

UNITED STATES DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration NOAA Marine and Aviation Operations Marine Operations Center 439 W. York Street Norfolk, VA 23510-1114

JUL 3 2012

MEMORANDUM FOR: Commander Robert Kamphaus, NOAA Commanding Officer, NOAA Ship Okeanos Explorer

Captain Anita L. Lopez, NOAA

FROM:

Captain Anita L. Lopez, NOAA Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT:

Project Instruction for EX-12-05 South Atlantic Bight MPA

Attached is the final Project Instruction for EX-12-05, Exploration – Blake Plateau, which is scheduled aboard NOAA Ship *Okeanos Explorer* during the period of 05 July – 24 July 2012. Acknowledge receipt of these instructions via e-mail to <u>OpsMgr.MOA@noaa.gov</u> at Marine Operations Center-Atlantic.

Attachment

cc: MOA1



doi:10.25923/s8qq-ac19



#### NOAA OFFICE OF OCEAN EXPLORATION AND RESEARCH

#### **Project Instructions**

**Date Submitted:** 

Platform: NOAA Ship Okeanos Explorer

**Cruise Number:** 

Project Title: Exploration, Blake Plateau

EX-12-05 Leg I

**Cruise Dates:** 

July 5 - July 24, 2012 (Davisville, RI - Morehead City, NC)

Prepared by:

Approved by:

Dated: 6/26/12

Craig)W. Russell, NOAA Program Manager Office of Ocean Exploration & Research

Approved by:

Dated: 3JUL12

CAPT Anita L. Lopez, NOAA Commanding Officer Marine Operations Center – Atlantic

#### I. OVERVIEW

#### A. Cruise Period

This document contains Project Instructions for EX-12-05 Leg I of NOAA Ship *Okeanos Explorer's* exploration of the Blake Ridge and Hatteras Transverse Canyon in the Western Atlantic Ocean. EX-12-05 Leg 1 operations will commence on July 5, 2012 from Davisville, RI and conclude on July 24, 2012 in Morehead City, NC.

#### B. Operating Area

The operating area for EX-12-05 Leg 1 will be offshore of the US East Coast, from Rhode Island, south to the Blake Ridge off the coast of South Carolina (*figure. 1*). There will be two areas of focused exploration during this cruise. The first will be engineering dives conducted in 5,000m of water or deeper. The location of these dives is the Hatteras Transverse Canyon, about 200nm ESE of Morehead City, NC. *Okeanos Explorer* will spend approximately three days at Hatteras Transverse Canyon conducting deepwater testing of the AUV *Sentry*, and mapping while *Sentry* is out of the water.



Figure 1: Google Earth map showing overall EX-12-05 Leg 1 operation areas. The white rectangle shows the primary project operating area at Blake Ridge. Three days of engineering dives will be conducted at Hatteras Transverse Canyon. The blue lines represent State EEZ's.



Figure 2: Google Earth map showing EX-12-05 Leg 1 Hatteras Transverse Canyon area. Multibeam bathymetry from previous Okeanos Explorer cruises and US Law of Sea project.

<b>.</b>	<b>T</b> ( <b>1</b> )	<b>T 1</b> / 1
Location	Latitude	Longitude
NE	34.1790 N	-72.4954 W
NW	34.3243 N	-72.9165 W
CE	33.6842 N	-73.3215 W
CW	33.5820 N	-72.8635 W
SW	33.0552 N	-73.4027 W
SE	33.0201 N	-72.9204 W

Table 1: Bounding box coordinates of the Hatteras Transverse Canyon area.

Once engineering dives are completed *Okeanos Explorer* will transit to the project operating area on the Blake Ridge (figures 4-7), approximately 300km off the coast of North and South Carolina. The transit will take less than a day from the Hatteras Transverse Canyon area to the Blake Ridge. During transits the ship will conduct 24hr mapping operations. The primary operating area at the Blake Ridge will be the Blake Ridge Diapir, the Cape Fear Diapir complex and the 800-1000-m isobath (figures 4, 5). This area is located entirely within the U.S. Exclusive Economic Zone.



Figure 4. Location of the Blake Ridge Diapir (BRD), the Cape Fear Diapir Complex (CFDC), and the 1000-m isobaths on the Blake Plateau/Blake Escarpment.

Multibeam bathymetry has been collected for this area as part of the Law of the Sea Extended Continental Shelf Project. Little is known about the seeps in the area of the diapirs and the biological communities associated with them. *Okeanos Explorer* will spend 10-11 days conducting operations around the diapirs, related structures, and nearby 1000m isobath, acquiring data with the *Sentry* AUV, EM302 multibeam sonar, EK60 singlebeam sonar, Knudsen sub-bottom profiler and the CTD rosette system with *in situ* sensors.

Senior Scientist, Cindy Van Dover, will lead a team of students and scientists participating remotely via telepresence from the Inner Space Center at the University of Rhode Island during AUV operations in the Blake Ridge area. Senior Scientist and core AUV team member, Dana Yoerger, will also participate in the cruise from shore via telepresence. Chris German will lead the effort to integrate water column, mapping, and sensor data as tools for prospecting for seep environments. This cruise is experimental in nature and a component of this cruise includes integrating the *Sentry* AUV into telepresence-enabled exploration.



Figure 5: Google Earth view of study area. Box dimension: 50 km x 100 km. Dashed line is approximate location of the 1000 m isobath; red line is a 25 km target length for multibeam mapping.

Point ID	Latitude (N)	Longitude (W)
OpsSW	32 35' 21.294" N	76 30' 47.105" W
OpsSE	32 23' 54.82" N	76 4' 27.56" W
OpsNE	33 06' 44.28 N	75 43' 57.74" W
OpsNW	33 14' 47.43" N	76 8' 51.1" W

Table 1: Primary Project Operations Area. Includes BRD, CFD, unbreached diapirs, 1000-m isobaths.

Tracking of the *Sentry* AUV and acquisition of precise navigation data will require *Okeanos Explorer* to remain in relatively close proximity to the vehicle while it is submerged. Simultaneous *Sentry* AUV and hull-mounted sonar mapping operations are not expected. However, if operations allow *Okeanos Explorer* may conduct CTD operations that will not interfere with *Sentry*'s operations. While *Sentry* is on deck for data download, battery charging and programming, the ship will conduct mapping operations, exploring for water column seeps, acquiring sub-bottom profiler data, and adding to bathymetry collected by the Extended Continental Shelf Project.

Project activities in the Blake Ridge area will be coordinated with R/V *Endeavor*, which will be in the same region from 16 July to the end of *Okeanos Explorer* operations. *Sentry* will be acquiring data in the

operating area of both vessels, and scientists onboard R/V Endeavor are interested in getting Sentry data from Okeanos Explorer to inform ongoing science operations. Sentry data products will be created by shore-side science participants, and e-mailed to R/V Endeavor scientists. No impact to at-sea operations are expected.

Upon completion of operations in the Blake Ridge operating area Okeanos Explorer will transit to Morehead City, North Carolina. During the transit mapping data will be collected.



76°20'0"W

Table 3.	· Key	Targets,	Blake	Plateau

BCB

								DDI
					Water	Borehole		Dept
Feature	Lat1	Long2	Lat	Long	Depth	Depth	BSR	h
ODP site 996-BRD	32°	76°	32.4938833					
seep	29.633'	11.454′	3	76.1909	2170	63	No	
BRD depression 1								
BRD depression 2				TBD				
BRD depression 3								
	32°	75°	32.9836333	75.9300166				
ODP site 991-CFD	59.018'	55.801'	3	6	2567	56.6	No	
	32°	75°		75.9160166				
ODP site 992-CFD	58.542'	54.961'	32.9757	7	2587	50.3	No	
	32°	75°						
ODP site 993-CFD	57.779′	53.685'	32.9629833	75.89475	2642	51.9	No	
sm subsurface diapir 1	32° 52.35′	75° 56′	32.8725	75.93333				
Ĩ			33.0833333					
lg subsurface diapir 2	33° 05′	75° 55′	3	75.9166666				

	31°	75°						
ODP site 994	47.141'	32.751'	31.785735	75.54585	2808	704	No	
	31°	75°		75.5223833				
ODP site 995	38.210'	31.343'	31.6368333	3	2789	704	Yes	440
	31°	75°	31.8431333					
ODP site 997	50.588'	28.118'	3	75.4686333	2770	750	Yes	464
1000-m isobath	50-km extent, between BRD and CFD							

#### C. Summary of Objectives

The EX-12-05 Leg 1 *Sentry* AUV cruise represents a partnership between NOAA *Okeanos Explorer* Program, National Science Foundation (NSF) and Woods Hole Oceanographic Institution (WHOI) - with each partner bringing different but complementary objectives to the table. NOAA's Office of Ocean Exploration and Research (OER) primary focus during EX-12-05 Leg 1 is to test the use of an AUV operated from *Okeanos Explorer* while the ship is outfitted for "full" exploration mode (with joint ROV operations), to explore what it will take to integrate an AUV into telepresence-enabled exploration. NSF and WHOI objectives for this cruise include a series of engineering trials and experiments of the *Sentry* AUV capabilities. NSF objectives for this cruise also include survey data collection using the *Sentry* AUV and *Okeanos Explorer* systems that will support a follow-on NSF-funded project at Blake Ridge in 2013 with Principle Investigator, Cindy Van Dover.

#### **Engineering Dives at Hatteras Transverse Canyon**

#### **Engineering & Operations Objectives:**

- Calibrate the *Sentry* USBL prior to engineering trials (needs to be done early during the cruise in 1-3000m of water. Will probably take about 12 hours)
- Test the ability to operate the *Sentry* AUV from aboard *Okeanos Explorer* as if the ship were in full exploration mode (with joint ROV operations)
- Conduct three days (three dives) of engineering dives with WHOI equipment in deep water (5,000-6,000m). *See Appendix D for specific engineering objectives*
- Test operational and engineering procedures to prepare the *Sentry* AUV for deployment remotely from shore through telepresence
- Train and develop new engineers on use of *Sentry*

#### **Telepresence Objectives**

- Test operational and engineering procedures to prepare the *Sentry* AUV for deployment remotely through telepresence
- Assess what a standard *Sentry* AUV product suite might look like for future *Okeanos Explorer* telepresence-enabled cruises
- Test Sentry data and product data sharing and pipeline
- Test use of collaboration tools to share and communicate about the latest cruise datasets
- Collaborate with shore-side scientists to communicate the latest data, discuss findings, and plan the next steps of the at-sea operation
- Provide context about ongoing AUV operations to shore-side participants by streaming, e.g. the AUV navigation stream to shore as a live video feed.

• Test the functional capacity of the URI Inner Space Center to host and support engineering objectives for an AUV cruise from *Okeanos Explorer* 

#### **Science Objectives**

- Add science value to engineering dives by engaging interested members of the science community, and sharing the data
- Explore Hatteras Transverse Canyon habitats
- Acquire data to look for evidence of mass wasting and sediment transport

#### **Mapping Objectives**

- Conduct training of new mapping interns and watchstanders.
- Collect multibeam, singlebeam and subbottom data during transit
- Collect single beam and sub-bottom profiler data of the Hatteras Transverse Canyon and surrounding area
- Test the ability to conduct EM302 multibeam mapping operations while the *Sentry* AUV is on the seafloor
- Add to pre-existing Law of the Sea and *Okeanos Explorer* bathymetric data coverage in the region if possible
- Develop joint mapping products (TBD) with the Sentry AUV team

#### **Data Management Objectives**

• Incorporate the *Sentry* AUV data and products into *Okeanos Explorer* data workflow for sharing with the shore-side science team during the cruise

#### **Operations at Blake Ridge**

#### **Telepresence Objectives**

- Explore the use of telepresence during AUV operations by streaming AUV data, e.g. underwater vehicle data and/or navigation data to shore
- Test use of collaboration tools to share and communicate about the latest cruise datasets • This may include piping the raw multibeam data to shore
- Collaborate with shore-side scientists to communicate the latest data, discuss findings, and plan the next steps of the at-sea operation
- Test the ability for a core AUV team member to successfully participate in an at-sea cruise from shore. This objective includes sending large amounts of raw data to shore for processing and product development.
- Assess what a standard *Sentry* AUV product suite might look like for future *Okeanos Explorer* telepresence-enabled cruises
- Test the functional capacity of the URI Inner Space Center to host and support mission objectives for an AUV cruise from *Okeanos Explorer*
- Collect topside video of AUV operations

#### **Science Objectives**

• Map and explore the diversity of seep habitats of the Blake Ridge Diapir system

- Reoccupy the Blake Ridge Diapir and investigate temporal stability of subsurface conduits by remapping the 2003 grid
- Collect a 100% photomosaic cover of the known Blake Ridge Diapir seep site
- Use photomosaic strip method to test for seep communities at putative seep sites on the Blake Ridge Diapir
- Map two additional diapirs for evidence of seepage, with photo ground truth of map targets
- Test the hypothesis that there may be seepage and chemosynthetic communities along the 800-1000 m isobaths at the boundary of the methane hydrate stability zone using mapping and photo ground- truthing of selected targets
- Test efficacy of multiple approaches to localizing seeps (mapping, sensors, images, water column plumes, etc)
- Create documentary film of program

#### **Mapping Objectives**

- Collect multibeam, singlebeam and subbottom data during transit
- Collect multibeam and subbottom data at the primary project sites, including water-column data where appropriate
- Develop joint mapping products (TBD) with the Sentry AUV team
- Assess the Reson 7125 multibeam system for potential integration on the Pheonix ROV or another future OER vehicle
- Add to pre-existing Law of the Sea and *Okeanos Explorer* bathymetric data coverage in the region
- Conduct training of new mapping interns and watchstanders

## **XBT Operations**

• During mapping operations, XBT casts will be conducted

#### **CTD Rosette Objectives**

- Conduct vertical casts in the primary Blake Ridge operating area to acquire *in situ* sensor data
- Re-establish standard CTD operating procedures on *Okeanos Explorer*
- Assess what standard CTD and *in situ* sensor data products OER might consider for the future
- Train onboard personnel in CTD rosette operations

#### **Data Management Objectives**

- Test data pipeline for daily transfer of raw AUV data to shore for processing and product development
- Incorporate the *Sentry* AUV data and products into *Okeanos Explorer* data workflow for sharing with the shore-side science team during the cruise
- Incorporate select *Sentry* data and products into *Okeanos Explorer* data workflow for postcruise archival

#### **Education & Outreach Objectives**

• Develop ship-to-shore education and outreach opportunities (TBD)

• Support shore-side artist's efforts (Philip Brubaker, DUKE)

#### **URI Inner Space Center Objectives**

- Support shore-side participation of mission and engineering personnel
- Explore the engagement and contribution of shore-side participants to at-sea AUV operations
- Train scientists on how to use online collaboration tools and technologies to conduct remote science; develop/refine SOPs
- Ongoing system familiarization and training
- Collect video and still images of shore-side participation
- Host education and outreach efforts as required

#### **D.** Participating Institutions

National Oceanic and Atmospheric Administration (NOAA) - Office of Ocean Exploration and Research (OER) - 1315 East-West Hwy, Silver Spring, MD 20910 USA

The National Science Foundation (NSF), 4201 Wilson Boulevard, Arlington, Virginia 22230, USA phone: (703) 292-5111,

Woods Hole Oceanographic Institute (WHOI), Woods Hole Oceanographic Institution, Woods Hole, MA 02543-1541, fax: (508) 457-2163

Duke University Marine Lab, 135 Duke Marine Lab Road, Beaufort, NC 28516 phone: 252.504.7503

University of Rhode Island (URI), 215 South Ferry Road, Narragansett, RI 02882-1197, USA

University Corporation for Atmospheric Research Joint Office for Science Support (JOSS), PO Box 3000 Boulder, CO 80307

University of New Hampshire (UNH) - Center for Coastal and Ocean Mapping (CCOM) - Jere A. Chase Ocean Engineering Lab, 24 Colovos Road, Durham, NH 03824 USA

Louisiana State University (LSU), Baton Rouge, LA, 70803

#### E. Personnel (Science Party)

The experimental nature of this cruise necessitates a compliment of experienced personnel from all the mission disciplines. Required mission personnel include an expedition coordinator, mapping leads, WHOI's AUV team, telepresence team, and UCAR ROV support personnel as well as mapping watch standers.

	Name	Affiliation	Position	M/F	Status
1	Kelley Elliott	OER	Expedition Coordinator	F	US Citizen
2	Webb Pinner	OER	Telepresence Lead	М	US Citizen

3	Elizabeth "Meme" Lobecker	OER	CO-Mapping Lead	F	US Citizen
4	Adam Skarke	OER	CO-Mapping Lead	М	US Citizen
5	Laura Brothers	USGS	Mapping Watchstander /Scientist	F	US Citizen
6	Dominique Paxton	UCAR	Mapping Watchstander	F	US Citizen
7	Carl Keiser	WHOI	AUV Team Lead	М	US Citizen
8	Andrew Billings	WHOI	AUV Team	М	US Citizen
9	Justin Fujji	WHOI	AUV Team	М	US Citizen
10	Al Duester	WHOI	AUV Team	М	US Citizen
11	Brian Bingham	UCAR	AUV Support	М	US Citizen
12	Joshua Carlson	UCAR	AUV Support	М	US Citizen
13	Lora Van Uffelen	UCAR	AUV Support	F	US Citizen
14	Roland Brian	UCAR	Video Engineer	М	US Citizen
15	Tara Smithee	UCAR	Video Team	F	US Citizen
16	Jay Sheehan	UCAR	CTD/Survey Technician	F	US Citizen
17	Brendan Reser	OER/NCDDC	Data	М	US Citizen
18					
19	LT Laura Gallant	OMAO	OPS in Training	F	US Citizen

Table 4: Full list of mission personnel and their affiliation

NAME	INSTITUTION	ROLE	PARTICIPATION	DATES
Catalina Martinez	OER	Regional Manager	ECC Coordinator	
LTJG Brian Kennedy	OER	Expedition Operations	Assistant ECC Coordinator	
Kathy Catanach	USGS	Geologist	Science Participant Location TBD	07/9- 07/11
Rhian Waller	U. Maine	Marine Biologist	Science Participant Location TBD	07/9- 07/11
Cindy Van Dover	Duke University	Science Lead/Principle Investigator	Science Lead	07/11 – 07/23
Dana Yoerger	WHOI	Senior Scientist/AUV Team	AUV Team	
James Kinsey	WHOI	AUV Team	AUV Team	
Chris German	WHOI	Senior Scientist	Senior Scientist	07/11 – 07/23
Megumi Shimizu	Duke	Biologist (PhD Student, 3rd year)	Science Participant	07/11 – 07/23
Jamie Wagner	Duke	Biologist (PhD Student, 1st Year)	Science Participant	07/11 – 07/23

# Shore-side Participants (Location and duration of participation will vary):

Zachary	Dulta	Undergraduate Duke	Science	07/11 -
McKelvey	Duke	Bookout Scholar	Participant	07/23
Malla Ma Data Dala		Undergraduate Duke	Science	07/11 -
Mony Mc Entee D	Duke	Bookout Scholar	Participant	07/23
Stephanie	LCII	Quest Mosters Student	Science	07/11 -
Sharuga	LSU	Guest Masters Student	Participant	07/23
Dhilin Dauhaltan	Dulto	Creducto Student MEA	Artist (Doc Film)	07/11 -
Finip Brudaker	Philip Brubaker Duke Graduate Student, MFA			07/23
David Mindall	WIIOI	Scientist/Engineen	Science/Engineer	
David Mindeli	WHOI	Scientist/Engineer	ing Participant	
(David's student)	WHOI	Student/Engineen	Science/Engineer	
(David's student) WHOI Student/Engine		Student/Engineer	ing Participant	

Table 5: List of expected shore-side science participants working out of the URI ISC, collaborating via intercom, ftp data sharing and teleconferences.

#### F. Administrative

Key Points of Contact:

#### Ship Operations

Marine Operations Center, Atlantic (MOA) 439 West York Street Norfolk, VA 23510-1145 Telephone: (757) 441-6776 Fax: (757) 441-6495

Chief, Operations Division, Atlantic (MOA) LCDR Jason Appler Telephone: (757) 441-6716 E-mail: ChiefOps.MOA@noaa.gov

#### **Mission Operations**

Kelley Elliott, Expedition Coordinator NOAA Ocean Exploration and Research Phone: (301) 734-1024/ (703) 927-5449 Email: <u>Kelley.Elliott@noaa.gov</u>

John McDonough, Deputy Director NOAA Ocean Exploration & Research Phone: 301-734-1023 / 240-676-5206 E-mail: John.McDonough@noaa.gov

Other Mission Contacts

Catalina Martinez, Regional Manager NOAA Office of Ocean Exploration & Research Phone: (401) 874-6250 (o) / (401) 330-9662 (c) CDR Robert Kamphaus, Commanding Officer NOAA Ship *Okeanos Explorer* Phone: (401) 378-8284 Email: <u>CO.Explorer@noaa.gov</u>

LT Megan Nadeau, Operations Officer NOAA Ship *Okeanos Explorer* Phone: (401) 932-4114 (o)/ (207) 240-0957 (c) E-mail: <u>Ops.Explorer@noaa.gov</u>

LCDR Nicola VerPlanck, Deputy EX Program Manager NOAA Ocean Exploration & Research Email: Catalina.Martinez@noaa.gov

Elizabeth "Meme" Lobecker CO-Lead NOAA Office of Ocean Exploration and Research (ERT, Inc.) Phone: (401) 662-9297/ (603)377-6319 E-mail: <u>elizabeth.lobecker@noaa.gov</u>

Dave Lovalvo, ROV Program Manager Eastern Oceanics Phone: 203-246-5531 Email: <u>David.Lovalvo@noaa.gov</u> Phone: 206-526-4801 E-mail: <u>Nicola.Verplanck@noaa.gov</u>

Webb Pinner, Telepresence Lead NOAA Office of Ocean Exploration & Research Phone: (401) 874-6250 (o) / (401) 330-9662 (c) Email: Webb.Pinner@noaa.gov

Adam Skarke, Mapping CO-Lead NOAA Ocean Exploration & Research Phone: 603-862-0369/ 302-981-9908 E-mail: <u>Adam.Skarke@noaa.gov</u>

#### **G.** Diplomatic Clearances

#### NOT APPLICABLE TO THIS CRUISE

#### **H.** Shipments

The AUV transducer pole will be delivered by WHOI personnel the week before the cruise (week of 25 June 2012) for assembly and installation. Two (2) twenty foot containers from WHOI will be delivered to North Kingstown, RI for loading; a work van with reported weight of 14,000 lbs and a secondary van with a weight of 12,000 lbs. Container weights must be verified by certified scales or calibrated dynamometer at/prior to time of loading.

Both containers will be offloaded in Morehead City, NC and shipped to Senty's next project.

#### I. Licenses and Permits

See appendix C for categorical exclusion documentation

#### **II. OPERATIONS**

**A.** Cruise Plan Itinerary (All times and dates are subject to prevailing conditions and the discretion of the Commanding Officer). See figures 5 and 6 for reference.

Date	Operations	Remarks
July 2, 2012	Staging /loading Sentry	Crane barge arranged
	containers at Davisville, RI	
July 5, 2012	Depart Davisville, RI	1300 departure time.
	12 hr Steam to USBL	39° 33.654'N, 71°
	calibration site	2.779'W approx.
July 5, 2012	~0100 arrive USBL cal. Site	Deck dept. not required.
July 5/6, 2012	Conduct Sentry USBL	About 12 hours. Beacon
	calibration in ~2-3000m	pick-up needs to occur
		during daylight hours.

July 6, 2012	Recover USBL cal. equip.	Anytime from 0600-1000, depending on calibration success.
July 6, 2012	Depart for Hatteras Transverse Canyon by ~1500	There will be a NOC network outage in Silver Spring from 9pm to 9am Eastern.
July 9, 2012	Arrive Hatteras Transverse Canyon ~0900	Commence engineering dives
July 9-11, 2012	Hatteras Transverse Canyon – Engineering Dives	Three AUV dives; <i>Okeanos</i> mapping operations while AUV is on surface/charging
July 11, 2012	Depart from Hatteras Transverse Canyon by ~1800	Begin transit to Blake Ridge
July 12, 2012	Arrive Blake Ridge Op Area by ~1200	Commence AUV Operations
July 13, 2012	Blake Ridge Diapir	AUV: Multibeam/SSS data
	Blake Ridge Diapir – Diapir 2	Ship: Multibeam, Singlebeam & SBP data.
July 14, 2012	Blake Ridge Diapir, Seep Location	AUV: Photo data Ship: CTD Cast
	Blake Ridge, Diapir 2	Ship: Multibeam, Singlebeam & SBPdata transect
July 15, 2012	Blake Ridge, Pockmarks	AUV: Photo data Ship: CTD Cast
	Blake Ridge, Diapir 2	Ship: Multibeam, Singlebeam & SBP data transect
July 16, 2012	Blake Ridge, Pockmarks	AUV: Photo data Ship: CTD Cast
	Blake Ridge, Diapir 2	Ship: Multibeam, Singlebeam & SBP data transect
July 17, 2012	Blake Ridge, Pockmarks	AUV: Photo data Ship: CTD Cast
	Blake Ridge, Diapir 1	Ship: Multibeam, Singlebeam & SBP data transect
July 18, 2012	Transect across 3 diapirs	AUV: Multibeam/SSS Ship: Multibeam/SBP
	Cape Fear Diapir	Ship: Multibeam, Singlebeam & SBP data

		transect
July 19, 2012	Diapir 1	AUV: Multibeam
		Ship: Multibeam,
		Singlebeam & SBP
		AUV: Photo
		Ship: CTD casts
	Diapir 2	Ship: Multibeam,
		Singlebeam & SBP
July 20, 2012	Diapir 1	AUV: Photo
		Ship: CTD casts
	Cape Fear Slide	Ship: Multibeam,
		Singlebeam & SBP
July 21, 2012	Diapir 2	Ship: Multibeam,
		Singlebeam & SBP
		AUV: Multibeam
		Ship: Multibeam,
		Singlebeam & SBP
		AUV: Photo
		Ship: CTD casts
	Cape Fear Slide	Ship: Multibeam,
		Singlebeam & SBP
July 22, 2012	Cape Fear Diapir	AUV: Multibeam
		Ship: Multibeam,
		Singlebeam &SBP
		AUV: Photo
		Ship: CTD casts
	Criss-cross 800m isobath	Ship: Multibeam,
		Singlebeam & SBP
		AUV: Charging
July 23, 2012	Criss-cross 800m isobath	AUV: Multibeam/SSS
		Ship: Multibeam,
		Singlebeam &SBP
	<i>(if time allows)</i>	Ship: Multibeam,
		Singlebeam & SBP
		AUV: Charging
	Depart Blake Ridge Op Area	12 hour return transit
July 24, 2012	Arrive Morehead City, NC	(The ship usually pulls
		into port in the morning)
July 25, 2012	Sentry AUV de-staging;	
	departure of Mission Personnel	

Table 6: Details about operations from 05 July – 24 July, 2012

# **B.** Telepresence Events

A joint telepresence event with E/V *Nautilus*, the University of Rhode Island and Inner Space Center may take place the week of July 16, 2012.

### C. In-Port Events

No port events are anticipated at this time. EX-12-05 Leg 1 Duke Marine Lab scientists will likely visit the ship on July 25, 2012.

### **D.** Staging and Destaging

Bringing the *Sentry* AUV and related equipment onboard the ship brings with it a number of staging requirements, including loading two 20' vans.

	Ν	IOBILIZATION
Date	Operations	Remarks
June 13th	Block/winch wire to be	The A-Frame block with the winch wire will be taken down
	taken down.	by ship crew and Webb Pinner
June 21 <sup>st</sup> or 22 <sup>nd</sup>	Transducer pole	Welding operations to make some changes to the ship in
	welding	preparation for the transducer pole installation are desired in
		advance of the installation.
June 25	Transducer pole	Andy Bowen and one other person to arrive from WHOI to
	installation	put the pole in place establish protocol for lowering and
		raising it.
		- The transducer will NOT actually be installed.
		- No hot work is necessary if welding conducted prior
July 2 <sup>nd</sup>	Offloading and loading	- Sentry team arrives in Davisville, RI
	of ROV and AUV	- ROV container to be offloaded
	containers	- AUV containers to arrive in the morning on a truck and be
		loaded onto the O-2 deck of the ship
		- Crane arrangements are being arranged by WHOI
		- One of these vans will need 450 VAC 3 phase, to be
		connected via an un-terminated cable.
July 3 <sup>ra</sup>	Mission personnel	- Ensure CET, Webb Pinner and someone from the deck
	conduct cruise	department is available. The Sentry team will want help with
	preparations	networking.
July 4 <sup>th</sup>	Sentry team conduct	Sentry team may use this day to build out network
	cruise preparations	infrastructure and conduct testing. Need access to the ship,
	Ship crew rest day	not support.
July 5 <sup>th</sup>	Ship departs	From Davisville, RI

	DE-	MOBILIZATION
Date	Operations	Remarks
July 24 <sup>th</sup>	Ship arrives	To Morehead City, NC

July 25 <sup>th</sup>	AUV containers taken off the	- Sentry AUV team to make crane arrangements for this
	ship	- Need to arrange parking the containers at the port for a
		week or so, or seeing if the NOAA facility in Seattle, WA
		will allow storage prior to follow-on Sentry cruise.
		- Mission personnel depart ship

#### **E.** Sonar Operations

#### Mapping Operations

EM 302, EK 60, and Knudsen sub-bottom data acquisition are planned for this cruise. The mapping team will ensure that all the standard protocols are accomplished as laid out by the Commanding Officer. Mapping lead directives will be followed for efficient and safe mapping operations. The Knudsen sub-bottom profiler is anticipated to be operated during the day time (1000-1600) at minimum power level settings (Power level at 1) and lowest possible pulse length setting (1-4 ms). XBTs will be conducted every 2-4 hours, or less/more often as necessary to maintain multibeam data quality. *Okeanos Explorer* hull mounted multibeam sonar may cause interference with Sentry's multibeam therefore the two systems cannot be in operation simultaneously.

Mapping data from Sentry's Reson 7125 multibeam sonar will also be collected. The AUV data will be processed and cleaned by WHOI personnel during the cruise.

## F. SCUBA Dive Plan

#### NOT APPLICABLE TO THIS CRUISE

#### G. Applicable Restrictions

## NOT APPLICABLE TO THIS CRUISE

## III. EQUIPMENT

#### A. Equipment and capabilities provided by the ship

- Kongsberg Simrad EM 302 Multibeam Echosounder (MBES)
- Kongsberg Simrad EK 60 Singlebeam Echosounder
- Knudsen Chirp 3260 Sub-bottom profiler (SBP)
- LHM Sippican XBT (various probes)
- Seabird SBE 911Plus CTD
- Seabird SBE 32 Carousel and 24 2.5 L Niskin Bottles
- CNAV GPS
- POS/MV
- Seabird SBE-45 (Micro TSG)
- Reson SVP-70
- Kongsberg Dynamic Positioning-1 System

- NetApps mapping storage system
- CARIS HIPS Software
- IVS Fledermaus Software
- SIS Software
- Hypack Software
- Scientific Computing System (SCS)
- ECDIS
- Met/Wx Sensor Package
- Cruise Information Management System (CIMS)
- High Speed VSAT (10 mbps ship-to-shore; T1 shore-to-ship)

#### **B.** Equipment and capabilities provided by the scientists

- Sentry AUV
- Sonardyne USBL System

## IV. HAZARDOUS MATERIALS

#### A. Policy and Compliance

All HAZMAT brought aboard by visiting scientists for EX1205 operations will comply with DMS, Fleet Environmental Compliance #07, Hazardous Material and Hazardous Waste Management Requirements for Visiting Scientists, released July 2002.

Hazardous Materials (HAZMAT) Anticipated to be brought aboard by mission personnel

- Ultralife Lithium Power Cell
- Epoxy Resin
- Super Glue
- G5 Adhesive
- Silicone Sealant
- Braycote Micronic hydrolic oil
- Silikroil lubricant (aerosol)
- Scotchkote brand electrical coating

<u>Neutralizing agents</u>, <u>buffers and/or absorbents required for HAZMAT</u> See appendix D for HAZMAT material safety data sheets (MSDS).

Guest scientists and the Expedition Coordinator are responsible for ensuring the HAZMAT are listed, packaged, labeled and transported in compliance with DOT regulations

#### A. Radioactive Isotopes

#### NOT APPLICABLE TO THIS CRUISE

#### **B.** Inventory

#### NOT APPLICABLE TO THIS CRUISE

#### V. ADDITIONAL PROJECTS

#### A. Supplementary Projects

#### NOT APPLICABLE TO THIS CRUISE

#### **B. NOAA Fleet Ancillary Projects**

#### NOT APPLICABLE TO THIS CRUISE

#### VI. DISPOSITION OF DATA AND REPORTS

#### A. Data Responsibilities

All data acquired on *Okeanos Explorer* will be provided to the public archives without proprietary rights. All data management activities shall be executed in accordance with NAO 212-15, Management of Environmental and Geospatial Data and Information [http://www.corporateservices.noaa.gov/ames/NAOs/Chap 212/naos 212 15.html].

[http://www.corporateservices.noaa.gov/ames/NAOs/Chap\_212/naos\_212

#### Ship Responsibilities

The Commanding Officer is responsible for all data collected for missions until those data have been transferred to mission party designees. Data transfers will be documented on NOAA Form 61-29. Reporting and sending copies of project data to NESDIS (ROSCOP form) is the responsibility of OER.

#### NOAA OER Responsibilities

The Expedition Coordinator will work with *Okeanos Explorer* Operations Officer to ensure data pipeline protocols are followed for final archive of all data acquired on the EX without proprietary rights.

#### Deliverables

- a. At sea
  - Daily plans of the Day (POD)
  - Daily situation reports (SITREPS)
  - Daily summary bathymetry data files
- b. Post cruise
  - Refined SOPs for all pertinent operational activities
  - Assessments of all activities
- c. Science
  - Multibeam and XBT raw and processed data (see appendix B for the formal cruise data management plan)
  - Mapping data report
  - AUV collected sonar raw and processed data

• AUV still images

#### Archive

• The Program and ship will work together to ensure documentation and stewardship of acquired data sets in accordance with NAO 212-15. The Cruise Information Management System is the primary tool used to accomplish this activity.

#### **B.** Pre and Post Cruise Meeting

#### Pre-Cruise Meeting

Prior to departure, the Operation's Officer will conduct a meeting of the scientific party to inform them of cruise objectives and vessel protocols, e.g., meals, watches, etiquette, etc.

#### Post-Cruise Meeting

Upon completion of the cruise, a meeting will be held by the Operation's Officer and attended by the ship's Survey Technicians, the Expedition Coordinator and members of the scientific party to review the cruise. Concerns regarding safety, efficiency, and suggestions for improvements for future cruises should be discussed.

#### Shipboard Meetings

Daily Operations Briefing meetings will be held at 1500 in the forward lounge to review the current day, and define operations, associated requirements and staffing needs for the following day. A Plan of the Day (POD) will be posted each evening for the next day in specified locations throughout the ship. A safety brief and overview of POD will occur on the Bridge each morning at 0800. Daily Situation Reports (SITREPS) will be posted as well and shared daily through e-mail and/or the EX PLONE site ( http://tethys.gso.uri.edu/OkeanosExplorerPortal ) and/or Okeanos Explorer FTP site.

## C. Ship Operation Evaluation Report

Within seven days of the completion of the cruise, a Ship Operation Evaluation form is to be completed by the Expedition Coordinator and lead scientist. The preferred method of transmittal of this form is via email to <u>OMAO.Customer.Satisfaction@noaa.gov</u>. If email is not an option, a hard copy may be forwarded to:

Director, NOAA Marine and Aviation Operations NOAA Office of Marine and Aviation Operations 8403 Colesville Road, Suite 500 Silver Spring, MD 20910

#### VII. MISCELLANEOUS

## A. Meals and Berthing

Meals and berthing are required for up to 19 scientists. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the cruise, and ending two hours after the termination of the cruise. 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 twenty-one days prior to the survey (e.g., Expedition Coordinator is allergic to fin fish). Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Expedition Coordinator. The Expedition Coordinator and Operations 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 Expedition Coordinator 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 Expedition Coordinator is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the cruise and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Expedition Coordinator will ensure that all non NOAA or non Federal scientists aboard also have proper orders. It is the responsibility of the Expedition Coordinator 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 7, 1999 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, Revised: 02 JAN 2012) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Expedition Coordinator or the NOAA website at <u>NOAA Health Services Questionnaire</u>. The completed form should be sent to the Regional Director of Health Services at Marine Operations Center. The participant can mail, fax, or scan the form into an email using the contact information below. The NHSQ should reach the Health Services Office no later than 4 weeks prior to the cruise to allow time for the participant to obtain and submit additional information that health services might require before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of the NHSQ. Be sure to include proof of tuberculosis (TB) testing, sign and date the form, and indicate the ship or ships the participant will be sailing on. Clearances are valid for 2 years for personnel under age 50 and 1 year for age 50 and over. All PPD's expire after one year from the date of administration. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

Contact information:

Regional Director of Health Services Marine Operations Center – Atlantic 439 W. York Street Norfolk, VA 23510 Telephone 757.441.6320 Fax 757.441.3760 E-mail: <u>MOA.Health.Services@noaa.gov</u>

Please make sure the <u>medical.explorer@noaa.gov</u> email address is cc'd on all medical correspondence.

Prior to departure, the Expedition Coordinator must provide a listing of emergency contacts to the Operations Officer for all members of the scientific party, with the following information: name, address, relationship to member, and telephone number.

Emergency contact form is included as Appendix A.

#### C. Shipboard Safety

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. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats are also 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.

Operational Risk Management: For every operation to be conducted aboard the ship (NOAA-wide initiative), risk management procedures will be followed. For each operation, risks will be identified and assessed for probability and severity. Risk mitigation strategies / measures will be investigated and implemented where possible. After mitigation, the residual risk will have to be assessed to make Go-No Go decisions for the operations. Particularly with new operations, risk assessment will be ongoing and updated as necessary. This applies to over-the-side operations andto everyday tasks aboard the vessel that pose risk to personnel and property.

- CTD, ROV (and other pertinent) ORM documents will be followed by all personnel working on board the EX.
- All personnel on board are in the position of calling a halt to operations/activities in the event of a safety concern.

#### **D.** Communications

A daily situation report (SITREP) on operations prepared by the Expedition Coordinator will be relayed to the program office. Sometimes it is necessary for the Expedition Coordinator to communicate with another vessel, aircraft, or shore facility. Through various modes of communication, the ship is able to maintain contact with the Marine Operations Center on an as needed basis. These methods will be made available to the Expedition Coordinator upon request, in order to conduct official business. The ship's primary means of communication with the Marine Operations Center is via e-mail 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 it must be arranged at least 30 days in advance.

Specific information on how to contact NOAA Ship *Okeanos Explorer* and all other fleet vessels can be found at: <u>http://www.moc.noaa.gov/phone.htm</u>

#### Important Telephone and Facsimile Numbers and E-mail Addresses

Ocean Exploration and Research (OER):

OER Program Administration: Phone: (301) 734-1010 Fax: (301) 713-4252 E-mail: Firstname.Lastname@noaa.gov

University of New Hampshire, Center for Coastal and Ocean Mapping

Phone:	(603) 862-3438
Fax:	(603) 862-0839

University of Rhode Island, Innerspace Center

Phone:	(401) 874-6158
Email:	innerspacecenter@gmail.com

NOAA Ship Okeanos Explorer - Telephone methods listed in order of increasing expense:

EX Cellular: (401) 378-7947 EX Iridium: (808) 659-9179 OER Mission Iridium (dry lab): (808) 851-3827

EX INMARSAT B Line 1: 011-872-764-852-328 Line 2: 011-872-764-852-329

Voice Over IP (VoIP) Phone: 301-713-7772 (expect a delay once picked up by directory)

E-Mail: <u>Ops.Explorer@noaa.gov</u> - (mention the person's name in SUBJECT field)

<u>expeditioncoordinator.explorer@noaa.gov</u> - For dissemination of all hands emails by Expedition Coordinator while on board. See ET for password.

#### E. IT Security

Any computer that will be hooked into the ship's network must comply with the NMAO Fleet IT

Security Policy 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 these 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

#### NOT APPLICABLE TO THIS CRUISE

No Foreign National Guests are expected for this Cruise.

All foreign national access to the vessel shall be in accordance with <u>NAO 207-12</u> and <u>RADM De Bow's</u> <u>March 16, 2006 memo</u>.

The following are basic requirements. Full compliance with NAO 207-12 is required.

Responsibilities of the Expedition Coordinator:

- 1. Provide the Commanding Officer with the e-mail generated by the FRNS granting approval for the foreign national guest's visit. This e-mail will identify the guest's DSN and will serve as evidence that the requirements of NAO 207-12 have been complied with.
- Escorts The Expedition Coordinator is responsible to provide escorts to comply with <u>NAO</u> <u>207-12</u> Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer. Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (<u>NAO 207-12</u>) at least annually or as required by the servicing Regional Security Officer.
- 3. Export Control The NEFSC currently neither possesses nor utilizes technologies that are subject to Export Administration Regulations (EAR).

The Commanding Officer and the Expedition Coordinator will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.

Responsibilities of the Commanding Officer:

- 1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.
- 2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written NMAO approval and compliance with export and sanction regulations.

- 3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.
- 4. Ensure receipt from the Expedition Coordinator or the DSN of the FRNS e-mail granting approval for the foreign national guest's visit.
- 5. Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.
- 6. Export Control 8 weeks in advance of the cruise, provide the Expedition Coordinator with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Expedition Coordinator of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Expedition Coordinator can take steps to prevent unlicensed export of Program controlled technology. The Commanding Officer and the Expedition Coordinator will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.
- 7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (<u>NAO 207-12</u>) at least annually or as required by the servicing Regional Security Officer.

Responsibilities of the Foreign National Sponsor:

- 1. Export Control The foreign national's sponsor is responsible for obtaining any required export licenses and complying with any conditions of those licenses prior to the foreign national being provided access to the controlled technology onboard regardless of the technology's ownership.
- 2. The DSN of the foreign national shall assign an on-board Program individual, who will be responsible for the foreign national while on board. The identified individual must be a U.S. citizen, NOAA (or DOC) employee. According to DOC/OSY, this requirement cannot be altered.
- 3. Ensure completion and submission of the Certification of Conditions and Responsibilities for a Foreign National Guest as required by <u>NAO 207-12</u> Section 5.03.h.

## Appendix A

#### EMERGENCY DATA SHEET NOAA OKEANOS EXPLORER

PRINT CLEARLY		
NAME:		
(Last, First, 1	Middle)	
Mailing Address		
	(Other than the ship address)	
Phone (Home)		
(Cell)		
Date of Birth		
Email Address:		
Emergency Contact:		
	(Name and Relationship)	
Address:		
Phone (Home)		
(Work)		
(Cell)		
E.C. Email:		
Signature	Date	

#### Appendix B: EX-12-05 Leg I Data Management Plan

All data collected during this expedition will be archived at the National Geophysical Data Center (NGDC) in accordance with the NOAA / OER data management protocols. Detailed data management plans are being developed currently and will be provided to the ship by end of the expedition.

#### **Appendix C:**



UNITED STATES DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration OCEANIC AND ATMOSPHERIC RESEARCH Office of Ocean Exploration and Research Silver Spring, MD 20910

June 21, 2012

MEMORANDUM FOR: The Record

SUBJECT: Categorical Exclusion for NOAA Ship Okeanos Explorer cruise EX1205 Leg 1

NAO 216-6, Environmental Review Procedures, requires all proposed projects to be reviewed with respect to environmental consequences on the human environment. This memorandum addresses the NOAA Ship *Okeanos Explorer's* scientific sensors possible affect on the human environment.

#### **Description of Projects**

This project is part of the Office of Ocean Exploration and Research's "Science Program". It will conduct autonomous underwater vehicle (AUV) operations and ocean mapping activities designed to increase knowledge of the marine environment. This project is entitled "EX1205 Sentry AUV Cruise" and will be led by Kelley Elliott, an Expedition Manager for NOAA OER. The work will be conducted in July at several locations in the North Atlantic. A 6,000 meter AUV will be deployed and CTD rosette casts will be conducted during the expedition. The Kongsberg EM 302 multibeam (30 kHz) and the Kongsberg EK 60 singlebeam (18 kHz) will be operated during the project. A Knudsen 3260 Sub-Bottom Profiler may also be operated. Additionally, expendable bathythermographs (XBTs) will be conducted at all times during the transit.

#### **Effect of Projects**

As expected with ocean research with limited time or presence in the marine environment, this project will not have the potential for significant impacts. Knowledgeable experts who are aware of the sensitivities of the marine environment will conduct the at-sea portions of this project.

#### **Categorical Exclusion**

This project would not result in any changes to the human environment. As defined in Sections 5.05 and 6.03.c.3 (a) of NAO 216-6, this is a research project of limited size or magnitude or with only short-term effects on the environment and for which any cumulative effects are negligible. As such, this project is categorically excluded from the need to prepare an environmental assessment.



Printed on Recycled Paper

#### Appendix D:

#### EX-12-05 Leg 1 Cruise Engineering Test Plans Sentry AUV

- 1. Dive 1: Misc Testing (5000 6000m of water)
  - 1.1. Thruster and Servo test in deep water drive in a straight line with close bottom following and make a couple of large altitude changes
  - 1.2. Speed verification benchmark the speed of the vehicle in deep water and with drag improvements. Make reciprocal lines at [0.5:0.1:1.0] m/s. Use current spy channels to collect data regarding power consumed
  - 1.3. Benchmark USBL performance collect cross correlations and SNR's from the avtrack regularly on the vehicle
  - 1.4. Sidescan/SBP cold start test leave the SSS and SBP off on the launch and descent, use mission controller directives to turn it on and run a short sidescan survey first at 30m then at 5m. Turn the SSS/SBP back off can make this a science targeted block Science opportunity for 1-2 sq km of sidescan coverage
  - 1.5. Reson Cold start test leave the Reson off at launch. Use a mission controller directive to turn the reson on, the reson configurator to set it up, and run a short survey. can make this a science targeted block Science opportunity for ~ 1sq km of multibeam coverage
  - 1.6. Strobe test test new strobe and see what light distribution looks like in deep water Science opportunity for ~100m square of photo coverage
  - 1.7. SVP probe test Run the SVP and log the data, do not do anything with it yet.
  - 1.8. WHOI Acomms run the WHOI acomms and attempt to communicate two ways with the vehicle. Log performance statistics to find out how solid communication is
  - 1.9. NAVEST test run an additional version of navest on the vehicle in neutered mode.
  - 1.10. EH sensor checkout check the correct polarity of the EH probe
- 2. Dive 2 Remote Ops See "Remote Operations and Visualization Plan for the VanDover Okeanos Explorer Cruise" in separate document **Water depth TBD** 
  - 2.1. Retest Strobe if necessary
  - 2.2. Secondary Avtrack test add an additional avtrack to the vehicle on isolated RS-232 only. Collect cross correlation and SNR data and compare it to fully integrated Avtrack logs for the same dive.
  - 2.3. Most of the dive is available for science, but there are some tight parameters. I would like to discuss this over the phone.
- 3. Dive 3 Additional Testing (5000 6000m of water)
  - 3.1. Imaging Cold start test use mission directives to start the camera, imaging stack, and strobe from cold and take pictures in a science selected block Science opportunity for approximately 100m square of photo coverage
  - **3.2.** SVP full integration plumb the SVP fully into the data pipeline and use it to make a multibeam map of a science selected target. Science opportunity for 1 2 square km of multibeam map but it must be on a slope that gives at least 300 400m of vertical relief and more if possible.
  - 3.3. Test "Hover" flight mode put the vehicle into "ROV" mode and make small square transects about a fixed point. Start with 0.3m/x and gradually decrease speed and leg length to see how tightly we can hold station before we go unstable.
  - 3.4. Test out Steve Martin "Vane Mode" see if we can get the vehicle to hold in a fixed spot
  - 3.5. LBL and XR tests to be determined.
  - 3.6. Likely to be some science flex time at the end of this one

Appendix D:

# **MSDS Sheets**

MATERIAL SAFETY	3M				
DATA SHEET	3M Center				
	St. Paul, Minnesota				
	55144-1000				
	1-800-364-3577 or (65	51) 737-6501 (	24 hours	)	
Copyright, 2 All rights 2 information is allowed p 1) the infor prior ag 2) neither 2 distribut	2001, Minnesota Mining a reserved. Copying and/o for the purpose of prop provided that: rmation is copied in ful reement is obtained from the copy nor the origina ted with the intention of	and Manufactur or downloading perly utilizin 11 with no cha a 3M, and al is resold o of earning a p	ing Comp of this g 3M pro nges unl r otherw rofit th	any. ducts ess ise ereon.	
DIVISION: ELECTRIO TRADE NAME:	CAL PRODUCTS DIVISION				
SCOTCHKOTE BRAND	ELECTRICAL COATING				
ID NUMBER/U.P.C.:					
80-6107-3307-5	00-54007-14853-1 80-611	L2-0519-8 00-	54007-43	906-6	
CS-0406-0592-8					
ISSUED: November 2	7, 2001				
SUPERSEDES: Octobe:	r 24, 2000				
DOCUMENT: 10-2644-2	2				
1. INGREDIENT		C.A.S. NO.	P	ERCENT	
ACETONE		67-64-1	40.0	- 45.0	
METHYL ETHYL KETON	Ξ	78-93-3	12.0	- 15.0	
TOLUENE		108-88-3	12.0	- 15.0	
ACRYLONITRILE-BUTA	DIENE POLYMER	9003-18-3	10.0	- 15.0	

 PHENOL-FORMALDEHYDE RESIN.
 25085-50-1
 3.0
 - 7.0

 GLYCEROL ESTERS OF ROSIN ACIDS.
 8050-31-5
 3.0
 - 7.0

 SALICYLIC ACID.
 69-72-7
 1.0
 - 2.0

 ZINC OXIDE.
 1314-13-2
 1.0
 - 2.0

 ANTIOXIDANT.
 68411-46-1
 0.1
 - 1.0

IN CASE OF EMERGENCY: THE NUMBERS AT THE TOP OF THIS PAGE PROVIDE 24 HOUR RESPONSE FROM ANY PHONE FOR ALL EMERGENCIES WITH THIS PRODUCT. The components of this product are in compliance with the chemical notification requirements of TSCA.

All ingredients on TSCA; EINECS; CDSL

This product contains the following toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Emergency Planning and Community Right-To-Know Act of 1986 and 40 CFR Part 372:

METHYL ETHYL KETONE TOLUENE ZINC OXIDE

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

MSDS: SCOTCHKOTE BRAND ELECTRICAL COATING November 27, 2001 PAGE 2 \_\_\_\_\_ 2. PHYSICAL DATA \_\_\_\_\_ BOILING POINT:..... 56.5C VAPOR PRESSURE:..... 229 mm Hg @25C VAPOR DENSITY: ..... 2.00 EVAPORATION RATE: ..... N/D SOLUBILITY IN WATER:..... Nil SPECIFIC GRAVITY:..... 0.88 pH:..... N/A VISCOSITY:..... 325cps MELTING POINT: ..... N/D APPEARANCE AND ODOR: Liquid, Brown, solvent odor \_\_\_\_\_ \_\_\_\_\_ 3. FIRE AND EXPLOSION HAZARD DATA \_\_\_\_\_ FLASH POINT:..... OF Closed Cup FLAMMABLE LIMITS - LEL:..... 2.15% FLAMMABLE LIMITS - UEL:..... 13.0% AUTOIGNITION TEMPERATURE:..... N/D EXTINGUISHING MEDIA: Carbon dioxide, Dry chemical, Foam SPECIAL FIRE FIGHTING PROCEDURES: Wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head. UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors may travel long distances along the ground or floor to an ignition source and flash back. NFPA HAZARD CODES: HEALTH: 2 FIRE: 3 REACTIVITY: 0 UNUSUAL REACTION HAZARD: none OSHA FIRE HAZARD CLASS: Class IB Flammable Liquid \_\_\_\_\_ 4. REACTIVITY DATA \_\_\_\_\_ STABILITY: Stable

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

\_\_\_\_\_

MSDS: SCOTCHKOTE BRAND ELECTRICAL COATING November 27, 2001 PAGE 3 \_\_\_\_\_ 4. REACTIVITY DATA (continued) \_\_\_\_\_ INCOMPATIBILITY - MATERIALS/CONDITIONS TO AVOID: None known. HAZARDOUS POLYMERIZATION: Hazardous polymerization will not occur. HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrocarbons, Amine Compounds. \_\_\_\_\_ 5. ENVIRONMENTAL INFORMATION \_\_\_\_\_ SPILL RESPONSE: Observe precautions from other sections. Ventilate area. Extinguish all ignition sources. Contain spill. Cover with inorganic absorbent material. Collect spilled material. Clean up residue. Place in an approved metal container. RECOMMENDED DISPOSAL: Incinerate in a permitted hazardous waste incinerator. ENVIRONMENTAL DATA: Not determined. **REGULATORY INFORMATION:** Volatile Organic Compounds: ca. 2.1 lb/gal. VOC Less H2O & Exempt Solvents: ca. 251 gms/liter. Since regulations vary, consult applicable regulations or authorities before disposal. In the event of an uncontrolled release of this material, the user should determine if the release qualifies as a reportable quantity. U.S. EPA Hazardous Waste Number = D001 (Ignitable) EPCRA HAZARD CLASS: FIRE HAZARD: Yes PRESSURE: No REACTIVITY: No ACUTE: Yes CHRONIC: Yes \_\_\_\_\_ 6. SUGGESTED FIRST AID \_\_\_\_\_ EYE CONTACT: Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention. SKIN CONTACT: Immediately flush skin with large amounts of water. Remove contaminated clothing. If irritation persists, call a physician. Wash contaminated clothing before reuse. \_\_\_\_\_ Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

MSDS: SCOTCHKOTE BRAND ELECTRICAL COATING November 27, 2001 PAGE 4 \_\_\_\_\_ 6. SUGGESTED FIRST AID (continued) \_\_\_\_\_ INHALATION: Remove person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, get immediate medical attention. IF SWALLOWED: Do not induce vomiting. Drink two glasses of water. Call a physician. \_\_\_\_\_ 7. PRECAUTIONARY INFORMATION \_\_\_\_\_ EYE PROTECTION: Avoid eye contact. Wear unvented goggles during operations in which exposure is likely. SKIN PROTECTION: Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: apron, coveralls. **RECOMMENDED VENTILATION:** Use with appropriate local exhaust ventilation. Provide appropriate local exhaust ventilation at transfer points. Provide appropriate local exhaust ventilation on open containers. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection. RESPIRATORY PROTECTION: Avoid breathing of vapors, mists or spray. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: half-mask organic vapor respirator, full-face organic vapor respirator. PREVENTION OF ACCIDENTAL INGESTION: Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water. RECOMMENDED STORAGE: Store in a cool place. Store away from acids. Store out of direct sunlight. Keep container in well-ventilated area. Contents may be under pressure, open carefully. Keep out of the reach of children. \_\_\_\_\_

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

MSDS: SCOTCHKOTE BRAND ELECTRICAL COATING November 27, 2001

PAGE 5

7. PRECAUTIONARY INFORMATION (continued)

#### FIRE AND EXPLOSION AVOIDANCE:

Keep container tightly closed. Flammable liquid and vapor. Keep away from heat, sparks, open flame, and other sources of ignition. Ground containers securely when transferring contents. Wear low static or properly grounded shoes. No smoking while handling this material. Vapors may ignite explosively.

#### EXPOSURE LIMITS

INGREDIENT	VALUE	UNIT		TYPE	AUTH	SKIN*
ACETONE	500	PPM		TWA	ACGIH	
ACETONE	750	PPM		STEL	ACGIH	
ACETONE	750	PPM		TWA	OSHAV	
	OSHA	VACATED	PEL			
ACETONE	1000	PPM		STEL	OSHAV	
	OSHA	VACATED	PEL			
ACETONE	1000	PPM		TWA	OSHA	
METHYL ETHYL KETONE	200	PPM		TWA	OSHA	
METHYL ETHYL KETONE	300	РРМ		STEL	OSHA	
METHYL ETHYL KETONE	200	PPM		TWA	ACGIH	
METHYI, ETHYI, KETONE	300	PPM		STEL	ACGTH	
TOLIENE	50	PPM		TWA	ACGTH	Y
TOLUENE	100	PPM		TWA	OSHAV	-
10202020	OSHA	VACATED	PET		001111	
TOLUENE	150	PPM		STEL	OSHAV	
10202020	OSHA	VACATED	PET		001111	
TOLUENE	200	PPM		TWA	OSHA	
TOLUENE	300	PPM		CETL	OSHA	
TOLIENE	75	DDM		STEL	CMRG	v
ACRYLONTTRILE-BUTADIENE POLYMER	NONE	NONE		NONE	NONE	1
PHENOL-FORMALDEHYDE RESIN	NONE	NONE		NONE	NONE	
GLYCEROL ESTERS OF ROSIN ACIDS	NONE	NONE		NONE	NONE	
SALICYLIC ACID	NONE	NONE		NONE	NONE	
ZINC OXIDE	10			TWA	ACCTH	
	AS DU	JST		IWA	ACGIII	
ZINC OXIDE	10	MG/M3		TWA	OSHAV	
	AS DU	JST				
	OSHA	VACATED	PEL			
ZINC OXIDE	5	MG/M3		TWA	ACGIH	
	as fu	ime				
ZINC OXIDE	10	MG/M3		STEL	ACGTH	
	as fu	ime				
ZINC OXIDE	5	MG/M3		TWA	OSHA	
	as fr	ime				
ZINC OXIDE	10	MG/M3		STEL	OSHAV	
	as fu	ime				
	OSHA	VACATED	PET			
ZINC OXIDE	15	MG/M3		TWA	OSHA	
Abbreviations: N/D - Not Determined N/A	- Not A	Applicabl	le	CA - Ap	proxim	nately

MSDS: SCOTCHKOTE BRAND ELECTRICAL COATING November 27, 2001

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EXPOSURE LIMITS					
INGREDIENT	VALUE	UNIT	TYPE	AUTH	SKIN*
ZINC OXIDE	AS T 5 RESP NONE	OTAL DUST MG/M3 IRABLE NONE	TWA NONE	OSHA NONE	
* SKIN NOTATION: Listed substances ind the potential contribution to the overa including mucous membrane and eye, eith by direct contact with the substance.	dicated w all expos ner by ai Vehicles	with 'Y' und sure by the rborne or, s can alter	der SKIN cutanec more pa skin ak	I refer ous rou orticul osorpti	to te arly, on.
SOURCE OF EXPOSURE LIMIT DATA: - ACGIH: American Conference of Government - CMRG: Chemical Manufacturer Recomment - OSHA: Occupational Safety and Health - OSHAV: Occupational Safety and Health Vacated Permissible Exposure of the OSHA PEL in some states. Or regulatory authority.	mental In nded Expo n Adminis n Adminis Limits (P Check wit	dustrial Hy sure Guide tration stration Vac PEL) are end h your loca	ygienist lines cated PF forced a al	s L.	
- NONE: None Established					
8. HEALTH HAZARD DATA					
8. HEALTH HAZARD DATA EYE CONTACT: Moderate Eye Irritation: signs/sympto pain, tearing, and hazy vision. SKIN CONTACT: Moderate Skin Irritation (after prolo signs/symptoms can include redness, s	oms can i onged or swelling,	nclude red repeated co itching, a	ness, sw pntact): and dryr	velling	,
8. HEALTH HAZARD DATA EYE CONTACT: Moderate Eye Irritation: signs/sympto pain, tearing, and hazy vision. SKIN CONTACT: Moderate Skin Irritation (after prolo signs/symptoms can include redness, s May be absorbed through the skin and those caused by inhalation and/or ing	oms can i onged or swelling, produce gestion.	nclude red repeated co itching, a effects sin	ness, sw ontact): and dryn niliar t	velling ness.	,
8. HEALTH HAZARD DATA EYE CONTACT: Moderate Eye Irritation: signs/sympton pain, tearing, and hazy vision. SKIN CONTACT: Moderate Skin Irritation (after prolocity signs/symptoms can include redness, signs/symptoms can include redness, signs/	oms can i onged or swelling, produce gestion. ogns/symp pordinati	nclude red repeated co itching, a effects sin otoms can in on, slowed	ness, sw ontact): and dryr miliar t nclude reactio	velling ness. to	· · · · · · · · · · · · · · · · · · ·
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<ul> <li>8. HEALTH HAZARD DATA</li> <li>EYE CONTACT: Moderate Eye Irritation: signs/symptopain, tearing, and hazy vision.</li> <li>SKIN CONTACT: Moderate Skin Irritation (after prolosigns/symptoms can include redness, some management of the skin and those caused by inhalation and/or inguination and/or inguination indication (after prolosion)</li> <li>INHALATION: Central Nervous System Depression: sine headache, dizziness, drowsiness, incosilurred speech, giddiness and unconsol Irritation (upper respiratory): signs of the nose and throat, coughing and Vapors of the uncured product may causystem.</li> </ul>	oms can i onged or swelling, produce gestion. .gns/symp oordinati ciousness s/symptom sneezing use irrit	nclude red repeated co itching, a effects sin otoms can in on, slowed s. us can inclu ation of th	ness, sw ontact): and dryn miliar t nclude reactio ude sore ne respi	velling ness. no n time eness .ratory	,
8. HEALTH HAZARD DATA EYE CONTACT: Moderate Eye Irritation: signs/sympton pain, tearing, and hazy vision. SKIN CONTACT: Moderate Skin Irritation (after protonsigns/symptoms can include redness, signs/symptoms can be added through the skin and those caused by inhalation and/or ing include redness, signs, downsiness, include category, giddiness and unconsol Irritation (upper respiratory): signs of the nose and throat, coughing and Vapors of the uncured product may category) system. Prolonged or repeated exposure may category is a system.	oms can i onged or swelling, produce gestion. .gns/symp oordinati ciousness s/symptom sneezing use irrit	nclude red repeated co itching, a effects sin otoms can in on, slowed s. us can inclu ation of th	hess, sw ontact): and dryn miliar t nclude reactio ude sore he respi	velling ness. to on time eness .ratory	, , ,
MSDS: SCOTCHKOTE BRAND ELECTRICAL COATING November 27, 2001

8. HEALTH HAZARD DATA (continued)

and fatigue.

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Cardiac Sensitization: sudden heart stoppage due to a reflex effect on the nerves which control the heart. This effect usually occurs only after inhalation of concentrated vapors such as in intentional abusive sniffing of certain solvents and propellants.

#### IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

Irritation of Gastrointestinal Tissues: signs/symptoms can include pain, vomiting, abdominal tenderness, nausea, blood in vomitus, and blood in feces.

Central Nervous System Depression: signs/symptoms can include headache, dizziness, drowsiness, muscular weakness, incoordination, slowed reaction time, fatigue, blurred vision, slurred speech, giddiness, tremors and convulsions.

Aspiration Pneumonitis: signs/symptoms can include coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.

Repeated ingestion may cause:

Kidney Effects: signs/symptoms can include reduced urine volume, blood in urine and back pain.

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

WARNING: Contains a chemical which can cause birth defects. (108-88-3)

SALICYLIC ACID (69-72-7) has been associated with lower birth weights, increased perinatal mortality, ante- and postpartum hemorrhage, prolonged gestation and complicated deliveries.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

PRECAUTIONARY INFO. SECTION CHANGED SINCE October 24, 2000 ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

The information in this Material Safety Data Sheet (MSDS) is believed to be correct as of the date issued. 3M MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's method of use or application. Given the variety of factors that can affect the use and application of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for user's method of use or application.

3M provides information in electronic form as a service to its customers. Due to the remote possibility that electronic transfer may have resulted in errors, omissions or alterations in this information, 3M makes no representations as to its completeness or accuracy. In addition, information obtained from a database may not be as current as the information in the MSDS available directly from 3M.

## MATERIAL SAFETY DATA SHEET

#### **MSDS001**

Section 1. Chemical Product And Company Identification	
--------------------------------------------------------	--

Ultralife Part Numb	ber:	U9VL; U9VL-FP; U9VL U9VLBUG-FP (Lectro)		9VL-J; U9VLBUG; ro)
Description:		Ultralife	Lithium Pov	ver Cell
Size:		9.6 Volt	S	
Customer Part Nur	mber:	N/A		
Customer Descript	tion:	N/A		
National Stock Code: U9VI		U9VL: 6135-01-369-9792		
Manufactured by	⊠Ultralife E	⊠Ultralife Batteries, Inc.		
	2000 Techn	2000 Technology Pkwy		
	Newark, NY	NY 14513-2175		
CAGE Code	0UU59			
Emergency Telephone Number: Chemtree		Chemtrec <sup>•</sup>	for Spills, Leaks, Fires	
USA <b>1-8</b>		1-800-4	424-9300	
International		703-	527-3887	
Technical Contact Telephone Number:		1-800-3	332-5000	

#### Section 2. Composition/Information on Ingredients

Chemical Name	CAS #	Exposure Limits	Percent of Content
Manganese Dioxide, MnO <sub>2</sub>	1313-13-9	None Listed	35 – 40
Lithium Metal, Li	7439-93-2	None Listed	1 – 4
Propylene Carbonate, C <sub>4</sub> H <sub>6</sub> O <sub>3</sub>	108-32-7	None Listed	8 – 10
1,3-Dioxolane, $C_3H_6O_2$	646-06-0	None Listed	5 – 9
Lithium Hexafluoroarsenate, $LiAsF_6$	29935-35-1	As: .01 mg/m <sup>3</sup>	1 – 4

Important Note: The materials 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.

#### Section 3. Hazards Identification

- 3.1 Emergency overview: May leak and /or flame if opened, recharged, connected improperly, or disposed of in fire.
- 3.2 Potential health effects: Skin contact may cause irritation and absorption. Contact with raw lithium may cause burns. Routes of entry: Inhalation or ingestion of electrolyte may have toxic effects. Acute exposure: Electrolyte may irritate skin and eyes. Effects of chronic exposure: Dry Skin

#### Section 4. First Aid Measures

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.

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.

#### Section 5. Fire Fighting Measures

Extinguishing Media:

Copious amounts of cold water are an effective extinguishing medium for lithium batteries. Do not use warm or hot water.

Do not use Halon type extinguishing material.

- 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.

Unusual Fire and Explosion Hazards

Batteries may flame or leak potentially hazardous organic vapors if exposed to excessive heat or fire.

Hazardous combustion products

Fire or excessive heat may produce hazardous decomposition products.

Damaged or opened batteries can result in rapid heating and the release of flammable vapors. Vapors are heavier than air and may travel along the ground or be moved by ventilation to an ignition source and flash back.

#### **ULTRALIFE BATTERIES**

#### Section 6. Accidental Release Measures

Damaged batteries that are not hot or burning should be placed in a sealed plastic bag or container.

#### Section 7. Handling And Storage

Do not store batteries in a manner that allows terminals to short circuit.

Batteries should be separated from other materials and stored in a non-combustible, well ventilated, sprinkler-protected structure with sufficient clearance between walls and battery stacks. Do not place batteries near heating equipment, nor expose to direct sunlight for long periods

Batteries should be stored in a cool (below 70°F), dry area. Air conditioning or cooling is not required unless excessively high temperatures will be encountered. Elevated storage temperatures can result in reduced battery shelf life and service life, and should be avoided. Batteries should be kept as cool as possible in order to maximize shelf life and service life.

Batteries are not designed to be recharged. Charging a battery may result in electrolyte leakage and/ or cause the battery to flame.

Never disassemble a battery.

Should a battery unintentionally be crushed, thus releasing its contents, rubber gloves must be used to handle all battery components. Avoid inhalation of any vapors that may be emitted.

In the event of skin or eye exposure to the electrolyte, refer to Section 4, First Aid Measures.

More than a momentary short circuit will generally reduce the battery service life. Batteries with fuses will no longer be functional after being shorted.

Extended short circuiting creates high temperatures in the cell. High temperatures can cause burns in skin or cause the cell to flame.

Avoid reversing battery polarity within the battery assembly. To do so may cause cell to flame or to leak.

The use of old and new batteries or batteries of varying sizes and types in the same battery assembly should be avoided. The batteries' electrical characteristics and capabilities vary and damage may result to batteries or electrical equipment.

#### Section 8. Exposure Controls/Personal Protection

No engineering controls are required for handling batteries that have not been damaged. Personal protective equipment for damaged batteries should include chemical resistant gloves and safety glasses. In the event of a fire, SCBA should be worn along with thermally protective outer garments.

#### **ULTRALIFE BATTERIES**

#### Section 9. Physical And Chemical Properties

Not Applicable

#### Section 10. Stability And Reactivity

(1) This product is stable under ordinary conditions of use and storage.

(2) It is not recommended that this product be stored above 85°C (194°F).

(3) Damaged batteries will react with water. Non-discharged batteries contain elemental Lithium. This is water reactive. This reaction gives off heat and hydrogen gas. A thermal reaction may occur.

(4) Hazardous decomposition products: Carbon Monoxide (CO), and Hydrogen Flouride (HF)

#### Section 11. Toxicological Information

- (1) Irritancy: The electrolytes contained in this battery can irritate eyes with any contact. Prolonged contact with the skin or mucous membranes may cause irritation.
- (2) Sensitization: No information is available at this time.
- (3) Carcinogenicity: No information is available at this time.
- (4) Reproductive toxicity: No information is available at this time.
- (5) Teratogenicity: No information is available at this time.
- (6) Mutagenicity: No information is available at this time.

#### Section 12. Ecological Information

Not applicable to this material/product.

#### Section 13. Disposal Considerations

Batteries must be completely discharged prior to disposal and/ or the terminals must be taped or capped to prevent short circuit. This product does not contain any materials listed by the United Stated EPA as requiring specific waste disposal requirements. When completely discharged it is not considered hazardous. Disposal of large quantities of lithium power cells may be subject to Federal, State, or Local regulations. Consult your local, state and provincial regulations regarding disposal of these batteries.

#### Section 14. Transport Information

Ultralife's lithium metal primary cells and batteries and lithium ion cells and batteries are classified and regulated as Class 9 dangerous goods (also known as "hazardous materials" in the United States) by the International Civil Aviation Organization (ICAO), International Air Transport Association (IATA), International Maritime Organization (IMO) and many government agencies such as the U.S. Department of Transportation (DOT). These organizations and agencies publish regulations that contain detailed packaging, marking, labeling, documentation, and training requirements that must be followed when offering (shipping) Ultralife's cells and batteries for transportation. However, small cells and batteries are not subject to certain provisions of the regulations (e.g., Class 9 labeling and UN specification packaging) if they meet specific requirements. The regulations are based on the UN Recommendations on the Transport of Dangerous Goods Model Regulations and the UN Manual of Tests and Criteria. These regulations also apply to shipments of cells and batteries that are packed with or contained in equipment. Failure to comply with these regulations can result in substantial civil or criminal penalties.

#### Cell and Battery Testing Requirements

The dangerous goods regulations require that each cell and battery design be subject to tests contained in Section 38.3 of the UN Manual of Tests and Criteria prior to being offered for transport. Ultralife's cells and batteries have been tested and comply with all of the UN testing requirements. Batteries or battery packs constructed from Ultralife's cells must be subjected to tests contained in the UN Manual of Tests and Criteria.

#### **Additional Information**

UN Recommendations on the Transport of Dangerous Goods Model Regulations

IATA Dangerous Goods Regulations

International Maritime Dangerous Goods Code

European Road Regulations (ADR)

U.S. Hazardous Materials Regulations

# For more information, please refer to the Transportation Regulations Page on Ultralife's Web Site:

#### http://www.ultralifebatteries.com/subcategory.php?ID=12

Product is shipped as:

Ground (DOT/ADR)	Air (IATA/ICAO)	Water(IMDG Code)
May be shipped without being declared as Class 9 dangerous goods.	May be shipped without being declared as Class 9 dangerous goods.	May be shipped without being declared as Class 9 dangerous goods.
UN specification packaging is <u>not</u> required. No Class 9 label or UN number is required on outer package. In addition, no shipper's declaration for dangerous goods is required.	UN specification packaging is <u>not</u> required. No Class 9 label or UN number is required on outer package. In addition, no shipper's declaration for dangerous goods is required. These batteries cannot be shipped on passenger aircraft from, to or within the USA.	UN specification packaging is <u>not</u> required. No Class 9 label or UN number is required on outer package. In addition, no shipper's declaration for dangerous goods is required.

#### ULTRALIFE BATTERIES

Special shipping information: This battery has been tested to Section 38.3 of 'UN Manual of Tests and Criteria'. The amount of Lithium contained in these batteries is below the limits set by the DOT in Section 49CFR173.185 and IATA A45. There is an exception to ship these with the following shipping label:

## LITHIUM BATTERIES

Do not damage or mishandle this package If package is damaged, batteries must be quarantined, inspected and repacked. For emergency information, call CHEMTREC 1-800-424-9300 North America 1-703-527-3887 International

These batteries cannot be shipped by passenger aircraft.

## Section 15. Regulatory Information

USA: This MSDS meets/exceeds OSHA requirements.

Canada: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

International: This MSDS conforms to European Union (EU), the International Standards Organization (ISO) and the International Labour Organization (ILO) and as documented in ANSI (American National Standards Institute) Standard Z400.1-1993.

#### Section 16. Other Information

The information contained herein is furnished without warranty of any kind. Users should consider this 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.

# MATERIAL SAFETY DATA SHEET Gougeon Brothers, Inc.

#### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:G5 Adhesive - Part B.PRODUCT CODE:865CHEMICAL FAMILY:Mercaptan.CHEMICAL NAME:Mercaptan polymer.FORMULA:Not applicable.

MANUFACTURER:	EMERGENCY TELEPI	HONE NUMBERS:
West System Inc.	Transportation	
102 Patterson Ave.	CHEMTREC:	800-424-9300 (U.S.)
Bay City, MI 48706, U.S.A.		703-527-3887 (International)
Phone: 866-937-8797 or 989-684-7286	Non-transportation	
www.westsystem.com	Poison Hotline:	800-222-1222

#### 2. COMPOSITION/INFORMATION ON HAZARDOUS INGREDIENTS

#### **INGREDIENT NAME**

Tris (dimethylaminomethyl) phenol Mercaptan terminated polymer

#### 3. HAZARDS IDENTIFICATION

#### **EMERGENCY OVERVIEW**

CAS#

90-72-2

Trade Secret

**CONCENTRATION** 

< 20%

PRIMARY ROUTE(S) OF ENTRY: ...... Inhalation, skin contact, eye contact.

#### **POTENTIAL HEALTH EFFECTS:**

**SYMPTOMS OF OVEREXPOSURE:**.....Respiratory tract irritation. Skin irritation. Severe eye irritation.

#### MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Existing skin, eye and lung conditions such as that resulting from allergies.

#### 4. FIRST AID MEASURES:

**FIRST AID FOR EYES:**......Immediately flush with water for at least 15 minutes. Get prompt medical attention.

**FIRST AID FOR INGESTION:**......Give conscious person at least 2 glasses of water. Do not induce vomiting. If vomiting should occur spontaneously, keep airway clear. Get medical attention.

#### 5. FIRE FIGHTING MEASURES:

**SPECIAL FIRE FIGHTING PROCEDURES:**.....Burning material will generate toxic fumes. Use full-body protective gear and a self-contained breathing apparatus. If spill has ignited, use water spray to disperse vapors and protect personnel attempting to stop leak. Use water to cool fire-exposed containers.

#### 6. ACCIDENTAL RELEASE MEASURES:

**SPILL OR LEAK PROCEDURES:** Stop leak without additional risk. Wear proper personal protective equipment. Dike and contain spill. Ventilate area. Absorb with inert absorbent material and remove to disposal container. Wash spill residue with warm, soapy water if necessary.

#### 7. HANDLING AND STORAGE:

Store in cool, dry place. Keep containers tightly closed.

**HANDLING PRECAUTIONS:**......Use only with adequate ventilation. Do not breath vapors or mists from heated product. Avoid contact with skin and eyes. Wash thoroughly after handling.

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

EYE PROTECTION GUIDELINES: ...... Chemical splash goggles or full-face shield.

#### **RESPIRATORY/VENTILATION GUIDELINES:**

General mechanical or local exhaust ventilation. In the absence of adequate ventilation controls, use a NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge.

MSDS# 865B-07a

**OCCUPATIONAL EXPOSURE LIMITS:**.....Not established for product as whole. Refer to OSHA's Permissible Exposure Level (PEL) or the ACGIH Guidelines for information on specific ingredients.

#### 9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM	Viscous liquid.
COLOR	Light yellow to amber.
ODOR	Mercaptan odor.
BOILING POINT	No data.
MELTING POINT/FREEZE POINT	No data.
pH	3-5
SOLUBILITY IN WATER	Slight.
SPECIFIC GRAVITY	1.14
BULK DENSITY	9.5 pounds/gallon.
VAPOR PRESSURE	No data.
VAPOR DENSITY	No data.
% VOLATILE BY WEIGHT	1.52%

#### 10. <u>REACTIVITY:</u>

**INCOMPATIBILITIES:**.....Avoid contact with strong oxidants. Contact with large masses of epoxy resin generates large quantities of heat due to exothermic reaction.

**DECOMPOSITION PRODUCTS:** ......Carbon dioxide, carbon monoxide, hydrogen sulfide, oxides of nitrogen, and oxides of sulfur.

#### 11. TOXICOLOGICAL INFORMATION:

No specific oral, inhalation or dermal toxicology data is known for this product.

Oral:	Slightly toxic.
Inhalation:	No data.
Dermal:	Slightly toxic.

#### **CARCINOGENICITY:**

NTP	No.
IARC	No.
OSHA	No.

This product contains no known carcinogens in concentrations greater than 0.1%.

#### 12. ECOLOGICAL INFORMATION:

No specific data. Wastes from this product may present long term environmental hazards. Do not allow into sewers, on the ground or in any body of water.

#### 13. <u>DISPOSAL CONSIDERATIONS:</u>

Incinerate, recycle (fuel blending) or reclaim may be preferred methods when conducted in accordance with federal, state and local regulations.

#### 14. TRANSPORTATION INFORMATION:

D.O.T. SHIPPING NAME:	Not regulated by DOT.
TECHNICAL SHIPPING NAME:	Not applicable.
D.O.T. HAZARD CLASS:	Not applicable.
U.N./N.A. NUMBER:	Not applicable.
PACKING GROUP:	Not applicable.

#### 15. <u>REGULATORY INFORMATION:</u>

OSHA STATUS:	Irritant.
TSCA STATUS:	All components are listed on TSCA inventory.
SARA TITLE III:	1
SECTION 313 TOXIC CHEMICALS	None.

#### **STATE REGULATORY INFORMATION:**

The following chemicals are specifically listed or otherwise regulated by individual states. For details on your regulatory requirements you should contact the appropriate agency in your state.

COMPONENT NAME /CAS NUMBER None known.

**CONCENTRATION** 

STATE CODE

#### 16. OTHER INFORMATION:

REASON FOR ISSUE:	Update in Section 2.
PREPARED BY:	T. J. Atkinson
APPROVED BY:	G. M. House
TITLE:	Health, Safety & Environmental Manager
APPROVAL DATE:	January 2, 2007
SUPERSEDES DATE:	January 3, 2005
MSDS NUMBER:	865B-07a

Note: The Hazardous Material Indexing System (HMIS), cited in the Emergency Overview of Section 3, uses the following index to assess hazard rating: 0 = Minimal; 1 = Slight: 2 = Moderate; 3 = Serious; and 4 = Severe.

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Gougeon Brothers, Inc. The data on this sheet is related only to the specific material designated herein. Gougeon Brothers, Inc. assumes no legal responsibility for use or reliance upon these data.

## MATERIAL SAFETY DATA SHEET West System Inc.

#### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:G5 Adhesive - Part A.PRODUCT CODE:865CHEMICAL FAMILY:Epoxy resin.CHEMICAL NAME:Bisphenol-A based epoxy resin.FORMULA:Not applicable.

#### **MANUFACTURER:**

West System Inc. 102 Patterson Ave. Bay City, MI 48706, U.S.A. Phone: 866-937-8797 or 989-684-7286 www.westsystem.com

#### **EMERGENCY TELEPHONE NUMBERS:**

Transportation CHEMTREC: .......800-424-9300 (U.S.) 703-527-3887 (International) Non-transportation Poison Hotline: ......800-222-1222

#### 2. <u>COMPOSITION/INFORMATION ON HAZARDOUS INGREDIENTS</u>

# INGREDIENT NAMECAS #CONCENTRATIONBisphenol-A type epoxy resin25085-99-8> 50%Bisphenol-F type epoxy resin28064-14-4< 50%</td>

#### 3. <u>HAZARDS IDENTIFICATION</u>

#### **EMERGENCY OVERVIEW**

HMIS Hazard Rating: Health - 2 Flammability - 1 Reactivity - 0

CAUTION. Moderate eye irritant. Moderate skin irritant. Possible skin sensitizer. Light-yellow liquid with mild odor and high viscosity.

PRIMARY ROUTE(S) OF ENTRY: ...... Skin contact.

#### **POTENTIAL HEALTH EFFECTS:**

**ACUTE INHALATION:** ...... Not likely to cause acute effects unless heated to high temperatures. If product is heated, vapors generated can cause headache, nausea, dizziness and possible respiratory irritation if inhaled in high concentrations.

**CHRONIC INHALATION:**...... Not likely to cause chronic effects. Repeated exposure to high vapor concentrations may cause irritation of pre-existing lung allergies and increase the chance of developing allergy symptoms to this product.

**INGESTION:** Low acute oral toxicity.

**SYMPTOMS OF OVEREXPOSURE:** ...... Possible sensitization and subsequent allergic reactions usually seen as redness and rashes. Repeated exposure is not likely to cause other adverse health effects.

#### MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Pre-existing skin and respiratory disorders may be aggravated by exposure to this product. Pre-existing lung and skin allergies may increase the chance of developing allergic symptoms to this product.

#### 4. FIRST AID MEASURES:

**FIRST AID FOR INHALATION:**...... Remove to fresh air. If effects occur and persist get medical attention.

**FIRST AID FOR INGESTION:** ...... Do not induce vomiting. In general, no treatment is necessary unless large quantities are ingested. Get medical advice.

#### 5. <u>FIRE FIGHTING MEASURES:</u>

**SPECIAL FIRE FIGHTING PROCEDURES:**..... Burning material will generate toxic fumes. Wear complete fire protection gear and a self-contained breathing apparatus. Cool fire-exposed containers with water spray. Material will not burn unless preheated.

#### 6. ACCIDENTAL RELEASE MEASURES:

#### 7. HANDLING AND STORAGE:

**STORAGE TEMPERATURE (MIN./MAX):** ....... 40°F (4°C) / 120°F (49°C)

MSDS# 865A-05a

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

**SKIN PROTECTION GUIDELINES:**...... Wear liquid-proof, chemical resistant gloves (nitrilebutyl rubber, neoprene, butyl rubber or natural rubber) and full body-covering clothing.

#### **RESPIRATORY/VENTILATION GUIDELINES:**

General mechanical and local exhaust ventilation is sufficient for most operations. A NIOSH/MSHA approved respirator with an organic vapor cartridge may be used when adequate ventilation is not possible or when using heated product.

#### **ADDITIONAL PROTECTIVE MEASURES:**

Practice good caution and personal cleanliness to avoid skin and eye contact. Avoid skin contact when removing gloves and other protective equipment. Wash thoroughly after handling..

**OCCUPATIONAL EXPOSURE LIMITS:** ...... Not established for product as whole. Refer to OSHA's Permissible Exposure Level (PEL) or the ACGIH Guidelines for information on specific ingredients.

#### 9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM	Viscous liquid.
COLOR	Pale yellow.
ODOR	Mild.
BOILING POINT	>400°F.
MELTING POINT/FREEZE POINT	No data.
pH	No data.
SOLUBILITY IN WATER	Slight.
SPECIFIC GRAVITY	
BULK DENSITY	
VAPOR PRESSURE	
VAPOR DENSITY	
% VOLATILE BY WEIGHT	

#### 10. <u>REACTIVITY:</u>

STABILITY: ...... Stable.

HAZARDOUS POLYMERIZATION: ...... Will not occur.

**INCOMPATIBILITIES:** ...... Strong acids, bases, amines and mercaptans can cause polymerization.

**DECOMPOSITION PRODUCTS:** ...... Carbon monoxide and carbon dioxide fumes may be produced when heated to decomposition.

#### 11. TOXICOLOGICAL INFORMATION:

No specific oral, inhalation or dermal toxicology data is known for this product. Specific toxicology information for a bisphenol-A based epoxy resin present in this product is indicated below:

Oral:	$LD_{50} > 5000 \text{ mg/kg} \text{ (rats)}$
Inhalation:	No Data.
Dermal:	$LD_{50} = 20,000 \text{ mg/kg}$ (skin absorption in rabbits)

#### CARCINOGENICITY:

NTP	Product not listed.
IARC	Product not listed.
OSHA	Product not listed.

Many studies have been conducted to assess the potential carcinogenicity of diglycidyl ether of bisphenol-A. Although some weak evidence of carcinogenicity has been reported in animals, when all of the data are considered, the weight of evidence does not show that DGEBPA is carcinogenic. Indeed, the most recent review of the available data by the International Agency for Research on Cancer (IARC) has concluded that DGEBPA is not classified as a carcinogen.

Epichlorohydrin, an impurity in this product (<25 ppm) has been reported to produce cancer in laboratory animals and to produce mutagenic changes in bacteria and cultured human cells. It has been established by the International Agency for Research on Cancer (IARC) as a probable human carcinogen (Group 2A) based on the following conclusions: human evidence – inadequate; animal evidence – sufficient. It has been classified as an anticipated human carcinogen by the National Toxicology Program (NTP).

#### 12. ECOLOGICAL INFORMATION:

Prevent entry into sewers and natural waters. May cause localized fish kill.

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Movement and Partitioning:
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Bioconcentration potential is moderate (BCF between 100 - 3000 or Log Kow between 3 - 5).

#### Degradation and Transformation:

Theoretical oxygen demand is calculated to be 2.35 p/p. 20-day biochemical oxygen demand is < 2.5%.

Ecotoxicology:

Material is moderately toxic to aquatic organisms on an acute basis.  $LC_{50}/EC_{50}$  between 1 - 10 mg/L in most sensitive species.

#### 13. DISPOSAL CONSIDERATIONS:

**WASTE DISPOSAL METHOD:**..... Evaluation of this product using RCRA criteria shows that it is not a hazardous waste, either by listing or characteristics, in its purchased form. It is the responsibility of the user to determine proper disposal methods.

Incinerate, recycle (fuel blending) or reclaim may be preferred methods when conducted in accordance with federal, state and local regulations.

#### 14. TRANSPORTATION INFORMATION:

D.O.T. SHIPPING NAME:	Not regulated by DOT.
TECHNICAL SHIPPING NAME:	Not applicable.
D.O.T. HAZARD CLASS:	Not applicable.
U.N./N.A. NUMBER:	Not applicable.
PACKING GROUP:	Not applicable.

#### 15. <u>REGULATORY INFORMATION:</u>

OSHA STATUS:	. Slight irritant; possible sensitizer.
TSCA STATUS:	. All components are listed on TSCA inventory.
SARA TITLE III:	
SECTION 313 TOXIC CHEMICALS	. None.

#### **STATE REGULATORY INFORMATION:**

The following chemicals are specifically listed or otherwise regulated by individual states. For details on your regulatory requirements you should contact the appropriate agency in your state.

COMPONENT NAME /CAS NUMBER	<b>CONCENTRATION</b>	STATE CODE
Epichlorohydrin 106-89-8	< 5ppm	<sup>1</sup> CA, MA, PA, RI
Phenyl glycidyl ether 122-60-1	<5ppm	1CA

<sup>1.</sup> These substances are known to the State of California to cause cancer or reproductive harm, or both.

#### 16. OTHER INFORMATION:

REASON FOR ISSUE:	Update in Section 1.
PREPARED BY:	T. J. Atkinson
APPROVED BY:	G. M. House
TITLE:	Health, Safety & Environmental Manager
APPROVAL DATE:	January 3, 2005
SUPERSEDES DATE:	January 5, 2004
MSDS NUMBER:	865A-05a

Note: The Hazardous Material Indexing System (HMIS), cited in the Emergency Overview of Section 3, uses the following index to assess hazard rating: 0 = Minimal; 1 = Slight: 2 = Moderate; 3 = Serious; and 4 = Severe.

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#### KANO LABORATORIES, INC. SAFETY DATA SHEET

#### SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Manufacturer: Kano Laboratories, Inc. 1000 E. Thompson Lane Nashville, TN 37211
Information Phone Number: (615) 833-4101
Fax: (615) 833-5790 Emergency: 800-424-9300 (Chemtrec)
Website: www.kanolaboratories.com

**Product Name:** SILIKROIL (aerosol) **MSDS Date of Preparation**: 6/7/09 **Product Use**: Penetrant/Lubricant for Industrial Use HMIS Hazard Rating



#### **SECTION 2: HAZARDS IDENTIFICATION**

Slightly reddish liquid with a refreshing odor packaged as an aerosol.

#### **EMERGENCY OVERVIEW**

WARNING! Contents under pressure. Heated can may rupture. Combustible Liquid and Vapor. May cause eye and skin irritation. May be harmful if absorbed through the skin. Inhalation of vapors or mist may cause respiratory irritation and central nervous system effects such as headache, dizziness, nausea and vomiting. Harmful or fatal if swallowed. Aspiration into the lungs during ingestion or vomiting may cause lung damage. May cause chronic effects.

#### **Potential Health Effects:**

Eye: May cause eye irritation with redness, tearing and stinging. Corneal injury is possible if not promptly removed.

**Skin:** May cause mild irritation with redness, rash, swelling. Prolonged or repeated contact may result in defatting and dermatitis. May be absorbed through the skin with effects similar to inhalation and ingestion.

**Inhalation:** Inhalation of vapors or mists may cause mucous membrane and upper respiratory tract irritation and central nervous system depression. Symptoms may include burning sensation, coughing, wheezing, sore throat, shortness of breath, headache, dizziness, drowsiness, nausea, vomiting, depressed respiration and heart rate, heart rhythm irregularities and unconsciousness.

**Ingestion:** Ingestion is an unlikely route of exposure for aerosol products. Swallowing may cause gastrointestinal irritation with abdominal pain, nausea, vomiting and diarrhea and central nervous system depression with symptoms including headache, dizziness, intoxication, weakness, respiratory failure, convulsions, cardiovascular collapse and pulmonary edema. Aspiration into the lungs during ingestion or vomiting may cause lung damage.

**Chronic Hazards:** Prolonged or repeated exposure may cause damage to the central nervous system, blood, kidney and liver. This product contains chemicals that in animal studies caused harm to the developing fetus, but only at exposure levels that harm the pregnant animal. There is no evidence of adverse fetal or reproductive effects in humans.

**Carcinogen Status:** None of the components of this product at greater than 0.1% are listed as carcinogens by OSHA, IARC or NTP.

Medical Conditions Aggravated by Exposure: Pre-existing eye, skin, respiratory, heart, central nervous system, liver and kidney disorders.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIEN'	TS
	10

Chemical Name	CAS#	%
Severely Hydrotreated Petroleum Distillates	64742-52-5	30-50
Light Petroleum Distillates	64742-95-6/64742-88-7/	30-50
	64742-47-8	
Aliphatic Alcohols	78-92-2/123-42-2	1-5
Glycol Ether	111-76-2	1-5
Silicone	63148-62-9	1-10
Proprietary Ingredients	Proprietary	5-15
Carbon Dioxide Propellant	124-38-9	1-15

#### **SECTION 4: FIRST AID MEASURES**

**Eye:** Rinse thoroughly with water for at least 15 minutes, holding the eye lids open to be sure the material is washed out. Get immediate medical attention.

**Skin:** Remove contaminated clothing. Wash contact area thoroughly with soap and water. Get medical attention if irritation or symptoms of exposure develop. Launder clothing before re-use.

**Inhalation:** Remove victim to fresh air. Give artificial respiration if needed. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

**Ingestion:** Ingestion is an unlikely route of exposure for aerosol products. DO NOT induce vomiting. Keep the victim calm and warm. Never give anything by mouth to an unconscious or drowsy person. Get immediate medical attention.

#### **SECTION 5: FIRE FIGHTING MEASURES**

Flash Point: 124°F (51°C) COC

Flammable Limits:	LEL:	0.9%
	UEL:	10.6%

Autoignition Temperature: Not Determined Aerosol Flame Extension: None Aerosol Flashback: None Aerosol Protection Level (NPPA 30B): Level 3 Extinguishing Media: Use carbon dioxide. dry ch

**Extinguishing Media:** Use carbon dioxide, dry chemical or foam. Water may be ineffective but can be used to cool containers and structures.

**Special Fire Fighting Procedures:** Wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing. Cool fire exposed containers with water.

**Unusual Fire Hazards:** Contents under pressure. Keep away from heat and open flames. Container may rupture or explode in the heat of a fire. Prolonged exposure to temperatures above 120°F may cause cans to burst. Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back. Never use welding or cutting torch on or near containers (even empty) because product can ignite explosively. Combustion products may be hazardous.

Hazardous Decomposition Products: Oxides of carbon, organic compounds, smoke and fumes.

#### SECTION 6: ACCIDENTAL RELEASE MEASURES

**Spill:** Remove all ignition sources such as open flames, spark producing equipment, pilot lights, etc. Wear appropriate protective clothing to prevent eye and skin contact including impervious gloves, safety goggles and respirator if needed (refer to Section 8 for specific recommendations). Ventilate area. Cover with an inert absorbent

material and collect into an appropriate container for disposal. Report spills and releases as required to appropriate authorities.

#### **SECTION 7: HANDLING AND STORAGE**

**Handling:** Avoid breathing vapors, aerosols and mists. Use with adequate ventilation. Avoid contact with the eyes, skin and clothing. Wash exposed skin thoroughly with soap and water after use. Keep product away from heat, sparks, flames and all other sources of ignition. No smoking in storage or use areas. Do not cut, braze, solder, grind or weld on or near containers. Contents under pressure. Do not puncture or incinerate container.

**Storage** Store in a cool, well ventilated area at temperatures below 120°F. Do not store in direct sunlight. Store as a Level 3 aerosol.

Chemical Name	Exposure Limits	
Severely Hydrotreated Petroleum Distillates	5 mg/m3 OSHA PEL-TWA	
	5 mg/m3 ACGIH TLV-TWA	
	10 mg/m3 ACGIH TLV-STEL	
Light Petroleum Distillates	100 ppm OSHA PEL-TWA	
	100 ppm ACGIH TLV-TWA	
Aliphatic Alcohol	150 ppm OSHA PEL-TWA	
•	100 ppm ACGIH TLV-TWA	
Aliphatic Alcohol	50 ppm OSHA PEL-TWA	
	50 ppm ACGIH TLV-TWA	
Glycol Ether	50 ppm OSHA PEL-TWA	
	20 ppm ACGIH TLV-TWA	
Silicone	None Established	
Proprietary Ingredients	None Established	
Carbon Dioxide Propellant	5000 ppm OSHA PEL-TWA	
-	5000 ppm ACGIH TLV-TWA	
	30000 ppm ACGIH TLV-STEL	

#### SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

**Ventilation:** Use with adequate general or local exhaust ventilation to maintain concentrations below the occupational exposure limits. Use explosion proof electrical equipment and wiring where required.

**Respiratory Protection:** If needed, a NIOSH approved respirator with organic vapor cartridges may be used. For higher exposures, a supplied air respirator may be required. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice.

**Skin Protection** Impervious gloves are recommended when needed to avoid skin contact. Based on available test data, 4H or Silver Shield gloves are suggested.

Eye Protection: Chemical safety goggles recommended.

**Other Protective Equipment:** Impervious clothing as required to prevent skin contact and contamination of personal clothing. Suitable eye wash and washing facilities should be available in the work area.

#### **SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

Appearance and Odor: Slightly reddish liquid with a refreshing odor packaged as an aerosol.pH: 6-7Specific Gravity: 0.87Boiling Point: 258°FMelting Point: Not applicableVapor Pressure: 12 mm Hg @ 20°C (aliphatic alcohol)Water Solubility: NegligibleVapor Density (air =1): Greater than 1Evaporation Rate (ether=1): Less than 1

#### SECTION 10: STABILITY AND REACTIVITY

**Stability:** Stable under normal conditions of storage or use.

**Incompatibility/Conditions to Avoid:** Avoid strong oxidizing agents, reducing agents, acids, bases, amines, alkanolamines, ammonia, chlorinated compounds. Avoid heat, sparks, flames and all other sources of ignition.

Hazardous Decomposition Products: Combustion will produce oxides of carbon, organic compounds, smoke and fumes.

Hazardous Polymerization: Will not occur.

#### SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological testing has not been performed on this product as a mixture.

The calculated acute toxicity values, as determined by the DOT and other agency standard formula are: Oral LD50 = 2270; Dermal LD50 = 1500 mg/kg. Silikroil is not classified as toxic under workplace or transportation criteria.

#### **SECTION 12: ECOLOGICAL INFORMATION**

No data available.

#### **SECTION 13: DISPOSAL INFORMATION**

Dispose in accordance with all local, state and federal regulations. Do not puncture or incinerate containers. When contents are depleted, continue to depress button until all gas is expelled.

#### SECTION 14: TRANSPORT INFORMATION

DOT Proper Shipping Name: Consumer Commodity DOT Technical Name: None DOT Hazard Class: ORM-D UN Number: None DOT Labels Required (49CFR172.101): None Hazardous Substance (49CFR172.101): None Reportable Quantity: None

DOT Marine Pollutants: This product does not contain marine pollutants as defined in 49CFR 171.8.

IMDG Shipping Description: Aerosols, 2, UN1950, FP 51 C, Limited Quantity ID Number: UN1950 Hazard Class: 2 Packing Group: None Labels Required: None Marking Required: Aerosol Marking On Carton Placards Required: Limited Quantities On Transport Containers

#### **SECTION 15: REGULATORY INFORMATION**

#### **U.S. FEDERAL REGULATIONS:**

**CERCLA 103 Reportable Quantity:** This product is not subject to CERCLA reporting requirements, however, oil spills are reportable to the National Response Center under the Clean Water Act and many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

#### SARA TITLE III:

Hazard Category for Section 311/312: Acute Health, Chronic Health, Fire Hazard, Sudden Release of Pressure

**Section 313 Toxic Chemicals:** This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements:

Aliphatic Alcohol	78-92-2	1-5%
Glycol Ether	111-76-2	1-5%
1,2,4-Trimethylbenzene	95-63-6	.5 - < 5%

Section 302 Extremely Hazardous Substances (TPQ): None

**EPA Toxic Substances Control Act (TSCA) Status:** All of the components of this product are listed on the TSCA inventory.

#### SECTION 16: OTHER INFORMATION

<b>HMIS Ratings:</b>	Health - 1	Flammability - 2	Reactivity - 0
NFPA Ratings:	Health - 1	Flammability - 2	Reactivity - 0

The information contained herein has been developed based upon current available scientific data. New information may be developed from time to time which may render the conclusions of this report obsolete. Therefore, no warranty is extended as to the applicability of this information to the user's intended purpose or the consequences of its use or misuse.

# BURMAH-CASTROL INC-BRAY PRODUCTS DIV. -- BRAYCOTE MICRONIC 756 E -- 9150-00-082-7524

Product ID: BRAYCOTE MICRONIC 756 E MSDS Date:01/01/1987 FSC:9150 NIIN:00-082-7524 MSDS Number: BCYCP === Responsible Party === Company Name: BURMAH-CASTROL INC-BRAY PRODUCTS DIV. Emergency Phone Num: 714-660-9414 CAGE: DO827 === Contractor Identification === Company Name: BURMAH-CASTROL INC. Address:30 EXECUTIVE AVE City: EDISON State:NJ ZIP:08817 Country:US Phone: 201 287-3120 CAGE:DO827 Company Name: CASTROL INDUSTRIAL NORTH AMERICA INC SPECIALTY PRODUCTS DIV Address:1001 WEST 31ST STREET Box:City:DOWNERS GROVE State: IL ZIP:60515-1280 Country:US Phone:800-621-2661/ FAX: 630-241-4140 CAGE: 2R128 Ingred Name: PETROLEUM SOLVENT, CAS#64742-46-7 (60-70%) TAKE TLV AS OILMIST CAS:64742-46-7 RTECS #: JN9379645 Fraction by Wt: 65.0% ACGIH TLV: 5MG/CUM(OILMIST Ingred Name: ADDITIVES (PROPRIETARY COMPOSITION) Fraction by Wt: <35% ACGIH TLV:NOT SPECIFIED Effects of Overexposure: MAY AFFECT VERY SENSITIVE PERSON. MAY CAUSE EYE IRRITATION.PROLONGED CONTACT MAY DEFAT SKIN/DERMATITI First Aid:EYE CONTACT:FLUSH THOROUGHLY WITH WATER; SKIN CONTACT; WIPE, THEN WASH WITH SOAP AND WATER.INGESTION:DO NOT INDUCE VOMITING,CALL PHYSICIAN Flash Point:215F/102C (COC) Extinguishing Media: CARBON DIOXIDE, DRY CHEMICAL, FOAM, WATER FOG Fire Fighting Procedures: USE WATER AS WATER FOG ONLY TO COOL CONTAINERS TO AVOID TEM

Unusual Fire/Explosion Hazard:NONE

Spill Release Procedures:STOP FLOW.WIPE, MOP, OR ABSORB WITH CLAY, DIATOMACEOUS EARTH, OR OTHER INERT MATERIAL AND STORE IN CLOSED METAL CONTAINERS. Handling and Storage Precautions: NO SPECIAL PRECAUTIONS, EXCEPT DO NOT STORE NEAR HEAT, OPEN FLAME, OR OTHER SOURCES OF IGNITION Other Precautions: AVOID CONT WITH SKIN AND EYES.DO NOT USE CONTAMINATED CLOTHES.WASH AFTER EACH USE. Respiratory Protection: USE NIOSH APPROVED RESPIRATOR FOR ORGANIC VAPORS/OIL MIST Ventilation:LOCAL EXHAUST RECOMMENDED ONLY FOR MIST Protective Gloves: IMPERVIOUS Eve Protection: SAFETY GLASSES RECOMMENDE Other Protective Equipment: FULL WORK CLOTHING TO PREVENT REPEATED OR PROLONGED CONTACT. Supplemental Safety and Health MSDS DATED:10/17/85. HCC:V6 Boiling Pt:B.P. Text:>400/204C Spec Gravity:0.875 Solubility in Water: INSOL. Appearance and Odor:LOW VISCOSITY FLUID, DYED RED, PETROLEUM ODOR Stability Indicator/Materials to Avoid:YES AVOID STRONG OXIDIZING AGENTS Hazardous Decomposition Products: COMBUSTION MAY PRODUCE CO AND ASPHYXIANTS. Waste Disposal Methods: CONTROLLED INCINERATION OR OTHER METHOD IAW LOCAL, STATE, AND FEDERAL REGULATIONS REGARDING HEALTH, AIR, AND WATER POLLUTION Disclaimer (provided with this information by the compiling agencies): This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever, expressly or implied, warrants this information to be accurate and disclaims all liability for its use. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their

particular situation.



Version: 1.1 11/01/2005

## RTV112 12T-Tube (0.770LBS-0.350KG) SILICONE SEALANT

#### **1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

Manufactured By: Revised: Preparer: CHEMTREC		GES Waterford Plant 260 Hudson River Rd Waterford NY 12188 11/01/2005 PRODUCT STEWARDSHIP COMPLIANCE AND STANDARDS 1-800-424-9300				
Chemical Family/Use: Formula:		Sealant Mixture				
<b>HMIS</b> Flammability:	2	Reactivity:	0	Health:	0	Prot. Equipm.:
<b>NFPA</b> Flammability:	2	Reactivity:	0	Health:	1	Special Haz.:

2. COMPOSITION/INFORMATION ON INGREDIENTS					
PRODUCT COMPOSITION	CAS REG NO.	WGT. %			
<u>A. HAZARDOUS</u>					
Methyltriacetoxysilane	4253-34-3	1 - 5 %			
Octamethylcyclotetrasiloxane	556-67-2	1 - 5 %			
Diacetoxydi-tert-butoxysilane	13170-23-5	1 - 5 %			
B. NON-HAZARDOUS					
Siloxanes & Silicones,	68554-67-6	5 - 10 %			
Dimethylpolymers					
Silica	7631-86-9	10 - 30 %			
Dimethylpolysiloxane	70131-67-8	60 - 90 %			
	-				

### **3. HAZARDS IDENTIFICATION**

#### **EMERGENCY OVERVIEW**

WARNING! May be harmful if swallowed. Irritating to eyes, respiratory system and skin. Adverse liver and reproductive effects reported in animals.

Form: solid Color: white

Odor: Acetic acid



Version: 1.1 11/01/2005

## RTV112 12T-Tube (0.770LBS-0.350KG) SILICONE SEALANT

#### POTENTIAL HEALTH EFFECTS

#### INGESTION

May be harmful if swallowed.

#### SKIN

Uncured product contact will irritate lips, gums and tongue. Skin irritation is possible after contact with the uncured product.

#### INHALATION

Inhalation of vapors may cause irritation of the respiratory tract. Applies in uncured state.

#### EYES

Eye irritation is possible after contact with the uncured product.

#### MEDICAL CONDITIONS AGGRAVATED

None known.

#### SUBCHRONIC (TARGET ORGAN )

Liver; Reproductive hazard.

#### **CHRONIC EFFECTS / CARCINOGENICITY**

This product or one of its ingredients present at 0.1% or more is NOT listed as a carcinogen or suspected carcinogen by NTP, IARC, or OSHA.

#### **ROUTES OF EXPOSURE**

dermal

#### OTHER

Acetic acid released during curing. This product contains methylpolysiloxanes which can generate formaldehyde at approximately 300 F (150 C) and above in atmospheres which contain oxygen. Formaldehyde is a skin and respiratory sensitizer, eye and throat irritant, acute toxicant, and potential cancer hazard. An MSDS for formaldehyde is available from GE Advanced Materials - Silicones.

#### 4. FIRST AID MEASURES

#### INGESTION

Do not induce vomiting. If victim is conscious, give 1-3 glasses of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if irritation persists.

#### SKIN

To clean from skin, remove completely with a dry cloth or paper towel, before washing with detergent and water. Get medical attention if irritation persists.

#### INHALATION

If inhaled, remove to fresh air. If not breathing give artificial respiration using a barrier device. If breathing is difficult give oxygen. Get medical attention.



Version: 1.1 11/01/2005

## RTV112 12T-Tube (0.770LBS-0.350KG) SILICONE SEALANT

#### EYES

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

ca. 72 °C; 161.60 °F

not applicable

not applicable

No

#### NOTE TO PHYSICIAN

Treatment is symptomatic and supportive.

#### 5. FIRE-FIGHTING MEASURES

FLASH POINT: METHOD: IGNITION TEMPERATURE: FLAMMABLE LIMITS IN AIR - LOWER (%): FLAMMABLE LIMITS IN AIR - UPPER (%):

SENSITIVITY TO MECHANICAL IMPACT:

#### SENSITIVITY TO STATIC DISCHARGE

Sensitivity to static discharge is not expected.

#### EXTINGUISHING MEDIA

All standard extinguishing agents are suitable.

#### SPECIAL FIRE FIGHTING PROCEDURES

Combustible, Firefighters must wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus with full face mask and full protective clothing.

#### 6. ACCIDENTAL RELEASE MEASURES

#### ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Wipe, scrape or soak up in an inert material and put in a container for disposal. Wash walking surfaces with detergent and water to reduce slipping hazard. Wear proper protective equipment as specified in the protective equipment section.

#### 7. HANDLING AND STORAGE

#### STORAGE

Store away from heat, sources of ignition, and incompatibles. Keep out of the reach of children. Keep container tightly closed.

#### PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Product releases acetic acid during application and curing. Use only in well-ventilated areas. Avoid contact with skin and eyes. Remove contact lenses before using sealant. Do not handle lenses until all sealant has been cleaned from the fingertips, nails and cuticles. Residual sealant may remain on fingers for several days and transfer to lenses and cause severe eye irritation.



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## RTV112 12T-Tube (0.770LBS-0.350KG) SILICONE SEALANT

#### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

#### **ENGINEERING CONTROLS**

Eyewash stations; Showers; Exhaust ventilation

#### **RESPIRATORY PROTECTION**

If exposure limits are exceeded or respiratory irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Supplied air respirators may be required for non-routine or emergency situations. Respiratory protection must be provided in accordance with OSHA regulations (see 29 CFR 1910.134).

#### **PROTECTIVE GLOVES**

Impermeable or chemical resistant gloves.

#### **EYE AND FACE PROTECTION**

Safety glasses

#### **OTHER PROTECTIVE EQUIPMENT**

Wear suitable protective clothing and eye/face protection.

#### **Exposure Guidelines**

<u>Component</u>	CAS RN	<u>Source</u>	<u>Value</u>

Absence of values indicates none found

PEL - OSHA Permissible Exposure Limit; TLV - ACGIH Threshold Limit Value; TWA - Time Weighted Average

OSHA revoked the Final Rule Limits of January 19, 1989 in response to the 11th Circuit Court of Appeals decision (AFL-CIO v. OSHA) effective June 30, 1993. See 29 CFR 1910.1000 (58 FR 35338).

#### 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT - C & F: VAPOR PRESSURE (20 C) (MM HG): VAPOR DENSITY (AIR=1): FREEZING POINT: MELTING POINT: PHYSICAL STATE: ODOR: COLOR: EVAPORATION RATE (BUTYL ACETATE=1): SPECIFIC GRAVITY (WATER=1): DENSITY (KG/M3): ACID / ALKALINITY (MEQ/G): pH: VOLATILE ORGANIC CONTENT (VOL): no data available solid Acetic acid white < 1 1.05 ca. 1.05 KG/M3 Unknown Unknown 5 %(m)



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## RTV112 12T-Tube (0.770LBS-0.350KG) SILICONE SEALANT

SOLUBILITY IN WATER (20 C): SOLUBILITY IN ORGANIC SOLVENT (STATE SOLVENT): VOC EXCL. H2O & EXEMPTS (G/L): insoluble Soluble in toluene

< 52

#### **10. STABILITY AND REACTIVITY**

#### STABILITY

Stable

#### HAZARDOUS POLYMERIZATION

Will not occur

#### HAZARDOUS THERMAL DECOMPOSITION / COMBUSTION PRODUCTS

carbon dioxide (CO2); Carbon monoxide; Acetic acid; Silicon dioxide.; formaldehyde

#### **INCOMPATIBILITY (MATERIALS TO AVOID)**

None known.

#### **CONDITIONS TO AVOID**

None known.

#### **11. TOXICOLOGICAL INFORMATION**

#### ACUTE ORAL

Unknown

#### ACUTE DERMAL

Unknown

#### **ACUTE INHALATION**

NONE FOUND

#### OTHER

Octamethylcyclotetrasiloxane Ingestion: Rodents given large doses via oral gavage of octamethylcyclotetrasiloxane (1600 mg/kg day, 14 days) developed increased liver weights relative to unexposed control animals due to hepatocellular hyperplasia (increased number of liver cells which appear normal) as well as hypertrophy (increased cell size). Inhalation: In inhalation studies, laboratory rodents exposed to octamethylcyclotetrasiloxane (300 ppm five days week, 90 days) developed increased liver weights in female animals relative to unexposed control animals. When the exposure was stopped, liver weights returned to normal. Microscopic examination of the liver cells did not show any evidence of pathology. Inhalation studies utililizing laboratory rabbits and guinea pigs showed no toxic effects in rodents. Range finding reproductive studies were conducted (whole body inhalation, 70 days prior to mating, through mating, gestation and lactation) with octamethylcyclotetrasiloxane (D4). Rats were exposed to 70 and 700 ppm. In the 700 ppm group, there was a statistically significant reduction in mean litter size and in implantation sites. No D4



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related clinical signs were observed in the pups and no exposure related pathological findings were found. Interim results from a two generation reproductive study in rats exposed to 500 and 700 ppm D4 (whole body inhalation, 70 days prior to mating, through mating, gestation and lactation) resulted in a statistically significant decrease in live mean litter size as well as extended periods of off-spring delivery (dystocia). These results were not observed at the 70 and 300 ppm dosing levels. Preliminary results from an ongoing 24-month combined chronic/oncogenicity study in rats exposed to 10, 30, 150, or 700 ppm D4 showed test-article related effects in the kidney (male and female) and uterus of rats exposed for 12 to 24 months. These effects include increased kidney weight and severity of chronic nephropathy, increased uterine weight, increased incidence of endometrial cell hyperplasia, and an increased incidence of endometrial adenomas. All of these effects are limited to the 700 ppm exposure group. The relevance of these data to humans is unclear. Further studies are ongoing. In developmental toxicity studies, rats and rabbits were exposed to octamethylcyclotetrasiloxane at concentrations up to 700 ppm and 500 ppm respectively. No teratogenic effects (birth defects) were observed in either study.

#### SENSITIZATION

no data available

#### SKIN IRRITATION

no data available

#### EYE IRRITATION

no data available

#### MUTAGENICITY

Unknown

#### **12. ECOLOGICAL INFORMATION**

#### ECOTOXICOLOGY

no data available

#### CHEMICAL FATE

no data available

#### DISTRIBUTION

no data available

#### **13. DISPOSAL CONSIDERATIONS**

#### **DISPOSAL METHOD**

Disposal should be made in accordance with federal, state and local regulations.

#### **14. TRANSPORT INFORMATION**

#### Not Regulated if Section is Blank

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## RTV112 12T-Tube (0.770LBS-0.350KG) SILICONE SEALANT

DOT SHIPPING NAME:	Combustible liquid, n.o.s. (METHYLTRIACETOXYSILANE)
DOT HAZARD CLASS:	CBL
DOT LABEL (S):	
UN/NA NUMBÉR:	NA 1993
PACKING GROUP:	111
Demode	

Remarks IMDG:

DOT Regulated Only - Not IMDG Regulated

#### **15. REGULATORY INFORMATION**

#### **Inventories**

y (positive listing) y (positive listing)
v (positivo listing)
y (positive listing)
y (positive listing)
y (positive listing)
y (positive listing)
y (positive listing)
y (positive listing)
n (Negative listing)
estricted or special cases, please contact GE.

#### **US Regulatory Information**

CERCLA PRODUCT COMPOSITION	<u>Chemical</u>	CERCLA Reportable Quantity
CLEAN AIR ACT		
CLEAN WATER ACT		
SARA SECTION 302		



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## RTV112 12T-Tube (0.770LBS-0.350KG) SILICONE SEALANT

#### SARA (311,312) HAZARD CLASS

Acute Health Hazard; Chronic Health Hazard; Fire Hazard

SARA (313) CHEMICALS

#### **Canadian Regulatory Information**

#### WHMIS HAZARD CLASS

Combustible Liquid, D2A VERY TOXIC MATERIALS, D2B TOXIC MATERIALS

EAR99

#### <u>Other</u>

SCHDLE B/HTSUS:

3214.10 Mastic Based on Rubber

ECCN:

#### CALIFORNIA PROPOSITION 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

#### **16. OTHER INFORMATION**

#### OTHER

C = ceiling limit NEGL = negligible EST = estimated NF = none found NA = not applicable UNKN = unknown NE = none established REC = recommended ND = none V = recommended by vendor SKN = skin determined TS = trade secret R = MST = mist NT = not tested recommended STEL = short term exposure limit ppm = ppb = parts per billion By-product= reaction by-product, TSCA inventory status parts per million not required under 40 CFR part 720.30(h-2)., These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

## **Devcon Consumer Products**

## **Material Safety Data Sheet**

Part No.: 44001

## **SUPER GLUE**

This product appears in the following stock number(s): S-290 S-2940 S-298

Last revised: 08/13/02 Printed: 1/22/2003

#### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Tradename: SUPER GLUE

**General use:** Bonds skin and eyes immediately. In case of skin or eye contact, do not force bonded surfaces apart; follow first aid instructions below.

Chemical family: Cyanoacrylates

#### **MANUFACTURER**

Devcon Consumer Products 2107 West Blue Heron BLVD. Riviera Beach, FL 33404

#### **EMERGENCY INFORMATION**

Emergency telephone number (CHEMTREC): (800) 424-9300 Other Calls: (561) 845-2425

#### 2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS CONSTITUENTS			Exposure limits			
Constituent	Abbr.	CAS No.	Weight percent	ACGIH TLV	OSHA PEL	Other Limits
Ethyl-2-cyanoacrylate		7085850	>80	0.2 ppm	n/e	n/e
Polymethyl methacrylate		9011874	<20	n/e	n/e	n/e

"TLV" means the Threshold Limit Value exposure (eight-hour, time-weighted average, unless otherwise noted) established by the American Conference of Governmental Industrial Hygienists. "STEL" indicates a short-term exposure limit. "PEL" indicates the OSHA Permissible Exposure Limit."n/e" indicates that no exposure limit has been established. An asterisk (\*) indicates a substance whose identity is a trade secret of our supplier and unknown to us.

## 3. HAZARDS IDENTIFICATION

#### **Emergency Overview**

Appearance, form, odor: colorless viscous liquid with slightly pungent odor.

WARNING! Contains Cyanoacrylate Esters. Can cause severe eye injury. Bonds body tissue in seconds.

#### **Potential health effects**

Primary routes of exposure: Skin contact

Skin absorption Eye contact

Inhalation Ingestion

#### Symptoms of acute overexposure:

Skin: Bonds skin rapidly and strongly. Large quantities may cause burns.

**Eyes:** May bond eyelid. A large drop may cause a burn upon solidification. Lachrymator, double vision. **Inhalation:** 

Avoid prolonged inhalation. Vapors may cause irritation of nose and bronchial passages.

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## **Devcon Consumer Products**

#### Part No.: 44001

#### Ingestion:

The adhesive solidifies and adheres in the mouth, almost impossible to swallow. Lips may bond.

#### Effects of chronic overexposure:

Possible respiratory sensitization, asthmatic effects.

Carcinogenicity -- OSHA regulated: No ACGIH: No International Agency for Research on Cancer:No Cancer-suspect constituent(s) : none

#### Medical conditions which may be aggravated by exposure:

Eye, skin, respiratory disorders.

Other effects:

None known.

#### 4. FIRST AID MEASURES

#### First aid for eyes:

Flush with lukewarm water for 15 minutes. Call a physician immediately. Do not attempt to peal bonded eyelid from eye!

#### First aid for skin:

Immerse in warm soapy water. Do not force apart.

#### First aid for inhalation:

Move to fresh air. If symptoms persist, call a physician.

#### First aid for ingestion:

Apply warm water to lips. Use maximum wetting with saliva. Position victim to prevent ingestion of solid. Call a physician.

#### 5. FIRE FIGHTING MEASURES

Extinguishing media:						
Water	Carbon dioxide	Dry chemical	Foam	Alcohol foam		
Flash Point (°F): > 170	Method: S	сс				
Explosive limits in air (percent) Lower: nd Upper: nd						
Special firefighting proc	edures:					
Wear full protective equipment including self-contained breathing apparatus.						

#### Unusual fire and explosion hazards:

Water may spread fire due to product floating on surface. Cloths used to wipe spills may polymerize and auto-ignite.

#### Hazardous products of combustion:

Oxides of carbon, oxides of nitrogen, trace amounts of hydrogen cyanide and unidentified organic combustion products.

#### 6. ACCIDENTAL RELEASE MEASURES

#### Spill control:

Flood area with water to cure and to control product vapors. Wear protective clothing and a NIOSH approved respirator for organic vapors or a self-contained breathing apparatus if needed.

#### **Containment:**

N/A

National Toxicology Program: No

## **Devcon Consumer Products**

## Material Safety Data Sheet

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#### Part No.: 44001

#### Cleanup:

Scrape up cured product and dispose of in accordance with all applicable disposal regulations.

#### Special procedures:

Contact with cotton or wool may result in a strong exothermic reaction which can result in a fire.

#### 7. HANDLING AND STORAGE

#### Handling precautions:

Cyanoacrylates bond skin rapidly and strongly. May also bond eyelid to eyelid and/or skin. Wear appropriate personal protective equipment (see Section 8). Provide appropriate ventilation/respiratory protection against decomposition products (see Section 10) during welding/flame cutting operations and to protect against nuisance dust during sanding/grinding of cured product.

#### Storage:

Store away from heat and direct sunlight. Store in a dry location. Keep container tightly closed when not in use.

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### **Engineering controls**

#### Ventilation :

General ventillation is adequate for occasional use. Where the adhesive is in continual use or is heated, or heating cured adhesive over 400 F, provide local exhaust to keep vapors below the TLV.

#### Other engineering controls :

Have emergency shower and eye wash available.

#### Personal protective equipment

#### Eye and face protection:

Safety glasses with side shields or safety goggles.

#### Skin protection:

Polyethylene gloves and apron. Do not wear rubber or cloth gloves.

#### **Respiratory protection:**

Use NIOSH approved respirator for organic vapors or self-contained breathing apparatus if appropriate ventillation is not available.

#### 9. PHYSICAL AND CHEMICAL PROPERTIES

Specific gravity:	1.08	Boiling point (°F):	>300
Melting point (°F):	n/d	Vapor density (air = 1):	>1
Vapor pressure (mmHg):	0.17 mm Hg at 68 °F	Solubility in water:	<0.1%
VOC (grams/liter):	n/d	pH (5% solution or slurry in water):	n/d
Percent volatile by volume:	0		
Percent solids by weight:	100		
# **Devcon Consumer Products**

### Part No.: 44001

# **10. STABILITY AND REACTIVITY**

This material is chemically Unstable. Hazardous polymerization may occur.

#### Conditions to avoid :

High temperatures and humidity

#### Incompatible materials:

Base cotton, wool, water, alkaline materials

#### Hazardous products of decomposition:

Oxides of carbon, oxides of nitrogen, trace amounts of hydrogen cyanide and unidentified organic decomposition products.

#### Conditions under which hazardous polymerization may occur:

Contamination with water, alkaline materials or peroxides may build-up pressure in a closed container.

# 11. TOXICOLOGICAL INFORMATION

Acute oral effects: LD50 (rat): not determined

#### Acute dermal effects: LD50 (rabbit): not determined

Instantly bonds skin. Large drops may cause burns upon solidification.

# Acute inhalation effects: LC50 (rat): not determined

Causes irritation of nose and bronchial passages.

#### Eye irritation:

Instantly bonds eyelid to eyelid and/or eye.

#### Subchronic effects:

None known.

#### Carcinogenicity, teratogenicity, and mutagenicity: None known.

#### Other chronic effects:

None known.

#### Toxicological information on hazardous chemical constituents of this product:

Constituent	Oral LD50 (rat)	Dermal LD50 (rabbit)	Inhalation LC50 4hr, (rat)
Ethyl-2-cyanoacrylate	n/d	n/d	n/d
Polymethyl methacrylate	n/d	n/d	n/d

'n/d' = 'not determined'

# **12 ECOLOGICAL INFORMATION**

#### **Ecotoxicity:**

No data available.

#### Mobility and persistence:



Exposure: hours.

# **Devcon Consumer Products**

#### Part No.: 44001

No data available

#### **Environmental fate:**

No data available.

### 13. DISPOSAL CONSIDERATIONS Please see also Section 15, Regulatory Information.

#### Waste management recommendations:

As shipped this product is not a hazardous waste as specified in 40 CFR 261. Dispose of according to local, state, and federal regulations.

### **14. TRANSPORT INFORMATION**

Proper shipping name:	Non-regulated
Technical name :	N/A
Hazard class :	N/A
UN number:	N/A
Packing group:	N/A
Emergency Response Guid	eno.: N/A
IMDG page number:	N/A
Other:	N/A

# **15. REGULATORY INFORMATION**

### **U.S. Federal Regulations**

#### TSCA

All ingredients of this product are listed, or are exempt from listing, on the TSCA inventory.

### The following RCRA code(s) applies to this material if it becomes waste:

None

# Regulatory status of hazardous chemical constituents of this product:

Constituent	Extremely Hazardous*	Toxic Chemical**	CERCLA RQ (lbs)	TSCA 12B Export Notification
Ethyl-2-cyanoacrylate	No	No	0.0	Not required
Polymethyl methacrylate	No	No	0.0	Not required

\*Consult the appropriate regulations for emergency planning and release reporting requirements for substances on the SARA Section 301 Extremely Hazardous Substance list.

\*\*Substances for which the "Toxic Chemical" column is marked "Yes" are on the SARA Section 313 list of Toxic Chemicals, for which release reporting may be required. For specific requirements, consult the appropriate regulations.

# For purposes of SARA Section 312 hazardous materials inventory reporting, the following hazard

**Material Safety Data Sheet** 

MSDS0619

# **Devcon Consumer Products**

# Material Safety Data Sheet

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Part No.: 44001

#### classes apply to this material:

- Immediate health hazard -- Fire hazard -

# **Canadian regulations**

WHMIS hazard class(es): D2B; B3 All components of this product are on the Domestic Substances List.

# **16. OTHER INFORMATION**



The information and recommendations in this document are based on the best information available to us at the time of preparation, but we make no other warranty, express or implied, as to its correctness or completeness, or as to the results of reliance on this document.

SAFETY DATA SHEET

 PAGE:
 1 of 3

 PRINT DATE:
 21/09/2000

**REF:** X0039

1. IDENTIFICATION OF THE	SUBSTANCE/F	REPARATION	AND THE COMP	PANY/UNDER	TAKING			
Product name:		5-MINU	5-MINUTE EPOXY RESIN					
Supplier:		ITW Devco	on					
		Shannon I	ndustrial Estate	B	runel Close, Park Farm Ind. st.,			
		Co. Clare,	Ireland.	V N	/ellingborough, Northants IN8 6QX			
Emergency telephone nu	mber:	353(61)47	1299	0	01933 675299			
Fax No:		353(61)471285 01933 675765						
2. COMPOSITION/INFORMA	TION ON INGR	EDIENTS						
Identification of the prepa	aration							
Chemical Name			CAS-No	EEC-No	Class	Weight 9		
BISPHENOL A-(EPICHLC {REACTION PRODUCT}		25068-38-6	603-074-00 8	- Xi; R36/38 R43	>60			
3. HAZARDS IDENTIFICATIO	N							
Most important hazards:	Mo	derate skin irritat	tion	•				
Specific hazards	Irrita	ating to eyes and	d skin. May caus	se sensitizatio	n by skin contact.			
4. FIRST AID MEASURES								
General advice:	Show this safe eyes.	ety data sheet to	the doctor in at	tendance.Avo	id contact with skin and			
Inhalation:	Move to fresh air. Consult a physician after significant exposure.							
Skin contact:	Remove immediately adhering matter, Wash off immediately with soap and plenty of water. If skin irritation persists, call a physician.							
Eye contact:	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.							
Ingestion:	Rinse mouth, Do not induce vomiting, Call a physician immediately. If a person vomits when lying on his back, turn over on his side.							
5. FIRE-FIGHTING MEASUR	ES							
Suitable extinguishing me	edia:	dry powder, fo	oam, Carbon Di	oxide (CO	<sub>2</sub> )			
Extinguishing media which	ch must not be	used for safety	reasons:					
high volume water jet.								
Specific hazards:	Burning prod	uces irritant fum	es.					
Special protective equipn	nent for firefigl	nters:	In c app	ase of fire, we aratus, protec	ear a self contained breathing ctive suit			
Specific methods:	Standard	procedure for ch	emical fires					
6. ACCIDENTAL RELEASE N	IEASURES							
Personal precautions:	Avoid contact with the skin and the eyes.Use personal protective equipment.Ensure adequate ventilation.							
Environmental precautions: Do not contaminate water. Avoid subsoil penetration.								
Methods for cleaning up:		Dam up, Scrape covered steel d	e up, Soak up w rums.	ith inert absor	bent material, Transfer to			
7. HANDLING AND STORAG	E							
Handling:	Use only in well-ventilated areas. Keep away from heat and sources of ignition. General industrial hygiene practice.							
I	naaoana nygioi	ie praeliee.				Keep containers tightly closed in a cool, well-ventilated place.		

Product name:

Contaminated packaging:

European waste Catalogue No:

# **5-MINUTE EPOXY RESIN**

PAGE: 2 of 3 **PRINT DATE:** 21/09/2000

**REF:** X0039

BISPHENOL A-(EPICHLOR		RODUCT}	no data available	
Engineering measures to reduce exposure				
- Respiratory protection:	No pers of insuff	No personal respiratory protective equipment normally required. In case of insufficient ventilation, wear suitable respiratory equipment.		
- Hand protection:	solvent-	resistant gloves (buty	/Irubber).	
- Eye protection:	safety g	safety glasses with side-shields, goggles.		
- Skin and body protection	n: Wear as	Wear as appropriate :.		
Hygiene measures:	Wash h Keep av Genera	Wash hands before breaks and immediately after handling the product, Keep away from food, drink and animal feeding stuffs. Do not smoke. General industrial hygiene practice.		
9. PHYSICAL AND CHEMICAL	PROPERTIES			
Form: liquid.	Colour:	light yellow.	Odour:	slight.
<b>pH:</b> ( 50 g/l H	20) 7	( 20 °C)		
Boiling point/range:	> 200	°C		
Flash point:	> 150	°C		
Melting point/range:	n/d	°C		
Autoignition temperature:	>290	°C		
Flammability (solid, gas):	Not app	licable		
Oxidizing properties:	Not app	licable.		
Vapour pressure:	0.01	mm Hg	(20 °C)	
Relative density:	- lower	1.147	(25 °C)	
VOC:	1160	g/l		
Water solubility	negligib	le.		
Partition coefficient (n-octa	anol/water)	> 2.5		
10. STABILITY AND REACTIVI	 TY			
Stability:	Stable.			
Conditions to avoid:	Prolonged heating at temperatures above 50°C.			
Materials to avoid:	strong acids and oxidizing agents, amines.			
Hazardous decomposition	products:	No decomposition	if stored normally	
			in stored normany.	
Acute toxicity:	Epoxy constituents: LD LD50/dermal/ LC50/inhalati	950/oral/rat = 30g/Kg rabbit = > 20 ml/Kg on/4h/rat = fatality =	= 0	
Local effects:	Moderate skin irritation			
Sensitization:	May cause sensitization	n by skin contact.		
Long term toxicity:	Components of the product may be absorbed into the body by inhalation and ingestion Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.			
12. ECOLOGICAL INFORMATI	ON			
Mobility:	Do not o	contaminate water. D	o not let product enter di	rains.
Other information:	Other information: formulated product - not applicable.			
13. DISPOSAL CONSIDERATION	ONS			
Waste from residues / unus	sed products:	Solidify unex processed m with local and	posed surplus and dispo aterial as cured plastic w d national regulations	se of together with vaste - In accordance

In accordance with local and national regulations

08 04 99

Product name:	5-MINUTE EPOXY RESIN	PAGE:       3 of 3         PRINT DATE:       21/09/2000         REF:       X0039				
14. TRANSPORT INFOR	RMATION					
Proper shipp	Proper shipping name: Not classified as dangerous in the meaning of transport regulations: UN, ADR/RID, IMO & IATA/ICAO.					
15. REGULATORY INFO	ORMATION					
Classification accor	ding to European directive on classification of haza	dous preparations 93/21/EEC				
- Contains:	BISPHENOL A-(EPICHLORHYDRIN) {F	REACTION PRODUCT}				
- Symbol(s):	Xi					
R -phrase(s):	<b>R -phrase(s):</b> R43 - May cause sensitization by skin contact. R36 - Irritating to eyes R38 - Irritating to skin.					
S -phrase(s):	S -phrase(s):S2 - Keep out of reach of children S28 - After contact with skin, wash immediately with plenty of water. S37/39 - Wear suitable gloves and eye/face protection.					
16. OTHER INFORMAT	ION					
Recommended use:	Adhesives.					
Recommended rest	rictions:					
When used in a mixture, read the labels and safety data sheets of all components.						
Revision date:	<b>Revision date:</b> 01/10/2000.					
The information provided	in this Safety Data Sheet is correct to the best of our knowledge, i	nformation and belief at the date of its publication				