

THE MARINE CHEMIST NEWS

JUNE, 2001

**DEVOTED TO THE DEVELOPMENT AND DISSEMINATION OF
METHODS FOR EVALUATING AND ELIMINATING HEALTH AND
FIRE HAZARDS IN THE MARINE INDUSTRY.**

MARINE CHEMIST ASSOCIATION, P.O. BOX 1285, PLYMOUTH, MA 02362

Chairman – Leslie Blaize, Chairman-Elect – Christopher Scott, Past-Chairman – Dorvan Turner

Atlantic Section Representatives – Greg Grondin and Robert Walker III

Gulf/Inland Section Representatives – Eric Moore and Alan Bonds

Pacific Section Representatives – Martin Finkel and Bobby Lee

Secretary-Treasurer & Newsletter Editor – Edward Willwerth

Visit the MCA Web Site at www.marinechemist.org



2001 ANNUAL SEMINAR - The 43rd Annual Seminar of the Marine Chemist Association will be held at the Mystic Hilton Hotel in Mystic Connecticut, July 23, 24 and 25, 2001. The seminar's keynote speech and general

membership meeting will start the seminar Monday, July 23. Technical presentations will begin Monday after the MCA membership meeting and proceed through mid-day on Wednesday, July 25.

(Hint: **Before you put this newsletter down**, if you are planning to attend this year's annual seminar, call and make your reservations! **Deadline for special room rate: June 30, 2001.** Telephone number, Mystic Hilton: 860/572-0731 – Ask for reservations for the Marine Chemist Association: \$145.00 night + 12% CT tax.) **Registration form is on the back page of this newsletter.**

The technical program will consist of presentations covering discovery of unexpected cadmium exposure in marine confined space work, and a demonstrated synergistic relationship between noise exposure and hearing loss. Topics covering shipbreaking, the USCG's fingerprinting chemistry of oil releases, and a description of the Navy's new T-AKE vessels will be presented. In addition to an **instrument manufacturer's roundtable and exposition**, a study on the interchangeability of detector tubes and pumps will be given. (NIOSH's study done in the 1970's has been updated in the past few years by two manufacturers, RAE Systems and MSA. The results are interesting and not in agreement with much that is taught on this matter.)

An update on the electronic certificate writing field applications program is scheduled, and presentations on NFPA's Cutting and Welding Processes standard, NFPA 51B, will be made. Mr. Frank Losey of the American Shipbuilders Association will make a much anticipated presentation, and, of course, a presentation on the final form and changes in NFPA 306 will be given by the committee members present.

The social program will include a **Chairman's Reception** on Monday evening, and **Dinner at the Mystic Aquarium**, sponsored by the **Gas Hazards Control Program** and the **Marine Chemist Association** on Tuesday evening. There will be a guests' tour of the Mystic area and world-famous **Mystic Seaport** on Monday. On Tuesday there will be a trip to the **Mashantucket-Pequot Tribal Nation Museum** and near-by spectacular **Foxwoods** entertainment and gaming complex (for interested adults) during the technical program.

The **closest major airport** to Mystic is **Providence's Green International**. Automobile rental are available at the airport. The distance is about 40 miles west on Rt. 95, at exit 90. The hotel is at the exit beside the Mystic Aquarium.

Mystic is near the heart of Connecticut's maritime heritage community, with Nautilus Park, General Dynamics/Electric Boat Division and the USCG Academy not far away. The seminar will be held at the peak of New England's temperate summer, and attendees will be within striking distance of Cape Cod, New York City and even New Hampshire's White Mountains. It's a great place to plan a family vacation, and the seminar promises to be a great time for all. Hope to see you there!

CHAIRMAN'S CORNER – BUILDING TRUE CONSENSUS? This cycle of 306 started and continued for about two years as the smooth and open process that it was designed to be. It became a firestorm during its final phase. Just when we thought the revised standard

was done there came a barrage of threats, attempted distortion of facts, don't-ask-don't-tell policies, even waverling support for the process. Opportunism of some players was coupled with the lack of knowledge of others in an attempt to overturn the 306 process. There was even a thread of OSHA's inability to read its own standard. Days on the phone and many sleepless nights were spent trying to save the process, and it got more than a little depressing. Yet, I would not have traded this experience for anything in the world.

I have always viewed the job of marine chemist, regardless of who signs the check, as that of being advocate for the shipyard worker's safety. Idealistically, I thought to some extent this view was shared by the rest of the maritime world. A different view has never been more evident than with this revision of 306. I have talked with countless representatives from labor, OSHA, MACOSH, NFPA, Navy, Coast Guard, vessel owners and operators and shipyards across the country in the past few weeks. As a result I realized that chemists and your Association are advocates and more. Because of the hands-on nature of our job, in many places we may be the only thing resembling a safety program. In addition, we are also the disseminators of information. Your Executive Committee has realized the importance of attending, monitoring and helping the various regulatory organizations stem the possibility of a tide of misinformation, and to bring practical knowledge to the table. I think we have learned a valuable lesson in these past two years and we will be vigilant.

I am very proud to be a marine chemist and chairman of an organization that is composed of such unique and dedicated individuals. I thank ya'll for the opportunity to serve as your chairman, and all for your help.

Les Blaize, MCA Chairman

MCQB & RELATED NEWS - The first full year of the new millennium has proven to be very challenging for your executive committee, your NFPA 306 committee and for your qualification board. The previous year has brought many changes and introduced us to some new faces. Changes in NPFA 306 and subsequent acceptance by the NFPA general membership was a whirlwind experience with more ups and downs than a five star roller coaster ride. The steadfast resolve of our current chairman and 306 committee members to see the standard, as approved by committee, through the entire process has proven that the process is not flawed and should not be changed. I applaud the efforts and actions of Les, John, Dave, Tom, Frank, Ed and all the 306 committee members who worked so hard to deliver a standard that is safe and effective. The battle has been won, however the war may not be over. We need to continue the work of those who have so diligently labored on this document. The standard is going to be put on a fast track cycle for revisions, so please get involved and solicit input from your local shipyards, vessel owners/operators and labor organizations in preserving a document that is there to protect "life, limb and property".

New members to the Qualification Board include Kimble Lehman, Ken Mercer, Terry Guidry and Christine Ryback. All are proving their worth with invaluable input during lively board discussions. It never ceases to amaze me how so many people from differing backgrounds can come together, focus on a topic and provide the necessary input to resolve their differences and address the situation before moving on to the next problem at hand. The Board anticipates interviews with several candidates during the next year and looks forward to interviewing and certifying as many as possible. Unfortunately, we will be losing the services of **CDR Bob Corbin**, the US Coast Guard representative and **Tim Donney**, the insurance representative and current Chairman, between now and September. These gentlemen have selflessly served us by attending meetings, reviewing certification applications and re-certification applications, interviewing candidates, reviewing accident and incident reports and providing overall input for the self regulation of our industry. We owe them a debt of gratitude.

The NFPA-sponsored "electronic certificate" program has almost completed the three-month pilot program. Input from all participants has evolved a certificate that appears to meet our expectations. Evaluation of the "e"-certificate by Eighth District Coast Guard inspectors has drawn rave reviews. The certificates are actually legible and the format is consistent from certificate to certificate. I look forward to seeing what **Ron Capone** has in store for us during his presentation in Mystic.

The U S Coast Guard has completed its revision of their "Confined Space Policy", due for implementation by July 31, 2001. Current practices of entering spaces based upon inspection by Shipyard Competent Persons or Coast Guard Competent Persons will be abolished. Coast Guard personnel are to enter spaces only after they have been adequately tested and inspected by a NFPA certified Marine Chemist or Certified Industrial Hygienist. While we in the southern states have seen this policy for some time, the rest of the country is now going to have to get onboard. Will this leave some areas of the country short regarding the services of Certified Marine Chemists? I hope not. The Association, the Qualification Board and the Marine Gas Hazard Control Program are always concerned about this potential problem. Please contact me if you perceive such a problem may arise in your area. We may be able to steer you in the direction of chemists that may be looking and/or are willing to relocate.

I look forward to seeing everyone at the National in Mystic. We have a highly informative and entertaining program. - Chris Scott, CMC621 Chairman-elect

SECRETARY'S DESK - Troubling news comes from **Don Smith, CMCLM**. Don was about to undergo surgical repair of a knee problem when routine blood work revealed that he has a form of leukemia. Treatment is well underway, and Don said he is resting and taking it in stride and feels OK. Our wishes for a speedy recovery are with him and Evelyn, and we hope to see them both

in Mystic at the seminar in July. In addition, **Lin Temple, CMCLM** and Chairman of the Marine Field Advisory Committee of the Marine Gas Hazards Control Program underwent some serious surgery this winter while in Florida. He and Barbara have returned to Bath, Maine for the summer and should also be joining us in Mystic.

Election results are official: with over 100 ballots sent to chemists and life members, the results have been tabulated, confirming **Greg Grondin, CMC 676**, as the 36th marine chemist to serve as Chairman-elect. Greg will be installed as chairman-elect at the annual conference in Mystic Connecticut on Monday, July 23, 2001. At that time Chris Scott will take position as Chairman, Les Blaize assumes duties of Past Chair, and Dorvan Turner steps down from that position, having completed six years service to the executive committee.

The Past Two Years on 306 - As an alternate on the 306 committee for this past cycle and novice chemist with 306, I think it appropriate to bring to all members' attention the enormous amount of work done by the principals our Association had representing it. **John Bell** and **Les Blaize** did an incredible job explaining in detail their take on what our profession saw as the reasons for and potential impact of each and every change proposed. **Frank Monaghan**, who's membership on NFPA 306 extended back to the 1980's also served as an enormously valuable resource as alternate. **Tom Beacham**, representing the Shipbuilders Council of America (SCA), the association of the nation's smaller shipyards, was also an asset and great credit to the shipbuilders he served. I was deeply impressed with the work all committee members did, especially the chemists, and it was a direct reflection of the understanding of the fundamentals as well as subtleties they had as professionals.

The work the MCA Executive Committee and the MCA NFPA 306 representatives did on this past revision began soon after the 1997 edition was explained and reviewed. Lists of observations and justifiable criticisms submitted from chemists across the country were kept and discussed by the ExCom and 306 members as the revision cycle work drew closer in 1998 and 1999. In 1999 the MCA had what it hoped was a definitive list of significant issues that it would bring to the committee as proposals. Each and every one of those issues was brought before the 306 committee. Some were accepted, some were rejected, many were changed and resulted in sound compromises - but all were discussed in the full light of NFPA's committee process.

I believe the totally unexpected and enormous turmoil that surfaced after the standard's final draft had been approved, however, brought out the best in our profession. Your executive committee debated long and hard about what was unfolding last February. There certainly was (and remains) a great deal at stake. In the end the ExCom decided that it was best to stick by the NFPA process that has served us so well for decades. Having made the decision, many chemists literally spent days on the telephone collecting, clarifying and disseminating

information to assure that the work done would survive what appeared to be an unjustified and inaccurate assault on the facts. Key among those ensuring the survival of your work was your current chairman, Les Blaize. I am convinced that anything less than his absolute commitment to the job he was elected to do would have resulted in returning this issue of 306 to committee, and a waste of two years' work. Les's work raised all actions above the board: anyone associated with questioning the intent or interpretation of the proposed and approved changes to 306 was contacted personally by Les, and though they might not have agreed with him, they certainly understood the facts correctly when their conversation ended. It is due in large part, if not completely, to Les's work that the two letters submitted to NFPA requesting the return of 306 to committee were rescinded by their submitters. Both admitted that they did not have all the facts when they submitted their initial requests, and withdrew the letters after speaking with your chairman.

NFPA 306 will never be perfect, just as New York City will never be done. But it will continue as what has to be one of the most carefully scrutinized and well thought-out safety standards used in American industry. It can only continue to have that status, however, if defended by those who have faith in NFPA's process and your profession's worth. The actions of the current MCA chairman proved that faith is still there.

Ed Willwerth

NFPA 306 COMPLETES FINAL HURDLE ON ITS WAY TO THE 2001 EDITION – On Thursday, May 17, 2001, at the NFPA Annual Convention in Anaheim, California, the 2001 edition of NFPA 306 – Control of Gas Hazards on Vessels came before the NFPA general membership and was passed. Though approval of revisions at this meeting has been an “understood” move in the past, this year's edition faced an unusual amount of opposition. Opposition became active after the final draft had been approved last December and from within the committee. Opponents claimed that some of the changes in 306 were not in the best interests of safety, were contrary to what OSHA required in 29CFR1915, and were proceeding without the appropriate knowledge and support of representatives of the marine industry. Letters received by NFPA from the leaders of two influential groups, the American Shipbuilders Association and OSHA's Marine Advisory Committee on Occupational Safety and Health (MACOSH), initially requested the document be returned to committee.

Surprised members of the 306 committee, upon contacting the ASA and MACOSH directors, found they had only been partially informed of the contents and changes in 306. They were also informed that their appropriate membership were indeed well informed about the issues, had submitted comments and generally were well satisfied with the proposed changes. Both the MACOSH and ASA directors withdrew the letters once the nature of the information they initially received and the changes in 306 had been corrected.

This revision of NFPA 306 had in the order of eighty changes made to the document, most of them minor, but several of substantial importance:

- **NFPA 306 has been reformatted.** The reformatting brings 306 into line with required changes applied to all NFPA documents. (This reformatting was an NFPA internal requirement and was not directed by the 306 Committee.) Though it will change the numbering of where various parts of the standard are, NFPA has worked to ensure that the new format will not change the way the document is applied or interpreted.
- Change of the standard safety designation “Safe for Workers” to “**Atmosphere Safe for Workers**” (but with no change to the criteria).
- **Introduction of the OSHA-required Shipyard Competent Person** into 306 with clear reference to duties required to maintain a marine chemist's certificate as valid.
- **Definition of “facility”** now refers to a shore-side location with a continuous waterfront. This will result in very important limitations to shifting vessels under a marine chemist's certificate. Now the SCP will be able to update and keep valid a marine chemist's certificate only after approved shifting within a facility that meets this more carefully tuned definition.
- **Clarification of the requirement for opening, entering and assessing adjacent spaces** for toxic materials when certifying a space as “Atmosphere Safe for Workers” only. (This issue, surprisingly, caused perhaps most of the confusion and discontent during the final stages of this edition's approval cycle. There is evidently a difference of opinion of what the language in the preamble of previous revisions to 29CFR1915 clearly state as opposed to what some within OSHA interpret the requirements of 29CFR1915.12(ii) to mean now. Read it for yourself – what does it mean to you?)
- **A change in maximum acceptable oxygen levels for inerting from 8% to 6%,** (or 50% of the amount needed to support combustion, whichever is less). Note: The oxygen level needed for **lay up**, however, **remains at less than 8% oxygen** (or 50% of the amount needed to support combustion, whichever is less).

The changes in NFPA 306 will be the subject of a special presentation at the annual seminar in Mystic in July.

SAND BLASTING AND SILICOSIS: A HISTORY OF CONCERN – For many of us, experience with abrasive blasting has meant steel shot or ‘black beauty’-type abrasives. Metal shot is usually associated with enclosed throwing and recovery facilities, allowing enclosure and rotation of the blasted unit and efficient recovery and reconditioning of the shot. For outside blasting, protected workers under positive pressure hoods would use black non-crystalline abrasives to “wash off” vessel hulls or newly completed units being made ready for fresh coats of preservatives.

Outside abrasive blasting has had a number of health and safety concerns, but these days they usually stem from the uncontrolled distribution of materials associated with anti-fouling coatings. These have included at

various times in marine history, copper, arsenic, lead, tributyl tin and other bio-toxic ingredients that coatings chemists mixed into paint to keep the hulls one step ahead of marine growth. Occasionally there have also been hidden materials in the blast grit itself. At times unacceptable levels of highly toxic materials including lead, cadmium and even beryllium have inadvertently been delivered with the blast grit, only to be discovered during area monitoring.

But, historically, the greatest single source of concern for blasters and the workforce nearby was from crystalline silica released from natural quartz sand when used as an abrasive. It caused silicosis. This debilitating disease ruined the lives and even killed thousands of laborers involved in abrasive blasting and tunneling work early in the last century. In what has been called one of the worst disasters in American construction history, blasting gave lethal silicosis to up to 700 workers between 1930 and 1932 at the Hawks Nest West Virginia tunnel site.

The use of non-crystalline (amorphous) silica materials, like power-plant bottom slag and metal's reclaiming slag, has meant great reduction in the risk of silicosis. Nevertheless, as I began to travel to other parts of the US, I was surprised to find that, though never used in the shipyards in which I spent much of my career, the use of crystalline silica sand for abrasive blasting continues, legally, in many parts of the United States.

The following letter offers one vantage point as to why this is still so. It is reprinted from the March 2001 edition of the Synergist.

"The Tragedy of Silicosis

In his January 2001 letter to the editor (p.6) Michael Grasso offered his opinions on the tragedy of silicosis in the construction industry. He noted the recognition of silicosis as an occupational disease for hundreds of years and then laid the blame on public health professionals, including industrial hygienists. I quote:

It appears 60 years and countless deaths and illnesses later, the researchers, regulators and industrial hygienists are finally getting their heads out of the sand and paying attention to the hazards of silica and control measures required for the prevention of silica dust.

Let's set the record straight as to who the purveyors of death have been in relation to silicosis. Until 1971 the federal government could only use education and recommendations to try and control this hazard. The U.S. Public Health Service, working with state health departments, conducted surveys, especially in foundries, and many workplace conditions were corrected. Unfortunately, most states did not place a high priority on occupational health and safety, thus the passage of the OSH Act in 1970.

For almost 100 years the work process most responsible for silicosis was sand blasting. A major effort of NIOSH in its first decade was to develop recommended standards that were sent to OSHA for consideration as federal regulations. A high-priority recommended

standard, sent to OSHA in 1974, addressed silica. The NIOSH recommendation, which I helped formulate, proposed exposure to silica be controlled through a complete health standard (such as had been promulgated for asbestos) and that the use of sand as an abrasive blasting material be banned. Abrasive blasting with sand had been previously been banned in the United Kingdom, where the first studies on the hazard had been conducted.

Shortly thereafter, OSHA proposed such a standard. The industry benefiting from the use of sand as an abrasive blasting material immediately formed the Silica Safety Society. The sole purpose of this group was to defeat the OSHA regulation of silica. I have reviewed all of the minutes of this organization's meetings and the issues of "safety" when using silica was never discussed. Indeed after president Ronald Reagan was elected and OSHA discontinued plans to regulate silica, the SSA declared victory and disbanded. Who were the members of the SSA? They were the companies who sold sand and personal protective equipment for use in sand blasting.

For the past 15 years, I have served as an expert witness for the workers lives whose lives have been destroyed and their families. I've never heard the defendants-sand companies and respirator manufactures-defend themselves with the claim that government or industrial hygienists did not do their jobs. Through the use of facts and industry records, others and I have been able to show juries who really was responsible. The legal system has forced a change in behavior in those who caused silicosis in tens of thousands of American Workers. That's a fact, and I've been there and witnessed it.

Vern Rose, League City, Texas"

ACCIDENTS - Several weeks ago at a small shipyard in southern Massachusetts, a welder was tasked with welding the skeg on the lower hull of an aluminum whale-watching boat. The skeg was leaking, and was known to be connected internally to the engine room.



(Photo, P.Giles)

The shipyard claimed that they had a shipyard competent person's program, but "they didn't check this space since it wasn't connected to any fuel tanks, and the boat was strictly diesel." As the welder touched his arc

to a seam along the hull and the skeg, the resulting explosion blew him "about 15 feet straight backward" onto the ground. Fortunately, nothing was in his flight path and he was not hit by any part of the metal skeg. Other than bruises and superficial damage to his underwear, the welder was unharmed. The skeg burst along its entire welded seam and was blown completely away from the vessel, however.

Speculation about the cause first centered on diesel fuel leaking from the engine room bilge into the skeg. This was soon discounted, however, since the temperature on that day was well below the flash point of diesel fuel and there was no running machinery that could have accounted for an ignition of diesel mist, especially inside or even near the skeg. Since the vessel was aluminum, however, and alkaline cleaners were onboard, about the only credible guess was that alkaline cleaning solution used to clean equipment in the machinery space found its way to the bilge, and into the skeg. Since aluminum (and zinc) will generate hydrogen when exposed to either strongly alkaline or acidic solutions, it is a good guess that the welder ignited hydrogen. (With an explosive range of 4 to 75 % in air, it would have been hard to miss doing so.)

Of course, no one will ever know exactly why this accident happened, and this close-call underlines why SCPs and CMCs exist: to check all sealed spaces involved in hot work before the arc is struck so that the instruments find the gas before the arc and welder do. (Many thanks to Phil Giles, CMC 670, for the photos.)



(Photo, USCG/Waterways Journal)

MISSISSIPPI RIVER BARGE EXPLOSION – Dave Trebisacci and Lamar Labauve sent a series of spectacular photos on line of an accident that occurred on this past May 5. As if the accident above was not enough of a surprise for the welder, imagine how the crew of the towboat MV GENE NEAL felt. The Waterways Journal reported that the vessel was running a tow consisting of three empty crude oil barges. In the midst of a calm morning, the rake of one of the barges in its tow, the MM-25, blew up. The explosion in the forward rake burst the deck and blew a 22 x 22 foot section of the

starboard tank into the piping of an adjacent barge in the tow some 40 feet away, and was reportedly heard for miles. No one was on deck, there was no repair in progress, no machinery was running (other than on the tow boat), and the weather was not a cause. What happened?

Lamar Labauve, CMC 576 was among those called to examine and explain the event.

"I am almost positive that the running lights were the ignition source. It was obvious that the initial ignition occurred in the bow compartment, and this ignition blew a hole into the #1 stbd. cargo tank. The cargo vaporized from heat release and blew the deck off the 1 p/s cargo tanks. There were no other sources of ignition in the bow compartment.

"There were pinhole leaks at the top of the collision bulkhead between the bow rake and the # 1 p/s cargo tanks. The bulkhead was paper-thin and was rusting away behind the electrical conduit. With a vapor recovery system on the barge, there was pressure on the cargo tanks during loading. I suspect this pushed vapor through the pinholes into the bow rake. The rake is very seldom opened, so over a period of time the concentration of gas inside the rake reached the LEL. Then the electrical conduit developed cracks and 110 AC caused the system to short out. Then: BOOM!"

Glynn Hair, CMC 636 confirmed that the wreck is awaiting the repair-or-scrap decision in Greenville. (Many thanks to Lamar, Glynn and Dave for the details and photos.)



(Photo, L. Labauve)

THE LAST NEWSLETTER'S PROBLEM:

"After some significant difficulty, a young man in a boat dropped a mooring buoy anchor off a safe distance from a pier. As he tied his boat off, the harbormaster was heard to yell out to him, "Hey kid, how many feet of water is that buoy anchored in? We've got limits here, you know."

Having neither measured the length of his cable nor the depth of the water, and mildly embarrassed about the oversight, the young man assumed he could figure it out without performing the arduous task of pulling the entire setup ashore and measuring it.

He noticed that if he pulled the chain in as much as he could, he pulled twelve feet of slack out of the water. He assumed, at that point, he was directly over the anchor. Letting the slack back into the water and drifting with the tide, he noted that he moved twenty-five feet from the point over the anchor until the chain stopped his movement.

Once ashore, he ran into the old chemist who had witnessed the happenings while waiting at the pier for a launch. "I guess I'd better brush up on my geometry for this one, eh?" he said to the chemist. "I'll bet the best approach is to use the Pythagorean theorem,"

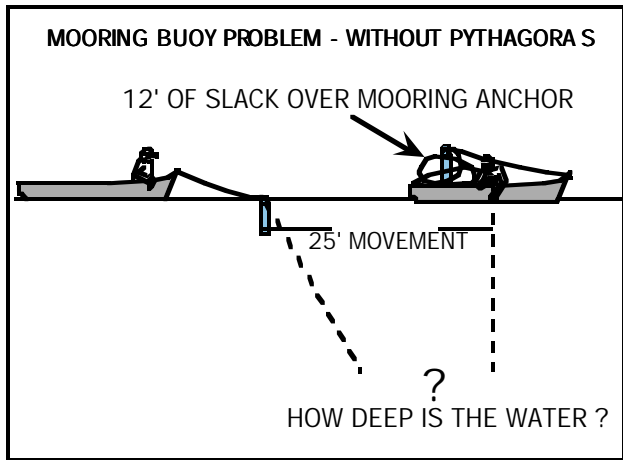
"Well, you can" replied the chemist, "but this is an example of a famous problem that can be solved without bothering with the Pythagorean theorem. Using the Pythagorean theorem will actually take you much longer."

After trying the Pythagorean approach, and running into an increasingly complicated position, the chemist showed him a very direct method based on a key hint: What is the property of the sections of two intersecting chords in a circle?

Find the depth of the water in which the mooring buoy is anchored without using the Pythagorean theorem. The winner must submit his/her solution, not just the answer.

THE SOLUTION:

What is the key property of two intersecting chords in a circle used here? It is that for a circle's intersecting chords, the product of two parts of one chord equal the product of the two parts of the other. The sketch below illustrates how simple the problem now becomes.



Marine Chemist Emeritus Maximus Donald W. Smith, LM noted that no solutions were received, so the prize was not awarded. The new Jaguar was scrapped instead.

KEY HINT: "PRODUCT OF INTERSECTING CHORD SEGMENTS ARE EQUAL", SO,

$$FC' \times CB' = AC' \times CE$$

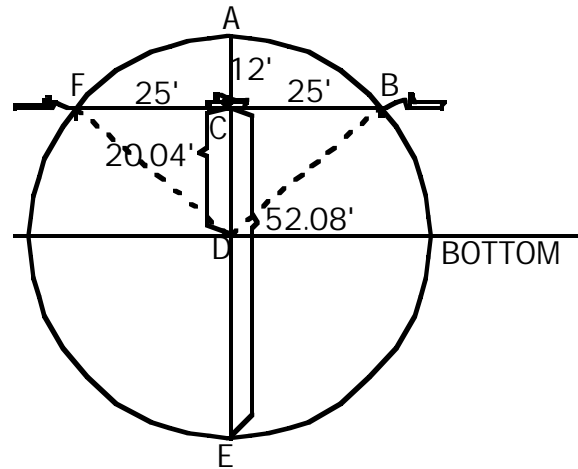
$$25' \times 25' = 12' \times CE, \text{ OR, } 625 = 12 \times CE$$

$$CE = 52.08'$$

$$AE = \text{DIAMETER OF CIRCLE} = 64.08' (52.08' + 12')$$

$$AD = \text{RADIUS} = 32.04'$$

$$CD = \text{DEPTH} = 20.04'$$



REGISTRATION FORM

**Marine Chemist Association
43rd Annual Seminar
July 23 - 25, 2001
Mystic Hilton Hotel
20 Coogan Blvd.
Mystic, Connecticut 06355
(Exit 90 off Rt. 95)**

	<u>Site/P.O.</u>	<u>Pre-Paid</u>
Registrant _____	\$ 425.00	\$375.00
Address: _____		

Guests/ Family		
1. _____	\$ 150.00	\$125.00
2. _____		
3. _____		
4. _____		
5. _____		
6. _____		
7. _____		
Children Under 12		
1. _____	(Free - N/C)	
2. _____		
3. _____		
4. _____		

Total Due: _____

**Remit to: Marine Chemist Association, Inc.
P.O. Box 1285
Plymouth, MA 02362
(Fax: 508/747-6969)**

Fees cover all scheduled seminar functions.

**Hotel Reservations: 860/572-0731
\$145.00/night + 12% CT tax**

Cut-Off Date for above rate: June 30, 2001