

INQUIRY INTO THE DEATH OF MOHAMMED TASLEEN IQBAL v.

SHERIFFDOM OF THE LOTHIAN AND BORDERS AT DUNS

**UNDER THE FATAL ACCIDENTS AND SUDDEN DEATHS INQUIRY
(SCOTLAND) ACT 1976**

INQUIRY INTO THE DEATH OF MOHAMMED TASLEEN IQBAL

Representation :

Graham Fraser : Procurator Fiscal ,Jedburgh for the public interest.

Mr.Peter Gray, Advocate, for the family of the deceased.

Mr. Lachlan McNeill , Advocate for Mr. David Martin

Mr.Peter Anderson Solicitor-Advocate for Aquatron

Duns 20 September 2001. The Sheriff having resumed consideration of the evidence given at the Inquiry makes the following determination.

- In terms of Section 6(1) (a) and (b) I determine that Mohammed Tasleen Iqbal died in the North Sea near to the coastline adjacent to Weasel Loch and Divers Hole near Eyemouth, Berwickshire on Saturday 19th September 1998 between 2.30 p.m. and 4.00p.m. He was certified dead when the lifeboat carrying his body arrived at the quayside at Eyemouth at approximately 5.10 p.m. on that date.
- The cause of his death was accidental drowning caused by a diving incident. The accident occurred as a result of a combination of (i) failures to observe proper and established diving practices and safety procedures on the part of Mr David Martin and Stuart Smith employees of Aquatron who, while acting in the course of their employment were responsible for the supervision of a number of persons including the deceased who were taking part in diving activities that day. They failed to ensure that all members of the diving group under instruction had surfaced before leaving the location of the dive and consequently failed to carry out established search and rescue practices (ii) failure by Aquatron to select a suitable location for a first dry suit training dive which was appropriate to the level of Mr. Iqbal's experience and (iii) defects in the equipment with which he was supplied by Aquatron in order to carry out the dive in respect that Mr. Iqbal was issued with a badly adjusted second stage regulator which resulted in increased inhalation resistance and a defective pressure gauge which gave a false reading of the volume of air remaining in his air cylinder.

3. In terms of Section 6 (1) (c) the death and the accident resulting in the death might have been avoided by taking reasonable precautions to ensure that :-

- Mr. Iqbal had been trained in the use of the dry suit provided for the dive and had not been allowed to participate in any other dry suit dive under instruction before the completion of such training.
- those responsible for the pre-dive briefing ensured (a) that all participating in the dive including the deceased were given clear instructions as to the activities to be carried out during the dive and (b) that the functions to be carried out in the course of the dive by all participants, that is to say, that the separate functions of the trainees, the "buddies" and the instructors were all made clear to all participants and were adhered to and
- that those responsible during the dive for supervising his ascent from the sea bed carried out a head count of all members of the party immediately before and after surfacing and before leaving the location where the party surfaced.

4. In terms of Section 6(1)(d) defects in the system of working which contributed to the accident resulting in the death were :-

- failure to have a system in place to ensure that equipment issued to trainees was within its service period and was so maintained as to comply in all respects with manufacturers' specifications.
- failure to prepare an adequate dive plan for the training which was to be undertaken and which accurately recorded the participants and activities to be undertaken.
- failure to ensure that those participating in the dive had the appropriate level of training for the activities in which they were expected to engage.
- failure to carry out adequate pre-dive checks on equipment.
- failure to ensure that divers under instruction in dry suits for the first time were appropriately weighted so as to achieve and demonstrate neutral buoyancy.
- failure to ensure compliance with the buddy system and lost buddy search procedures
- failure to keep the dive party together and failure on the part of the instructors to remain with the group under instruction.

5. In terms of Section 6(1)(e) other facts which are relevant to the circumstances of the death are that had there been some means of visual identification of individual divers in place, for example by the presence of some form of unique identifying feature on hoods, the absence of the deceased from the group of which he was part might have been more immediately apparent to the instructors, his buddy and the divemaster on shore thereby enabling recognised search procedures to be undertaken without delay.

(signed) T A K Drummond

Note :

Recommendations.

In the light of the evidence which emerged in the course of this Inquiry I was invited to make a number of recommendations: I do not make certain of those recommendations because, in my opinion, they went further than was appropriate for

the scope of a Fatal Accident Inquiry and impinged on wider issues relating to the conduct of the recreational diving industry as a whole.

I now set out the recommendations which I considered it appropriate to make but I have set out at length in this note the full text of those other recommendations in order that those involved in recreational diving should be aware of the issues raised in the Inquiry.

My recommendations are :-

- that regular checks to identify known potential defects in the operation of pressure gauges should be carried out at regular intervals and that the carrying out of such checks should be documented in appropriate service records .
- that persons or organisations involved in the hiring of diving equipment should carry out checks on regulators prior to every transaction of hiring out to ensure that inhalation resistance pressures and all parts of regulators capable of adjustment are within manufacturers specifications before being issued for hire : that the fact of such checks , the result , the date on which they were carried out and the identity of the person carrying out the check should be recorded in appropriate documentation.

It will readily be appreciated that this activity relates to the provision of life support equipment to the public and there is a real public interest in ensuring that standards are observed in the maintenance and servicing of that equipment.

- That persons or organisations involved in the hiring out of diving equipment should maintain reliable systems to record the number of occasions on which individual items of equipment are hired out: that persons to whom such equipment is hired should be required to complete a record of the number of dives on which the equipment was used during the period of hire. If that information is not provided hire centres should assume that not less than two dives per day occurred during the period of hire.
- That a means of unique visual identification and which is visible from distance be carried by each diver on his hood and that such unique identification should form part of the dive log retained by the Divemaster or other supervisory person who remains on shore.
- That in the course of any dive in which more than two persons participate, the dive supervisor or, if not appointed, the dive leader, be responsible for a formal headcount on the divers surfacing to ensure the immediate integrity of the group of persons participating in that dive.

The Other Recommendations which I was asked to make:

I had been invited by the Procurator Fiscal to recommend that diving schools should not be allowed to offer fixed fee courses with a view to reducing commercial pressures to cut corners, as it was put, in achieving rapid compliance with qualification standards (Recommendation 6). I was also asked to recommend that a system of inspection be introduced (Recommendation 7) covering the standards of diving training and maintenance of equipment in the commercial sport diving field. It

was said that this should be carried out by a suitably qualified non-profit body : that all commercial dive and diving equipment hire centres should be required to register with the Health and Safety Executive and that it should be unlawful to provide such training without registration. It was also proposed that registration should be subject to periodical renewal with potential for refusal to renew in the event of what were described as adverse reports.

I appreciate fully the sentiments which underlie these proposals but the present Inquiry was not concerned with standards in the industry generally: nor was it concerned with the financial implications of the whole conduct of diver training. This was an Inquiry into the circumstances in which one individual recreational diver died during recreational diving training conducted by one contractor using one training system. While reference was made on a number of occasions to "industry norms" and what were said to be practices within the diving industry generally, I did not feel able to conclude on the evidence before me that I had sufficient evidence or information to enable me to make what would be clearly far reaching recommendations in relation to the regulation of recreational diving and to financial aspects of recreational diver training : nor was I able to conclude that there was evidence which would enable me to address questions such as registration of diver training organisations and systems of inspection.

Questions such as these would require to be the subject of careful scrutiny in isolation and preferably outwith the context of a Fatal Accident Inquiry carrying, as they inevitably would, implications for the diving industry in general and a requirement for careful definition of the respective scopes of recreational and commercial diving.

Partly for that reason I have set out in some detail the evidence and submissions before me in the Inquiry in the hope that it will enable persons or organisations involved in recreational diving to give careful consideration to the implications of some of the issues raised.

I have restricted my formal findings and recommendations to the circumstances immediately attendant upon the death of Mr. Iqbal and made recommendations which I consider might contribute to avoiding a repetition of some of the shortcomings which I have concluded contributed to the accident in which he met his death.

Recreational diving is undoubtedly a sport which is inherently hazardous to the extent at least that persons involved in it are entering an environment where their survival is largely dependent on the efficacy of their equipment and training. Their equipment could accurately be described as life support equipment for in the event of significant failure there must be serious danger if not inevitability of death. It is unlikely that any participants could be unaware of those risks. Nonetheless I heard evidence which was suggestive that there might be a culture within certain areas of recreational diving which adopts a so called "macho" approach to the sport and might regard attention to detail in planning and supervision of diving and maintenance of equipment as being restrictive.

If the Inquiry into the sad and unnecessary death of this young man helps to prevent further deaths it will not have been in vain.

I tender the sympathy of the Court to his grieving family who attended the proceeding over their protracted duration no doubt at no small burden to themselves.

Background Matters: 1. Chronology.

The Inquiry occupied a total of fifteen court days between 7th February 2001 and 10 May 2001.

In view of the time which had elapsed since the death of Mr. Iqbal (19th September 1998) and the commencement of the Fatal Accident Inquiry I asked the Crown at the conclusion of the evidence to provide me with a chronology of events leading up to the Inquiry.

My reason for doing so was not simply due to the lapse of time since the death but issues had been raised in the course of the evidence as to the validity of the results of certain tests carried out on the equipment being used by the deceased in the course of the dive which ended with his death as a result of the lapse of time between the death and the examination of the relevant equipment.

I now set out that chronology:

I was informed that the case was reported to Crown Office by the Procurator Fiscal in August 1999 after inquiries and meetings with the family.

In February 2000 Crown Counsel instructed that a Fatal Accident Inquiry be held.

In March 2000 the application for an Inquiry was made to the Sheriff Clerk and days in August 2000 were identified for the inquiry.

In May 2000 the Procurator Fiscal became aware of new Health and Safety Executive facilities and asked for an examination at that facility of the equipment used by Mr. Iqbal. Up to that date he had proceeded on the basis of a report from a police officer at Strathclyde Police Underwater Unit.

At that time there was no reason to believe that the Health and Safety Executive examination would produce anything additional to the information already available. The Health and Safety Executive decided that an examination was desirable as a scuba regulator had been found to be defective in another case.

In June 2000 concern was raised about the function of part of the equipment used by Mr. Iqbal on the fatal dive, namely, the regulator which is an important part of his breathing apparatus.

It was accordingly clear that the Inquiry would not be able to proceed in August.

When reports were therefore received from the Health and Safety Executive at the end of July 2000 further investigations required to be made into the results.

The Procurator Fiscal then understood that the family had encountered problems with their application for legal aid.

A new application was then submitted in mid-October for a Fatal Accident Inquiry and a date in February 2001 was given. None of the other parties to the Inquiry disputed this chronology .

It was perhaps surprising that steps were not taken at an early stage to have the equipment examined by the manufacturers under appropriate conditions. In the course of the Inquiry evidence was given by a representative of the manufacturers in relation to the internal functions of certain items of diving equipment. That witness said that he had examined the particular item only that morning within the court building shortly before giving evidence.

Evidence was given by a diving consultant, Mr. Meinert, of tests carried out by him which were said to demonstrate that the regulator was operating below the specifications laid down by those manufacturers. In addition, against the chronology which is set out above the equipment was being stored for extended periods of time in Police production facilities without consideration of the effects if any, which storage might be having upon its operational efficiency.

It was unfortunate that a significant amount of the 15 days of the Inquiry was occupied by disputes in relation to the validity of the results of tests carried out on that equipment as a result of the protracted period of storage when at least the manufacturers of the equipment were presumably available to carry out immediate tests under conditions of appropriate supervision if that were felt necessary.

Background Matters : 2. Definitions and terms used.

This inquiry was into the death of a young man who was undergoing instruction for the first time in a dry suit dive. He already had some limited experience in wet suit diving to which I will refer later. The use of a dry suit for diving is a distinct skill which requires to be learned because, *inter alia*, a dry suit is also a buoyancy control device and control of buoyancy is a primary and essential feature of diving.

It is also fitted with valves which can be operated by the user to regulate the flow of air into and out of the suit. The position on the suit and the precise operation of these valves can vary for example between manual and automatic functions.

I heard evidence from a number of witnesses about Mr Iqbal's previous diving experience up to the date in question and, put shortly, it is that he had previously carried out eight dives all of which were wet suit dives. Extracts from his personal diving log are productions 20 - 27 inclusive.

Mr Iqbal was a student of the PADI (the Professional Association of Diving Instructors) system of diving which was operated by Aquatron. PADI produces instruction manuals for both instructors and students who are undertaking its courses which lead towards their certification in varying degrees of diving proficiency. Much time was taken up during the Inquiry by reference to various sections of the PADI instruction manuals in relation to various aspects of the activities which were

undertaken that day. In the context of my determination the following extracts from the instruction manuals are of particular significance and I quote their terms by way of explanation of some of the terms used:-

(1) At section 1- 12 of the PADI Advanced Open Water Instructor guide it is provided as follows:-

"completion of a confined water dry suit training session is required of students never having used a dry suit prior to making the elective dry suit dive. This confined water session must be completed prior to making the elective dry suit dive."

This provision is repeated at other stages in the course of the manual (for example 3 - 25)

(2) "Confined water training " is defined at page 8 of the PADI General Standards and Procedure as follows:-

Confined water refers to either a swimming pool or an open water site that offers swimming pool like conditions with respect to clarity, calmness and depth. Initially students need water shallow enough to stand up in and later they progress to water too deep in which to stand. The confined water session cannot be combined with open water training dives. After a confined water session students must leave the water and remove their equipment before beginning any open water training dive activities".

(3) "Open Water" is defined as

any body of water considerably larger than a swimming pool which exposes students to an environment similar to that experienced by recreational divers.

Reference will be made throughout this Note to "buddies": it should be explained that the "buddy" is an important feature of safe diving. A "buddy" is a diving colleague who takes responsibility for his partner in checking his equipment, staying in his company throughout the dive and is available to assist in the event of problems being encountered in the course of the dive. The buddy system must be adhered to in the course of every dive.

Mr Iqbal's "buddy" on the day in question was Mr Samuel Moore who gave evidence. Mr Iqbal and Mr Moore were both carrying out their first dives in dry suits that day.

The Risk Assessment: (Production 33) : this is a document which is site specific and is required to be prepared in terms of regulation 8 of the Diving At Work Regulations 1997. It should be a record of the planning carried out by a diving contractor to ensure that the particular diving project being undertaken is conducted in a manner which protects the health and safety of all persons taking part in the project. It should cover, inter alia, site suitability and the experience level of dive participants at that site.

(Details of its requirements are set out at "Regulation 6: (31) below.)

The Dive Plan: (Pro.34) : This is a document which requires to be prepared in terms of Regulation 6 of the 1997 Regulations covering the actual diving activity taking place . Further detail of its requirements are also contained at "Regulation 6" below.

I also mention at this juncture that the manufacturer of the relevant diving equipment is an organisation known as Scubapro and the training activity in which the deceased, Mr. Iqbal, was engaged was being organised by a firm named Aquatron.

Aquatron inter alia retail, hire and service Scubapro equipment. At the date of Mr. Iqbal's death they also operated a training scheme for divers seeking to qualify for varying degrees of certification under the PADI system of instruction.

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Having dealt with some of the terms and background to the training aspects of the diving activity in which Mr.Iqbal was engaged at the time of his death it is appropriate that before dealing with the events which led up to his death I should now set out some parts of the regulatory framework which are relevant to the diving activity which was taking place that day.

Background Matters: 3. The Regulatory Framework

The diving activity in which Mr. Iqbal died was one which is regulated by The Diving at Work Regulations 1997 (SI 1997 No 2776)

For the purpose of providing practical guidance with respect to the requirements of the Regulations an approved code of practice (ACOP) entitled "Recreational Diving Projects" came into force on 1 April 1998.

The ACOP was production No 11 and the following extracts covering both the ACOP and the regulations are taken from Pro.11.

The code covers both the instruction and guiding of people diving for recreational purposes where at least one person taking part is at work, for example, as an instructor. The code also applies to all recreational diving projects within the 12 mile limit of territorial water adjacent to Great Britain.

The draft code was produced by a working party of representatives from the British Sub Aqua Club, the Professional Association of Diving Instructors, and representatives of the Health and Safety Executive.

Diving at Work Regulations 1997

Regulation 2(i) "Diver" means a person at work who dives.

The Diving Regulations apply when at least one diver taking part is at work. They do not apply when there are no divers at work. Therefore recreational diving will generally only fall within these Regulations when an instructor is being employed to

dive in order to teach students or where an appropriately qualified diver is employed to guide a dive party.

In the present case Mr. Smith and Mr. Martin were so employed as instructors by Aquatron.

Diving project is the term used for the overall diving job whether it lasts two hours or two months. It can be made up of one or more diving operations.

"Diving project" means any activity made up of one or more diving operations in which at least one person takes part or will take part as a diver and extends from the time when that person or the first such person commences to prepare to dive until that person or the last such person has left the water, chamber or other environment in which the dive or any part of the dive took place.....".

"Diving operation" means a diving operation identified in the Diving Project Plan pursuant to Regulation 8(3). A diving operation should be that portion of a diving project identified in the diving project plan which one supervisor can safely supervise. One supervisor must be appointed for each diving operation. The diving contractor and the supervisor could be the same person. When deciding the size and structure of the proposed diving operation the diving contractor should take into account factors such as the type of instruction or dive, the nature of the lesson or the aim of the dive, the experience of the students or divers and the dive site location. The diving contractor will also need to be satisfied that he or she allocates themselves a manageable team. All these points and others should be taken into account when preparing the Diving Project Plan.

Regulation 4

"Every person who to any extent is responsible for, has control over or is engaged in a diving project or whose acts or omission could adversely affect the health and safety of persons engaged in such a project, shall take such measures as it is reasonable for a person in his position to take to ensure that these Regulations are complied with.

(25) Everyone who is involved in the planning and organisation of a diving project has a responsibility to:-

(a) Take reasonable steps to ensure that any diving contractor selected is capable of complying with the Regulations.

- Provide sufficient detail of the content of the diving project to allow it to be carried out safely.
- Ensure that any equipment or activities under the control of the client do not affect the safety of the diving project.

Regulation 6

(1) The diving contractor shall ensure so far as is reasonably practicable that the diving project is planned, managed and conducted in a manner which protects the health and safety of all persons taking part in that project.

(2) The diving contractor shall before the commencement of any diving operation (i) appoint a person to supervise that operation in accordance with Regulation 9 and (ii) make a written record of that appointment.

(3) The diving contractors shall (d) ensure so far as reasonably practicable that any person taking part in the diving project complies with the requirements and prohibitions imposed on him by or under the relevant statutory provisions and observes the provisions of the diving project plan (e) ensure that a record containing the required particulars is kept for each diving operation.

31. The diving contractor has overall responsibility for the safety of the diving project. This includes ensuring that:

(a) A suitable Risk Assessment and Diving Project Plan have been prepared which identify the number of supervisors, divers and equipment needed.

(c) The place from which the diving is to be carried out is suitable and safe.

- The supervisor and dive team are fully briefed on the project and aware of the contents of the Diving Project Plan.

(h) Suitable plant and equipment are provided and are properly maintained.

- Adequate arrangements exist for emergencies including first aid and medical treatment.
- An up-to-date record is kept for each diving Regulation.

It should be noted (32) that recreational diving projects are in the main enforced by Local Authorities.

Regulation 8

(3) The diving project plan shall identify each diving operation which makes up the diving project and the nature and size of any diving operation so identified shall be such that it can safely be supervised by one person.

37. The diving contractor should check that the divers are competent to dive to the depths required by the Diving Project Plan.

- The following factors should be taken into account in assessing the diving site:

(a) Water conditions including wave motion movement visibility weather

- The task or training drill to be performed and the experience level of those participating including those who are not at work.

Dive Teams and Associated Working Practice

Regulation 6:

(49) The two divers in the water should be capable of rendering assistance to each other in the event of an emergency underwater. Under specific circumstances *one* (my emphasis) of these divers can be a student undergoing training provided that he or she has been trained in rescue techniques, has been assessed as competent to carry out rescue techniques and has reached the minimum competency level required for this task set out by the appropriate recreational diving organisation.

Maintenance of Diving Plant

Regulation 6

- Diving plant and equipment is used under extreme conditions including frequent immersion in salt water. It therefore requires regular inspection, maintenance and testing to ensure that it is fit for use and not damaged or suffering from deterioration
- In order to ensure that the equipment is maintained the diving contractor should have a written scheme of equipment, maintenance and inspection. All plant and equipment should be checked by a competent person immediately before use and this check entered in the diving operation record.
- The equipment maintenance scheme should be based upon the manufacturer's recommendations and in accordance with current International, European or national standards.

Regulation 10

(1) The supervisor shall in respect of the diving operation for which he has been appointed as a supervisor (a) ensure that it is carried out so far as is reasonably practicable (i) without risk to the health and safety of all those taking part in that operation and (b) before the commencement of the operation ensure that each person taking part is aware of the contents of the Diving Project Plan.

Supervisor's Responsibility:

(83) The supervisor has legal responsibility for the safety of the diving operation he or she is supervising This includes confirming that (a) the proposed site and water and weather conditions are suitable, (d) the equipment provided is appropriate adequate and has been checked by a competent person prior to use and recorded in the Diving Operation Record.

(f) The Diving Project Plan and arrangements for dealing with foreseeable emergencies are clearly understood by all those engaged in the diving operation. This would normally be ensured by a pre-dive briefing session with all those involved.

(g) Proper records of the diving operation are maintained. As a minimum this would include a description of the dive, the names of those taking part and their dive qualifications and a record that the equipment has been checked prior to the dive.

Regulation 13

(1) No person shall dive in a diving project (a) unless he is competent to carry out safely and without risk to health any activity he may reasonably expect to carry out while taking part in the diving project.

(87) Divers covered by this code should be competent to dive with a buddy who should also be competent for the conditions likely to be encountered in open water using recreational diving equipment. They should be able to initiate appropriate actions in the event of an emergency.

For the purpose of the Code competence is defined as "having a combination of training, knowledge and experience which enables a person to do the job required in a safe manner".

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The Fatal Dive

During the Inquiry witnesses dealing with events which took place during the fatal dive were interspersed with witnesses whose evidence related principally to the equipment or to other organisational features of the dive.

In order to provide a structure to my note I do not deal with the witnesses in the order in which they were called but under a number of headings to which their evidence was principally addressed. There is inevitably a degree of overlap.

The persons taking part in the dive from which Mr.Iqbal did not return were as follows :-

- Mr. David Martin : he was the instructor in charge of the dive and was buddied to Caroline McLeod.
- Stuart Smith : a part time employee of Aquatron who was the assistant instructor and was apparently buddied to both Caroline McLeod and David Martin.
- Caroline McLeod : a trainee under instruction who had not dived in a dry suit for approximately twelve months.
- Samuel Moore : a trainee carrying out a dry suit dive for the first time and was Mr.Iqbal's buddy.
- Mr.Iqbal : the deceased who was under instruction and was also carrying out his first dry suit instruction : buddied to Mr. Moore
- Neil Sandford: a trainee under instruction and on his first dry suit dive.
- Mr. David Christie : his name did not appear on the dive plan as a participant in the training dive but he was said in evidence to be buddied to Neil Sandford.
- Mr. Derek Clark : the divemaster who remained on shore throughout the dive.
- Conn Ward : an experienced diver who did not take part in the training dive.

- Mr. McLean : a novice who accompanied Mr. McLean.
- Mr. Forbes : he did not give evidence and was not part of the training dive under the direct supervision of Mr. Martin.

From the foregoing list of participants and the roles they had to play on the day it is immediately demonstrable that the Dive Plan prepared by Mr. Martin for the fatal dive was defective in that it does not include any reference whatever to Mr. Christie who was said to be buddied to Neil Sandford. The "buddying " of Mr. Iqbal and Mr. Moore who were both wearing dry suits for the first time and the buddying of Martin, McLeod and Smith, (who was to occupy a position at the rear of the group), is demonstrative of the fact that from the outset of the activities scant regard was being paid to the function and responsibilities of buddies.

Mr Iqbal was known by Aquatron and their instructor for the day, Mr David Martin, to be engaged in his first dry suit dive. He was taken for that purpose to a location known as Weasel Loch near Eyemouth. Weasel Loch lies on the coastline with the North Sea and was described as follows by a number of witnesses (photographs were available showing the location in detail): it is a large basin cut out of a cliff face by the action of the sea: the entrance from the basin to the sea is approximately ten metres wide: it faces due north and any swell from the sea is funneled up the loch. There are 76 stairs from the top of the cliff to the point where the divers enter the water which point is surrounded by rocks.

On the day in question there was a swell in the sea which was running into Weasel Loch. Under no circumstances could Weasel Loch be described as "swimming pool like conditions" and I was satisfied on the evidence that the location was entirely inappropriate for initial instruction being given in dry suit training. That location was selected by Mr Young of Aquatron since he believed it would be more "educational" for the students believing that a swimming pool was inadequate to learn the skills.

In the following narrative of what took place in the course of the dive itself it should be borne in mind that the events took place in the context of a diving location where Mr. Iqbal should not have been having regard to the fact that he was undergoing his first instruction in a dry suit and having regard to his level of experience.

My findings of what happened during the dive are based substantially on the evidence of Stuart Smith which I accepted in so far as it is consistent with the following account of events. David Martin's account was at variance with Smith's in certain important respects which I will highlight and in so far as they were inconsistent I preferred the evidence of Smith.

I find that the events which then took place in the course of the dive were as follows.

When Mr Iqbal first entered the water he was having trouble maintaining buoyancy : he kept going under and coming up: he looked distressed: his arms were waving about : he was out of his depth (the evidence of Caroline McLeod and Sandford and which I accepted.) Others went to his assistance and he was helped out of the water : the dive master and an instructor were checking Mr Iqbal's suit and carrying out checks on his buoyancy jacket.

I did not accept the version of events given by Mr. Martin to the effect that Mr. Iqbal's difficulties at this early stage were solely attributable to his having lost a fin. I am satisfied that Mr. Iqbal was demonstrating difficulties in achieving buoyancy.

In order to demonstrate that the students had mastered the buoyancy skills which were necessary for this instructional dive they were required to demonstrate to the instructor the carrying out of (1) a "hover" and (2) "a fin pivot". A hover as the name suggests is a demonstration of the ability to remain completely stationary at a depth below the surface with the body horizontal thereby demonstrating that neutral buoyancy has been achieved. The fin pivot is essentially a demonstration of the same buoyancy skill in the vertical position.

The students were unable to complete the "hover" part of the exercise as the water conditions were such that the divers were being moved by the swell or surge. It was maintained in evidence before me by all who took part in the dive that the fin pivot was carried out but in the statements which they made to PADI (Productions 57 and 58) shortly after the incident Mr Smith (the assistant instructor) and Mr Martin (the instructor) both recorded that they did neither the hover nor the fin pivot by reason of the water conditions.

Notwithstanding that the preliminary training elements had not been completed the party then set out under the instruction of Mr. Martin for what was referred to in evidence as a "fun dive".

Regardless of the title given to the activity which followed the trainees were still under the instruction of Mr. Martin and Mr. Smith . They left the immediate vicinity of the point where they had entered the water and swam under water through the channel into the open sea. The party was led by David Martin and his assistant instructor was Mr Stuart J Smith.

Notwithstanding that he was buddied to both Martin and McLeod, Mr Smith was bringing up the rear and observing the divers to ensure their safety.

The party was heading for a location known as Divers Hole which was some distance from Weasel Loch. In order to reach Divers Hole they required to leave Weasel Loch and enter the open sea : they would require to travel some distance round a headland in order to enter Divers Hole.

Part of the equipment being worn by every diver was a gauge which indicates the volume of air remaining in the tank which forms part of his breathing apparatus. At the time of the pre-dive briefing (to which I will return later in this Note) it had been decided that the party should come to the surface when any member reached a minimum of 50 bar of air remaining in his tank. In the course of the dive which was now taking place Mr Smith checked the air of all divers approximately two to three times.

As the dive progressed the party reached a number of lobster pots outside Weasel Loch and en route to Divers Hole and which were known to be at that location . A decision was taken that the party should now return underwater to Weasel Loch. The decision was probably taken by Martin. At about this time Smith was aware that two

additional divers were now with their group. They were Forbes and Smythe who were not part of the group under the instruction of Martin and Smith. At about the same time the now enlarged group split up. Also at about the same time Martin decided to take Forbes to the surface without communicating that fact to the rest of the group. I was satisfied on a balance of probabilities that the reason for the group splitting up was Martin's decision to take Forbes to the surface.

Smith became aware that the group had split up. He was aware of only McLeod, Moore, Sandford and Christie. He knew that Moore was Iqbal's buddy and had become separated. He assumed that Moore knew. He did not ask him. He knew that he had lost the rest of the group when they split. Mr. Iqbal became separated from his buddy and from the rest of the group at about this time.

Smith checked the air of Caroline McLeod and her supply was at a level which caused him to decide to bring the group with him to the surface.

Moore, Smith and McLeod surfaced without doing a safety stop on their way to the surface. Sandford and Christie made a safety stop 5 metres below the surface. The group had now split up further.

When Smith surfaced he saw Martin swimming towards him on the surface and Martin gave him the hand signal asking if he was "okay": he returned the signal indicating that he was "okay".

Smith did not report that he had lost a diver. He told Martin that Sandford and Christie were doing a safety stop.

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Beyond Martin he saw what he thought were three people swimming towards Weasel Loch and he assumed that that accounted for the group. He knew that Moore was now separated from his "buddy", Mr Iqbal, and that Moore was not doing what a "buddy" should do. He then said that he asked Moore (presumably by hand signals) if he and Caroline were okay. He assumed that Moore knew that he had lost his "buddy". He assumed that Mr Iqbal was with the others whom he had seen but did not check. When he reached the surface there was swell of two to three feet in the sea. David Martin was between him and Weasel Loch and was swimming towards the group. He thought that Martin would know that the deceased and Moore had been separated. Having been separated from the remainder of the group Mr. Iqbal was without guidance supervision or support. He was wearing a defective pressure gauge which gave him false information as to the content of his air cylinder. He ran out of air while separated from the rest of the group below the surface.

Neither Smith nor Martin realised that Mr Iqbal was missing until they got out of the water at Weasel Loch.

The party was then organised on the cliff tops to look for Mr Iqbal in the water.

The coast guard were alerted and Mr Smith eventually went back into the water along with Mr. Conn Ward who had not been participating in the activities under the

instruction of Mr. Martin but who was probably the most experienced diver at Weasel Loch that day.

They eventually found Mr Iqbal on the sea bed at a depth of approximately 14 metres. He was on what was described as a track from the lobster pots about 25 metres distant from the lobster pots themselves and outside but close to the entrance to Weasel Loch. He was still wearing his dry suit and his belt which carried his weights. His buoyancy control device was not inflated nor was his suit. The gauge for his air supply was showing a reading of 20-30 bar.(I was unable on the evidence to determine the precise figure beyond 20-30 bar.) His depth gauge was recording a depth of 31 metres notwithstanding that he had not been below 16 metres in the course of the fatal dive. His face mask was still in place and there was no damage to his diving suit. I could not be satisfied on the evidence whether or not his the mouthpiece part of his breathing apparatus was still in his mouth. He was found approximately three quarters of an hour after the party had exited from the water. They did not attempt to give him air: he was blue.

According to his gauge he still had air in his tank to a level of 20-30 bar but when they tried to fill his jacket from his tank no air entered the jacket. Mr. Iqbal's pressure gauge was defective

Mr Iqbal was declared dead by a doctor on arrival at the quayside at Eyemouth.

I was satisfied on a balance of probabilities that Mr. Iqbal became separated from the group at around the time that the instruction to surface was given and that his absence went unnoticed by his buddy, by the assistant supervisor, Mr. Smith and by the supervisor, David Martin: that the pressure gauge showing the amount of air remaining in his tank was defective : that the depth gauge he was wearing had not been zeroed before he entered the water :that the difficulties he had experienced on first entering the water had contributed to his having a lower volume of air available to him at this point in the dive than any of the others by the time they set out for Divers Hole: that while his breathing equipment was functional there were a number of defects in that breathing equipment which, when combined with his inexperience would have caused him to be using air at a higher rate than a more experienced diver : that having become separated from the rest of the group under instruction at or about the time that the instruction to surface was given he ran out of air and having run out of air there was no assistance available to him from either his buddy , the instructors or any other member of the party from whom he had become separated : that by reason of his inexperience with the equipment he was using and the circumstances in which he found himself he was unable to carry out emergency procedures such as the dumping of his weight belt. He was overcome and died on the seabed.

These then are the bare events which I am satisfied took place.

There are other aspects of the activities that day to which I shall return later in this Note.

The Evidence relating to the Dive :

I turn now to the evidence: certain formal evidence was given by **Dr. Paul Fineron** a Senior Lecturer in Pathology at Edinburgh University . He carried out a post mortem examination of the deceased.

He found no disease to be present which could account for Mr. Iqbal's death.

The deceased's lungs were moderately full of fluid and were of a consistency which was consistent with death having been caused by drowning.

He issued a death certificate in which he certified the cause of death as 1(a) presumed drowning and (b) diving incident.

He said that it would be reasonable to change the cause of death to simply " drowning.". I accepted that conclusion.

I heard evidence of a background nature from Mr. Iqbal's fiancée, **Ms. Harjit Ram**. They had been engaged for a number of years and she had known him for fourteen years. She did not dive with him.

The deceased had gone on a number of diving courses and had qualified as an Open Water Diver. In the summer of 1998 he began his Advanced Course. All his courses were done through Aquatron in Glasgow.

On one occasion about a month before his death he had told her of some difficulty which he got into in the course of a dive. He said that he had just found it claustrophobic and got into difficulty. Someone had had to bring him to the surface.

She did not know how many dives he did after that and she did not know that he was diving on the day of his death

He did not talk about it much as he knew her attitude towards diving.

She identified his handwriting in his personal Diving Logs.

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I deal next with the evidence given by the instructor, David Martin and Stuart Smith.

A number of days of evidence passed and many separate issues relating to equipment and diving procedures were explored between Smith and Martin giving evidence in relation to the fatal dive. They were important witnesses in relation to the immediate circumstances surrounding the death and for that reason I deal with their evidence together.

David Martin was the instructor who was nominally in charge of the group .He was 32 years of age and had started diving during 1995. He qualified through the PADI system and was now an Instructor Development Course Diver.

He became an instructor in 1998. On the day in question "I was the nominated supervisor, it's a bit vague, but because I was full time it was my role: Stuart (Smith) was a casual employee." By September 1998 he owned his own equipment but the majority of the party were students and were hiring their equipment from Aquatron. The student paid for their course and he thought that at that time the course fee included the cost of hiring equipment. He was provided with a Risk Assessment (Production number 33) which was prepared on the 14th September 1998 by Mr Ronnie Young , one of the principals of Aquatron and who later gave evidence. The Dive Plan (Production number 34) was prepared by Mr Martin himself and is in his handwriting: in it he names himself as the supervisor and it purports to describe how before the party entered the water they would have decided what dives they would be doing.

There were four trainees. Ronnie Young had decided in Glasgow what was to take place and where it was to take place: Martin took his instructions from Mr Young. Martin had dived on four previous occasions at Weasel Loch but he had never taken trainees there. The party met at Aquatron's premises in Glasgow and consisted of the following persons: -

Mr Christie who was not part of the training group: he did not give evidence.

Mr Forbes who was not part of the training group: he did not give evidence

Mr Smythe who was not part of the training group: he did not give evidence

Mr McLean: not part of the training group : he did not give evidence.

Mr Ward who was not part of the training group

Mr. Stuart Smith the assistant instructor.

Mr. Moore who formed part of the group under instruction.

Caroline McLeod who formed part of the group under instruction

Mr.Iqbal and

Mr. Sandford who also formed part of the group under instruction.

Derek Clarke who was to be the divemaster on shore. He did not give evidence.

Mr. Martin himself, the instructor.

There were accordingly 4 trainees and two instructors in the immediate party of which the deceased was a member.

Part of the dive plan document was completed before they left Glasgow. Martin knew that the trainees (except Caroline McLeod) were having their first experience of a dry suit. He agreed that it was an essential part of that training that it should take place in confined water. (cf definition at page 11 hereof) He said that he did not realise at

the time of the accident what he knows now. Everybody he knew up to that point had done their introductory training in the sea. He said that there is nowhere in the United Kingdom where sea conditions are swimming pool like.

He said that he now realised that because the PADI system is American they are describing sea conditions in for example Florida or the Red Sea. He would now say that confined water training could not be done in the sea in Scotland. Since the date of this accident initial training has been done in a swimming pool. He accepted that it was wholly inappropriate for this training to take place at Weasel Loch that day: he says so with the benefit of hindsight. There are companies who are still doing their training in the sea: PADI have made it clear that there is nowhere in the sea which could meet their conditions for confined water. He agreed that if he had consulted the PADI manual he could have found the answer as to whether or not this training could take place in the sea but he said that this was something which was just always done.

The party travelled from Glasgow to Eyemouth by a bus which was owned by Aquatron. After disembarking they had a look at the sea conditions from the cliff top. There was a bit of a swell: "you could see the water rising and falling on the cliff walls."

Mr Ward and Mr McLean decided the conditions were good enough for them and they decided they were going for a dive. Martin was "struggling to remember" what instructions he gave to Mr McLean. He agreed that he was Mr McLean's instructor: Mr McLean was a paying customer of Aquatron and was obtaining a diving qualification.

At the cliff top he did a "skills overview" with the group of trainees namely, McLeod, Moore, Sandford and Iqbal. This covered buoyancy control, weights, air supply and other matters.

When asked what weight should be being worn by each diver he said that he was able to assess from experience what weight they should be carrying. He was carrying extra weights which were available for any adjustments which required to be made and after a quick check at the beginning of the dive he could carry out any necessary adjustment.

The party of trainees then entered the water at Weasel Loch. It was not long before he realised that Mr Iqbal was having a problem. He appeared to have lost a fin and was having problems trying to get his fin back on. (I did not accept Mr. Martin's evidence that Mr. Iqbal's difficulties related solely to his having lost a fin.) Derek Clark insisted that Mr Iqbal check his buoyancy control device because he was ducking under the water. With their buoyancy control devices inflated the trainees were able to retain buoyancy on the surface. Martin did not think that he had to adjust anybody's weights and I heard no evidence which suggested that any trainee required adjustment to the weight which he or she was wearing on entering the water for the first time that day.

I pause in this record of Martin's evidence to observe that I found Mr Martin's approach to the important area of buoyancy control to be unfortunately casual.

He purported to be able to rely upon his experience which gave him the ability to make a visual assessment of the individual concerned to determine the appropriate weight they should be carrying as opposed to their actual performance in the water.

The weights worn by Mr. Iqbal in the past according to his diving log varied from 24lb to 28lb in a wet suit . He was now carrying out his first dry suit dive which can require up to an additional 6 lb. in weight. (I accepted the evidence of the witnesses Nelson and Ward in this matter)

Bearing in mind that Mr. Iqbal was on his first dry suit dive I am left with grave doubt as to whether or not Mr. Iqbal's basic buoyancy level in a dry suit had been determined. In saying so I also bear in mind the evidence which I accepted that Mr.Iqbal was in difficulty immediately on entering the water.

Mr. Martin in his evidence went on to say that the party then descended underwater to the bottom and continued with their training. A fin pivot was done. He was asked why in his report to PADI he said that no fin pivot had been carried out. He did not know why he had said that. It was pointed out to him that Mr Smith said the same in his report to PADI which was also dated two days after the incident. Mr Martin had no explanation for this.

He said that the conditions were good but there was a surge in the water. The fin pivot was difficult under those conditions with four people moving in a confined space. It was not feasible to do the hover.

It was put to him that under these circumstances he could not have assessed if they had attained the necessary buoyancy skills: in response he said that this was difficult to explain but the water movement was worse in the body of the Loch than at the point where they had entered the water. He decided that there was therefore no point in continuing with a dry suit training dive. He thought that they had enough instructors to take the party out into the body of the Loch and the sea to test if they could use the equipment. He said that that was what he thought at the time but he would not do it now. The trainees had traveled a long way for this exercise. He said there were four trainees and two instructors and he felt that they could control the situation. He agreed that his actions did not comply with PADI instructions in a number of respects but he did not think he was putting the trainees at risk.

It was put to him that trainees require to be familiar with their equipment to which he replied that they were as familiar with it as they were going to be. They could obviously use the equipment. He did not think it was unsafe. He said that a dry suit is not a complex piece of equipment. He had done fifteen hundred to two thousand dives. He had done two to three hundred dry suit dives in advanced training dives and these trainees got the same as others. He did not do anything different from what he had done previously. He accepted that it was not in accordance with PADI guidelines but it was in accordance with Aquatron practice.

Again I pause to to observe that in this additional area of the necessity for students to have had ample safe opportunity to familiarise themselves with

new equipment I found Mr. Martin's approach to be at best cavalier and at worst, irresponsible.

He said that during the briefing, before the party entered the water, he had said that if they could not complete the training he would take them for "a wee dive round the headland"

In his formal report to PADI he made no reference to this potential change in the instructions nor is it reflected in any way in the dive plan.

He said that the party was going on to do "a fun dive". He agreed that they did not leave the water between embarking on the formal training element of the dive and continuing with the "fun dive." He agreed that the PADI instruction manual requires that trainees should leave the water and de-suit. He said he was unaware of that requirement but said that he felt that he had met that requirement by discussing it in the briefing.

He then described how he was Caroline's "buddy" : Mr Iqbal and Mr Moore were "buddied" : Neil and David Christie were somewhere and Stuart was at the rear.

I have already mentioned that the name of David Christie does not appear on the dive plan at all.

He also said that Stuart Smith was "sort of "buddied" with me" but agreed that if Mr Smith had experienced a problem he would not have known about it. He agreed that he could not rely on Caroline who was inexperienced. Mr Sandford and Mr Christie had both done about the same amount of dives and Mr Iqbal and Mr Moore knew nothing about dry suits. Stuart Smith was at the rear to keep an eye on them.

I find that the Dive Plan was defective, that the pre-dive briefing was inadequate and that there was patent failure to adhere to the buddy system. Bearing in mind that what is demonstrated by this passage of evidence is not simply a diver failing to observe established diving practice but an instructor dealing with trainees who are expected to be learning safe diving practice , the failures of Mr. Martin in this respect are of a high order.

He then described how , during the dive which followed and before the group had reached Divers Hole, the decision was taken to turn back and return to Weasel Loch : somebody was said to be at 100 bar. The party headed back, they came to the lobster pots and stopped. He gave the manual signal to everyone asking if they were "okay". He said that somebody was down to 50 bar therefore the party was going to surface. He swam round them all and confirmed that all were "okay".

He then said "...this is where it all gets kind of" And left his answer unfinished.

Surfacing, he said, is not a point which requires particular attention.

Mr Iqbal was there and everyone was okay. At about this time Smythe and Forbes appeared. They were not part of his group of trainees but they were both Aquatron

trainees. Smythe was not on "an Aquatron dive". Forbes signaled that something was wrong. Mr Martin therefore turned and signaled to everyone in his group to surface.

At this point I contrast the evidence of the instructor, Martin, with the assistant instructor, Smith. Smith maintains that it was he who gave the instruction to surface. I was satisfied that control of the group was lost by Martin and Smith: that Martin left the group without communicating that fact to anyone in the group : that the instruction to surface was given to the remainder of the group by Smith . Whether Mr.Iqbal was aware of an instruction from Martin or Smith can never be known. That no one checked on Mr. Iqbal's well-being or the state of his equipment or that he was in fact able to carry out the necessary steps to surface is known. Mr.Iqbal would now have been on the point of carrying out his first resurfacing in a dry suit.

Martin continued with his evidence by recounting that it was not until he came to the surface with Forbes that he learned that Forbes was low on air. It was drawn to his attention that in his statement to PADI he had said that Forbes had indicated underwater that he was low on air.

Why he did not simply instruct Forbes and Smythe to surface while he remained with the trainees was never explained.

He said that his decision was simply " a judgement call" as Forbes was telling him there was something wrong.

He said that he took hold of Forbes by his buoyancy control jacket and took him to the surface. Caroline McLeod surfaced with him: Caroline was close to him throughout the dive. Stuart Smith surfaced very quickly behind him approximately 10 to 15 feet away. He was not sure who all had come to the surface. He could see Stuart and other people and he recognised Neil (Sandford) and David (Christie). He did not do a head count "we just never did it". He agreed that there was a break down in communication.

The party then swam on the surface towards the exit point: he had taken the longest to get there because he was assisting Caroline. He did not know Mr Iqbal was missing until he reached the exit point. He thought Mr.Iqbal might be on the surface.

He described how Mr Ward, by reason of his greater experience, then took responsibility for the search which followed. After some time he, Mr Martin, went out in the lifeboat. They eventually found Mr Iqbal against rocks. He had no mouthpiece in place. His face mask was on: he did not remember seeing any blood.

He tried to inflate Mr Iqbal's BCD: there was no air in his tank. He ditched Mr Iqbal's weight belt and he was lifted to the surface. His pressure gauge was showing 20 or 30 bar. He was at a depth of 14 metres. He said that in an emergency you should ditch your weight belt and come to the surface.

He said that the dive which they did that day was not a dry suit dive "for Fun and Pleasure" in the context of the PADI instruction manual at 3-25. He agreed that no

safety stop was done during surfacing. He agreed that they had not removed their equipment after completion of the training and agreed that they did a "fun dive" but not a "training fun dive". It was suggested to him that this reference to a fun dive was an invention to cover his failures on that day and to "get PADI off his back". His response was simply that he knew that a hover had not taken place.

At the conclusion of his Evidence in Chief I invited his comment on the apparently obvious fact that Mr Iqbal had died while in the company of five other people each of whom was equipped with an emergency air device (the octopus) which might have saved him. He said that he thought that the other instructor should not have left the bottom until everyone had surfaced.

The foregoing may well have been one of a number of considerations which could have saved Mr. Iqbal. It could reasonably have been expected that such an instruction to the effect that the other instructor would not leave the bottom until everyone had surfaced might have been covered in the pre-dive briefing. It is also a position which sits unhappily with Mr. Martin's earlier evidence that the ascent requires no special attention. The confusion in the management of the group of trainees which is demonstrated at this point draws together a number of the failings in the whole diving operation that day.

In cross examination to counsel for the family of Mr Iqbal it was put to the witness that the conditions into which he took the trainees were entirely inappropriate. He said that he would never take first time students to those conditions. He agreed that if the training is not carried out in a pool there is always a risk of things going wrong. With hindsight the location was not the right place and so far as Mr Moore and Mr Iqbal being "buddied" when both were novices he agreed that they required close supervision.

It was pointed out to Mr Martin that the depth gauge which was being worn by Mr Iqbal was reading a depth of 31 metres. Bearing in mind that Mr Iqbal had not been below 14 meters he agreed that this appeared to indicate that the depth gauge had not been returned to zero before Mr Iqbal entered the water. He said it was something they should be taught to do automatically. It should have been dealt with at the pre-dive briefing.

He said that Mr Iqbal was a diver not a novice and pointed out that there was nothing to have prevented Mr Iqbal having hired the equipment and having gone out by himself.

That may well be correct but is a defensive position which does not absolve him in his capacity as an instructor from his responsibilities either to the trainees under his instruction or to the PADI system under which he was operating.

He agreed that it was an important part of diving that they should know what weight was required on their belt. By reference to productions 20-26 he agreed that Mr. Iqbal's weight appeared to be changing throughout the dives and varied from 24 to 28 lbs. and some had no weights recorded in his log. He said he was satisfied that Mr Iqbal had a proper understanding of the importance of the weight belt. He said

that if there are blanks in Mr Iqbal's log these are blanks for which he , Mr Iqbal is responsible and he, Martin, could not be criticised.

On being asked if he thought it was sensible to take the four named trainees out into water so far that by the time they got to Divers Hole they would require to surface and have a long swim back, he responded by saying that it was difficult to predict where you are going to surface.

I considered this to be a further demonstration of the lack of thought and planning which went into the dive bearing in mind the experience of the trainees.

He agreed that students will use air quicker than an experienced diver. His instruction was that the party should turn back when anyone was at 100 bar. That should have provided for enough air for all to get back.

He agreed that it is important that a student should be comfortable with his equipment and his surrounding circumstances. He disagreed that Mr Iqbal demonstrated any signs of distress, that he struggled with his buoyancy control device or had to come out of the water. He said that the problem was nothing to do with the dry suit, the problem was with his fin. That explains why he was going under. There was a wee bit of water movement and he was struggling.

I have already indicated that I do not accept Mr. Martin's account of Mr. Iqbal's difficulties on entering the water.

He was asked why the Scottish Sub Aqua Club take trainees to swimming pools for hours in their buoyancy training: in answer he said that it is down to individual instructors and his branch never went to those lengths. Many Scottish Sub Aqua Club members did training in the sea.

He described how when wearing a dry suit air requires to be dumped as the diver is ascending. If you dump too much you will go to the bottom or alternatively you could ascend too quickly and in an extreme case bends will result. He agreed that learning buoyancy skills is essential but explained that a dry suit is merely a different way of doing it. It would not do them any harm to revert to use of their buoyancy control device.

He said that getting the weight right has to be done in the sea it cannot be done properly in a swimming pool. If you don't get the weight right then you put air into the suit. From his, Mr Martin's, experience he knew that Mr Iqbal would not have to put much air in when he was carrying weight of 28 lbs. He was asked if a dry suit will in general require 6lbs extra weight: he said that he could not agree as the dry suit has a tendency to be slightly heavier to begin with.

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I now deal with the evidence of the Assistant Instructor Stuart Smith

Mr Stuart J Smith is a master scuba diver trainer who qualified through the PADI system. In 1998 he was an open water instructor and was employed on a casual basis by Aquatron. He was the assistant instructor to David Martin. He had previously dived at this location on five or six occasions.

He described the weather as clear: there was a swell on the water: it was not swimming pool conditions but met the confined water description for PADI. On being confronted with the PADI definition of confined water training he agreed that the conditions did not comply with PADI but said that it wasn't dangerous. He said that for novice divers it did not comply with PADI.

He described the briefing at the cliff top which he said was (1) how to use a dry suit (2) a feet first ascent (3) skills to be done and what would be done if these skills were unable to be carried out i.e. they would continue with a fun dive. He said that the people concerned were already trained in buoyancy and it is just a matter of adding or taking away air. People who could not perfect these skills should not be there but once you are a qualified open water diver there is no requirement to be trained in a dry suit.

I contrast this passage of his evidence with a directly contradictory position which he adopted on being confronted with the PADI requirements for dry suit training below.

He agreed that a dry suit has different characteristics to the extent that the suit itself is a buoyancy control device. He described other things which can go wrong in a dry suit but said that these are addressed in training with the dry suit. He said that it was sensible to put someone into open water when they had not been trained in a dry suit. He said that Mr Iqbal would be going into the sea in a dry suit at some stage and they were now going to do it in Weasel Loch. He said they did most of the training: the only thing they did not do was the hover: he then said

"strictly speaking we did not complete the training and strictly speaking we did not have confined water".

He said there is an element of risk but these are experienced divers. They had experienced diving before.

His attention was drawn to the PADI requirement for dry suit training: he agreed that when training is to be done it requires to be done in a specific way. He did not agree that there is a difference between a fun dive and instruction. He said that you can take people into the water for a Discover Scuba course in a dry suit without them having had any experience of diving before. All of the trainees had experience of buoyancy devices. He himself simply bought a dry suit and went out diving,

His attention was directed to production number 14 which is the PADI standard safe diving practices statement of understanding.

He said that going into the sea untrained in a dry suit is not consistent with his experience. Mr Iqbal was breaching the requirements in going into the sea and anyone responsible for him as also breaching the safe practice.

He repeated that that they were going to do a training dive but if they could not complete all the skills they would just do a fun dive: the students would know it was a fun dive. His responsibilities on the day were to bring up the rear to watch the divers and ensure their safety.

He knew there was some problem with Mr Iqbal at an early stage of getting him to the water: he confirmed that they did not do the hover. That was David Martin's decision. He said that in the conditions "strictly speaking " it was not possible to complete that.

He confirmed that they continued out of the Loch and into the open sea: this was just a fun dive to see what was there; the training had been abandoned. They had asked if all the trainees were agreeable and they were. They could do the hover at some other time and would then be "signed off". His attention was directed to the instructor manual under the heading of confined water training where it is provided that

" the confined water session cannot be combined with open water training dive: after a confined water session students must leave the water and remove equipment."

He said they did not do that because the entry and exit was not appropriate: it would have taken some time to do all of that. This was a means of saving time and the PADI standards were put to the side. So far as the PADI system was concerned he was keeping an eye on Caroline (McLeod) David and him were splitting responsibility between them. He said Caroline's "buddy" was principally himself because David was leading the dive. David did not have a buddy.

On his attention being directed to paragraph 5 of production 14 :-

"adhere to the buddy system throughout every dive"

he said it was a group of three and they were both buddying Caroline . He said the buddy system can go out of the window in a group. He said that David Christie was there and he was an experienced diver: it is better to team up the inexperienced with experienced.

He checked all divers two or three times during the dive and he checked their air once before the group turned back: the decision was taken to return to Weasel Loch when they reached the lobster pots: it was not the decision at the that point to go to the surface. He did a head count and came up with two more than they should have had. The other two were using hired equipment: they had no Aquatron personnel with them. They were doing their own thing and were not in a PADI training scheme. He just assumed that they were following the same route as the group. This can be a problem. The group split up after the lobster pots. He could see Caroline, Sam Sandford and Christie: he knew that Sam was Iqbal's buddy: he couldn't see any of the rest of the group but just assumed they had gone off in a different direction. There is a signal for "where is your buddy". He did not ask Sam Moore where his buddy was. He assumed that Moore knew that he had lost his buddy.

There are specific things which require to be done when a buddy is lost :these include a search for one minute at that location and then surface and attract attention.

None of the recommended practices in relation to a lost buddy were followed.

He checked the air of the members of the party and told them to surface.

It will be recalled that Martin also asserts that he, Martin, gave the instruction to surface.

He assumed Iqbal was with the others: he did not check. He said that Iqbal could have been sitting on the surface waiting for them: he just missed out the search. Himself, Caroline and Sam did not do a safety stop: it was not required. They were not on a training dive so did not need to do the safety stop.

His attention was drawn to production 5 Advanced Guide A - 13. He said that a safety stop was two more minutes and he wanted to get them to the surface. They had stopped the training dive before they came out of Weasel Loch. His attention was directed to the Instructor Manual at page 8 and he said that safety standards are not different between a training dive and a fun dive but they were not on a training dive so they did not need to do the safety stop.

On surfacing the swell was two to three feet in height and it periodically stopped him seeing David Martin.

He did not report that he had lost a diver.

He told Martin that Sandford and Christie were doing a safety stop: he told the group to head for the shore. He had seen three people swimming into the Loch. He thought that Martin would know that Iqbal and Moore had been separated. He did not realise Iqbal was missing until he got out of the water.

He then described how he returned to the water and found Mr Iqbal (all as described above)

In cross-examination he said that the decision to go to Weasel Loch for the training exercise would be taken by Ronnie Young and David Martin.

Aquatron used swimming pools for training. They would be hired in the evening. He said that the policy at that time was for the first dry suit dive to be done in open water, not a pool. That was the industry norm. It would be done at St. Catherine's , Loch Fyne, and Loch Long. In the right conditions St. Catherine's could be treated as confined water. Weasel Loch does not share these conditions only in respect of the access. There is no current and being north facing does not present a problem with swell or surge. He agreed that it was not swimming pool conditions.

He was referred to production number 5 (Instructor Manual) at page 8 (open water training)where reference is made to "any body of water considerably larger than a swimming pool.": confined water training is described as "swimming pool or an open

water site that offers swimming pool like conditions." He regarded the pool area at Weasel Loch as safe for confined water. He considered that it would meet the industry norm for confined water.

I did not accept this unqualified assertion : from time to time in the course of the evidence reference was made to the fact that initial training being carried out in the sea was, as it was put, " an industry norm." Whether or not that is the case I am unable to say on the evidence before me. While the evidence led in this Inquiry covered a wide range of activities it was neither directed towards nor did it establish what could be termed norms within the diving industry.

Smith, however, agreed that it did not meet the PADI standards according to the manual.

Since this accident Aquatron now does confined water training for dry suits in a swimming pool as a matter of policy. He knew that PADI had become involved in the inquiries into this incident and would be looking to see if their standards had been complied with.

When Mr Iqbal was found on the seabed there was no indication of a tear in his suit. There was nothing to indicate whether he might have been doing a feet first ascent. If they had completed the hover it would not have assisted him if his suit had been torn nor if he had been doing a feet first ascent.

When he was found his gauge showed thirty bar but they could get no inflation therefore there was no air. There was something wrong with the gauge.

It was put to him that David Martin had told the group to ascend and exchanged hand signals with him. He replied that Martin's signal was to turn round. Caroline had under one hundred bar and he told Martin it was time to turn back and it was a minute or two after that that the group split. Martin went round every single member of the group

oOo

I have dealt with the evidence of Martin and Smith together for convenience because they were the instructors for the group. Their respective accounts of events are at variance from the point in the course of the dive where decisions were taken to turn back until the party surfaced. On both of these accounts, however, Martin left the group of trainees without regard for their safety at a critical point in the exercise. At one point in his evidence Martin had said that surfacing was not a stage which required particular attention. At another stage he said that the other instructor should not have left the bottom until everyone had surfaced. By leaving them at the time and in the manner which he did control of the group was lost. Smith on the other hand was aware at about the same time that Iqbal was separated from his buddy and took no steps whatever to deal with that situation.

It will be borne in mind that Iqbal, Moore and Sandford were trainees who had never made an ascent in a dry suit. They were undertaking their first dry suit dive. Iqbal

and Moore were buddied together on their first dive and had become separated. Martin, the instructor was unaware that they had separated because he had left the group to their own devices. Smith, the assistant instructor, was aware on the other hand that they had become separated but took no steps whatever to initiate the appropriate procedures nor to alert Martin or anyone else to what had occurred. Martin took no steps whatsoever to regain control of the group of divers under his instruction when they came to the surface. There was total loss of control of the group of trainees by the instructors. The buddy system was ignored. Standard search procedures were not undertaken and no attempt was made to ensure the integrity of the group before they left the location where they had surfaced.

Every member of the group was wearing equipment which was fitted with a spare breathing regulator (the octopus). If the group of trainees had been kept under the observation and supervision of the instructors the fact that Iqbal was missing from the group at the point of ascent could have been responded to appropriately. There was ample equipment and air available which could have been provided to him if, as I conclude, he had run out of air whilst using equipment with which he was unfamiliar and in the use of which he had not received adequate instruction. His pressure gauge was also providing misleading information.

The failures of the two instructors to observe proper and established diving safety procedures was the principal factor in the combination of factors which resulted in the accident which led to the death. At that depth he could and should have survived running out of air. He should not have been in that location in the first place. Taking him into the open sea on his first dry suit dive was contrary to the PADI system in which he was receiving instruction.

Virtually every aspect of the diving operation in which Mr. Iqbal died demonstrates failures of its management and operation.

Proper planning of a dive is an important factor in ensuring the safety of the participants who should all be aware of what is to be done and the parts which each has to play and I now turn to aspects of the planning of the dive.

The Dive Plan

The Dive Plan prepared by Mr. Martin (Pro.34) makes no reference to any " fun dive " in the event of any other dive being aborted. The times recorded in advance of anyone entering the water for various dives taking place demonstrate that even that which was said to have been being planned in advance was incapable of being carried out as the times allowed in the plan for certain activities overlap in time with other activities by the same participants. I have already mentioned above that there is no mention whatever in the plan of the name of Christie who was participating in the fatal dive.

I am satisfied that the document prepared in name of a Dive Plan was no more than the paying of lip service to the requirement for such a document.

Part of my reason for including reference to this aspect of the dive in my formal determination (at 4(2)) is that failures to record properly the participants, the activities

and the functions of the persons involved can result in the dive master who remains on shore being in possession of a defective or incomplete dive plan and accordingly being unable to react appropriately when the diving group surfaces and becomes visible to him on the surface in the event of for example the failure of any member of the group to come to the surface.

I heard in evidence that divers will often identify each other in the course of a dive either by familiarity with their equipment, their body language or their general style. That may or may not be all very well where it involves individuals or groups who are well known to each other and where there is no possibility of encountering other divers in the course of group activity under water. I heard for example, that colours can appear to change underwater: divers are frequently wearing equipment which is virtually identical and that will tend to be the case in particular when groups of recreational divers hire equipment from the same supplier. In the present case the group of divers under instruction and supervision encountered two other divers who became involved with them to the extent that one of the supervisors of the group under instruction, which included the deceased, surfaced with the other two divers. That fact did not appear to have been known to all members of the group under instruction.

One result of this was that when the deceased's "buddy", Mr Moore, surfaced without Mr Iqbal, the number of persons on the surface and now swimming on the surface towards dry land resulted in false assumptions being made about the integrity of the group. Had there been (a) a head count and (b) some means of visual identification of individuals the absence of Mr Iqbal would have become immediately apparent. All of his party were carrying equipment which was fitted with a spare secondary regulator ("the octopus") and there was ample means of providing him with air if he had been found without delay.

The Pre-Dive Briefing

The next stage in carrying out the dive which I address is the pre-dive briefing. Obviously, as its name suggests it precedes the actual dive but for the purposes of this note I considered it appropriate to address first the actual events in which Mr. Iqbal met his death.

The evidence in relation to the pre-dive briefing illustrates further the confusion and uncertainty which existed in this diving operation in that Ms. McLeod had not heard of a "fun dive" and was unaware that the training would be aborted if conditions were not right. She was unaware of any discussion as to who would decide to bring the dive to a conclusion. Moore was unaware of any suggestion that the training dive might be aborted and thought that he was carrying out a "Dry Suit Dive for Fun and Pleasure" which is one of the PADI elective dives and Sandford said that Martin said that if the conditions were too turbulent they would not do the hover or fin pivot but would just do a fun dive.

I conclude that the pre-dive briefing was inadequate and that the trainees had not been adequately instructed in the precise activities which were to be carried out. I have already concluded that those activities which were to be carried out were inappropriate to Mr. Iqbal's experience.

A further demonstration of the lack of thought and preparation was disclosed when Martin was asked if he thought it was sensible to take the four trainees out into water so far that by the time they got to Divers Hole they would require to surface and have a long swim back. He said it was "...difficult to predict where you are going to surface." I accepted the evidence of Mr. Nelson to the effect that the dive should be planned so as to surface at or near the point where the dive commenced. This involves considerations of the rate of air consumption and a pre-arranged determination of a return point half way into the dive. No such considerations were undertaken by Mr. Martin or Aquatron which resulted in the party surfacing a significant distance from the shore.

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The evidence of the other divers

I now deal in turn with the evidence of the other participants in the dive who were called as witnesses.

Mr Samuel Moore was Mr Iqbal's "buddy" that day and gave evidence: he was on his ninth dive and had never previously dived at Weasel Loch. He had not dived in a dry suit prior to this date. He did no training in a swimming pool. When he arrived on the bus from Glasgow he was not aware of any concerns being expressed about the water conditions.

He and Mr Iqbal assisted each other in putting on their equipment.

So far as the conditions were concerned he said there as a bit of a "rush" in the Loch but nothing drastic. On entering the water he achieved buoyancy through the use of his BCD. He knew they were to perform a fin pivot and a hover. They did not do the hover: he did not know the reason why. He was not aware of Mr Iqbal being distressed; he understood that Mr. Iqbal lost a fin as he entered the water. Mr Moore did not feel in any danger. He was unaware of the deceased leaving the water.

So far as the briefing was concerned he was told that it would be a dry suit dive to demonstrate the skills and that it would then continue as a "fun dive".

He was not told that if conditions were not good enough it would turn into a "fun dive" He understood that a "fun dive" would not be part of the training but would allow the trainees to become familiar with the equipment.

By reference to production number 5 at page A - 13 of the Manual ("dry suit dive for fun and pleasure") he believed that that exercise was what he was carrying out.

He described the group going into the sea and the conditions in the sea were fine. Mr Iqbal seemed unconcerned. The group were informed that when their air supply reached 100 bar they should give a signal and likewise when the air supply reached 50 bar they should give a signal and would then surface.

They stopped at the lobster pots and checked their gauges. Mr Moore had 50 bar, Mr Iqbal had 54. He said that they signaled to surface. He could not remember if a

safety stop was done. He felt that having completed the dive he had earned his qualification. He also said that if you start as a training dive it finishes as a training dive; it is declared a fun dive before you enter the water.

When he reached the surface there was a one to two metre swell: he did not realise that Mr Iqbal had not surfaced with him. On the surface he noticed the distance which he would require to swim: he inflated his buoyancy jacket and set out for the shore. He had no difficulty in the ascent and would expect to be in close proximity to his "buddy". He had no memory of Mr Iqbal after the lobster pots.

On the surface he was beside Mr Smith and a female and he said to them "that's some swim - I'm off "

When he reached the shore the diver master shouted that Mr Iqbal had not surfaced. The coastguard was notified.

As will be obvious from the foregoing account not only did he fail to note the absence of his buddy but plainly he had no regard for his presence or absence throughout the ascent nor on his return to shore.

It is difficult to be overly critical of Mr. Moore for these failures. They were serious failures but he should not have been placed in the position which he was. It was his first dry suit dive. He was somewhat unfit. He was a poor swimmer. He had enough to cope with looking after himself. It was the failure of supervision and planning on the part of the instructors which was the cause of the situation in which he found himself.

In cross-examination he agreed that his total diving experience was approximately 4 hours. He was a poor swimmer. He said that there were four trainees doing a dry suit training dive with two instructors. There were another six people on the bus but those six were going for a fun dive.

In the briefing there was no suggestion that the training dive might be aborted.

After they got into the water he performed (1) hose replacement and (2) fin pivot : he did not do the hover because there was a bit of a swell. He had completed the training dive. He watched the others doing a fin pivot. They all completed and the party moved out together. After he surfaced the swim back to the shore would take approximately ten minutes. On the surface no one signaled to him that the group should reform as a group. He was unaware of a signal to that effect. He saw heads bobbing about but he couldn't say how many or who they were. He does not remember seeing Mr Martin at the lobster pots: he did not know where Mr Martin was. He agreed that there was no excuse for him not having checked for the presence of his "buddy" when he surfaced.

This was the first time he had ever tried on a dry suit: when trying it on at the shop they explained the inflation valve and the dump valve operation. You tend to use the suit to control your buoyancy . He had no difficulty in grasping the principles. Neutral buoyancy is obtained by letting air in or out of the suit.

He said that he was under water for 34 minutes and carried out checks on his equipment every three to four minutes.

He did not get his certificate at the end of this dive but Aquatron gave him a free dive. He never got his certificate because they wanted a dry suit orientation dive in a pool.; he did that later. He would have said that the conditions were suitable for being defined as confined water.

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Mr Neil Sandford also gave evidence: he was a qualified open water diver and was now doing his advanced course. He had logged 30 dives. He had never dived at Weasel Loch and he had never used a dry suit.

The purpose of his dive that day was (1) a dry suit dive and (2) a naturalist dive: these were being organized by Aquatron. He had his own mask, fins and snorkel but the rest of the equipment was hired from Aquatron.

He was allocated to dive with David Christie. This was done by the instructor. He knew that Mr Iqbal was on his first dry suit dive.

On entering the water Mr Iqbal had buoyancy difficulties: he was pressing his dump valve. Mr Sandford grabbed him and inflated his BCD; he had lost a fin: he was stressed but as soon as his jacket was inflated his was okay.

Derek Clark was the active dive master. Clark told Mr Iqbal to leave the water and checked him over to make sure he knew where the various valves were: Mr Martin came back in and got Mr Iqbal's fin. They did the fin pivot but not a hover: there was a bit of a surge which was moving the divers about half a metre in both directions: it was relatively calm but it was not pool like conditions.

After their knowledge review they did a dive briefing. They were told that if it was too turbulent they would not do a fin pivot or hover and would just do a fun dive. Conditions were not good enough for all of the requirements to be done: he couldn't remember the details of what was done but Mr Martin would have signalled and they would all have headed off for a fun dive. He knew he would no longer be trying to get his certification. He said that dry suit diving is actually easier than wet suit. He said that they did not go into open water: they surfaced at lobster pots at the mouth of the Loch: they may very well have been in the open sea and it may have been 20 to 30 metres back to the entrance to the Loch. They were in a reasonably tight group. He said that Mr Christie was in an attentive "buddy" and that David Martin was guiding them through the exercise. He did not know why the party had resurfaced but he assumed that the air limit had been reached: he understood however that another two divers had been met who were low on air. He had one hundred to one hundred and twenty bar remaining and was disappointed that they had to surface: he and David Christie came to the surface and made a safety stop at 5 metres for three minutes. They stayed approximately a foot from each other facing each other to ensure that they did not lose each other. He had been trained by Aquatron that a safety stop was necessary. They had been moved twenty to thirty metres from the remainder of the group probably by the tide which was running and had moved some

distance from Weasel Loch. They signaled to the dive master on shore that they were okay. The rest of the group had started swimming towards shore and they followed.

It was not until they reached the shore that they became aware that Mr Iqbal was missing.

In cross-examination he said that before going to Weasel Loch he had had an orientation dive in St. Catherine's Bay in Loch Fyne under the guidance of David Martin.

On the day in question he saw David Martin give the signal for the group to ascend. He was last aware of the group being together at the lobster pot: he could not confirm that every member of the party was there. The grouping of four students and two instructors with a diver master in the surface was a set up which was more than safe. It was his impression that Aquatron were well organised.

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The next witness who participated in the dive was **Caroline McLeod**. She had previously been trained in dry suit diving but had not dived for about twelve months. She said that on 19th September 1998 she was going on a training dive which was going to be made up of two dives, one being a dry suit dive and the second "to see the scenery". She was hiring Aquatron equipment for the dive. David Martin was in charge of the dive. They discussed inflation of the suits and what they were going to do.

She said that you do a buddy check before going into the water: this consists of checking the air in the tank, checking the weight that is on the weight belt, that the buckle is to hand for emergency release, and check if the jacket is inflating and deflating. Operating the valve allows air to release from the suit, which would cause you to descend.

In the water your buddy checks by signs if you are O.K. You keep your buddy in sight at all time. You should constantly be aware of you buddy and should check their air every five minutes. On surfacing, your buddy checks if you are O.K.

She was buddied with David Martin. The buddies were picked at the top of the cliffs, before entering the water.

The sea was choppy. She was asked if it was too choppy. She knew that she was with a qualified training company and assumed that it was safe.

She carried out buddy checks with Mr Martin and the party descended the steps and entered the water. Mr Iqbal was already in the water when she entered. He was having trouble maintaining buoyancy: he kept going under and coming up: he looked distressed: his arms were waving about and he was out of his depth.

Derek Clark (the divemaster) and another trainee diver went to Mr Iqbal's assistance. He came back to the edge and was helped out of the water. When he got out of the

water they were checking his suit. Checks were being carried out on his jacket, it seemed to be inflating O.K.

Mr Iqbal was asked to sit at the side of the water for a wee while. She was not aware of him having lost any equipment.

She was not aware of him coming back into the water and assumed that he had not got back into the water.

She said that they did not move out into the open sea. So far as she could recall they remained in the loch.

David checked her gauge a number of times.

David told her to surface. She did not know how far down they were. She did not remember any stops on the way up. She did not recall much detail of the dive: she relied on Mr Martin.

Her pressure gauge was close to minimum when she came up: she thought 50 bar.

When she surfaced they were far out, but still within the outlet close to the sea: it was still quite choppy, but not as choppy as the sea.

She said there was a collision between two people, and not involving her.

It possibly took 20 minutes to swim back to the shore.

She was not aware of a head count taking place.

Mr Martin was told as soon as he reached the edge that someone was missing. Her thought was that Mr Iqbal had stayed onshore: she thought he had gone for a walk.

The initial plan was for her to do two dives. She would not have done a second dive as she was too tired after the first. She looked along the shore for Mr Iqbal.

She was possibly under water for about thirty minutes.

In cross examination to Mr Gray she explained that she had an open water certificate: her dry suit was part of her certification.

It is a hazardous sport and the main safeguard is the buddy system.

There were nine or ten people on the dive, with a wide range of experience.

She assumed that all had an open water certificate.

She got the impression that most trainees had no experience of dry suit diving. She was not aware of any special selections made within the buddy teams. David Martin said she could buddy with him because she had not dived for a year. She felt she would benefit from his experience.

She would not have been happy without a buddy instructor.

There was no discussion in Glasgow as to who would be buddies.

The buddy must be capable of looking after himself. She would not be confident that she would be an effective buddy in a dry suit for the first time.

She said that Mr Iqbal appeared to have difficulty coping at the beginning. She didn't know if his buddy had previously dived in a dry suit.

She had not heard of a "fun dive". She did not hear that the course could be aborted because the conditions were not right.

She did not remember if anyone did a fin pivot.

There was a dive plan discussed to the effect that they would go to the bottom, have a look around, and gain experience. Buddies were to remain together. They were not told they could split up: it is assumed that you do not split up.

She has dived in the company of two other divers and normally the party remains together.

She understood Martin to be in charge of the dive and understood there was another who was qualified to provide assistance.

There was no discussion within the dive plan as to who would decide when it came to an end: she assumed the person in charge would decide.

She was asked what would happen if one buddy wanted to stop: how would that be communicated to David Martin. She said in response that she did not remember it being discussed.

So far as the depth gauge is concerned, you check that that is at zero before entering the water.

So far as the dive plan was concerned, she did not remember any discussion as to what should be done if your buddy gets into trouble. She remembered another party being present, but they left before her party started.

She vaguely remembers two people going into the water: she did not know if they were from her party or not.

She did not remember any discussion as to what to do if you lost sight of your buddy: she thought the procedure was to surface and see if he had surfaced.

Martin remained with her throughout the dive. She did not know if he went to the assistance of any other diver.

When she surfaced, Mr Martin was six feet away from her and the diver beside her was a trained instructor. It might have been the latter who came up with her. Identification of individuals whilst wearing suits can be difficult.

Dry suits have certain techniques: buoyancy can be controlled by letting air in and out of the suit. The purpose is to learn how to descend and remain on the bottom without using too much air. If you use too much air, you will be forced up. You have to learn the speed of taking air in: there is a danger of using it too fast.

She was asked if dry suit diving should be learned in a pool: she answered that she did not know, she has only previously dived in calm water.

The access to the water at Weasel Loch was not particularly easy. There were rocks at the entry to the water.

She was cross-examined by Mr Martin who, at this stage of the enquiry, was appearing on his own behalf.

She was clear about the signals to give if you run out of air: you get taught from day one what the procedure is: you should surface.

Visibility was average on this dive and there was white water at the edge of the rocks.

In cross-examination to Mr Anderson, she said that she had recreational diving experience previously.

On the open water course you learn the hazards of diving: you practised in a swimming pool first.

The early training was in a swimming pool. She was in a loch the first time she wore a dry suit.

At the end of her open water course she was now qualified to go out with another buddy but, in her personal opinion, she had not enough experience and therefore she signed up for the advanced training course with Aquatron.

The 19th September 1998 would have been her third dive of her training course. She had worn wet suits on previous dives.

So far as the pre-dive discussion was concerned, she thought this was a dry suit dive to gain experience and familiarity with dry suits. She was not aware of it being a qualifying dive.

It could have been said that this might be just a fun dive as opposed to a qualifying dive if the conditions were not right.

On entering the water, Mr Iqbal went under and came up three or four times. It looked to her as if he could not get buoyancy.

In re-examination she said that they waited for one to one and a half hours before they got into the water: they were just ascertaining if the water was O.K. to get in.

She was asked when a "fun dive was mentioned". She said when they were discussing the dive: she didn't know if it was during the briefing or during the one and a half hour wait.

She still thought this was a training dive.

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The final Witness who had any direct involvement with the dive itself was **Mr.Conn Ward**.

He was a very experienced diver and had logged some 1500 dives. He trained through the Scottish Sub Aqua Club

He had gone to Weasel Loch for a " fun dive. " He required no training or assistance from Aquatron. He had all his own equipment.

A friend of his, Mr. Ian McLean had trained with Aquatron and was going to Weasel Loch. He simply accompanied his friend.

He said that there is a big difference between diving in a dry suit as opposed to diving in a wet suit.

There was a swell in the water but it was diveable for an experienced diver.

He dived along with McLean before the Aquatron party entered the water. He entered the water at 1.39pm and was underwater for 20 minutes.

He got half way to Diver's Hole but knew that McLean was " heavy on air" as an inexperienced diver. He checked McLean regularly. They returned to Weasel Loch and left the water.

They watched the bubbles on the surface from the Aquatron party as far as the headland at the exit from Weasel Loch.

He only knew three people in the party and would identify people by their equipment.

He waited for them coming back. He thought they would be on the surface given the time and the number of trainees.

He saw them coming round the headland.

Derek Clark , the divemaster came running up the stairs from the water shouting that they had lost a diver and looking at the rocks to see if he had surfaced.

He told him to call the Coastguard.

He put his diving equipment back on as did David Martin and Stuart Smith.

It was 20 minutes before the coastguard came. They asked Ward, Smith and Martin to come out in the boat with them.

He described the search which they carried out and said "Mr. Martin and Mr. Smith had no clear picture of where he might be."

He described how they eventually came upon the deceased.

He was lying flat. He could not remember if his mouthpiece was in or out. .They tried to inflate his BCD : there was no air. His gauge was maybe reading 20 or so. He still had his weight belt on and had no air in his suit. He would not have been moved by the swell.

Ward thought it was very strange because the first thing a trainee should do is dump his weight belt as a last resort.

There was blood and mucous on his mask. The mask was on.

They dropped his weight belt and took him to the surface.

You should ascend to the surface with a minimum of 50 bar. You should ascend with a buddy. (he described the routine of doing so.)

He had not known that several members of the group were on their first dry suit dives. In perfect conditions in Weasel Loch it would be OK but the training should be done in a pool.

He would not have taken people into Weasel Loch for (initial) training.

He described the Scottish Sub Aqua Club training practices.

He said that you cannot buddy up 2 complete novices. It is not safe to allow two novices in open water. Weasel Loch was not "swimming pool like conditions."

He knows Martin : he is a good diver and a very capable instructor. If there were too many people he (Martin) would be stretched.

He then described how he accompanied the body to Eyemouth where police and a doctor were waiting.

He did not know what had gone wrong. You should be checking your buddy throughout the dive. You should do a safety stop while surfacing. This enables a check. The instructor should ensure that everyone is on the surface. He had never gone out in a group. There is a risk of getting mixed up or going off with the wrong diver.

In cross-examination to Mr. Gray he said that every dive has the same potential dangers whether it be a fun dive or an instruction dive. In training novice divers should be shown best practice. They should be required to do a safety stop

In a swimming pool you get used to the feel of the suit : only then should you go into safe confined water in near swimming pool conditions.

The buddy system is an essential part of the safety system In order to be effective it requires an agreed plan between buddies. If the ration of experienced to inexperienced is too high there is a risk of getting lost.

He would expect an instructor to be in charge of 2 buddy trainees. The instructor should treat them as if he was buddied to them. You should not buddy two novices.

In cross examination to Mr. McNeill he said that he did not know how far the group had gone.

In a swimming pool you concentrate on buoyancy control. The weight belt should be heavier in a dry suit than in a wet.

A dive leader should follow the dive plan. If anything goes wrong you abort the dive.

He described how if you lost your buddy you should search turning through 360 degrees.: you should ascend : wait for one minute checking for his bubbles on the surface. If bubbles are seen he should be at the bottom of them and you should go down to him. If you can't see bubbles the alarm should be raised there and then if you are with a group.

He was referred at length to various passages from the PADI Instructors Manual. He had not trained in the PADI system

In cross examination to Mr. Anderson he said that 4 divers who are Open Water Qualified + two instructors and one experienced diver is a safe ratio.

He said that if you meet two other divers who have a problem one instructor should be told to look after the group while the problem is dealt with.

In re-examination he said that a person in a dry suit for the first time is a novice.

A wet suit diver could lose buoyancy in a dry suit. One novice can't look after another and he was surprised when the suggestion was made that they should look for Mr.Iqbal outside Weasel Loch.

He said you cannot dive safely without a dive plan and you should not do anything dangerous like going into water with equipment with which you are not familiar.

The water that day was not calm. It was not appropriate (for the trainees).

I accepted the whole of Mr. Ward's evidence.

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Three witnesses gave evidence in relation to matters of diving practice who were not involved in the fatal dive :I now deal with them in turn.

Mr. Samuel Perkins gave evidence. He was a former instructor with Aquatron but not at the relevant date.

He was a PADI Master Instructor. And was a member of the National Association of Underwater Instructors.

He described the various gradings of PADI qualifications which were contained in a chart which was Pro.4A.

I do not propose to set these out beyond to say that Open Water Diver is the entry level to the system.

He had been head instructor at Aquatron for two and a half years and had left his employment with them in disagreement with them.

He dealt with the Open Water and Confined Water definitions from the Instructor Manual.

Mr.Iqbal came to Aquatron while Perkins was there.

The witness explained the buddy system, which is very important in diving and cannot be dispensed with.

He dealt with the duties of buddies, hand signals, the lost buddy procedure .

He then dealt with wet suits and dry suits explaining that a dry suit is also a buoyancy control device.

Buoyancy is easier to teach in a wet suit.

In dry suits a known hazard is a feet first ascent. Training is required to learn to control ascent in a dry suit.

He then dealt with the Advanced Course in the PADI system. He would not let a student into open water in a dry suit for the first time. Completion of confined water dry suit training is required.

He described the performance requirements including the achieving of neutral buoyancy: the identification of correct weights at dry and wet is necessary for buoyancy control

He described the hover and fin pivot exercises.

He knew David Martin. He taught him. He described Martin as a very good diver: he had not been around him as an instructor.

He heard on the radio about the death of Mr. Iqbal: he telephoned Martin just as a friend.

Perkins found it hard to believe that Iqbal was taken out diving in the conditions.

He said that Martin said that the conditions were bad and he couldn't make up his mind whether or not to train and he decided that if there could be no training they would just do a fun dive.

Perkins described the preparation which would be required for a training dive.

Depth course and route would all require to be planned and committed to writing.

It is absolutely necessary to plan it and carry out the plan.

He was shown Pro 33 the Risk assessment. It includes a provision that "...at no time will students take part in training that they do not meet the prerequisites for as laid down by PADI.."

If there was to be a change to the dive plan you should come out of the water and brief the divers.

If a student is not correctly trained in a dry suit he should not dive unless accompanied by an instructor: a buddy won't do.

A fun dive and training are quite separate.

Martin said to him during the conversation "...I'm covered...": Perkins was shocked.

Perkins found his attitude unacceptable.

Martin had said that it was the divemaster on shore who spotted that someone was missing.

If you couldn't do a headcount because of the swell you shouldn't be there in the first place.

If you witness something which is contrary to (PADI practice) you are obliged to inform PADI.

You can only change a training dive into a fun dive with experienced divers. If you are there as an instructor you remain in the capacity of an instructor.

In cross examination to counsel for the family, he said that he thought that Martin said that Iqbal had gone with another instructor.

To leave people with no experience on their own is dangerous.

Perkins had phoned Martin purely out of concern.

The PADI first dry suit dive should be in a swimming pool. He explained the reasons at length.

Students should not be taken to Weasel Loch for the first time in a dry suit.

The difficulties experienced by Mr. Iqbal on first entering the water were described and he said that it sounded like he was overweighted.

By reference to the Manual he described various provisions which require the student to be comfortable with his equipment.

Stress for the students should be reduced.

Two people on a first dry suit dive should not be buddies.

On ascending the whole group should ascend together.

Safety stops should be done.

Logs should be completed and signed by the instructor.

He was shown Mr. Iqbal's personal logs.

In cross examination to Mr. McNeill he said that safety stops should be trained as an automatic procedure.

PADI is a world wide standard. H&SE accept PADI standards.

He was taken through the procedures for completion of the Advanced Diver Course.

He did not accept that PADI envisages dry suit diving for unqualified divers as part of a fun exercise.

In order to get their certificate they require getting their confined water dry suit training in a swimming pool.

They have to be taught how to use the suit.

He agreed that Martin may have dived at Weasel Loch previously.

He was contacted by the family of Mr. Iqbal.

There were three or four different things about the dive which concerned him.

If he didn't know what he was doing with a dry suit that was just another factor.

He could have dropped his weight belt as a last resort and surfaced.

It was a mistake to put Mr. Iqbal in that position.

(He repeated his position in respect of confined water dry suit training being an essential prerequisite)

Various hypotheses were put to him

He had become involved in litigation with Aquatron.

In cross examination to Mr. Anderson for Aquatron He agreed the split was ill tempered.

It was suggested he was trying to make trouble for Aquatron which he denied.

He had never been to Weasel Loch.

He was taken through the requirements for various stages of the PADI courses.

He said in answer to one proposition that if this is not a training dive PADI have nothing to do with it.

He denied that he regularly puts people in the water without dry suit orientation training.

I allowed counsel for the family to re-cross examine on a matter which I find it unnecessary to record.

In re-examination he said that Mr. Iqbal was a novice , a very inexperienced diver.

He otherwise confirmed his earlier evidence at length.

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The next witness was **Police Constable Peoples** a constable of Lothian and Borders Police at Eyemouth. He was on duty when the call was received in connection with the incident and was present when Mr Iqbal's body was brought to the quayside and he was certified dead.

He took possession of the diving equipment. It was stored in a production cupboard at Eyemouth Police Office; it was sent to Glasgow for inspection two weeks later and left with the Underwater Unit at Strathclyde Police: it was eventually returned to Eyemouth for storage and thereafter was kept until spring 2000 at the production room at Eyemouth or Duns.

He had no recollection of seeing any blood on Mr Iqbal's face mask that day.

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The final witness before the Inquiry but whose evidence I find it convenient to deal with at this point was Mr **Ian Nelson**. He was led by Mr Gray for the family of Mr Iqbal. He had been in court throughout the whole evidence with the agreement of the parties

He was a senior assistant manager in a Leisure Complex in Glasgow: he joined the Scottish Sub Aqua Club in 1974. It is the national governing body for diving in Scotland and was founded in 1953.

He has over 600 logged dives and 1500 to 1800 hours of pool training.

He has been a snorkel diver since June 1974.

His training began in a pool for 3 to 4 months followed by 3 to 4 months in the sea following divers as surface cover. In November 1974 he was certified as a third class diver. This involved the use of both wet and dry suits. After 14 years he became a second class diver (now called master diver).

It is a very advanced course which requires 2 years membership with 2 years of diving and 40 logged dives of various depths some over 30 metres. He became a Branch Diving Officer in 1985 and joined the National Diving Council. He is the Assistant National Diving Officer in training standards.

As a regional coach he is responsible for all coaching in his area and for the carrying out of training courses. He is one level above instructor to ensure that standards are maintained.

He contrasted the different approaches of PADI and the Scottish Sub Aqua Club (SSAC). With PADI a qualification can be obtained (open water) after 4 dives: With SSAC after 4 dives you have no real experience and are very much a novice.

PADI advanced open water begins after 5 dives and requires a total of 9: SSAC would still regard this as a trainee diver. SSAC would require 30 to 40 hours before a diver gets near the sea: Then there would be 10 open water dives with a minimum of 5 hours in the water which would result in the minimum qualification of a "sports diver".

He spent some time explaining the diving computer which is worn by a diver and which figures in some of the evidence in this case. I do not propose to dwell upon this part of his evidence.

By reference to production No 35 he said he had never known there to be an error in the date produced by the computer unless it had been tampered with.

The time should also be accurate.

SSAC require a compulsory 5-metre stop for one minute to allow nitrogen to escape. Too fast an ascent can cause problems in subsequent dives.

He agreed that equipment should be serviced every 12 months or every 100 dives. He will not now do 100 dives per annum: He will average 50. The regulator should be washed in warm soapy water after every dive. He is not qualified to carry out servicing and said that anyone tampering with the regulator would be foolish. He has never seen anyone at any organised dive open their regulator: He has dived throughout the world.

Learning to dive with SSAC

The diving world changed when fast track diving came in. In order to increase membership you have to train people quicker. In the early eighties snorkel was incorporated into diver training. You cannot teach to dive quickly.

The first qualification is sports diver: Membership of SSAC is £102 for the first year and all training and equipment is free: You can take as long to complete the training as is appropriate. It can be in wet or dry suits: They recommend dry suit. A trainee does not get into the sea without going through pool training. A trainee will not be allowed to use a wet suit until he has completed diving training with (1) aqua lung, (2) buoyancy control, (3) BCD and (4) fins/snorkel/weight belt.

Buoyancy control might last for 10 to 12 sessions: After 14 to 16 sessions he would now be wearing an aqua lung and would be learning buoyancy. He is now taught how to look after someone else: Some rescue work is done over another 5 or 6 sessions: This is all done in pools.

They are now ready for a simulated dive for wet or dry suits.

Equipped as if they were fully equipped for the sea they would now enter the pool: they would be expected to get their buoyancy right first time. If they did not do so they would return the next week and start all over again.

There are 12 lectures in addition to practice in relation to the buddy system: Their buddy is an instructor and the ratio is one to one. They change instructors over a rota so that the trainee is not always learning from the same person.

The next stage is a first simulated dive in the sea in safe confined water: They will have done on average 2 to 3 hours in a pool in a dry suit: They are still trainees on one to one instruction.

He was asked about the observations by Mr Martin and Mr Smith that there is very little difference between wet and dry suit diving: He disagreed.

At worst the dry suit has a larger volume of air and if it is got wrong and too much air is put into the suit it could result in death: The BCD does not have the volume of air to cause the same problem. The dry suit can be harder to regulate the large volume of air. In his experience this is a real problem that is why the training is done in a pool. Correct weighting is crucial . Too much lead can cause over inflation of the suit and partial loss of buoyancy.

It will take at least half of the sessions in the swimming pool for the student to achieve confidence in a dry suit: The student will know the principles, but the instructor will do it for him on the first session. The next session will simply be hovering in a pool which can be difficult because there is only 2 metres of water. If the student can hover in a pool he can hover anywhere.

Learning a controlled ascent in a dry suit is crucial. If the ascent is too fast there can be nitrogen narcosis. There can also be a development of air embolisms.

The assessing of the correct weight is only the first stage of determining the appropriate weight. The exercises still have to be done in full, and there could be adjustments around 2, 4 or 6 lbs in weight. It could take half an hour to get the weight correct. The fin pivot is regarded as an extension of buoyancy control.

Confined Water

SSAC have laid down guidelines: For the first two dives it is limited to 6 metres: The student is not ready to go deeper. Salt water is more buoyant: There requires to be re-assessment and there may be a taking off or putting on of 2 lbs of weight.

St. Catherine's Loch comes within their definition in that it has a large bay with sloping water, no currents, no obstruction and easy access.

He would never take a student into open water in a dry suit for the first time.

He was invited to comment on Mr Young's observation that going into the sea in a dry suit for the first time is an industry norm. The witness disagreed: all initial training is in the pool: The British Sub Aqua Club, the Irish Underwater Council and the Sub Aqua Association all have the same requirements as SSAC.

He disagreed with Mr Young's assessment that Weasel Loch was better than a swimming pool.

As between wet and dry suits there would be an average difference of plus or minus 6 lbs in weight: You need more weight in a dry suit.

It was pointed out that Mr Iqbal appeared to be using 28 lbs in wet and also in dry: He said that it was sufficient to take him down, but is grossly overweight for his wet suit: He would have to have used a lot of air in his BCD to obtain buoyancy. The fact that he was on 28 lbs in both wet and dry suits means he was not properly weighted in his wet suit.

He was referred to productions Nos 20, 21, 22, 23, 24 and 25 which were Mr Iqbal's log showing weights of 28, 28, 24, 28, 28, and 28. From these he concluded that it appeared that buoyancy checks were not done on every dive: That weight will stay with you and he would expect an additional 4 to 6 lbs for a dry suit.

The buddy system is in operation from the classroom stage: It is a diver's lifeline. The buddy must know all of your equipment and must also be familiar with the dive plan.

It was pointed out to the witness that Mr Iqbal's depth gauge was showing 31 metres at the time of his death when he was in a depth of 16 metres or water. This demonstrated that it had not been zeroed or properly zeroed before he entered the water. The zeroing of the depth gauge is part of the buddy check before entering the water.

Under the SSAC system there would be a minimum of two sessions in safe confined water: The next stage would be four dives up to 14/16 metres. It is crucial that the

dives become shallower during the day as you are increasing decompression problems: All diving tables throughout the world will say the same.

He was referred to productions 26 and 27. These were Mr Iqbal's records for the 13 September 1998. Dive 7 was shown at a depth of 6.1 metres. A subsequent dive on the same date went to a depth of 21 metres. This goes against good practice and goes against all dive tables.

The witness explained that you become saturated with nitrogen: The tables are formulated for depth and time and rate. The tables cannot calibrate for a deeper second dive.

PADI have their own recreational dive tables.

SSAC still require a further 10 dives in the sea at various depths and locations. A trainee could have had 15 dives, but not have been signed off due to insufficient variety.

It was put to the witness that the PADI regulations require a confined water session, and he was asked when is the logical time to do the dry suit training, namely, before or after entering the sea. The witness said it must be done before entering the sea.: The trainee is going into an environment with too much to learn.

He was next referred to the dive plan which SSAC designate as "an expedition sheet". They record the place, date and time together with a brief description of the site similar to that on the risk assessment. They decide who is the expedition leader who may be a trainee: There is a safety officer for all club equipment to ensure that it is up to standard and carry out a check in addition to the buddy check: There is a First Aid Officer and a First Aid box. The plan will show the dive leader and diver 2 will be his buddy.

As each pair enters the water the dive leader reports to the beach master with the contents of his cylinder and the direction of travel and time. All of this information is recorded on an A4 sheet.

On surfacing the dive leader raises his hand to the beach master and it is kept raised until the signal is returned by the beach master: The beach master on their exit records the air left in the cylinder and accordingly they will know the depth, the air used, and the time that the party has been under water: The dive master will be able to say, for example, they have full cylinders, I will give them a further 5 minutes.

As to identity of the individuals, this is more difficult. The dive leader needs to know what his buddy looks like.

The beach master does not need to know who they are. SSAC members do not dive in large groups therefore identification does not become a problem. It is not safe diving in large groups. SSAC was one of the earlier and leading clubs in the world. They set some of the standards: Over the years they have learned that 1:1 for diving is the norm. People are curious and if one member of a party dives away from the

others the situation cannot be controlled. For trainees it requires to be based on considerations of safety and 1:1.

It was drawn to his attention that the witness Stuart Smith had said that if you go in a group it can be very confusing especially if they are using similar equipment. The witness agreed.

Other people around are not his responsibility. You must look after your buddy. The dive plan should decide how far from the shore i.e. horizontally the party should travel. When the cylinder reaches 100 bar you have reached half way and should stop and turn back. You should aim to surface at the same place as you entered.

Ideally there should be no surface swim in order to return to the entry point at the shore. If you are down to 50 bar you should be in shallower water. He would not stay at the same depth to 50 bar. By 50 bar he would expect to be within the exit area. A trainee should surface well before 50 bar. An experienced diver would last twice as long as a trainee on 50 bar.

It was suggested that in relation to Caroline McLeod she had indicated that she was down to 50 bar and there was an indication that they should turn round. In the first place she should not be swimming away from shore on 50 bar: Secondly, she should be in shallower water and thirdly, she should not have been there in any event.

They were in the water for 34 minutes. It would take 20 minutes to get to Divers Hole. To have done some training and then go out to Divers Hole is ambitious: It could be done, but is not advisable. You will be swimming back against current and when you eventually do get back you will have 76 steps to climb.

The practice of turning back at 100 bar did not occur.

When told to turn round at 50 bar ,that is bad. That should be an instruction to surface. They had been told in training to be on the surface at 50 bar.

Once the diver gets to the surface he can change over to his snorkel. That is all very well if the sea is calm: They will tend to keep the demand valve on from the cylinder.

Leaving the Sea Bed

Surface ascent skills are trained. First of all the trainee is told to stop in the water. They then check each other's air. A thumbs up signal is given and they begin a face to face controlled ascent. The dive computer or depth gauge is held prominently: Both should be looking together at their gauges and stop for one minute at 5 metres. One metre from the surface the arm should be raised and move in a circle in case of surface traffic, for example, boats. On surfacing there should then be a check that all is well. The buoyancy control device would be inflated. When that is done the diver can relax and float in his BCD. If the suit is fitted with an auto dump control as this was, then by raising the left arm above shoulder level the air goes out of the suit. There is another type of dump valve which can be manual or auto.

Simply by raising your arm above your shoulder level you will dump air from the suit. If you were on the surface and raise your arm you will dump air and could sink.

Label No 4 which was Mr Iqbal's suit which was worn on that day was not identical to the suit which was illustrated in Court on a model.

Loss of a Buddy

Under the SSAC system as soon as you lose sight of your buddy you should stop, swim in a circle for approximately half a minute to a minute, bang on the cylinder to attract attention and surface. If the buddy is not there on the surface do not return under water to look for him: Remain on the surface. If the lost buddy was a trainee he would give 5 minutes: By 10 minutes he would be worried: If it was a calm day and he found a trail of bubbles he might follow the bubbles down. At Weasel Loch, 4 to 5 metres of visibility would be good: There would be an average of 3 to 4 metres.

The first thing which must be done is to find out who his buddy was and where he was last seen, and how long since he had been last seen. In a swell with waves of 2 to 3 feet it is not safe to assume that everyone is present. The group should have been brought together as a group and commenced the swim to shore as a group.

A swim of 10 to 20 minutes is a long swim and he would not let anyone swim on their own. If it was choppy there would be a current and he would expect the party to remain as a group until they reached shore.

Aquatron were regarded as a good reputable company for all purposes.

SSAC get enquiries from prospective divers. People want to learn to dive quickly. SSAC do not teach diving quickly. They would be recommended to PADI. You cannot train someone quickly.

The PADI system has "add on" courses: SSAC activities are all part of the same course. To train someone from an SSAC point of view in this country requires 12 months of which 6 is in a pool and 6 in the sea. There are 5 hours and 14 tests: They will not get those 14 tests in 10 dives. It will usually be 15.

There are substantial differences between diving in Scotland and diving abroad where there might be 100 metres of visibility. In the Caribbean in November the water temperature might be 28 degrees. You learn quickly in the Caribbean by Caribbean standards. They will teach you in 4 days. You will be with an instructor at all times. It is much safer than our conditions. To get an SSAC certificate the standard will be the same. Training is provided by volunteers: There is no payment and SSAC consider that theirs is a safe way to learn to dive.

Weasel Loch could never be safe confined water to SSAC standards. It is too deep and the access is not acceptable. It is possible that it would get close if the water was like a mill pond, but the other two considerations would rule it out. It was not adequate in the conditions that day. There is too much swell or surge for it to be swimming pool conditions: You require to be able to stand.

SSAC has no system of buddying where two inexperienced people would be together. They would have to be familiar with all equipment. If both of them have never used the equipment before they should not be allowed to be together. He did not understand why Caroline McLeod was buddied between the two instructors. It should have been one instructor to two or three trainees. SSAC would not be in Weasel Loch in either those conditions or numbers.

The tail end Charlie system which was being operated with Martin at the front followed by 5 divers with Smith to the rear was not a safe way to dive. They could be 15 metres apart. If a trainee was missed he could carry on if the leader turned. This was an accident waiting to happen. It is standard practice in the Caribbean, but their visibility can be 100 metres.

Mr Iqbal's state on entering the water made it obvious that he was not having a good time. He should have been floating comfortably. He had either not been shown or had forgotten.

On the day it was the dive master who intervened: It should have been the instructor. He should have been told by the instructor to stay at his shoulder. If he was having difficulty once he would have it again.

So far as the training exercises were concerned he said that knowing Weasel Loch it will move 1 metre forward and back. To do a fin pivot in these conditions you would have to lie on the bottom and dump air and then float by breathing. A hover would actually be the easier of the two movements. A hover would not interfere with visibility. The trainees should do the tasks individually.

So far as adjusting the weight is concerned you would require to be able to stand in the water. You cannot add or remove weight while people are swimming. The instructor would have to have a box of weights with him and would have to have access to shallow water to put weights on close at the side. The whole training exercise could take 20 minutes if the trainees were good.

By reference to production 35 the graph appears to show the diver going down to 8 metres in the first 2 minutes. He spent 2 minutes at 8 to 10 metres. They have spent no more than 6 to 10 minutes doing tests. They were probably done for one person. He would expect a flat line at 10 metres for 20 minutes.

If he had taken this party into Weasel Loch, which he would not have done, he would not have carried on with the dive if they could not practice and demonstrate these skills. Learning a controlled ascent is crucial. If you cannot hover you cannot do a controlled ascent.

Everyone should have been collected together on the seabed. A head count should have been done. They should surface immediately together as a group. He would do a safety stop as he has other students to consider.

If two additional people joined the group and signaled a problem he would not leave his own students: he would try to establish what was wrong and would expect them to ascend in buddy teams.

Finally in his evidence in chief he was asked to comment on the fact that Mr. Young had no problem with his decisions firstly to choose Weasel Loch and secondly to continue with the dive. The witness disagreed vigorously.

Mr. Iqbal would have had no difficulty in releasing his weight belt. The witness considered that he was over weighted in his wet suit diving therefore he would be putting too much air into his BCD. The deceased had had four open water dives and was now having to ascend for the first time in a dry suit.

The witness was invited to assume that a problem struck when Mr. Iqbal was seeking to ascend. In response he said that on an educated guess the witness said that on the last check he had 55 bar; the contents gauge was 20 over therefore he had only 35 bar. If he was still swimming he would only have 3 to 4 minutes of air left. Accordingly he was swimming alone when he ran completely out of air. He could not use his BCD or his suit because there was no air.

He had a cylinder with 232 bar of air (12 litres); the whole dive took 34 minutes: he was probably using air at the rate of 80 litres per minute therefore at his last check at 55 bar, which was in truth 35 bar, he had only 3 to 4 minutes left and he swam on using 80 litres per minute. His training would tell him to get to his buddy but his buddy has gone; he has the octopus: there is nobody and no air.

He said that the foregoing was an educated guess.

Smith was using 15.3 litres per minute and Martin 21.2 per minute.

Iqbal would probably have used a lot of air with the problems which he encountered before he set out.

When a demand valve lies on its side on the surface it can free flow. This a common problem. It was therefore reasonable to assume that Mr. Iqbal had consumed an unquantifiable quantity of air before he set out. If he was dumping air he was using it up. In the suit which he was wearing he just had to lean to the side to dump air. Standard procedure is to raise the arms to get all air out of the suit. You should get neutral buoyancy by emptying the BCD.

The actual exercise of ascending should be that he is first neutrally buoyant; he can slowly swim to the surface or he can eject small quantities of air from the suit but can become too buoyant. Air expands as he ascends: he should release sufficient air to remain neutrally buoyant.

As soon as he got down to 30 bar there would be a noticeable difference. The last stage is at 15 to 20 bar where you get a feeling of less air.

As an instructor he carries an alternative "pony" cylinder to use an emergency. It is an SSAC recommendation. He also has a further emergency device on his BCD which will give him buoyancy from 30 metres and will provide air to breathe on the way up. These were common systems 10 years ago. He was asked if Mr. Iqbal simply not been able to get air into his jacket whether the octopus could have been used to breathe. Mr. Moore would then have required to take control of the ascent.

He would still do a safety stop even where a body has been lost. The diving tables to which he works are compulsory on a safety stop.

There is a 2 per cent risk on every dive of de-compression sickness. It is very difficult to find someone under water. You would have to surface to try to find the bubbles and would not go down again unless you found a trace of bubbles. If the diver has run out of air there would be no trace of bubbles.

In cross-examination to Mr. Anderson he agreed that a head count would alert sooner but would not have prevented the death. If the diver was neutrally buoyant he would expect to have to fin to assist his ascent. He would expect an instructor to close in to control the ascent.

If the mouthpiece comes out air will continue to flow. It would free-flow in a prone condition.

The witness explained that he made the assumption that Mr. Iqbal ran out of air at 34 minutes. He could have had 4 1/2 minute of air left. Fifty bar could be 5 minutes breathing efficiently.

The PADI recommended rate of ascent was 18 metres per minute. There is nothing wrong with that. If you are using a computer it is the computer which calculates your nitrogen therefore you require sticking to the rate on your computer. It is mathematically linked to your system. It is simply another system but you stick to whatever system you are using.

PADI is designed essentially for warm water. When you are using it in this country you should assume that the dive is 4 metres deeper. There are quite a number of differences between PADI and SSAC: "sports diver" would be their "master diver".

PADI said a ratio of two to one. From experience of 26 years as a member of one of the older clubs in the world their experience is one to one.

In cross-examination to the Procurator Fiscal he said that it is possible in certain profiles of ascending or descending too often to get bends.

BCD's with emergency supplies are still available. They can be got if you ask for them.

In the light of what he had heard during this inquiry he would probably be reluctant to recommend Aquatron now.

The Procurator Fiscal put it to him the following :- that Forbes was on the bottom with 35 bar: Iqbal doesn't drop his weight belt: Moore does not follow the buddy system. The witness said it all comes down to supervision : these things should not have happened.

In answer to questions from the Court he explained that there are two main dives at Weasel Loch one is to turn right the second more adventurous. You go out another 30 to 40 metres to a series of small reefs. Lobster men do drop pots and ropes.

Divers tend to steer clear of them. It's a popular area for fishermen who lose nylon line which you can swim into but it is a relatively safe dive. There is a current and it is a strenuous dive. It needs to be planned to avoid a long swim. Some people swim it round and emerge at a different point.

A head count will disclose a person missing. On a distress signal the shore man will alert the coastguard.

In re-examination he said that it would be possible to come up with two or three different theories for the cause of Mr. Iqbal's death. The one he mentioned is the most likely.

The main criticism is that there was no one there to help him: no one at his shoulder looking after him. Under SSAC systems his buddy that day would never have been a trainee.

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The Equipment

A substantial amount of time was taken up in the course of the Inquiry by evidence in relation to the examination of the equipment which was being used by Mr Iqbal that day.

It transpired that, following the death, the equipment which he was wearing was taken by the police to the production room at Duns police office. It remained there for approximately two weeks, when it was transported to Glasgow for examination by Constable Bell of the Strathclyde Police Underwater Unit.

He carried out certain examinations to which I will refer briefly, and the equipment was thereafter returned to Duns police office.

It remained there until May 2000 when it was handed over to the Health and Safety Laboratory for examination. A series of tests on various parts of the equipment were carried out some of which required immersion of the equipment, or parts of it in water. A Report on their findings (Pro.52) was prepared by a Mr. Tony Hughes, an employee of the Laboratory. Following that examination the equipment was then passed to a .Mr Charles Meinert, a diving consultant in Lancaster who was invited to carry out a detailed examination of some of the internal workings of the equipment. His Report thereon is Pro 50 . Some twenty months had accordingly passed between the equipment being last used in the sea and being examined by Mr Meinert.

The equipment had last been used in salt water. It had not been rinsed. It was not kept under any particular conditions but simply remained in a production room at a police station for the majority of that time.

Counsel for Mr.Martin and the solicitor advocate for Aquatron suggested to the witnesses who had examined the equipment that some of the results of their tests demonstrated that the possibility of a deterioration of function in the equipment in the

period from 18th September 1998 until their examinations in 2000 either could not be discounted or was indeed actually demonstrated by the results of their tests and the other findings which they had made.

I was satisfied on the evidence before me that there was merit in some of these suggestions. For this reason alone, I was not prepared to accept at face value a number of the results of the tests and I do not propose to deal here with the competing positions thereon. There were, however, matters relating to the equipment on which I was satisfied that the period of time in storage either could not have had or did not have any adverse effect upon its function.

The whole relevant equipment was as follows:-

- **The dry suit** itself which is connected to the air supply and can receive and eject air by means of appropriate valves. It is part of the buoyancy system.
 - **The Buoyancy Control Device** (The BCD): this is a jacket or vest which is worn by the diver over his dry suit and which can be supplied with air from the cylinder by way of a valve to be operated by the diver. It is also fitted with one or more "dump valves" by which air can be ejected from the BCD. Its purpose, inter alia , is to enable the diver to remain buoyant on the surface before or after descending.
 - **The cylinder**: this contained the supply of air for Mr Iqbal on the day in question;
3. **The primary regulator**: this item is in two distinct parts, namely (1) a pressure reducing valve which is fitted directly to the cylinder, and (2) two hoses, one of which is attached to the diver's dry suit, and the other of which is attached to his buoyancy control jacket;
- **The secondary regulator**, which comprises three additional hoses emerging from the primary regulator. One of these hoses is attached to the pressure gauge carried by the diver, which is intended to show the amount of air available in the cylinder. The other two hoses are attached to two mouthpieces through each of which the diver can be supplied with air from the cylinder. One of these two is intended for emergency use and can be made available to another diver should that become necessary. These were referred to respectively in evidence as (1) the " primary second stage regulator " which is intended for use by the diver and (2) the " octopus second stage regulator" which is intended for emergency use.
 - **The pressure gauge** which is worn by the diver and is intended to show the volume of air remaining in the cylinder.
 - **The depth gauge** : also worn by the diver : capable of being reset to zero and which will record the maximum depth to which he has descended in the course of a dive.

I now deal with each of the above items of equipment in turn .

(1) I was satisfied on the evidence that the dry suit itself (1 above) being worn by Mr.Iqbal was free of any defect. (2) I was satisfied that the BCD being worn was free from defect.

(3) On testing of items 3 and 4 above by the Health and Safety Laboratory against a European Standard Test (EN250) the following findings were made :-

(i) there was found to be a pressure drop between the primary and secondary stages.

(ii) the inhalation resistance in the primary second stage regulator was found to exceed the standard limit by almost 20 %. It was said that it would be fairly difficult to breathe from the regulator in this condition.

(iii) The pressure gauge exceeded the standard margins of error permitted by EN250. The pressure gauge would give a diver the impression that he had more air remaining in the cylinder than was actually the case. At low pressure the discrepancy was of the order of 25%. The Report (Pro 52) recorded that "...it should also be noted that a diver who was low on air when returning to the surface would need not only a breathing supply but also enough air to inflate his BCD jacket in order to become buoyant enough to make an ascent. " The report also recorded the fact that the apparatus tested may not be operating exactly as it did during the incident due to the length of time in storage.

It was found, however, that "...The scuba equipment as tested in this report was found to perform in such a way as to give the very minimum level of performance for the depths being dived...during which the incident in question occurred."

It also concluded that " The likelihood of a diver unexpectedly running out of air would be increased by the high reading pressure gauge. "

By reason of the defects which had been found by the Health and Safety Laboratory the equipment was sent to Mr. Meinert, a diving equipment consultant for examination in order to see if a cause or causes could be determined for some of the defects which had been found.

Mr. Meinert prepared a Report (Pro 50) following his examination of the equipment.

On examination he found that the interstage pressure drop resulted from the fact that there was not a proper seal at the valve seat. The valve seat is a wearable item and should have an annual overhaul or, if in rental use should be checked more often. One result of this defect is that there was reduced air going to the diver. It can also cause air to be wasted and reduce the amount of time able to be spent underwater. In terms of safety it was not serious but can be indicative of lack of attention to the equipment.

The O-ring on the piston was also split which contributed to the pressure drop.

The witness attributed the damage to the O-ring to a fault on assembly at servicing of the equipment. This particular conclusion by the witness was the subject of lengthy dispute in cross examination. I am not able to say on the evidence whether or not the defect occurred on assembly but I am satisfied that at the time of the use of the equipment by Mr. Iqbal there was damage to the o-ring which may well have been the result of wear and tear .

I accept the evidence of this witness that one of the effects of the damage to the O-ring which I find was present was that as the diver is required to work harder e.g. against a tide, he will demand more from the regulator and it will not be capable of giving him more.

In his examination of the primary second stage regulator (the diver's mouthpiece) the second stage lever was excessively out of position in relation to the diaphragm. This resulted from the adjusting nut being screwed in too far. One result was that it is harder to breathe through the mouthpiece.

Examination of the second mouthpiece (the octopus) disclosed a similar situation but in this case the adjusting nut was screwed in even further. His finding was that on the diver's own mouthpiece the relevant pressure was fifty percent over acceptable and the octopus was even worse.

I find that these two particular defects in the position of the levers in relation to the diaphragm did not arise from the passage of time or storage of the equipment between the fatal dive and the examination of the equipment.

I was satisfied on the evidence that these two particular defects were present in the equipment issued to Mr.Iqbal by Aquatron and they were in that condition when he used the equipment on the fatal dive.

I was satisfied also on the evidence that the result of these defects in the second stage regulator was that initially the diver might notice nothing, particularly if he had the level of experience which Mr. Iqbal had, but as he is required to work harder during the dive his breathing would become more difficult causing him to work harder against the equipment using even more air. In this context it will be borne in mind that Mr. Iqbal was also equipped with a defective pressure gauge which records the level of air in the cylinder.

Finally in relation to the equipment being used by Mr. Iqbal that day evidence was given by Derek Scott who was an engineer employed by Aquatron. His duties included the servicing of equipment including the secondary regulator used by Mr.Iqbal on 19th September 1998.

The Regulator Worksheet relating to the regulator being used by Mr.Iqbal was produced (Pro. 48). It disclosed that that regulator was last serviced on 19th September 1997. The date on the Worksheet appeared to have been altered from " 19/7" to " 19/9": I am unable on the evidence to say whether or not that alteration was a result of error by an operator on 19th September 1997 or was deliberately altered after the date of service.

The manufacturers recommend that regulators should be serviced every 100 dives or within twelve months whichever occurs earlier. Having been issued to him for use on 19th September 1998 the regulator issued to Mr.Iqbal could not have met that minimum requirement for servicing. In addition, Aquatron did not maintain any system for recording the number of dives in which any particular regulator had been used.

The combination of the defects in the first and second stage regulators and the defect in the pressure gauge which I have mentioned above are the defects to which I refer at (ii) in my determination under sections 6(1)(a) and(b).

I now set out the evidence which was directed principally towards the equipment bearing in mind my earlier remarks in relation to a degree of overlap between different areas of the evidence.

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PC Ian Bell of Strathclyde Police Underwater Unit gave evidence.

He had been diving for approximately 17 years.

On 1 October 1998 he was asked to examine the diving equipment in this case.

Following his examination he prepared a Report which was Pro. 38.

He carried out his examination using the equipment available to him which he described. He said that slightly different readings might be obtained using different test equipment.

He is not qualified to carry out servicing on the regulators which he examined.

He did not know if the equipment had been washed before his examination. He did not wash it.

The equipment was returned to the Police at Eyemouth after 3 days.

The regulators which he examined are similar to those used by his Unit.

He described the "cracking pressure" readings which he obtained by reference to his report. The regulator with the red mouthpiece gave an inhalation resistance of -38mm and the blue mouthpiece tested at -100mm. The reading of 100mm seemed high. It might not cause a problem at atmospheric pressure but it might cause problems at depth.

It was put to the witness that there were discrepancies between his descriptions of the regulators by colour compared with that given by Mr. Meinert. He said that any error could be his.

In cross examination to Mr. Anderson he said that the regulators had no apparent defects.

He said that he operated the purge button and did not remember anything unusual.

Where there were differences in the results of tests on the equipment between this witness and Mr. Meinert and witnesses from the Health and Safety Executive Laboratory I preferred the evidence of those other witnesses. This is no criticism of this witness who carried out limited tests.

The Evidence of Witness Meinert.

Mr Charles Stewart Meinert is a principal of CSM Consultants in Lancaster who are involved in the training of technicians who maintain diving equipment.

He had fifteen years experience: was a contributor to the Industry Code of Practice and was a qualified diving instructor. He was a member of the association of Scuba service engineers and technicians, the Scuba Industry's Trade Association, the Inspectorate of Diving Equipment Servicing and Testing and was the author of a number of publications. He was a diving instructor, a PADI instructor and an advanced instructor for the British Sub Aqua Club. He was an assessor for courses to NVQ standard and has worked with the Health and Safety Executive on equipment.

He had dived at Weasel Loch on four or five occasions.

He described it as an awkward site due to the stairs and the boulders at the bottom. If the weather turns into the loch waves can throw divers onto the rocks.

It is open to the sea.

If the weather was absolutely calm it would be acceptable for PADI confined water: if there was a half metre of swell it would not be appropriate for carrying out drills.

He had examined the equipment used by Mr Iqbal on the 18th September 1998 and had prepared a report following his examination which was production number 50.

He described the external condition of the equipment as satisfactory.

The air cylinder which was used that day was in test and any corrosion inside was probably after the event.

He described the two main parts of the regulator attached to the tank and described how he cut one of the hoses in order to investigate a poor flow rate from the tank into the dry suit. He found that the internal bore of the hose was significantly undersized. He could not say whether this was intentional or not; there was no manufacturers mark. The external diameter was three millimetres but the internal diameter was one point two millimetres. That gave a slow rate for inflating the suit.

An examination of the primary regulator itself showed two problems namely (1) there was a severe pressure drop under load on the first stage and (2) when left under load the pressure creeps. The result of (1) is that there would be too little air going to the diver. This would not be obvious when the diver was not under stress. The result of (2) is that the valve is designed to close at ten bar. Creepage should be zero. This valve can creep over a three minute period. In terms of safety this is not serious but was indicative of lack of attention.. The fact of the creeping may explain other later matters. It can cause air to be wasted and reduce the amount of time able to be spent under water.

There is no concern with the design of the valve.

By reference to diagrams he explained the operation of the internal mechanisms within the regulator.

The creep resulted from the fact that there was not a proper seal at the valve seat. The valve seat is one of the most wearable items and should have (a) annual overhaul or (b) if in rental use it should be checked more often. The wear on the valve seat was simple wear and tear. Replacement of the O-ring resulted in immediate improvement in pressure drop. The O-ring was split. There was a circumferential cut of almost three hundred and sixty degrees caused by the piston being forced down past it: this is an assembly error. He said it occurs only on assembly.

He described the tool which is provided by the manufacturers to assist in avoiding this problem on assembly. The effect of O-ring damage is that the diver may feel nothing on what the witness described as "a benign dive" but as he works harder for example against a tide he will demand more from the regulator and it is not capable of giving him more. It will feel as if his air is turned off.

He also examined the mouth pieces (the second stage of the regulator). He found excessive clearance on the second stage lever. It was many millimetres away from its correct position. It was excessively out of position.

He said that he would be able to tell on using the equipment and he would expect an instructor to know. Someone who was on his ninth dive he would consider unlikely to notice especially if it was not his own equipment. Initially the diver might notice nothing but as he works harder, (the effect of the adjustment of the lever) is causing harder work and it becomes a vicious circle. This would impede his breathing making life more difficult.

There are only two possible reasons for the foregoing error namely (a) the adjusting nut is worn which was not the case or (b) the adjusting valve has been screwed too far in: the result is that it is harder to draw air in and harder to breathe.

On examination of the second mouth piece on the second stage (the octopus) he found a similar situation but it was screwed in even further. This resulted in cracking pressure being too high. It should be at one point four to one point six: he measured it at four point six two.

He carried out his examination in July 2000.

The cracking pressure on the diver's own mouth piece was fifty per cent over acceptable and the diver would find the secondary mouth piece even worse. The diver might put it down to himself.

He did not examine the hose size to the BCD. It was inflating at a reasonable rate.

The standard of manufacture of the first stage regulator is acceptable: it has been assembled badly. It was difficult to see from the wear which was present when it was last serviced.

He was shown production number 48 which was the Aquatron work sheet.

The results of the service tests for both mouth pieces was within the recommended range: the sheet was dated 19th September 1997 but without knowing how often the items had been used the regulator was overdue for maintenance.

The valve adjustments are set positions and do not change in use. He would have expected maintenance to have been better. The person who allowed the deceased into the water may not have known that it was poor.

On it being put to him that the hover had been abandoned due to the conditions on the day of Mr Iqbal's death the witness said that if the trainees had not completed the drills they should not have been on an extension dive. If they had not completed their training according to the manual the dive should not have been continuing. They should have left the water , removed their equipment as part of their training and re-equipped.

In relation to the selection of buddies he said it was not unheard of to put two first time trainees together.

He said that a head count is normal practice on surfacing.

In cross examination to Mr McNeill the witness said that the whole area at the end of Weasel Loch could be an appropriate dry suit training area in accordance with PADI standards. When the wind moves round to the north or east the swell will be pushed into the Loch making entry and exit difficult. He said that it is shallow there and the swell will be throughout its depth.

The narrow diameter on the dry suit inflation hose would not be a problem at sixteen metres. It may have been significant at twenty to forty metres but would not be a major problem at sixteen metres.

It might be a factor if the diver is sinking then the slower rate of inflation means that he cannot arrest his descent: he cannot control his buoyancy.

The witness described how the air cylinder being used by Mr Iqbal was a twelve litre cylinder. Until it reached twenty or perhaps even ten bar there would be no noticeable difference.

As a result of the defects in the regulator it will supply a given amount of air but as the diver works harder it will be become harder to draw and will be used more quickly.

The witness had not previously seen the report by the Health and Safety Executive. He said that the effect of the venturi is so little that it has no real variation in the control.

He said that it would not take much to begin the cycle of difficult breathing at 14 metres alone and unable to use your buddy's octopus.

The service sheet production number 48 makes no provision for checking the depth gauge or pressure gauge. It is normal for them to be checked periodically. There is nothing here to say that they were checked.

In cross examination to Mr Anderson he confirmed that the gauges are not part of the regulator.

He confirmed that he has done the servicing of regulators and probably serviced this particular model on two or three hundred occasions.

He was asked about his experience and qualifications at some length and I do not find it necessary to set out his replies.

He said that a fun dive is a dive which has no training element in it and is for pleasure. You could tack a fun dive onto the end of a training dive. Assuming the divers have the necessary skills there is no reason why it should not be undertaken.

He would say that it is most unwise to dive with equipment in respect of which you have not completed the training. In his view if you have not completed the tests you have not completed the training.

He confirmed that twenty one months had elapsed between the accident and his report.

Sea water is corrosive. Ordinarily the equipment would be washed and dried in a suitable room temperature to remove salt water and the build up of salts.

He was not told of the treatment of the equipment following the accident. It was obvious that it had been stored for a long time and he tried to take account of changes during that time. He did not know if it had been cleaned. The Health and Safety Executive Laboratory had carried out tests a relatively short time before his. Their report was not given to him. He was asked to investigate specific faults namely (1) the drop in pressure under load and (2) the poor breathing performance of the second stage.

He knew what tests the Health and Safety Executive would have carried out and these involved immersion in water.

The regulator was quite clean bearing in mind the time in storage: there can be a build up of salts under clips and covers but there were none. If the valve was corroded it would be in the ambient water chamber. There was none. The ambient chamber will always be flooded and corrosion levels were really quite low. The spring and valve mechanisms in the second stage of the regulator were remarkably clean. You can see some sign of external build up of salt. The tests would tend to dissolve salts.

By reference to production number 52, the Health and Safety Executive report he confirmed that there were seventeen tests of the regulator in total and that was of equipment which had been untouched since October 1998. The tests may

demonstrate the equipment loosening as it cycled and removing salt build up and easing operation of the equipment.

He described the materials from which the various parts of the regulator are made.

The EN 250 test is carried out at 25 breaths per minute each of which uses two point five litres per breath. Average human consumption is twenty five litres per minute.

The creep as at September 1998 would not of itself cause difficulty for the diver. He agreed that the regulator had not been lubricated for thirty three months before the test: he would normally expect much less.

It was suggested to him that the Health and Safety Executive tests may have caused the damage to the valve seat. He seriously doubted that. The number of uses in the twelve month period would be far greater than the test and it was his opinion that the wear came from use and not from the test. The mark on the O-ring did not come from it being offset.

On replacing the O-ring there was still creep. There must have been wear at the orifice at the foot of the piston.

Turning the second stage regulator he found that the cracking pressure on the primary mouth piece was two point two and on the octopus four point six two.

His attention was drawn to production number 38 the report by Constable Bell following his examination on 1st October 1998. It was put to the witness that Bell found one point five which is in the middle of the manufacturers range.

The witness said that one of Bell's figures is close to his and one is not: he could only assume that a change had taken place over a passage of time.

At this stage in his evidence the witness removed and replaced the mouthpieces within each of the second stages of the regulator. The colour of the mouth pieces did not match the purge buttons and may have been described by colour only by P.C.Bell. Bell had found one to be at one point five and one at three point nine. Assuming that it was the octopus which Bell had found at three point nine Minert found it at four point six. The differential may be attributable to the lapse of time.

It was put to him that the damage to the O-ring was consistent with resumed use after a period of inactivity. The witness disagreed. He said that the damage which he found was more consistent with incorrect assembly. The lubricant had not dried out and resilience of the O-ring and the ease of movement still caused him to conclude that the damage was caused on assembly. There was no sign of any corrosion on the valve stem. The witness said that he had found this common and well known problem on numerous occasions. It can be duplicated readily. This was damage which he had seen from installation many time.

It was put to him that if Bell's measurements are correct then he had to accept that there was no high cracking pressure; the witness responded that if the lever is moved away from the diaphragm as he found it in this case there is a rise in cracking

pressure. The amount which he found will take it well outside the manufacturers range.

The witness said that the lever may not now be exactly as he found it. It is likely not to be in the same position.. He will have altered the settings and may not have returned it precisely to the position where it was found.

By reference again to the damage to the O-ring he said in his experience most of the damage comes from assembly and that remained his conclusion in this case.

He was aware of changes in piston design which had been made by Scuba Pro.

He said that there is no adjustment which could cause the lever to be millimetres away from the diaphragm which could be correct. There was four to five millimetres of clearance between the lever and the diaphragm. Half a millimetre would be normal. On the octopus the adjustment nut was on four to five threads.

In re-examination he confirmed that considering the length of time which the equipment was in storage it was in remarkable condition.

He confirmed that as between P. C. Bell's report and his own the results between the red and blue mouth pieces have become transposed. His readings proceed on the code numbers and not on the colours. There is a discrepancy of naught point seven between both of Bell's measurements and his. His would be more accurate. The position of the lever in relation to the diaphragm could not have produced a cracking pressure within the manufactures figures. He did not agree that all the equipment was functioning properly: it was functioning.

In conclusion the witness expressed concern about the poor quality of maintenance in the industry.

In relation to the error in the pressure gauge he said that the lower end the error is quite severe.

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The next witness was **Derek Scott** who was an engineer employed by Aquatron. He was employed for the purpose of servicing compressed air systems and amongst his responsibilities was a service contract for Strathclyde Fire Brigade.

He had been employed in that capacity for 11 years and held City and Guilds Certificates in Plant Maintenance. He had served his time with a firm who used compressed air for a whole range of tools.

Production number 43 was a certificate which he had obtained from Scuba Pro for attendance at their basic two days course on the twenty second of April 1997. It was a broad based service course for regulators.

Production number 48 was a document entitled "Regulator Work Sheet": it had been completed by the witness and related to his servicing of the regulators supplied to Mr Iqbal on 19 September 1998.

The document bore to be dated 19 September 1997: the witness agreed that it appeared to have been changed from 19/7 to 19/9 . He could not explain that.

He did not know what the company policy was on the purchase and retention of equipment.

He no longer services Regulators and has not done so for some years.

His current responsibilities relate to Strathclyde Fire Brigade, The Ministry of Defence, BP and he is mostly out of the work shop.

He explained that the O-ring would always be replaced on servicing. There is a manufacturers service kit. The manufacturers provide a tool for positioning the O-ring. He said that the regulator would not have worked if the O-ring was damaged. It would be vigorously tested and would be used by many customers: no fault had been brought to his attention.

If the regulator had been sitting unused for a couple of years and had then been used dry that could have caused the damage which was seen by Mr Meinert.

It was put to him that Mr Meinert had found a cut on the O-ring. The witness said that that Mr Meinert may have caused the damage in removing the O-ring. The witness had never done such an examination for court purposes.

He denied that he had installed the O- ring without using the appropriate tool.

By reference sketch number 5 prepared by Mr Meinert he said that he would expect to see indentations in the valve seat.

He was given instructions as to when a regulator was to be serviced.

The firm would have dozens of these regulators: Scuba Pro required annual service.

He was asked where the regulators were being used frequently whether more regular services were required. In response he said that that had never been said to him by Scuba Pro but it seemed sensible. It was not his decision when to carry out any servicing.

By reference to sketch number 6 prepared by Mr Meinert (the second stage regulator) he agreed that it depicts the lever not meeting the diaphragm . The lever should be in constant touch with the diaphragm: this situation would not arise due to the passage of time. He would not have assembled a regulator in that way. He said that it would be possible to take the face off it in ten seconds: he had seen people adjusting their regulators on site. It's peoples' own business but if it were Aquatron equipment he would do something about it.

By reference to diagram number 7 he said that cracking pressure of 2.2 is excessive.

By reference to sketch number 8 he said that a cracking pressure of 4.62 is obviously not correct: it is well over the scale. It would be very difficult to breathe. This is the way it has been assembled , it is not due to wear and tear.

He described the procedure for adjusting and testing the cracking pressure. He said that these regulators should not have left anywhere with cracking pressure of 2.2 and 4.6. They would not have left the service lab under those conditions. He said they would deteriorate with the passage of time. The regulator has been in the sea: he would not imagine that it had been cleaned and salt crystals could build up. He was asked how it could deteriorate over time and he replied that Scuba Pro recommend annual lubrication.

In cross examination to Mr McNeill he said that in the period from April to September 1997 he was not the only one involved in servicing.

He was shown the pressure gauge: he said this is not a Scuba Pro item: it is an Aqualung manufacture. He had not done an Aqualung course. He did not service the gauges. The gauges are not serviced, they are calibrated. It is not part of the normal service routine. He could not say if a particular gauge ever calibrated.

In cross examination to Mr Anderson for Aquatron he described how he would carry out a purge test of the secondary regulator: if the lever was not set properly it would rattle on being shaken. If it rattled he would re- examine the whole procedure.

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I heard evidence from **Anthony Stephen Hughes** who was a scientific officer at the Health and Safety Executive Laboratory. He had an HNC in engineering physics and had been employed for 16 years by the Health and Safety Executive and specialised in breathing apparatus. He had a certain amount of diving experience and was a PADI Open Water Diver who had fifteen logged dives.

He examined the diving equipment which had been used by Mr Iqbal on the 19th September 1998. The equipment was delivered to him from Duns Police Station in May 2000, some 20 months after the accident.

He had prepared a report which was production number 52. In order to carry out his examination he did not dismantle the assembly. He is not qualified to service regulators. The tests which he carried out were to check the performance of the equipment against a standard E N 250 which establishes performance criteria.

The external appearance of the equipment was reasonably good considering that it had been stored for 20 months.

The equipment which he examined was as follows:-

buoyancy control device. This is a flotation jacket, which is worn externally by the diver over his wet or dry suit. On examination the jacket appeared to be in a good state of repair.

Gas cylinder:- The cylinder was within its schedule retest period at the time of the incident.

Main Regulator assembly:- The first stage regulator was on Scuba Pro manufacturer .

The Main Second stage regulator was a Scuba Pro R 190 coloured black with a blue mouth piece and purge button.

The octopus second stage regulator was also a Scuba Pro R 190 coloured black with a red mouth piece and touch button. Both were fitted with a venturi control. A third medium pressure hose connected to the control assembly of the BCD was secure and correctly fitted. A cylinder pressure gauge and depth gauge were also fitted. The witness then described in detail and by reference to production number 52 certain tests which were carried out on the main second stage regulator (the mouth piece) the result of the first series of tests showed that the regulator performance failed to comply with requirements at a depth of 20 metres due to excessive inhalation resistance. According to witness statements which had been provided to him the incident occurred at approximately 16 metres in depth. It would be possible to breathe from the regulator at this depth although it would require noticeable effort to do so.

There was a pressure drop of over 4 bar during inhalation throughout the tests suggesting that the first stage regulator could not supply enough air to the second stage.

A second series of tests was carried out this time at low supply pressure (50 bar) . Following these tests the regulator exceeded the standard requirements for inhalation resistance at 10 metre depths. At sixteen metres depth the inhalation effort required exceeded the standard limit of 25 M bar by almost 20%: it would be fairly difficult to breath from the regulator in this condition.

A further series of tests were carried out a very low supply pressure (down to 10 bar) These tests were performed at 16 metres water depth. These tests show that the breathing resistance level were not significantly higher than those carried out in the previous tests.

A third series of tests were carried out at low supply pressure with the venturi at maximum. Following these tests it was found that the regulator complies with the standard requirements down to a depth of between forty and fifty metres. The regulator would provide enough air at reasonable effort to a depth of 40 metres.

The cylinder pressure gauge was tested and compared to the calibrated pressure gauge on the test rig.

Following these tests it was found that the pressure gauge fitted to the apparatus being worn by Mr Iqbal gives a high reading when compared to the actual pressure in the cylinder. The E 250 standard allows for an error of not more than 10 bar at pressures of 100 and 200 bar cylinder pressure and an error of 5 bar at 40 bar cylinder pressure. The pressure gauge being tested produced readings which were in excess of these margins of error. The pressure gauge would give the diver the impression that he or she had more air remaining in the cylinder than was the actual case. At low cylinder pressure the gauge approaches 25 per cent discrepancy. It was pointed out that a diver who was low on air when returning to the surface would need not only a breathing supply but also enough air to inflate his BCD jacket in order to become buoyant enough to make an ascent.

Actual performance levels for the octopus regulator were not measured.

In conclusion he found that the main regulator did not comply with European Standard EN250. His report however points out that it should be noted that the apparatus as tested may not operate exactly as it did during the incident in question due to the length of time during which the apparatus has been in storage since the incident. This is particularly relevant if the apparatus has spent a lengthy period in storage with salt water residue in or on it.

He concluded that the equipment as tested in his report was found to perform in such a way as to give the very minimum level of performance for the depths being dived. The likelihood of a diver unexpectedly running out of air would be increased by the high reading pressure gauge.

The witness agreed that part of the result of obtained in his first series of tests could have been caused by a build up of salt.: the particular result never recurred in subsequent tests.

He said that the regulator was operating as it was designed to operate, that is to say its function was satisfactory but it was not operating to the standard required. The levels of performance are not correctly adjusted: the efficiency was not what it should be.

By reference to the test where the pressure was reduced to 10 Bar (table 3) he said that by the time the using diver got down to 50 bar of remaining pressure he would be having problems: it would not get much worse after that.

So far as the pressure gauge was concerned he said that this system has been around for many years and will be found in this form in many high pressure systems. The standard EN250 allows for a certain margin of error. At 200 bar the margin of error was more than twice the permitted level: at 30 Bar it was almost twice the permitted percentage error. As the cylinder pressure drops it will represent a higher percentage of the maximum. It fails EN250 standard.

By reference to production number 38 which was a further report following examination of this equipment by constable Begg of Strathclyde Police Underwater Search Unit where it was found that the gauge was out by +20 bar the witness said that his reading was "+23" : it may have been stuck at 20 when Bell received it.

It was reading similarly at the high end of the scale two weeks after the accident when he examined it.

A diver would think that he had more air in his tank than was the case : he might suddenly be aware of air.

He accepted that some of the defects in the apparatus might be due to its having been in storage. He did not notice any particular deposits of salt on the externals.

The equipment gave the very minimum level of performance.

In cross examination to Counsel for Mr Martin he said that as a diver he would take it for granted that his buddy was also available and the buddy has a spare mouth piece. If a diver encountered a problem at this level and his buddy was gone he could run out of air in five minutes.

The witness was unwilling to comment on the servicing of regulators but he said that not everyone will understand that gauges need servicing as well. He would say that there is a tendency for the servicing of gauges to be overlooked.

In his opinion the gauge being used by Mr Iqbal was sticking.

In cross-examination to Mr Anderson on behalf of Aquatron the witness agreed that he could not say that the breathing equipment was operating to the same standard on the 19th September 1998. He could only describe its condition at the time of his test.

Standard EN 250 came into effect on the 15th May 1993. All new regulators after that date require complying. He did not know the age of the regulator in this case. The tests are carried out in fresh water.

He previously examined Scuba Pro equipment. He had not previously examined equipment which had been both (a) in the sea and (b) stored for 20 months.

He agreed that part of the findings which he had made in table 1 of his tests was likely to be a result of the equipment sticking and then having freed. He agreed that a lapse of 20 months together the possible presence of salt, a reduction in lubrication and a beginning of seizing of components was a possibility. He said however that after test 1 the freeing process had already occurred. He did not repeat his tests. With hindsight he would have rechecked it.

In re-examination he said that he was satisfied that his results were reliable.

oOo

The next witness with whom I deal is **Mr Michael Robertson** who was the UK sales manager of Scuba Pro. He was called on behalf of Aquatron and by agreement his evidence was interposed during the evidence led by the Procurator Fiscal. Scubapro are the manufacturers of the diving equipment involved in this case. He was a technical services manager for four and a half years and attended servicing courses

for most of the Scuba equipment. He is a PADI master instructor. He has conducted numerous technical seminars.

He had examined the equipment in this case.

By reference to label number 1 he described this as a Scubapro mark 10 regulator and R 190 primary secondary stage. The gauges and hoses were not scuba pro equipment. The primary breathing device was Scubapro

He was familiar with Aquatron who were long standing authorised retailers and servicers of their equipment. They have attended seminars and have access to spares. They make regular sales visits and from these visits are able to ascertain the quality of presentation and service.

He knew of Mr Meinert but Mr Meinert is not an authorised scuba pro service engineer. He has not attended a scuba pro seminar in four years.

He was referred to production number 50 which was Mr Meinert 's report. He was aware that 20 months had elapsed before Mr Meinert's examination. He was asked what would be the effect if during that twenty months the equipment had not been rinsed or washed until May 2000 and no attempt made to add lubrication. He said that storage will affect the characteristics dramatically. Scuba pro

recommend annual servicing or every one hundred dives. The reason is the mechanical properties of the o-rings: they can become brittle which decreases their performance: lubrication is crucial ; if the properties of the lubricant change then performance will decrease. Both of these factors will affect the first stage by resistance on the piston with a corresponding increased pressure on the valve and an increased in the stage pressure drop.

In addition he said that during storage the valve seat will be in contact with the sharp edge of the piston and this will have an engraving effect on the low pressure seat which will cause a decrease in performance of the second stage. He said there will accordingly be a increase in the cracking effort in the second stage. After the equipment has been in the sea there will be some effect from salt build up. Salt water can penetrate most areas of the first stage. If incorrectly rinsed and stored salt can crystallise which can result in impeded performance of the piston and if very abrasive can damage the softer components of the regulator namely the o-rings.

By reference to production number 50 he said that the equipment had been last serviced in September 1997: it had then been idle for twenty one months followed by the Health and Safety Executive tests. He said that the creep tests could be correct at the time of the accident but the storage period together with the salt could have impeded the sealing mechanism. Either of these is possible.

By reference to production number 55 it was his opinion that damage to the valve seat was more likely to be due to wear in the period before the accident.

He agreed that there was damage to the o-ring: he then said " from brief inspection it is consistent with damage after a normal service interval period. It is difficult to say if there is a cut. I did not see a cut this morning."

He then gave the perhaps surprising evidence that the first time he had carried out an examination of at least this part of the equipment was this morning at the court building.

He said that starting up the equipment on a dry brittle o-ring could cause damage. It was his opinion that if there was a cut in the o-ring on installation that that would be "an open wound" now. If there was a cut on insertion of the o-ring at installation there would be an ambient pressure leak. If there was a small cut that would aggravated by ordinary wear and tear.

He next turned his attention to the primary second stage (the face mask); this was as depicted in sketch 7 of production 55. The manufacturers specification for the adjustment of the nut was one point three millimetres which is the equivalent of two threads. You can have up to three and a half threads exposed ; the more there is exposed the greater is the inhalation pressure; one thread showing is acceptable. He said that the lever height is not governed exclusively by the lock nut: it is also governed by the external orifice adjustment: the lever should be in contact with the diaphragm . There is a tool available which allows adjustment whilst the system is pressurised. The second stage will rattle on inspection if the lever is not in contact with the diaphragm . It was his opinion that cracking effort has increased during storage due engraving on the low pressure seat within the second stage (that is the blue valve seat in sketch seven) The lever has eight degrees of opening ability. If not properly adjusted it will have a reduced degree of opening and therefore give reduced air flow. It would not cut off the air flow but it would reduce the volume. He said this was not a major contributing factor to cracking pressure increase. It is the spring in the valve orifice which is the primary source of pressure: absence of contact between the lever and diaphragm is an indicator of mal adjustment of the valve orifice screw.

By reference to production number 52 (the H&SL Report) he said that there was a dramatic and unacceptable performance from the first stage during these tests.

The tests are outwith the service period but so is the regulator. It had been used for twelve months with twenty months in storage. A test twenty months after that situation is not a fair test on the regulator. The test tables show signs of it freeing up.

In cross-examination to Mr Gray the witness explained that the cracking pressure is the initial effort required to initiate air flow. It is governed by the spring tension on the nylon lock nut. Pressure in the octopus can be set somewhat higher to balance the unit.

Breathing performance for a novice would be increased by ten to fifteen per cent. The technician doing servicing does not know who will be using the equipment. The manufacturers would recommend caution and tune the unit down that is to a higher cracking pressure.

Figure 98 is at its most extreme and is unacceptable. This would give a very high cracking pressure but would not debilitate.

In cross examination to Mr McNeill he was shown production number 47 the service record sheet for regulators. He would not expect the scuba pro representative to see the service records on visits to Aquatron. There is nothing in the service record to show when the unit has been used on one hundred dives. He did not know if there was any system for recording the use to which regulators are put.

He was shown production number 48 which recorded that the unit used by Mr Iqbal was last serviced on 19th September 1997 and issued to Mr Iqbal on the 19th September 1998. He agreed that the regulator was not going to be serviced within the maximum of one year. Wear on the o-ring was consistent with the normal servicing period but it is undesirable to use the equipment in that condition. Scuba pro supplied the first and second stage regulators only: the retailers assemble the units for the customers.

In cross examination to the procurator fiscal he said that Scuba pro as manufacturers do not check if the retailer is carrying out servicing. It has not been their responsibility.

The mark 10 is now a discontinued product.

He reaffirmed that the wear on the o-ring looked to him like wear and tear. He said there were indication that it has been dry when the damage was caused. When invited to offer other explanations for the damage he said that he could not say because he had not been asked.

Mr Meinert's view is no more than one of a number of possibilities. The defects would be more noticeable under water.

He was referred to sketch number 7 which showed the lever being four point five millimetres away from the diaphragm. Wear and tear could contribute to this but it looks as if it was how it was assembled. Cracking pressure was in excess of acceptable levels.

The cracking pressure of four point two in the octopus was unacceptable. It was three point nine

when examined by the police: that is also unacceptable. Breathing would be difficult but not impossible.

It was not desirable to use the equipment with this o-ring: it would have impeded the performance and reduce the amount of air available: inhalation resistance would be increased.

oOo

Mr. Peter Cook gave evidence. He is an Inspector at the Health and safety Laboratory specializing in diving and based at Aberdeen. He was an engineering

graduate and held a Saturation Diving qualification at the highest level of diving in the UK. He had personal diving experience having taken the PADI Open Water course, a SCUBA technician's course and was involved with the British Sub-Aqua Club. He had been employed in commercial diving as a diving engineer and was a member of the Institute of Occupational safety and Health. He had logged several hundred dives.

He spoke to Pro 11 which was the Approved Code of Practice (ACOP) for Recreational Diving Projects. The Code was in force at the date of Mr. Iqbal's death.

The dive that day was a "diving project "

Martin and Smith were "divers " within the Code

The contractor was Aquatron and Martin held a formal letter of appointment as the supervisor.

By reference to Pro.33 (The Dive Plan and Risk Assessment he said that all of the objectives stated were PADI based. It was a starting point for the dive plan for the day.

He became involved the weekend of the death because it involved a person at work.

On 24 September he went to Aquatron's premises and conducted interviews. He uplifted a number of documents which I need not specify.

He expressed various observations in relation to the standard of verification of Mr. Iqbal's personal logs by Aquatron personnel.

He was with Martin when information was downloaded from Martin's dive computer. It showed a dive taking place on "10 September 1998". He was told that this in fact related to the dive on 19 Sept.

He interpreted the computer printout with particular reference to safety stops. These were, he said, an essential part of the PADI routine.

He also considered Smith's printout. He did not consider that they disclosed adequate time for training to have been carried out.

He discussed his findings and an Improvement Notice was served on Aquatron (Pro.39)

Aquatron disputed the terms of the Improvement Notice by a letter (Pro.40) Having considered the circumstances surrounding Mr.Iqbal's death he said that he had not come to a view as to what caused his death other than a combination of circumstances. These were issues for the improvement of training which had not been carried out.

If the trainees had been adequately trained they should have understood the "buddy system": it was understandable that they were poor at basic skills. Aquatron agreed

that the failure to carry out a head count was not helpful. It is common sense to gather the group together. The problem was that they met other divers. The responsibility lies with the contractor to review the records and ensure that proper standards are being met. So far as paragraph (e) of the Improvement Notice is concerned the Health and Safety Executive did not get information from any one else that a dive had been "aborted".

Production number 41 was the second improvement notice and is a response to Aquatron's letter. The witness was asked if any of these trainee divers should have been allowed into the open sea. He replied that they should not: the instruction in relation to the skills should be in confined water before they then proceed to open water: the skills should again be demonstrated in open water (see the schedule attached to the improvement notice). The British Sub Aqua Club does most of their training in a swimming pool and there is then a series of dives using a dry suit.

So far as Aquatron's response to the improvement notices was concerned, the Health and Safety Executive formed the impression that the requirements were viewed as onerous by Aquatron and would affect the business. This impression was formed from their dealings with Mr Young. They did not think that there was anything in the improvement notices beyond good practice and PADI procedures. The Health and Safety Executive had meetings with them in connection with compliance but were told that Aquatron were not doing any more training.

If proper procedures had been followed, this dive would not have occurred. There was some concern that the evidence showed that Mr Iqbal was in some difficulty at the commencement of the dive and a question arose as to whether he was properly prepared and had the correct weight. He was floundering and the required instruction on how to put additional air into his BCD: this was a matter of concern. The first requirement is to get your weight right without the BCD. If he was floundering when he went in it was the weight which should be checked. Inflating a BCD is not a new skill. When wearing a face mask vision is limited and things are done by touch and familiarity. He was wearing a new suit with new components and familiarity with the suit is an essential.

Mr Moore was given a free dive in a pool and was then given his certificate: his dive must have been treated as his elective dry suit dive: the procedure is back to front. He could not have been given his certificate: the safety stop was never done and his neutrally buoyant ascent was not carried out: it should have been done in training. To proceed to dive in a dry suit without demonstrating the necessary abilities should alert instructors that they must be very cautious.

On being asked if he had any recommendations to suggest he said that in this case it is difficult to identify factors unique to the industry. There was a combination of poor practice which contributed to the death. The British Sub Aqua Club are concerned that accidents are due to poor buoyancy control which is more difficult in a dry suit. It is easy to see that if conditions were not perfect that that may have contributed. There were just enough failures here to combine. The most important was a lack of training. A well trained diver should survive lack of air at that depth. If he was given appropriate support he should be okay.

The trainees cannot be criticised: they should have been given proper cover by their instructors. Both Smith and Moore were aware that Iqbal was not present when they surfaced.

In cross-examination for Mr Gray the witness identified production number 34 as being in the same handwriting throughout: he assumes Mr Martin but it could be the dive master on shore. It is a critical document for the shore master. He may be meetings a number of divers for the first time: he may not know them by sight and he counts them out and in.

For dive 2 McLeod, Martin and Smith were shown as "buddies" Moore and Iqbal as buddies: so far as Sandford and Christie were concerned Christie's name does not appear on the log at all: Christie was to be a buddy to a trainee. If a shore master is to rely on the log he should have the names of all participating the dive. Divers should signal to the shore master before heading back for land.

He was aware that the pressure gauge was faulty and that there was a problem with the regulator. He was asked if there was any evidence other than speculation that Mr Iqbal's dry suit itself had anything to do with his death: the witness replied that the lack of familiarity may have contributed: he may have been overweight and unfamiliar with the suit which is a dangerous combination. If he was overweight from the start of the dive he would be overweight on the bottom and uncomfortable or alternatively would have to have put air into his suit .

Being overweight requires more effort on the part of the diver. He would have lack of familiarity with the controls on the suit.

It was put to the witness that it appears that whatever happened to Mr Iqbal it happened very suddenly in that he had been seen just before the group started the ascent. The witnesses replied that it was not known whether he ever began his ascent. So far as the blood/mucus which was found he may have begun his ascent and gone down again: it is common to find blood due to the expansion in the sinuses. He may have attempted to surface; may have got all the way and being short of air may have sunk again,. There was no one with him: if he had attempted to dive to the surface and was overweight he may have got there and sunk again.

By reference to production number 41, the second improvement notice, the witness said the dive plan was not adequate: the dive plan and risk assessment together were inadequate: if it had just been the plan which had been defective nothing would have happened: bad plans don't cause deaths directly. Improvement Notice number 2 was intended to supersede notice number 1: the language was more precise in paragraphs (b) and (c).

Dealing with the procedures to be followed the witness said that the critical point is on the bottom before the ascent. The divers should ascend as a pair. One instructor went up with Iqbal's buddy: they should go up as a pair.

In answer to a question from the court the witness said that he would expect the instructor to be concerned and to take a pair up and leave another instructor on the bottom: they should be ferried up: it was an oversight in not having taught them

ascent skills in dry suits. It might have represented three wasted minutes if they had done a safety stop. If there had been an instructor there he could have sent the students to the surface and gone down to look for Iqbal. Someone should have gone to look for him; the safety stop and the lost diver are not connected. There is a lot of PADI guidance on control of a group.

When they visited PADI they were shown considerable guidance on controlling a dive group.

He agreed that PADI is a commercial organisation and they run franchise retail establishments. They make it clear that if people sign up to their system it is very important that they should comply to the letter. He was aware that PADI suspended Mr Martin from instructing and ordered him to undergo retraining. The Health and Safety Executive had discussions with PADI on the contents of the improvement notice and if their standards had been followed the accident would not have happened. He did not know if Aquatron were still involved in training: "they may be training instructors rather than students"

In cross-examination to Mr Anderson the witness said that he personally had advanced well beyond the open water diver stage. The British Sub Aqua Club standards were different but in PADI standards he was slightly higher than an advanced diver.

He was referred to production number 20 which was the log of Mr Iqbal's first dive. He agreed that the document was personal to the diver but the instructor signs. It is one of the documents about which they were concerned because the divers record and the organisations documents tended not to tally. So far as productions 20 to 27 (personal logs) were concerned he agreed that how that is filled in is a matter for the student. There is guidance but at the end of the day it is a matter for the student. None of these documents in isolation would lead him to have any general concerns but a number of things taken into conjunction caused him concern. Production number 32 has no verification certificate.

He was referred to production 58, the PADI incident report form. The Health and Safety Executive interviewed the instructors a week later and were told the same as was contained in the reports. They then heard a different version in court.

He had contact with Mr Thomas Young in Aquatron : Mr Young told them he had long experience in diving. It is quite possible that paragraphs (b) and (c) of notice 1 could have been more happily framed.

So far as production number 33 is concerned he described it as a useful document but not a plan in itself. Regulation (6)(2)(b)(3) requires there to be a written plan. Production number 33 does not relate to that particular operation. It was suggested that the verbal discussion before entering the water may have compensated. He said that people are not now clear as to the content of that verbal discussion.

Not everyone agrees the content of the verbal briefing.

The witness produced a weight belt which he had made up for demonstration purposes. It was marked label number 3 and was 28lbs in weight.

They had asked what weight Mr Iqbal was wearing: the weights were coloured coded: it did not say not say on the issue sheet what weight he was wearing. He did not get a response to that question. "about right" isn't good enough. A buoyancy check and adjustment should have been done. If a diver is overweight he can compensate by air being introduced into the suit. If underweight he simply will not go down. If there were four trainees involved the chances are that someone would need adjustment. He suspected that all were overweight ; there is no record of any adjustment.

In re-examination and by reference to production number 58, the statement given by Mr Smith there is no reference made to any cancellation.

He was asked if there was any significance in the fact that Mr Iqbal was found sitting on the bottom with his weight belt on: he said that his lungs were partially flooded; with the correct buoyancy he would ascend easily: if all else fails the weight belt should be removed: if he had reached the surface that is the time to ditch the belt.

By reference to Martin's statement at production 57 where Martin said that he met up with Forbes and Smith. The witnesses pointed out that Martin had no obligation to these other divers. They should have been sent to the surface. Martin still had four trainees on the bottom who were coming to a critical stage in the dive.

In answer to a question by the court he referred to production 11 at page 17 where it was said " all equipment must be checked by a competent person and entered in a diving operation record." This was apparently not done.

oOo

The next witness was **Mr Rognvald Graham Young** who is a partner in Aquatron: the partners are himself, his father Thomas Young and his mother Ursula Young. He is in day to day charge : he started in 1987 : Aquatron has been in existence since 1969.

Aquatron has been linked with PADI since about 1990. He himself had been a diver since about 1989. He qualified through the British Sub Aqua Club system. In the early nineties he became a PADI open water diver and is now an instructor development course instructor and has been for about two years.

At the time of the incident Aquatron did a full range of training. They now send enquiries to a company Delta Diving for any training below instructor level. They have no commercial connection with Delta Diving other than that they rent equipment from Aquatron.

They carry out servicing for Fire Brigades, Industrial Breathing Equipment, High Pressure Breathing Equipment, and compressors. They supply and service regulators for sport and the diving industry. They are still a Scuba Pro Centre.

Mr Young himself spends no time in teaching. He is qualified to assist a course director in teaching instructors. They are not course directors for PADI. They sell, hire and service scuba equipment. All but one of the staff is an instructor: very little time is spent in actual instructing: they are not employed as instructors.

In September 1998 there was a lot more training been done. They have now moved away from training for commercial reasons. In 1998 he was responsible for the dive training side along with Mr Martin.

He described how along with staff he would schedule training exercises and would also issue equipment to students. In 1998 he was doing instructing. He could easily have been the instructor on the day in question.

The decision to select the location was his.

He has responsibility as a dive contractor for health and safety purposes.

He had dived at Weasel Loch on less than ten occasions: he had never instructed at Weasel Loch. The diving around the Eyemouth area was good quality: emergency services were close and visibility in the area was good: it seemed a good choice.

At the time he considered that it complied with PADI standards in good conditions.

He had looked closely at PADI and if you take it literally then "any area of the sea would not comply". The industry norm was to use the sea.

He now accepts that Weasel Loch does not meet the PADI definition : it would be a difficult decision to defend.

It was suggested to him that confined water training in the sea could not be done in Scotland. He said that you predict calmness but perhaps not clarity: tidal movement also has to be considered and entry to the water would need to be timed in accordance with the tides. Any dive centre which restricts its confined water training to the sea would be foolish.

"Dry suit orientation " is an expression used by PADI : it is part of a specialty course or advanced course which students must complete.

His attention was directed to production number 5 at 3.25 to 3.26 under the heading of "Dry Suit Training Orientation". Before this part of a dive there should be a separate confined water session. The skills listed at 3.25/ 3.26 is a list for a dry suit elective dive.

By reference to production 5 pages 1 - 13 he said that the orientation session is a dry run in pool before going into the sea. In PADI terms that could be called open water. It was not considered from a commercial point of view . It was an industry norm. It was a correct decision. He would not defend it in court but from an educational point of view he still says it was the right decision.

The trainee would get more benefit in Weasel Loch than in the pool: there is more depth; ascents and descents are more meaningful. The dry suit is not used the same in a pool as it is in the sea for example there is a 30lb weight belt. In text book terms you require to swim up and down which is more difficult in shallow water.

By reference to condition number 6 he said that you are measuring the rate of ascent not the distance and you cannot practice it effectively.

By reference to the skills required (number 1 - 7) he said that he thinks that educationally it is better for the trainee to go into the open sea before completion of a "confined water dry suit session"

By reference to production 5 3-4 (2) he said that to have done a naturalist dive before the dry suit elective dive would not be in accordance with 3-4 paragraph 2. That looks like common sense.

He selected Mr Martin. He was an employee who worked with him on a day to day basis.

Stuart Smith was part time. Mr Perkins was responsible for diving operation until he left. Aquatron was the contractor and he was the training manager. This witness took on the role after Mr Perkins departure.

He had prepared a document appointing Mr Martin until further notice to be the supervisor on any site when Mr Young was not present. This appointment was before Mr Iqbal died. Mr Martin would not be given the appointment along with the dive plan.

His attention was directed to production number 11 page 18 paragraph 79. He said that the operation that day complied. As far as he was concerned Martin was a supervisor; how he carried it out was a matter for him. A dive leader and supervisor are not the same. A student could be the leader.

Martin was given the dive plan production number 33. It is non specific. It was a basis for a plan.

Production number 34 was the intention (the dive plan for the day). That form was provided to assist Martin in planning the day. There is information on the reverse side where staff acknowledge their responsibilities.

His attention was directed to page 10 regulation 8 (3) of production 11. There were twelve people in the party but he thought that Ward and McLean left in a private car. Aquatron were paid by the trainees for the transport.

So far as his responsibilities to Christie, Forbes and Smythe were concerned, he said that if they use our equipment we have a duty to advise and assist. That is why they would come back to us. They did not form any part of the (training exercise) on that day. Christie should have been named on the plan. It was a fun dive which was taking place. There is no reference in production number 33 to a fun dive.

Mr Martin was at work as a diver. If they were being supervised they were divers under supervision.

There was a break down of procedures in a party of seven: there was break down in "buddy" procedures. In this respect he was asked to comment on the quality of the instruction by Aquatron since both Mr Iqbal and Mr Moore were Aquatron trained divers. He replied that it was not a matter for the quality of the instruction by Aquatron. If there were defects in the training he would be prepared to carry the responsibility.

He was asked if a surface head count is not a matter of common sense with which he agreed: he added however he was not convinced that a head count was not done. Martin and Smith made a mistake in not doing a head count. They had no specific procedures. He agreed that if an instructor realised that they have come across two extra divers and that one diver has lost his buddy that is an extra reason for a head count.

In response to a question from the court he said that he would expect an instructor to monitor the ascent.

He was asked about Martin going to the assistance of Forbes and Smythe: he replied that it is down to the individual ; he was demonstrating some distress and he himself would probably take him to the surface and then consider the safety of others.

Turning to the equipment which was in use he accepted that the cracking pressure in the octopus was in excess of the manufacturers recommendation. He would like to know how it happened. Such an exceptionally high figure does not come from the set up. There may be a foreign body in there for example sand or salt. He reserved judgement until he sees it.

He said that he had experimented and could not achieve that cracking pressure. It seemed most likely that it was in that condition when it left Aquatron.

At that particular time they had a three year replacement cycle. They now have a two year cycle. An item of equipment is in their possession for twelve months: they do not service it. He was asked about servicing within one hundred uses: he knew of that requirement but it is extremely unlikely that any item would go out that number of times. They have no system to determine the number of times that an item is hired; "to some extent we log it out". It would be looked at for signs of damage or abuse on its return. They had not done cracking pressure tests in the past. He said they have been trying to find the truth: the octopus was defective. He agreed that they could have introduced a one hundred use log: they have not done so

Turning to the servicing of equipment he agreed that the maximum was twelve months and it is sensible : for one hundred uses that is not done. He explained that equipment could be hired out for a week and maybe shared with others. He would not know the number of dives which had been done with it. He would not know its internal condition.

They check the visible state and they pressurise for leaks.

He agreed that his form of logging may not be foolproof.

He agreed that individual marking on suits would be sensible.

Improvement Notices Production 41

There are five recommendations. With (a) [no student to participate in dives before completion of training] he has no difficulty and it was not the rule at the time.

With (b)[..safety stops at 5m to be carried out when required by PADI].. he also has no difficulty. It is a good practice to adopt. It is more appropriate to recommend a safety stop in a potential emergency. Where making a direct ascent from depth a safety stop would be made. A safety stop was a good practice. It might have saved Mr Iqbal as it would have been realised that he was missing.

With (c)[..safety procedures to account for all divers and diver separation..] he has no difficulty. He went into this with the Health and Safety Executive; he did not recall their specific recommendations; they have reiterated (c) at length.

So far as (d) is concerned [diveplans/logs to be accurately completed and verification system] they modified the dive plan. The so-called fun dive is not entered in the dive project log. Changes have been made but there are no entries for a "fun dive".

PADI would not look at their diving logs.

He was asked about the preparation of the incident statements to PADI (Productions 57 and 58). He said that he had no input into them: he did not know who typed them

He did not type them. He did not change them. He does not know who did. He has had sight of David Martin's original statement. The type face does not look like Aquatron's . It looks like it has been edited. He agreed that the statements appeared to be very similar: he had no comment to make.

In cross examination to Mr Gray he said that so far as productions 57 and 58 are concerned they did not have secretarial staff at Aquatron. It was put to him that these statements were prepared by someone at Aquatron: he replied "I did not do so": he had no idea where the originals of the statements were.

He agreed that productions 57 and 58 were important documents. Smith gave him his original first. He received them on different occasions. He agreed that the language used was not that of Smith or Martin. He denied that he or his father had an involvement with these typed statements.

Turning again to the equipment he said that they keep some documentation for hiring out until the equipment makes a profit (20 hires): it is unlikely that it would be used more than one hundred times in twelve months: sometimes it is hired out less than 20 times.

It was put to him that if they have the use of a swimming pool for 52 weeks of the year with six to eight students that alone could account for twelve regulators. The cost to Aquatron of a regulator was £250 to £300 : the equipment was maintained for training rather than hire.

In cross examination to Mr McNeill he was referred to production 47 the service record. Items seven and eight were described as "new" . Item eight was new/97 and serviced 11/99 and 8/98. This does not mean that the equipment was used during the period.

Items 1 - 6 and 9 of production 47: he could not say how old they were. He would think they were new one year before the first date shown. Number 4 was older and may have been for example a trade in that which was not purchased in the usual way. These regulators are continuously improved.

Production number 44 is an invoice to Aquatron for the purchase of dry suits. Invoices for regulators do not show their serial numbers.

By reference to production 4 (a) he was asked about the organisation of Aquatron, its staff and some of its history which I do not find necessary to record.

The supervisor is responsible for diving operations which may include a diving project. This witness has responsibility for diving operations.

In relation to the Diving at Work Regulations he said that the primary thrust of the regulations required two responsibilities namely (1) the project must be thought out and (2) the carrying out of each dive must be supervised by a team in accordance with para 48.

At this point in the evidence Mr Anderson took objection to the line of evidence. The line being adopted was said not to arise out of anything raised by Mr Martin.

Mr McNeill said that he was eliciting from the witness evidence to the effect that Aquatron were inadequately structured to meet their fundamental requirements.

I permitted Mr McNeill to continue with the line but it was not followed further.

In cross examination to Mr Anderson the witness said that it had never been suggested to him by anyone that they were improperly structured.

There is no recommendation by the Health and Safety Executive that they need more instructors: there was no suggestion that Mr Martin could not lead a party if the witness was not present.

He explained that you get to know your students and develop a personal relationship with them. Mr Iqbal was known to the dive team and his death affected both the witness and everyone in the team.

He expressed his deepest regrets to the family of Mr Iqbal who were present.

He referred to the different types of equipment and the organisations for whom they service it: they do servicing work for the police: occasionally when the police have problems they come to Aquatron for advice: their reputation in the diving school industry is good. They were probably the largest dive training school in the country. In order to reach their PADI grading (five star IDC) you have to meet certain requirements in connection with minimum numbers of students and minimum standards for a retail outlet: there must be full time qualified staff in instruction and servicing. There is a quality assurance requirement. After this incident Martin and Aquatron were the subject of a PADI investigation which focused on the instructor . Aquatron's five star rating was not removed.

Mr Martin did all his training with Aquatron. Aquatron does not have a course director qualification. In liaison with PADI an instructor examiner is brought in.

He was asked if when Martin took the party to Weasel Loch he considered that that was satisfactory at that time. He replied "I still don't see why/how this clashes with PADI: I can read the regulations either way". He agreed they should not do what was done on that day.

By reference to production 5 pages 1- 12 he agreed that it should be done before doing the elective dry suit dive. It does not say that you should not make a dry suit dive before it. The original intention was to do the dry suit training session: it was not possible to fulfill this so they went on to do an experienced dive. They believed that what they were doing was not a breach of PADI.

At 1 -12 PADI does not forbid any amount of "fun diving".

By reference to the "Open Water Diver Course Instructor Guide the witness was asked if there is anything else which confirms this "grey area" he referred to an amendment dated January 1997 for open water training which included reference in to the fact that completion of a confined water dry suit orientation session is required before a dry suit diving open water diver course training dive is completed.

By reference to production number 1 for Martin "discover scuba training" he said that he found this document supportive of the views which he then held. He would summarise that a diver must be under supervision until they have the qualification: by reference to 2 - 9 Weasel Loch would not allow someone to stand: by reference to 2 - 13 a PADI instructor is entitled to take a student into the sea.

By reference to 2-2 "instructor supervision" a ratio of 6:1 or 8:1 with a PADI qualified assistant is acceptable. He said that the fin pivot would be eminently easy ; you could not assess the hover; it is difficult to assess at the best of times: the student must remain motionless in a column of water for thirty seconds. Most, learners, when remaining still would end up on their backs being turned by the weight of the tank if there was water movement.

Twenty Eight pounds of weight sounds right for the deceased. Martin is probably the best he has seen in assessing weight requirements.

The dive plan (production number 23) is a starting point for specific planning.

So far as production number 24 is concerned the dive master on shore would not be relying on this: he would count them out so he would not need anyone to tell him.

There is no recommendation for a head count in the PADI scheme.

Equipment

SERVICING at annual or one hundred dive intervals : he said that they gauge from the cash till electronics when the equipment has been issued twenty times.

PRODUCTION NUMBER 59 THE CERTIFICATE OF CALIBRATION:

The witness could not relate to the gauge used to perform the calibration. The range of test equipment is zero / two hundred: this purports to be testing to two hundred and eighteen.

PRODUCTION NUMBER 52 ; THE TESTING OF REGULATOR ASSEMBLIES

Tables 1/ 4 : when these arrived the witness was astonished that a regulator under this time scale of storage (was being tested): the only question in his mind is by how much it will be failing.

After twenty months lubrication is critical: there will be an aging process in soft parts. There will be a build up of salt or contaminants and there will be potential corrosion.

The free flow in test 1/5 demonstrates a fault somewhere. The mechanism is jammed open. You cannot make one of these regulators free flow.

They have changed parameters and not replicated the tests.

On the inhalation cycle he detected an improvement: it seemed to him to be a dramatic improvement.

Production number 50 Meinert's Report: He could not say this was not a consequence of bad assembly: he has tried to damage an o-ring on assembly and got a "nibbled effect": the damage is more concentrated horizontally . He had never looked into this matter in any depth. His initial thoughts were that the time in storage was a candidate for the results which were found.

The equipment had not developed a leak therefore there is a suggestion of recent damage. Given the damage it could have been cause by the end of the Health and Safety Executive test.

PRESSURE CREEP: VALVE SEAT DAMAGE:

The piston has to cause the damage by its very nature. It is a matter of course with this regulator that the seat will wear. On this particular regulator the damage is exacerbated : the piston does not run true. Its only bearing is the o-ring.

It is normal for one year old regulator to show creep. This will reduce cracking pressure. It is irrelevant in this case.

Turning to the second stage and dealing first with the primary second stage :

The manufacturer's recommendation is 1.4 to 1.6: the finding is 2.2. Police Constable Bell had measured the resistance at 1.4. The witness asked why there was such a difference between Bell's finding and Meinert's. There will always be a difference but there should not be such a substantial difference: the storage problems could have an impact.

The witness accepted that the octopus as tested by Bell exceeded the manufacturer's readings. On the primary stage he would notice the amount of travel assuming the 4 to 5 millimeters was correct. By reference to production 55(7) he said that prior to disassembling they subject the unit to cracking level tests: they will note the position of the threads and would be inclined to return it to that position. The manual provides measurements in millimeters rather than threads. They would adjust the valve orifice under pressure and set the cracking pressure against the gauge. If the lever height was low it would have some impact on performance. He said the fault was in the first stage and therefore the second stage is not having the problem delivering: the lever height would not have any great impact. "Standing Bell's finding of cracking pressure the set up of the equipment would not have much impact on the day".

Gauges :

It was showing 20 to 30 bar when worn by Mr Iqbal: It was showing 20 when seen by Bell and was showing zero when examined by the Health and Safety Executive. The witness said that the flow restricter by which this operates is a pin hole size: these can be subject to blockage and if the blockage was complete there would be no air registering.

In re-examination he said that he regarded production No 52 as being inconclusive in relation to the pressure gauge. He was not happy with the calibration record: That gauge could not have been the calibration gauge..

He did not dispute that there was an error in the gauge. There should not be debris in the gauge if properly maintained. He said that the gauge is checked every time that it is used to demonstrate to the student that it is working. It is not a calibration: It is a check. Aquatron do a rudimentary check. He could not state with certainty that it was accurate, but Meinert and Robertson disagree.

He said that the PADI guidance can be read in different ways. It should be read conservatively for safety. He did not agree that Aquatron did not take the safety approach.

He was asked if he now accepted that what was done that day was not sensible: He replied he would not do it again. The Improvement Notice and the incident have contributed to that. He does not have a problem with the decision to conduct training

in Weasel Loch. He does not have difficulty with the decision to go ahead with the dive after non-completion of the hover.

His attention was directed to that part of the manual which deals with completion of dry suit orientation. The statement in the manual applies to people not having used dry suits before. Before you ask divers to complete the tasks in open water they should have done so in confined water. They should not have been allowed to dive without supervision.

Production No 33, the dive plan, indicates that Weasel Loch is an appropriate site for all levels of experience.

He was asked if he accepted that more regular maintenance and servicing of equipment was necessary due to their being damage. He said that it would be done if there was an indication of damage.

He did not accept the tone of Meinert's report.

He would expect that the other organisations for which they carry out maintenance maintain a specific log for each item of breathing apparatus.

That concluded the evidence.

Crown Submissions

There were a number of factors which may have contributed to Mr Iqbal's death. It is impossible on the evidence to say which of these factors were most significant and it may be that some of them played no part or only a negligible part. Their order of importance is unlikely to be established with any degree of certainty, but the factors which contributed to his death were said to be as follows:-

1. The deceased ran out of air. No evidence of any misfortune, illness or accident extraneous to the diving procedure has been offered. When his body was found his buoyancy control device was unable to be inflated by reason of the fact that there was no air left in his cylinder. His pressure gauge was stuck at 20 bar which gave a false reading. The pressure gauge was outwith the requirements of British Standard EN250 throughout the range of its operation. The degree of error was such that it could have given the deceased and any other person checking his pressure a false sense of security as to the level of air remaining in the tank.

There was no regular check of the accuracy of the pressure gauge by Aquatron.

2. When he was found the deceased was still wearing his weight belt. It is a fundamental piece of diving training that a weight belt should be jettisoned to allow a return to the surface. The fact that the deceased failed to carry out this basic manoeuvre suggests both that the training given to the deceased by Aquatron was insufficiently rigorous and that the deceased was overcome by panic. Given that this dive was supposed to be being carried out within the PADI scheme and the code of conduct it was not simply the trainee divers who failed, but the instructors were also

Aquatron trained and the failure to carry out safety stops and proper search procedures are indicators that Aquatron was operating a shoddy system.

- The breathing apparatus has a number of defects.

In answer to the criticisms made by the Solicitor for Aquatron the Procurator Fiscal said that no approach had ever been made by Aquatron to conduct a detailed examination of the equipment either before or since the Inquiry commenced in February, despite the contents of the reports being known to Aquatron since approximately October last year, nor during the Inquiry when it could have been addressed on various occasions. It had never been the Crown position that the manufacturers had an adverse interest. The fundamental design of the equipment has never been an issue: it is the set up and maintenance of the equipment which is in issue.

The hose leading to the dry suit was of a diameter which was significantly less than would normally be expected. This defect would not have contributed to the death.

The first stage regulator was defective in two respects, namely, (1) the valve seat had been eroded by the sharp edge of the piston which was a well known problem. While the annual maintenance schedule would probably have been adequate had the unit been the private property of an individual diver the fact that it was used by a diving school which also hired out equipment meant that its level of usage would have been much higher and as a result the speed at which erosion of the valve seat would occur would have been significantly more rapid. Aquatron had no system in place to monitor the number of dives in which the equipment was being used in order to meet the service intervals.

The effect of this was to cause creep which in normal usage would not have affected the diver, but at higher levels of stress would have resulted in a lower level of air supply to the diver. On its own this would not have been fatal, but in combination with other defects could have contributed to the accident.

There was no evidence that the lengthy period of storage between the accident and examination could have caused this defect. The evidence supported Meinert's opinion that the valve seat damage was caused during use.

(2) The second defect in the first stage regulator was that the o-ring was damaged in a manner which was consistent with faulty installation. While it was submitted on behalf of Aquatron that post accident storage of the equipment could have invalidated the results of the examination the evidence of Mr Meinert was that there were few signs of corrosion on the equipment and that the level of lubrication was adequate. Mr Robertson for Scuba Pro could not see the tearing damage identified by Mr Meinert.

It is a matter for the Inquiry to decide whether on the evidence available the storage period played any part in the development of this defect. The damage found by Meinert was not consistent with "nibbling".

The assembly of the primary second stage regulator (with blue mouth piece and purge button) was defective in that the lever was not in contact with the diaphragm which increased the cracking pressure above acceptable limits. This should have been obvious to any technician.

The octopus regulator (with red mouth piece and purge button) was at a level which was highly unacceptable.

These units are constructed so as to discourage tampering or adjustment. Scott's evidence that he had often seen divers interfering with their equipment should be treated with some scepticism. Robertson claimed there was a recognised problem with divers interfering with equipment to fit in with their performance demands.

There is no evidence or suggestion that Mr Iqbal had either the experience, knowledge or inclination to have done this.

On the evidence it was impossible to avoid the conclusion that both the second stage regulators were assembled so as to produce the adjustment found by Mr Meinert. It was beyond dispute that the period of storage would not have changed the set up of the equipment and the positioning of the weaver. In broad terms therefore the condition of both second stage regulators was the same on examination by Meinert as it was on issue to Mr Iqbal. It is not clear on the evidence that it was left in that condition when last serviced by Mr Scott. If he did he clearly failed to comply with the manufacturers' requirements and could not have achieved a satisfactory result when he tested it. There was general agreement that equipment in that condition whilst it would not have caused a problem to a diver in normal use, like the defects in the first stage, it would have added to the diver's breathing problems if he had had to work harder than usual or if he became stressed or began to panic. If he had then moved to the octopus for assistance he would have been worse off.

Police Constable Bell's finding of a cracking pressure at around 1.5 inches contrasts with Mr Meinert's finding at 2.2. Bell's finding has to be regarded with some doubt given the other problems with his report. There was a consistent difference of 0.7 inches in cracking pressure between his results and those achieved by Mr Meinert with no evidence that there had been any significant deterioration in the condition or operation of the primary regulator during its period in storage. The material in P C Bell's report is open to doubt and the probable transposition of recorded cracking pressures causes problems: It is nonetheless significant that his probable result for the octopus (red) is approximately 3.9 inches and while not so high as Mr Meinert's at 4.62 was still over 2.5 times the manufacturers' specification, and indicates that the condition of the equipment did not change appreciably between the time of the accident and the time of Bell's examination on 1 October 1998.

The issue which arises from the state of both second stage regulators is that there appeared to be no monitoring or checking of hire equipment by Aquatron between customers.

I was invited to make the following recommendation

That dive hire centres and similar operations carry out adequate checks prior to a hire of equipment to ensure that cracking pressures are within manufacturers' specifications and that a note is made of such checks , the results, the date on which they were carried out and the technician who carried out the check.

This would not be a significant cost or effort requiring perhaps 5 minutes per unit.

That dive hire centres and similar operations maintain a reliable and robust system to record the number of occasions on which individual items of equipment are hired and require persons hiring such equipment to complete documentation on returning it as to the number of dives which were carried out using it. If the person hiring the equipment does not provide such information it should be assumed by the hire centre that two dives occurred daily during the currency of the hire.

The Procedures during the Dive

It should be borne in mind that all the trainees were relative novices and with the exception of Caroline McLeod, none had dived in a dry suit.

The PADI Advanced Open Water Diver Instructor Guide page 1-5 (production 5) provides as follows: "The PADI Advanced Open Water Diver Programme provides the novice diver with a structured, well supervised means to gain additional experience neither the advanced open water diver nor advanced plus course makes the student an expert diver, but rather gives him a taste of what more specialist diving activities have to offer".

Dive Planning and Risk Assessment:

It is clear from all documentation and evidence that proper planning of a dive is an essential pre-requisite of diving. It is essential that all participants are aware of what is to happen and what they are to do. The plans and risk assessment are contained in productions 33 and 34. Mr Young sought to argue that there was a "fun" dive implied into the plan. This could not be supported in the face of the information available. Mr Young's evidence has to be treated with care and unless it can be confirmed from an independent source should not be regarded as reliable. While Mr Martin was at least genuinely distressed by aspects of his recollection of the events of that day he was at times less than frank. Production 33 did not cover what the instructors later claimed took place, and in the result, even if their account is accepted it was not an adequate plan since it did not cover the dive which occurred. That is to say it did not cover a dry suit training dive, and there is no reference to a confined water dive or dry suit orientation.

On the other hand if the Court is satisfied that what took place was in fact a dry suit training dive which went wrong then the plan is insufficiently specific as to what was to take place. Dive plans should relate to what actually happened. Such an all embracing document cannot be regarded as a plan of a particular dive on a particular day.

In addition it is also inadequate as a risk assessment since it does not satisfy the requirements of paragraph 39(f) of the code of practice in that among the factors to

be taken into account in assessing the dive site should be "the task or training drill to be performed and the experience level of those participating". The document is silent on these issues. The same applies even if these productions are read together since No 34 made no reference to a fun dive nor to an elective dry suit dive, but only to an orientation dry suit dive which appears to have been in reality a confined water dive which was being carried out in conditions which did not meet PADI confined water criteria.

The planning of these dives was accordingly completely inadequate. This view is reinforced by the fact that the original schedule of the first two dives was a practical impossibility. The dive times overlapped and even without allowing for any surface and changeover times and briefing of the participants in the second dive. It also has to be questioned whether the instructor's account of the briefing is correct. There is no mention of it in the PADI reports nor in the Dive Plan nor the log sheet.

Any risk assessment must have regard to the 10 principles of the PADI Statement Of Understanding (production 14) which requires to be obeyed by every PADI diver. In this case the following passages are appropriate:-

- if diving conditions are worse than those in which I am experienced postpone diving or select an alternative site with better conditions. Engage only in diving activities consistent with my training and experience.
- use complete well maintained reliable equipment with which I am familiar.....

5. adhere to the buddy system throughout every dive.

- maintain proper buoyancy. Adjust weighting at the surface for neutral buoyancy with no air in my buoyancy control device..... have weights clear for easy removal and establish buoyancy when in distress while diving".

It was submitted that had these basis principles been considered by those planning the dive it would not have been allowed to commence nor would it have proceeded to its fatal conclusion.

The pre-dive checks:

The checks which should have been carried out on the equipment were inadequate and led to Mr Iqbal being issued with equipment which was at least overdue for service, was configured outwith the manufacturer's specification and was inaccurate to a degree which placed the user at risk.

The state of the depth gauge on Mr Iqbal's equipment indicated that the necessary pre-dive buddy check was not satisfactorily carried out.

Equipment familiarity:

The Procurator Fiscal relied upon Mr Iqbal's concerns which he had expressed to Miss Ram. It was said that it was incredible that these concerns did not communicate themselves to the instructors.

The period spent in Weasel Loch was so short given the number of trainees and the routines which they were expected to attempt. It is claimed by Mr Martin that none of the 4 trainees required to have their weight adjusted. Mr Nelson suggested that this would take 20 to 30 minutes per student and even with 2 instructors involved would accordingly have taken up a period longer than the dive itself. This could only have been done in a shallow location since the instructors own buoyancy would be affected by carrying additional weights. Mr Nelson's view that a weight of 28 lbs was excessive suggested that Mr Martin's assessment was not as reliable as he thought, and that the overall lack of buoyancy checks carried out by Aquatron instructors was significant since the pattern had been repeated through a number of dives with different instructors.

Martin appeared to suggest that as part of the neutral buoyancy test it would be acceptable for divers to inflate their BCDs to maintain buoyancy. This was a complete lack of understanding on his part and would defeat the point of the test.

None of the 4 trainees were sufficiently trained to enter open water in dry suits.

Mr Martin and Mr Young appeared to make light of the differences involved between the wet and dry suits. There is undoubtedly a significant difference in technique and in principle between wet and dry suits and there is a wholly different approach to buoyancy control.

It was submitted that to suggest that a dry suit would be an appropriate piece of equipment for a Discover Scuba Diving Dive and that this was implicitly accepted by PADI's documentation showed an attitude to dive safety and a willingness to play with words in the face of fundamental principles which did not do credit to Martin or Young. As the witness Perkins put it if you cannot control your dry suit you cannot control yourself: And if you cannot control yourself you cannot offer assistance to your buddy.

The Buddy System

It is an essential that the buddy system be observed even the most experienced diver would not dive without a buddy. It is very difficult for a diver to be an effective buddy if he is unfamiliar with his equipment. It therefore has to be regarded as a significant risk to buddy up two novice dry suit divers particularly where one is uncomfortable with his equipment. It is inevitable that in training the more experienced divers, the instructors, will be buddied with less experienced trainees. That is something which should form part of the risk assessment. The buddy is a lifeline and it is essential to ensure that a trainee is well trained to look after the instructor if for no other reason. The risk assessment in this case makes no reference whatsoever to the experience level of the participants. It defies all common sense for the two instructors to buddy up with each other even if there was a third person in the group rather than sharing their skills and experience out among the dive party.

Mr Christie who was an experienced non trainee was allowed to join the party and buddied with Mr Sandford. The instructors appeared to have been concerned about Miss McLeod so they formed a buddy group which could never have worked properly with one member being the dive leader and the other the tail end Charlie with 5 divers in between. It is unlikely that they could see each other let alone communicate. They teamed Mr Iqbal with Mr Moore. Smith or Martin should have looked after Miss McLeod and the other should have buddied with the two inexperienced trainees. That way all the students would have had an experienced buddy to supervise them (something which is referred to in the buddy documentation as a feature of the advanced open water course).

It would also have allowed the instructors to ensure that the buddy system was being implemented.

Even when it became obvious to Mr Smith that the buddy pairing of Iqbal and Moore had broken down and that they had become separated he neither implemented the recognised one minute search and surface instructions nor instructed Moore to carry them out. He was unable to provide a sensible explanation for this, and in addition to demonstrating his own failure to put the procedures into practice the example which was shown to the students was unacceptable.

It was submitted that the instructors cannot shrug off responsibility for the breakdown of the buddy system. It is impossible to avoid the conclusion that the failure of this fundamental piece of training in combination with other fundamental failures represents an indication that the training provided by Aquatron was inadequate. The Procurator Fiscal made it clear that he did not go so far as to suggest that this was a result of any defect in the PADI system. Had the correct messages been properly instructed it is inconceivable that Aquatron trainees and instructors would make so many fundamental errors. These were not isolated incidents, but a catalogue of failure.

Confined Water Training and Learning Necessary Skills

It is clear from the PADI documentation that before the elective dry suit dive could take place the students had to do a confined water dry suit dive. This was the purpose of the first dive and Mr Young chose the location since he believed that it would be more "educational" for the students believing that a swimming pool was inadequate to learn the skills. Neilson's evidence should be preferred to Young's on this matter.

It was submitted that no regard was paid to the clear and unambiguous definition of confined water provided by the PADI manual at page 8 and it would appear that none of the instructors was aware of its existence or content. In their evidence Martin and Young attempted to indulge in what was said to be semantics in respect of what is a commendably clear statement. Their efforts were defeated by the revised section of the manual which was read out by Mr Young:-

"When using dry suits during open water diving course training dives completion of the confined water dry suit orientation session is required".

This was not complied with and it was submitted that considerations of safety and common sense indicated that there should be no real distinction between open water and advanced water students in terms of the degree of experience and skill demonstrated by them.

It was also submitted that both men appeared to accept in their evidence that confined water training could not in practice be conducted in the sea anywhere in Scotland and should be carried out in a swimming pool. Both attempted to blame Mr Perkins for poor practice in the past, but by the time of the accident Mr Perkins had left and Mr Young in particular was responsible for the Aquatron policy. It was said that there is no suggestion or evidence that Perkins had ever conducted such an exercise at Weasel Loch or any similar site.

The site used by Perkins at St Catherine's Loch and which was criticised by Martin and Young was one which Mr Neilson would regard as coming within the safe confined water definition of the SSAC.

Their attempts to argue that they were simply going along with the "industry norm" should not be accepted in the absence of evidence of standards within the industry. If the industry standard was unsafe or inappropriate that did not justify Aquatron's practice.

It was submitted that Mr Young's evidence in this respect was at least disingenuous. He appeared on the one hand to accept that confined water training should not be carried out at Weasel Loch, but at the same time argued that it would still have more educational benefit than being carried out in a swimming pool. The implication was that he had changed his view because of the improvement notice and the potential legal consequences of such a problem arising again. The suggestion that carrying out the same exercise there in similar conditions would be unsafe appeared to be something which he could not accept. His submission that adequate preparatory training could not be obtained in a swimming pool flies in the face of the successful training by SSAC over many years.

Failure to Leave Water before Open Water Dive

It is clear from the PADI manual that it is essential that between a confined water dive and open water dive the party returns to shore, removes their equipment and then prepares for the open water session. This allows for further familiarity with the equipment and also a proper briefing and assessment of the students. It was not carried out in this case, and the need for such a shore session seems to have been unknown to all Aquatron instructor staff. This is indicative of poor training, poor planning and unfamiliarity with PADI requirements. In this case it would have allowed students to have been to raise any problems with their instructors more effectively.

Dive Master's Records

There was some debate about the precise purpose of this document (production 34) with some suggestion that it could and should have been used as a movement record of those divers in the water: The Aquatron position that it was simply a plan and would get wet if used at the dive.

Whatever its purpose on the day of Mr Iqbal's death it appears that any such log could serve several useful purposes, namely:-

(a). A record of the divers in the water. It was submitted that it would have been preferable that everyone on the bus whether trainees or not should have been under the control of the dive master.

It was said that he would have no idea otherwise who was in the water or how long they had been in the water. It was said that this should be combined with a note of individual colour identifications allocated to each diver (of which more later) so that a visual check would reveal which diver was not visible.

- It would allow a record to be kept of how long individual divers were in the water in case they were overdue.

The records of when the dive actually started appear to have been entered after the event.

- Any change to the dive plan (such as the purported alteration from a training dive to a fun dive) could be recorded . It would be a useful PADI audit tool on both the divers in the water and the effectiveness of the dive master's.

Supervision of Trainees during Dive

The buddy system failed and there was nothing done by the instructors to remedy the situation.

The fact that an instructor left the group of trainees behind in the water to bring Mr Forbes and Mr Smyth to the surface has to be regarded as very worrying. It would have been a simple matter for him to tell Forbes and Smyth to surface. While they were not experienced divers they were more familiar with their equipment than the trainees, and it is clear that the surfacing element of dry suit diving is a crucial of their knowledge of the equipment and their buoyancy control.

It was submitted that it may not be necessary for the Inquiry to determine which of the versions given by Mr Martin was correct. He first told PADI that he had checked Forbes' air supply on the seabed and he did not mention any distress. His account is now that he did not know what the problem was and was not aware of the pressure until they surfaced. If the current version is accepted as correct then there may be some justification for abandoning the trainees while the original account simply required only that the instruction be given to surface without a safety stop, and Martin could have joined Forbes and Smyth at the surface after the usual safety stop.

The fact that Mr Forbes was still on the bottom at 30 bar also reflects poorly on the overall standards of training.

Whatever the truth Martin's reaction is probably symptomatic of the lack of care which was demonstrated throughout. It was commented that it is interesting that there is no suggestion at any stage being advanced that Martin's reaction might have

been different had he perceived himself as being on a training dive as opposed to the "fun" dive which he claimed he was leading.

Safety Stop

Three introductory comments were made, namely, first that PADI do not require a safety stop on all dives but regard it as a sensible procedure. It was simply a guard against decompression problems and provided an opportunity to practice skills and for buddies to check up on each other. Secondly, if this was a training dive for the elective dry suit certificate then a safety stop is compulsory and thirdly, the depth at which the dive had taken place was not such that a safety stop was required for decompression purposes. There is no evidence or suggestion that Mr Iqbal died due to the lack of a safety stop in itself. His absence, however, was yet another indication of the approach to the dive demonstrated throughout.

It was submitted that a safety stop should be an instinctive act on the part of every diver except in an emergency and the fact that it was carried out only by the pair including the experienced Mr Christie says again little for the quality of the training of the students involved nor the importance attached to it by instructors.

Surface Head Count

It was submitted that the SSAC rule that no group larger than a buddy pair should be allowed to dive is a council of perfection, but it was said that the reasons put forward by Mr Nelson for this were persuasive and would have helped to avoid the confusion which arose in this case. It was said that the cost to commercial dive centres of providing a 1-1 instructor student ratio would be prohibitive, but it is said it was something which should have been incorporated into their risk assessment and was not.

Secondly it appears that there is no specific reference in all of the PADI manuals to conducting a head count when a dive party reaches the surface: It is also clear that the responsible instructor should be making continuous checks to ensure that his dive party is all present. These should happen underwater as well as on the surface, and part of the dive briefing should be that once the party is on the surface they should be gathered together, a head count should be carried out and the party should return to shore as one unit.

None of this requires instruction in a manual and the fact that so much time was devoted to it at this Inquiry and the fact that it is having to be specifically considered here reflects the unsatisfactory state of organisation and planning which went into the dive and the absence of any real and genuine safety culture at Aquatron.

Thirdly, the system must be so organised that the dive master is in a position to ensure that all members of the party surface safely and this was not possible in this case due to the confusion. To assist him in doing this it would be helpful to have a unique identification mark on the hood or on some other prominent part of the equipment of all divers. The precise form which this takes would not matter: This need not be limited to students since it would be a useful tool in all dive parties, and need not be an indication that a diver is, for example, a learner. The connection

between the identification mark and the identities of the divers should be entered on the log together with their tank pressures on entering the water.

(c) The Reasonable Precautions if any whereby the Death and any accident resulting in the Death might have been avoided

The Procurator Fiscal accepted the submissions to be made by Mr Anderson in this regard. The legislation says "might not" would and even if the sequence of events is unclear the proposals set out in the second Improvement Note (production no 41) do not appear to be seriously disputed and are worth reiterating. Mr Cook and Mr Watney were able to identify within a few months after the dive the matters in which failures were found on the part of Aquatron and Martin.

At that time the defects in the equipment were not apparent and additional precautions were accordingly suggested, namely:-

- Before hiring out equipment ensure that it complies with manufacturer's specifications and other applicable standards and that it is in good working order.
- Ensure that at a minimum the manufacturer's requirements in relation to maintenance and servicing are adhered to: that proper records are kept of equipment used to identify when servicing is required and that proper records of the servicing procedures are kept.

(d) The defects if any in the system of working which contributed to the death or any accident resulting in the death

It was submitted that these were 9 in number, namely, 1. failure to properly maintain and service equipment. 2. Failure to prepare an adequate dive plan. 3. Failure to comply with the dive plan. 4. Failure to keep a proper record of the divers in the water. 5. Failure to ensure that students engaged only in diving activities consistent with their training and experience. 6. Failure to ensure that divers used complete well maintained and reliable equipment with which they were familiar. 7. Failure to ensure adherence to the buddy system. 8. Failure to conduct a satisfactory head count and wrong information being given to the supervisor by the other instructor that all was well with the trainee group. 9. Failure to keep the dive party together and failure by the instructors to remain with the dive party at all times.

• Any other facts which are relevant to the circumstances of the death

It was not suggested that the training systems operated by PADI as opposed to the systems operated by other organisations such as SSAC is inherently faulty or dangerous. The emphasis of their training regimes are different but each has a fundamental appreciation of the overriding need for safety in any diving operation. There may be a commercial risk to cut corners and then rely upon what were said to be tendentious or partial readings of the manuals to attempt to justify the failures.

It was said that what can be lost sight of under the weight of manuals and paper and was unfortunately frequently lost sight of in the Inquiry is the fact that diving is an inherently dangerous activity conducted in an unnatural environment for the human

and in which the participants are wholly reliant on a combination of training, knowledge and the mechanical devices available to them. It was worthy of emphasis that the rules to be found in such as the PADI Statement of Understanding (production 14) are fundamental and if these are ignored or breached the result is that divers are endangered and lives may be lost.

It was said to be striking about this case that it is impossible to avoid the conclusion that automatic responses which should be derived from training were to a worryingly large extent absent not only from the training given, but also from the behaviour of the instructors and the managers.

Commercial considerations undoubtedly had a part to play. Aquatron charged a fixed fee for completion of the whole advanced open water course and accordingly it was in their interest to have students complete the course with as few dives as possible. This is not an ideal position. The risk is that students will be certified without acquiring or perfecting the necessary skills giving them a false sense of security and leaving them with a "qualification" which was worthless.

In these circumstances it was the Procurator Fiscal's submission that I should recommend that diving skills should not be allowed to offer fixed fee courses. Courses should be paid for on a per dive or per day basis. Schools could easily estimate the number of days or dives required to achieve a qualification so as to offer the student an indication of likely overall cost and, it was said, it would be for the student to acquire the required knowledge and perfect the necessary skills in as few dives or sessions as they could. Schools would therefore not be under commercial pressure to cut corners to achieve as rapid a qualification as possible and students would simply have to work as hard as possible to cut down the cost.

It was said to be surprising that Scuba Pro's liaison with their dive centres does not review the quality of their servicing and maintenance.

Equally it was said the policing by PADI of their dive centres appears lax given the basic failures in procedure which were identified by this Inquiry. These, it was said, could easily have been identified by PADI were it not for their apparent reliance on what were described as the anodyne sanitized and possibly inaccurate and misleading contents of the remarkably similar reports submitted by Mr Smith and Mr Martin and which, on the evidence, were certainly edited by some unidentified person, these were said to follow a strikingly similar agenda, description and use of language. It is hard to avoid the conclusion that Mr Young and Aquatron had a much greater part to play in the preparation of these statements than they were prepared to admit.

It was said to be striking that PADI are in a position to give Aquatron their highest rating when the quality of the training and supervision provided was as inadequate as has been established by this Inquiry.

It was submitted that some independent framework requires to be established whereby checks are carried out on the training carried out by dive centres and the servicing of equipment by dive hire centres given the fact that both training and equipment are fundamental to the protection of life and commercial organisations

have a financial interest firstly in selling their products which risks taking over from the fundamental requirement to protect human life.

I was accordingly invited to make the following recommendation:-

Inspections should be introduced of the standard of training (in practice as well as in principle) and of equipment maintenance in the commercial sport diving field. These should be carried out by a suitably qualified non profit body. All commercial dive centres and diving hire centres and the instructors involved should be required to register with the Health and Safety Executive and it should be illegal to provide such services without registration. Registration would be required to be renewed regularly (say every 3 years) and could be refused in the event of an adverse report.

It was submitted that whilst none of this will be of any use to Mr Iqbal it is important that the time and care devoted to this Inquiry should help prevent other fatalities and make dive centres and clubs think more carefully about the preparation, planning and execution of dives. Finally it was said that if Aquatron and their employees had carried out their business in accordance with the code of practice, the PADI requirements and with regard to common sense issues of safety Mr Iqbal would not have been placed in the dangerous position which eventually led to his entirely avoidable death. So long as instructors and dive schools continue to carry out their business in the cavalier, casual and shoddy way demonstrated by Aquatron and their employees pupils will still put their lives at risk and some might die. Like Mr Iqbal's death those deaths will be to a very large extent foreseeable and preventable.

Submissions for the family of Mr.Iqbal.

Mr Gray, Advocate, for the family of Mr Iqbal adopted in their entirety the submissions of the Procurator Fiscal. He said there was no difference between his position and that of the Crown other than some matters of emphasis.

In particular he adopted the Crown position as to causes and defects.

In addition, however, the Court is entitled to have regard to the conduct of Aquatron on the day of the death, but also on the evidence of its conduct prior to that date. In his submission a clear picture emerges. Whilst the precise cause of the drowning cannot be stated, it occurred against a background of repeated disregard of practice and training before the death. The picture which emerged was one of lip service being paid to the paramount issue of safety.

In the context of this Inquiry a number of examples of this were clear:-

- The diving logs maintained by Mr Iqbal had numerous omissions, but Mr Martin provided verification and while his role was limited he took very little responsibility for the content.
- 2. It was clear that Aquatron displayed disregard for the decompression tables. Productions 26 and 27 which recorded two dives at Largs demonstrated that a second and deeper dive took place.

- They never took students for the first time in swimming pools or confined water.
- All witnesses who were trained by Aquatron were unclear on safety stops as to whether they should be done on every dive and whether they should have been done on 19 September 1998.
- I was invited to accept the evidence of Mr Neilson that determination of the correct diving weight is crucial.

Mr Iqbal's records demonstrate that the assessment of his weight in a wet suit was never being properly addressed.

On behalf of the family it was accepted that it was not possible to state the precise cause of drowning and, it was said, that the family accepted the Procurator Fiscal's submissions as to the potential causes and the failures within the system which all overlap.

It was emphasised that on the day the cause of death was not one isolated issue but a number of acts and omissions which together justified the conclusion that on 19 September there was disregard for proper practice and training by Aquatron and their employees.

There is no accurate dive log (production No 34) is inaccurate and there is no mention of Mr Christie.

The content of the dive log should be contrasted with Mr Neilson's evidence as to the information which would be entered by an SSAC Dive Master, namely, the names of buddies, the volume of air in and out, where the party was going, and the period for which they were out. It is essential information as a matter of safety so that the Beach Master can properly assess what action may be required.

Attention was directed to the confusion of McLeod and Moore as to the purpose of the dive. McLeod thought that she was on a dry suit training dive and a naturalist dive. According to the Health and Safety Executive witness she was unclear as to the precise purpose of her dive. Mr Moore thought that he had completed his dry suit elective dive. The above represent the fundamental lack of communication and a failure by instructors to ensure that all understood what was being done.

The dive proceeded when it was clear that it was not possible to complete the fundamental training skills. Despite the conditions being wholly inappropriate and in that knowledge the dry suit dive continued. Aquatron were paying lip service to safety.

Martin and Smith's assumptions which were made after it was known that Iqbal was missing were acknowledged by Martin to be wholly inappropriate were again a disregard of proper practice and paying lip service to safety.

The ascent by Smith with the trainees was too fast.

Communication with the divemaster on shore was inadequate. Sandford signalled to the divemaster but Moore did not.

It was submitted that if there was a procedure to be adopted by divers on surfacing it was either not known or not followed by Moore and he was not rebuked by any instructor. There is again disregard for proper practice and training . These may not be fundamental but are examples which when taken together demonstrate Aquatron's disregard for safety. The fact that Moore and other trainees for the first time in dry suits were so far from shore that they had a 10-20 minute swim shows a failure to plan the dive properly.

Mr. Gray pointed to the defective regulator which, he said rattled thereby demonstrating its defect, to the depth gauge registering 31 metres when the dive did not exceed 16metres. These show that matters were missed at the shop when the equipment was issued and missed again when buddy checks were done all illustrative of lip service to safety.

The most important considerations were however (1) Mr. Iqbal should not have been where he was. Martin agreed It was said that it does not need PADI to tell us that. Common sense tells us and (2) the decision to buddy him with another trainee who was incapable of carrying out his buddy responsibilities.

It was said that the response in evidence by employees of Aquatron further demonstrated this disregard for safety. Smith frequently used the expression " strictly speaking" when referred to matters of safety. He demonstrated a cavalier attitude to safety .

Martin's assessment of dry suit diving as being simply " air in and air out " was in the same category and Mr. Young who had listened to the whole evidence in court would not criticise the use of Weasel Loch for first dry suit training and his description of Martin's decision to proceed with the dive showed breathtaking arrogance or extreme naivety.

I was therefore invited to look at what were described as the "underlying causes" of this death and to look at the cumulative effects of the departures from safe practice.

Submissions for Mr Martin

Mr. McNeill adopted the Procurator Fiscal's submissions in relation to the state of the equipment , the failures of maintenance and the significance of the failure in planning diving operations.

He also wholly concurred in Mr. Gray's submissions with regard to events before the day in question.

He submitted that the defective equipment should be specified as one of the causes of the accident.

It was submitted that the first event which set in train the set of circumstances which led to the death was an inability to ascend while he still had air was an equipment failure.

I was invited to discount the fact that he was in open water for the first time in a dry suit as a cause of the death. It was accepted that trainees should not be taken to open water without previous training in a dry suit. The diver has to be able to use the equipment safely. It was said, nonetheless that diving is a sport and people can go off as they choose, as it was put.

It was submitted that there was no evidence from which it can be concluded that the deceased did anything which could have the consequence of causing him to be unable to surface. It was said that the evidence was not that he was overweight but that he had got used to being overweight in a wet suit and in consequence he might at the point of ascent have tried to put air into his BCD or dry suit.

If the starting point of the chain of events was a sudden loss of air or an inability to access air then this was an equipment failure due to the defective gauge or because the regulator was defective. If on top of these difficulties he was in a dry suit for the first time and had also lost his buddy it was understandable that he should panic which would only make matters worse. It was said that the fact that defective equipment was one cause of the accident does not take away from the fact that no assistance was offered to him nor that there was a lack of planning. At the end of the day this is an equipment failure.

It was said that when PADI refers to training dives it means dives which lead to certification. In the result the manuals do not really cover the situation of students having additional experience open water dives within these course and the PADI system would not disapprove of such dives if properly planned. It was said that there was a degree of confusion between training dives and " fun dives "

I should distinguish between the diving contractor and the instructor. A contractor should be able to decide that divers are in need of more experience and to act accordingly. It was said that such additional dives were part of Aquatron's diving project however it may be defined. I should accept Martin's position that in the pre-dive briefing he made it clear that this was a general experience dive which Sandford and Moore support

It was important that the commercial contractor should plan properly in terms of the Regulations.

By reference to the Regulations and the Code of Guidance Pro.33, the Dive Plan and Risk Assessment was inadequate.

In terms of Section 6(1)(c) the death might have been avoided by the contractors fulfilling their planning functions and their servicing responsibilities. There should be a system for identification of trainee divers on surfacing.

It was said that Smith's failure to raise with Moore the absence of his buddy was a system failure under section 6(1)(d).

I was invited to find that Martin's decision to take Forbes to the surface was justified, that Martin adhered to his buddy duties in respect of McLeod and that the choice of buddies should be for the contractor and not the instructor.

It was said that Aquatron and their systems were the problem.

Submissions for Aquatron.

The time and place of death were not in dispute.

The cause of death is drowning. The cause of any accident resulting in the death remains unknown and uncertain and no determination can be made as to the cause of any accident because of the absence of evidence as to how he came to have no air or failed to surface.

The fact that the tank was empty does not mean that he continued to draw air from it until he expired. He is found with his mouthpiece dislodged and there is no evidence to support either the Crown's position or Aquatron's. Although an unwelcome position a balance of probabilities does not enable the court to find an established cause. It was not unduly fanciful that Mr. Iqbal may himself have accidentally knocked the purge button which evacuated the air.

Aquatron do not try to defend the position that he should be in the sea without training.

When Mr. Iqbal is last seen is what was described as the "causal moment." : it was accepted that an instructor has an obligation to ensure that students are able to surface.

I was invited to find that the necessary buoyancy control skills were in fact being demonstrated during the dive.

It was said that Miss Ram's evidence did not support the construction sought to be put on it by the Crown that Mr. Iqbal's discomfort should have communicated itself to the instructors. Nor did it support the Crown position in relation to the alleged inadequacy of the briefing where support was found for Aquatron's position in the evidence of Sandford, McLeod and Moore.. It was said that the students were clear as to what was to be done.

The training of Smith and Martin as instructors is not done by Aquatron who should not be held responsible for any of their failings in this respect.

Young's evidence was that in September 1998 the decisions which were taken were sensible but that is not what would be done today. It was difficult to disagree that they were "going in and out of the PADI regulations."

The briefing was satisfactory and Pro 33 the Risk Assessment was also appropriate to proper dive planning.

I was invited to find that Mr. Iqbal's difficulty in entering the water was probably due to losing a fin: once he recovered from the difficulties he was happy to continue : the water and weather conditions were good : he showed no signs of difficulty during the dive : the dive was uneventful and Martin gave the instruction to turn back when someone reached 100 bar : Martin checked all of the group : Smith told Moore to

surface because he was at 50 bar : at that time Smith and Forbes appeared and had a difficulty : Martin told the group to surface and he surfaced with Forbes and McLeod: The last time Iqbal was seen he showed no sign of difficulty : on surfacing Moore did not check for his buddy and headed for shore : Iqbal was found approximately 3 hours later with an empty tank, his weight belt on his mask on, his BCD uninflated and his gauge reading about twenty bar. The mouthpiece was not in his mouth: air can free flow from the tank if the mouthpiece is removed: Mr. Iqbal did not follow his training and remove his weight belt and 28lb was an appropriate weight for him.

The court cannot be satisfied as to the cause of any accident and a number of speculations can be offered.

It was said that in terms of Section 6(1)© the court cannot conclude that any precautions might have avoided the death because the cause of death is unknown This position was modified to the extent that it was said that a reasonable precaution of the supervision of trainees and adherence to the buddy system would seem on any view to be precautions which could have prevented the death.

No exception was taken to the recommendations proposed by the Procurator Fiscal but it was said that these flowed from Section 6(1)(e) as opposed to 6(1)(a), that is to say, they do not relate to factors which are causal in the death.

Nor was it accepted that the recommendations contained in the Second Improvement Notice were relevant to 6(1)(a) : it was submitted that a safety stop would not have prevented the death, nor would an accurate dive plan : all of the changes with the possible exception relating to the pressure gauge were matters for 6(1)(e): it was also said that the condition of the octopus was not a causal matter for 6(1)(a) :

It was submitted that given that the immediate cause of death was unknown the court could not be satisfied that any defects in the system of working contributed to the death or any accident resulting in the death : any defects in the system of working which the court finds contributed should not be included other than in Section 6(1)(e) unless they could actually in singulo contribute to the death.

It was said that the evidence did not establish any failure to ensure that divers used well maintained and reliable equipment or failure to ensure that they were able to demonstrate neutral buoyancy nor did it establish that the failure to carry out a headcount contributed to the death .

It was accepted that the Crown submission that failures to adhere to the buddy system, the failure to carry out lost buddy checks and failure by instructors to remain with the trainees could constitute relevant 6(1)(e) matters.

Under the heading of the Administration, instruction and supervision of the dive training course it was said that the Risk Assessment (Pro.33) was entirely appropriate. The H& SE have not criticised the Risk Assessment . If there was compliance with PADI standards there was compliance with the Diving At Work Regulations.

It was accepted that the Dive Plan (Pro 34) is inaccurate. The submissions made on behalf of Martin do not lead to the conclusion that the cause of death was the planning. It was Martin's decision to depart from a PADI regulated dive.

If the instructors have let themselves down or , as the Procurator Fiscal suggests, there has been a deficiency in the training of the instructors that is not attributable to Aquatron. They were PADI trained as instructors.

It was said that there is no reference to the carrying out of a headcount in the PADI Manuals

The Crown submission that there was a failure of the instructors in the manner in which the group was left by one and brought to the surface by the other.

So far as the provision and maintenance of equipment was concerned it could not be said that the equipment was in the same condition at the date of testing by Meinert or the H&SE. All the indications are to the contrary.

PC Bell found no apparent defects and Meinert would not accept that it was good but said it was functioning.

His tests on the second stage regulator (the diver's mouthpiece) are within the manufacturer's guidelines. PC Bell's findings were not made known to Meinert and H&SE.

The regulator had last been serviced 20 months before examination by H&SE. and 22 months before examined by Meinert.

Submissions were then made concerning the detailed results of certain of the tests carried out.

Witness Robertson from Scubapro had said that the wear on the valve seat was consistent with 12 month's use and was not excessive. Pressure creep was not have caused a problem for Mr. Iqbal.

Meinert's conclusions in respect of the damage to the o-ring were criticised.

His conclusions in relation to cracking pressures were said to be more probably the results of salt or corrosion or lack of lubrication in the equipment.

The cracking pressure in the octopus which was accepted as excessive was said to be irrelevant because it was most unlikely that Mr. Iqbal would have attempted to use it.

Meinert's evidence concerning the excessive clearance between the second stage lever and the diaphragm was said to be unsatisfactory in that no dimensions were given. This was said not to be consistent with PC Bell's evidence: he was said to have found the lever operation to be satisfactory. It was said that there was no high cracking pressure and accordingly there was no evidence to suggest that there was unnecessary additional breathing resistance. The condition of the primary second

stage and the octopus as found by Meinert do not represent their condition after they had been serviced (By Scott) : it may have been adjusted by some subsequent diving user.. The condition as noted cannot confidently be said to be the condition on 19th September 1998.

So far as the pressure gauge was concerned reliance was then placed on the HSL pressure tests at 50-55 bar which produced an error in the gauge, it was said , at 16-17%. It was accordingly said that at 55 bar Mr.Iqbal would in reality have had not less than 45 bar and would only need 5-6 bar in order to surface. The prospect of him running out of air was thus remote.

It was accordingly said that it was not possible to say if the accident was caused or contributed to by the condition of the regulator: it could only have caused problems for a diver if he had reason to panic and, it was said, no such reason arose for Mr.Iqbal.

It was also said that Aquatron complied with the manufacturers service standards in that they were serviced on an annual basis. They were said not to have been used during that period more than 20 times.

Aquatron are highly thought of in the diving business. Their instructors are fully and properly qualified by PADI.

The requirements of the Second Improvement Notice had been accepted by Aquatron It was therefore unnecessary for the court to repeat the recommendations.

It was said to be a matter of considerable concern and regret that no detailed inspection and test of the diving equipment was carried out for 20 months during which time the equipment was held still subject to the effects of salt water which had not been rinsed. The storage conditions are unknown : the equipment was not made available to Aquatron for testing and their position is prejudiced in consequence.

The Health and Safety Executive have not explained why the manufacturers were not invited to inspect the equipment.

The best evidence is PC Bell's report.

It was submitted that the Procurator Fiscal's 6th and 7th proposed recommendations concerning the operation of diving schools and dive hire centres should not be accepted. This has not been an Inquiry into the how the sports diving industry does its business. There is a fundamental difference between amateur and club operations as opposed to commercial operations. It cannot be said whether the PADI system or the Scottish Sub-Aqua Club system was better or worse. Recommendation 7, concerning a system of inspection for the standards of training takes the court into areas of difficulty especially in relation to maintenance and inspection : evidence would be needed from local authorities and manufacturers. The proposed recommendations ask the court to go further than the scope of this Inquiry.

In conclusion it was said that any errors or omissions in Mr. Iqbal's diving logs are his own responsibility. The instructor is merely confirming that the dive took place.

The evidence is not sufficient to justify the view that there is any practice of departing from the dive tables as suggested by Neilson.

Aquatron did take students to swimming pools for training contrary to the suggestions made by the Procurator Fiscal.

Students were trained in safety stops: the circumstances on the day of the fatal dive were emergency circumstances

Martin got the weights right.

I should attach no significance to departures from ascent rates based on the dive computers used by individuals.

Mr.Young should not be criticised .

The cracking pressure on the octopus may have come about by external interference: if it was handed out in that condition who can say what happened in the intervening 21 months.