

Project Procedure

Emergency Evacuation Plan V90

OFFSHORE WINDPARK EGMOND AAN ZEE (OWEZ)

Client:
NoordZee Wind
Parent: Nuon and Shell

Responsible for	Function	Name	Date	Signature
Content	Project HSSE Manager	Mr. Craig Hutchinson	18 Jan 2006	
Checked	Project Quality Manager	Mr. Kjell Hansen	18 Jan 2006	
Approval	BCE Project Director	Mr. Esben Schmidt Mr. Dolf Elsevier van Griethuysen	18 Jan 2006	
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DISTRIBUTION LIST			
#	FUNCTION TITLE	Co	NAME (Optional)
1.	Project Director	BCE	Dolf Elsevier van Griethuysen
2.	Project Director	BCE	Esben Schmidt
3.	Project Engineer	BCE	M. van der Veen
4.	Project HSSE Manager	BCE	Craig Hutchinson
5.	Client Project Manager	NZW	M. Haag
6.	Client Project Engineer	NZW	Guido de Groot
7.	Client HSSE Advisor (Shell)	NZW	Mike Mitchell
8.	Client HSSE Advisor (Nuon)	NZW	Jan Pero
9.	Client HSSE Manager(PMSS)	NZW	Alan Chivers
10.	Client Environmental Advisor (PMSS)	NZW	Rob Waddington
11.	Client HSSE Advisor (Shell)	NZW	Jos van der Ven
12.	Client HSSE Advisor (Nuon)	NZW	Joop de Bakker
13.	Project Manager WTG (Vestas)	BCE	Albert Winnemuller
14.	Project Manager Civil Works (Balast Nedam)	BCE	Johan Verhagen
15.	Project Manager Electrical Works	BCE	Thomas Arensbach
16.	Project Quality Manager (Vestas)	BCE	Kjell R Hansen
Note:			

Evacuation Plan V90 offshore



Note:- This document has been issued for information purposes alongside the S&R & ER Plans Rev E - 1st May 2005.

Evacuation from V90 Offshore

EVACUATION PROCEDURE

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1.0 GENERAL PROVISIONS

The EVACUATION PROCEDURE must always be kept in the wind turbine.

1.1 In the event of accident the alarm must be raised quickly and correctly.

1.2 In the event of serious accident, life saving first aid must always be offered in preference to evacuation or waiting for the arrival of the doctor/rescue squad.

1.3 In the event of lesser injuries, where the patient is mobile, an effort must be made to use the normal ascent and descent methods, but the first-aider must be especially attentive.
In case of doubt, operate on the worst-case principle.

1.4 In the event of accidents in the tower, work on the principle of “always down and always inside”. However, this does not apply to rescue zone 1 (nacelle) in connection with horizontal evacuations. If the rescue helicopter can be used, evacuate upwards and out onto the roof of the nacelle

1.5 In the event of an accident on a ladder or between two platforms, use the personal lowering equipment to lower to the nearest horizontal floor.

1.6 If a fire breaks out in the wind turbine, quickly report this to operating control room.

Fight the fire if possible, but operate on the principle,
“Rescue persons rather than equipment”.

Activate the wind turbine’s emergency stop and interrupt the power control switch if possible (F60).
In the event of lowering during a fire, beware of the risk of objects falling from the wind turbine.

1.7 If it proves necessary to evacuate quickly from the nacelle, the survival suit and life vest must be used.

1.8 As it can be difficult to evacuate an unconscious person with a suspected vertebral fracture, shock or the like in the way prescribed by the rescue service, a medically qualified person or trained rescue worker must be present in the wind turbine before evacuation starts, and while waiting for this, attention must be given to life-saving first aid.

1.9 Efforts must be made to put the first aider in contact with a doctor or knowledgeable person able to provide guidance in the correct procedure.
Contact can be established by mobile phone or VHF radio.

2.0 When the doctor or rescue personnel arrive at the wind turbine, they will take over responsibility for evacuation, and their instructions must be followed. In this phase, Vestas workers will act as helpers/advisers in the purely practical work of lowering/evacuation.

Vestas worker will ensure that platforms and other wind turbine parts are dismantled if this will aid evacuation if the doctor/rescue personnel consider this necessary.

In the event of horizontal evacuation of severely injured patients, the correct rescue equipment must be used. Efforts must also be made to ensure that the patient is lying horizontally or as directed by the doctor/rescue squad.

Marine stretcher with lifting harness, when this can be supplied by the rescue service and on the orders of the doctor, depending on the relevant rescue zone.

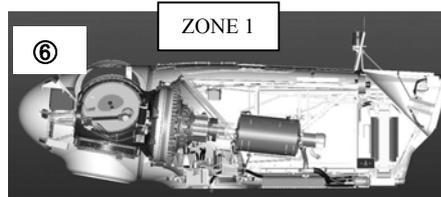
3.0 IMPLEMENTATION OF EVACUATION

3.1 Definition of horizontal and vertical evacuation:

Horizontal evacuation is when the patient has an injury which means that it would be life-threatening to evacuate him vertically. (Vertebral fracture – shock).
The patient must lie in horizontal position during the entire operation.

Vertical evacuation is when the patient has an injury such that he is able to use the normal ascent and descent methods, either alone or with help, or when the patient may be hung vertically during rapid lowering from the nacelle or from the tower ladder.

3.2 RESCUE ZONES



ZONE 1

Nacellen = ⑥

ZONE 2

Vibration damper platform = ⑤

ZONE 3

Service lift TOP = ④

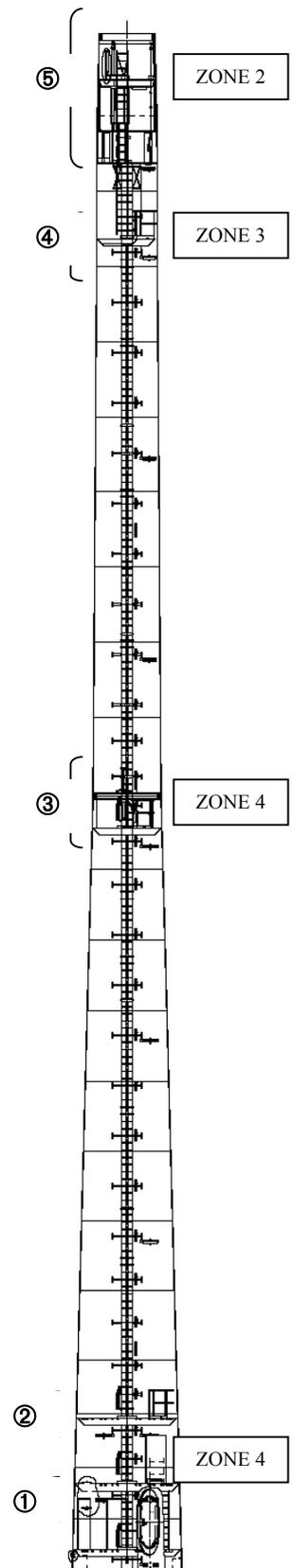
ZONE 4

Resting and safety platform = ③

Platform = ②

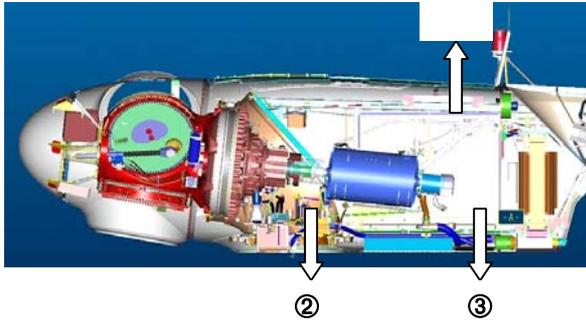
Tower/base = ①

Rescue zones are divided up according to narrow passages and existing platforms



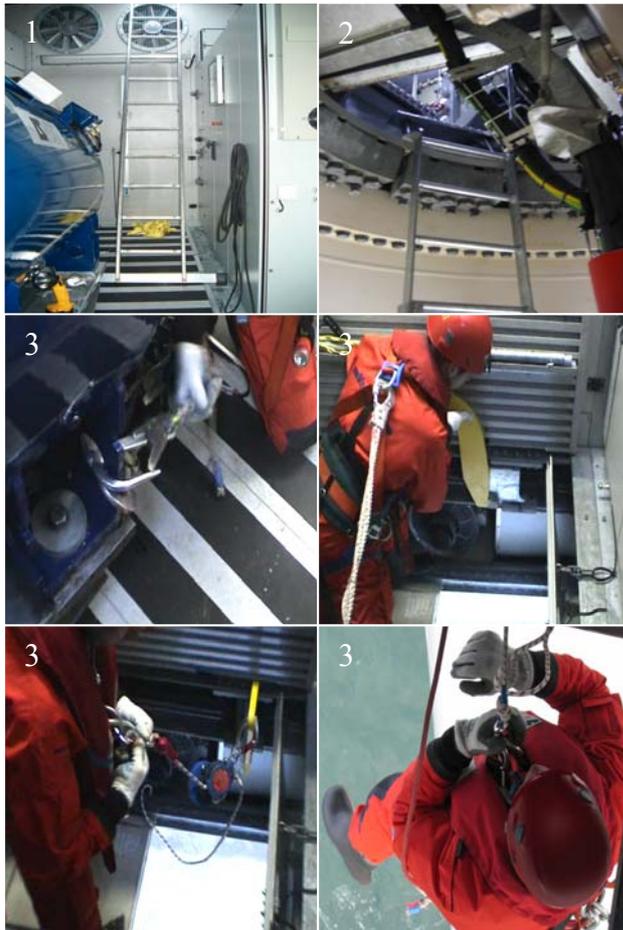
4.0 PRACTICAL IMPLEMENTATION

4.1 RESCUE ZONE 1



Options for leaving the nacelle

1. Up onto the nacelle roof
2. Down the tower/zone 2
3. Decending from nacelle



FROM RESCUE ZONE 1 (NACELLE)

Evacuation to helicopter Wait in the nacelle

On the arrival of the doctor or rescue personnel at the wind turbine, they will take over responsibility for the evacuation and their instructions must be followed.

Implementation:

At the instruction of the helicopter team, the patient moves up on to the roof of the nacelle.

Vertical evacuation

Minor injuries where it is necessary to leave the wind turbine.

Implementation:

In the event of lesser injuries, where the patient is mobile, an effort must be made to use the normal ascent and descent methods.

Descent should be carried out with great care and with fall protection in use at all times.

A patient can in an emergency situation be lowered through the base hatch if there is a helper at the bottom.

Horizontal evacuation

All unconscious patients.

Where a vertebral fracture is suspected.

Injuries and illnesses which lead to loss of the ability to crawl or walk.

On doctor's orders.

Implementation:

The patient is laid on a stretcher and brought to the area in front of the ladder to the top of the nacelle but not up to the roof.

On the instructions of the helicopter team, the patient is raised by everyone lifting him up the ladder and out onto the roof.

The helicopter's standard procedure for horizontal evacuation is to be followed.

Rapid evacuation

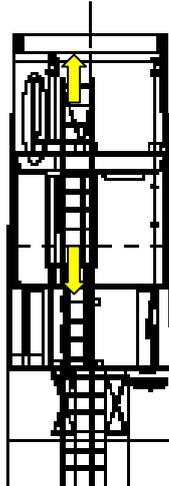
Rapid evacuation must be considered in the event of fire or smoke generation.

Implementation:

A. Put on the survival suit, H-harness and life jacket, prepare lowering equipment, open the base hatch and leave the wind turbine.

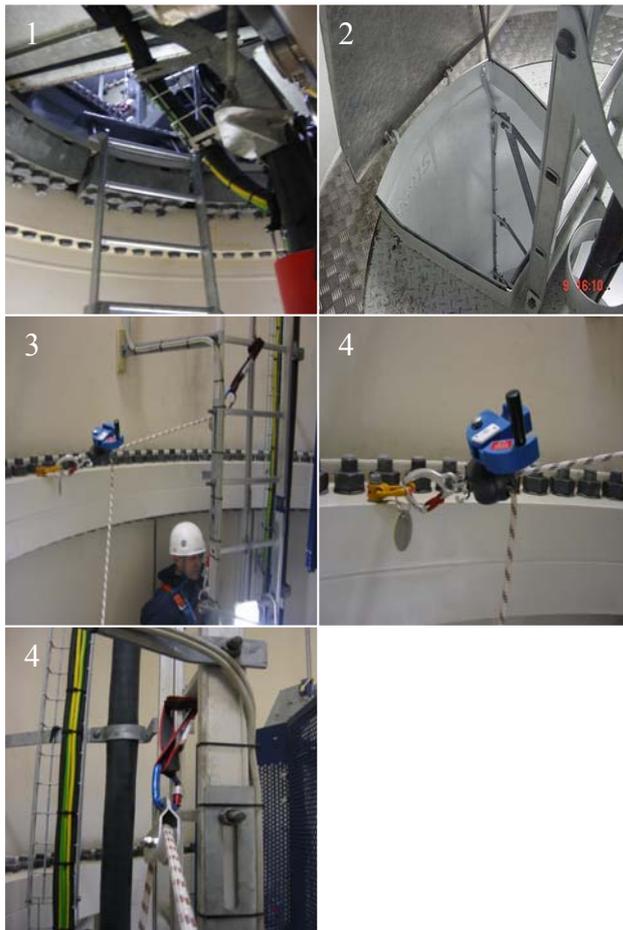
B. Quickly climb down the ladder to the service lift, and go down in this.

4.2 RESCUE ZONE 2



There are 3 options for leaving zone 2

1. Up the ladder to the nacelle
2. Down the ladder to zone 3
3. Lowering via lowering equipment
4. Lowering equipment attached



FROM RESCUE ZONE 2

Evacuation to helicopter

If possible, evacuate to the nacelle and follow the procedure for Zone 1.

On the arrival of the doctor or rescue personnel at the wind turbine, they will take over responsibility for evacuation and their instructions must be followed.

Vertical evacuation

Minor injuries where it is necessary to leave the wind turbine.

In the event of lesser injuries, where the patient is mobile, an effort must be made to use the normal ascent and descent methods.

Implementation:

Use the normal ascent and descent methods.

Horizontal evacuation

All unconscious patients.

Where a vertebral fracture is suspected. Injuries and illnesses which lead to loss of the ability to crawl or walk.

On doctor's orders.

Implementation:

The patient is laid on a stretcher and brought up to the nacelle, and the procedure for Zone 1 is followed.

Rapid evacuation

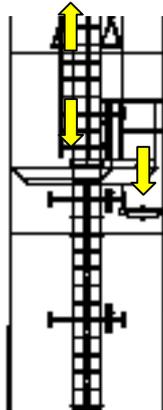
Rapid evacuation must be considered in the event of fire or smoke generation.

Implementation:

A. Climb up into the nacelle, put on the survival suit, H-harness and life jacket make the lowering equipment ready, open the base hatch and leave the wind turbine.

B. Quickly climb down the ladder to the service lift and go down in this.

4.3 RESCUE ZONE 3



There are 4 options for leaving zone 3

1. Down the tower ladder
2. Up the ladder to zone 2
3. Down in the service lift
4. Lowering through void space

FROM RESCUE ZONE 3

Vertical evacuation

In the event of lesser injuries, where the patient is mobile, an effort must be made to use the normal ascent and descent methods.

Implementation:

Use the service lift

Horizontal evacuation

All unconscious patients.

Where a vertebral fracture is suspected. Injuries and illnesses, which lead to loss of the ability to crawl or walk.

On doctor's orders.

Implementation:

Seriously injured patients in a stretcher cannot be evacuated horizontally, but can be placed vertically in the service lift in the stretcher. One person can accompany the patient in the lift while others descend the ladder.

Horizontal evacuation can be carried out in the passage to the service lift if the latter is brought all the way down.

On arrival of the doctor or rescue personnel at the wind turbine, they will take over responsibility for evacuation and their instructions must be followed.



Rapid evacuation

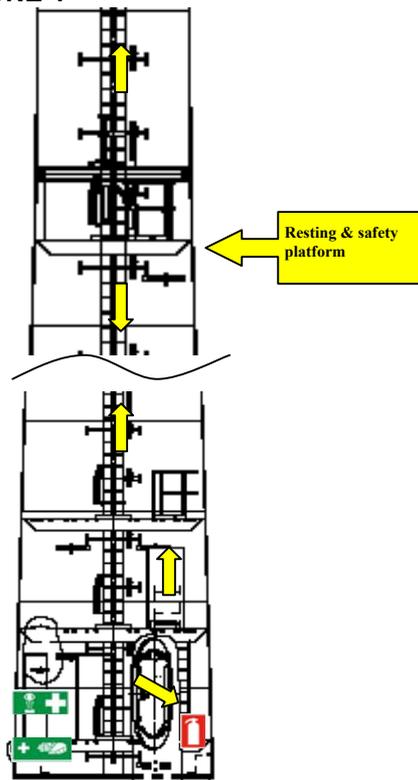
Rapid evacuation must be considered in the event of fire or smoke generation.

Implementation:

A. Fix H-harness with fall protection to the cable on the ladder and quickly climb down. Put on the survival suit and life jacket before leaving the wind turbine.

B. Take the service lift down.

4.4 RESCUE ZONE 4



There are 3 options for leaving zone 4

1. Out of the door
2. Up in the service lift
3. Up the tower ladder to zone 3
4. Permanent rescue boat

FROM RESCUE ZONE 4

Evacuation to Rescue Boat

On arrival of the doctor or rescue personnel at the wind turbine, they will take over responsibility for evacuation and their instructions must be followed.

Vertical evacuation

In the event of lesser injuries, where the patient is mobile, an effort must be made to use the normal ascent and descent methods.

Implementation:

Use the service lift.

Use the ladder, with fall protection.

In the event of an accident on a ladder or between two platforms, use the personal lowering equipment to lower to the nearest horizontal floor.

Raising should be avoided if possible, but is feasible with the hand wheel on the lowering equipment and is activated after releasing the patient's fall protection. However, this is very time-consuming.

Horizontal evacuation

All unconscious patients.

Where a vertebral fracture is suspected. Injuries and illnesses, which lead to loss of the ability to crawl or walk.

On doctor's orders.

Implementation:

The patient is laid on the stretcher and brought to the door at the base of the tower.

On the instructions of the helicopter team, the patient is brought onto the platform by everyone lifting him out of the door.

If permanent boat facilities have been established, evacuation from the platform can be carried out straight away, otherwise wait for the rescue squad or MOB/FRB arrival.

The boat's standard procedure for horizontal evacuation is to be followed.

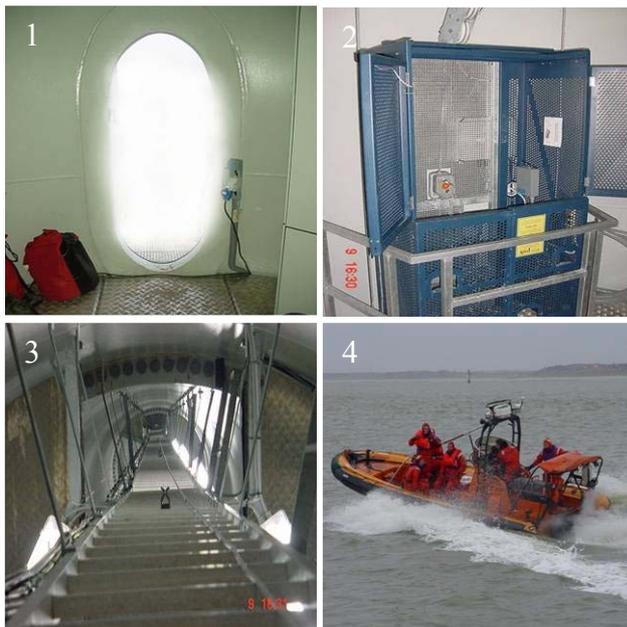
Rapid evacuation

Rapid evacuation must be considered in the event of fire or smoke generation.

Implementation:

A. Put on the survival suit and life jacket fix H-harness with fall protection to the cable on the ladder and quickly climb down.

B. Go out and wait for the arrival of the rescue squad.



5.0 FIRST AID EQUIPMENT at V90 Offshore

5.1 Green first-aid box

Contains various items for minor injuries and everyday wound care.

The case does not contain advanced emergency equipment, but many useful items for effective first aid, e.g. a mask for artificial respiration, burns spray and space blanket.

The case is mounted in a quick lock fitting and can be carried round the wind turbine.

Location:

The first-aid boxes are located at the rear of the nacelle on the transformer wall and at the control cabinet at the base of the tower by the entrance.

Contents:

ITEM	QTY
Triangular bandage	6
Compress - ordinary	3
Compress - small	3
Gauze compress – pack of three	10
Elastic bandage	4
Elastic plaster 50x6 cm	3
Roll of plaster	3
Medium plaster strips – sheet of two	20
Finger tip plaster	10
Wound cleaning napkins	30
Harness shears	1
Tweezers	2
Space blanket	2
Safety pins – bunch of six	1
Eye wash 0.5 L	1
Chemical ice pack for muscles	2
Disposable gloves – bag of three pairs	3
First aid leaflet	1

6.0 RESCUE EQUIPMENT V90 Offshore

6.1 Lowering equipment

The rescue equipment is a Res-Q model as normally used at Vestas and is a fixed part of the inventory in the Megawatt-producing wind turbines.

Location:

The lowering equipment is located in the nacelle, at the rear against the transformer bulwark on the left side, in a red PVC-container.

Contents:

ITEM	QTY
Red PVC-container, foam support inside, SKV 380 x 317 x 240 mm	1 pc.
Equipment back.	1 pc.
Sling 0, 8 meter.	1 pc.
Red Pro rescue and evacuation equipment.	1 pc.

7.0 FIRE FIGHTING EQUIPMENT

7.1 FIREFIGHTING TOOLS

There are two 6 kg CO₂ extinguishers in the wind turbine.

LOCATION:

TOP

One 6 kg CO₂ fire extinguisher is placed in the nacelle on the crane pillar by the rear left-hand yawing gear.

BASE

One 6 kg CO₂ fire extinguisher is placed on the cable ladder in the base of the tower by the entrance.

Contents:

ITEM	QTY
6 kg CO ₂ extinguishers	2 pcs.

8.0 ITEMS FOR EMERGENCY STAY in the tower of the V90 Offshore

8.1 Vestas item no. 115999 Offshore survival ration and equipment, set for one man in 72 hour.

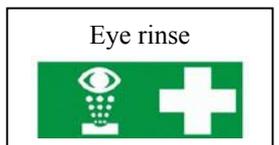
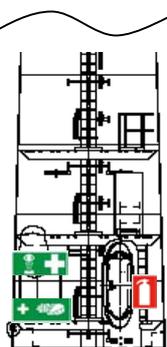
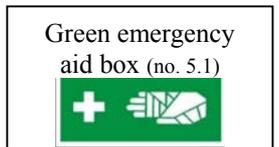
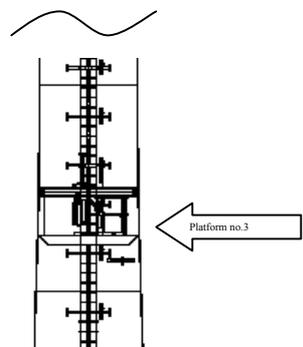
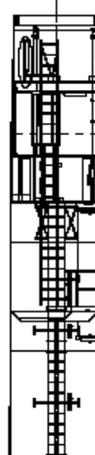
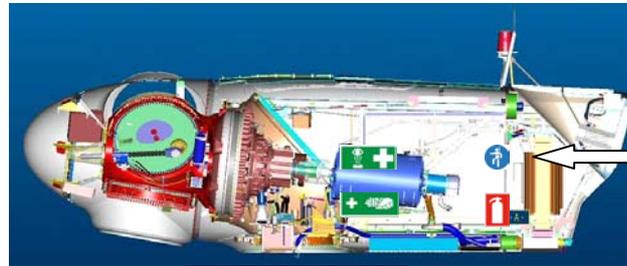
Vestas item no.	Pieces	Unit	Description
244341	1	piece	Bright star 2618 yellow industrial torch.
244342	2	piece	BATTERI 1,5 V 736-F6-R20 D.
244343	1	piece	Knife RED CARBON.
244344	1	piece	Playing cards ART. 4412.
244345	1	piece	Sleeping bag - 15 DEG. C. + sleeping pad.
244346	3	packet	Emergency ration F/LIVBOAD 500 GR "SEVEN OCEAN" EXP. + 5 year.
244347	10	bag	Emergency drinking water.500ml (5x100ML) "SEVEN OCEAN" EXP. + 5 year.
244349	1	piece	Emballage & packing + 60 LTR. Plastic container

Offshore survival ration and equipment



Evacuation Plan V90 offshore

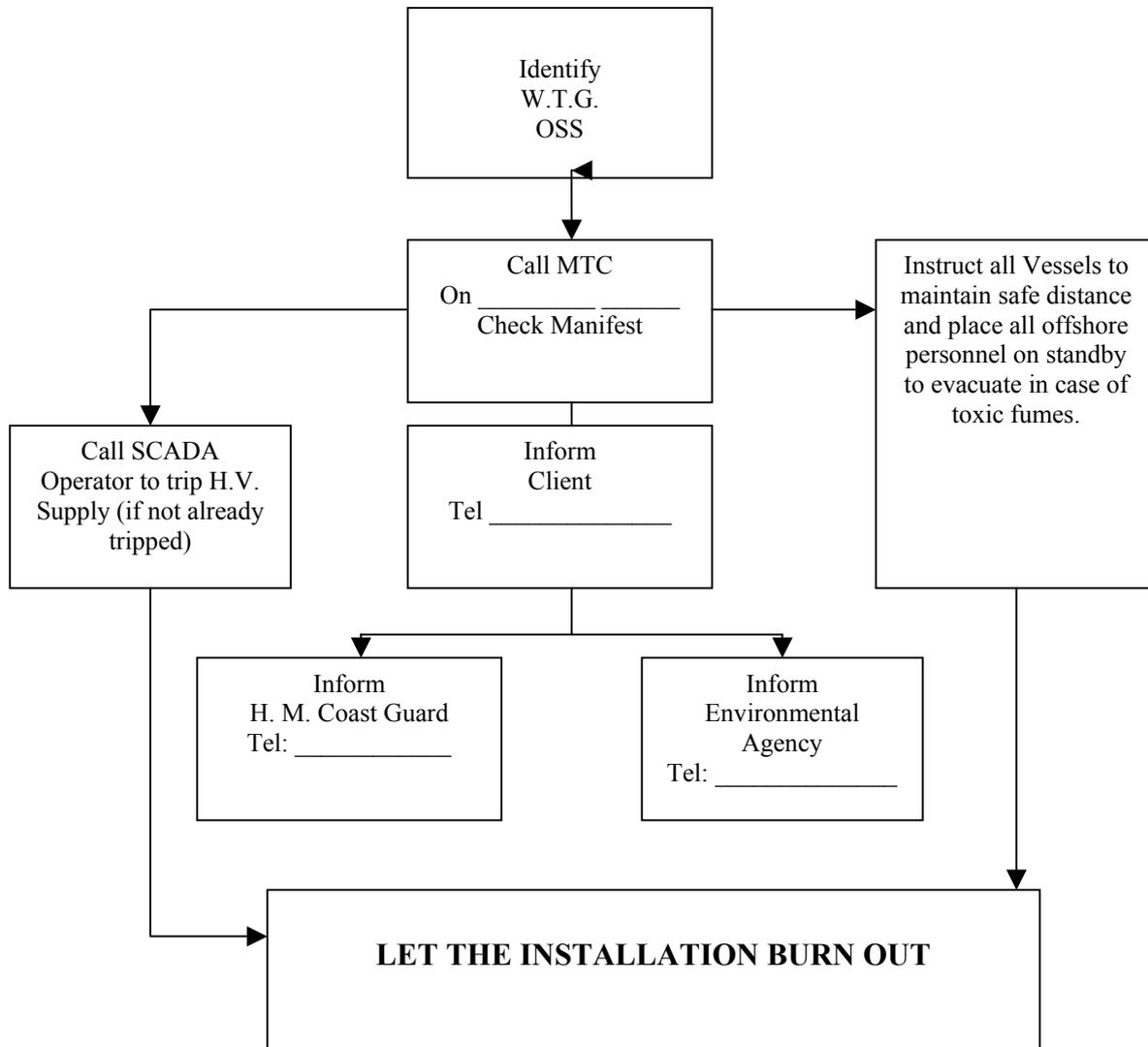
9.0 Diagram of emergency equipment



10.0 Flow diagram

10.1 Fire – No Personnel on WTG Procedure.

If you see signs of fire on a WTG, the following procedure must be followed.

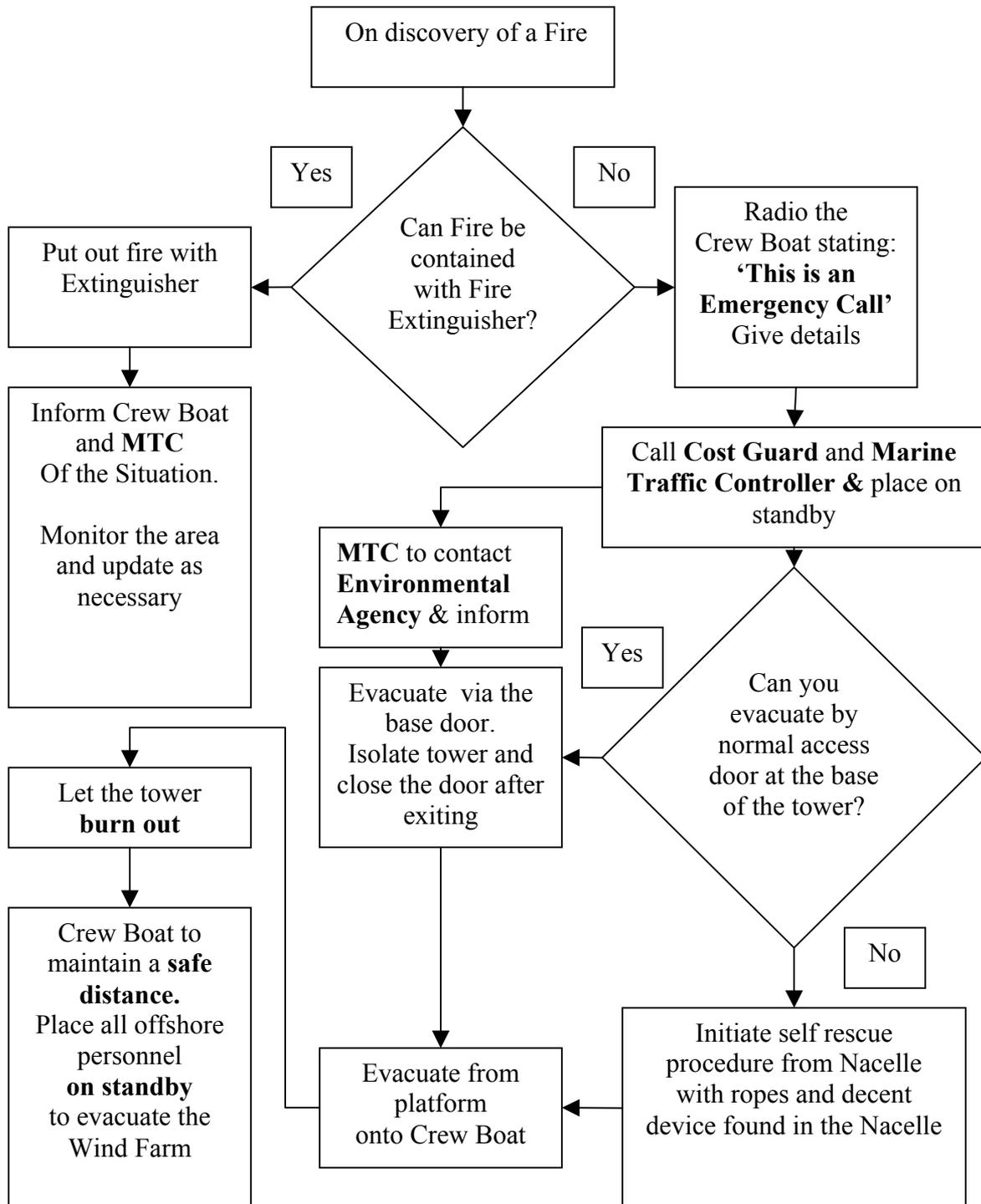


BEWARE OF TOXIC FUMES AND FALLING DEBRIS.

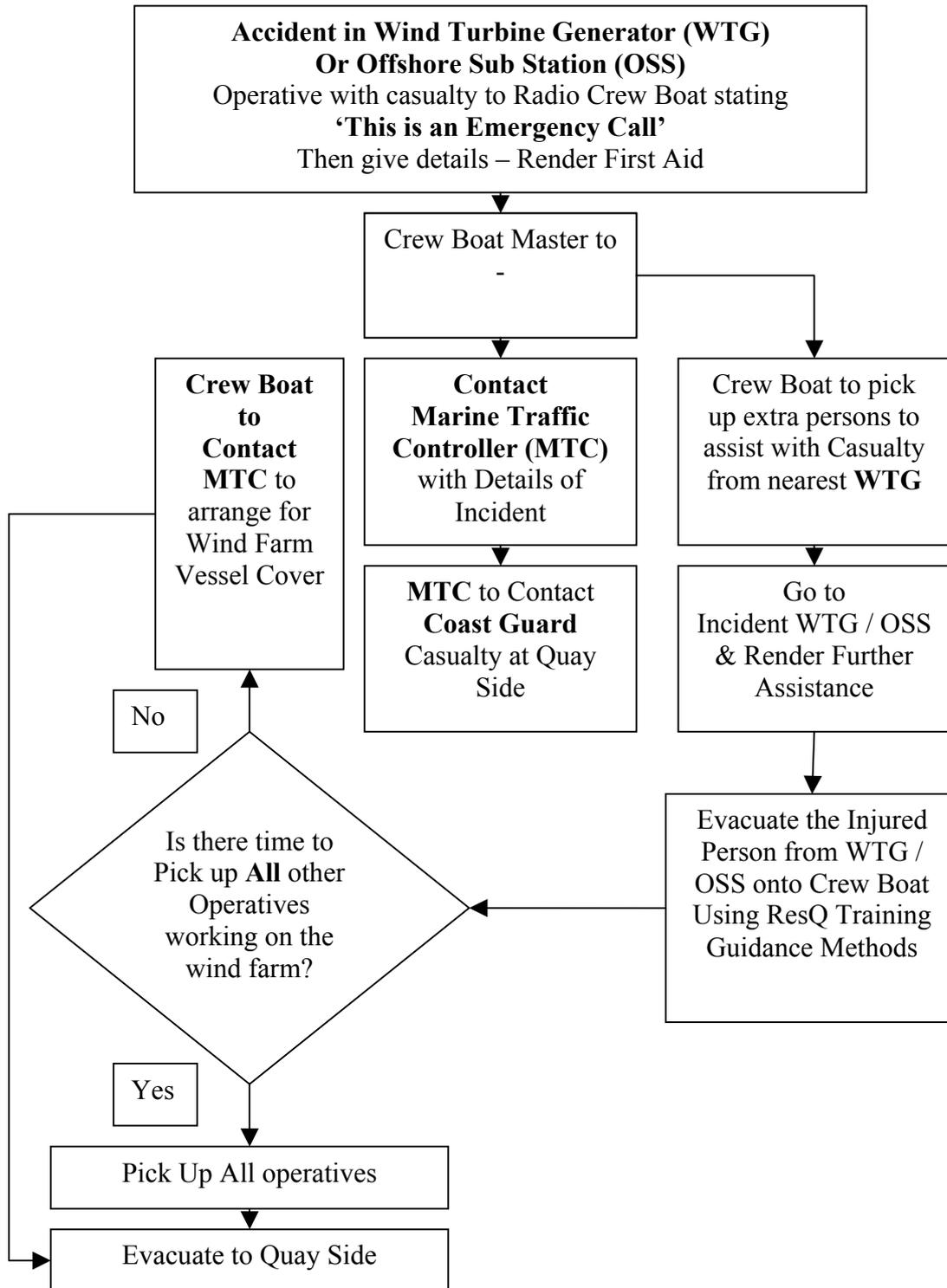
ALL VESSELS TO KEEP CLEAR AND UP-WIND OF FIRE.

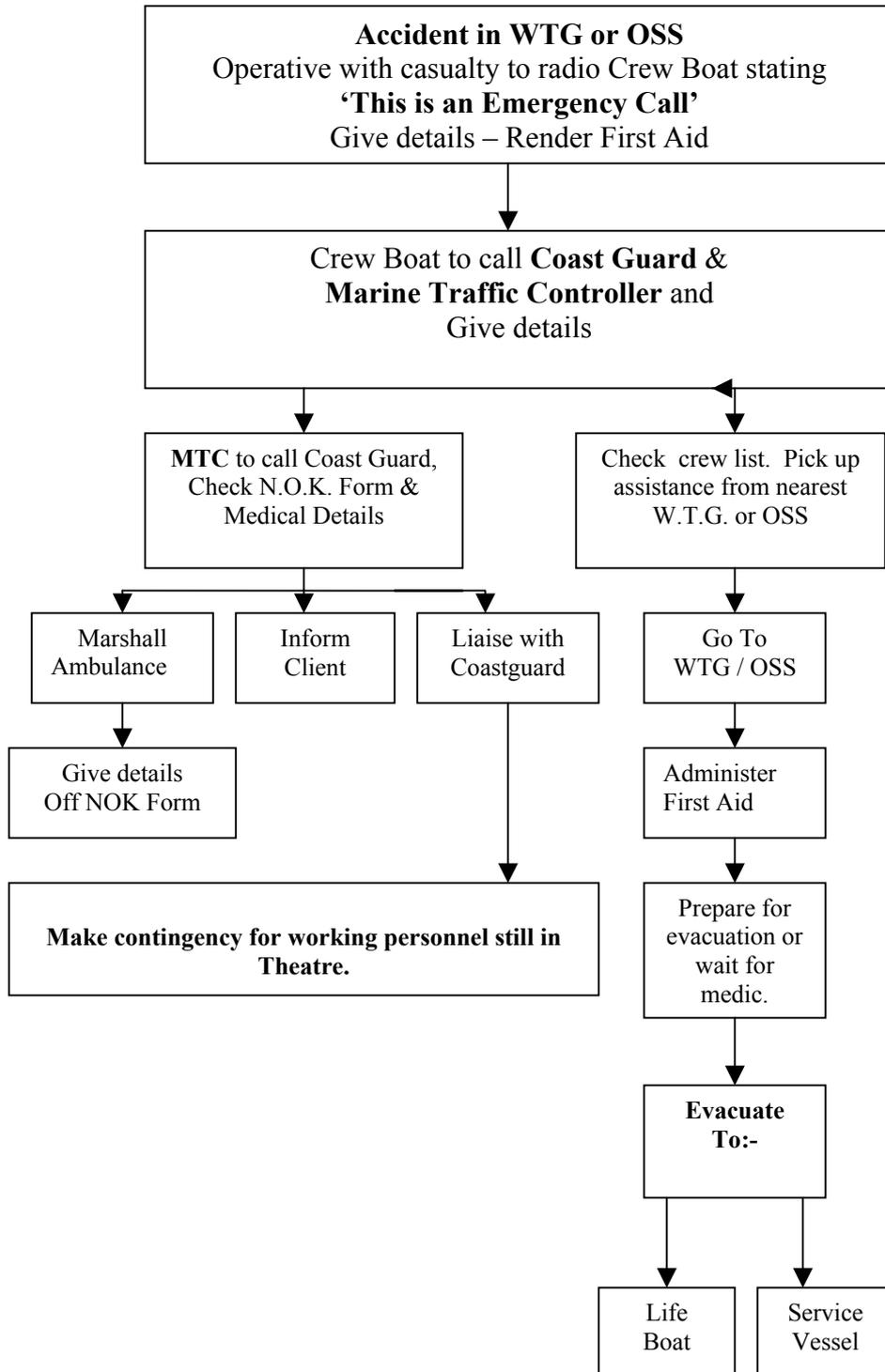
Evacuation Plan V90 offshore

10.2 Fire – Personnel on WTG Procedure.



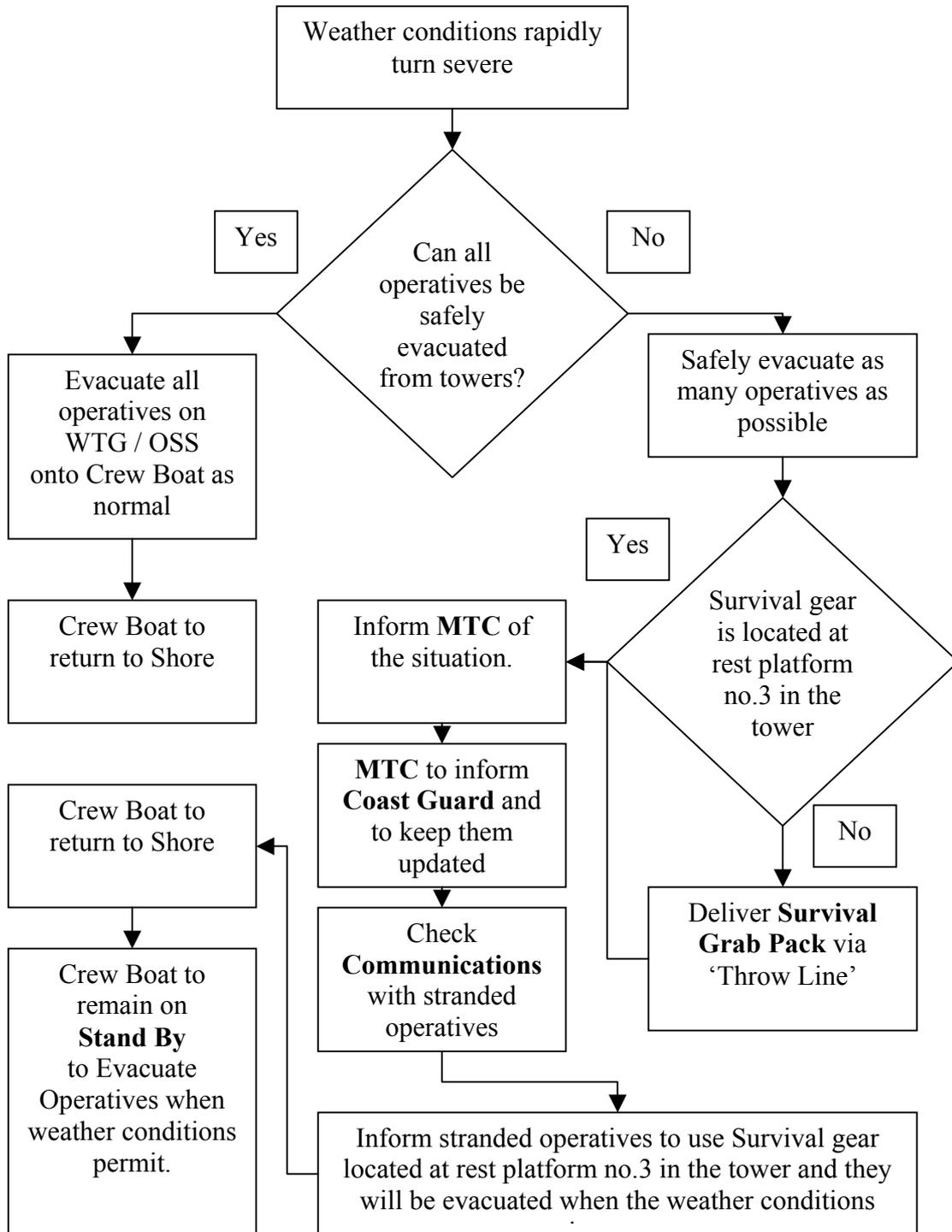
10.3 Walking Casualty Procedure.



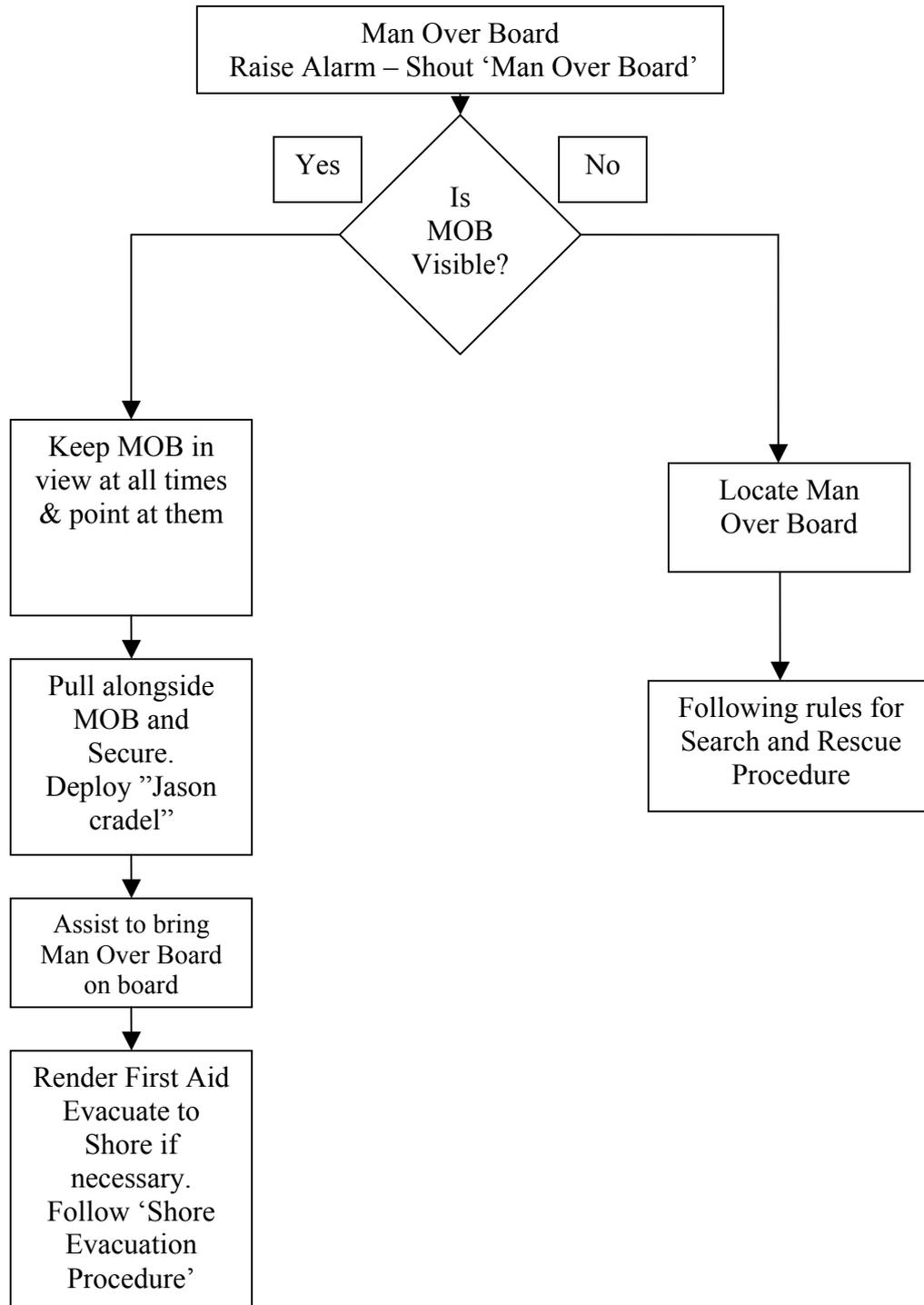
Evacuation Plan V90 offshore**10.4 STRETCHER CASUALTY PROCEDURE.**

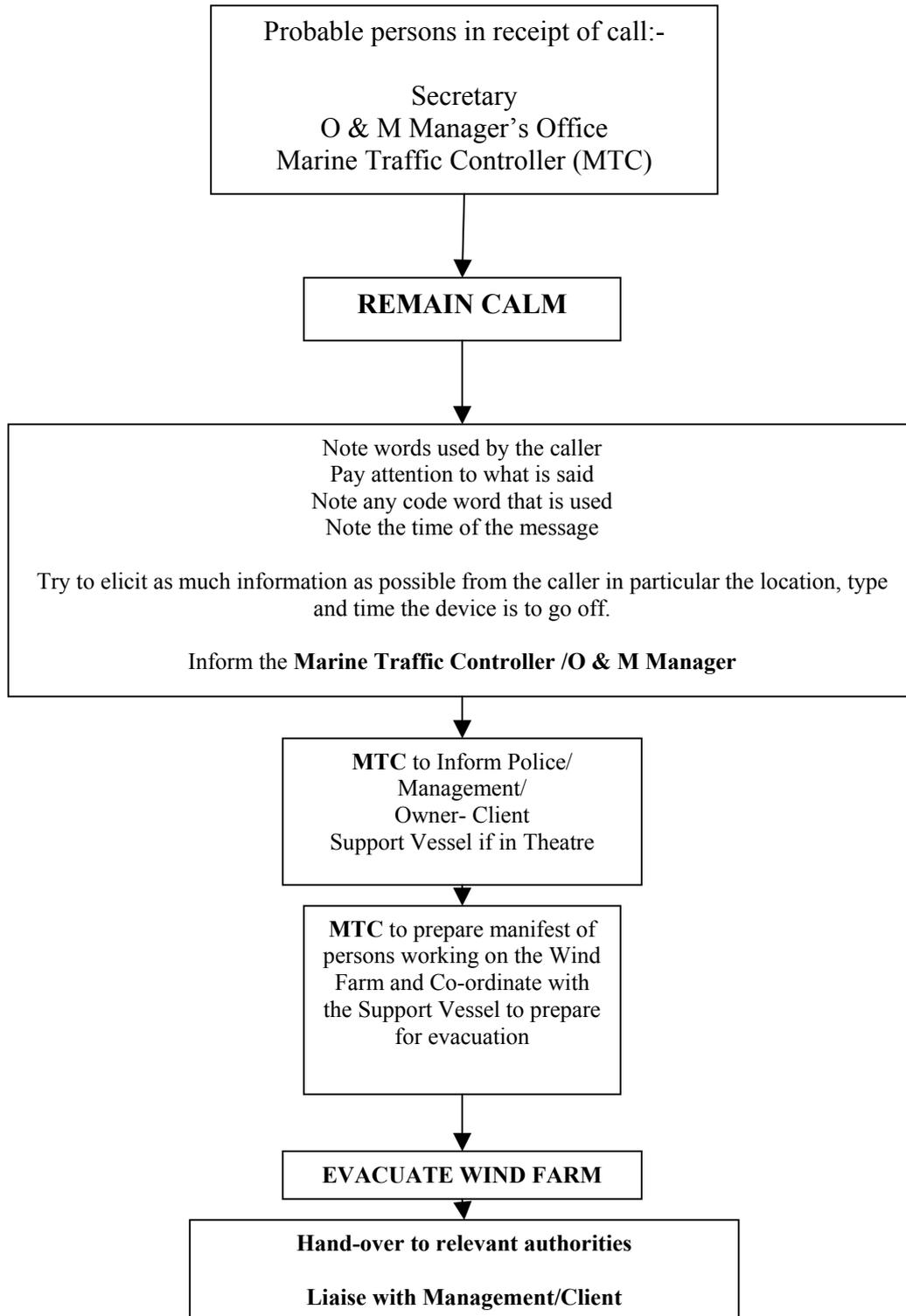
Evacuation Plan V90 offshore

10.5 Stranded by Weather Procedure.



10.6 Man over board.



Evacuation Plan V90 offshore**10.7 Bomb Threat Management Procedure.**

10.8 Incapacitated Crew Boat Procedure.

Crew Boat incapacitated – engine failure – hull holed – props fouled

