UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Alaska Fisheries Science Center
Resource Assessment and Conservation Engineering
7600 Sand Point Way NE
Seattle, WA 98115

DRAFT Project Instructions

Date Submitted: January 5, 2015

Platform: NOAA Ship *Oscar Dyson*

Project Number: DY-15-02 (OMAO)

Project Title: Acoustic-trawl survey of the Shumagin Islands, Sanak Trough, Pavlov Bay, Morzhovoi Bay, Kenai Peninsula Bays, and Prince William Sound.

Project Dates: 9-27 February 2015

Prepared by: _____ Dated: 1/5/15
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Research Fish Biologist
AFSC/RACE Division

Approved by: _____ Dated: 1/5/15
Dr. Jeffrey M. Napp
Division Director
AFSC/RACE Division

Approved by: _____ Dated: 1/6/15
Dr. Douglas A. DeMaster
Science and Research Director
Alaska Fisheries Science Center

Approved by: _____ Dated: 04 Feb 2015
Captain Doug Baird, NOAA
Commanding Officer
Marine Operations Center – Pacific

I. Overview

A. Brief Summary and Project Period: Acoustic-trawl survey 9-27 February 2015

B. Days at Sea (DAS): Of the 19 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 19 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 High Operational Tempo.

C. Operating Area: Shumagin Islands, Sanak Trough, Pavlof Bay, Morzhovoi Bay, Kenai Peninsula Bays, Prince William Sound, Shelikof Strait (see Appendix A)

D. Summary of Objectives: (1) collect acoustic-trawl (AT) data necessary to determine the distribution, biomass, and biological composition of walleye pollock; (2) collect target strength data using hull-mounted transducers for use in scaling acoustic data to estimates of absolute abundance; (3) calibrate the EK60 acoustic and 3 autonomous echosounder systems using standard sphere calibration techniques; (4) collect physical oceanographic data (temperature and salinity profiles) at selected sites, and continuously collect sea surface temperature and salinity data; (5) conduct trawl hauls (AWT, PNE) to ground truth multi-frequency echo integration data collection; (6) deploy moored echosounders at three locations in Shelikof Strait and conduct CTD casts and mini-acoustic surveys and trawls in vicinity of deployments. The areas where the moored echosounders are deployed will also be sampled (mini surveys, trawls, CTD casts) on the transit from the Shumagin Islands survey area to Kenai/PWS survey area.

E. Participating Institutions: Alaska Fisheries Science Center, Seattle, WA

F. Personnel/Science Party:

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
De Robertis, Alex	Chief Scientist	Feb 7	Feb 27	Male	AFSC	USA
Wilson, Chris	Fish Biologist	Feb 7	Feb 27	Male	AFSC	USA
Furnish, Scott	IT Specialist	Feb 7	Feb 27	Male	AFSC	USA
Jones, Darin	Fish Biologist	Feb 7	Feb 27	Male	AFSC	USA
Michael Gallagher	Vessel Services Coordinator	Feb 7	Feb 27	Male	NMFS Office of Science & Technology	USA
Levine, Robert	Fish Biologist	Feb 7	Feb 27	Male	Contractor with Ocean Associates	USA
Vijgen, Alison	IT Specialist	Feb 7	Feb 27	Female	AFSC	USA
Kenney, Heather	IT Specialist	Feb 7	Feb 27	Female	AFSC	USA

G. Administrative

1. Points of Contact: Alex DeRobertis (Chief Scientist), 7600 Sand Point Way NE, Seattle, WA. 98115, 206-526-4789, alex.derobertis@noaa.gov; Alternate: Chris Wilson (MACE Program manager), 206-526-6435, Chris.Wilson@noaa.gov.

2. Diplomatic Clearances

   None Required.

3. Licenses and Permits

This project will be conducted under a Scientific Research Permit issued by the Alaska Regional Office, National Marine Fisheries Service (2015-B1), and a Fish Resource Permit issued by the State of Alaska (CF-13-002). The Chief Scientist will be included as an authorized participant on both permits.

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:

Feb 7	Embark scientists in Kodiak, AK
Feb 9	Depart Kodiak, AK
Feb 9-11	Transit to Shelikof Strait mooring deployment sites. Deploy moored echosounders and survey area. Conduct sphere calibration in location TBD
Feb 11	Transit to survey start in Shumagin Trough
Feb 12-20	AT surveys in the Shumagins/Sanak/Pavlof/Morzohvoi areas
Feb 20	Transit to Shelikof Strait mooring deployment sites
Feb 20-21	Survey moored echosounder deployment sites
Feb 22	Transit to Kenai Peninsula
Feb 22-26	Survey Kenai/PWS area
Feb 26	Transit to Kodiak
Feb 27	Arrive Kodiak; project end

B. Staging and Destaging: Scientific gear will be loaded and mounted onto the vessel in Seattle prior to departure for the gear trials in Puget Sound on Jan. 15-16, 2015. PNE nets stored in Kodiak will be loaded aboard the ship in Kodiak prior to departure for the survey at a time determined in consultation with the ship's personnel. All scientific gear will remain aboard following the survey.

C. Operations to be conducted:

1. Underway Operations:

1A. Survey operations will be conducted 24-hours per day. Acoustic data will be collected continuously along a series of parallel transects with a Simrad EK60 echo integration system incorporating five centerboard-mounted transducers (18-, 38-, 70-, 120-, and 200-kHz) and an ME-70 multibeam echosounder. Operating the following equipment will degrade the quality of the acoustic data.

- Other echosounders or acoustic equipment including the Doppler speed log and bridge Furuno depth sounder
- Bow thruster

It is requested that this equipment not be operated unless to ensure the safe navigation of the vessel or at the discretion of the command. If the equipment is operated these times will be noted in the ships SCS/electronic MOA.

Parallel transect spacing will be as follows: 1.0 nm off Renshaw Point; 2.0 nm in Sanak Trough, Pavlof Bay, and Morzhovoi Bay ; 2.5 nm in Stepovak Bay, Unga Strait, West Nagai Strait, and most of Prince William Sound; and 5.0 nm in Shumagin Trough. Kenai Peninsula bays (Port Bainbridge, Port Dick, Day Harbor, Resurrection Sound, Aialik Bay, Harris Bay, McCarty Fiord, and Nuka Bay) and portions of Prince William Sound are too narrow for parallel trackline spacing; thus, a zigzag pattern will be used in these areas (Appendix A). Trackline start and end points will

be provided in an electronic file to the Navigation Officer. Because the start point of the first trackline of each survey is selected randomly, tracklines will not necessarily match tracklines from prior surveys. The ship is expected to maintain a shaft speed of no less than 105 RPM (averaging 11 to 12 knots) under favorable conditions (as weather and safe operation of the vessel allow).

Acoustic trawl survey operations require that an Aleutian wing trawl (AWT) midwater and poly Nor'eastern (PNE) bottom trawl with roller gear be loaded onto the net reels. A spare AWT and PNE will serve as backups. Codend liner mesh size will be 0.5" for both the AWT and the PNE. Fishbuster doors will be used with all trawls. Small fishes or zooplankton may be sampled using fine-mesh nets (e.g. Methot net). We request that the Chief Boatswain keep a trawl gear logbook to record any modifications made to trawl gear during the project.

Trawl hauls will be made to identify echo sign and provide pollock samples and other biological data. Haul duration will be kept to the minimum necessary to ensure an adequate sample. We anticipate that on average 2-3 tows will be conducted during a 24-hour period. Biological data collected from each haul will include species composition, sex composition, length frequencies, whole fish and ovary weights, maturities, and otoliths. Walleye pollock tissue samples will be collected from selected hauls for aging and fecundity studies.

A Cam-Trawl camera system will be deployed in the intermediate of the midwater trawl to optically sample fish. Prior to being loaded, the AWT will have been modified with an opening in the starboard side panel allowing the attachment of the camera. When the Cam-Trawl is not attached, the opening will be sewn shut to prevent fish escapement.

The Scientific Computing System (SCS) will run continuously throughout the project and will be configured to log data from various sensors at a sampling rate of 1 Hz.

1B. Target strength data collection will occur on an opportunistic basis. These data are used to validate the relationship between fish length and target strength. Data will be collected when certain conditions (i.e., low fish densities, single species) are encountered. Collecting target strength data typically involves repeated passes over an aggregation of fish at a vessel speed of less than 3 knots. One or two trawl hauls are made to provide species composition and biological data. When calm seas are encountered along with the above-mentioned conditions, a second approach to collecting target strength data may be attempted: with the vessel stopped, a "drop-TS" assembly containing a 38-kHz transducer will be lowered to a depth just above the fish sign.

1C. A standard sphere calibration of the centerboard-mounted scientific acoustic systems (18-, 38-, 70-, 120-, and 200-kHz) will be conducted at the beginning of the project in a location to be determined. This requires anchoring the vessel at the bow and stern and suspending a calibration sphere assembly directly beneath the vessel's centerboard. A CTD cast will be conducted prior to the calibration.

1D. Conductivity-temperature-depth (CTD) data may be collected with a Seabird SeaCat system at trawl locations and at other selected locations. Temperature and depth profile data will be collected with a Seabird SBE39 micro-bathythermograph attached to the trawl headrope. Sea surface temperature and salinity will be collected continuously throughout the Project and logged with the vessel's Scientific Collection System (SCS).

1E. If single-species aggregations are encountered (e.g. rockfish, euphausiid, capelin), opportunistic trawl hauls (AWT and Methot) may be conducted to ground truth multi-frequency echo integration data collection.

1F. Three bottom moored upward looking echosounders will be deployed in Shelikof Strait at locations given in Appendix 3, Figure 3. The moorings (4' by 6', 750 lbs in air) will be deployed

by attaching them to an acoustic release, lifting them with the hydro winch and a-frame, lowering them to slightly above the seafloor and triggering the release to allow the moorings to free-fall to the bottom. The moorings will not be recovered during this cruise.

Following each deployment a mini-acoustic survey a CTD cast and a trawl will be conducted in the area. Mini-surveys, trawl sampling and CTD casts in the vicinity of the moored echosounders will also be conducted on the transit from the Shumagin Islands AT survey area to the Kenai Peninsula/PWS AT survey area.

1. G. Prior to deployment of moored echosounders, these echosounders will be calibrated by attaching them to a frame and lowering them to depths of ~ 300 m.

D. Dive Plan

It may be necessary to deploy divers during the survey if it is suspected that the propeller has been fouled.

All dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program (http://www.ndc.noaa.gov/dr.html) and require the approval of the ship's Commanding Officer.

E. Applicable Restrictions: Conditions which preclude normal operations include: poor weather conditions, equipment failure, safety concerns, and other unforeseen circumstances. The Chief Scientist will confer with the commanding officer to mitigate the impacts of these circumstances on the project goals.

III. Equipment

A. Equipment and Capabilities Provided by the ship (number is 1 unless specified)

1. Acoustic Equipment
   - GPS with NEMA 183 to EK60 (2)
   - 50/200 kHz ES60 Bridge sounder
   - Furuno FE-700 fathometer

2. Trawling Equipment
   - 3rd wire FS-70 net sonar with winch and accessories (2)
   - Simrad ITI net mensuration system (2)
   - Furuno CN24 headrope transducer
3. Oceanographic Equipment
   - Seabird SBE 911plus CTD System
   - Seabird SBE 19plus CTD
4. Biological Sampling Equipment
   - Fish lab conveyor system
   - Catch sorting and weighing table
5. Computing equipment
   - Scientific Computing System
6. Edgetech acoustic release command and control deck unit and centerboard-mounted transducer.

B. Equipment and Capabilities provided by the scientists (number is 1 unless specified)

1. Acoustic Equipment
   - Simrad EK60 system (2)
   - Simrad ES18 transducer (2)
   - Simrad ES38B transducer (2)

Simrad ES38DD transducer (1)
Simrad ES70 transducer (1)
Simrad ES120-7C transducer (2)
Simrad ES200-7C transducer (3)
Standard target & suspension assembly
Simrad ME70 system

Note that some of this equipment is ship's eqipment and some is brought on by the scientists, but the scientific party will operate and troubleshoot the equipment.

2. Trawling Equipment
   Aleutian wing trawl (AWT) with 0.5" mesh liners and accessories needed for deployment (2)
   Poly nor'eastern (PNE) trawl with 0.5" mesh liners and accessories needed for deployment (2)
   Marinovich trawl w/accessories (1)
   Dandylines (10 fm x ½ in.)
   Dandylines (30 fm x 5/8 in.)
   Fishbuster door with accessories (2 sets) – set with sensor pockets to be used as primary set
   Spare webbing & twine
   Spare hardware
   500 lb. tom weights (4)
   250 lb. tom weights (4)
   Methot net with accessories (2)
   Miscellaneous supplies*
3. Oceanographic Equipment
   Seabird SBE39 (2)
4. Biological Sampling Equipment
   Dynamometer
   Marel M60 60 kg scale (2)
   Marel M60 6 kg scale (2)
   Fish baskets (30)
   Glycerin/Thymol (5 gal)
   Misc. biological supplies*
5. Computing equipment
   IBM compatibles w/Windows 7 Op.System*
   Dell PowerEdge MACEBASE Server
   Printers*
6. Upward looking echosounders in trawl resistant housings
   3 echosounder moorings equipped with flotation, radio beacons, and acoustic releases.

Note: * indicates amount not specified.

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 5 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.

A. Inventory

Common Name of Material	Qty	Notes	Trained Individual	Spill control
Glycerol (50%) / Thymol (1%)	5 gal. (18.9 L)	Non-Hazardous in quantities used	Darin Jones	G
Formaldehyde solution (37%)	4.2 gal. (16 L)	Stored in ship chem. Locker	Darin Jones	F

C. Chemical safety and spill response procedures

See also Appendix B.

G: Glycerol/Thymol

- Rinse affected area with copious amounts of water.

F: Formalin/Formaldehyde

- Ventilate area of leak or spill. Remove all sources of ignition.
- Wear appropriate personal protective equipment.
- Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible.
- Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container.
- Do not use combustible materials, such as saw dust.

Inventory of Spill Kit supplies

Product Name	Amount	Chemicals it is useful against	Amount it can clean up
Neutralex	5 gal. (18.9 L)	Formaldehyde solution (37%)	5 gal. (18.9 L)

D. Radioactive Materials

No Radioactive Isotopes are planned for this project

E. Other

The echosounder moorings are equipped with lithium thionyl chloride batteries. A total of 3 Kongsberg L14.4 cnode Maxi batteries will be present inside of the aluminum echosounder pressure housings. See the attached safety data sheets (Appendix 3) for more information on these batteries and the individual cells used to construct the batteries.

V. Additional Projects

A. Supplementary ("Piggyback") Projects: Supplementary ("Piggyback") Projects:

Secondary objectives of the project include scientific research requested by AFSC and other investigators. Anticipated projects include specimen collections from standard trawl hauls such as ovary collection from pre-spawning walleye pollock and rockfish. Detailed descriptions of additional ancillary projects will be provided as soon as received. Significant changes to these projects that affect vessel operations will be communicated as soon as they are known.

B. NOAA Fleet Ancillary Projects:
No NOAA Fleet Ancillary Projects are planned.

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:

1. An electronic Marine Operations Abstract (MOA) will be created to log all operations via daily transfers of position data from the ship's SCS system to MACE. An appropriate logging interval will be chosen for automated track position data. Specific events (and frequency) to be recorded will be decided at the beginning of the project. Globe software will be available to log operations data as a backup. All times should be recorded as Greenwich Mean Time (GMT)

2. The data sets requested by the Chief Scientist from the ship will include the following: electronic files (MOA) from the SCS of all operations logged during the project, and backup media (e.g., DVDs) with all sensor data logged to the Scientific Computer System (SCS).

3. The Chief Scientist will represent the AFSC lab director for data disposition. A single copy of all data gathered by the vessel will be delivered to the Chief Scientist, who in turn will be responsible for distributing data to other investigators desiring copies.

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.omao.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 ship's 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

Appendix A - Proposed survey areas and tracklines.

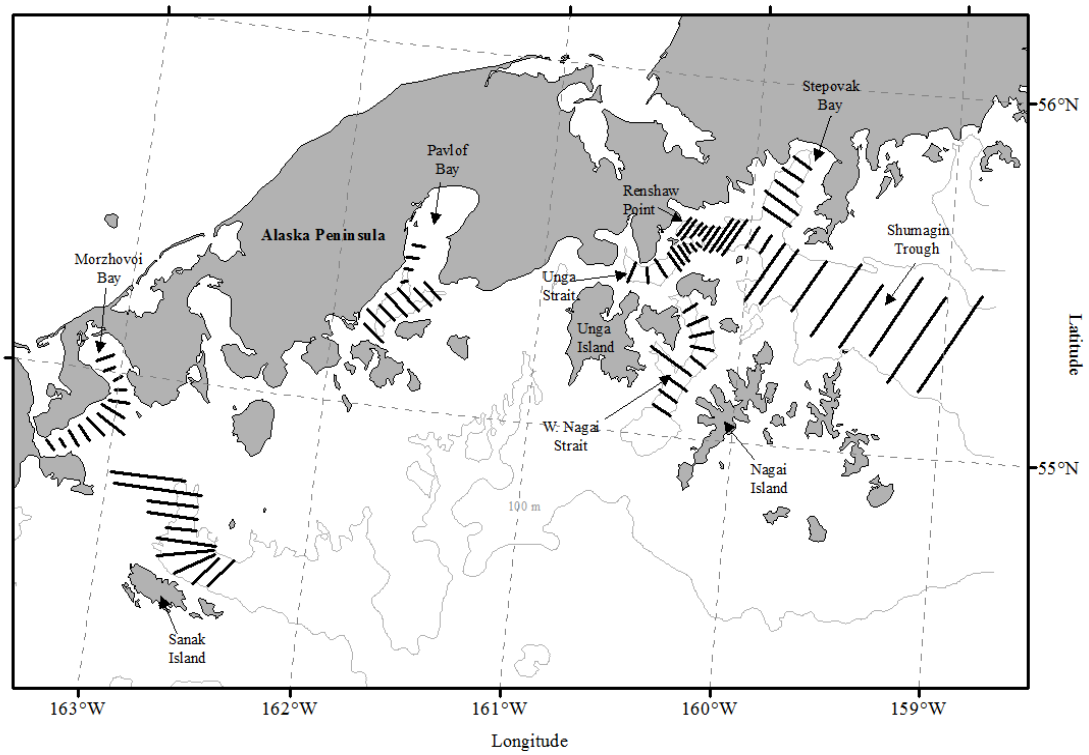


Fig. 1. Shumagin Islands, Sanak Trough, Morzhovoi Bay and Pavlof Bay survey areas.

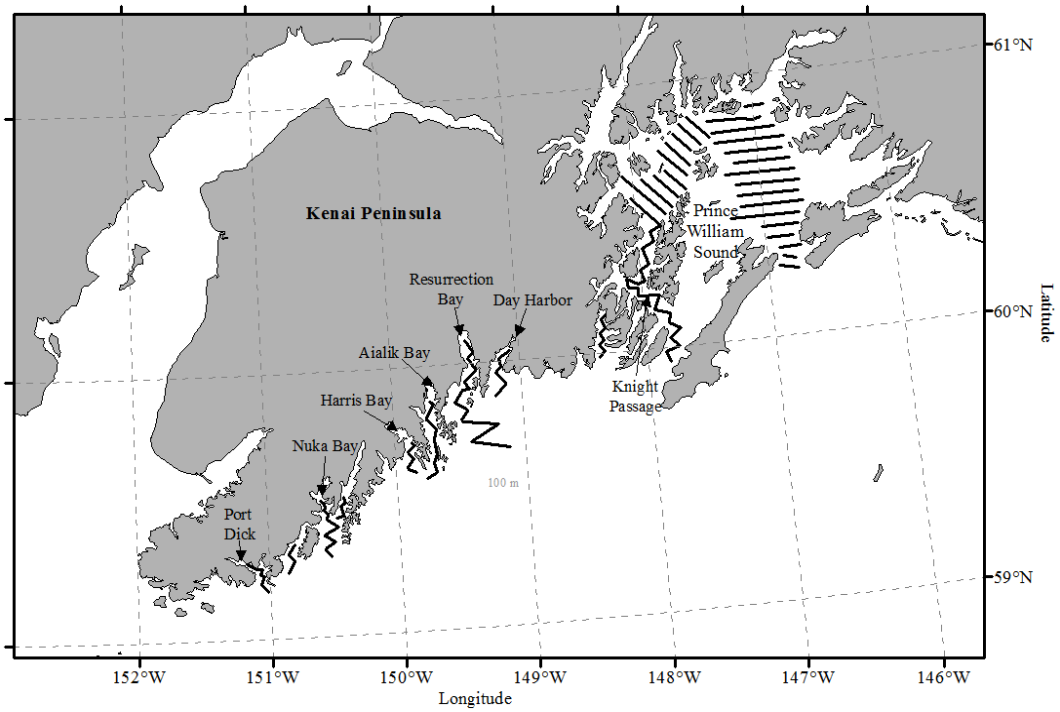


Fig 2. Kenai Peninsula and Prince William Sound survey areas

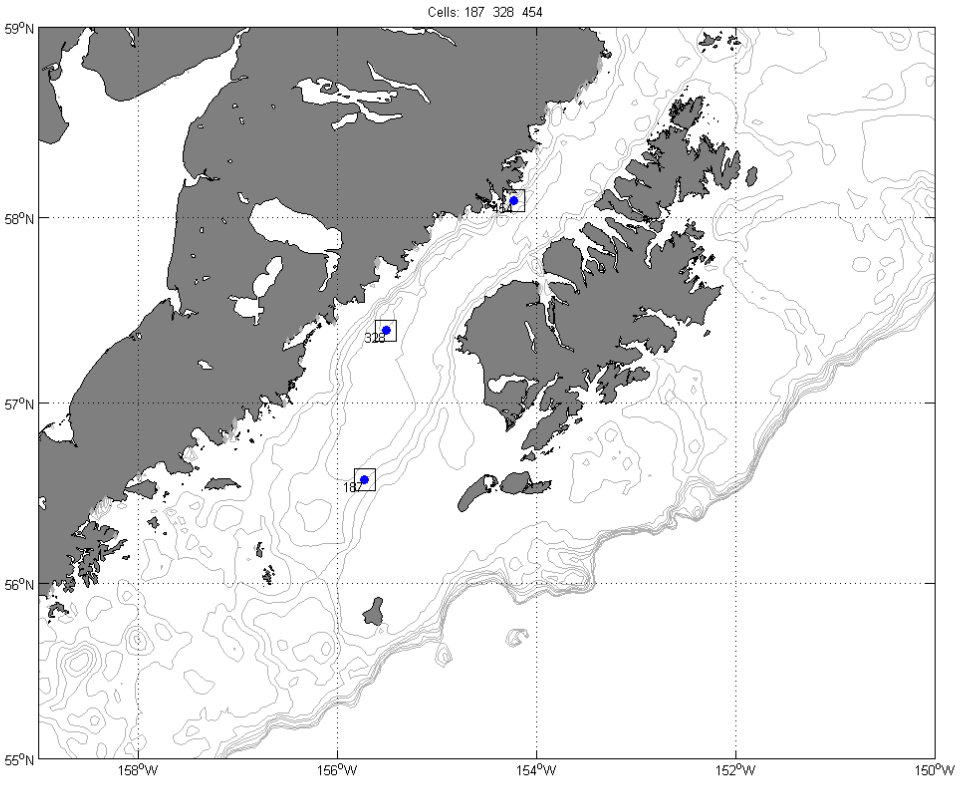


Fig 3. Approximate locations (boxed blue dots) for moored echosounder deployments and mini-acoustic surveys in Shelikof Strait.

Appendix B: Chemical Hygiene Plan

Following is a list of hazardous materials by name and anticipated quantity. Chemicals will be transported, stored and used in a manner that will avoid spills and adequate containment, absorbents, and cleanup materials will be available in the event of a spill.

The scientific chemicals to be used for this project are: 1) formaldehyde (37%) 2) ethyl Alcohol (95%). Dilutions of scientific chemicals will be used to preserve tissues collected from trawl samples as described in the Operations section of these project instructions. Use of these chemicals and the specified dilutions will only occur in areas away from air intakes. Scientific chemicals shall not be disposed over the side.

Standard Operating Procedures and Information Sheets are provided for the scientific chemicals. Included are details concerning personal protective equipment, work area precautions, special handling and storage requirements, spill and accident procedures/first aid, waste disposal and other pertinent information. Spills are of particular concern and should first be contained and then neutralized. In all cases, the first responder should evaluate the risks of personal exposure versus potential impacts of a delayed response. A large formaldehyde spill (>1L) is extremely hazardous and individuals at risk of exposure should immediately leave the area. The CO or OOD should be notified immediately so that a response team with self-contained breathing apparatus can be deployed to complete the cleanup operation of dispense the hazard with a fire hose directed overboard. The vessel's course should be adjusted to minimize exposure of personnel to wind-driven vapors and to limit spread of the spill due to vessel motion.

Chemical Inventory

Chemical Name	Concentration	Quantity	Notes
Glycerol/Thymol	50%Glycerin/1%Thymol	5 gal. (18.9 L)	For otolith preservation
Formaldehyde	37%	4.2 gal. (16 L)	For ovary preservation

In addition, there the echosounder moorings equipped with lithium thionyl chloride batteries. A total of 3 Kongsberg L14.4 cnode Maxi batteries will be present inside of the aluminum echosounder pressure housings, and deployed with the moorings. These batteries weigh 5.9 kg and contain 183 g of lithium each. Operating Procedures and Information Sheets are provided for the batteries as attachments to this document.

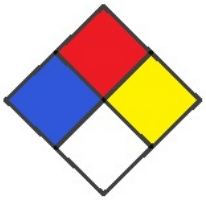
ALASKA FISHERIES SCIENCE CENTER STANDARD OPERATING PROCEDURES
RACE/MACE HAZARDOUS CHEMICALS
Dec 2013

Glycerin (50%)/Thymol (0.3%) solution

#1 Process	General use in the field or on research vessels for otolith preservation
#2 Hazardous Chemicals/Class of Hazardous Chemicals	100% Glycerin may cause eye or skin irritation.
#3 Personal Protective Equipment/ Decontamination	Gloves, splash goggles, lab coat or rain gear. For small spills dilute with water and mop up. For larger spills, absorb with inert material. In case of skin/eye contact: flush with running water for at least 15 min. In case of ingestion: Do not induce vomiting. In case of inhalation: move to fresh air.
#4 Engineering/ Ventilation Controls	Provide exhaust venilation to keep airborne concentrations of vapors low.
#5 Special Handling Procedures and Storage Requirements	Store at room temp in tightly closed container.
#6 Waste Disposal	Dispose of waste and residues in accordance with local authority requirements. Incinerate. When released into water, this material is expected to readily biodegrade and is not expected to significantly bioaccumulate.

ALASKA FISHERIES SCIENCE CENTER STANDARD OPERATING PROCEDURES
RACE/MACE AZARDOUS CHEMICALS
Dec 2013

Formaldehyde Solution – 37%



#1 Process	General use of 37% formaldehyde in the field or on research vessels.
#2 Hazardous Chemicals/Class of Hazardous Chemicals	37% formaldehyde Carcinogen; very harmful by absorption through skin/eyes, inhalation and ingestion. If you smell formaldehyde, you may be overexposed. Odor and eye irritation becomes less sensitive with time as one adapts to formaldehyde. Possible irreversible effects.
#3 Personal Protective Equipment/ Decontamination	Nitrile or rubber gloves, goggles, apron or rain gear, rubber boots are required. Get a co-worker to stand by as an observer. For small spills spray on Neutralex and wipe up with formalin spill pads. For larger spills, circle the spill with Spill-X for formaldehyde to contain spill to one area. Fill circle with Spill-X or Neutralex and sweep, wipe up, or hose down. For spills on deck, attempt to pour Neutralex on spill before hosing down deck. This reduces vapors and creates a safer environment for co-workers (i.e. neutralizes splash). Wear protective clothing and full face respirator with a formaldehyde cartridge. In case of skin/eye contact: flush with running water for at least 15 min.Toxic, exposure may cause irritation and possible burns. In case of ingestion: Do not induce vomiting. Rinse mouth with water. Ingestion may cause severe abdominal pain, vomiting, headache, diarrhea. In case of inhalation: move to fresh air. Exposure may cause sore throat, coughing, and shortness of breath. If difficult breathing give oxygen. If not breathing, administer CPR. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device.Call a physician. ***For large spills or extreme exposure of formalin contact FPC & CO or OOD***
#4 Engineering/ Ventilation Controls	All work should be performed outside in plenty of fresh air or in lab (i.e. Oscar Dyson wet lab) with good ventilation and accessible water hoses. While working, have Neutralex nearby or easily accessible. Fume hoods when present, must be tested and certified regularly.
#5 Special Handling Procedures and Storage Requirements	Store in cool place away from strong oxidizing or reducing agents. When making 10% formalin, prepare solution BEFORE project while in port. This reduces chance of spill and injury. If you must prepare solution at sea have 37% formaldehyde in small containers, 1 L, rather than 5 gallon jugs.
#6	Pour waste 37% formaldehyde into a container and mix 1:1 with Neutralex.

Waste Disposal	Let sit for 2 hr or until reaction is complete and wash down the scupper with hose. If formalin spill pads are used, spray Neutralex in excess of spill.
#8 Designated Area	Special storage is required – Must be stored within flammable cabinet or on deck away from living quarters. Make certain that container is well labeled.

Tadiran
Batteries GmbH
Industriestrasse 22
D-63654 Büdingen

TADIRAN BATTERIES

Revised 2014-03-10

Distribution Class 1 General

Technical Notice

Lithium Battery Information Sheet

1. Identification

1.1	Product Name:	Tadiran High Energy Lithium Battery, or Sonnenschein Lithium Inorganic Lithium Battery
	Voltage:	3.6 Volts
	Chemistry System:	Lithium Thionyl chloride
	Anode:	Lithium metal
	Cathode:	Liquid, Thionyl chloride
1.2	Company: Adress:	Tadiran Batteries GmbH Industriestr. 22 63654 BÜDINGEN Germany Tel.: +49(0)6042-954-0 Fax: +49(0)6042-954-190 Web: www.tadiranbatteries.de
1.3	Emergency Telephone Number:	+49(0)6042/954-599
	Note:	This information sheet refers to cells and batteries assembled from them

2. Hazards Identification

Warning: Fire, explosion, and severe, burn hazard. Do not recharge, disassemble, heat above 100 °C (series SL-500: 150 °C), incinerate, or expose contents to water.

Protection from charging:

Whenever lithium batteries are not the single power source in a circuit the following measures recommended by Underwriters Laboratories are relevant. The cells should not be connected in series with an electrical power source that would increase the forward current through the cells.

The circuit for these cells shall include one of the following:

A. Two suitable diodes or the equivalent in series with the cells to prevent any reverse (charging) current. The second diode is used to provide protection in the event that one should fail. Quality control, or equivalent procedures, shall be established by the device manufacturer to ensure the diode polarity is correct for each unit,

or

B. A blocking diode or the equivalent to prevent any reverse (charging) current and a resistor to limit current in case of a diode failure. The resistor should be sized to limit the reverse charging) current to the maximums given in the data sheets.

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3. Composition/Information on Ingredients

Substance	CAS No.	Content w/w %	Hazard symbol	R-phrases	GHS Code	Sinal word	H-phrases
Lithium Metal	7439-93-2	2 - 6	F, C	14/15, 34	GHS02, GHS05	Danger	260, 314, EUH014
Thionyl Chloride	7719-09-7	18 - 47	C	14, 34, 37	GHS05, GHS06	Danger	302, 331, 314, 335
Aluminium Chloride	7446-70-0	2 - 5	C, Xn	48/20	GHS05, GHS08	Danger	314, 372-373
Lithium Chloride	7447-41-8	1 - 2	Xn	22, 36/38	GHS07	Warning	302, 315, 319
Carbon	7440-44-0	2 - 5	--		--		
Steel, Nickel plated	--	35 - 73	--		--		
Glass	--	0 - 2	--		--		
Organic polymeres	Different	0 - 2	--		--		

Hazard Symbols:	C	Corrosive
	F	Highly flammable
	Xn	Harmful
R-Phrases:	R 14	Reacts violently with water
	R 14/15	Reacts violently with water liberating extremely flammable gases
	R 22	Harmful if swallowed
	R 34	Causes burns
	R 36/38	Irritating to eyes and skin
	R 37	Irritating to respiratory system
	R 48/20	Danger of serious damage to health by prolonged exposure through inhalation
GHS-Code:	GHS02	Flame
	GHS05	Corrosion
	GHS06	Skull and crossbones
	GHS07	Exclamation mark
	GHS08	Health hazard
H-Phrases:	260	In contact with water releases flammable gases which may ignite spontaneously
	302	Harmful if swallowed
	314	Causes severe skin burns and eye damage
	315	Causes skin irritation
	319	Causes serious eye irritation
	331	Toxic if inhaled
	335	May cause respiratory irritation

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372-373	Causes damage to lung through prolonged or repeated exposure (inhale); may cause damage to central nervous system through prolonged exposure (swallow)
EUH014	Reacts violently with water

Important Note: The material in this section may only represent a hazard if the integrity of the battery is compromised, or if the battery is physically or electrically abused.

4. First Aid Measures

A. Electrolyte Contact

• Skin	Immediately flush with plenty of water for at least 15 minutes. If symptoms are present after flushing, get medical attention.
• Eyes	Immediately flush with plenty of water for at least 15 minutes and get medical attention.
• Respiratory system:	With large quantities and irritation of the respiratory tract medical surveillance for 48 hours. Immediately inhale Cortisone Spray, e.g. Pulmicort.

B. Lithium Metal Contact

• Skin	Remove particles of lithium from skin as rapidly as possible. Immediately flush with plenty of water for at least 15 minutes and get medical attention.
• Eyes	Immediately flush with plenty of water for at least 15 minutes and get immediate medical attention.

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5. Fire - fighting measures

A. Extinguishing Media

- During a fire with lithium batteries, copious amounts of cold water is an effective medium to prevent expansion of the fire. Do not use warm water or hot water.
- Lith-X (Class D extinguishing media) is effective on fires involving only a few lithium batteries.
- Do not use CO_2 or Halon type extinguishers.
- Dry chemical type extinguishers have limited extinguishing potential.

B. Fire Fighting Procedures

- Use a positive pressure self-contained breathing apparatus if batteries are involved in a fire.
- Full protective clothing is necessary.
- During water application caution is advised as burning pieces of lithium may be ejected from the fire.
- Where the cells or batteries are not at the centre of the fire copious amounts of water may be supplied to the cells using a diffuser type nozzle so that the cells remain cool during the containment and extinguishing of the fire. A sprinkler system should be sufficient for this purpose the critical factor being that the lithium cells do not experience temperatures above the melting point of lithium.
- Small amounts of water should never be used such as the volumes contained within portable fire extinguishers. Standard dry powder extinguishers are ineffective. Halon extinguishers must not be used when fighting lithium fires as toxic gases may be generated during fire fighting. It should be noted that a hazard of hydrogen formation exists whenever hot lithium metal comes into contact with water.

6. Accidental release measures

When the battery housing is damaged, small amounts of electrolyte may leak. Seal battery air tight in a plastic bag, adding some chalk ($CaCO_3$) or lime (CaO) powder or Vermiculite.

Electrolyte traces may be wiped off dryly using household paper. Rinse with water afterwards.

7. Handling and Storage

- Do not allow terminals to short-circuit.
- Storage preferably in a cool (below 21 °C), dry area that is subject to little temperature change.
- Do not place near heating equipment, nor expose to direct sunlight for long periods. Elevated temperatures can result in reduced battery service life.

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TADIRAN BATTERIES

8. Exposure controls / personal protection

Lithium batteries are products, from which no substance is released under normal and reasonably foreseeable conditions of use.

9. Physical and chemical properties

Refer to information under item 3.

10. Stability and reactivity

May rupture violently when heated above 150 °C or when charged.

11. Toxicological information

Not applicable

Refer to information under item 3.

12. Ecological information

The batteries do not contain mercury, cadmium or other heavy metals.

13. Disposal Considerations

- Batteries do not contain hazardous materials according to EC directives 91/157/EEC, 93/86/EEC, and 2011/65/EU (RoHS directive)
- EC battery directive 2006/66/EC has been implemented by most EC member states.
- According to the EU Battery Directive, Batteries are marked with the symbol of the crossed-out wheeled bin (see figure). The symbol reminds the end user that batteries are not permitted to be disposed of with household waste, but must be collected separately.

- Waste Batteries must effectively be protected against short circuit during storage and transport.
- A disposal service is offered upon request by Tadiran Batteries.
- For additional information a Technical Notice is available upon request

Tadiran
Batteries GmbH
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TADIRAN BATTERIES

14. Transport information

Class 9

UN 3090:	LITHIUM METAL BATTERIES
UN 3091:	LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT, or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT
Packing group:	II

Special provisions and packing instructions:

ADR, RID:	188, 230, 310, 360, 636, 656, 661, P903, P903a, P903b
IATA:	A48, A88, A99, A154, A164, A181, A182, A183, P968, P969, P970
IMDG-Code:	188, 230, 310, 957, P903 EmS: F-A, S-I Storage and segregation: Category A

For more information see www.tadiranbatteries.de > products > Transport & Information

15. Regulatory information

Transport Regulations: see in section 14
EU Battery Directive: see in section 13

16. Other information

- Tadiran Lithium Batteries are registered by Underwriters Laboratories, Northbrook, U.S.A. under file MH 12827.
- Further information is given in
  - Tadiran Lithium Battery Product Data Catalogue
  - Tadiran Lithium Battery Technical Brochure.
- For lithium batteries in general, Safety standard IEC 60086-4 applies. It contains detailed recommendations for manufacturers of equipment and users.
- Battery packs
  The design and assembly of battery packs require special skills, expertise and experience. Therefore it is not recommended that the end user attempt to self-assemble battery packs. It is preferable that any battery using lithium cells be fabricated by TADIRAN to ensure proper battery design and construction. A full battery assembly service is available from TADIRAN who can be contacted for further information. If for any reason, this is not possible, TADIRAN can review the pack design in confidence to ensure that the design is safe (in assembly and use) and capable of meeting stated performance requirements.

The REACH regulation (1907/2006/EC) has replaced the EU directive for safety data sheets (91/155/EU). Both the now valid REACH regulation and the no longer valid directive require safety data sheets to be created and updated for materials and preparations. For products - including lithium batteries - no EU safety data sheets are required according to European chemicals regulations.

The information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of the suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.

Safety Data Sheet

KONGSBERG

Safety information for transponder and transponder battery

This document includes transponder safety information for all the Kongsberg Maritime transponders with lithium battery and separate transponder lithium batteries. This document also includes emergency procedures.

Warning ***This document must be read before handling transponders with lithium battery and separate transponder lithium batteries.***

Safety information for transponder and transponder battery

This document includes transponder safety information for the Kongsberg Maritime transponders with lithium battery, and separate Kongsberg Maritime transponder lithium batteries. It also includes emergency procedures.

Warning ***This document must be read before handling transponders with lithium battery and separate transponder lithium batteries.***

About this document

Rev	Date	Written by	Checked by	Approved by
F	23 April 2014	AJ	HAA	SER
	Added a new ex battery.			

Copyright

Disclaimer

Kongsberg Maritime endeavours to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omission.

Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. The user must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment. Kongsberg Maritime disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

Support

All Kongsberg Maritime products:
Phone 24 hour: +47 33 03 24 07
E mail: km.support.hpr@kongsberg.com
Web: http://www.km.kongsberg.com/support_hpr

Table of contents

1 IDENTIFICATION OF THE PRODUCTS AND COMPANY

1.1 Product name

All Kongsberg Maritime transponders with a lithium battery, and separate Kongsberg Maritime transponder lithium batteries.

1.2 Range of products

PART NUMBER	BATTERY TYPE
290-089501	L10/36 (15/20)
290-101665	L10/36 (18/30)
290-103053	L10/36 (15/40)
290-089505	L10/36 (36/60)
290-102726	L10/40 (3/11)
290-210845	L10/40 (3/11)
290-089010	L10/21 (6/12)
290-082380	L10/21 (6/48)
290-089592	L10/50 (12/42)
290-222071	L10/50 (27/28)
290-083530	L50/10/24 (70/12/7)
290-219492	L24 (98)
290-062447	L50 (35)
290-080718	L80 (56)
325902	L14.4 (48)
319554	L14.4 (48), cNODE Maxi
355324	L14.4 (48), cNODE Maxi Exd
347563	L14.4 (24), cNODE Midi

1.3 Company address

Kongsberg Maritime AS

P.O.Box 111

N-3190 Horten

Norway

1.4 Emergency contact

Duty phone 24 hour: +47 33 03 24 07

2 COMPOSITION AND INFORMATION ON INGREDIENTS

2.1 Battery chemistry

A transponder lithium battery consists of **Lithium Metal** cells with chemistry:

Lithium Thionyl Chloride - $Li/SOCl_2$

- Negative electrode: Lithium metal (Li)
- Positive electrode: Carbon
- Electrolyte: Solution of lithium tetrachloroaluminate ($LiAlCl_4$) in thionyl chloride

2.2 Battery weight and lithium content

Part number	Battery type	Battery weight (kg)	Lithium content (g)
290-089501	L10/36 (15/20)	4.3	175
290-101665	L10/36 (18/30)	5.6	240
290-103053	L10/36 (15/40)	6.6	235
290-089505	L10/36 (36/60)	11.7	480
290-102726	L10/40 (3/11)	1.7	70
290-210845	L10/40 (3/11)	1.7	70
290-089010	L10/21 (6/12)	2.2	90
290-082380	L10/21 (6/48)	6.7	270
290-089592	L10/50 (12/42)	6.5	228
290-222071	L10/50 (27/28)	6.6	247
290-083530	L50/10/24 (70/12/7)	10	438
290-219492	L24 (98)	11	490
290-062447	L50 (35)	4.3	175
290-080718	L80 (56)	6.8	280
325902	L14.4 (48)	5.9	183
319554	L14.4 (48), cNODE Maxi	5.9	183
355324	L14.4 (48), cNODE Maxi Exd	5.9	183
347563	L14.4 (24), cNODE Midi	3.0	92

2.3 Battery cell manufacturers/types

A transponder lithium battery consists of cells from one or two of the following manufacturers and types:

- Tadiran TL-2300
- Sonnenschein SL-780
- Saft LS 33600
- Saft LSH 20
- Sonnenschein SL-760

2.4 Battery design

A transponder lithium battery consists of several battery cells that are electrical connected, both in serial and parallel.

There are transponder batteries with different number of cells, voltages and capacity.

All transponder batteries include protection against short-circuits (re-settable fuses) and reverse current (diodes).

3 HAZARDS IDENTIFICATION

Short-circuits, overheating, mechanical damage and exposure to water can start chemical reactions and high currents inside the transponder lithium battery. This can generate noxious gases and/or danger of explosions. The chemical reactions will continue without additional supply of oxygen, as the battery cells contain the necessary ingredients for maintaining the chemical reactions.

During operation, the battery is placed inside the transponder. Water ingression into the transponder can cause dangerous situations.

3.1 Danger of explosions

- If the cells that form the battery exceed the critical temperature of 180° C, they may explode.
- **External fire** - The temperature can reach the critical point of 180° C.
- **Water ingression** - The battery temperature will increase, caused by the high internal currents. The temperature can reach the critical point of 180° C.
- **Water ingression** - Electrolysis gives hydrogen. Together with oxygen, hydrogen can create oxyhydrogen gas inside the transponder (depends on the concentration). This gas is very inflammable/explosive.
- **Water ingression** - Chemical reactions in the battery will cause a pressure build-up inside the transponder. The transponder can explode if the inside pressure is high enough.
- If the transponder explodes, either the transducer or the bottom end cap will blow out, or the transponder becomes fragmented. This can cause serious damages on personnel and/or equipment.
- Some transponders have a relief valve that will prevent over-pressure. Noxious gases will then leak out of the transponder until the chemical reactions have stopped.

Note — *The relief valve can be plugged, caused by products from the chemical reactions during an emergency as described above.*

3.2 Noxious gases

- Thionyl chloride ($SOCl_2$)
- Sulphur dioxide (SO_2)
- Hydrogen sulphide (H_2S)
- Hydrogen chloride (HCl)
- Chlorine (Cl_2)

4 FIRST-AID MEASURES

All personnel that have been exposed to the noxious gases should immediately be seen by a doctor.

Inhalation:	Remove from exposure, rest and keep warm.
Skin contact:	Wash off skin thoroughly with water. Remove contaminated clothing and wash it before reuse.
Eye contact:	Irrigate thoroughly with water for at least 15 minutes.
Ingestion:	Wash out mouth thoroughly with water and give plenty of water to drink.

5 FIRE-FIGHTING MEASURES

- **Cool down the battery with copious amounts of cold water.**
  - Transponder with lithium battery:
    * Immerse the transponder in the sea for 24 hours or permanent.
    * If this method is impossible, the transponder can be cooled down by use of a fire hose.
  - Separate transponder lithium battery:
    * Immerse the battery in the sea for 24 hours or permanent.
    * If this method is impossible, the battery can be cooled down by use of a fire hose.

Cooling down the battery with copious amount of cold water is the only way to reduce/stop the internal chemical reactions, or to limit the fire/explosions to as few battery cells as possible. The chemical reactions/fire will continue without additional supply of oxygen, so extinguisher like Lith-X will not work properly.

Applying water directly onto a battery may develop hydrogen gas, due to the possible electrolysis if the battery terminals are exposed to water. Mixed with air, this gas is very inflammable/explosive. However, if the water cooling takes place out on deck or in a storeroom with good ventilation, there will never be enough hydrogen gas to exceed the lower explosive limit of hydrogen in air (about 4%).

- **Remove transponders with lithium battery and separate transponder lithium batteries in case of an external fire if possible.**

6 ACCIDENTAL RELEASE MEASURES

Refer to Chapter 7, ***Handling and Storage***.

7 HANDLING AND STORAGE

All personnel that handle transponders must know the transponder's status:

'Functioning' - 'Failing' - 'Unknown'

A Transponder with unknown status **must be handled** as a transponder that is failing.

7.1 Recovering a *"functioning"* transponder

- All transponders recovered from the sea, should be placed in a safe place out on deck and controlled for minimum 2 hours:
  - Look for outer damages that could involve a water leakage.
  - The transponder housing temperature must be checked to verify a possible temperature increase in the lithium battery.
- If everything is OK refer to Kongsberg Maritime transponder instruction manuals for normal procedures.

7.2 Recovering a *"failing"* transponder

- Handle as possible water ingression.
- Evacuate all unnecessary people.
- Recover the transponder with great precaution. Use a crane.
- No people should be near the transponder when it is lifted up on deck.
- Place the transponder in a safe place out on deck, shielded from people and vital equipment.
- Fasten the transponder in a crane, ready to lower it into the sea again.
- Control the transponder for minimum 2 hours:
  - Look for outer damages that could involve a water leakage.
  - The transponder housing temperature must be checked to verify a possible temperature increase in the lithium battery.

Failing and normal temperature:

- Take out the battery - see ***Opening a transponder with defect/possible defect battery***.

Failing and increasing temperature:

- See ***Handling a heated or self-heated transponder***.

7.3 Handling a heated or self-heated transponder

- Evacuate all unnecessary people.
- Fasten the transponder to a rope and immerse it in the sea for 24 hours or permanent.
  - If this method is impossible, the transponder can be cooled down with copious amount of cold water. Use a fire hose.
- Recover the transponder and control the temperature.
- Repeat this until the temperature is low and stable.
- The transponder can now be opened - see ***Opening a transponder with defect/possible defect battery***.

7.4 Handling a transponder if relief valve opens

- Evacuate all unnecessary people.
- Use necessary protection equipment.
- Fasten the transponder to a rope and immerse it in the sea for 24 hours or permanent.
  - If this method is impossible, the transponder can be cooled down with copious amount of cold water.
  - Use a fire hose.
- Repeat this until no gases come out the check valve and the temperature is low and stable.
- The transponder can now be opened - see ***Opening a transponder with defect/possible defect battery***.
- Wash out chemical reaction products with water.

7.5 Opening a transponder with defect/possible defect battery

- The transponder is reported failing. There could have been water ingression in the transponder.
- Open the transponder in a safe place out on deck, shielded from people and vital equipment.
- Use necessary protection equipment.

Caution *Do not stand in front of transducer or bottom end cap, when opening the transponder.*

- If there has been water ingression, and the battery is still warm:
  - Disconnect the battery from the transponder electronics, and then - see ***Handling heated or warm separate battery.***
- Wash out chemical reaction products with water.

7.6 Opening a *"functioning"* transponder

- The transponder is reported functioning.
- Open the transponder in a safe place out on deck, shielded from people and vital equipment.

Caution *Do not stand in front of transducer or bottom end cap, when opening the transponder.*

7.7 Handling heated or warm separate battery

- Evacuate all unnecessary people.
- Fasten the battery to a rope and immerse it in the sea for 24 hours or permanent.
  - If this method is impossible, the battery can be cooled down with copious amount of cold water.
  - Use a fire hose.
- Wash out chemical reaction products with water.

7.8 Handling transponders and separate transponder batteries in case of an external fire

- Remove transponders with lithium battery and separate transponder lithium batteries in case of an external fire if possible
- Cool down transponders and separate transponder batteries with copious amounts of cold water - see Chapter 5, ***Fire-fighting measures*** on page 10.

7.9 Storage

Caution — *A transponder that is failing must be stored in a safe place out on deck, shielded from people and vital equipment.*

A transponder that is functioning, and separate batteries can be stored indoors. The battery must be removed from the transponder when stored indoors.

- Storage temperature:
  - Recommended storage temperature lies between 0° C and +25° C (max +50° C, min -55° C).
- Storage relative air humidity:
  - Recommended relative air humidity is 40 to 70%.
- A transponder/separate battery must not be stored directly in the sunlight.
- A battery must not be exposed to water.
- Storeroom:
  - A solid room with study racks for transponders/separate batteries.
  - A room where no people are staying, or no vital equipment is placed.
  - Good ventilation.
  - Clearly identified.
  - Easy to remove transponders and batteries in case of an external fire.

Caution — *The storeroom must have a sprinkler system or a fire station, with fire hose (water), must be placed outside the storeroom.*

8 EXPOSURE CONTROLS AND PERSONALS PROTECTION

Fire/explosion:

- Use self-contained breathing apparatus.

Relief valve opens and noxious gasses come out:

- Use a full face mask with minimum BE-filter, and protective equipment of rubber or plastic.

Opening transponder with defect/possible defect battery:

- Use a full face mask with minimum BE-filter, and protective equipment of rubber or plastic.

Opening a functioning transponder:

- Use protective goggles.

9 PHYSICAL AND CHEMICAL PROPERTIES

Not applicable unless individual components exposed.

10 STABILITY AND REACTIVITY

The products are stable under normal conditions - see Chapter 3, ***Hazards identifications*** on page 8.

11 TOXICLOGICAL INFORMATION

Signs and symptoms:

- None, unless battery ruptures. In the event of exposure to internal contents, corrosive fumes with pungent odour will be very irritating to skin, eyes and mucous membranes. Over-exposure can cause symptoms of non-fibrotic lung injury and membrane irritation.

Inhalation:	Lung irritant.
Skin contact:	Skin irritant.
Eye contact:	Eye irritant.
Ingestion:	Tissue damage to throat and gastro/respiratory tract if swallowed.
Medical conditions:	Eczema, skin allergies, lung injuries, asthma and other respiratory disorders may occur.

12 ECOLOGICAL INFORMATION

None known if used/disposed of correctly.

13 DISPOSAL CONSIDERATIONS

- A lithium thionyl chloride battery does not contain any heavy metals, and is therefore not regarded as special waste (contains only biodegradable parts).
- A used transponder lithium battery often contains a significant amount of residual energy. It is the danger of explosion that presents a problem when disposing a battery.
  - Used batteries must therefore be handled with the same care as new ones.

Caution — *For safe disposal, contact the nearest local company that has been approved to collect and dispose lithium batteries.*

14 TRANSPORT INFORMATION

All transponders with a lithium battery and separate transponder lithium batteries must be shipped in accordance with the prevailing national regulations.

Transponder with lithium battery:

UN no. 3091, Class 9 Miscellaneous
(Lithium batteries contained in equipment).

Separate transponder lithium battery:

UN no. 3090, Class 9 Miscellaneous (Lithium batteries)

Transport:

Aircraft:	IATA DGR
Sea Transport:	IMDG Code
Railway:	RID
Road transport:	ADR

- Aircraft - Only new separate transponder lithium batteries can be transported by air.
- Aircraft - Transport of all transponders with new lithium battery and new separate transponder lithium batteries by air is only permitted on board cargo aircraft. The goods must be clearly labelled:
  CARGO AIRCRAFT ONLY

Caution

Transponder with lithium battery - During transport the lithium battery must always be disconnected from the electronics.

- Original transponder/battery cages must be used.

15 REGULATORY INFORMATION

Not applicable.

16 OTHER INFORMATION

The battery cell manufacturers' safety data sheets are available on the following internet addresses:

- Saft: Saft: www.saftbatteries.com
- Tadiran / Sonnenschein: www.tadiranbatteries.de