MIDWEST SCUBA CENTER, INC.
4306 W. 96th Street
INDIANAPOLIS, INDIANA 46268

(317) 872-2522

MEMO LETTER

DATE 5/24/94

TO: SEA QUEST
C/O ROBERT
CUSTOMER SERVICE

SUBJECT

POPPET #92357

> HERE IS THE SPECTRUM HP SEAT WE TALKED ABOUT WITH CUSTOMERS INVOICE. THE CUSTOMER WAS KAREN LAUX
255 W. NEWHART INDPLS IN 46217 HM PHONE
317-780-9789

THANKS

☐ Please Reply ☐ No Reply Necessary

TOM KUPLOK
SIGNED

PRODUCT 3053 NEBS Inc., Groton, Mass. 01471. To Order PHONE TOLL FREE 1 + 800-225-6380

OCEAN DIVERS
522 CARIBBEAN DRIVE
KEY LARGO, FL 33037
(305) 451-1113

QUANTITY	ITEM NUMBER	AMOUNT
1	MMICGTL	13.95
ODIVERS ODI TANK LOGO L		
QUANTITY	ITEM NUMBER	AMOUNT
1	MMSCPRT	12.50
REPAIR MISC PARTS		
QUANTITY	ITEM NUMBER	AMOUNT
1	LABREGOVR	18.00
REPAIR LABOR REG OVERHAUL		
QUANTITY	ITEM NUMBER	AMOUNT
1	MHIPBUMP-001	1.25
X-TRA HIPSHER BUMPER STICKERS		

Seaquest high pressure seat attached

SUB-TOTAL	45.70
TAX	3.20
TOTAL	48.90
CHECK SALE	48.90
CHANGE	0.00

Invoice Number : 66032
Date : 03/24/94
Time : 3:47 PM
1

THANKS & HAPPY DIVING

TECHNICAL BULLETIN

July 20, 1994

Subject: SPECTRUM REGULATOR REWORK INFORMATION

The following steps should be taken to rework Spectrum regulators subject to recall.

1. Inspect the regulator first stage serial number. If it begins with AE, AF, AG, AK, AL or BB, the regulator should be reworked. Regulators with other serial number prefixes or regulators that have a red or blue indicator mark near the serial number are not subject to recall or have already been reworked. There is no benefit to replacing high pressure seats in these products.

2. If you are a dealer with a technician trained in the repair of Sea Quest Spectrum regulators and you choose to perform the rework, Sea Quest will credit $6.00 to your account to compensate for labor involved. In order to receive credit please return the high pressure seat which you removed along with the customer's name and regulator first stage serial number on the report form provided. The materials needed to perform the rework have been provided to dealers that were shipped regulators or may be obtained by contacting Robbert Bruins at 1-800-854-7066.

3. If you wish to return the regulator to Sea Quest for rework please contact Robbert Bruins at 1-800-854-7066 for instructions.

HIGH PRESSURE SEAT REPLACEMENT INSTRUCTIONS

For replacement of the high pressure seat on Sea Quest Spectrum regulator model 3-70100 please follow these step by step instructions.

MATERIALS NEEDED

New high pressure seat part 3-122330
Blue torque seal indicator
Clean pencil eraser
Large flat blade screwdriver
Spectrum parts diagram

1.0 DISASSEMBLY

1.1) Unscrew and remove the high pressure plug (10) using a large flat blade screwdriver.

1.2) Remove the spring (12), spring block (13), high pressure seat spring (16), high pressure seat (17), and pin (20). This can be done by turning the first stage over to allow all parts to fall into the palm of your hand or on to a table top.

2.0 INSPECTION AND HIGH PRESSURE SEAT REPLACEMENT

2.1 Under a bright light, visually inspect inside the first stage for any evidence of Loctite residue or other contaminants. Pay particular attention to the seat crown (19) and the area around the seat crown. If there is evidence of Loctite residue on the seating surface the entire regulator and parts should be returned to Sea Quest for rework.

2.2 If there is no evidence of Loctite residue, lightly polish the sealing surface of the seat crown using a clean pencil eraser. Loose particles should be removed from the regulator body by blowing out with compressed air.

2.3 Replace the old HP seat with the new HP seat. You may note that the new HP seat is different in appearance. Although either type may be used in Spectrum regulators, the new style offers improved durability and wear characteristics.

2.4 Return the old seat along with the customer's name and regulator first stage serial number. A Field Rework Report form is provided for your convenience.

3.0 REASSEMBLY

3.1 Install the pin (20) into the high pressure side of the first stage making sure it is centered in the seat crown (19).

3.2 Install the new high pressure seat part so that it fits over the pin. Make sure the pin engages the hole in the high pressure seat. Use the Spectrum parts diagram as a reference for proper orientation of HP seat.

3.3 Re-install the HP seat spring (16), the spring block (13), and spring block spring (12) into the high pressure side of the first stage.

3.4 Screw the HP cap (10) in and tighten with large flat blade screwdriver until hand tight.

3.5 Place a drop of blue torque seal on the high pressure plug (10) at its perimeter near but not over the serial number.

4.0 TESTING PROCEDURES

Perform a a test to check the intermediate pressure and a leak test.

To verify that the first stage intermediate pressure is correctly set use the following procedures:

4.1 Attach an intermediate pressure (IP) gauge to a low pressure (LP) port. Attach the first stage to a low pressure air supply with a supply pressure of 400-600 psig. While watching the IP gauge slowly open the air supply valve. The gauge should stop at or near the correct intermediate pressure of 150 psig or less. Purge the second stage at least three times to confirm that the intermediate pressure remains within specification.

CAUTION: If the gauge indicator continues beyond an intermediate pressure of 160 psig, immediately turn of the air supply valve and depressurize the first stage by depressing the second stage purge button. This indicates a leak through the first stage.

When the purge button is depressed and released, the intermediate pressure should drop, then return to the original intermediate pressure. Watch the intermediate pressure for 5-15 seconds after purging. The intermediate pressure should not "creep" or slowly increase more than 5

psig within this time. If the intermediate pressure continues to slowly increase after 5-15 seconds there is an internal leak from the high pressure area in the first stage to the low pressure area. Disassembly and re-inspection of the first stage will be required.

4.2 If the intermediate pressure stabilizes at a value greater than 150 psig, the intermediate pressure may be adjusted downward by unscrewing (counter clockwise) the adjustment screw (27). Unscrew the adjustment screw 1/8 of a turn and then depress the second stage purge button several times while observing the IP gauge. Continue this process until the correct intermediate pressure is achieved. Do not turn the adjustment screw more than 1/8 of a turn at a time.

4.3 After the intermediate pressure has been stabilized, repeat steps 4.1 through 4.2 at a supply pressure of 2600-3000 psig. The intermediate pressure should be 125-131 psig.

4.4 If the intermediate pressure reading is lower than the recommended 125-131 psig it may be increased by screwing in (clockwise) the adjustement screw (27). Screw in the adjustment screw 1/8 of a turn and then depress the second stage purge button several times while observing the IP gauge. Continue this process untill the correct intermediate pressure is achieved. Do not turn the adjustment screw more than 1/8 of a turn at a time. See 4.2 if the pressure must be increased to conform to the specification.

4.5 If adjustment of the intermediate pressure was necessary, recheck the intermediate pressure at 400-600 psig supply pressure to confirm it remains below 150 psig.

If the correct Intermediate pressure can not be achieved contact Sea Quest for further instructions.

If you have any questions on these procedures please call Sea Quest Inc. toll free at 800-854-7066.

Spectrum Regulator Part List

First Stage

Item	Description	Part #	Dealer
1	Button Sticker		3-122626
2	Yoke Screw		3-122295
3	Circlip		3-116124
4	***Conical Filter**		**3-121129**
5	Yoke Retainer		3-122207
6	***O-ring, Yoke/Din**		**3-850219**
7	Yoke 3000 PSI		3-116855
8 & 9	Dust Cap w/ O-ring		3-122317
10	Plug		3-122234
11	***O-ring, Plug**		**3-213714**
12	Spring		3-122243
13	Spring Block		3-122227
14	***Back Up Ring**		**3-119129**
15	***O-ring**		**3-119135**
16	Spring		3-122244
17	***Seat, High Pressure**		**3-122230**
18	***O-ring**		**3-840163**
19	Seat, Crown		3-122224
20	Pin		3-122225
21	Pin Support		3-122236
22	***Diaphragm**		**3-119159**
23	Washer, Diaphragm		3-119143
24	Body Cap		3-122210
25	Spring Pad		3-119155
26	Spring		3-119156
27	Adjustment Screw		3-122219
28	Diaphragm, Environmental		3-122262
29	Diaphragm Retaining Screw, Environ.		3-122248
30	Body High Pressure		3-122253
31	***O-ring, LP Port/Hose (4 required)**		**3-116881**
32	LP Port Plug		3-122229
33	***O-ring, HP Port (2 required)**		**3-116174**
34	HP Port Plug		3-122232
35	Dust Cap, Din Connector		3-117218
36	Tank Seat, Din Connector		3-122318
37	O-ring		3-228157
38	Filter, Din Connector		3-113616
39	Seat Base, Din Connector		3-122309
40	Hand Wheel Din Connector		3-122308
41	Body Cap, Environmental		3-122242
42	Adjusting Screw, Environmental		3-122264

*Items in **bold** are included in the Service Kit

Spectrum Regulator Parts Diagram

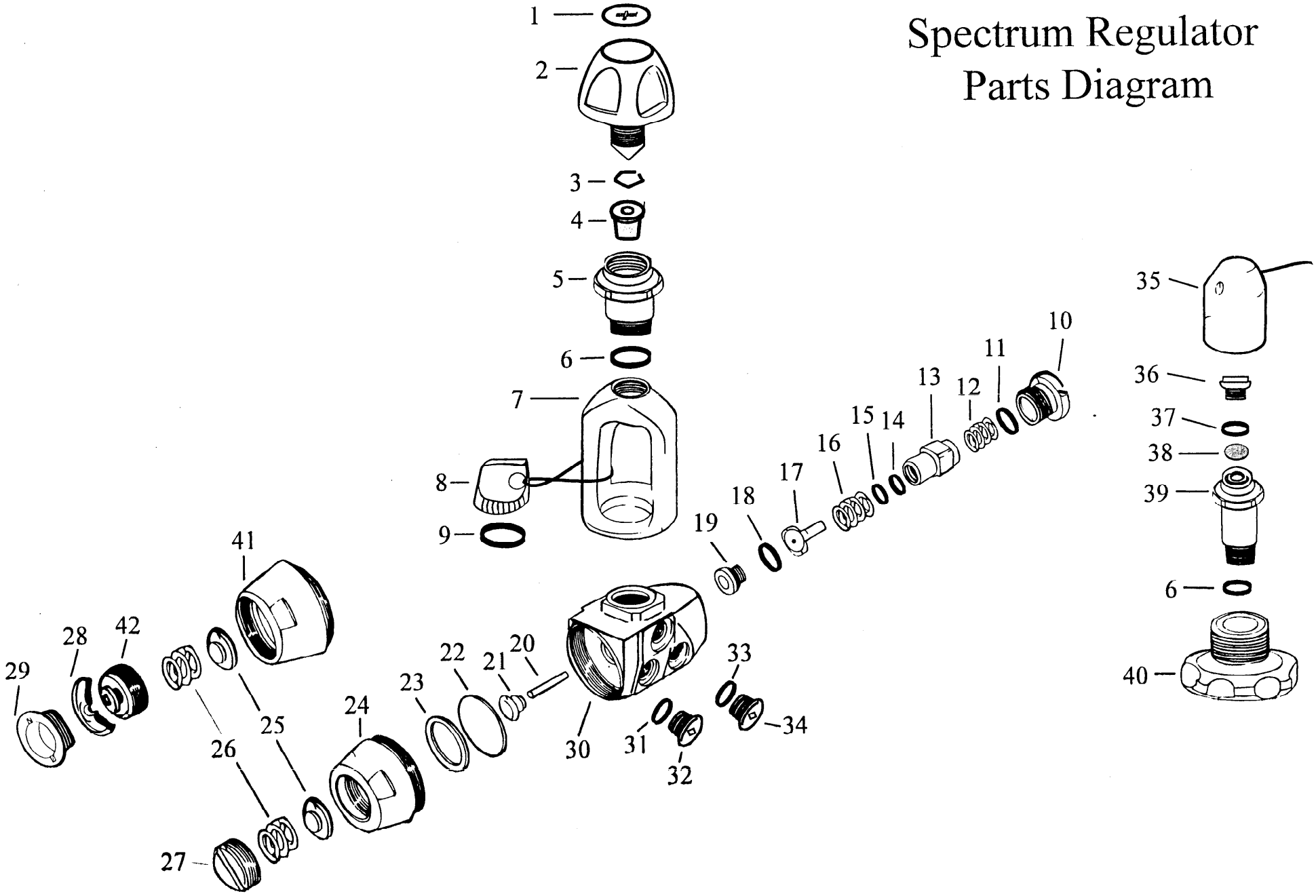

EXHIBIT G

sea Quest

Sea Quest, Inc.
2151 Las Palmas Drive
Carlsbad, California 92009-1525 USA

619/438-1101
FAX: 619/438-3142

IMPORTANT SAFETY NOTICE
PRODUCT RECALL

July 20, 1994

Dear Sea Quest Dealer:

Sea Quest is conducting a recall of model 3-70100 Spectrum regulators. This recall was voluntarily initiated by Sea Quest in the interest of consumers and is being conducted in cooperation with the United States Consumer Product Safety Commission which monitors the effectiveness of the recall.

Spectrum regulators that were manufactured in France between April 1993 and May 1994 may contain first stage high pressure seats that have been exposed during assembly to solvents found in a thread locking compound known as Loctite®. These solvents may have a weakening effect on the rubber seal material of the high pressure seat which, under certain circumstances, could cause the regulator to deliver an uncontrolled rapid flow of air.

IF THIS WERE TO OCCUR DURING A DIVE, THERE WOULD BE A RISK TO THE DIVER OF SERIOUS INJURY OR DEATH.

The corrective action to remedy this condition is to replace the high pressure seats in affected regulators.

This recall does not apply to regulators other than the Spectrum model.

Our records indicate you were shipped at least one Spectrum regulator: Your immediate help and cooperation is necessary. Please do the following:

- **Promptly display the enclosed point of purchase notice** to advise visitors to your store of this recall.
- **Check your sales records and promptly notify your customers** who have purchased Spectrum regulators from you to not dive with the regulator until it has been inspected and reworked as necessary. If you prefer to have Sea Quest notify these customers and you have either their address or phone number, please immediately provide it to Sea Quest and we will make the notification.
- **Immediately stop selling all Spectrum** regulators subject to the recall until they are reworked. Information regarding the identification of these regulators appears in the enclosed Technical Bulletin.
- **Make available your services** to perform a simple rework to regulators in your inventory and to regulators returned to you by consumers. Sea Quest will provide the materials needed to perform this simple procedure free of charge, and upon receiving return of the Field Rework Report, will issue you a credit for the labor required at $6.00 per regulator. If you are not qualified or prefer to return regulators to Sea Quest for this procedure, please contact Sea Quest at **1-800-854-7066** for further information.

We appreciate your support in making this recall successful and sincerely apologize for any inconvenience it may have caused.

Sincerely,

Bill N. Oliver
Vice President/Technical Director

sea Quest
Sea Quest, Inc.
2151 Las Palmas Drive
Carlsbad, California 92009-1525 USA
619/438-1101
FAX: 619/438-3142

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IF THIS WERE TO OCCUR DURING A DIVE, THERE WOULD BE A RISK TO THE DIVER OF SERIOUS INJURY OR DEATH.

The corrective action to remedy this condition is to replace the high pressure seats in affected regulators.

This recall does not apply to regulators other than the Spectrum model.

Although our records indicate you were not shipped any Spectrum regulators, your immediate help and cooperation is necessary. Please do the following:

- **Promptly display the enclosed point of purchase notice** to advise visitors to your store of this recall.
- **Promptly notify anyone** who has a Spectrum regulator to not dive with the regulator until it has been inspected and reworked as necessary. The enclosed Technical Bulletin provides information to identify Spectrum regulators subject to recall. If you prefer to have Sea Quest notify these persons and you have either their address or phone number, please immediately provide it to Sea Quest and we will make the notification.
- **Make available your services** to perform a simple rework to regulators in your inventory and to regulators returned to you by consumers. Sea Quest will provide the materials needed to perform this simple procedure free of charge, and upon receiving return of the Field Rework Report, will issue you a credit for the labor required at $6.00 per regulator. If you are not qualified or prefer to return regulators to Sea Quest for this procedure, please contact Sea Quest at **1-800-854-7066** for further information.

We appreciate your support in making this recall successful and sincerely apologize for any inconvenience it may have caused.

Sincerely,

Bill N. Oliver
Vice President/Technical Director

SPECTRUM REGULATOR REWORK KIT CONSISTS OF:

1. H.P. Seat (300 bar)
2. Torque Seal Indicator - Blue

EXHIBIT J

SEA QUEST, INC.

SPECTRUM REGULATOR RECALL

Field Rework Report

Store Stock (includes new inventory, rental and class regulators)

Serial # _____	Date _____	Serial # _____	Date _____
Serial # _____	Date _____	Serial # _____	Date _____
Serial # _____	Date _____	Serial # _____	Date _____
Serial # _____	Date _____	Serial # _____	Date _____
Serial # _____	Date _____	Serial # _____	Date _____

NOTE: Serial number is stamped on first stage body.

Consumer's Regulators

Name _____	Name _____
Address _____	Address _____
City, State, Zip _____	City, State, Zip _____
1st stage serial # _____	1st stage serial # _____
Name _____	Name _____
Address _____	Address _____
City, State, Zip _____	City, State, Zip _____
1st stage serial # _____	1st stage serial # _____
Name _____	Name _____
Address _____	Address _____
City, State, Zip _____	City, State, Zip _____
1st stage serial # _____	1st stage serial # _____

Account # _____ Account Name _____

Signature _____ Date _____

Please return a copy of this field work report to Sea Quest, Attention Department K to obtain account credit.

7/94

IMPORTANT SAFETY NOTICE

Sea Quest Spectrum Regulator Recall

Sea Quest is conducting a voluntary recall of all Spectrum Regulators.

A potentially hazardous problem may exist with the high pressure seat in the first stage that may result in an uncontrolled free flow of air. If this occurs during a dive, use of the product could be hazardous.

DO NOT DIVE WITH THIS REGULATOR

Failure to heed the warning may result in serious injury or death.

If you possess a Sea Quest Spectrum Regulator, please return it to the nearest Authorized Sea Quest Dealer for a free rework.

For further information call
1-800-854-7066

EXHIBIT L

Sea Quest, Inc.
2151 Las Palmas Drive
Carlsbad, California 92009-1525 USA
619/438-1101
FAX: 619/438-3142

IMPORTANT SAFETY NOTICE
SEA QUEST SPECTRUM REGULATOR RECALL

July 20, 1994

Dear Spectrum Regulator Owner:

We have identified you as an owner of a Sea Quest Spectrum regulator.

A potentially hazardous problem may exist with the high pressure seats in the first stage of these regulators that may result in an uncontrolled free-flow of air. If this occurs during a dive, use of the regultor could be hazardous. **Please do not dive with this regulator. Failure to heed this warning may result in serious injury or death.**

In the interest of its customers, Sea Quest has initiated a voluntary recall of Spectrum Regulators. The recall is being conducted in cooperation with the United States Consumer Product Safety Commission which monitors the effectiveness of the recall.

All Spectrum regulators have a serial number stamped into the brass body of the first stage. If your regulator has a serial number beginning with AE, AF, AG, AK, AL or BB, please return it to where it was purchased or to your nearest authorized Sea Quest dealer for a free inspection or repair.

Any authorized Sea Quest dealer should be able to quickly provide service in connection with this recall, however, if you need further information, please call **1-800-854-7066**.

We thank you for your cooperation in this matter and apologize for any inconvenience this may have caused.

Sincerely,

Bill N. Oliver
Vice President/
Technical Director

IMPORTANT SAFETY NOTICE

Sea Quest Spectrum Regulator Recall

Sea Quest is conducting a voluntary product recall of all Spectrum Regulators. A potentially hazardous problem may exist with the high pressure seat in the first stage that may result in an uncontrolled free flow of air. If this occurs during a dive, use of the product could be hazardous.

DO NOT DIVE WITH THE SPECTRUM REGULATOR

Failure to heed the warning may result in serious injury or death.

If you possess a Sea Quest Spectrum Regulator, please return it to the nearest Authorized Sea Quest Dealer for a free rework.

For further information call: Sea Quest, Inc. 1-800-854-7066
1251 Las Palmas Drive Carlsbad, Ca 92009 USA

EXHIBIT N

U.S.DIVERS® / AQUA-LUNG®

CONFIDENTIAL

December 22, 1993

Mr. Bill Oliver
Sea Quest
2151 Las Palmas Drive
Carlsbad, CA 92009

Dear Bill:

Please find a copy of the laboratory analysis for the two high pressure seats from Japan. It is more than likely that the glue (type loctite) found on top of the brass and in the bottom of the rubber disk had a negative effect on the bonding.

I have tried to reproduce the phenomenon with some high pressure seats and glue here, but I was not able to obtain the delamination (which does not invalidate the hypothesis of the glue being the cause of the delamination). However, I was able to verify the glue changed the characteristics of the rubber (cracks on surface, "chewing gum" aspect of the whole rubber during the pick test) when applied on the surface.

I have been told that La Spirotechnique changed its process in order to let the regulator dry. This should solve your problems in the future.

Best regards,

Serge Taba
Vice President
R&D/Operations

ST/sjt

Attachment

ST-14/USD-3

3323 W. WARNER AVE. PO BOX 25018 SANTA ANA, CA 92799-5018 / 714-540-8010 / FAX: 714-432-9340

SERGE T.

250 NORTH NASH STREET, EL SEGUNDO, CA 90245 • (310) 322-2011 • FAX (310) 322-2243

SEAL LABORATORIES

December 14, 1993

Mr. William Manieri
U.S. DIVERS COMPANY INCORPORATED
3323 W. Warner Ave.
Santa Ana, CA 92704

RE: FTIR of Contaminant
Purchase Order No. 3815, SEAL Job No. 8116

Dear Mr. Manieri:

Two (2) high pressure seats used in the scuba diving regulators were submitted for Fourier-Transform Infrared (FTIR) spectroscopy to identify the contaminant on them. Each seat is composed of a brass insert (made of CDA 464 naval brass) and a nitrile rubber disk. The rubber disk has delaminated as a result of contamination.

Samples analyzed were identified as follows:

Sample #1: greenish material on top of seat "A"
Sample #2: clear material underneath the rubber disk of seat "B"

Figures 1 and 2 show the FTIR spectra of Samples #1 and #2, respectively. Through our library search, they have both been identified as a combination of an ester and an amine. This is very similar to a Loctite sealant formulation.

If you have any questions regarding this analysis or require further assistance, please do not hesitate to contact me.

Sincerely,

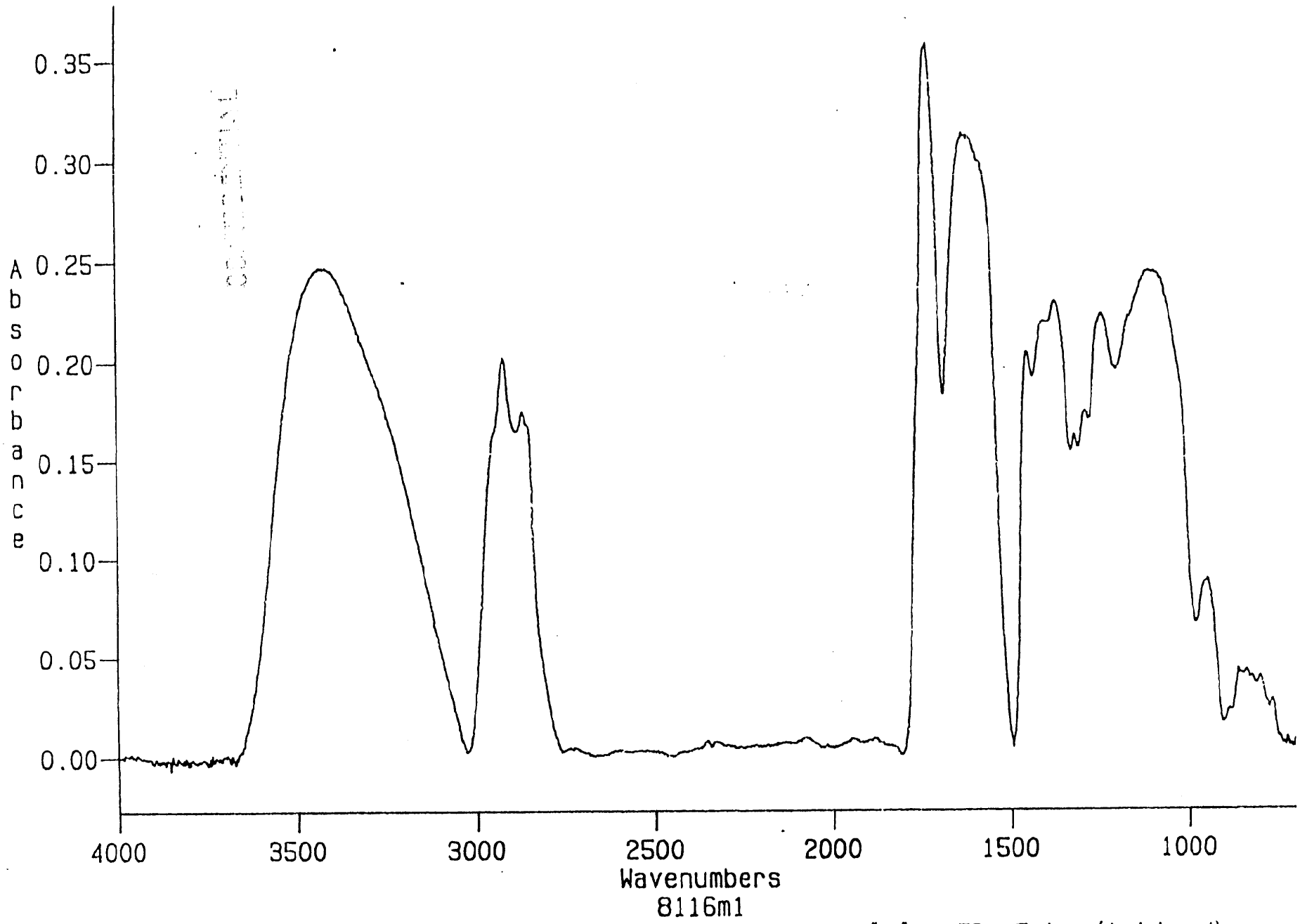
SEAL Laboratories

May T. Wong, Ph.D.
Senior Member Technical Staff - Chemistry

Enclosures:

Two (2) FTIR Spectra

Figure 1. FTIR Spectrum of Green Material on Brass Seat "A" - ID: Ester + Amine



...terial on Top Surface of Brass Seat "A" - ID: Ester/Amide 2°

May 1, 1994

TO: Bill Oliver
FROM: Mark Ouellette

TITLE: REGULATOR HIGH PRESSURE SEAT INSPECTION/STATUS REPORT

1.0 ABSTRACT

According to Sea Quest field reports, a total of 15 Spectrum regulators exhibit free flow of the second stage. Ten customers confirm that the first stage seats show signs of delamination. The regulators are also reported to be new or newly used units. Sea Quest started distribution of Spectrum regulators in September 1993. A total of 1,133 have been sold in the U.S. to date.

The poppet assembly is manufactured by U.S. Divers, USA. The first stage regulator assembly, which includes the poppet assembly, is manufactured by Spirotechnique, France.

Management has requested Engineering to investigate reports, conduct inspection of inventory units and any returned test units exhibiting delamination.

All tests and inspections were performed between April 25-27.

2.0 PURPOSE

The purpose of this report is to collect information from inspections, tests and analysis of Sea Quest Spectrum regulators in collaboration with U.S. Divers and report to Sea Quest management and Spiro.

3.0 SCOPE

Spectrum regulator 2nd stage 18473 93
Spectrum regulator 1st stage AF 1288; Returned unit; confirmed free flow and seat delamination.
Spectrum regulator 1st stage AF 1247; Returned unit; confirmed free flow and seat delamination.
61 Spectrum regulators; 1st stage lot AFXXX-ALXXX

4.0 EQUIPMENT

4x Stereo Scope, USD
4x Stereo Scope, Sea Quest
Dental Pick, USD

5.0 TESTS

5.1 SUBJECTIVE TESTS

AF 1288 and 1247 exhibiting free flow and delaminated seats were tested in a swimming pool at a depth of 5 feet. The testers were Mark Ouellette (tester 1) and Don Rockwell (tester 2) of Sea Quest.

Each regulator was taken down to five feet and then the tank valve was turned on with the second stage regulator placed in the tester's mouth.

5.11 Regulator AF 1288

The second stage regulator free flowed at a cyclic frequency of 5 cycles per second. The flow rate was high. The regulator continuously vibrated and produced a loud cyclic noise.

Tester #1 reported that air could not be inhaled because lungs felt constant pressure from incoming air. The throat and teeth became very irritated from the second stage vibration and cold air flow.

Tester #2 reported that it was possible but difficult to inhale air because of the constant pressure and vibration. The loud noise and cold air flow caused physical irritation.

5.12 Regulator AF 1247

The regulator exhibited similar characteristics as AF 1288.

Tester #1 and #2 concluded that with regulator AF 1247 it was possible but difficult to inhale air because of physical irritation. The high volume of cold air and vibration caused mouth and teeth irritation.

5.2 LAB TESTS

First stage regulators AF 1288 and 1247 were tested on the Sea Quest Regulator Test Bench for intermediate pressure and flow rate at 2.0 in. water.

Regulator	Pressure	Free Flow	i.p.	Flow Rate @ 2.0 in.
1288	2750	13 cfm	165	23 cfm
1247	2750	21 cfm	165	42 cfm

6.0 INSPECTIONS

6.1 PICK TEST

US Divers inspector Penny Beach performed US Divers Pick Test on selected high pressure seats from lots AF, AK and AL that were in Sea Quest inventory. The pick test is used to test the bond strength between the seat and the poppet. The bond is created by adhesive and heat transfer during the manufacturing process.

Test Criteria: Any visible signs of delamination or degradation of bond is rejected during a box pattern insertion and lift technique on the seat using a sharp dental pick. A stereo scope is used for inspection.

Lot No.	Inspec. Qty.	Poppet No.	Suspect	%
AFXXX	16	93005 93032 92349	2*	12.5
AKXXX	29	93053 93131	0	0.0
ALXXX	16	93131	0	0.0

* Tester detected that bond strength is suspect of degradation.

6.2 VISUAL; INVENTORY

Under 2X magnification, ALL poppets, seats and crown surfaces exhibited a clear film layer. Occasionally large clumps .010 dia. of what appeared to be silicone was present on the seat/poppet surfaces.

There does not appear to be any significant visual differences among the film surfaces of the lots. Some film layers did exhibit minor variation in the viscosity and the amount of clear (silicone texture) clumps present.

The two poppets that were suspect exhibited a film layer which was "dry" and was not viscous as the majority of the assemblies inspected.

6.3 VISUAL; RETURNED REGULATORS

First stages on regulators AF 1288 and 1247 exhibited a light green film layer on the poppet, seat and crown surfaces.

The delamination of the seat occurred on the bottom surface of the seat and was not visually present on the outer perimeter edge.

7.0 HISTORY; SEA QUEST

7.1 SEA QUEST

Qty Sold	Failures	1st Stage Lot	Poppet Lot
1133	15	AE1102	93032
		AF1155-	92349
		AF1288	92357
		(range)	93012

8.0 DISCUSSION

The pool test results indicate that a free flow condition similar to units AF 1288 and AF 1247 may be harmful to the user. The free flow condition and loud noise causes significant physical irritation to lungs, throat, teeth and mouth.

The US Divers Pick Test is a comparison test of detecting variation of poppet seal bond strength. US Divers performs this test as part of their Quality Assurance Procedures. The correlation between "unacceptable bond strength" and performance has not been confirmed.

Test data reported in this report did not confirm the source of the seat delamination. It is presumed that bond degradation could be caused by a chemical reaction with a number of substances present. The primary suspect material is the Loctite adhesive

The secondary suspect materials are rubber compound and the rubber additives. US Divers and Spiro to continue search for cause of delamination.

At this time it cannot be confirmed that the cause of the delamination is age or frequency (use) dependent. All of the reported failures have occurred prior to use or used very infrequently (up to five dives).

9.0 CONCLUSION

Based upon data recorded in this test report, the cause of delamination of the first stage seat is not known at this time.

Based upon the Pick Test results, two of sixty one poppets tested were suspect.

All suspect seats in the Pick Test and reported free flow units from the field are from first stage lots AE and AF. There are no suspect units from either laboratory or field results for lots newer than AG.

The lab tests conclude that the delaminated seats of AF 1288 and AF 1247 permitted the intermediate pressure to exceed the designed working pressure of 125-131 psi causing the second stage to free flow. The test bench recorded 165 psi at the free flow state.

All Spectrum Regulators in stock are currently on Engineering "hold" until further notice according to Bill Oliver April 25, 1994.

June 16, 1994

To: Bill Oliver
From: Mark Ouellette

Title: INSPECTION 2: REGULATOR HIGH PRESSURE SEAT REPORT.

1.0 ABSTRACT:

This report is the second of 2 Seaquest test reports regarding the Spectrum Regulator high pressure seat failures that have been reported from the field.

A second pick test inspection of high pressure seats was requested by Bill O. to help determine the disposition of Group II Spectrum Regulators in stock. Currently all Spectrum Regulators with the original components are on HOLD awaiting Engineering disposition.

The pick test is a method of detecting suspect adhesion of the poppet seal to the poppet. The adhesion integrity of the poppet seal is what Engineering is evaluating. The pick test is currently used at US Divers to verify that suspect adhesion is not exhibited in the manufacturing of the poppets.

Initial pick tests of Group I(lot AE-AG) and Group II(lot AH-BB) was conducted April 25-27 reference TR #9405.

2.0 PURPOSE:

The purpose of this test is to increase the sampling size of Group II regulators and acquire more data to assist management in determining the disposition of Group II regulators in stock.

3.0 SCOPE:

SPECTRUM REGULATOR 1ST STAGES; LOTS AK,AL and BB QTY: 93

4.0 EQUIPMENT:

4.0X Stereo scope
Needle pick
Vise

5.0 PROCEDURES:

The technique used to perform the test was that demonstrated during training of the initial test by USD inspector Penny Beach. A 4 point box pattern is created by inserting and prying the rubber seat using sharp pick. The test and inspection is conducted under 1.5X magnification. Any seals exhibiting delamination during the pick test is considered suspect and is regarded as a REJECT. All seals not rejected are regarded as ACCEPTABLE.

6.0 RESULTS:

6.1 Test Results TR 9406.

1st stage lot	poppet number(s)	qty	acc./rej.
AKXXXX	93053,93131,93132	62	acc.
ALXXXX	93053	2	acc.
BBXXXX	93194,93132,93053 93131	29 ---	acc.
	total	93	

6.2 Summary of Group II results of TR 9405 and TR 9406.

AK	91	accept
AL	18	accept
BB	29	accept
	--	
total	138	

7.0 DISCUSSION:

Group II regulators are ALL regulators whose 1st stages are from lots starting with AH-BB. It has been communicated from Spiro Technique that starting with lot AG a new manufacturing process was implemented to apply the locktite thread locker in the 1st stage housing. Spiro also confirms that the method of locitite application used for group II is not contributing to poor seal adhesion. All units from Group II are considered alike because the process to produce the units is the same.

8.0 CONCLUSION:

According to Group II pick test results of this report and TR 9405, 138 parts were tested and NO suspect parts were detected. The adhesion integrity of Group II poppet seals, according to the pick test sampling performed, is not suspect of poor adhesion.

cc: Jeff Hart