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GSI Wins Safety In Seas Award

GSI is winner of the 1979 National Ocean Industries Association (NOIA) Safety in Seas award sponsored by Compass Publications.

The company was cited for outstanding safety achievements by its marine geophysical crews and particularly for implementing the TI Standard of Safety (TISOS) on each of its seismic vessels to assure a minimum acceptable standard of safety.

GSI put an aggressive plan into effect in 1978 to update its entire fleet to comply with TISOS, which

goes far beyond any Coast Guard minimums. Equipment was standardized aboard the marine vessels and standard procedures set up on various aspects of safety. The entire program is maintained as per the TISOS manual.

The standard equipment includes an engine room Halon 1301 system (if a CO₂ system was not installed), a light water foam auxiliary pump and driver feeding a deluge system above the main seismic cable reel, and various distributed hose stations.

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Add-On More Than Doubles Pemex 3D Program Coverage

By **DICK CONROY**

Since last reporting, GSI's Gulf of Mexico 3D marine survey for Pemex has been expanded to provide detail coverage over 1425 square kilometers. This represents a commitment of more than twice the original total program planned.

The crew of the M/V *Cecil H. Green* and the processing and interpretation groups can justifiably be proud of being directly involved and responsible for the largest single company 3D project to date in an area that may very well have the major new petroleum reserve in the Western Hemisphere.

For the archeologist and all curious venturesome souls, the Yucatan and all Central America have many secrets other than those now being unraveled in the subsurface by modern seismograph and drilling. Evidence of the ancient advanced culture of the Maya-Quiche civilization can be examined at Chichen Itza and Uxmal in the state of Yucatan. In what are now the states of Tabasco and Chiapas of Mexico, and parts of Guatemala and Honduras, were founded the cities of Copan, Quirigua, Tikal, and Palenque, built in 175 to 375 A.D. True to the heritage of the area, names of the past appear on modern day oil wells such as Akal, Chac, Abkatun, and Nohoch.

For Pemex and GSI as well as the ancient proud Maya, the area is

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M/V Jonsson Gets Better Crew Quarters in Refit

By **RICK FOSTER**

M/V *J. E. Jonsson* has a new look as it starts the 1979 season and certainly should be more comfortable for the crew.

The ship has undergone a refit, intended to improve living conditions and, hopefully, to boost the morale of the crew, who work in difficult weather, and who spend the majority of their off-duty time inside.

The original *Jonsson* accommodations consisted of mainly four-man cabins, with only one washroom and two showers between 26 crew members. One cabin was situated in the compressor room, with an incessant noise from the engines coupled with a smell of diesel oil.

Basically, the modifications consist of extending the sides of the existing superstructure to the full

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M/V Jonsson before refit.



How the Jonsson looks now.

GSI Wins

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Ships have side scan sonar for detection of submerged hazards and numerous other items for reducing the danger to life and equipment.

A crew member is appointed "Safety Man of the Month," with responsibility for maintenance of the entire TISOS program aboard the vessel. Safety drills relative to man overboard, abandon ship, and fire emergency stations are held regularly along with monthly crew safety meetings. Safety equipment and procedures are continually monitored, and a monthly safety report circulated to higher management indicating whether these are up to standard.

The TISOS committee consists of Bill Turney, corporate safety director, chairman; Bill Blakeley, Marine operating services manager; Bob Kelland, Science Services Division safety director; and a Marine safety coordinator acting as secretary.

NOIA is a trade association representing all facets of the



Jim Toomey accepts safety award for GSI from Ed Shannon, NOIA chairman, at meeting in Washington, D.C.

offshore and ocean-related industries. Its membership comes from companies which provide services, supplies, and support capabilities to marine offshore and ocean work, manufacturing, mineral production, deep ocean mining, fishing, geophysical exploration, and other ocean-related business.



The award, a 24-kt gold-plated bronze sculpture on a sterling silver plaque, is displayed in the Marine office in Dallas.

GSI was selected for the award out of approximately 400 companies operating in offshore businesses.

A photographic reproduction of the award will be installed on each ship in the GSI fleet, symbolizing that the award is shared by the people who made it happen — you.

GSI Marine in Spotlight At TI Stockholders Meeting

GSI Marine Exploration achievements drew plaudits from TI President Fred Bucy at the annual stockholders meeting April 19 in Dallas. Noting that 1978 was an important year for petroleum industry acceptance of GSI-developed 3D data gathering and processing, Fred pointed out:

"The largest 3D contract to date has been awarded to GSI to survey

Mexico's Gulf of Campeche fields, believed to contain some of the largest newly discovered petroleum reserves in the world."

Fred commented that GSI has done extensive geophysical work in Mexico since 1931 and is a key participant in the Mexican government's evaluation and inventory of their hydrocarbon resources.

As a photo of M/V *Patrick E. Haggerty*, GSI's newest seismic ship, was flashed on the screen, Fred told the stockholders:

"This vessel is linked by satellite to TI's worldwide communications network. It is also outfitted with the most modern radar, sonar and loran navigation systems. It will be on station in the North Sea in May."

Copies of the 1979 TI first quarter and stockholders meeting report will be mailed to the ships and Marine processing centers as soon as they are available.

M/V Jonsson

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width of the vessel, dispensing with the deck walkways on either side.

By expanding in this way, it was possible to construct more cabins with two bunks in each instead of four, and giving access to a washroom and shower/WC for every two cabins. Each cabin consists of two bunks, two lockers, a desk, and a bench seat.

There is only one four-man cabin remaining — the penthouse. This is situated on the lifeboat deck and has been extended to house its own washroom, shower, and WC.

One of the best features of the refit is a spacious lounge area adjoining the galley, where personnel will be able to relax and pursue, whenever possible, their interests.

Add-On

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proving to be a happy hunting ground. Let's all hope the present thrust does not some day become a mystery to another generation.

GSI Seismic Mariner News

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**P&AE...
IT WORKS**

Accent on People Development At Boat Managers Conference

By **TONY REBEC**

Continuous emphasis on our people development programs — especially training and career development — was the main thrust of GSI's second annual boat managers conference March 14-17 in London.

Status of the TI Standard of Safety (TISOS) program was highlighted for the individual boats; 1978 was, in fact, Marine's best year to date with regard to safety.

Integrated crew development was discussed in both general and specific terms, with several points, particularly the responsibilities, being clarified.

Many seemingly valid issues surfaced under the personnel-related topics and were noted for further action. The importance of performance reviews was discussed in depth, especially in the context of goal setting and career development and the forever increasingly important review discussion between the supervisor and the GSler.

Both the Marine Engineering and Material Control programs were very

well received in spite of the last-minute cutback in time allocations to the speakers. Thanks again to Lynn Heitman, Roy Kelm, and Wayne Clemens.

The conference turned out to be a real work session, with some very hard bargaining going on around the table. (Credit here goes to John Jones, who ran the Effective Negotiating Seminar prior to the conference.) Work groups were set up to recommend solutions to various major issues brought up. These groups could be found in various corners of the hotel discussing late into the evenings — some even to early hours of the morning.

Some issues discussed were unresolved, including the Roger Keyte 31 issues "white paper" with W3's in place. By the way, some of those dates are kinda getting awful close at the time of writing this article.

In retrospect, everybody contributed a great deal toward the success of the conference and also enjoyed themselves at the same time, in spite of those somewhat tense moments. The honesty shown has to be admired.

Boat managers present were Ian Baxter, M/V *Mariner*; Dave Brown, M/V *Arctic Seal*; Lynn Darby, M/V *J. E. Jonsson*; Ian Fitzgerald, M/V *Patrick E. Haggerty*; Ian Jones, M/V *Tasman Seal*; Jim Markham, M/V *Cecil H. Green*; Charlie Martin, M/V *R. C. Dunlap*; George Sellers, M/V *Caribbean Seal*; John Stanton, M/V *Eugene McDermott II*; and Ian Taylor, M/V *Karunda*.

Other area folks on hand were George Steel and Dick Miles, sitting closer together than during the normal work day (usually separated by the Nullarbor); Jim Richardson and John Lovelock representing EAME, along with appearances from Gerry Gilbert and Tony Short; and Stan Wilkowsky representing US/LA. The Dallas team consisted of Eric Jones, Roger Keyte, Bill Blakeley, Jerry Strickert, and Tony Rebec.

Thanks again to John Lovelock, the host, and Ian Fitzgerald for the hard work put into the organizing.

Have a good shooting season, putting all those good ideas into practice. Then look forward to the next nail-biting, fan-splattering session next year to report on your results.

Safety at Work

If the Shoe Fits...

Each month it is required that all ships in the GSI fleet conduct a Safety meeting, fire drill, abandon ship drill, and a man-overboard drill. Forms have been provided for reporting the results of these various drills in addition to a safety report checklist where the status of safety aboard your home can be reported.

One of my responsibilities as safety coordinator is to read and digest these reports in an effort to find weak spots in the system or failure to comply with the TI Standard of Safety (TISOS).

An item that continues to show up month after month on most ships is failure to comply with the requirement of wearing safety shoes when working in certain areas on board the ship. The subject is well-covered on pages VII-11 and VII-12 of the TISOS manual, including brand names and stock numbers of approved shoes. Others can be used if approved by the party manager or the boat manager.

These safety shoes cost you nothing as company policy states that you will be reimbursed on presentation of the purchase receipt.

It's your feet you are asked to protect by using steel-toe shoes on the back deck. It's your hips, arms, and ribs you are asked to protect by using non-slip oil-resistant shoes in the engine room or oil-covered back deck.

Why not consider the possibility of taking advantage of this company-paid program on your next port call. If you are scheduled to attend a DFS* or CMS** school in Dallas, plan to buy the shoes while here.

Why risk the pain of an injury that could be avoided?

Safe sailing — B.A.T.

*TI Trademark **GSI Trademark

Embree, Johnston McBeath Honored As Senior MTS

Pete Embree, Roy Johnston, and Bob McBeath of the Science Services Division are among 83 Tiers recently elected as Senior Members of the Technical Staff.

Pete and Bob are chief area geophysicists for GSI Land and Marine Exploration, respectively, and Roy is in charge of research for sources and streamers in Marine Engineering.

Election as a Senior MTS is limited to 5% of the people in engineering and research job classes throughout TI and to no more than 20% of the population of these job classes in any one division.

Designation as a Senior MTS is open to engineers, scientists, mathematicians, or other technologists who make very significant contributions to TI's objectives. A Senior MTS may also manage a small group of people in an activity below the level of laboratory or department manager.

Ca\$h for Photo\$

Checks are in the mail to Bob Kelland, Rick Foster, John Hornsby, Stuart Hill, and Boyce Taylor for photos used in the April *Seismic Mariner News*. We pay \$25 cash for each photo appearing on page 1 and \$15 for pictures on inside pages, and we're always looking for good photos. So do us (and yourself) a favor and send in some shots of the action on your ship or in your office.

MARISAT Transmits High-Speed Data From Ship in North Sea

By THOMAS O. CALVIT

Late in 1978, there was a series of shipboard tests which could have a significant future impact on the operations of maritime exploration and research vessels. For two previously land-locked engineers from Washington, D.C., that test voyage proved to be quite a challenge. It provided not only an opportunity to confirm theoretical conclusions about high-speed data transmission under operational conditions, but also a chance to test our personal capabilities for survival on a small ship in the stormy North Sea.

Tom Calvit is manager, system analysis, COMSAT General System Planning Division, and is responsible for MARISAT system performance testing. This article originally was written for a COMSAT General publication.

The ship was the M/V J. E. Jonsson, a 171-foot seismic research vessel of 1,008 gross tons, owned and operated by Geophysical Service Inc. (GSI), a subsidiary of Texas Instruments Incorporated. She was equipped with a COMSAT General mobile terminal for communications via the MARISAT satellite system. Two COMSAT General engineers, Eli Wachsberg and I, were aboard to conduct tests on the feasibility of transmitting high-speed data at 56,000 bits per second (56 KBPS) from ship to shore via MARISAT.

Rough Seas, Spectacular Scenery

We were at sea a total of 12 days aboard the *Jonsson*. The first leg of the journey was from Middlesbrough, England, to Alesund, Norway. After several days in a Norwegian fjord, we again crossed the North Sea to work in Moray Firth on the northeastern coast of Scotland. The voyage was finally completed when we put into port at Peterhead, Scotland. The weather on the North Sea was, according to Captain Clive Berry, typical for late fall — winds of 50 to 70 mph with waves up to 40 feet; the ship reacted with characteristic rolls of up to ± 30 degrees, much to the discomfort of both crew and passengers. The violent motion of the ship at times made self-survival a full-time job.



Tom Calvit (right) and Eli Wachsberg on M/V Jonsson to test high-speed ship-to-shore data communications via MARISAT.

Even simple tasks such as eating and sleeping became serious exercises in concentration and persistence. It became a real challenge when, on several occasions, we had to go aloft in the dark of night to check the performance of the above-deck antenna or an amplifier.

A brief respite from the terrible North Sea occurred one morning in mid-voyage when the *Jonsson* slipped slowly into Storfjorden Fjord. The view was quite impressive with snow-capped mountains reaching down to the water's edge. Even the memory of the rough crossing, and storm clouds that encrusted many of the peaks, did not diminish that spectacular first glimpse.

Experimental Work

The *Jonsson* had finished its production work for the year and was supporting experimental work in two unrelated areas, one of which involved a cooperative effort between GSI and COMSAT General for high-speed ship-to-shore data communications. Evolutionary improvements in seismic technology have, over the years, resulted in ever-increasing amounts of raw production data. The operational effectiveness of seismic operations could be greatly improved if some or all of the large mass of data generated by these improved techniques could be made available in near real time to shore-based data processing facilities. Given these requirements, COMSAT General has been studying the possibility of high-speed data transmission from ship-to-shore for several years. The North Sea journey of the *Jonsson* provided an opportunity to test such a system under severe operational conditions.

The test trip culminated many months of theoretical and laboratory

work by COMSAT General engineering personnel. While Eli Wachsberg and I worked aboard the ship, two other COMSAT General engineers, Ray Malitzke-Goes and Daniel Doody, conducted the test operations at our shore station in Southbury, Connecticut — the other end of a 45,000 mile transmission link via the Atlantic MARISAT satellite. Lynn Heitman and Rick Foster of GSI provided invaluable support to us both in pre-mission preparation and during the tests aboard ship. Captain Clive Berry and First Mate Stuart Kempster of the *Jonsson* assisted with expert comments on the ship's operating environment, and aided us in calibrating the MARISAT ship terminal tracking equipment.

Communications Tests Successful

Rather simple modifications were made to the COMSAT General MARISAT shipboard terminal to accommodate the 56 KBPS test equipment.

For each test, the line was initially established as a duplex voice call. After the preliminary arrangements were completed, a switch on the ship was turned to connect the 56 KBPS modulator to the ship terminal up-converter. After that switch-over, and throughout the tests, the COMSAT General shore station in Connecticut employed a simplex return link to the ship, voice or telex, to coordinate directions and operational procedures.

When installation was first completed aboard the *Jonsson* in England, the ship remained at dockside for two full days, so there was ample time for in-port performance tests. As expected, performance of the system was excellent while the ship was in the quiet waters of the port. Actual sea tests also proceeded very well, although the weather was not always cooperative. For example, within 15 hours after departing England, there were 10-foot waves and 35-mph winds producing 10- to 15-degree rolls of the ship. Those sea conditions exceeded limits originally expected for satisfactory 56 KBPS performance. Even though the rough weather lasted during the entire North Sea run, there were long periods of uninterrupted error-free transmission through the data link.

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The Market Place

By DAVEY EINARSSON

- Rod Cotton offers this strange explanation for John Anderson's famous 4-day Paris negotiation ... HE DOES NOT SPEAK FRENCH...
- A report was received in Dallas that Dr. Bud Lampkin, instead of traveling from Arabian Gulf via Dallas, had rushed to the Philippines to treat Shorty Shipp, who was bitten by a spider.
- Texaco has plugged and abandoned its second well on discovery Block 598 in the Baltimore Canyon after encountering NO oil or gas in producible quantities.
- Shell Oil, operator for a group, says its well in Baltimore Canyon Block 272 is a dry hole.
- By the way, with announcement of this ninth duster in the Baltimore Canyon region, it seems appropriate to pass along the latest joke making the rounds (if you appreciate gallow humor, that is). The joke is: "Nothing on the rocks."
- China: There will be five large blocks along China's coast issued to operators strictly for the purpose of acquiring seismic data. This desk estimates there will be 12 vessels collecting seismic data offshore China in this first phase of exploration.
- The M/V *Dabney E. Petty* & U.S.

Olympic have been sold to the Chinese. This brings their fleet up to four operating vessels with two more to come.

- I had the pleasure of having dinner with the March DFS* V school participants — all Marine and highest average ever. Nice going, fellas.
- Reports on Chinese technicians for vessels are that, as expected, they know all the printed material in amazing detail.
- Britain has offered to buy the entire gas production from the Statfjord field.
- Look for Mexico to bring on the planned production of 2.25 million barrels per day by 1980 instead of 1982 as originally planned.
- Oil output from the UK's 12 producing fields continues to rise. Output in January was 1,458,941 barrels, an increase of over 100,000 from December.
- Chevron will drill offshore Nova Scotia in June. The project will cost \$25 million. Drilling activity offshore Eastern Canada will be up sharply in 1979.
- Bow Valley plugged and abandoned its 28A-1X test well off Vietnam.
- Arco is advertising for participants to drill a strat hole in the Bering Sea. (That's what you get — a hole in the ground for plus or minus \$20 million).

- There are now an estimated 67 seismic vessels operating. This is up from the 1977 low of 59 on a worldwide basis.
- Abu Dhabi has reportedly encountered several hundred feet of pay in what could prove to be one of the world's largest natural gas finds ever.
- Hispanoil has spudded a wildcat 200 kilometers off the mouth of the Amazon.
- Iran has granted Elf-Aquitaine permission to resume production in the Sirri field.
- Petro Canada has filed application to Ottawa to transport the 13 trillion known reserves in Arctic islands to Eastern Canada. Cost is estimated at \$1.5 billion.
- Shell Oil Company has been awarded offshore blocks in Argentina (just where the M/V *Dunlap* worked earlier this year).
- Amoco to drill offshore Oman.
- In Australia, following successful Fortescue #1 and #2 wells, the third in Esso/BHP's Bass Strait program also recovered oil, confirming westward extension of the field.
- Arco and BP have signed agreement to explore offshore China.
- Keep on shooting! And don't forget an Aggie cocktail is "Perrier and water."

U.S. Oil Companies: Net Income 1978

	Million Dollars					
	Fourth quarter 1977r)	1978	% change	Calendar year 1977r)	1978	% change
Exxon	573	850	+48	2,443	2,760	+13
Gulf Oil	175	253	+45	752	791	+5
Mobil	301	332	+10	999	1,124	+13
SoCal	270	358	+33	1,004	1,106	+10
Texaco	191	328	+72	890	852	-4
Total, majors	1,510	2,121	+40	6,088	6,633	+9
Atlantic Richfield	171	223	+30	702	804	+15
Cities Service	54	54	—	210	202	-4
Continental Oil	82	155	+89	381	451	+18
Getty Oil	85	102	+20	309	328	+6
Marathon Oil	57	74	+30	197	225	+14
Occidental Petroleum	61	23	-62	154	7	-95
Phillips Petroleum	147	299	+103	517	711	+38
Shell Oil	193	192	—	760	814	+7
Standard (Indiana)	223	217	-3	1,032	1,076	+4
Standard (Ohio)	70	164	+134	181	450	+149
Sun Co	93	95	+2	362	365	+1
Union Oil	81	124	+53	334	382	+14
Total, others	1,317	1,722	+31	5,139	5,815	+13
Grand total	2,827	3,843	+36	11,227	12,448	+11

r) Restated where appropriate.

Source: *Petroleum Economist*, March 1979.

New Boat Assignments

M/V Arctic Explorer — Steve Williams, PM; Allen Boudreaux, Adm.

M/V Arctic Seal — John Clare, PM; David Dale, Adm.

M/V Caribbean Seal — George Sellers, BM.

M/V Cecil H. Green — Jim Markham, BM; Paul Woodward, PM; Frank Stark, Adm.

M/V Patrick E. Haggerty — Ian Fitzgerald, BM; Rick Foster, PM; Bob Simpson, Adm.

M/V J. E. Jonsson — Mick McDermott, PM; Don Stuart, Adm.

M/V Karunda — Ian Taylor, BM; Neil Smith, PM; Bernie Shaeffer, Adm.

M/V Eugene McDermott II — John Stanton, BM; Eric Pickstone, PM; Norman McGowan, Adm.

M/V Tasman Seal — Mick Stormonth, PM.

Active P&AE Effort Evolves in Perth

By CHARLES POYNTON

Despite the quiet from this end of the world, plenty has been happening in GSI's Perth Service Center. We have been like the proverbial duck — quiet on top and working like crazy underneath.

The business side has shown continued expansion, with increases in the number of kilometers of data, machines, clients, and of people to get the data through the works. There are now three TIMAP* systems, compared with just one a year ago, and two floors (previously a half) of office space.

During the "early days," many of the staff were people new to Perth, and naturally enough kept each others' company not only during working hours, but shared apartments and often enough went on holiday weekends as a group. The past year has seen numbers rise from 11 to about 50 workers, these additions being natives with their own social contacts. Consequently, camping weekends have become less common.

The environment in the office has always been one of friendly cooperation, frank discussion, and Christian-name terms. There is no unnecessary formality.

The happy atmosphere is a reflection of the general mood in Western Australia, which is celebrating its 150th anniversary this

year. It was in 1829 that a colony was founded by British settlers lead by a naval officer, Captain James Stirling. The celebrations are less meaningful for one group (the Australian Aborigines) but this has not detracted from the highly enjoyable series of festivals, community picnics, and sometimes spectacular displays.

In fact, the GSI office is right in the middle of the celebrations, being in the heart of the city. The city's foundation was by the felling of a tree. This historic event, which has become a way for "Sandgroppers," was performed by a Ms. Dance in June of 1829. The location was just opposite GSI's Barrack St. office, and a large painting depicting the scene hangs opposite the input crews. No trees are visible these days, as they have all been cut down, but the painting helps beautify one of the many ugly ferro-cement symbols of progress.

Despite the carnival atmosphere outside, an active P&AE effort has been evolving in Perth. Teams devoted to topics such as input, computer operations, personnel relations, tape library management, and special technical problems have been meeting regularly. They have been discussing matters raised by various staff members, on monthly questionnaires that are circulated to all staff.

These suggestions are polled for popularity and discussed by the



P&AE organizer Charles Poynton at entrance to GSI Perth.



Mike Sayers and Jan Fleming at window overlooking site of the city's foundation. The building visible through the window is the Perth Town Hall, built in the 1860's with convict labor.



Lim Tia Cher checks the list of P&AE suggestions posted in the scheduling area.



Prince Charles (right) unveils statue of Captain James Stirling, commemorating the founding of Perth. The statue is opposite GSI's office. Photo courtesy of West Australian Newspapers.



Danny Lenzarini on TIMAP 349.



Steve Hulland, leader of the "technical problems team," checks a Gould printout.



Peter Bentley and Stuart Bell sort things out on machine 369.

teams. The polls themselves tend to unearth more suggestions.

The lack of a meals room is a problem which has been under review by the personnel team. In the past, there has been insufficient space for such a facility, and staff have eaten at their desks or nearby shopping precincts. Often enough, though, a desk is covered in work, and it is raining outside.

So, the team discussed the matter, and decided that a space should be set aside where staff can relax, eat, talk, and perhaps even watch TV during their meal break.

Another concept under discussion is that of "cross training," where people could gain skills outside their present area. For instance, an exchange of skills between input and the computer operators is planned.

The tape library team, containing just three people, was formed to control the size of the burgeoning



Charles de Gois, tape librarian, loads cards into the hopper of machine 369 to run the library inventory.

library. It has discussed several possible actions, one of which is an inventory program. This is quite unsophisticated, but gives input



Peter Lanzon, "Tiphany," Judy Pearson, and Graeme Smith taking lunch in the Hay St. Mall.

teams necessary details of client, tape and line number, generation dates, etc. This simplifies the degaussing procedure.

What EFR Analysis Reveals About System Problem Areas

(Part 2 of a Series)

By MICKEY KELLY

As a result of Engineering analysis of the EFR data concerning the DMAC and system coordinator, we are encouraged that the system can provide us with the information needed to identify problematic subsystems. In evaluating this data we have also identified a few problems with the reporting system itself which, if corrected, can provide more accurate failure analysis data.

First, those of us in Engineering need to be more conscientious in returning the "blue forms" with our comments to the field as soon as possible. We need to make sure that

appropriate feedback reaches the field.

Although over 3500 EFRs have been turned in to date, I would like to encourage everyone to report every problem so that an accurate, unslanted data base can be maintained. For example, the total boat down time attributed to CMS in 1978 was only about 160 hours. I would like to believe that this was indeed the case, but unfortunately I can't deceive myself to that extent.

Although only the first few lines of data supplied by the EFR actually enter the data base, the comments supplied regarding problem description and probable causes are of great importance, so supply as much

detail as possible. Also please keep in mind that for EFR purposes a day may be longer than 24 hours (i.e., if two problems occur simultaneously, record lost time as if each problem existed separately. Do not divide total time between the two problems).

Those of us in Marine Engineering believe that the EFR system can provide us with the data necessary to identify our problem areas and we plan to extend our analysis of the data base to other systems outside of the test set. We appreciate the effort of all field personnel who have supplied us with this data and we encourage you to continue to support the EFR system.

Middlesbrough — Hub of North Sea Operations

(Part 4 of a Series)

By FRANK WEST

We started the year 1976 with a search for a new Middlesbrough warehouse. Finally, the choice was made and the warehouse moved about two miles to Stockton into the best premises we have known. The warehouse is well-lit, and the office accommodation is first class. Further, we are situated in the middle of an industrial estate where we are able to purchase most of our supplies. We are beside the main road system and have good access for the docks and travel to Bedford or Aberdeen.

We moved in on 1st March and were soon involved with the arrival of M/V *J. E. Jonsson*, bringing Allen Boudreaux and Davy Dale. Now, for the first time, we were also able to supply all the commissary supplies as well. Ray Elsworth started overhauling GM engines and PB 44s from the *Egede*, rebuilding and shipping to the *Caribbean Seal*. International truck runs were established to supply the needs of the vessels operating off the Spanish coast.

Later that year, we tried supplying the *Dunlap* off Saudi Arabia by truck from U.K. This far extended the promised delivery time. Due to the fact the truck carried Shell Sol T, it was held at the border, and for two weeks (as far as both owners and GSI were concerned) had just disappeared.

In September, the *Caribbean Seal* was prepared and departed for Brazil, and the *Arctic Seal* went back to the Med. In December, the *Jonsson* was de-rigged for her drydock and re-fit.

The warehouse started 1977 packed to the doors with equipment from the *Jonsson*. Then the doghouse was put outside and connected via the door to the warehouse for its refurbishing. Another Norwalk compressor arrived, and with it Pete Reichle to prepare it for installation. The doghouse was refurbished and fitted by Brian Flood, John Hornsby, and sundry other assistance. Harry Harrison arrived and with various airgun personnel got busy on new airgun arrays and systems. Soon the great day dawned, and the *Jonsson* was finally fitted and sailed.

Visits were made by Bill Blakeley and Mac McDonnell to keep an eye



Jim Walker ordering more supplies.



Ron Walters, warehouseman/driver, assists John Hornsby on M/V *Jonsson* refit.

on progress. The *Arctic Seal* returned to the North Sea, but by the end of May sailed for the Caribbean. In June, we were connected to TI's IMS network, and this improved our communications tremendously.

In September, the *Jonsson* went 96-trace cable and changed her instruments to a DFS* V system. At the same time, we welcomed the *Carino* to the North Sea and soon were involved in installing an extra set of DFS instruments on her and supplying 96-trace cable. Both she and the *Jonsson* fought the North Sea gales in the effort to get some production. We were also pleased in September to welcome Eric Jones, Jim Richardson, Eric Firmin, and Don Glanvill when they paid one of their visits to the *Jonsson*.

In the navigation department, Shoran was prepared for Greenland, GEOTRAC** equipment was serviced, and JMR system and Mini-

Ranger installed under the guiding hands of Georg Mangold, Dave Amos, Charlie Marsh, and Bob Dowe. John Lovelock was finally able to move into his office in July, joining Lynn Darby.

The staff at Middlesbrough are Frank West, manager; Jim Walker, accounts; Karen Mucklin, secretary/receptionist, general duties; John Hornsby, carpenter/driver/warehouseman; and Ken Fisher, warehouseman/driver. The services given are purchasing and supply of as much as can possibly be obtained locally; handling and processing of shipments from Dallas; control of inventory for customs purposes; delivery of stores; collection and delivery of data from ports; assistance with personnel problems; and, in fact, anything that can be done to assist in the efficient day-to-day running of the vessels.

Survival After Shipwreck

This is a continuation of an article listing the general principles of survival after shipwreck. It is being reprinted with permission from the October 1978 issue of Seaways, the Nautical Institute monthly bulletin.

In cold climates:

- Protect face, ears, and hands from frostbite. Adopt buddy principle and watch one another for tell-tale white patches. Warm affected part with palm of a warm hand and cover it with cotton, wool, or similar material. Do NOT massage frostbite.
- Keep feet as dry as possible. Move the fingers and toes, move at ankles and knees, clinch fists and stretch limbs, wrinkle face and nose, manipulate ears. This keeps the blood circulating.
- Put feet up for at least five minutes in every hour (boats).
- Keep weather cover closed except for small opening (about 6 inches

diameter) to ensure ventilation.

- If chilled by cold rain, rinse clothes in seawater, wring dry, and put on again (the sea is warmer than the rain).

In hot climates:

- Avoid sweating.
- Protect skin against sunburn and protect eyes against glare from sky and sea.
- Adjust weather cover to provide maximum through draught by

day; close it at night except for a small opening for ventilation.

- Keep outside of weather cover wet with seawater throughout daylight — the evaporation lowers the inside temperature.
- Deflate floor of raft by day to obtain cooling effect of the sea; inflate floor at sundown.
- Keep clothing wet by day, soak shirt in sea water and put it on wet. Rinse clothes before sun-

down and squeeze out salt. Clothing and floor of raft should be dry by sundown.

- Do NOT swim, it wastes energy.
- Stick to the rules. Many seafarers have been worse off than you, and have survived.

(Submitted by E.C.B. Lee, OBE, RCNC, FRINA, COMPANION)

(Continued Next Month)

How Bedford Processing Got To Be the Africa Experts

By GERARD HURRELL

The South African Summer coincides with the North Sea Winter.



Marine production group — Jane Jones, Rooplal Kalyan, Terry Cook, Steve Kemp, Jeff Wareham (group leader), and Paul Harper.



FTP group — Pauline Cock, John Corkill, Matthew Brown, Phil Lloyd (group leader), and Derek Basten.



Esme Brown, Armadgeep Chaggar, Ginny Stratton, and Jenny Hudson (group leader) of the printing and shipping group.

This fact has helped Bedford Marine Processing to eliminate the traditional Winter lull in processing this year.

In November 1978, we processed one line for a South African client for the purpose of demonstrating our enhanced technical capabilities since we last had worked for them in 1974. The line was processed by the "job start-up" group, with the whole group acting as party chief.

This was found to be a stimulating exercise, choosing all the parameters, deciding upon tests and processing sequence to be performed. This "democratic" approach may have some merit. The client was sufficiently impressed to award us 250 kms of further reprocessing of 1976 data. This was completed early in January and led to the award of a further 1500 kms of 1978 reprocessing. In November, we had bid on the processing of 7400 kms of 1979 data, currently being shot by another contractor, and have been awarded that contract.

One-third of the data covers the West coast of South Africa, the other two-thirds is around the Cape of Good Hope, and these projects are of major economic importance to the Government of South Africa.

The zone of interest is deep data in the Lower Mesozoic (Sunday's River Formation) where signs of oil have been seen. Sea noise and multiples have been great problems in previous processing. Our new technology has made significant improvements. VEFILT has helped minimize the sea-noise problem, while DESIGNATURE has produced marked improvement in clarity and continuity over previous processing in the same area. DEMULT, being applied over most of the area, is making a big impact on multiple attenuation.



Rob Atkinson, group leader; Marion Hanson; John Cooke, party chief; and Gordon Murdoch of the Bedford Marine startup group.



Ed Paulpillai (right), processing manager, with party chiefs Colin Adlard, Roger Gater, Alfred Chan, and Jerry Kapoor.



Glyn Roberts, group leader; Pete Chandler; Janet Astle; Neil Rattnet; Jenny Ganderton; Andrew Bishop; and Raman Luthra of the Marine velocity group.

Party chief on the project is John Cooke, who has a big coordination job on his hands with the data being shot by another contractor; time-penalty clauses in the contract; magnetics data being shipped to Dallas for processing; 8 test

Continued on Page 12

Houston Processing Group Tackles Arabian Gulf Data

By **KIMBLE SKIPPER**

In the latter part of 1976, a Mid-East client contracted GSI to set up a processing and interpretation crew



Ron Weaver, Marine manager.



Ken Jensen, Tim Larson, Kimble Skipper, and Ken Kleeman.



Wilbur Thompson and Barry Edwards.



Lloyd Johnson, interpretation group supervisor.

to operate out of the GSI Houston office. While the processing crews worked on new data, the interpretation group started reviewing old data in preparation for the newly acquired data to be added to the interpretation.

During the first half of 1978, GSI started reprocessing several years of vintage data, some of which dates back to 1966. All the reprocessing was tied into the new data by using the 2D HI-TECH processing programs. Because of the technical success of the HI-TECH processing and reprocessing, GSI was awarded a contract to process the 1978 Marine seismic program.

The M/V *Tasman Seal* crew spent the summer cruising the Arabian Gulf, under the leadership of John Lovelock, operations manager; Ian Jones, boat manager; and Ian Fitzgerald, party manager. They gathered the seismic data that GSI is now processing in the Houston office.

Larry Godfrey, project manager, spent the first week of shooting on the *Tasman Seal* and brought good reports about the operation of the crew. Larry said, "The crew was very well organized and did an efficient job of gathering the data." After the completion of the 2D program, the *Tasman Seal* crew shot a 3D program with the same excellent results.

The Houston processing center is in its third year of processing and interpreting data for this client. We are presently processing 2D and 3D shot in 1978 using all HI-TECH programs. Ken Jensen is the party chief for the 2D processing, and working on his staff are Bill

Boettcher; Manu Patel, party chief of reprocessing; Baldemar Villarreal; Frank Prudich; and Jerry Pote.

The 2D processing group leader, Ken Kleeman, and his fine staff consisting of Tim Larson; Detra Clarke; Ken Dickerman; Dave Janos, assistant group leader in charge of reprocessing; Bruce May; Wilbur Thompson; and Barry Edwards are working hard to keep all the data flowing through the ASC system.

Continued on Page 11



Dave Janos, assistant group leader for 2D processing.



Manu Patel and Baldemar Villarreal.



Bill Boettcher.



John Ralph, 3D processing PC.



Steve Matthiesen and Gale Nealy.

Continued From Page 10

The 3D processing party chief, John Ralph, and group leader, Mark Egan, with the help of Steve Matthiesen, Maple Jackson, Jennifer Craft, Gale Nealy, Karen Plumlee, and Alma Lopez are working on the 3D project. With all this HI-TECH processing going on we called on Dave Hayes from the Dallas AG group for help.

The interpretation group supervised by Lloyd Johnson is in the process of tying reprocessing and current data together and making



Helen Torres, Barbara Carbajal, Jeanette Cox, and Charlotte Powell.

contour maps. Working with Lloyd in the interpretation group are Sam Spikes, Ruben Knowles, Prakash Desai, and Don South. GSI also has a data base program going and GSIs working on this project are Jerry Rice and John Perantie.

Lloyd would have an impossible task of getting all his maps completed without the help of draftspersons Jeanette Cox, Helen Torres, and Barbara Carbajal, who are also responsible for filing and keeping up with all the sections that the interpreters drag out of the files.



Alma Lopez, Peg Korty, Mark Egan, and Maple Jackson.

The first person and probably the last that you will see in the interpretation group is the receptionist, Charlotte Powell, who always has a pleasant smile for you.

The processing and interpretation falls under the function of Latin America and Outside Processing. Ron Weaver, Latin America manager, and Kimble Skipper, processing supervisor, are pleased with the way collection, processing, and interpretation are working together as one unity.



Don South and Ruben Knowles.



Jerry Rice and John Perantie.



Sam Spikes and Prakash Desai.

What You Need to Know About Wavelet Processing

(Part 3 of a Series)

By **BOB McBEATH**

After application of DESIGNATURE and DEMULT, the seismic section should be free of the distortions and confusions associated with ghosts, reverberations and multiples and be a valid representation of the subsurface boundaries. Even if this is true, the data will undoubtedly lack the details, particularly at depth, the interpreter

needs to understand and map zones of interest. The data exhibits "lack of resolution"! The problem is directly associated with transmitting seismic energy through the layered earth.

The first problem is called "inelastic attenuation." Even a massive, homogeneous layer is not perfect in allowing all energy that enters to leave it. It steals energy on a frequency-selective basis. More high frequencies are stolen due to heat or friction losses than are low frequencies. Is it not true that, in a

crowded room of mixed persons, it is a strain to hear the high-pitched lady standing next to you, whereas the deep, booming voice of the man in the far corner comes in "loud and clear"? The wavelets are broadened in time (lowered in frequency) as they travel farther, and as they broaden, they represent larger and larger thickness intervals, so the fine details are lost.

The rate at which the high frequencies are lost does vary with the material, and it is expressed as its Q factor. In sediments, the range of Q is reasonably small, and an average value for the penetration of

Continued on Page 12

MARISAT*Continued From Page 4*

In all, preliminary evaluations indicate a very successful test.

Potential for Valuable New Service

Throughout the trip, the tests demonstrated conclusively that compact, state-of-the-art equipment components can be interconnected with existing COMSAT General MARISAT shipboard terminal equipment to provide reliable 56 KBPS data transmission with bit-error rates of better than 10^{-6} in a variety of rough sea operational conditions. This conclusion opens the door to a new and valuable communications service via MARISAT.

Bedford*Continued From Page 9*

locations (2 still to be shot) and many combinations of tests to perform; 3800 velocity analyses to be picked; and 760 other display frames to be enlarged, spliced, trimmed, printed, and shipped by Jenny Hudson and her printing/shipping group.

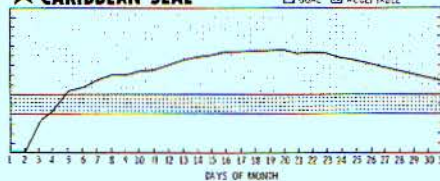
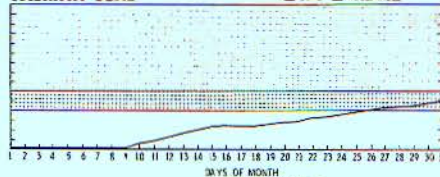
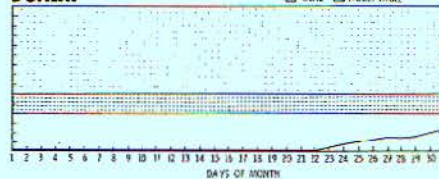
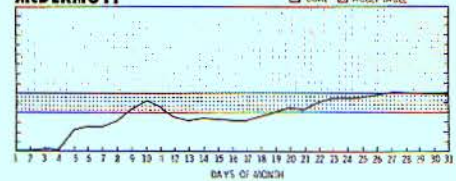
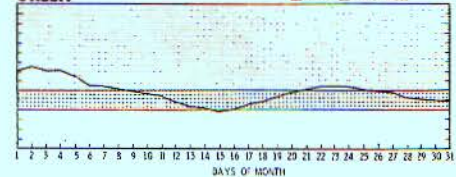
Some features, particularly long lines up to 130 kms of 60 trace/60 fold/6 second data, have imposed great demands on the TISIS*/TIPEX* input system which have been successfully met. A client representative is inhouse overseeing the processing, and this puts demands on the input groups to meet deadlines — so far met successfully.

Farther North, up the West coast of Africa, we are nearing completion of another large project — 18,500 kms shot by the M/V *Arctic Seal*, of which GSI was awarded 12,500 kms of processing.

In February 1978, a French client approached GSI with a problem. They had never seen much pre-salt data (1-2 seconds) on their offshore Gabon/Congo/Camerouns blocks. Another contractor had just shot and processed some test lines and had obtained good pre-salt results. The client wanted GSI to show what we could do.

The *Arctic Seal* shot 800 kms of tests in April '78, employing various combinations of shot and geophone configurations. After processing testing, it was decided that shooting with EAGAR (extended airgun array), applying DESIGNATURE in processing, and using MULTIVELS to aid in the critical velocity analysis stage gave impressive results in the pre-salt zone.

Based on the results achieved

Vessel Recording Performance March 1979**★ CARIBBEAN SEAL****TASMAN SEAL****DUNLAP****MCDERMOTT****GREEN****★ VESSEL OF THE MONTH**

from this sequence, GSI was awarded 4000 kms of data collection and processing offshore Gabon/Camerouns, which was shot May-June '78 and processed June-August with very good turnaround and results. A further 6000 kms of data collection for July-September was awarded to the *Arctic Seal*, with this processing going to another contractor — the client feeling that we had a lot on our processing plate already. However, GSI was awarded the next 7000 kms processing, shot by GSI in September-December '78. VEFILT has been added to the processing sequence on this data and is doing a good job of eliminating surface noise and edge-effects from salt domes.

Currently, we are processing 700 kms of 1979 offshore Camerouns data plus 500 kms reprocessing of old data, with the possibility of 1000 kms more.

We are getting to be Africa experts these days.

Wavelet Processing*Continued From Page 11*

seismic energy is a reasonable assumption.

The program called QCOMP (compensation for loss due to Q factor) is applied to continuously increase the frequency content of the stacked data with increasing arrival time. This provides sharper wavelets and more resolution of fine details so long as higher frequencies

are bringing in more reflection signal and not noise.

The second problem is a side effect of the reflection process. If a boundary exists that will reflect some seismic energy back to the detectors, then it follows that the energy transmitted into the layer below the boundary is poorer by the amount reflected. Each reflecting interface robs the system of some fraction of the energy output from the source. When this effect is combined with thin beds (closely spaced boundaries), the effect is to selectively transmit some frequencies and to suppress others. The wavelet reflected from a deep boundary, in strength and frequency content, is at the mercy of the layering above it.

A process is in development at this date to measure the respective strengths of each frequency as a function of time and to compensate for losses at specific frequencies from reflection to reflection. This process will be called TRANSCOMP (compensation for transmission effects).

In summary, the Wavelet Processing concept involves removing from the recorded data the distortion effects created by the water layer, the confusion caused by the presence of multiples, and to enhance the data to allow detailed interpretation of the nature of the subsurface layering. This is the objective of the Wavelet Processing system.