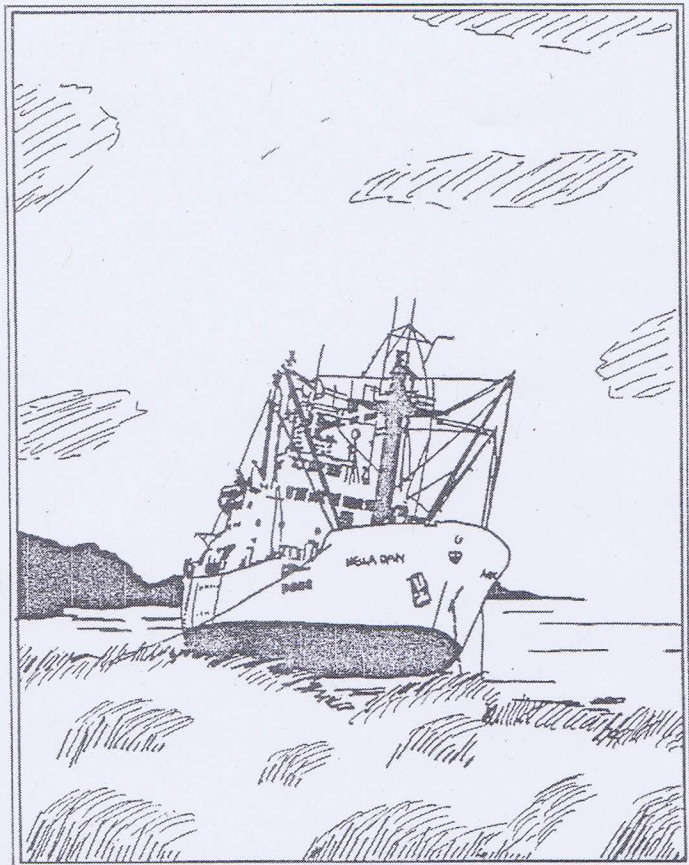


## Removal of oil pollutants and subsequent sinking, MV Nella Dan



Macquarie Island  
10-27 December 1987



Report of Assignment to Macquarie Island to attend stranding of MV NELLA DAN.  
Condensed and Verbatim as per official report.

Executive Summary.  
AOPO3PO671

Late on the evening of Thursday, 3 December 1987, a message was received in the federal Sea Safety and Surveillance Centre that the MV NELLA DAN, a vessel on charter to the Australian National Antarctic Research Expedition (ANARE) had grounded at Macquarie island. The vessel was in the process of landing supplies to the ANARE research station on the island. Concern was expressed by both the Federal and Tasmanian environmental authorities at the consequence of the grounding. Macquarie Island is Tasmanian Territory and the NELLA DAN was reported to have on board substantial quantities of fuel and lubricants

The Department of Transport and Communications was requested by the respective Federal and State authorities to implement measures to ensure the removal of pollutants and minimise the effects of any resultant pollution.

The following report, compiled by Donald Broadie who holds the position of Technical Advisor, Marine Pollution in the Department of Transport and Communications, and who joined the team of specialists who visited Macquarie Island, details the measures taken to remove oil, pollutants. On behalf of the Minister of State for the Environment and the Arts. Broadie also subsequently supervised preparations for and witnessed the sinking of the NELLA DAN.

#### Introduction

The MV. NELLA DAN, a vessel on charter to the Australian Antarctic Research Expedition grounded in Buckles Bay, Macquarie Island, at approximately 1845 AEST 3 December 1987. NELLA DAN was constructed in 1961, strengthened to Lloyds Ice Class 1 and was of 2187 tonnes gross. While lying at the anchorage, 0.5 miles from shore discharging stores and fuel oil, a strong blow from the south east caused her to drag anchor and become stranded on rocks in the location shown on the plan, attachment 1.

Information obtained through ANARE net work indicated that the vessel had on board between 400 and 500 tonnes of marine diesel fuel oil and a quantity of lubricants, at first estimated at 90 tonnes but subsequently understood to be in the region of 15 – 20 tonnes.

Macquarie Island is Tasmanian Territory and is regarded as having a highly sensitive and fragile environment. It is a declared national park and wild life sanctuary and both Federal and State government authorities considered that removal of pollutants from the casualty be given top priority.

#### Response.

Subsequent to receipt of the first message indicating stranding, activities centred on the extent of the threat and means by which the pollution risk could be mitigated. The department and Communications was requested by Federal and Tasmanian Environmental authorities to examine the ways and means of removing the oils onboard NELLA DAN and, if feasible, to assist with removal task. From the the Danish Owners J. Lauritzen, operating from Copenhagen, became aware of government concerns regarding the pollution threat and arranged for representatives to fly immediately to Australia.

They were.: Captain Vilh. Pedersen of Baltica, Hull underwriters

: Mr Bendt. Neilsen. Engineer Superintendent J. Lauritzen

Subsequently: Mr Mike Lennon of London Offshore Consultants, representing the West of England P & I Club arrived in Melbourne, Monday 7 December.

Options initially considered by the Department for oil removal were as follows :

- a) through the use of a team provided by a potential salvor
- b) use of and RAN vessel
- c) air drop of portable oil storage tanks.



Option (a) was adopted and as proved later, option (b) and (c) would have proven impracticable and impossible without salvage expertise.

After considerable deliberation the owners, and subsequently the P & I Club, entered into an arrangement with Austpac Salvage Ltd, a consortium of Howard Smith Ltd and Inchcape Pacific. This was not a salvage contract but was an arrangement based on an offer of service to supply personnel and equipment to remove oil and equipment from the casualty. Initially, and from Copenhagen the owners attempted to arrange a contract remotely with Melbourne based resources and applied to the Department to import a foreign flag offshore vessel for this purpose. It is understood that this request was refused. These early negotiations took approximately three days and incurred valuable time in the early part of the response.

On Saturday 5/12 I received direction from first assistant secretary, Maritime Safety Division (FAS MSD), to accompany the south bound team and take with me a range of the most appropriate pollution response equipment. As a result of a telephone call from Mr Kjens Kirsten of J. Lauritzen in Copenhagen, arrangements were made to ship 600 metres of heavy duty oil spill boom and suitable skimmer.

As departure from Barry Beach Marine Terminal (BBMT) Port Welshpool, Victoria, was initially planned for early Monday morning, 7/12, I flew to Melbourne Sunday pm and that evening made contact with the Austpac/Danish team then assembled in a Melbourne Hotel. By this time a contract had been entered into between Austpac and Australian Offshore Services Ltd.(AOS), owners of a number of offshore supply vessels considered suitable for oil removal and possibly refloating task. It could not be stated at any time that the aim of the team was to salvage NELLA DAN but to remove pollutants, refloat the vessel and assess the degree of damage. From the subsequent discussion and events it was evident that the owners wished to repair NELLA DAN if it was at all possible despite the vessel's age and apparent extensive damage.

Being aware of the concerns of the Tasmanian and Commonwealth environmental authorities, department personnel advised Captain Ken Ross, General manager Salvage, of Austpac, that preparatory work towards obtaining a permit to cater for the possible dumping of the vessel would be well advised, despite the attitude of the owners in this regard. Accordingly, a draft dumping permit was made available to the author prior to departure from Barry Beach.

A number of conferences and discussions were held in the Melbourne Office of AOS, 7/10 December during which details of the casualty and conditions in Macquarie Island became clear. Captain Pedersen (Baltica) was subsequently to prove to be a most useful member of the team through his knowledge as former Master with Lauritzen and personal experience with the Buckles Bay anchorage.

By Wednesday 10/12 all persons had assembled at BBMT and equipment was loaded aboard the chartered offshore rig tender LADY LORRAINE under the command of Captain Roger Rusling. After obtaining local knowledge of the area from ANARE and the Baltica representative, it was later decided with P&I owners and Tasmanian Govt agreement, to leave behind the three reels (600 metre) of oil spill boom as it was considered that due to the close proximity of the stranding to the shore, use of this equipment would be ineffective. Overnight, deck cargo was welded and lashed securely for the southbound voyage and departure was made at 0345, 11.12.

The voyage south took four days and was made in generally fine conditions with weather aft beam and an average speed of 12.2 knots was achieved. Whilst at sea, members of the team were employed in running equipment and ensuring that all was in readiness for arrival.

LADY LORRAINE arrived Buckles Bay anchorage at 1700 Sunday 13/12/ An amphibious army LARC immediately transferred the Austpac, DOTC etc, team of eleven persons to the NELLA DAN. On board were the Master, Captain A. Sorensen, Chief Officer, first officer, Bosun, Chief Engineer and Cook. In



discussion we brought ourselves up to date on the situation and soon determined which areas of the vessel were flooded and where bunkers were known to be located. A first task was to provide cooling water for the generators to provide power for services. NELLA DAN was firmly aground beam on the shore and heeled at an angle of 11° to port. The team arranged themselves in cabins, mostly on the port side and were reasonably comfortable although initially no heating existed. Fresh water was hand carried from aft peak and sanitary water was available only from a hose fee bucket.

On Monday 14/12 an initial diving survey was carried out. This showed the vessel to be aground from just forward of the skeg to frame 75. An extensive crack was visible in the shell plating in a way of No 3 stb'd tank. The skeg did not appear to be damaged nor did the rudder. From the flooding in many double bottoms, deep tanks, engine room and No3 hold, it was evident that considerable bottom damage had occurred and it appeared that a number of bulkheads between tanks had suffered damage making tanks common.

Using a LARC, soundings were carried out of the area between the stranding and the anchorage to provide information for (a) closest point at which the LADY LORRAINE could approach for transfer of fuel and (b) to determine the area for laying ground tackle. For eventual refloating attempt. Soundings were carried out using a sounding bar slung below the LARC and positions plotted using NELLA DAN radar. Soundings obtained are shown in attachment 2.

On Tuesday 15/12 LADY LORRAINE moored astern the casualty at a distance of 0.2nm using a heavy stern anchor. On board NELLA DAN pumping of fuel commenced from No2 port deep tank to the special cargo tank forward. By 2150 hrs of that day some 80 cubic metres of fuel had been transferred forward.. On the 16/12 the 2inch shore hose had been run between the casualty and LADY LORRAINE and the hose adapted to take Kamlok couplings compatible with the fittings on both vessels. By midday of that day the hose was tested and at 1130 hrs transfer of fuel commenced using air driven Wilden pumps and the DOTC Spate pump. A number of teething problems arose through pump vibration and leaking hose connections. However by 2200 hrs that night 84.3 cu metres had been transferred to the LADY LORRAINE.

During Thursday 17/12, pumping of fuel from various tanks to the special cargo tank continued and thence to the LADY LORRAINE. This technique ensured that the main transfer pump had a continuous delivery, The DOTC Marflex pump was installed in the flooded No3 hold and on Friday that compartment was pumped out. A hat box was cemented over a tank top fracture on the Stbd side Double bottom and a small submersible pump was placed in No3 hold to deal with water intake. Operations continued throughout 18/12 with the bulk of the fuel being transferred and stripping of all tanks into the special cargo hold began. Tanks from which fuel was pumped were No 1,2 and 3 double bottom, No's 2,3 and 5 deep tanks. No 4 port deep was accessed but no oil found. No 4 port double bottom was not accessed, By 1705 hrs Saturday 19/12, 358.22 cu metres of fuel had been transferred to LADY LORRAINE. After a final inspection of all compartments this was the final figure received.

A picture may be given at this point of conditions aboard NELL DAN. She was a relatively small vessel and whilst well maintained and in good condition, not an easy vessel on which to conduct this type of operation.

Many of the tanks to be pumped were small and difficult to access. Suction hoses had to be introduced through air pipes at main deck level. Air pipes frequently had right angle bends in them so that it was impossible to use a rigid suction spear. Only by trial and error could one be sure that the flexible hose was in oil/water interface or at the deepest part of the tank.

Aside from the substantial list which made movement difficult, alleyways were small, deck space was limited and cluttered with ANARE containers and salvage equipment. All equipment had to be securely



lashed down with wires and chains, because of the list thus further impeding movement. Alleyways soon became cluttered with hoses and air lines and decks became very slippery with oil from hose leaks, equipment refuelling spills and rain. Sorbent materials were used to reduce the surface hazard, however the constant rain and force 5 -8 winds reduced the effectiveness of these. Daylight was available seventeen hours each day. During the first week of operations the team generally turned to at 0600 and ceased work at 2200 or later according to the task in hand. It was regular practice to turn out again several times during the night to run a pump for such time as was required to reduce water levels in a breached compartment.

On Saturday 19/12, LADY LORRAINE laid the ground tackle using a seven tonne rock anchor, this was secured to the casualty with a 44mm wire through the centreline Panama fairlead and turned onto the Stbd bitts on NELLA DAN's focs'l'e. During the same day blanks flanges were cut and fitted with air connections to air vent of tanks. Air was gradually applied to these compartments and the extent of inter tank leakage was confined when air was found to be blowing out of shell plating or adjacent tank vents.

On Sunday 20/12. LADY LORRAINE passed her to wire to the casualty whose starboard anchor cable had been disconnected. A number of turns of cable were secured onto the port forward bitts. As the casualty's windlass had insufficient power to handle heavy gear, a messenger was passed through the for'd lead taken down the port side focs'l'e and returned to the LADY LORRAINE. Attached to the messenger was a polypropylene line followed by a 60 mm wire which was shackled to the stb'd cable.

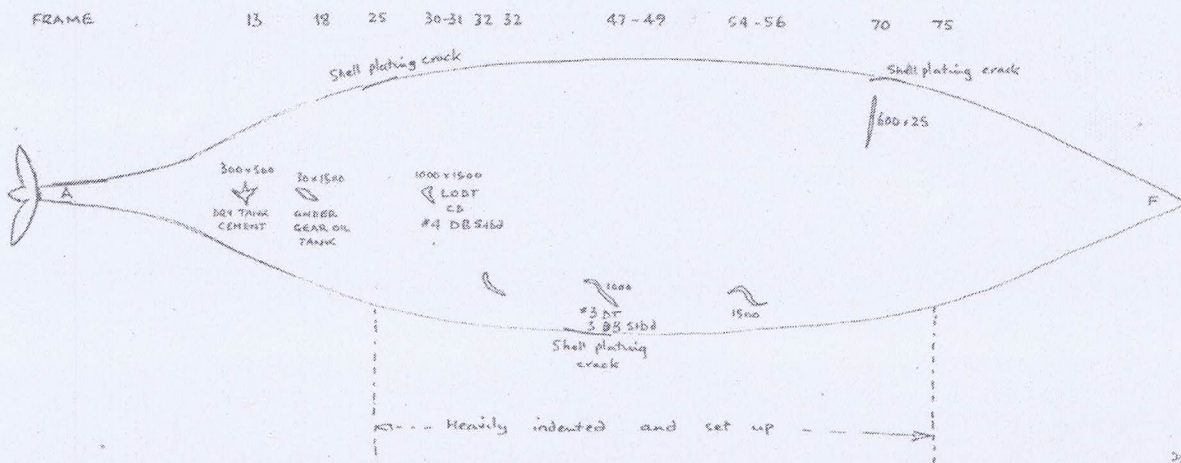
Between 1900 and 2200 hrs of 20/12, the Marflex pump was used to dewater the engine room. LADY LORRAINE took the weight and at 0025hrs 21/12 the casualty turned through a heading of 98° to 142° T as shown in attachment 2. While the forepart of the vessel was afloat, she remained aground from approximately frame 25 to aft. This manoeuvre was intentional to obtain a feel for the vessel's condition. From this point on the Marflex pump was used continuously to keep the water level down in the engine room. Water was gaining access through the shaft tunnel water tightdoor as well as through leaking double bottom tanks. It was determined that the engine oil tank located below the main engine was surrounded by a cofferdam was breached and appeared to be empty of lubricating oil.

No1 deep tank and double bottom were ballasted during the day to alter trim for high water refloating attempt during the night of 21/12. Predicted height of tide at 0115 22/12 was 1.73 metres above datum and the highest tide of the current spring range. It was calculated that the casualty would refloat on a mean draft of 5.47 metres trimmed 0.67 by the stern and have a GM of 0.47m.

At 2230 21/12 LADY LORRAINE applied power, increasing to 30% at 2300, and 45% at 2320. NELLA DAN refloated at 2347, tow wire was slipped and she lay to the ground tackle at the normal anchorage. Weather conditions at the time were wind, west force 6, temperature 5°C and glass 1014mb rising gradually.

On the morning of 22/12 and in the company of Mr Bob Hamilton, Tasmanian National Parks and Wildlife Officer and Mr Mike Lennon, I made a thorough inspection of offshore and foreshore areas in and adjacent to Garden Cove. All agreed that no oil pollution of consequence was apparent. At 0800 22/12 an underwater survey of the hull was carried out, this being simultaneously recorded on video tape for subsequent evaluation. This survey revealed extensive underwater damage the extent of which is shown approximately in attachment 3. (See below)





Details of the survey and the P+I Club engineer surveyors report on the extent of work estimated to be necessary for the casualty to be restored to a towage condition were sent to J. Lauritzen, Austpac and the West of England P+I Club during the afternoon of that day.

With the refloating, the ingress of water, which had previously been tidal to some extent, increased. Removal of the seal between pressed hull areas and the ground allowed faster flooding of the engine room and shaft tunnel and the Marflex pump was used extensively in an attempt to keep the water to the lower landing level in the engine room.

LADY LORRAINE came alongside the casualty's port side and commenced taking lube oils from the group of No 6 stbd tanks accessed through the engine room. At 2000 hrs together with the salvage master I made a check of all daily service and settling tanks in the engine room to ensure that no fuel or lubricants remained and at 2100 hrs the vessel was declared free, as far as was practical, of oil pollutants. A total of 12.4 cu metres of lubricating oils of various grades were received aboard the LADY LORRAINE. This vessel then stood off to seaward. Having dragged anchor on three occasions during night watch, Cpt Rusling was understandably happier to remain under way overnight.

The morning of Wednesday 23/12 saw the casualty lying at anchor with a 3° list to stbd, pumps being operated to keep water engine to an acceptable level and the salvage team awaiting response from the Copenhagen based owners as to the fate of the vessel. The P+I representative was in no doubt as to the extent of the work necessary to put the vessel into a towable condition, this was estimated to take a minimum of two weeks of acceptable weather. All representatives on the scene were concerned that the vessel could founder in anchorage in Buckles Bay. It was realised that visible damage to the hull was extensive enough; the extent of inter tank bulk head damage, although not specifically known in detail, was gauged to be very serious. It was at this stage that I registered my concern with FAS MSD that efforts onboard to keep the vessel afloat may fail and that moves to initiate a wreck removal order might be advisable. As it turned out, by midday 23/12, the owners advised their decision to scuttle NELLA DAN. The master put in train measures to remove items of value from the vessel and at the request of the acting station leader Macquarie Island, to land as much ANARE equipment as possible.

Similarly the salvage master arranged for the salvage equipment to be transferred back to the LADY LORRAINE alongside as soon as possible. A scuttling plan was drawn up for 24/12 and I agreed to that., to minimise the rate of flooding until the vessel was considered ready for dumping, the DOTC Marflex pump set to be the last item to be removed.



A team from the station boarded and commenced removing fittings and handing them down to the amphibious vehicles until at 1600 hrs the vessels stbd list started to increase and it was decided that the LADY LORRAINE depart from alongside and pass a tow line to the casualty. This list soon became 13° and orders were given for non essential personnel to disembark to the LARC's and LADY LORRAINE. All personnel remaining on board donned life jackets or survival suits. The salvage team released the ground tackle and prepared for towing whilst the crew assisted with evacuation preparations. By 1645 hrs the vessel was under tow and at 1720 the vessel was evacuated and being towed seawards. The last LARC to leave the vessel had on board two EPIRBS, the builders plate and the ships bell: the author personally saw these items secured aboard LADY LORRAINE.

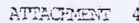
At the time of evacuation the vessel's emergency generator was still providing power to basic services but the Marflex power plant on the fore deck had ceased operating having run out of fuel. Both compressors at No2 Hatch had also stopped although a number of tanks remained under pressure. Air could be seen escaping from cracks in the shell plating at No2 and 4 Port tanks as the vessel heeled under tow.

The casualty was towed to approximately four miles offshore. The list appeared to settle at about 15° To starboard but it was decided not to make an attempt to re-board in view of the lateness of the day. A number of small items were still required from the vessel and it was decided to board in the less of the land early next morning should she still be afloat. While a possibility existed that the DOTC pump heads could be taken off, I advised against attempting to remove the pump containers and other bulky items in view of the vessel's sluggish movement in conditions brought about by a NE'ly swell. Handling heavy gear under union purchase from a vessel with a substantial list, into LARC's, would place personnel in a situation of unnecessary danger.

Over night the vessel was towed slowly in an area between 4 and 6 miles off the east coast of Macquarie Island, refer attachment 4. At 0530 24/12, the condition of the casualty appeared much the same but with some settling by the stern due to the extensive flooding of the engine room spaces and No 3 hold from the shaft tunnel

At 0800 smoke was observed from the vents around and aft end of the accommodation and the funnel and at 0810 the radar scanner stopped rotating indicating that power had ceased. Whilst assessing the situation on the LADY LORRAINE'S bridge, the 0800 ABC news broadcast was heard to state that the NELLA DAN had been taken to sea and scuttled on the afternoon of 23/12, another of the premature reports, then at 0905 MSD was given a resume of the situation via Sydney radio. Advice was not to risk personnel with removal of gear was noted. Plans to place personnel aboard the casualty were abandoned and the vessel was towed 10 miles to seaward of Tom Uglies Point.







Attempts were made to hasten flooding of the casualty through the use of the fire monitor aboard LADY LORRAINE. This was not a very successful operation as the access targets were small, both vessels were rolling and the manually directed monitor was difficult to train onto a small target.

It is not possible to state with any certainty the cause or origine of the fire. The action of the fire braking out was unexpected to all members of the team and ships crew. Due to the haste of evacuation it would appear that all services in use including those in the galley were left on. To speculate further to the cause is considered to be outside of the terms of this report.

The fire appeared to have completely burnt out accommodation and bridge spaces by 1400 hrs and smoke was still issuing from openings after that time. The heat from the funnel and engine casing appeared sufficient to set fire to the grp coamings of both lifeboats in their falls. The port lifeboat falls apparently burnt through and caused the boat to fall into the water while ablaze. This boat soon sank. The starboard lifeboat forward falls also parted leaving the boat dangling to the waterline by its after falls. On sinking, that boat went down with the ship and did not reappear.

At 1648 the salvage master and two divers boarded the casualty by means of a Zodiac dinghy at No1 hatch well and rigged a hose into No1 hold through which water was pumped from the LADY LORRAINE. On opening hatch covers and air escapes substantial pressures of smoke and air were released and shortly afterwards the vessel began to settle at the stern. 1742, NELLA DAN sank in position Lat 54°37.5'S Long 159° 13.3' east Tom Uglies Point bearing 289°-10 miles. No bottom was recorded on the echo sounder at this position.

#### Pollution Response.

According to reports from the crew and a check of fuel figures, the casualty lost a substantial quantity of oil fuel on grounding. Subsequently, and before the salvage team it is understood that a further quantity was pumped ashore into the station storage tanks. Oil continued to seep from the hull during removal operations and when the vessel was partially refloated and her head turned on 20/12, further quantities of both fuel and lubricants appeared at the vessels port side. There was unfortunately no way in which this release could be avoided as access to the engine oil tank, from which I estimated the lubricating oil to be coming, was not possible in view of the engine room condition. Once fully afloat, release of oil from the vessel ceased, confirming the effectiveness of pumping operations. Fortunately the wind at all times was from the SW to NW and any released oil was being blown seawards and dispersed rapidly.

It was evident that the decision to leave the heavy duty oil spill boom behind was the correct one. No circumstance arose requiring its use and carriage of the equipment to Macquarie island would only have placed expensive items at risk of weather damage.

It appeared that reports of extensive oil pollution were being received on the mainland from time to time. Fortunately the presence on the island of an officer of the Tasmanian Parks and Wildlife lent environmental authority to my observations and statements regarding the extent of pollution. A list of DOTC pollution response equipment is shown at attachment 5 as are comments on its effectiveness and a number of recommendations proposing improved performance.

#### Requirements of Environmental Protection (Sea Dumping) Act 1981

The vessel was sunk approximately 2.5 miles to seaward of the position nominated in the special permit, Attachment 6. This was due to our concern that a vessel abandoned and on fire should be taken as far from the shore as feasible possible in the event that the tow should part. Contaminants and harmful substances were removed insofar as was practicable. Once the decision was made to dump the vessel, the fullest cooperation of the owners, salvors and P&I club representatives and the master of the LADY LORRAINE was received in observing all conditions of the permit.



## OBSERVATIONS.

1. This incident thigh lighted the difficulty in appreciating the problems involved with removal of oil from a cargo vessel of this size. In the case of a bulk carrier, either oil or ore, location of fuel or cargo is generally well known, access to tanks is relatively simple and tanks are large enough to introduce pumps of reasonable size. NELLA DAN was a small (2187 gross tonnes) vessel with fuel in deep tanks, double bottoms, service and settling tanks. As her engine spaces were completely flooded, access to tanks was possible only through air pipes, the vents of which had to be removed to allow suction hoses to be introduced. Whilst the assistance of a naval vessel was initially considered amongst the options available, it is not thought that this would have been a practical or successful operation due primarily to the lack of salvage expertise and limited knowledge of merchant ships held aboard RAN vessels. It is considered that for such a task to be seen to a satisfactory conclusion, the services of a team experienced in merchant ship structures and operations is essential
2. Some criticism was voiced as to the delay in arriving on the scene, in a remote area where no landing strips exist, it is essential that the team departs equipped with the fullest knowledge of the casualty, its circumstances, and adequate equipment to deal with all possible options. Preparations for such an exercise takes time, requires adequate consultation before hand and acquisition of appropriate equipment. In using LADY LORRAINE it was necessary to start with basics, the vessel was not equipped with lifting gear of her own and even a crane had to be hired for the voyage to transfer plant to the casualty.
3. Had a contract to salvage the vessel been entered into this operation, from the salvors point of view, would have taken precedence over oil removal. Attendance by a representative of concerned government departments is essential, as is appropriate legislation to give backing to his requirements.
4. Consultation and liaison between Captain Ross in Sydney, the Salvage team, owners and insurers representative on board and the master and officers with the DOTC personnel was excellent. Advice of the writer was frequently sought regarding such matters as the oil transfer operation, probable attitude of authorities regarding removal of the wreck, conditions of the dumping permit and their interpretation and location of dump site. Similarly advice of actions proposed were always discussed before implementation.
5. Communications between NELLA DAN, LADY LORRAINE. LARCs and Macquarie Island Radio were by means of VHF Channel 6, 156.3 Mhz. and were reliable using a number of hand held sets using rechargeable batteries.
6. The P&I representative requested to be kept informed at all times of hire rates, standby and operational, and other charges which would appear on the final account. Fortunately it is DOTC policy to maintain a constant review of these charges and provide an explanation as to their detail as required. Clarification needs to be sought from DOTC finance branch as to the charging policy.

### ATTACHMENT 5

DOTC Pollution response equipment activated for NELLA DAN stranding.

- Vikoma Oceanic boom 600 metres on three reels.
- Terling GT oil recovery unit.



Above items moved to Barry Beach from Westernport but not taken on voyage..

-Three days, 6/12, 9/12 standby rates to apply.

One set Marflex pumps plus one additional MSP 200 Pump used aboard NELLA DAN.

Standby rate to apply 6/12 to 14/12 thence full levy payers hire rate to apply until loss on 24/12. This unit was the only high capacity pump taken to the stranding. It was used continuously for dewatering flooded spaces and performed to expectation. Salvage team was impressed by its reliability and high performance.

One OMI 200 oil mop skimmer.

This unit was taken to Macquarie Island in the event that oil was present on the water in sufficient quantities to warrant surface skimming. The equipment was not used and stand by rate should apply from 6/12 to 31/12.

Two Spate 4" induction pumps

These units were landed aboard NELLA DAN, only one was used. The second unit would not start for mechanical reasons, which were not determined. Both pumps were purchased in 1975 as booster pumps for the original cargo transfer pumps and were fully depreciated. Both pumps were lost with NELLA DAN on 24/12. Consideration should be given as to whether replacement is needed and if this is to go ahead, general purpose self priming pumps with foot valve should be acquired. Standby hire rate is recommended for one pump only from 6/12 to 14/12 thence a levy payer full rate to apply from 15/12 to loss on 24/12.

Operative Spate pump performed satisfactorily but is considered unsuitable for this type of work as vibration was excessive and frequently blew hose couplings.

Four drums of BP A-B oil dispersant were taken and approximately twenty litres were used for removal of oil from engine room landings. All drums were sealed and lost at time of sinking.

A quantity of oil sorbent material's of the synthetic polypropylene type were landed aboard NELLA DAN,. Some were used and all except the sorbent booms were lost. Sorbent booms were returned to Melbourne

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