APPENDIX XIV

UNOLS VESSEL ESTIMATED USEFUL LIFE

Based on the responses to the UNOLS e-mail message dated 11/18/96 regarding vessel use-life, we have compiled a table listing the vessels and their dates of construction, conversion/mid-life, and predicted retirement from the the UNOLS fleet. The 1995 Fleet Improvement Plan, Figure I-1 on page 12 was used as a starting point. The figure's retirement dates were modified in accordance with the feedback received from you. When feedback was not received, we used the dates as presented in the figure.

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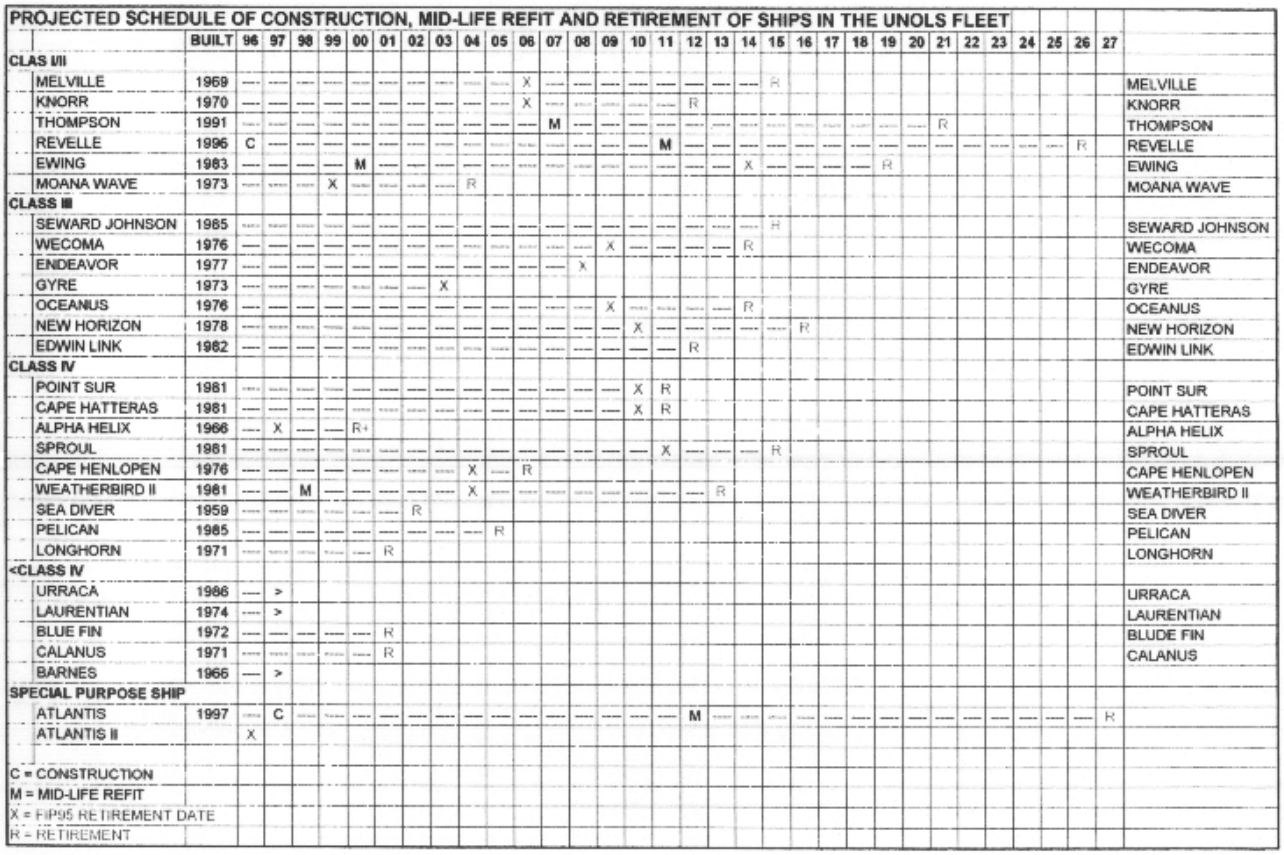
SHIP	BUILT	CNV/MDR	RETIRED
CLASS I/II			
MOANA WAVE	1973	1984	2004
MELVILLE	1969	1991	2015
KNORR	1970	1989	2012
EWING	1983	1990	2019
THOMPSON	1991	2007	2021
REVELLE	1996	2011	2026
ATLANTIS	1997	2012	2027
CLASS III			
GYRE	1973	1980	2003
ENDEAVOR	1977	1993	2008+
NEW HORIZON	1978	1996	2016
EDWIN LINK	1982	1988	2012
WECOMA	1976	1994	2014
OCEANUS	1976	1994	2014
SEWARD JOHNSON	1985	1995	2015
CLASS IV			
ALPHA HELIX	1966	1984	+
LONGHORN	1971	1986	2001
SEA DIVER	1959	1992	2002
PELICAN	1985	2005	
CAPE HENLOPEN	1976	2006	
POINT SUR	1981	2011	
CAPE HATTERAS	1981	1998	2011
SPROUL	1981	1985	2015
WEATHERBIRD II	1981	1993	2013
<CLASS IV			
URRACA	1986	1994	
LAURENTIAN	1974		
BLUE FIN	1972	1975	2001
CALANUS	1971	2001	+
BARNES	1966	1984	



PROJECTED SCHEDULE OF CONSTRUCTION, MID-LIFE REFIT AND RETIREMENT OF SHIPS IN THE UNOLS FLEET

	BUILT	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
CLAS I/II																																		
MELVILLE	1969											X						R			R												MELVILLE
KNORR	1970											X						R															KNORR
THOMPSON	1991												M														R							THOMPSON
REVELLE	1996	C															M															R		REVELLE
EWING	1983					M														X					R									EWING
MOANA WAVE	1973				X					R																								MOANA WAVE
CLASS III																																		
SEWARD JOHNSON	1985																				R													SEWARD JOHNSON
WECOMA	1976														X					R														WECOMA
ENDEAVOR	1977												X																					ENDEAVOR
GYRE	1973								X																									GYRE
OCEANUS	1976														X					R														OCEANUS
NEW HORIZON	1978															X						R												NEW HORIZON
EDWIN LINK	1982																	R																EDWIN LINK
CLASS IV																																		
POINT SUR	1981															X	R																	POINT SUR
CAPE HATTERAS	1981															X	R																	CAPE HATTERAS
ALPHA HELIX	1966		X			R+																												ALPHA HELIX
SPROUL	1981																X				R													SPROUL
CAPE HENLOPEN	1976									X		R																						CAPE HENLOPEN
WEATHERBIRD II	1981			M						X									R															WEATHERBIRD II
SEA DIVER	1959							R																										SEA DIVER
PELICAN	1985										R																							PELICAN
LONGHORN	1971						R																											LONGHORN
<CLASS IV																																		
URRACA	1986		>																															URRACA
LAURENTIAN	1974		>																															LAURENTIAN
BLUE FIN	1972						R																											BLUDE FIN
CALANUS	1971						R																											CALANUS
BARNES	1966		>																															
SPECIAL PURPOSE SHIP																																		
ATLANTIS	1997		C															M															R	
ATLANTIS II		X																																

C = CONSTRUCTION
M = MID-LIFE REFIT
X = FIP95 RETIREMENT DATE
R = RETIREMENT

12/11/96 RETIRE.XLS Page 1

From unols@gsosun1 Wed Dec 4 15:06:10 1996
Date: Mon, 18 Nov 1996 15:49:32 -0500 (EST)
From: UNOLS Office <unols@gsosun1>
Subject: Vessel Use-Life Prediction>
To: mailinglist rvoc <rvoc@diu.cms.udel.edu>
cc: ken Johnson <johnson@mlml.calstate.edu>, chris mooers <cmooers@rsmas.miami.edu>, "office,uri unols" <unols@gsosun1.gso.uri.edu>

To: RVOC
From: UNOLS Office

The UNOLS Fleet Improvement Committee is in the process of updating the Fleet Improvement Plan. For our upcoming meeting, we would like to look at the age of the fleet and determine the useful life of each vessel. The formula used to-date has predicted the ship life at 20 years. If a ship has received a mid-life refit the life the useful life is extended to 30 years. Recent feedback from operators has indicated that this formula may or maynot always be valid.

We are taking a poll of each of the UNOLS vessels operators. If your institution's formula differs from the formula providedabove, please let us know the formula. Also, please provide the year you predict your vessel(s) will be removed from operation in the UNOLS fleet. A table summarizing this information will be circulated priorto the FIC meeting.

Thank you for your help,
Annette

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From pfeiffer@udel.edu Tue Nov 19 09:06:33 1996
Date: Mon, 18 Nov 1996 17:00:10 -0500 (EST)
From: Timothy Pfeiffer <pfeiffer@udel.edu>
To: UNOLS Office <unols@gsosun1.gso.uri.edu>
Subject: Re: Vessel Use-Life Prediction

I'd say that in general I agree with the 20/30 year spans. We're just finishing 20 and are planning to request funds for some rennovations and upgrades this year. We expect to run at least another 10 years after so 2006 would be a reasonable retirement date for the CAPE HENLOPEN. Since the CAPE HATTERAS and PT SUR will follow shortly this means that the science mission requirements for new coastal zone vessels should become a matter of some urgency within a year or two.

Regards, Tim

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From jcoburn@whoi.edu Wed Nov 20 07:39:26 1996
Date: Tue, 19 Nov 1996 14:26:20 -0500
To: UNOLS Office <unols@gsosun1.gso.uri.edu>
From: Joe Coburn <jcoburn@whoi.edu>
Subject: Re: Vessel Use-Life Prediction

GENERAL

The expected service life of a ship depends on many factors. For examples: initial design and construction, quality of care over its lifetime, and equipment obsolescence. A ship that is well-maintained to ABS, Coast Guard, UNOLS and Navy standards could last a long time but at some point becomes a financial burden. With no upgrade or midlife renovation, 30 years would be a good planning lifetime. Ships receiving extensive upgrades should have extended life expectancy, as a result helping to amortize such expeditures.

SHIP-SPECIFIC COMMENTS

KNORR

KNORR underwent a major conversion. The conversion involved:

- Reengining: diesel/electric

- New propulsors - 3 z-drives

- Extensive repiping throughout the ship

- Extensive rewiring throughout the ship

- SeaBeam 2112 is new and the same state-of-the-art

as REVELLE and ATLANTIS.

- Other shipboard electronics are new.

- Both hydrowinches are new Markey DESH-5's.

Much work has been done post-delivery to correct all shipyard deficiencies. Expected service life 1992 plus 20 years or 2012.

OCEANUS

OCEANUS underwent mid-life overhaul in 1994.
Significant work incident to MLO:

- New superstructure

- Completely rehab'd laboratories

- New HVAC system

- New Reefer and freezer

- New windlass and capstan

- New traction/trawl winches

- Upgraded Science Information System

- Main engine upgrade

- New generators

- New emergency generator

These vessels are simple in design and intrinsically easy to maintain. OCEANUS can be expected to operate Cost-effectively until 1994 plus 20 years or 2014.

Regards,
Joe Coburn

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From quentinl@duncoc.ml.duke.edu Wed Nov 20 07:37:08 1996
Date: Tue, 19 Nov 96 10:42:50 EST
To: UNOLS Office <unols@gsosun1.gso.uri.edu>
From: "Quentin M. Lewis, Jr." <quentinl@duncoc.ml.duke.edu>

Subject: Re: Vessel Use-Life Prediction

Hi Annette:

The CAPE HATTERAS was completed and put in service in July, 1981. We are currently planning a midlife refit in late 1998 or early 1999. This would give the vessel a useful life to at least 2011, based on the current 30 year formula. Given the excellent condition of the vessel now, and our current level of maintenance, I would predict that the HATTERAS could go as long as 2016, without significant increase in maintenance and operating costs.

Anything else you need, let me know. Thanks.....

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From TAskew@HBOI.edu Wed Nov 20 07:39:02 1996
From: Tim Askew <TAskew@HBOI.edu>
To: UNOLS Office <unols@gsosun1.gso.uri.edu>
Subject: RE: Vessel Use-Life Prediction
> Date: Tue, 19 Nov 1996 13:39:00 -0500

Annette,

Here is information on Harbor Branch Vessels

R/V SEWARD JOHNSON - Built in 1985; Midlife in 1995; 20 years in 2015 2 years

R/V EDWIN LINK - Built in 1982; Converted/Midlife in 1988; 20 years in 2012 +/- 2 years

R/V SEA DIVER - Built in 1959; Extended/Midlife in 1992; 20 years 2002 2 years

Hope this information helps. Regards, Tim Askew

Harbor Branch Marine Operations

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From dpowell@rsmas.miami.edu Wed Nov 20 07:39:16 1996
Date: Tue, 19 Nov 1996 13:52:54 -0500
UNOLS Office <unols@gsosun1.gso.uri.edu>
From: Dave Powell <dpowell@rsmas.miami.edu>

Subject: Re: Vessel Use-Life Prediction
Cc: dpowell@rsmas.miami.edu

Annette

I don't know that there was ever an institutional formul for ship life. The Iselin was 22/23 years in service when it was grounded in 1994. There was aclear plan that it had substantial life remaining and would continue in service. The work done on it due to the grounding would constitute a mid/late life refit. I would suggest there is 10+ years of service in it and that puts it at 30-35 years total.

The R/ V Calanus is of a similar vintage. We are working on getting started with a replacement but we would consider the Calanus to have a number of years of life left.

There have been a number of other vessels here at RSMAS but I know very little about their age, what retirement criteria were used, etc.

Regards

Dave Powell

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From fnts@aurora.alaska.edu Thu Nov 21 08:39:40 1996
Date: Wed, 20 Nov 1996 14:20:46 -0900 (AKST)
From: SMITH TOM _ <fnts@aurora.alaska.edu>
To: UNOLS <UNOLS@gsosun1.gso.uri.edu>
Cc: Tom Weingartner <weingart@ims.alaska.edu>

Subject: Vessel Use - Life Prediction

We do not have a formula regarding life predicition for the Helix. The vessel is maintained to ABS class. As such it has all equipment, spaces machinery, hull guaging inspected by ABS every 5 years. The vessel is according to ABS Inspefctors and shipyard workers in excellent shape. Hull guaging show little wear over the vessel's life.

I do not believe a vessel's useful life fits well into any formula. I suggest that you use the 20 years as a rule at which all vessels surveyed throughly by an independent agency and its remaining life expectancy forecast based on the survey and future operations. This seems a more realistic approach than asking the vessel operators for a prediction.//Tom
Smith

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From lblack@bbsr.edu Mon Nov 25 07:46:30 1996
Date: Fri, 22 Nov 1996 10:43:50 -0400
To: UNOLS Office <unols@gsosun1.gso.uri.edu>
From: lblack@bbsr.edu (Lee Black)
>Subject: Re: Vessel Use-Life Prediction
Cc: dennis@sargasso.bbsr.edu, mpollak@bbsr.edu,
sspurling@bbsr.edu (Sandy Spurling)

Hello Annette,

The WEATHERBIRD II had a major conversion in 1993. This would extend it's usefull life by at least 20 years to 2013. Some of the work included:

Complete re-work of accommodations

Added accommodations

New wheelhouse and aft-control station

New bow-thruster and compartment

New main lab and CTD garage

New Markey DUSH-5 CTD winch

Re-built main engines

New generators

Cheers,

Lee Black

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From jonesf@ucs.orst.edu Mon Nov 25 07:47:15 1996
From: "Fred J. Jones, Mar. Supt." <jonesf@ucs.orst.edu>
To: 'UNOLS Office' <unols@gsosun1.gso.uri.edu>
Cc: "'G. Brent Dalrymple'" <gbd@oce.orst.edu>
Subject: RE: Vessel Use-Life Prediction
Date: Thu, 21 Nov 1996 11:33:02 -0800

Annette, I'd use the same points Joe a WHOI did for OCEANUS to estimate WECOMA's replacement as 2014, 20 years beyond the 1994 "mid-life."

--- Fred

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From bcoste@poha.soest.hawaii.edu Wed Dec 4 15:23:38 1996
Date: Tue, 26 Nov 1996 10:22:26 -1000 (HST)
To: unols@gsosun1.gso.uri.edu
From: bcoste@poha.soest.hawaii.edu (Bill Coste)
Subject: Ship Use-Life Prediction
Cc: b.taylor@soest.hawaii.edu, snug@soest.hawaii.edu

Regarding the subject inquiry, we don't have a formula for predicting useful life of a vessel. I agree with Joe Coburn that it depends on construction, maintenance, mission requirements and operating area. Certainly, 30 years is reasonable and many ships are still in service after morethan 40 years. Frankly, a lot would depend on the economics of repair/maintenance versus replacement. Obviously, an owner who couldn't afford replacement would view useful life far differently from one who could.

Addressing MOANA WAVE, since she is owned by the Navy, they would determine replacement/retirement. She is in good enough condition to safely operate through 2004 (30 years), but is becoming obsolete as a research vessel due to changing technology (dynamic positioning, SeaBeam, etc) and major modifications/upgrades are

not feasible due to her age. In other words, her usefulness to the science community (user days) will dictate her eventual demise before her material condition.

Bill Coste

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From b_hahn@gsosun1.gso.uri.edu Thu Dec 5 13:20:17 1996
Date: Thu, 05 Dec 1996 11:09:34 -0500
To: unols@gsosun1.gso.uri.edu From: Bill Hahn <b_hahn@gsosun1.gso.uri.edu>

Subject: Retirement of ENDEAVOR

Annette:

This is our response to your question on retirement.

>In principle URI/GSO agrees with the existing retirement formula of 30 years with a mid-life refit. This would mean that the ENDEAVOR would be retired in the fall of 2008. There are many considerations that go along with picking this date however and, we feel that the ENDEAVOR could physically extend well beyond that date. The question is would anyone want her to.

>The mid-life done on the ENDEAVOR did not touch the bottom end of the main engine, ship's generators or their prime movers, the main switchboard, or the hull of the vessel. This machinery and structure will suffer breakdowns, increasing in frequency with time, and will have to be ultimately replaced or repaired at great cost. The cost effectiveness of doing this will be based on several things. The need for the ship in the UNOLS fleet or the availability of a replacement.

A lot of the effort and dollars invested in the ENDEAVOR during her mid-life refit were to improve her ability to meet the needs of the science being done now and into the future. In ten years mission obsolescence may be a factor again. Will there be money to bring ENDEAVOR's outfit back to the level required for the science being done at that time, and will such an investment be considered a good one? We believe increasing bunk space and/or lab space, to meet changing mission requirements, could not cost effectively be accomplished on a vessel of ENDEAVOR's ageand could affect her desirability in the future.

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From marsupt@ldgo.columbia.edu Fri Dec 6 08:31:53 1996
Date: Fri, 6 Dec 96 00:20:36 GMT
To: UNOLS Office <unols@gsosun1.gso.uri.edu>
From: marsupt@ldgo.columbia.edu (Paul Ljunggren)
Subject: Re: UNOLS Vessels - Use-life Prediction

Annette:

Received the chart projected on retirements R/V's and would just like to offer a comment.

With regards to the life of a ship, I failed to reply and suddenly find myself a day late and a dollar short. My initial reaction was that Joe Coburns message on the life of a ship really said it all. If a ship is maintained IAW CG regulations, maintained per classification society standards it should not have a problem having a service life in excess of 30 year.

I think that in terms of the service our ship's see, a midlife refit is more critical from the perspective of keeping up with improving technology and being able to meet new /changing mission requirements.

Regards

Paul

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From steve@skio.peachnet.edu Fri Dec 6 13:22:20 1996
Date: Fri, 6 Dec 96 13:13:21 EST
To: unols@gsosun1.gso.uri.edu
From: Steve Carignan <steve@skio.peachnet.edu>
Subject: Vessel Use-Life Prediction

Hello Annette

If possible, please include this information on the R/V Blue Fin. The Blue Fin was built in 1972 and went through a major conversion to a research vessel in 1975. The ship has a wood hull and has be well maintained over the years. I find the refit formula does not work very well in our case and estimate that the ship has 5 years of service left making the maximum replace date 2001. Skidaway Institute is in the process of design and replacement of this ship. The proposed replacement vessel is a new 85' fiberglass research ship designed for coastal and estuary work. Prospects are very good that this ship will replace the Blue Fin within the next 3 years.

Thanks Steve

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From capt@mpl.ucsd.edu Mon Dec 9 09:11:04 1996
Date: Fri, 6 Dec 96 08:43:55 PST
To: desilva@gsosun1.gso.uri.edu
>From: Thomas Althouse <capt@mpl.ucsd.edu>
Subject: Ship Life Expectancy
Cc: knox@sio.UCSD.EDU, seaweed@mpl.ucsd.edu, woodys@odf.ucsd.edu,
mfshop@mpl.ucsd.edu, joan@mpl.ucsd.edu, larry@mpl.ucsd.edu

Annette,

Sorry for the delay in responding to your request for estimates of ship life expectancy. I'm afraid it got lost in the rush of getting ROGER REVELLE ready for her first expedition which starts December 27th.

SIO feels that the following dates should be utilized for estimates of the useful lives of our ships.

MELVILLE -- 2015

As noted for KNORR, major material upgrades, system replacements and repairs during the mid-life refit which ended for MELVILLE in 1992 will result in a significant increase in the useful life of the ship. We estimate that the ship will provide excellent service to science until the year 2015.

NEW HORIZON -- 2016

The mid-life refit completed in May of 1996 improved material condition and upgraded systems which should result in this very capable intermediate ship successfully supporting science for 20 more years.

ROBERT GORDON SPROUL 2015

This ship entered service as an R/V in 1985. Useful service life at that time was based on 30 years from her completion of construction in 1981 which resulted in an end of service date of 2011. While the ship has not been given a major refit, continued incremental improvements have been accomplished and useful service is now projected until at least 2015. This will be extended if a major refit isscheduled.

ROGER REVELLE 2026

The current 30 year projection is considered valid. If a mid-life refit is scheduled at a future date, this date will be considerably extended.

Have a nice Christmas,

Tom