

Project Instructions

Date Submitted: September 4, 2014

Platform: NOAA Ship *Bell M. Shimada*

Project Number: SH-14-06

Project Title: UxS

Project Dates: September 17, 2014 to September 21, 2014

Prepared by: Chelsea D Frate Dated: 9/5/2014
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National Weather Service, National Data Buoy Center

Approved by: Helmut H. Portmann Dated: 9/5/2014
Helmut H. Portmann
Director
National Data Buoy Center

Approved by: Thomas Peltzer Dated: 9/5/2014
CDR Thomas Peltzer
Associate Director for Operations
Pacific Marine Environmental Laboratory, PMEL

Approved by: _____ Dated: 05Sept2014
Captain Douglas Baird, NOAA
Commanding Officer
Marine Operations Center - Pacific

9/5/2014

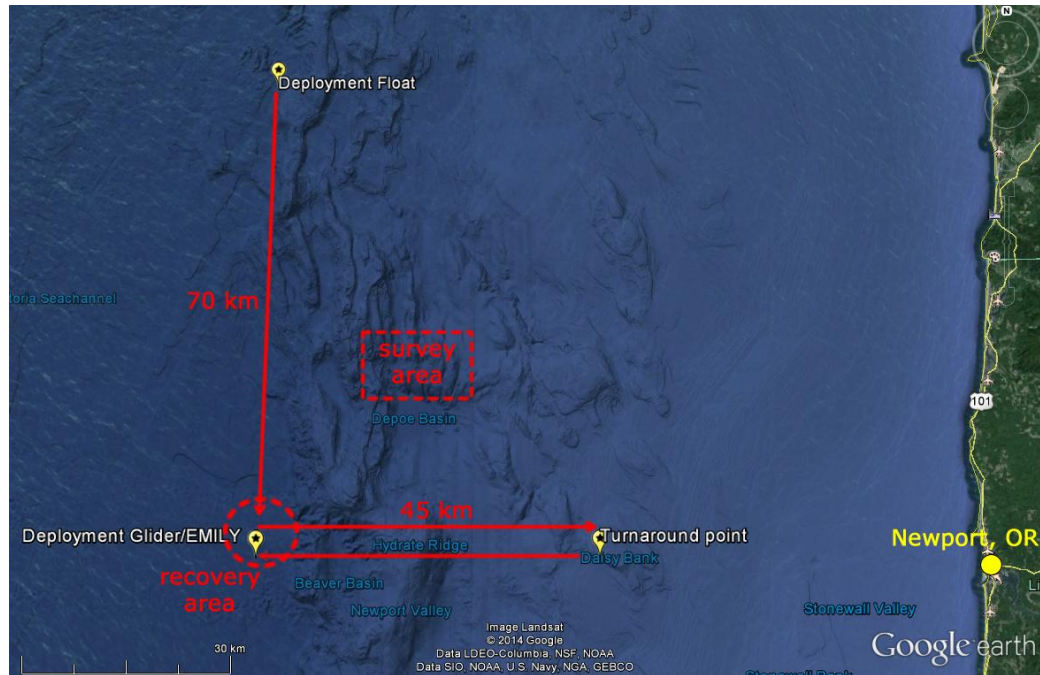
I. Overview

A. September 17-21, 2014 from Newport, OR to Newport, OR.

B. Days at Sea (DAS)

Of the 5 DAS scheduled for this project, 5 DAS are funded by an OMAO allocation, 0 DAS are funded by a Line Office Allocation, 0 DAS are Program Funded and 0 DAS are Other Agency funded. This project is estimated to exhibit a Medium Operational Tempo.

C. Operating Area (include optional map/figure showing op area)



Deployment and recovery position for the passive-acoustic Seaglider AUV will be approximately 100 km offshore near Beaver Basin indicated in above diagram, at position N44.65, W125.40. The ARGOS Drifter Float will be deployed about 70 km north of position at N45.30, W125.40 and is expected to drift south at a speed which will allow us to recover the instrument in conjunction with the Seaglider at the end of the project.

The Survey area (15x10km; center at N44.91, W125.12) on the above figure is the approximate distance away that we request the ship stay to avoid any access noise or acoustic disturbances.

D. Summary of Objectives

The primary objective of this project is to demonstrate command and control turnover procedures with various unmanned systems as well as to field test newly developed passive-acoustic autonomous underwater vehicle (AUV) and unmanned surface vehicle (USV) off the Oregon coast. The testing survey will take place along the Newport Hydrographic (NH) Line. A secondary objective would also be to recover a DART 4G buoy as well as a Bottom Pressure Recorder (BPR) deployment.

E. Participating Institutions

NOAA – Pacific Marine Environmental Laboratory (PMEL)
7600 Sand Point Way, N.E. Seattle, Washington 98115

OSU/NOAA Cooperative Institute for Marine Resources Studies (CIMRS/PMEL)

OSU Marine Mammal Institute (OSU)

NOAA – National Data Buoy Center (NDBC)
Building 3205, Stennis Space Center, Mississippi 39529

F. Personnel/Science Party: name, title, gender, affiliation, and nationality

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Frate, Chelsea	Chief Scientist NOAA Corps	9/16/2014	9/22/2014	Female	NWS / NDBC	USA
McCall, Walt	Wave Glider Expert	9/16/2014	9/22/2014	Male	NWS / NDBC	USA
Klinck, Holger	Assistant Professor	9/17/2014	9/21/2014	Male	CIRMS/PMEL	USA
Turpin, Alex	Seaglider Technician	9/17/2014	9/21/2014	Male	CIMRS/PMEL	USA
Holdman, Amanda	Grad Student	9/17/2014	9/21/2014	Female	OSU	USA
VanTulder, Florence	Grad Student	9/17/2014	9/21/2014	Female	OSU	USA
Pickett, Matt	ONMS Aviation Operations	9/17/2014	9/21/2014	Male	Channel Islands – NMS	USA
Kathy Hough	Survey Tech	9/17/2014	9/21/2014	Female	Channel Islands - NMS	USA
Michael Craig	DART Technician	9/17/2014	9/21/2014	Male	NOAA/PMEL	USA

G. Administrative

1. Points of Contacts:

LTJG Chelsea Frate NOAA Corps
National Data Buoy Center
Stennis Space Center, MS 39529
Office: 228-688-1144 Cell: 203-610-1652
Email: Chelsea.d.frate@noaa.gov

Christian Meinig, PMEL
Phone: 206-526-6149
Email: Christian.meinig@noaa.gov

LT Patrick Sweeney/LTJG Zachary Cress
NOAA Ship *Bell M. Shimada*, Operations Officer
Phone: 301-713-7788
Email: OPS.Bell.Shimada@noaa.gov

2. Diplomatic Clearances: None Required.

3. Licenses and Permits: None Required.

II. Operations

The Chief Scientist is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives and priorities. The Commanding Officer is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. Project Itinerary:

Departure: September 17, 2014 – Newport, OR
Arrival: September 21, 2014 – Newport, OR

B. Staging and De-staging:

Shipping boxes with equipment will be shipped directly from the National Data Buoy Center, Stennis Space Center, MS to Newport, OR Marine Operations Center – Pacific. Equipment will be transported from PMEL directly to the ship with scientific party. Loading gear shall occur as appropriate before sailing. The scientific party will arrive at least one day early to assist with loading and preparation. The scientific party will be responsible for arranging vehicles for transporting themselves and equipment to the ship. Equipment will be off-loaded in Newport, OR upon arrival and proper shipping avenues will be conducted by scientific party.

C. Operations to be Conducted:

NOAA/PMEL in collaboration with the OSU/NOAA Cooperative Institute for Marine Resources Studies will field test newly developed passive-acoustic autonomous underwater vehicles (AUVs) and an unmanned surface vehicle (USV) off the Oregon coast.

We propose to deploy and recover the Seaglider from a small boat approximately 54 NM offshore Newport near Beaver Basin at position N44.65, W125.40.

From the deployment location the instrument will conduct a 90 km (round-trip) survey indicated by the red arrows in the section I.C. The anticipated duration of this survey is 96 hours. Therefore the instruments would ideally be deployed at the beginning (Wednesday, September 17th) and recovered at the end (Sunday September 21st) of the project. Ship time necessary for deployment and recovery (during daylight hours) is approximately 4 hours, respectively.

We furthermore propose to deploy the acoustically equipped ARGOS Drifter Float about 38 NM north of the Seaglider deployment location at N45.30, W125.40. The float is expected to drift south at a speed which will allow us to recover the instrument in conjunction with the Seaglider at the end of the project in the area labeled recovery area in the section I.C. The float can be deployed from the *Shimada* (no small boat necessary). However, recovery involves small boat operation.

The Emily USV has an expected duration time, per full tank of gasoline, for about 24 hours. Emily's fuel tank holds approximately 3.5 gallons of fuel. We will deploy Emily on 1-2 test transects which should take 18-20 hours each, recovering and refueling between.

The instruments will be collecting passive acoustic recordings. The data will be analyzed for marine mammal vocalizations in the lab after recovery. We will be bringing a handheld hydrophone as well to opportunistically record vocalizations in the vicinity of the marine mammals from the small boat. This data will be used to ground truth the data collected with the autonomous platforms. The data collected by the OSU visual observers will also be used for this purpose.

The instruments (ARGOS Drifter, Seaglider and Emily) each have independent GPS transmitters. If weather does not permit recovery by small boat, we will be able to track and retrieve at a later date.

NDBC will be launching a wave glider to be used for the command and control demonstration. This demonstration will show how the process for readying the wave glider and preparing it for deployment as well as how to control the glider once deployed and pass command back to the shore-side command location (Mission Control Center (MCC) – Stennis Space Center, MS). We will show radio silent control pass over as well as phone communicated radio pass over. After the demonstration is complete, the MCC will pilot the glider south to complete the WFO Medford proposed project – recovery of the wave glider is pending a later date.

NOAA/PMEL has requested the recovery of DART 4G buoy and BPR deployment. The DART mooring is currently at position 44 38.57N 125 59.64W. The new BPR would be

deployed at position 44 48.05N 125 59.79W. Diagrams of these operations will be attached.

- D. Dive Plan: Diving is not planned for this project.
- E. Applicable Restrictions

The ship will be bringing the MOC-P workboat, MOC-P 2401 (Zodiac Hurricane 733). The boat is 24', weighs 4520 lbs with outboards (Yamaha outboards 115 hp each) and full tank of gas. The use of this small boat will be for the deployment of USV Emily and recovery of USV Emily, UAV Sea glider and ARGOS drifter. Contingency recovery plans for inclement weather have been established. The MOC-P 2401 will also be utilized to assist in the DART evolution.

III. Equipment

- A. Equipment and Capabilities provided by the ship (itemized)
 - Minimum of 2 computers with internet and email access,
 - Laboratory space with storage spaces,
 - Adequate deck lighting for dusk/dawn operations,
 - Navigational equipment including GPS and Radar,
 - Safety harnesses for working on hero deck and fantail,
 - Ship's crane(s) used for loading and/or deploying,
 - Workboat – MOC-P 2401
 - RS232 Interface with ships GPS for laptop connection
- B. Equipment and Capabilities provided by the scientists (itemized)
 - Wave Glider (1.7 m long and weighs 55 kg in air)
 - Seaglider AUV (2.0 m long and weighs 52 kg in air)
 - Emily USV (1.7 m long and weighs 57 kg in air)
 - ARGOS Float (1.5m long and 0.25 m diameter, 50 kg in air)
 - Spill Kits for scientists' HazMat
 - Miscellaneous office supplies,

IV. Hazardous Materials

- A. Policy and Compliance

The Chief Scientist is responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical

brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

- List of chemicals by name with anticipated quantity
- List of spill response materials, including neutralizing agents, buffers, and absorbents
- Chemical safety and spill response procedures, such as excerpts of the program's Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship's Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

Upon embarkation and prior to loading hazardous materials aboard the vessel, the scientific party will provide to the CO or their designee:

- An inventory list showing actual amount of hazardous material brought aboard
- An MSDS for each material
- Confirmation that neutralizing agents and spill equipment were brought aboard sufficient to contain and cleanup all of the hazardous material brought aboard by the program
- Confirmation that chemical safety and spill response procedures were brought aboard

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO's designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship's complement, in compliance with Hazard Communication Laws.

Scientific parties are expected to manage and respond to spills of scientific hazardous materials. Overboard discharge of hazardous materials is not permitted aboard NOAA ships.

B. Inventory

Common Name of Material	Qty	Notes	Trained Individual	Spill control
Lithium Sulfuryl Chloride Cells and Batteries	2	Seaglider	Alex Turpin	Class D Fire Extinguisher, Granular absorbent
Marine Grade Gasoline	5 gal	Emily	Alex Turpin	Granular absorbent

C. Chemical safety and spill response procedures

See Material Safety Data Sheet in Appendix

Inventory of Spill Kit supplies

Product Name	Amount	Chemicals it is useful against	Amount it can clean up
Class D Fire Extinguisher	1	Lithium Batteries	100% of Lithium onboard.
Absorbents		Marine Grade Gasoline	100% of Gasoline onboard.

- D. Radioactive Materials: No Radioactive Isotopes are planned for this project.
- E. Inventory (itemized) of Radioactive Materials: No Radioactive Isotopes are planned for this project.

V. Additional Projects

- A. Supplementary (“Piggyback”) Projects: No Supplementary Projects are planned.
- B. NOAA Fleet Ancillary Projects: N/A

VI. Disposition of Data and Reports

Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information*. To guide the implementation of these NAOs, NOAA’s Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

- A. Data Classifications: *Under Development*
 - a. OMAO Data
 - b. Program Data
- B. Responsibilities: *Under Development*

VII. Meetings, Vessel Familiarization, and Project Evaluations

- A. Pre-Project Meeting: The Chief Scientist and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship’s crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship’s Operations Officer usually is delegated to assist the Chief Scientist in arranging this meeting.

- B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.
- C. Post-Project Meeting: The Commanding Officer is responsible for conducted a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.
- D. Project Evaluation Report

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at <http://www.oma.noaa.gov/fleeteval.html> and provides a "Submit" button at the end of the form. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships', specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the project.

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Chief Scientist. The Chief Scientist and Commanding Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The Chief Scientist is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Chief Scientist is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the project and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Chief Scientist will ensure that all non NOAA or non Federal scientists aboard also have proper orders. It is the responsibility of the Chief Scientist to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 17, 2000 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website <http://www.corporateservices.noaa.gov/noaaforms/eforms/nf57-10-01.pdf>.

All NHSQs submitted after March 1, 2014 must be accompanied by [NOAA Form \(NF\) 57-10-02](#) - Tuberculosis Screening Document in compliance with [OMAO Policy 1008](#) (Tuberculosis Protection Program).

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance (http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240).

The only secure email process approved by NOAA is [Accellion Secure File Transfer](#) which requires the sender to setup an account. [Accellion's Web Users Guide](#) is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab", after your Accellion account has been established send an email from the associated email account to accellionAlerts@doc.gov requesting access to the "Send

Tab” function. They will notify you via email usually within 1 business day of your approval. The ‘Send Tab” function will be accessible for 30 days.

Contact information:

Regional Director of Health Services
Marine Operations Center – Pacific
2002 SE Marine Science Dr.
Newport, OR 97365
Telephone 541-867-8822
Fax 541-867-8856
Email MOP.Health-Services@noaa.gov

Prior to departure, the Chief Scientist must provide an electronic listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: contact name, address, relationship to member, and telephone number.

C. Shipboard Safety

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery. The ship does not provide safety-toed shoes/boots. The ship’s Operations Officer should be consulted by the Chief Scientist to ensure members of the scientific party report aboard with the proper attire.

D. Communications

A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually accommodate the Chief Scientist. Special radio voice communications requirements should be listed in the project instructions. The ship’s primary means of communication with the Marine Operations Center is via email and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required and it must be arranged through the ship’s Commanding Officer at least 30 days in advance.

E. IT Security

Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy* 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

- (1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
- (2) Installation of the latest critical operating system security patches.
- (3) No external public Internet Service Provider (ISP) connections.

Completion of the above requirements prior to boarding the ship is required.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ships' network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

Foreign National access to the NOAA ship or Federal Facilities is not required for this project.

VIII. Appendices (all that apply)

1. Figures, maps, tables, images, etc.



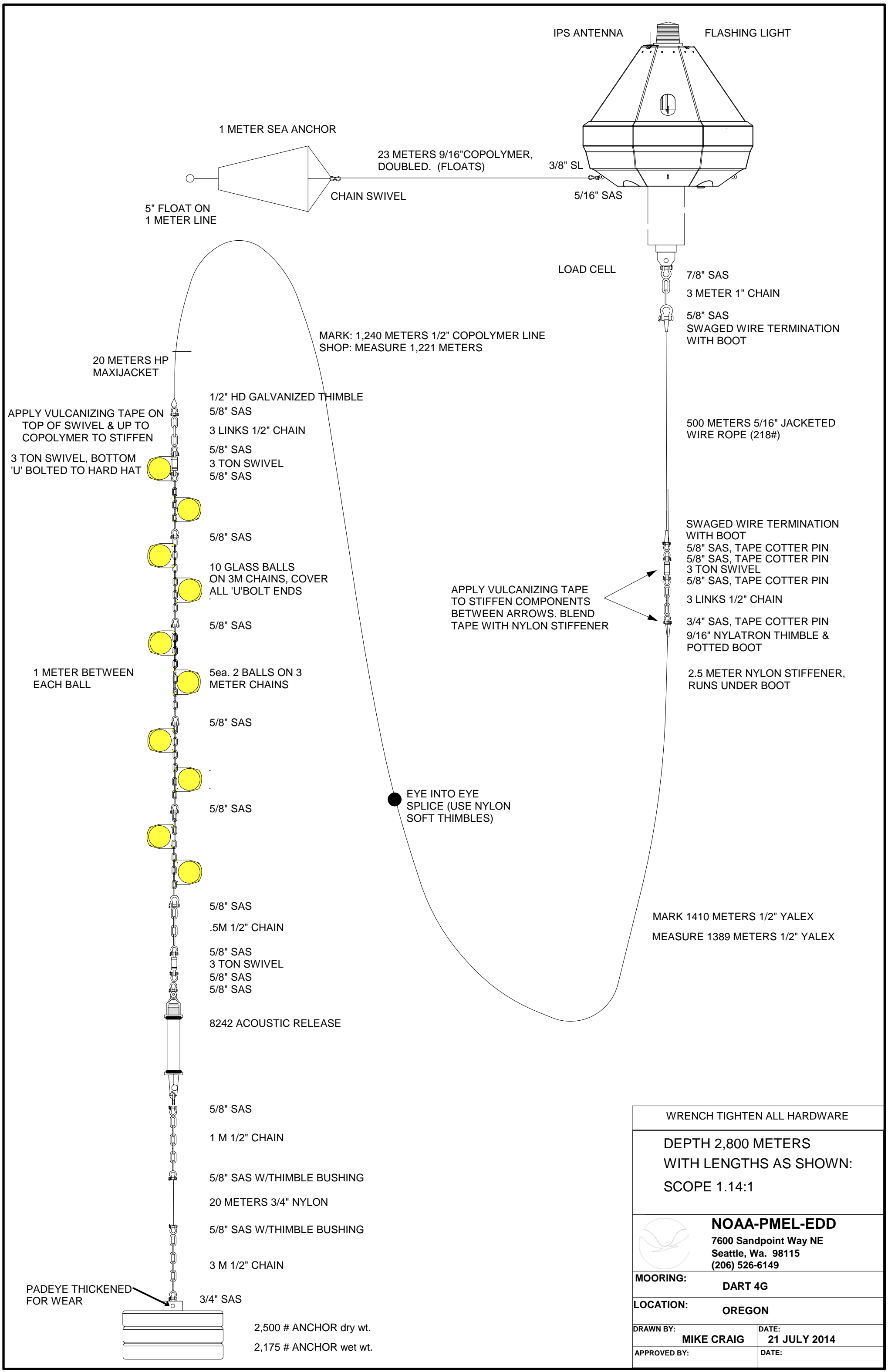
Above: ARGOS Float – Left: underwater, Right: on Deck



Above: Emily USV, Below: NDBC Wave Glider, Right: PMEL Seaglider



2. Station/Waypoint List (coordinates in Latitude, Longitude: degree-minutes)
 - a. Deployment/recovery of the Seaglider and Emily USV: N44.65, W125.40
 - i. Turnaround position: N44.65, W124.77
 - b. ARGOS Drifter Float Deployment position: N45.30, W125.40
 - i. Recovery Position same as Seaglider / Emily.
 - c. Recovery of DART 4G Mooring : 44 38.57N 125 59.64W
 - d. Deployment of DART BPR: 44 48.05N 125 59.79W



1 METER SEA ANCHOR

5" FLOAT ON 1 METER LINE

23 METERS 9/16" COPOLYMER, DOUBLED. (FLOATS)

CHAIN SWIVEL

3/8" SL

5/16" SAS

IPS ANTENNA

FLASHING LIGHT

LOAD CELL

7/8" SAS

3 METER 1" CHAIN

5/8" SAS SWAGED WIRE TERMINATION WITH BOOT

500 METERS 5/16" JACKETED WIRE ROPE (218#)

SWAGED WIRE TERMINATION WITH BOOT

5/8" SAS, TAPE COTTER PIN

5/8" SAS, TAPE COTTER PIN

3 TON SWIVEL

5/8" SAS, TAPE COTTER PIN

3 LINKS 1/2" CHAIN

3/4" SAS, TAPE COTTER PIN

9/16" NYLATRON THIMBLE & POTTED BOOT

2.5 METER NYLON STIFFENER, RUNS UNDER BOOT

MARK 1,240 METERS 1/2" COPOLYMER LINE
SHOP: MEASURE 1,221 METERS

20 METERS HP MAXIJACKET

1/2" HD GALVANIZED THIMBLE

5/8" SAS

3 LINKS 1/2" CHAIN

5/8" SAS

3 TON SWIVEL

5/8" SAS

5/8" SAS

10 GLASS BALLS ON 3M CHAINS, COVER ALL 'U'BOLT ENDS

5/8" SAS

5ea. 2 BALLS ON 3 METER CHAINS

5/8" SAS

5/8" SAS

5/8" SAS

5/8" SAS

5/8" SAS

5/8" SAS

.5M 1/2" CHAIN

5/8" SAS

3 TON SWIVEL

5/8" SAS

5/8" SAS

8242 ACOUSTIC RELEASE

5/8" SAS

1 M 1/2" CHAIN

5/8" SAS W/THIMBLE BUSHING

20 METERS 3/4" NYLON

5/8" SAS W/THIMBLE BUSHING

3 M 1/2" CHAIN

3/4" SAS

PADEYE THICKENED FOR WEAR

2,500 # ANCHOR dry wt.

2,175 # ANCHOR wet wt.

APPLY VULCANIZING TAPE ON TOP OF SWIVEL & UP TO COPOLYMER TO STIFFEN


3 TON SWIVEL, BOTTOM 'U' BOLTED TO HARD HAT

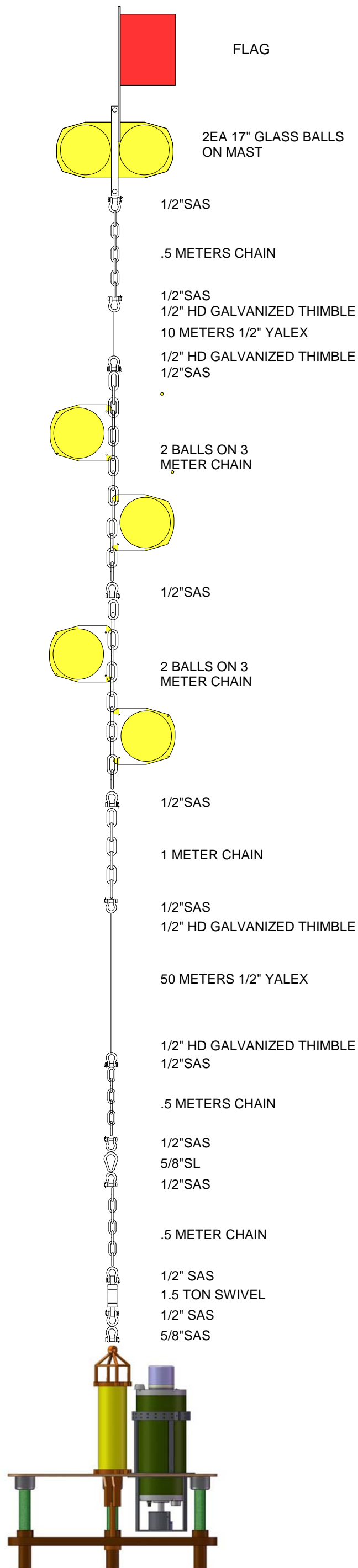
1 METER BETWEEN EACH BALL

APPLY VULCANIZING TAPE TO STIFFEN COMPONENTS BETWEEN ARROWS. BLEND TAPE WITH NYLON STIFFENER

EYE INTO EYE SPLICE (USE NYLON SOFT THIMBLES)

MARK 1410 METERS 1/2" YALEX
MEASURE 1389 METERS 1/2" YALEX

WRENCH TIGHTEN ALL HARDWARE	
DEPTH 2,800 METERS WITH LENGTHS AS SHOWN: SCOPE 1.14:1	
 NOAA-PMEL-EDD 7600 Sandpoint Way NE Seattle, Wa. 98115 (206) 526-6149	
MOORING:	DART 4G
LOCATION:	OREGON
DRAWN BY:	MIKE CRAIG
DATE:	21 JULY 2014
APPROVED BY:	
DATE:	



FLAG

2EA 17" GLASS BALLS
ON MAST

1/2"SAS

.5 METERS CHAIN

1/2"SAS
1/2" HD GALVANIZED THIMBLE
10 METERS 1/2" YALEX
1/2" HD GALVANIZED THIMBLE
1/2"SAS

2 BALLS ON 3
METER CHAIN

1/2"SAS

2 BALLS ON 3
METER CHAIN

1/2"SAS

1 METER CHAIN

1/2"SAS
1/2" HD GALVANIZED THIMBLE

50 METERS 1/2" YALEX

1/2" HD GALVANIZED THIMBLE
1/2"SAS

.5 METERS CHAIN

1/2"SAS
5/8"SL
1/2"SAS

.5 METER CHAIN


1/2" SAS
1.5 TON SWIVEL
1/2" SAS
5/8"SAS

2" THICK TRIANGULAR ANCHOR,
500# DRY - 435# WET

ENTIRE MOORING 284.5 lbs NEG.
WITH 8242 RELEASE, ANCHOR ATTACHED.

RELEASED MOORING 150.5# BUOYANT
WITHOUT ANCHOR

190# 8242, BPR, STAND, DRY
113# 8242, BPR, STAND, WET

 NOAA-PMEL-EDD 7600 Sandpoint Way NE Seattle, Wa. 98115 (206) 526-6149	
MOORING:	BPR
LOCATION:	OREGON
DRAWN BY:	RICK MILLER
DATE:	24 JULY 2013
APPROVED BY:	DATE:



UNLEADED GASOLINE (ALL GRADES) **MATERIAL SAFETY DATA SHEET**

Petrocom Energy Group, LLC
1330 Post Oak Blvd., Suite 2350
Houston, Texas 77056
Phone: 713-418-3000
Fax: 713-418-3001

Revision Date: 03/05/2008

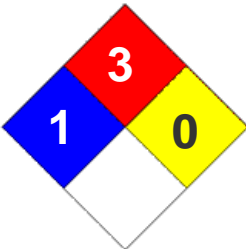
Section 1: Product Identification

Name: Unleaded Gasoline
Synonyms: Regular/Midgrade/Premium Gasoline, Motor Fuel, Reformulated Gasoline, RFG, Conventional Gasoline.
CAS No.: 86290-81-5
MSDS No.: PEG-UNL
Use: Motor fuel

Section 2: Product Composition

Component	CAS Number	Amount (%)
Gasoline	86290-81-5	0 – 100
Benzene	71-43-2	0 – 5
Toluene	108-88-3	0 – 30
Xylene (all isomers)	1330-20-7	0 – 25
Hexane (other isomers)	Mixture	5 – 25
n-Hexane	110-54-3	0 – 3
Cyclohexane	110-82-7	0 – 3
Octanes (all isomers)	Mixture	0 – 20
Heptane (all isomers)	142-82-5	0 – 15
Ethanol	64-17-5	0 – 10
Pentanes (all isomers)	Mixture	0 – 20
Trimethylbenzenes (all isomers)	95-63-6	0 – 5
Ethylbenzene	100-41-4	0 – 5
Cumene	98-82-8	0 – 5
Methyl Tertiary Butyl Ether (MTBE)	1634-04-4	0 – 16
Tertiary Amyl Methyl Ether (TAME)	994-05-8	0 – 6

Section 3: Hazards Identification

<u>Emergency Overview</u>	<u>Hazard Rankings</u>
<p style="text-align: center;">DANGER!</p> <p style="text-align: center;">Extremely Flammable liquid and vapor Harmful if swallowed Skin Irritant May cause eye and respiratory irritation Cancer Hazard – Contains material which can cause cancer</p>	<p style="text-align: center;">NFPA</p> <div style="text-align: center;">  </div>

Physical form: Liquid
Appearance: Clear to amber
Odor: Strong, Gasoline

Potential Health Effects

Eyes: Contact with eyes may cause irritation, redness, tearing, stinging, watering and blurred vision.

Skin: Contact with skin may cause irritation, itching, redness and skin damage. Prolonged or repeated contact may cause drying and cracking of the skin, and may also cause dermatitis and inflammation. (See also section 11).

Inhalation: Breathing high concentration can be harmful. Throat and lung irritation may occur. Central nervous system effects including nausea, euphoria, dizziness, headache, fatigue, drowsiness or unconsciousness may occur due to long term or high concentration exposure to vapors.

Ingestion: Toxic if swallowed. This product may cause nausea, vomiting, dizziness, drowsiness, diarrhea if swallowed. Central nervous system effects may be caused. Swallowing this product can result in severe lung damage and/or death.

Signs / Symptoms: When overexposed to this product effects such as nausea, vomiting, blurred vision, respiratory failure, central nervous system depression, unconsciousness, tremor, death may occur.

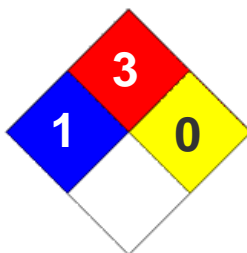
See toxicological Information (section 11)

Section 4: First Aid Measures

- Eye contact:** Flush eyes immediately with fresh, cool water for at least 15 minutes. If irritation or redness or any symptoms persist, seek medical attention.
- Skin contact:** Remove contaminated clothes and shoes. Flush affected area with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, wash affected area thoroughly with soap and water. If irritation or redness develops, seek medical attention.
- Inhalation (Breathing):** If inhaled, immediately move person to fresh air. If there is difficulty breathing, give oxygen. If not breathing, immediately give artificial respiration. Seek medical attention.
- Ingestion (Swallowing):** This product may be harmful or fatal if swallowed. This product may cause nausea, vomiting, diarrhea and restlessness. Do not induce vomiting. Do not give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is unconscious or drowsy, place on the left side with the head down. Seek immediate medical attention.
- Notes to Physician:** This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Inhalation overexposure can produce toxic effects. Monitor respiratory distress. If difficulty in breathing evaluate upper respiratory tract inflammation, bronchitis and pneumonitis. Administer supplemental oxygen as required. If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Consider activated charcoal and/or gastric lavage. If patient is obtunded, protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position.

Section 5: Fire Fighting Measures

NFPA Hazard Class: Health = 1 ; Flammability = 3 ; Instability = 0
(0 – Minimal ; 1 – Slight ; 2 – Moderate ; 3 – Serious ; 4 – Severe)



Auto – ignition temperature : >260 °C (500 °F)

Flash point : Closed cup: -43 °C (-45 °F)

Flammable limits : Lower: approximately 1.4%
Upper: approximately 7.6%

Products of combustion : Carbon monoxide, carbon dioxide, nitrogen and sulfur oxides, smoke, fumes, unburned hydrocarbons and other products of incomplete combustion.

Special properties : Flammable liquid! This material can be ignited by heat, sparks, flames or other sources of ignition. Vapors may travel long distances to a source where they can ignite and flash back, or explode. A mixture of vapor and air can create an explosion hazard in confined spaces. If container is not properly cooled, it can rupture on the heat of a fire.

Extinguishing media : Use of dry chemical, carbon dioxide, or foam is recommended to extinguish fire. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may not extinguish the fire, unless it is used by experienced fire fighters and under favorable conditions.

Protective Equipment for Fire Fighters : Fire fighters should wear appropriate protective equipment and self contained breathing apparatus (SCBA) with a full face piece operated in positive pressure mode.

Section 6: Accidental Release Measures

- Personal precautions:** This material is extremely flammable. Eliminate all ignition sources. Keep all hot metal surfaces away from spill/release. All equipment used when handling this material must be grounded.
- Spill precautions:** Stay upwind and away from spill. Notify persons down wind of the spill, isolate spill area and keep unauthorized personnel out. If it can be done with minimal risk, try to stop spill. Always wear protective equipment, including respiratory protection. Contact emergency personnel.
- Environmental precautions:** Prevent spilled material from entering sewers, drains, soil, and natural waterways. Use foam or spills to minimize vapors (section 5). Spilled material may be absorbed into an appropriate absorbent material.
- Methods for cleaning up:** Notify fire authorities and appropriate federal, state and local agencies. Immediate cleanup is recommended.

Section 7: Handling and Storage

- Handling:** Flammable liquid and vapor. To be used only as a motor fuel. Avoid inhalation of vapors and contact with skin. Wash hands thoroughly after handling this material. Use in a well ventilated area away from all ignition sources. Use product with caution around heat, sparks, static electricity and open flames. Static electricity may ignite vapors and cause fire.
- Empty containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks or other ignition sources. They may explode and cause injury and/or death. Empty drums should be completely drained, properly bunged, and returned promptly to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.
- Storage:** Store in approved containers only. Keep in tightly closed containers in cool, dry, well ventilated areas. Keep isolated away from heat, sources of ignition and hot metal surfaces.

Section 8: Exposure Controls / Personal Protection

Engineering controls: Provide ventilation or other engineering controls to keep the airborne concentrations of vapor or mists below their occupational exposure limits. Eyewash stations and safety showers should be located near the work-station.

Personal Protection

Eye Protection: Keep away from eyes. Safety glasses complying with approved standards should be worn. Chemical type goggles should be worn.

Skin Protection: Keep away from skin. Skin protection should be worn. Chemical resistant, impervious gloves should be worn. Always follow good personal hygiene practices after handling the material.

Respiratory Protection: Approved respiratory equipment must be used if a risk assessment indicates it is necessary. If workplace exposure limits for product or components are exceeded, NIOSH approved equipment should be worn.

General Protection: Use this material in well ventilated areas. Ventilation equipment should be explosion proof also.

Component	Applicable Workplace Exposure Limits
Gasoline	ACGIH – TWA: 300 ppm (8 hours) STEL: 500 ppm (15 minutes)
Benzene	ACGIH – TWA: 0.5 ppm (8 hours) STEL: 2.5 ppm (15 minutes) OSHA – TWA: 1 ppm (8 hours) STEL: 5 ppm (15 minutes)
Toluene	ACGIH – TWA: 20 ppm (8 hours) OSHA – TWA: 200 ppm (8 hours) CEIL: 300 ppm PEAK: 500 ppm (10 minutes)
Xylene (all isomers)	ACGIH – TWA: 100 ppm (8 hours) STEL: 150 ppm (15 minutes) OSHA – TWA: 100 ppm (8 hours)
Hexane (other isomers)	ACGIH – TWA: 500 ppm (8 hours) STEL: 1000 ppm (15 minutes)
n-Hexane	ACGIH – TWA: 50 ppm (8 hours) OSHA – TWA: 500 ppm (8 hours)
Cyclohexane	ACGIH – TWA: 100 ppm (8 hours) OSHA – TWA: 300 ppm (8 hours)
Octanes (all isomers)	ACGIH – TWA: 300 ppm (8 hours) OSHA – TWA: 500 ppm (8 hours)
Heptane (all isomers)	ACGIH – TWA: 400 ppm (8 hours) STEL: 5000 ppm (15 minutes) OSHA – TWA: 500 ppm (8 hours)
Ethanol	ACGIH – TWA: 1000 ppm (8 hours) OSHA – TWA: 1000 ppm (8 hours)
Pentanes (all isomers)	ACGIH – TWA: 600 ppm (8 hours) OSHA – TWA: 1000 ppm (8 hours)
Trimethylbenzenes (all isomers)	ACGIH – TWA: 25 ppm (8 hours)
Ethylbenzene	ACGIH – TWA: 100 ppm (8 hours) STEL: 125 ppm (15 minutes) OSHA – TWA: 100 ppm (8 hours)
Cumene	ACGIH – TWA: 50 ppm (8 hours) OSHA – TWA: 50 ppm (8 hours)
Methyl Tertiary Butyl Ether (MTBE)	ACGIH – TWA: 50 ppm (8 hours)
Tertiary Amyl Methyl Ether (TAME)	ACGIH – TWA: 20 ppm (8 hours)

Section 9: Physical and Chemical Properties

Physical State:	Liquid.
Color:	Transparent, clear to amber liquid.
Odor:	Strong. Characteristic gasoline odor.
pH:	Not applicable
Boiling Point:	>26 °C (>78 °F)
Melting Point:	Not applicable.
Specific gravity:	0.66 to 0.75 (Water = 1)
Vapor density:	3 to 4 (Air = 1)
Vapor pressure:	220-450 mm Hg at 20°C (68°F) / 6-15 Reid-psia at 37.8°C (100°F)
Volatility:	720 – 770 g/l VOC (w/v)
Viscosity (at 40 °C):	< 1
Flash Point:	< -45 °F / < 43°C
Bulk Density:	6.0 – 6.4 lbs/gal
Solubility in water:	Negligible

Section 10: Stability and Reactivity

Stability: Stable. Extremely flammable liquid and vapor. Vapor can cause fire.

Conditions to avoid: Keep away from heat, flame and all other possible sources of ignition.

Materials to avoid: Keep away from strong oxidizing agents such as acids, chlorine, hydrogen peroxide and oxygen.

Hazardous decomposition products: Please refer to the combustion products identified in Section 5 of this MSDS.

Hazardous Polymerization: Not expected to occur.

Section 11: Toxicological Information

Toxicology Information

Oral toxicity: Almost non-toxic. LD 50: > 2000 mg/kg (species: rats)
Dermal toxicity: Almost non-toxic. LD 50: > 2000 mg/kg (species: rabbits)
Inhalation toxicity: Almost non-toxic. LD 50: > 5 mg/l (species: rats)
Eye irritation: Almost non-irritating. Draize score: > 6 and < 15 (species: rabbits)
Skin irritation: Irritant. Primary irritation index: > 3 and < 5 (species: rabbits)

Other data: Inhalation of high concentrations of vapors or mists may cause respiratory system irritation and damage. It may also result in the damage and depression of the central nervous system and may cause death. Prolonged contact with the material may cause severe skin irritation.

Subchronic toxicity: Dermal studies resulted in significant irritation but not systematic toxicity (species: rabbits). Inhalation exposures (90 day, approximately 1500 ppm vapor) produced light hydrocarbon nephropathy but no significant systemic toxicity (species: rats).

Neurotoxicity: Repeated and prolonged exposures to high concentrations of vapor has been reported to result in central nervous system damage and eventually, death. In a study in which ten human volunteers were exposed for 30 minutes to approximately 200, 500 or 1000 ppm concentrations of gasoline vapor, irritation of the eyes was the only significant effect observed, based on both subjective and objective assessments. However, no persistent neurotoxic effects were observed in subchronic inhalation studies of gasoline.

Reproductive toxicity: An inhalation study with rats exposed to 0, 400 and 1600 ppm of wholly vaporized unleaded gasoline, 6 hours per day on day 6 through 16 of gestation, showed no teratogenic effects nor indication of toxicity to either the mother or the fetus. Another inhalation study in rats exposed to 3000, 6000, or 9000 ppm of gasoline vapor, 6 hours per day on day 6 through 20 of gestation, also showed no teratogenic effects nor indications of toxicity to either the mother or the fetus.

Chronic toxicity: A lifetime mouse skin painting study of unleaded gasoline applied at 50 microliters, three time weekly, resulted in some severe skin irritation and changes, but no statistically significant increase in skin cancer or cancer to any other organ. Lifetime inhalation of wholly vaporized unleaded gasoline over 2000 ppm has caused increased liver tumors in female mice and increased kidney tumors in male rats. The EPA has concluded that mechanism by which wholly vaporized unleaded gasoline causes kidney damage is unique to the male rat. The effects in that species (kidney damage and cancer) should not be used in human risk assessment.

Other toxic effects on humans	Extremely hazardous in case of ingestion. Very hazardous in case of eye contact. Hazardous in case of skin contact. Slightly hazardous in case of inhalation.
Carcinogenic effects:	Contains material that may cause cancer depending on the level and duration of exposure.
Target organs:	Contains material that may cause damage to humans organs such as (but not limited to) blood, kidneys, lungs, liver, eye, skin, nervous system and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity:	This material may be toxic to aquatic organisms such as algae and daphnia. It has also shown to be toxic to fish.
Environmental fate:	The material is expected to be readily biodegradable. When released into the environment, some of the constituents of gasoline will volatilize and be photo degraded in the atmosphere. Following spillage, the more volatile components of gasoline will be rapidly lost, with concurrent dissolution of these and other constituents into the water. Factors such as local environmental conditions, photo-oxidation, biodegradation and adsorption onto suspended sediments, can contribute to the weathering of spilled gasoline.

Section 13: Disposal Considerations

Waste disposal:	Avoid disposal of spilled material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product and any of its by products should always comply with the requirements of environmental protection and waste disposal legislation and any local authority requirements. This material would likely be identified as a federally regulated RCRA hazardous waste. See sections 7 and 8 for further information on handling, storage and personal protection. See section 9 for the material's physical and chemical properties.
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Section 14: Transportation Information

This material is U.S Department of Transportation (DOT) regulated material.

Shipping name: Gasoline, 3, UN 1203, PG II
Gasohol, 3, NA 1203, PG II (for gasoline blended with less than 20% ethanol).

Hazard class: 3 DOT Class: Flammable liquid

Packing Group: II

UN / NA Number: UN1203 / NA1203

Emergency Response Code: 128

Label:

**Section 15: Regulatory Information**

TSCA Inventory: This product and/or its components are listed on the Toxic Substances Control Act (TSCA)

**SARA 302 / 304:
Emergency planning and notification** The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for “Extremely Hazardous Substances” listed in 40 CFR 302.4 and CFR 355. No components were identified.

**SARA 311 / 312:
Hazard identification** SARA Title III requires facilities subject to this subpart to submit aggregate information on chemicals by “Hazard Category” as defined in 40 CFR 370.2. This material would be classified under: Fire, Acute (immediate) Health Hazard, Chronic (Delayed) Health Hazard.

**CERCLA / SARA 313:
Toxic and chemical
notification and release
reporting**

This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372

Component	CAS Number	Amount (%)
Benzene	71-43-2	0 – 5
Toluene	108-88-3	0 – 30
Xylene (o, m, p isomers)	1330-20-7	0 – 25
n-Hexane	110-54-3	0 – 3
Cyclohexane	110-82-7	0 – 3
1, 2, 4 Trimethylbenzenes	95-63-6	0 – 5
Ethylbenzene	100-41-4	0 – 5
Cumene	98-82-8	0 – 5
Methyl Tertiary Butyl Ether (MTBE)	1634-04-4	0 – 16

California Proposition 65: This material may contain detectable quantities of the following chemicals known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Benzene (CAS NO. 71-43-3)
Toluene (CAS No. 108-88-3)
Ethylbenzene (CAS No. 100-41-4)
Naphthalene (CAS No. 91-20-3)

Canadian Regulations:

WHMIS Hazard Class: B2 – Flammable Liquids
D2A – Very Toxic Material

Section 16: Other Information

Issue date: March 5, 2008
Previous issue date: No previous date
Version: 1
MSDS Code: PEG-UNL

Legend:

ACGIH = American Conference of Governmental Industrial Hygienists
CAS = Chemical Abstracts Service Registry
CEIL = Ceiling Limit
CERCLA = The Comprehensive Environmental Response, Compensation and Liability Act
EPA = Environmental Protection Agency
NFPA = National Fire Protection Association
OSHA = Occupational Safety and Health Administration
SARA = Superfund Amendments and Reauthorization Act
STEL = Short Term Exposure Limit (15 minutes)
TWA = Time Weighted Average (8 hours)
WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer:

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