 10 | 31 | 16 | 1 | 8 | 0.9749 | Asymp | Non-Significant Effect |
| | 18 | 26 | 16 | 1 | 8 | 0.7547 | Asymp | Non-Significant Effect |
| | 32 | 21 | 16 | 1 | 8 | 0.2891 | Asymp | Non-Significant Effect |
| | 100 | 28.5 | 16 | 2 | 8 | 0.9067 | Asymp | Non-Significant Effect |
| | 180* | 15 | 16 | 0 | 8 | 0.0222 | Asymp | Significant Effect |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.4182042 | 0.0697007 | 6 | 3.352 | 0.0129 | Significant Effect |
| Error | 0.5821834 | 0.02079226 | 28 | | | |
| Total | 1.000388 | | 34 | | | |

**Distributional Tests**

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variances | Bartlett Equality of Variance | 69.71 | 16.81 | <0.0001 | Unequal Variances |
| Variances | Mod Levene Equality of Variance | 1.067 | 3.812 | 0.4131 | Equal Variances |
| Variances | Levene Equality of Variance | 5.504 | 3.528 | 0.0007 | Unequal Variances |
| Distribution | Shapiro-Wilk W Normality | 0.5892 | 0.9146 | <0.0001 | Non-normal Distribution |
| Distribution | Kolmogorov-Smirnov D | 0.3055 | 0.1723 | <0.0001 | Non-normal Distribution |
| Distribution | D'Agostino Skewness | 5.661 | 2.576 | <0.0001 | Non-normal Distribution |
| Distribution | D'Agostino Kurtosis | 4.964 | 2.576 | <0.0001 | Non-normal Distribution |
| Distribution | D'Agostino-Pearson K2 Omnibus | 56.69 | 9.21 | <0.0001 | Non-normal Distribution |
| Distribution | Anderson-Darling A2 Normality | 4.895 | 3.878 | <0.0001 | Non-normal Distribution |

**Germination Rate Summary**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 0.908 | 0.9025 | 0.9135 | 0.91 | 0.9 | 0.91 | 0.001999 | 0.49% | 0.0% |
| 5.6 | | 5 | 0.9 | 0.8912 | 0.9088 | 0.9 | 0.89 | 0.91 | 0.003162 | 0.79% | 0.88% |
| 10 | | 5 | 0.91 | 0.8948 | 0.9252 | 0.91 | 0.89 | 0.92 | 0.005477 | 1.35% | -0.22% |
| 18 | | 5 | 0.902 | 0.8816 | 0.9224 | 0.91 | 0.88 | 0.92 | 0.007348 | 1.82% | 0.66% |
| 32 | | 5 | 0.884 | 0.8362 | 0.9318 | 0.9 | 0.82 | 0.92 | 0.0172 | 4.35% | 2.64% |
| 100 | | 5 | 0.886 | 0.8117 | 0.9603 | 0.91 | 0.78 | 0.92 | 0.02676 | 6.75% | 2.42% |
| 180 | | 5 | 0.652 | 0.254 | 1 | 0.79 | 0.08 | 0.82 | 0.1434 | 49.17% | 28.19% |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

**Angular (Corrected) Transformed Summary**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 5 | 1.263 | 1.253 | 1.272 | 1.266 | 1.249 | 1.266 | 0.003412 | 0.6% | 0.0% |
| 5.6 | | 5 | 1.249 | 1.235 | 1.264 | 1.249 | 1.233 | 1.266 | 0.005277 | 0.94% | 1.07% |
| 10 | | 5 | 1.267 | 1.241 | 1.293 | 1.266 | 1.233 | 1.284 | 0.00937 | 1.65% | -0.31% |
| 18 | | 5 | 1.253 | 1.219 | 1.287 | 1.266 | 1.217 | 1.284 | 0.01227 | 2.19% | 0.75% |
| 32 | | 5 | 1.226 | 1.155 | 1.298 | 1.249 | 1.133 | 1.284 | 0.02571 | 4.69% | 2.88% |
| 100 | | 5 | 1.233 | 1.127 | 1.339 | 1.266 | 1.083 | 1.284 | 0.0382 | 6.93% | 2.34% |
| 180 | | 5 | 0.9386 | 0.4848 | 1.392 | 1.095 | 0.2868 | 1.133 | 0.1634 | 38.94% | 25.67% |
| 320 | | 5 | 0.05002 | 0.05001 | 0.05003 | 0.05002 | 0.05002 | 0.05002 | 0 | 0.0% | 96.04% |

**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 11-1004-6513 | **Endpoint:** | Germination Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:10 | **Analysis:** | Nonparametric-Control vs Treatments | **Official Results:** | Yes |

### Germination Rate Detail

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 0.91 | 0.9 | 0.91 | 0.91 | 0.91 |
| 5.6 | | 0.9 | 0.89 | 0.9 | 0.9 | 0.91 |
| 10 | | 0.92 | 0.91 | 0.89 | 0.92 | 0.91 |
| 18 | | 0.88 | 0.91 | 0.89 | 0.92 | 0.91 |
| 32 | | 0.9 | 0.9 | 0.88 | 0.92 | 0.82 |
| 100 | | 0.92 | 0.91 | 0.9 | 0.92 | 0.78 |
| 180 | | 0.76 | 0.82 | 0.79 | 0.81 | 0.08 |
| 320 | | 0 | 0 | 0 | 0 | 0 |

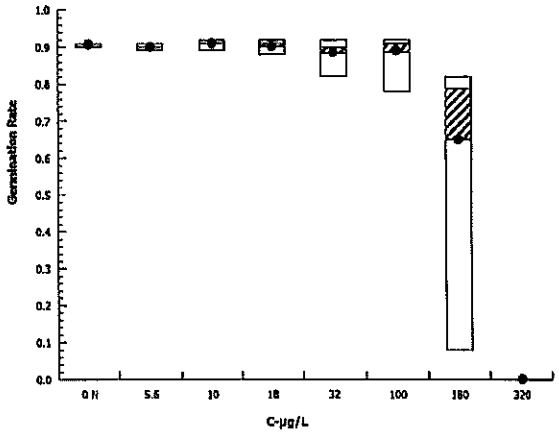
### Angular (Corrected) Transformed Detail

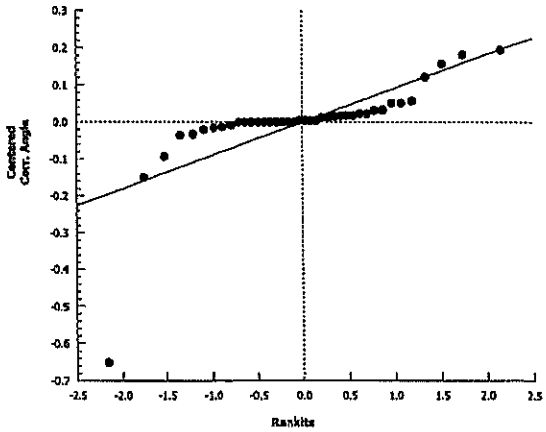
| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 1.266 | 1.249 | 1.266 | 1.266 | 1.266 |
| 5.6 | | 1.249 | 1.233 | 1.249 | 1.249 | 1.266 |
| 10 | | 1.284 | 1.266 | 1.233 | 1.284 | 1.266 |
| 18 | | 1.217 | 1.266 | 1.233 | 1.284 | 1.266 |
| 32 | | 1.249 | 1.249 | 1.217 | 1.284 | 1.133 |
| 100 | | 1.284 | 1.266 | 1.249 | 1.284 | 1.083 |
| 180 | | 1.059 | 1.133 | 1.095 | 1.12 | 0.2868 |
| 320 | | 0.05002 | 0.05002 | 0.05002 | 0.05002 | 0.05002 |

### Germination Rate Binomials

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 91/100 | 90/100 | 91/100 | 91/100 | 91/100 |
| 5.6 | | 90/100 | 89/100 | 90/100 | 90/100 | 91/100 |
| 10 | | 92/100 | 91/100 | 89/100 | 92/100 | 91/100 |
| 18 | | 88/100 | 91/100 | 89/100 | 92/100 | 91/100 |
| 32 | | 90/100 | 90/100 | 88/100 | 92/100 | 82/100 |
| 100 | | 92/100 | 91/100 | 90/100 | 92/100 | 78/100 |
| 180 | | 76/100 | 82/100 | 79/100 | 81/100 | 8/100 |
| 320 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |

### Graphics



**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 19-5459-9104 | **Endpoint:** | Mean Length | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:10 | **Analysis:** | Nonparametric-Control vs Treatments | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 13-1300-4078 | **Code:** | KLP061214 | **Client:** | Internal Lab |
| **Sample Date:** | 12 Jun-14 16:10 | **Material:** | Copper chloride | **Project:** | |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

| Data Transform | Zeta | Alt Hyp | Trials | Seed | PMSD | NOEL | LOEL | TOEL | TU |
|---|---|---|---|---|---|---|---|---|---|
| Untransformed | NA | C > T | NA | NA | 9.29% | 100 | 180 | 134.2 | |

### Steel Many-One Rank Sum Test

| Control vs | C-µg/L | Test Stat | Critical | Ties | DF | P-Value | P-Type | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|
| Negative Control | 5.6 | 37.5 | 16 | 1 | 8 | 0.9999 | Asymp | Non-Significant Effect |
| | 10 | 37 | 16 | 2 | 8 | 0.9998 | Asymp | Non-Significant Effect |
| | 18 | 29.5 | 16 | 1 | 8 | 0.9424 | Asymp | Non-Significant Effect |
| | 32 | 19 | 16 | 2 | 8 | 0.1478 | Asymp | Non-Significant Effect |
| | 100 | 32.5 | 16 | 1 | 8 | 0.9904 | Asymp | Non-Significant Effect |
| | 180* | 15 | 16 | 0 | 8 | 0.0222 | Asymp | Significant Effect |

### ANOVA Table

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 70.71085 | 11.78514 | 6 | 12.94 | <0.0001 | Significant Effect |
| Error | 25.508 | 0.9109998 | 28 | | | |
| Total | 96.21885 | | 34 | | | |

### Distributional Tests

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variances | Bartlett Equality of Variance | 30.9 | 16.81 | <0.0001 | Unequal Variances |
| Variances | Mod Levene Equality of Variance | 0.8513 | 3.812 | 0.5455 | Equal Variances |
| Variances | Levene Equality of Variance | 3.472 | 3.528 | 0.0108 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality | 0.7454 | 0.9146 | <0.0001 | Non-normal Distribution |
| Distribution | Kolmogorov-Smirnov D | 0.217 | 0.1723 | 0.0002 | Non-normal Distribution |
| Distribution | D'Agostino Skewness | 4.7 | 2.576 | <0.0001 | Non-normal Distribution |
| Distribution | D'Agostino Kurtosis | 4.063 | 2.576 | <0.0001 | Non-normal Distribution |
| Distribution | D'Agostino-Pearson K2 Omnibus | 38.6 | 9.21 | <0.0001 | Non-normal Distribution |
| Distribution | Anderson-Darling A2 Normality | 2.599 | 3.878 | <0.0001 | Non-normal Distribution |

### Mean Length Summary

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Control | 5 | 15.64 | 15.32 | 15.96 | 15.6 | 15.3 | 15.9 | 0.1166 | 1.67% | 0.0% |
| 5.6 | | 5 | 16.1 | 15.69 | 16.51 | 16.2 | 15.6 | 16.5 | 0.1483 | 2.06% | -2.94% |
| 10 | | 5 | 16.02 | 15.65 | 16.39 | 16 | 15.7 | 16.5 | 0.1319 | 1.84% | -2.43% |
| 18 | | 5 | 15.82 | 15.22 | 16.42 | 15.8 | 15.3 | 16.4 | 0.2154 | 3.05% | -1.15% |
| 32 | | 5 | 14.8 | 13.26 | 16.34 | 15.3 | 12.6 | 15.6 | 0.5559 | 8.4% | 5.37% |
| 100 | | 5 | 15.14 | 12.59 | 17.69 | 16 | 11.5 | 16.3 | 0.919 | 13.57% | 3.2% |
| 180 | | 5 | 11.72 | 11.3 | 12.14 | 11.6 | 11.5 | 12.3 | 0.1497 | 2.86% | 25.06% |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

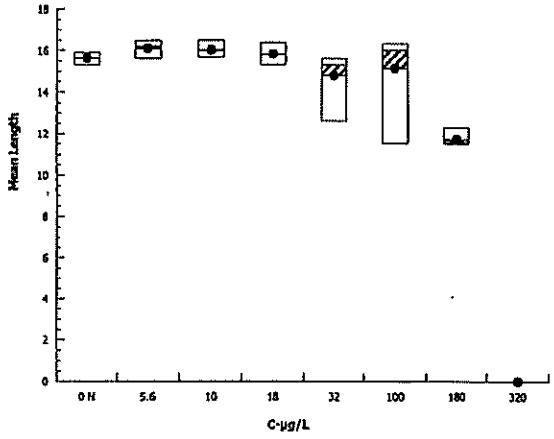
### Mean Length Detail

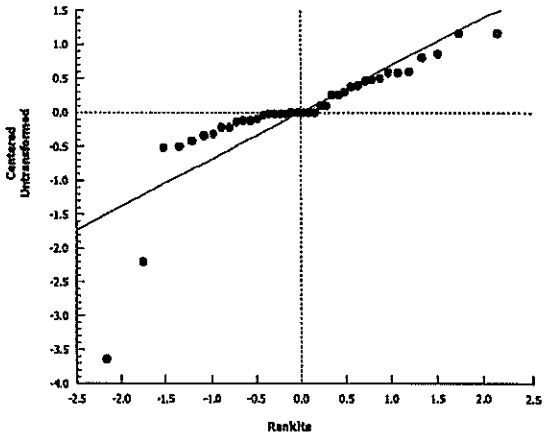
| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 15.3 | 15.5 | 15.9 | 15.9 | 15.6 |
| 5.6 | | 16.2 | 15.6 | 16.5 | 16.2 | 16 |
| 10 | | 16 | 15.7 | 16.5 | 16 | 15.9 |
| 18 | | 15.8 | 15.3 | 16.4 | 16.2 | 15.4 |
| 32 | | 15.1 | 15.6 | 15.4 | 15.3 | 12.6 |
| 100 | | 16.3 | 16.3 | 16 | 15.6 | 11.5 |
| 180 | | 12.3 | 11.7 | 11.5 | 11.5 | 11.6 |
| 320 | | 0 | 0 | 0 | 0 | 0 |

**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 19-5459-9104 | **Endpoint:** | Mean Length | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:10 | **Analysis:** | Nonparametric-Control vs Treatments | **Official Results:** | Yes |

### Graphics



# CETIS Analytical Report

Report Date: 02 Jul-14 14:10 (p 1 of 4)
Test Code: KLP061214 | 04-4614-2470

**Macrocystis Germination and Germ Tube Growth Test** — Aquatic Bioassay & Consulting Labs, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 14-0406-5345 | **Endpoint:** | Germination Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:10 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 13-1300-4078 | **Code:** | KLP061214 | **Client:** | Internal Lab |
| **Sample Date:** | 12 Jun-14 16:10 | **Material:** | Copper chloride | **Project:** | |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 0 | 280 | Yes | Two-Point Interpolation |

**Point Estimates**

| Level | µg/L | 95% LCL | 95% UCL |
|---|---|---|---|
| EC5 | 107.7 | 4.071 | 140.2 |
| EC10 | 123.3 | 97.09 | 193.6 |
| EC15 | 138.9 | 105.9 | 210 |
| EC20 | 154.5 | 109.7 | 214 |
| EC25 | 170 | 112.2 | 218 |
| EC40 | 203 | 127 | 236.9 |
| EC50 | 222.5 | 138.1 | 250.7 |

**Germination Rate Summary**

| | | | Calculated Variate(A/B) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-µg/L | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect | A | B |
| 0 | Negative Control | 5 | 0.908 | 0.9 | 0.91 | 0.001999 | 0.004469 | 0.49% | 0.0% | 454 | 500 |
| 5.6 | | 5 | 0.9 | 0.89 | 0.91 | 0.003162 | 0.00707 | 0.79% | 0.88% | 450 | 500 |
| 10 | | 5 | 0.91 | 0.89 | 0.92 | 0.005477 | 0.01225 | 1.35% | -0.22% | 455 | 500 |
| 18 | | 5 | 0.902 | 0.88 | 0.92 | 0.007348 | 0.01643 | 1.82% | 0.66% | 451 | 500 |
| 32 | | 5 | 0.884 | 0.82 | 0.92 | 0.0172 | 0.03847 | 4.35% | 2.64% | 442 | 500 |
| 100 | | 5 | 0.886 | 0.78 | 0.92 | 0.02676 | 0.05983 | 6.75% | 2.42% | 443 | 500 |
| 180 | | 5 | 0.652 | 0.08 | 0.82 | 0.1434 | 0.3206 | 49.17% | 28.19% | 326 | 500 |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | | 100.0% | 0 | 500 |

**Germination Rate Detail**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 0.91 | 0.9 | 0.91 | 0.91 | 0.91 |
| 5.6 | | 0.9 | 0.89 | 0.9 | 0.9 | 0.91 |
| 10 | | 0.92 | 0.91 | 0.89 | 0.92 | 0.91 |
| 18 | | 0.88 | 0.91 | 0.89 | 0.92 | 0.91 |
| 32 | | 0.9 | 0.9 | 0.88 | 0.92 | 0.82 |
| 100 | | 0.92 | 0.91 | 0.9 | 0.92 | 0.78 |
| 180 | | 0.76 | 0.82 | 0.79 | 0.81 | 0.08 |
| 320 | | 0 | 0 | 0 | 0 | 0 |

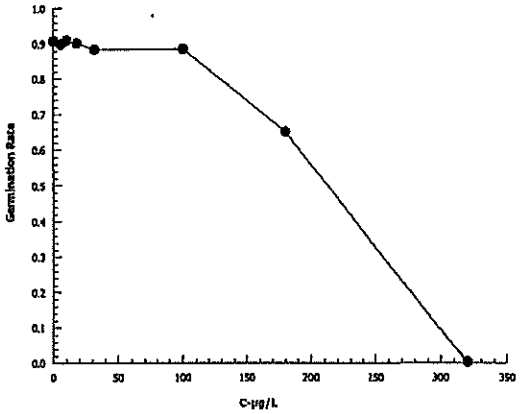
**Germination Rate Binomials**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 91/100 | 90/100 | 91/100 | 91/100 | 91/100 |
| 5.6 | | 90/100 | 89/100 | 90/100 | 90/100 | 91/100 |
| 10 | | 92/100 | 91/100 | 89/100 | 92/100 | 91/100 |
| 18 | | 88/100 | 91/100 | 89/100 | 92/100 | 91/100 |
| 32 | | 90/100 | 90/100 | 88/100 | 92/100 | 82/100 |
| 100 | | 92/100 | 91/100 | 90/100 | 92/100 | 78/100 |
| 180 | | 76/100 | 82/100 | 79/100 | 81/100 | 8/100 |
| 320 | | 0/100 | 0/100 | 0/100 | 0/100 | 0/100 |

**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 14-0406-5345 | **Endpoint:** | Germination Rate | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:10 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

**Graphics**



**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 01-8695-2064 | **Endpoint:** | Mean Length | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:10 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 13-1300-4078 | **Code:** | KLP061214 | **Client:** | Internal Lab |
| **Sample Date:** | 12 Jun-14 16:10 | **Material:** | Copper chloride | **Project:** | |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 35772 | 280 | Yes | Two-Point Interpolation |

**Point Estimates**

| Level | µg/L | 95% LCL | 95% UCL |
|---|---|---|---|
| IC5 | 29.46 | 19.21 | 153.3 |
| IC10 | 115.8 | N/A | 133.7 |
| IC15 | 135.4 | 63.46 | 149.1 |
| IC20 | 155 | 112.2 | 164.6 |
| IC25 | 174.6 | 157.9 | 183.5 |
| IC40 | 205.9 | 202.5 | 209.7 |
| IC50 | 224.9 | 222.1 | 228.1 |

**Mean Length Summary**

| | | | Calculated Variate | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C-µg/L | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Negative Control | 5 | 15.64 | 15.3 | 15.9 | 0.1166 | 0.2608 | 1.67% | 0.0% |
| 5.6 | | 5 | 16.1 | 15.6 | 16.5 | 0.1483 | 0.3317 | 2.06% | -2.94% |
| 10 | | 5 | 16.02 | 15.7 | 16.5 | 0.1319 | 0.295 | 1.84% | -2.43% |
| 18 | | 5 | 15.82 | 15.3 | 16.4 | 0.2154 | 0.4817 | 3.05% | -1.15% |
| 32 | | 5 | 14.8 | 12.6 | 15.6 | 0.5559 | 1.243 | 8.4% | 5.37% |
| 100 | | 5 | 15.14 | 11.5 | 16.3 | 0.919 | 2.055 | 13.57% | 3.2% |
| 180 | | 5 | 11.72 | 11.5 | 12.3 | 0.1497 | 0.3347 | 2.86% | 25.06% |
| 320 | | 5 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

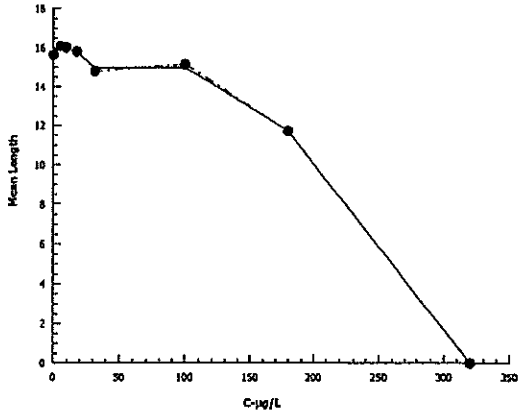
**Mean Length Detail**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Negative Control | 15.3 | 15.5 | 15.9 | 15.9 | 15.6 |
| 5.6 | | 16.2 | 15.6 | 16.5 | 16.2 | 16 |
| 10 | | 16 | 15.7 | 16.5 | 16 | 15.9 |
| 18 | | 15.8 | 15.3 | 16.4 | 16.2 | 15.4 |
| 32 | | 15.1 | 15.6 | 15.4 | 15.3 | 12.6 |
| 100 | | 16.3 | 16.3 | 16 | 15.6 | 11.5 |
| 180 | | 12.3 | 11.7 | 11.5 | 11.5 | 11.6 |
| 320 | | 0 | 0 | 0 | 0 | 0 |

**Macrocystis Germination and Germ Tube Growth Test** — **Aquatic Bioassay & Consulting Labs, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 01-8695-2064 | **Endpoint:** | Mean Length | **CETIS Version:** | CETISv1.8.7 |
| **Analyzed:** | 02 Jul-14 14:10 | **Analysis:** | Linear Interpolation (ICPIN) | **Official Results:** | Yes |

**Graphics**



# CETIS Measurement Report

Report Date: 02 Jul-14 14:10 (p 1 of 2)
Test Code: KLP061214 | 04-4614-2470

**Macrocystis Germination and Germ Tube Growth Test** — Aquatic Bioassay & Consulting Labs, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 15-5921-0113 | **Test Type:** | Growth-Germination | **Analyst:** | |
| **Start Date:** | 12 Jun-14 16:10 | **Protocol:** | EPA/600/R-95/136 (1995) | **Diluent:** | Laboratory Seawater |
| **Ending Date:** | | **Species:** | Macrocystis pyrifera | **Brine:** | Not Applicable |
| **Duration:** | NA | **Source:** | David Gutoff | **Age:** | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 13-1300-4078 | **Code:** | KLP061214 | **Client:** | Internal Lab |
| **Sample Date:** | 12 Jun-14 16:10 | **Material:** | Copper chloride | **Project:** | |
| **Receive Date:** | | **Source:** | Reference Toxicant | | |
| **Sample Age:** | NA | **Station:** | REF TOX | | |

**Dissolved Oxygen-mg/L**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 6.5 | 2.688 | 10.31 | 6.2 | 6.8 | 0.3 | 0.4243 | 6.53% | 0 |
| 5.6 | | 2 | 6.45 | 2.003 | 10.9 | 6.1 | 6.8 | 0.35 | 0.495 | 7.67% | 0 |
| 10 | | 2 | 6.45 | 4.544 | 8.356 | 6.3 | 6.6 | 0.15 | 0.2121 | 3.29% | 0 |
| 18 | | 2 | 6.45 | 3.273 | 9.627 | 6.2 | 6.7 | 0.25 | 0.3536 | 5.48% | 0 |
| 32 | | 2 | 6.45 | 0.7322 | 12.17 | 6 | 6.9 | 0.45 | 0.6364 | 9.87% | 0 |
| 100 | | 2 | 6.4 | 1.318 | 11.48 | 6 | 6.8 | 0.4 | 0.5657 | 8.84% | 0 |
| 180 | | 2 | 6.25 | 1.803 | 10.7 | 5.9 | 6.6 | 0.35 | 0.495 | 7.92% | 0 |
| 320 | | 2 | 6.5 | 2.688 | 10.31 | 6.2 | 6.8 | 0.3 | 0.4243 | 6.53% | 0 |
| Overall | | 16 | 6.431 | | | 5.9 | 6.9 | | | | 0 (0%) |

**pH-Units**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 7.9 | 7.884 | 7.916 | 7.9 | 7.9 | 0 | 0 | 0.0% | 0 |
| 5.6 | | 2 | 7.9 | 7.884 | 7.916 | 7.9 | 7.9 | 0 | 0 | 0.0% | 0 |
| 10 | | 2 | 7.9 | 7.884 | 7.916 | 7.9 | 7.9 | 0 | 0 | 0.0% | 0 |
| 18 | | 2 | 7.9 | 7.884 | 7.916 | 7.9 | 7.9 | 0 | 0 | 0.0% | 0 |
| 32 | | 2 | 7.9 | 7.884 | 7.916 | 7.9 | 7.9 | 0 | 0 | 0.0% | 0 |
| 100 | | 2 | 7.9 | 7.884 | 7.916 | 7.9 | 7.9 | 0 | 0 | 0.0% | 0 |
| 180 | | 2 | 7.9 | 7.884 | 7.916 | 7.9 | 7.9 | 0 | 0 | 0.0% | 0 |
| 320 | | 2 | 7.9 | 7.884 | 7.916 | 7.9 | 7.9 | 0 | 0 | 0.0% | 0 |
| Overall | | 16 | 7.9 | | | 7.9 | 7.9 | | | | 0 (0%) |

**Salinity-ppt**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 5.6 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 10 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 18 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 32 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 100 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 180 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| 320 | | 2 | 34 | 34 | 34 | 34 | 34 | 0 | 0 | 0.0% | 0 |
| Overall | | 16 | 34 | | | 34 | 34 | | | | 0 (0%) |

**Temperature-°C**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | QA Count |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Negative Contr | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 5.6 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 10 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 18 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 32 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 100 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 180 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| 320 | | 2 | 14.7 | 13.43 | 15.97 | 14.6 | 14.8 | 0.09999 | 0.1414 | 0.96% | 0 |
| Overall | | 16 | 14.7 | | | 14.6 | 14.8 | | | | 0 (0%) |

**Dissolved Oxygen-mg/L**

| C-µg/L | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 6.8 | 6.2 |
| 5.6 | | 6.8 | 6.1 |
| 10 | | 6.6 | 6.3 |
| 18 | | 6.7 | 6.2 |
| 32 | | 6.9 | 6 |
| 100 | | 6.8 | 6 |
| 180 | | 6.6 | 5.9 |
| 320 | | 6.8 | 6.2 |

**pH-Units**

| C-µg/L | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 7.9 | 7.9 |
| 5.6 | | 7.9 | 7.9 |
| 10 | | 7.9 | 7.9 |
| 18 | | 7.9 | 7.9 |
| 32 | | 7.9 | 7.9 |
| 100 | | 7.9 | 7.9 |
| 180 | | 7.9 | 7.9 |
| 320 | | 7.9 | 7.9 |

**Salinity-ppt**

| C-µg/L | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 34 | 34 |
| 5.6 | | 34 | 34 |
| 10 | | 34 | 34 |
| 18 | | 34 | 34 |
| 32 | | 34 | 34 |
| 100 | | 34 | 34 |
| 180 | | 34 | 34 |
| 320 | | 34 | 34 |

**Temperature-°C**

| C-µg/L | Control Type | 1 | 2 |
|---|---|---|---|
| 0 | Negative Contr | 14.8 | 14.6 |
| 5.6 | | 14.8 | 14.6 |
| 10 | | 14.8 | 14.6 |
| 18 | | 14.8 | 14.6 |
| 32 | | 14.8 | 14.6 |
| 100 | | 14.8 | 14.6 |
| 180 | | 14.8 | 14.6 |
| 320 | | 14.8 | 14.6 |