DRAFT 18th May 1999

Liferaft Assessment

This assessment will concentrate on the following aspects of liferaft operation relating to the Sydney Hobart yacht race abandonment's based on discussions with DSC Stewart Gray, N.S.W Police Service:

1. Correct procedure on stowage and storage of liferafts
2. Procedure for deployment from deck and from water
3. Righting the liferaft in calm and sea conditions (One person righting, with people inside)
4. Entering the liferaft
5. Cutting of the floor of the raft
6. Test rigidity of raft after cutting floor
7. Possible reasons for failure to inflate
8. Liferaft equipment

Proposed Methodology

Items 1 & 2 Raft Stowage and Deployment

1. Review of manufacturer's recommendations.
2. Review of CYCA race rules pertaining to liferaft carriage and stowage rules/guidelines.
3. Review of AYF rules/guidelines/recommendations.
4. Inspection of stowage systems actually in use on a range of offshore racing yacht sizes. [To be facilitated by a visit to Sydney to inspect and record methods used as well as crew's justifications for selected stowage methods. CYCA will be approached to facilitate access to yachts and crewmembers for interview.]

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs, video footage and quotes from interviews.

Item 3 Righting the Liferaft in Calm and Sea Conditions

1. A selection of raft types used in the race abandonment's are to be supplied by N.S.W. Police. [At least one raft will probably be rendered inoperable by investigations into items 5 & 6. The remaining rafts may sustain damage during calm water and seaway boarding and righting trials.]
2. Righting trials will initially be conducted in still water (AMC Survival Centre). It is anticipated that physical difficulties experienced in righting each raft type can be identified. By this trial. [All trial subjects will be required to wear typical yacht racing gear]

DRAFT 18th May 1999

3. To assess the impact of training on liferaft righting, it is intended to use a small number of subjects who are untrained in liferaft deployment and operation in the first trail. A subsequent trial will be conducted after the first (once basic training is provided) in order to gauge whether training affected the ease of righting.
4. Righting trials will be conducted by AMC and police staff to with varying numbers of personnel remaining inside a capsized raft in order to determine the feasibility of leaving crew members inside a raft during the righting process.
5. Righting trials will be conducted at sea in a seaway using a Tasmanian Water Police vessel with police divers as subjects. This may contribute to the identification environmental factors affecting the righting process.

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs, video footage and quotes from interviews with trial subjects.

Item 4 Entering the Raft

6. A selection of raft types used in the race abandonment's are to be supplied by N.S.W. Police. [At least one raft will probably be rendered inoperable by investigations into items 5 & 6. The remaining rafts may sustain damage during calm water and seaway boarding and righting trials.]
7. Boarding trials to be conducted in still water (AMC Survival Centre). [All trial subjects will be required to wear typical yacht racing gear] It is anticipated that physical difficulties experienced in boarding each raft type can be identified by this trial.
8. To assess the impact of training on liferaft boarding, it is intended to use a small number of subjects who are untrained in liferaft deployment and operation in the first trail. A subsequent trial will be conducted after the first (once basic training is provided) in order to gauge whether training affected the ease of entry.
9. The trail described in 3. can be expanded to include case of getting a disabled crewmember on board a raft.
10. Boarding trials will be conducted at sea in a seaway using a Tasmanian Water Police patrol vessel and police divers as subjects. This should identify additional factors affecting the boarding process.

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs, video footage and quotes from interviews with trial subjects.

Items 5 & 6 Effects of Cutting Liferaft Floor

1. Observe the degree of air exchange in a capsized liferaft in a seaway using the same type of raft and loading as were involved in the race incident. This may require obtaining air samples for later analysis. Real time sampling may be a cheaper

alternative using equipment owned by AMC. The worst case scenario for oxygen depletion can be trialed in the AMC survival centre.
2. Attempt to simulate similar weight loadings to those involved in the race incident in the AMC Survival centre.
3. Cut the liferaft floor and observe and record the outcome. The raft may be manipulated to simulate movement in a seaway.
4. Observe the effects on the raft's rigidity after the initial cut has spread.

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs, video footage. Quantitative findings would result from air sample analysis.

Item 7 Possible Reasons for Inflation Failure

1. Determine the inflation mechanism type involved in race non-inflation incidant
2. Contact manufacturer in order to ascertain likely causes and any previous history of inflation failure.
3. Review survivor's account of non-inflation incident.
4. Examine an example of the cylinder head valve by Mr. John Frearson (AMC Survival Centre) to determine possible set up configurations that may lead to inflation failure.

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs, video footage.

Item 8 Liferaft Equipment

1. Review of CYCA rules/guidelines pertaining to equipment packs and fittings required for race rafts.
2. Review of manufacturer's standard equipment packs and fittings for rafts used in offshore racing.
3. Comparison of above with Uniform Shipping Laws Code, SOLAS and Marine Orders Part 25 requirements.

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs and/or video footage.

Expert Witness Service

Mr. Tony Boyle will be available as an expert witness as required at a rate of $1,200 per day plus expenses.

DRAFT 18th May 1999

Items	Location	Time	Facilities Required
3 & 4	At sea	1 day (actual day will depend on weather)	Tasmanian Police boat Work/safety boat Police divers (up to 5) Trial liferafts Video camera (in waterproof housing) Still camera (in waterproof housing) Air sample containers Ground transport for liferafts and personnel Oxygen/Carbon Dioxide detector
3,4,5,6 & 7	AMC Survival Centre	2 days	AMC Survival Centre pool Trial liferafts Trial subjects (5-10) Raft inflation valve and cylinder Video camera (in waterproof housing) Still camera (in waterproof housing) Oxygen/Carbon Dioxide detector
1,2 & 8	Sydney	1 day	Air travel Ground transport (Taxi) Accommodation (1 night) Video camera Still camera (digital) Access to CYCA contacts and offshore racing yachts and crews

DRAFT 18th May 1999

Liferaft Assessment

This assessment will concentrate on the following aspects of liferaft operation relating to the Sydney Hobart yacht race abandonment's based on discussions with DSC Stewart Gray, N.S.W Police Service:

1. Correct procedure on stowage and storage of liferafts
2. Procedure for deployment from deck and from water
3. Righting the liferaft in calm and sea conditions (One person righting, with people inside)
4. Entering the liferaft
5. Cutting of the floor of the raft
6. Test rigidity of raft after cutting floor
7. Possible reasons for failure to inflate
8. Liferaft equipment

Proposed Methodology

Items 1 & 2 Raft Stowage and Deployment

1. Review of manufacturer's recommendations.
2. Review of CYCA race rules pertaining to liferaft carriage and stowage rules/guidelines.
3. Review of AYF rules/guidelines/recommendations.
4. Inspection of stowage systems actually in use on a range of offshore racing yacht sizes. [To be facilitated by a visit to Sydney to inspect and record methods used as well as crew's justifications for selected stowage methods. CYCA will be approached to facilitate access to yachts and crewmembers for interview.]

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs, video footage and quotes from interviews.

Item 3 Righting the Liferaft in Calm and Sea Conditions

1. A selection of raft types used in the race abandonment's are to be supplied by N.S.W. Police. [At least one raft will probably be rendered inoperable by investigations into items 5 & 6. The remaining rafts may sustain damage during calm water and seaway boarding and righting trials.]
2. Righting trials will initially be conducted in still water (AMC Survival Centre). It is anticipated that physical difficulties experienced in righting each raft type can be identified. By this trial. [All trial subjects will be required to wear typical yacht racing gear]

DRAFT 18th May 1999

3. To assess the impact of training on liferaft righting, it is intended to use a small number of subjects who are untrained in liferaft deployment and operation in the first trail. A subsequent trial will be conducted after the first (once basic training is provided) in order to gauge whether training affected the ease of righting.
4. Righting trials will be conducted by AMC and police staff to with varying numbers of personnel remaining inside a capsized raft in order to determine the feasibility of leaving crew members inside a raft during the righting process.
5. Righting trials will be conducted at sea in a seaway using a Tasmanian Water Police vessel with police divers as subjects. This may contribute to the identification environmental factors affecting the righting process.

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs, video footage and quotes from interviews with trial subjects.

Item 4 Entering the Raft

6. A selection of raft types used in the race abandonment's are to be supplied by N.S.W. Police. [At least one raft will probably be rendered inoperable by investigations into items 5 & 6. The remaining rafts may sustain damage during calm water and seaway boarding and righting trials.]
7. Boarding trials to be conducted in still water (AMC Survival Centre). [All trial subjects will be required to wear typical yacht racing gear] It is anticipated that physical difficulties experienced in boarding each raft type can be identified by this trial.
8. To assess the impact of training on liferaft boarding, it is intended to use a small number of subjects who are untrained in liferaft deployment and operation in the first trail. A subsequent trial will be conducted after the first (once basic training is provided) in order to gauge whether training affected the ease of entry.
9. The trail described in 3. can be expanded to include case of getting a disabled crewmember on board a raft.
10. Boarding trials will be conducted at sea in a seaway using a Tasmanian Water Police patrol vessel and police divers as subjects. This should identify additional factors affecting the boarding process.

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs, video footage and quotes from interviews with trial subjects.

Items 5 & 6 Effects of Cutting Liferaft Floor

1. Observe the degree of air exchange in a capsized liferaft in a seaway using the same type of raft and loading as were involved in the race incident. This may require obtaining air samples for later analysis. Real time sampling may be a cheaper

alternative using equipment owned by AMC. The worst case scenario for oxygen depletion can be trialed in the AMC survival centre.
2. Attempt to simulate similar weight loadings to those involved in the race incident in the AMC Survival centre.
3. Cut the liferaft floor and observe and record the outcome. The raft may be manipulated to simulate movement in a seaway.
4. Observe the effects on the raft's rigidity after the initial cut has spread.

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs, video footage. Quantitative findings would result from air sample analysis.

Item 7 Possible Reasons for Inflation Failure

1. Determine the inflation mechanism type involved in race non-inflation incidant
2. Contact manufacturer in order to ascertain likely causes and any previous history of inflation failure.
3. Review survivor's account of non-inflation incident.
4. Examine an example of the cylinder head valve by Mr. John Frearson (AMC Survival Centre) to determine possible set up configurations that may lead to inflation failure.

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs, video footage.

Item 8 Liferaft Equipment

1. Review of CYCA rules/guidelines pertaining to equipment packs and fittings required for race rafts.
2. Review of manufacturer's standard equipment packs and fittings for rafts used in offshore racing.
3. Comparison of above with Uniform Shipping Laws Code, SOLAS and Marine Orders Part 25 requirements.

Interpretation of findings will be qualitative in nature. Supporting evidence would be in the form of photographs and/or video footage.

Expert Witness Service

Mr. Tony Boyle will be available as an expert witness as required at a rate of $1,200 per day plus expenses.

DRAFT 18th May 1999

Items	Location	Time	Facilities Required
3 & 4	At sea	1 day (actual day will depend on weather)	Tasmanian Police boat Work/safety boat Police divers (up to 5) Trial liferafts Video camera (in waterproof housing) Still camera (in waterproof housing) Air sample containers Ground transport for liferafts and personnel Oxygen/Carbon Dioxide detector
3,4,5,6 & 7	AMC Survival Centre	2 days	AMC Survival Centre pool Trial liferafts Trial subjects (5-10) Raft inflation valve and cylinder Video camera (in waterproof housing) Still camera (in waterproof housing) Oxygen/Carbon Dioxide detector
1,2 & 8	Sydney	1 day	Air travel Ground transport (Taxi) Accommodation (1 night) Video camera Still camera (digital) Access to CYCA contacts and offshore racing yachts and crews