KEY BISCAYNE (JACK-UP DRILLING RIG)

PRELIMINARY INVESTIGATION INTO :

LOSS OF TOW AND SUBSEQUENT FOUNDERING OFF THE COAST OF WESTERN AUSTRALIA ON 1st SEPTEMBER 1983

CONTENTS

PRELIMINARY INVESTIGATION INTO THE LOSS OF 'KEY BISCAYNE' (MODU)

SUMMARY OF EVENTS -

The jack-up drilling rig 'Key Biscayne' was last seen afloat shortly after 1845 hours W.A.S.T. Friday 1 September 1983 in position 31° 10' S, 115° 11' E, 10 nautical miles off Ledge Point on the coast of Western Australia. Shortly before that time the tow line to the rig supply vessel 'Atlas Van Diemen' parted and the standby vessel 'Argus Guard', which had been stationed about 5 cables astern, pulled off to starboard to clear the rig as it was running down with the weather. 'Key Biscayne' was clearly seen when about 2 cables off the port beam of the standby vessel both visually and by radar. However, by the time 'Argus Guard' completed its turn, the rig was no longer visible and radar contact had been lost.

'Key Biscayne' was on voyage under tow by two rig supply vessels 'Lady Sonia' and 'Atlas Van Diemen' from a location off Darwin to Fremantle for stacking in Cockburn Sound pending its future employment.

The loss of the rig was the combination of a series of events during the final day when tow lines parted and gale force winds, rough seas and heavy swells buffeted the rig. All 52 persons aboard 'Key Biscayne' were evacuated by helicopter and were taken to nearby Lancelin township without loss or injury.

The tow line to 'Lady Sonia' parted at 0644 hours 1 September and for the next twelve hours 'Atlas Van Diemen' attempted to hold 'Key Biscayne' into the weather and away from the lee shore. Concern for the safety of the crew and of the rig was felt soon after the tow line to the supply vessel 'Lady Sonia' had parted. Shortly after 0900 hours the rig transmitted a PAN message seeking assistance. By 0930 hours this message had been converted into a MAYDAY and helicopter assistance was sought to evacuate crew. At 1110 hours the first man was lifted from the helipad and by 1230 hours all non-essential personnel had been evacuated by both RAAF and civilian helicopters. Throughout these operations the rig was wallowing in the heavy seas and swells, rolling and pitching heavily.

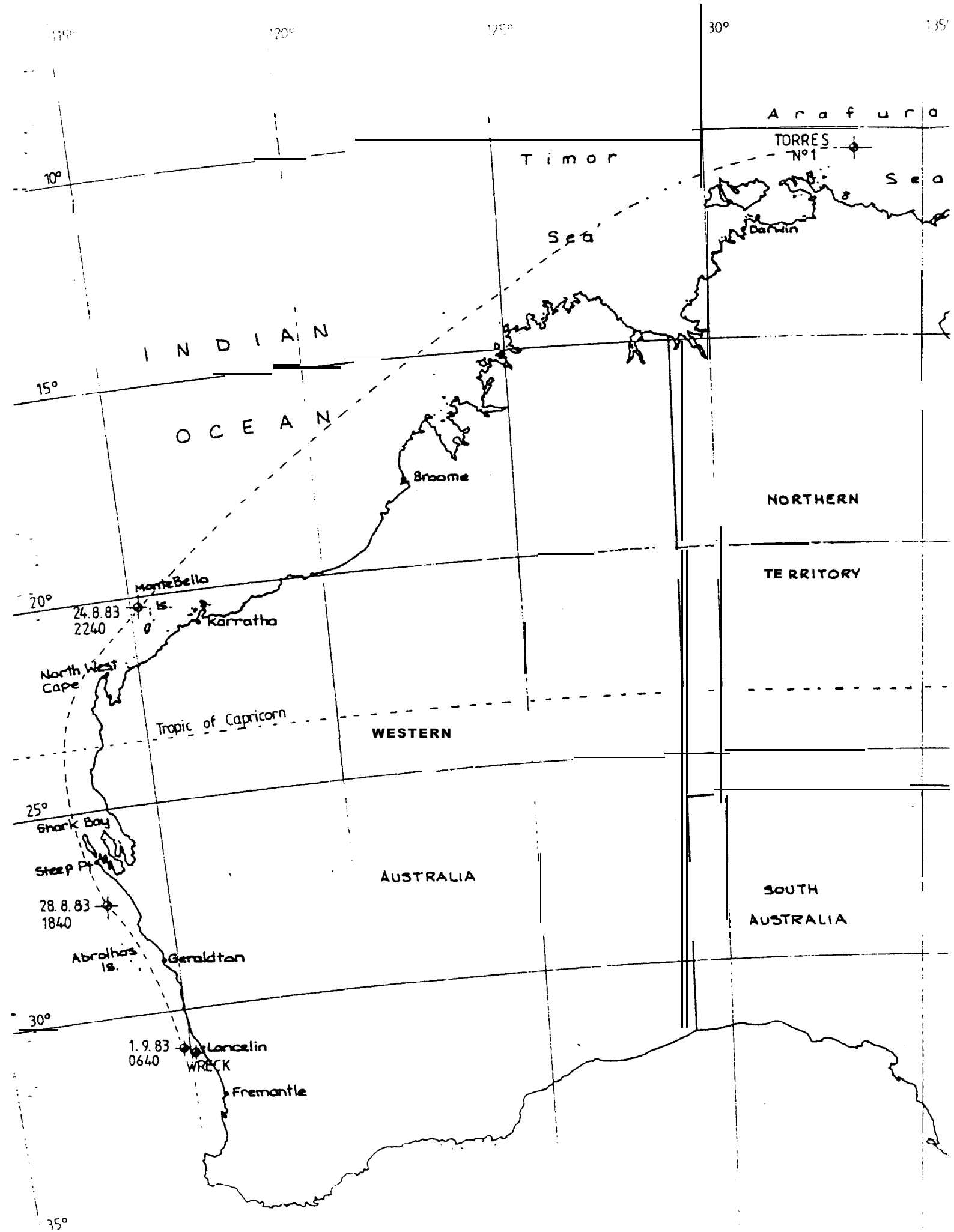
During the day it was noticed that the vessel was settling by the stern and listing to starboard, as heavy green seas were continually washing over the main deck. The bow of the rig was seen lifting clear of the seas and the stern immersed as the vessel pitched up to ten degrees forward and about twenty five degrees by the stern. At the same time the rig was rolling up to fifteen degrees each side of the upright.

All efforts to reconnect 'Lady Sonia' were unsuccessful. At about 1600 hours it was decided that the remaining crew should evacuate before dark and return the next day when conditions were expected to moderate. The drift of the rig toward the shore had been slowed by an anchor and the weight on the tow line. With all line-throwing rockets spent and conditions on deck too hazardous to work no useful purpose was seen in remaining on board. By 1620 hours the remaining crew had been lifted from the rig.

The three support vessels remained in the area during the night. At about 0830 hours Friday 2 September 'Argus Guard' recovered a guitar case, life jackets, paper and a trail of debris indicating the location of the sunken rig. The position of the wreck was confirmed by bathymetric survey carried out on 8 and 9 September 1983.

Subsequent underwater video film showed the rig to be inverted, lying on top of two of its legs with the third some distance away and all pointing in a north easterly directicn. Part of the starboard quarter of the rig hull together with the jack housing, had broken adrift. The position of the hull and legs indicated that the rig had tipped over backward. In settling on the bottom the legs were either bent or broken as the barge inverted on top of them.

The rig is lying position 31° 10' S, 115° 11.7' E in 41 metres of water. The bottom of the inverted hull is roughly 26 metres below the surface and the deep well tower, protruding through the hull, has some 20 metres clear water above it. The rig does not present hazard to commercial shipping operating in the area. Fisherman and divers have been warned of the dangers of wires, metal obstructions and other hazards of working close by.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North West
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WESTERN
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WRECK
Fremantle

AUTHORITY TO CONDUCT INVESTIGATION

On 1 September 1983, Captain David Pearson Clarke, Regional Director of the Department of Transport, Western Australia, was appointed under sub-section 377A (1) of the Navigation Act 1912 to make a preliminary investigation into the circumstances of the parting of the tow and subsequent drifting of the oil rig 'Key Biscayne' off the Western Australian coast on 1 September 1983. This appointment was extended on 5 September 1983 to include :

(a) the arrangements made for the voyage of the rig 'Key Biscayne' and accompanying vessels 'Atlas Van Diemen', 'Argus Guard' and 'Lady Sonia', which commenced on or about 17 August 1983 and terminated with the foundering of 'Key Biscayne' on or about 1 September 1983;

(b) the statutory approvals (if any) sought or obtained for the making of the voyage, the persons by whom they were sought or obtained and the Australian or Liberian authorities to whom application for any such approval was directed;

(c) the persons carried on 'Key Biscayne' during the voyage, the reasons for their carriage and the duties and responsibilities of persons in positions of authority on 'Key Biscayne' and the accompanying vessels during the voyage';

(d) any occurrences during the course of the voyage that significantly contributed to the foundering of 'Key Biscayne' and the loss of equipment carried on board.

In pursuit of the investigation into the causes of the casualty advice was sought of the Ship Safety Branch of the Department of Transport. The supplementary 'Stability Analysis' report into factors contributing to the loss of the jack-up rig 'Key Biscayne' is appended at Attachment .....

During the period 3 September to 16 September 1983, interviews were held and depositions recorded with persons directly involved with the incident. These include:

- Master, Mate and an AB from the rig supply vessel 'Atlas Van Diemen'
- Master, Mate and Second Mate from the 'Lady Sonia'
- Master and Mate from the standby vessel 'Argus Guard'
- Rig Superintendent, Tool Pusher, Safety Officer, Communications/Medic and a Mechanic together with the Esso representative and Noble Denton, Woodcock and Associates Marine Surveyor who were on board 'Key Biscayne' at the time of the accident.

Discussions have been held with officials from the Mines Departments of Western Australia and the Northern Territory regarding approvals and authorisations for the operations of the rig. In addition opportunity was taken to inspect the jack-up rig 'Maersk Valiant' on location off Barrow Island. The assistance provided by the crew of the 'Maersk Valiant,' in particular the Barge Engineer, is acknowledged.

At the invitation of the Department of Transport, Mr C. I. Cox, representative of the Bureau of Maritime Affairs, Republic of Liberia, participated in the preliminary investigation into the circumstances surrounding the accident to this Liberian registered vessel.

APPROVAL FOR THE VOYAGE

The Department of Transport was advised by letter of 25 May 1983 from the Department of Mines and Energy, Northern Territory, that Esso Exploration Australia Inc would be drilling the Torres No 1 well at location 10° 28' 06.28" South, 133° 23' 39.4" East in the Arafura Sea. The jack-up rig 'Key Biscayne' was to be used for the operation which was expected to commence in mid June and last about 96 days. This preliminary advice was given primarily for the information of mariners.

On 7 June 1983, the Acting Director of Energy, Department of Mines and Energy of the Northern Territory advised Esso that drilling of Torres No 1 well had been approved provided the operator kept the Australian Coastal Surveillance Centre, Canberra, informed of movements of drilling vessels and that operations were conducted in accordance with an approved oil spill contingency plan.

The 'Key Biscayne' arrived on location at Torres No 1 well on 17 June 1983. Owing to bad weather, the well did not spud until 26 June 1983.

On 5 August 1983 Esso sought approval under Section 107 of the Petroleum (Submerged Lands) Act to abandon Torres 1 well. Approval was given by the Northern Territory Director of Energy by letter of 5 August 1983 to the plug and abandonment program submitted. By telex of 8 August 1983 Esso requested permission to move 'Key Biscayne' from the Torres 1 location into Western Australian waters. The Department of Mines and Energy advised the Commonwealth Department of Resources and Energy, Canberra, by telephone and no concern was expressed.

The rig departed from the Torres No 1 location at 0230 hours 17 August 1983. Approval to move 'Key Biscayne' to Cockburn Sound for stacking was given by the Director, Petroleum Division, Western Australian Department of Mines, on 18 August 1983.

OUTLINE OF EVENTS

The tow commenced from Torres No 1 well located some 180 miles north east of Darwin on Wednesday 17 August 1983. The rig was jacked down on 16 August following a delay waiting for suitable sea wave conditions. Arrangements for the jack-down and tow were inspected by the Noble, Denton, Woodcock and Associates, Marine Surveyor. This included an overall check of the condition of the rig and equipment, as regards tiedown and stability, in addition to towing arrangements.

In accordance with operating instructions for the rig while afloat and during an ocean tow, the sub-base and sub-structure were jacked in and properly secured against movement. All loose equipment including drill pipe, containers and other items were secured prior to entry into the water. The leg length was not reduced to 324 feet as prescribed for an ocean tow in the operating instructions.

Stability calculations indicated that the vessel would float at a mean draft of about 13 feet 4 inches, approximately 10 inches by the stern. It was estimated that the height of the centre of gravity above the keel was about 48.5 feet with the legs jacked to their full height 357 feet.

Towing arrangements had been discussed and agreed with Noble, Denton, Woodcock and Associates prior to the arrival of 'Key Biscayne' in Australia. This included size, type and capacity of equipment to be used and required bollard pull of towing vessels.

In accordance with these arrangements, separate tow connections were made for each of the rig-supply vessels 'Lady Sonia' and 'Atlas Van Diemen'. On 'Key Biscayne', approximately 10 metres of 2% inch diameter chain, the inboard end made fast by a heavy duty enlarged link to the Smit deck connection, was led across the deck over an open fairlead on each bow. The outboard end was attached to a 1¾ inch wire rope fore-runner pennant, approximately 20 metres in length.

The towing vessels equipment consisted of the main tow wire and hydraulic winch together with nylon rope stretchers. 'Atlas Van Diemen's' towing wire, approximately 1000 metres of 58 mm I.W.R.C. wire rope, was fitted with a spelter socket attached to approximately 30 metres of 96mm nylon rope doubled, short spliced and frapped to form a "stretcher". In the case of 'Lady Sonia', towing equipment included approximately 700 metres of 58 mm I.W.R.C. wire rope on the towing winch attached to a 23 metre nylon stretcher of similar construction. This equipment had been regularly employed by the supply vessels for towing operations with the rig.

The 'Argus Guard' accompanied the fleet during the voyage in its role as standby vessel. During the passage, regular contact was made by helicopter from shore bases. When aircraft were operating from the rig, 'Argus Guard' would close to approximately 2 cables off. However for most of the voyage it maintained station roughly 5 cables astern of the rig.

The first seven days of the tow were uneventful and good progress was made on the run down the North West Coast. Light variable winds and slight seas enabled average speeds of 6 to 7 knots. Regular information was supplied to the Coastwatch centre and radio and helicopter communications maintained with shore bases.

At 2240 hours W.A.S.T. Wednesday 24 August the tow lines to both supply vessels parted almost simultaneously; that of the ‘Atlas Van Diemen' at the spelter socket, the ‘Lady Sonia’s’ on the eye of the nylon stretcher. No reason could be established for these breakages. On recovery it was found that the ‘Atlas Van Diemen' tow wire had parted where it entered the socket as wires and filling were still intact inside. The vesseis were in position 20° 18' S, 115° 12' E to the west of Tryal Rocks, near the Monte Bello Islands steering course 220° T with Sly winds force 4 to 5, 1.5 metre seas and approximately 3 metre SSW swell.

‘Lady Sonia' reconnected by 0040 hours Thursday 25 August, the ‘Atlas Van Diemen' by about 0330 hours when the tow was resumed. Part of the delay in re-establishing the tow lines arose from the time taken to recover each towing chain and fore-runner and to prepare for reconnection. There was limited working space forward on the rig and recovery of the gear was by use of a wire whip led from a winch aft at the drill floor through snatch blocks to the bow. In order to recover the cable it was necessary to handle it in fleets.

For the next three days the tow proceeded past North West Cape and outside Shark Bay at a reduced speed of 5 to 5.5 knots. Winds SSE to SSW force 3 to 5 were experienced with slight seas and 2 to 3 metre SW swells. Towing vessels and the tow were moving easily.

As the vessels sailed south of Steep Point, the weather worsened. During Sunday 28 August, wind increased to SW force 6 to 7 with rough seas and 6 to 7 metre SW swells. Towing speed was further reduced and the rig noticed to be rolling and pitching heavily to the beam swell with seas frequently washing across the main deck.

At 1838 hours, just after dark, the tow line to ‘Atlas Van Diemen' parted at the eye on the tug end of the stretcher. At 1950 hours the stretcher in the ‘Lady Sonia’s’ towing gear also carried away, leaving the rig adrift once again. The vessel was pitching and rolling severely with decks continuously awash making reconnection operations extremely difficult and hazardous. Although steel pipe and heavy equipment were well secured, smaller items including drums on pallets and small containers were being washed around the deck. The hatch lid from a disused propulsion caisson at the bow was blown off and cracked a pre-load tank vent on its way overside.

The ‘Lady Sonia’s’ gear was reconnected by 2115 hours and the tow hove-to while attempts were made to reconnect the ‘Atlas Van Diemen' During the period a number of the rig crew working on deck were washed down the forward leg opening by a large sea which carried away the railings. The men were using safety jackets and life lines and were recovered without suffering significant injury. An extra 20 metre wire pennant was added to the rig’s towing equipment in order to give the tugs more room for manoeuvring, however, attempts to recover ‘Atlas Van Diemen' were not successful until 1800 hours on Monday 29 August, when the tow was resumed and course 165° T set.

With the resumption of the tow the weather eased and the movement of the sea and swell reduced during the passage between the Abrolhos Islands and the mainland. Water taken on board in various machinery deck compartments during the previous days of bad weather, possibly through leaks in the deck and through stores hatches, was pumped out. The eductor system was put on the pre-load tanks in rotation to ensure that they were empty as concern had been expressed over possible fractures of deck plating.

As was anticipated,the heavy SW swells common to the Western Australian coast during the winter months re-appeared as the vessel cleared the lee of the Abrolhos Islands. During the afternoon of Wednesday, 31 August, bad weather was predicted and by midnight NW gale force winds, rough seas and 5 to 6 metre Wly swells were being experienced. The vessels were rolling and pitching heavily as they proceeded on a southerly course to gain more sea room. With the weather on the starboard quarter, the rig and tugs ‘sailed’ down the track with little weight on the towing gear.

With gale force winds astern the ‘Key Biscayne’ slewed to the port side of the towing vessels’ track and was tending to weathercock into the wind. As a result the seas and swells were predominant to the starboard side of the rig.

At 0644 hours Thursday 1 September, the ‘Lady Sonia’s’ towline parted again at the tug end of the eye on the nylon stretcher. The vessels were in position 31° 06' S 114° 43' E, some 30 miles off the coast near Lancelin. ‘Atlas Van Diemen’ reduced power and attempted to hold the rig into the weather without putting undue strain on the towing gear. Both tug and tow were being driven in a easterly direction toward the shore with the rig pitching and rolling heavily. As a result of the movement of the bow plunging into the sea the chain jumped from the fairlead, sliced through railings and staunchions and came to rest under the port anchor fairlead. There was some indication to those on board that the vessel seemed to be pitching more by the stern than by the head and the stern continually being swept by the seas indicated that, the after-body may have been flooded.

With waves continuously washing over the main deck, it was becoming obvious that the rig was settling by the stern. At 0730 hours it was recorded that the rig reported taking water in the after pump room, apparently an over-flow from the mud pits which were being filled through the large return pipe-line from the shale-shaker which was being flooded continuously. Although the mud pumps were put on to the mud tanks, apparently this did not stop the flooding of the after section. Water was reported overflowing from the pump room into the sack room situated on the port side. Subsequently instructions were given to ensure that all watertight doors on the machinery deck were closed.

Because of concern for the crew in the worsening situation, it was decided to evacuate non-essential personnel. A PAN alert signal was sent at 0917 hours giving details of the situation. hours. This signal was upgraded to MAYDAY at 0928 hours. By this time a charter helicopter had arrived on scene, and was standing by. The pilot advised the rig that the helicopter deck was pitching too much for him to land. At 1050 hours two defence force helicopters were on the scene in answer to the MAYDAY signal and by 1110 hours the first personnel were being winched off the rig. When these air-craft departed each with four crew members, the charter helicopter landed on the helipad during a lull and lifted 10 crew off.

Non-essential personnel were evacuated by 1230 hours and only 10 persons were left on board the rig. Numerous attempts were made to reconnect ‘Lady Sonia’ during the day but were unsuccessful. When the helicopter operations allowed, line throwing rockets were fired in an endeavour to re-establish the tow; most failed but one was used to pass a messenger so that the rig crew could recover an inflated raft from ‘Lady Sonia’ which was proposed for crew transfer to the supply vessel. This method was not utilised and eventually all the crew were evacuated by helicopter.

During the afternoon the eastery drift of the rig toward the land was reduced and the danger of blowing ashore eased. However, conditions on board the rig did not improve. With night-fall coming it was decided to evacuate and attempt to return the next day. All line-throwing rockets had been used and there seemed no hope of reconnecting 'Lady Sonia'. At 1530 hours the rig's port anchor was let go to help hold the vessel and arrangements made to close down. At 1620 hours the charter helicopter picked up the remaining personnel and the rig was abandoned in position 31° 08' South, 115° 11' East.

'Argus Guard' which had maintained its position on stand-by reported at 1730 hours that the rig anchor wire had parted. At 1845 hours the stretcher on 'Atlas Van Diemen' carried away leaving the rig free in position 31° 10' S 115° 11.2' E. No more was seen of the vessel until the underwater video survey.

VESSEL DATA

'KEY BISCAYNE'

OFFICIAL NUMBER	:	4226
PORT OF REGISTRY	:	MONROVIA
MATERIAL	:	WELDED STEEL
SERVICE	:	SELF-ELEVATING MOBILE DRILLING UNIT
BARGE PLATFORM	:	LENGTH 203 FEET
(TRIANGULAR)		BREADTH 168 FEET
		DEPTH 22 FEET
CLASSED	:	A.B.S. A.1. SELF ELEVATING DRILLING UNIT
YEAR BUILT	:	1972
WHERE BUILT	:	MARATHON LE TOURNEAU OFFSHORE (PTE). SINGAPORE
OWNER	:	KEY INTERNATIONAL DRILLING CO LTD
OPERATOR	:	KEYDRIL AUSTRALIA INC.
CHARTERER	:	ESSO AUSTRALIA LTD

The 2695 gross tons non-propelled mobile drilling rig was fitted with three triangular truss legs, each of 357 feet, which were raised and lowered by electric elevating machinery. In the stowed position, the spud can on the bottom of each leg protruded 8 feet below the bottom of the hull. The rig was designed to drill in 250 feet maximum water depth to a maximum of 25,000 feet. For an ocean tow the drilling derrick sub-base and substructure were designed to be jacked forward from the drilling position, and secured and clamped in the towing position aft of the accommodation housing.

The rig had four 25 ton S.W.L. deck mounted cranes, a 60 feet diameter heliport on the starboard side and accommodation for 95 persons in a 4 level accommodation block. The platform was constructed with a double bottom extending between the forward and after legs which contained tanks used for potable water, drilling water and fuel. Above these the machinery deck was fitted with two longtitudinal bulkheads. In the centre, the machinery space was separated by a watertight bulkhead from the mud pit and pump rooms. The fore and aft ends of the machinery deck were enclosed by transverse bulkheads embracing part of the leg well sections. On the port side the bulk air room, bulk cement room and sack room were divided by watertight bulkheads and on the starboard side, the space was divided into workshop, bulk (barytes) room and warehouse.

Pre-load tanks at each corner of the rig were formed by the watertight bulkheads, leg housing and shell side plating. Disused propulsion cassions which protruded through each pre-load tank, were covered by hatches.

In the Manual of Operations approved by ABS on 15 December 1972, four watertight doors leading from the main deck were required to be closed at all times when the unit was in an afloat condition. Below, in the machinery deck, rhe four watertight doors in the longitudinal bulkheads were required to be securely closed and locked at all times when the unit was afloat. If access was required, the opening and closing was to be logged. Watertight doors in the transverse bulkheads were also required to be closed and locked.

The Manual of operating instructions also includes reference to maintaining the seaworthiness of the rig. These detail requirements for closure and watertight security of doors, hatches, manholes and other openings, securing the sub-base and sub-structure for field moves and ocean tows, and recommendations for action to be taken for storms while afloat. In addition the Manual provides stability criteria for the rig when afloat.

Specific reference is made to the need for field moves to be conducted in good weather and calm seas and that the angle of pitch and/or roll should not exceed 5 degrees. No such requirements are listed for an ocean tow. The limits of service for a field transit and an ocean tow are prescribed. It is noted that for an ocean tow the Manual lists the vertical centre of gravity as 43.65 feet and leg length 324.0 feet.

The 'Key Biscayne' was issued with an International Load Line Certificate on 14 March 1983 by the American Bureau of Shipping. Certificate No 7217989-2 was valid to 31 August 1987. It was fitted with two motor life-boats, one each side, capable of accommodating 58 and 44 persons respectively; 5 liferafts each capable of accommodating 20 persons; 14 lifebuoys, 225 lifejackets, 6 line throwing rockets together with other lifesaving equipment in accordance with SOLAS 1974. The rig was inspected by an A.B.S. Surveyor on 11 February 1983.

The Approval for temporary importation of 'Key Biscayne' for three years in Australian waters was given by the Minister for Transport under the Customs (Prohibited Imports) Regulations on 16 November 1981. 'Key Biscayne' was 'entered' at Broome on 10 September 1982 and was inspected by a Department of Transport Marine Surveyor on 21 September 1982. No apparent defects were noted at a further inspection of Life Saving and Fire Appliances on 22 November 1982 when were all found to be in good order and condition.

'ATLAS VAN DIEMEN'

OFFICIAL NUMBER	:	396354
PORT OF REGISTRY	:	SYDNEY
MATERIAL		WELDED STEEL
SERVICE	:	TUG, SUPPLY VESSEL
GROSS TONNAGE	:	1179
CLASSED	:	DET NORSKE VERITAS
LENGTH	:	60.9m
BREADTH	:	13.8m
DEPTH		6.9m
PROPULSION	:	TWIN SCREW MOTOR
HORSE POWER	:	7040 BHP
YEAR BUILT		1981
WHERE BUILT	:	NEWCASTLE N.S.W.
OWNER/OPERATOR	:	BULKSHIPS CONTAINER PTY LTD

'Atlas Van Diemen' has two clutched controllable pitch propellars in fixed nozzles together with a controllable pitch tunnel bowthruster developing 7 tonnes thrust. Bollard pull about 87 tonnes. The vessel has a capacity to lift approximately 800 tonnes of deck cargo in addition to bulk cement and fuel together with potable and drilling water.

Certificates held by the vessel include

- Load Line, issued by DET NORSKE VERITAS valid to 30.11.83

- Safety Construction, issued by the Department of Transport valid to 29.6.87

- Cargo Ship Safety Equipment, issued by the Department of Transport, valid to 11.7.84

'L A D Y SONIA'

OFFICIAL NUMBER	:	850171
PORT OF REGISTRY	:	SYDNEY
MATERIAL	:	WELDED STEEL
SERVICE	:	OFFSHORE TUG/SUPPLY SHIP
GROSS TONNAGE	:	1232
CLASSED	:	LLOYDS
LENGTH	:	53.lm
BREADTH	:	13.lm
DEPTH	:	5.5m
PROPULSION	:	FOUR DIESEL ENGINE, TWIN SCREW
HORSE POWER	:	7200 BHP
YEAR BUILT	:	1982
WHERE BUILT	:	NEWCASTLE N.S.W.
OWNER/OPERATOR	:	AUSTRALIAN OFFSHORE SERVICES

'Lady Sonia' has two engines fitted to each propellor shaft and is capable of running with either two or four engines. It has a bollard pull of 72 tonnes and is equipped with a bow thruster.

Certificates held by the vessel include :

- Load Line issued by Lloyds valid to 29.6.83

- Safety Construction issued by Lloyds valid to 29.6.83

- Cargo Ship Safety Equipment issued by the Department of Trnasport on 29.7.83 which was valid for 1 month pending delivery of a new certificate.

‘ARGUS GUARD’

OFFICIAL NUMBER	:	343629
PORT OF REGISTRY	:	FREMANTLE
MATERIAL	:	WELDED STEEL
SERVICE	:	OFFSHORE STANDBY/SUPPORT VESSEL
GROSS TONNAGE	:	326
CLASSED	:	LLOYDS
LENGTH	:	36.6 m
BREADTH	:	8.8 m
DEPTH	:	4 m
PROPULSION	:	TWIN SCREW MOTOR
HORSE POWER	:	980
YEAR BUILT	:	1969
WHERE BUILT	:	NEWCASTLE NSW
OWNER	:	TANVAN PTY LTD PERTH
OPERATOR	:	WESTERN OFFSHORE SERVICES PTY LTD
CHARTERER	:	ESSO AUSTRALIA LTD

The ‘Argus Guard’ is equipped primarily for standby duties in the offshore oil exploration industry. It has accommodation for 10 persons in addition to the crew, and has a clear underdeck space which could be used for temporary accommodation in cases of emergency. The vessel is also provided with water and food surplus to normal crew requirements.

Certificates held by the ‘Argus Guard' include

Load Line Certificate issued by Lloyds valid to 27.10.83

Certificate of Equipment issued by the Department of Transport valid to 26.5.84

SAFETY OF NON SELF-PROPELLED SELF ELEVATING PLATFORMS

A report of the US. Committee on Assessment of Safety of Outer Continental Shelf Activities, "Safety and Offshore Oil", published in 1981 highlights the growth of Jack-up units in the world Mobile Offshore Drilling Unit Fleet and their safety record. In 1979 there were 229 Jack-up rigs in a world population of 450 MODU units, over 50%. In the period 1955 to 1980 there were 86 accidents involving MODU's including 42 losses. Of these 60, or 70%, involved Jack-up units, nearly half of which resulted in total loss. The report noted that major risks for Jack-up rigs occur in transit and moving on or off location. Storms were a major influence in the transit accidents.

The high incidence of damage to or loss of jack-ups was referenced in a U.S. Coast Guard Marine Board of Investigation Report on the capsizing and sinking of the 'Ocean Express' drilling unit in the Gulf of Mexico on 15 April 1976. The report noted that self elevating units are "vulnerable contrivances due to :

(a) minimal freeboard

(b) potentially destructive legs should the legs fracture in a seaway

(c) potentially destructive weights in the form of drilling equipment and supplies on deck".

The report highlighted the importance of maintaining the integrity of the towing system to avoid the possibility of the loss of directional control of the drilling unit with attendant dire consequences, and need to "assure directional control of self-elevating units will be maintained by towing vessels in adverse weather".

Safety Construction and seaworthiness provisions for the use of mobile platforms in Australian waters are included in Directions as to Marine Operations under the Petroleum (Submerged Lands) Act. These require inter-alia that

> "A person shall not, in a part of the adjacent area, use a mobile platform for or in connection with operations for the exploration for or the recovery of petroleum unless -
>
> (a) it has been classified by a classifying authority in accordance with the rules of that authority for classifying mobile platforms of that class and the classification has not been cancelled ;
>
> (b) it is used and maintained in accordance with those rules as in force at the time at which it was classified; and
>
> (c) the Designated Authority has given his consent in writing to the use of the mobile platform in that part of the adjacent area".

CONCLUSIONS

The parting of the tow and subsequent drifting of the oil rig ‘Key Biscayne’ off the coast of Western Australia was due to the gale force weather experienced south of Jurien Bay during 31 August and 1 September 1983. Following assessment of information provided at the preliminary investigation it is concluded that -

> The nylon stretcher in the tow line to one of the two towing vessels,‘Lady Sonia’ parted at 0644 hours, Thursday 1 September. The vessels were proceeding on a southerly course with the wind NW force 8, rough seas and 5 to 6 metre swells.
>
> As a result of this break in the tow line there was a loss of directional control over the rig. Although the tow line to the second towing vessel, ‘Atlas Van Diemen’, was retained during the succeeding twelve hours,there was not sufficient motive force provided to prevent the rig drifting toward the shore, nor to control its heading or movement.
>
> During this period the weather eased but the rig continued to wallow uncomfortably in the seaway, pitching and rolling heavily. Freeboard was reduced due to the entry of sea water in the after
>
> section of the rig via the shale-shaker return line to the mud pits and pump room, and, possibly, through other openings in the hull. As the rig settled by the stern the main deck became continuously awash.
>
> Due to these factors the range of stability was reduced and there was insufficient positive stability available to prevent the rig capsizing in the conditions which prevailed.

The voyage was programmed by the operator, Esso Australia Limited, for ‘Key Biscayne’, on completion of the Torres No 1 well, to be towed to Fremantle for stacking in Cockburn Sound pending its next drilling project. During the period of lay-up, repairs and maintenance were to be carried out on the vessel.

Arrangements were made for this non self-propelled jack-up rig to be towed by two supply vessels,‘Lady Sonia’ and ‘Atlas Van Diemen’, using towing equipment recommended by consultant Marine Surveyors, Noble, Denton, Woodcock and Associates. The tow was accompanied by the stand-by vessel ‘Argus Guard’. In addition, regular contact was made with shore bases by helicopter and continuous radio communications were maintained with both regional and Perth supply headquarters during the voyage.

Prior to jack-down, the rig was prepared for the afloat condition in accordance with the Keydril Operations Manual. The leg height was not reduced as recommended for an ocean tow, although in all other respects, the rig was prepared for an ocean voyage. Towing arrangements were inspected by the Marine Surveyor.

In accordance with requirements under the Petroleum (Submerged Lands) Act, approval to abandon Torres No 1 well was sought and obtained by Esso Australia Limited from the designated authority. Appropriate approval was also sought and obtained to move ‘Key Biscayne’ into Western Australian waters. Advice of the intended move was given to the Department of Transport. No approval was sought or obtained from the Liberian authority for the making of the voyage.

Under existing marine legislation, there is no requirement to seek and obtain specific approval for jack-down and/or towage operations of these units.

The rig's lifesaving and safety equipment was in compliance with requirements under the Navigation Act and maintained in good order and condition.

There were 52 persons carried on 'Key Biscayne' during the voyage, of whom 47 were Keydril personnel. They comprised the drilling crew together with mechanics, electricians, crane operators, welders, storemen, motormen, radio operators, cooks, cleaners, labourers etc required for the normal operation of the drilling rig.

No reasons were advanced as to why a full crew was carried other than the need to maintain normal operating procedures while the vessel was in transit.

The Drilling Superintendent was in charge of the rig. His responsibilities include the safety of all personnel onboard and its operation. Normally the superintendent operated from a shore station but travelled with the rig when it was moved between drilling locations. The Toolpusher was in charge of the rig drilling operations and overall officer in charge in the absence of the Drilling Superintendent.

Each of the Masters of the towing vessels was responsible for his vessel and for maintaining the integrity of the tow. It was agreed between the two concerned that the Master of 'Atlas Van Diemen' should be Tow Master for the voyage and communication between the rig and towing vessels was directed through him.

During the voyage the tow lines to each vessel parted on three occasions. Five of the partings were at the tug end soft eye of the nylon stretcher. All occurred when the vessels were moving in moderate to heavy swells.

Although the towing speed in the early part of the voyage may have been excessive and contributed to the breakage of the tow lines on the first occasion, tow speed was not a prime cause of the tow parting on 1 September 1983.

Working on the bow of the rig in rough weather was extremely hazardous due to the low Freeboard and bow shape/structure. Limited room to work together with remote winches made recovery and reconnection of broken tow lines difficult to achieve in these conditions.

There was no 'insurance' towing equipment readily available on 'Key Biscayne' and because of the relatively short forerunner pennants on the rig, recovery operations by the towing vessels were hazardous.

Apart from the Marine Surveyor, there was limited marine expertise onboard the rig. This was emphasised by towing vessel personnel who claimed difficulties in communicating their concerns and proposals to those on 'Key Biscayne' and in the abortive attempts to use line throwing rockets for reconnection of the broken tow lines.

It is doubtful that instructions regarding closure of watertight doors in the rig whilst on passage where adhered to until water was seen in the mud pit and pump rooms on the 'final day. No assessment could bc made of the extent to which the after compartments had flooded because main deck hatches and soundingpipes were awash.

Operational instructions for the rig while afloat in the Key International Drilling Company Ltd., Booklet of Operating Conditions do not appear to have been met.

The rig was subject to leg stresses from rolling and pitching far in excess of that cautioned in the operations manual. These may have resulted in hull fractures with subsequent loss of watertight integrity.

In view of the limited reserve of positive stability of jack-up rigs when rolling and/or pitching in a seaway, and the lack of suitable havens of refuge on the Western Australian coast south of Shark Bay, it would seem that, in programming the voyage to Fremantle in the August/September period, insufficient account was taken of the weather likely to be experienced.

Finally it is concluded that the fact that no lives were lost in the incident was due to opportune decisions made by those in charge to evacuate the crew from the rig. The success of this operation which was affected with-out accident or injury is due to the considerable skill and courage of the helicopter pilots involved in flying close to and landing on the moving platform.

The series of events which culminated in the loss of ‘Key Biscayne’ on 1 September 1983 highlights the vulnerability of jack-up rigs in transit during gale force weather.

Preliminary investigation into the loss referenced aspects of the accident concerned with the construction of jack-up rigs, their watertight integrity, both externally and internally, ballasting arrangement, provision for sounding tanks and compartments, the limited range of positive stability, particularly when the legs are jacked to their full extent, and the stresses which are imparted to the hull when these vessels are in a seaway.

In this regard it is noted that international standards for the construction and equipment of mobile offshore drilling units have been drawn up in the 1980 IMO MODU Code.

Other aspects of the accident are concerned with towing arrangements and marine manning of these non self-propelled units, particularly for an ocean tow, for which recommendations have been made.