Safety Offshore Elia
AVIO – GSIO

General Safety Instructions for Offshoreworks Elia = GSIO (ENG)

Algemene VeiligheidsInstructies bij werken op offshore installaties Elia = AVIO (DU)

Safety Governance & Certification

Version 2019

Content

1. **Elia Grid Operator**
2. Legislation
3. MOG Modular Offshore Grid
4. Minimum Requirements to access ELIA Offshore Assets
5. Dangers and Risks
6. Demarcation in Electrical installations
7. Specific Activities (scaffolding, ladders, lifting activities,…)
8. Emergency Procedures (Fire, First Aid, Adverse weather, …)
9. Environmental and Waste Policy
10. General Rules
11. Safety Documents + Procedures
12. Working on electric installations
    - Functions, Vital 7, Safety Distances
    - Lock Out – Tag Out – Elia Card system (CVM)

GO FOR ZERO!

Safety first!

Safety comes first anytime, anywhere and for everyone. We continue to invest in safety and we all work responsibly and safely

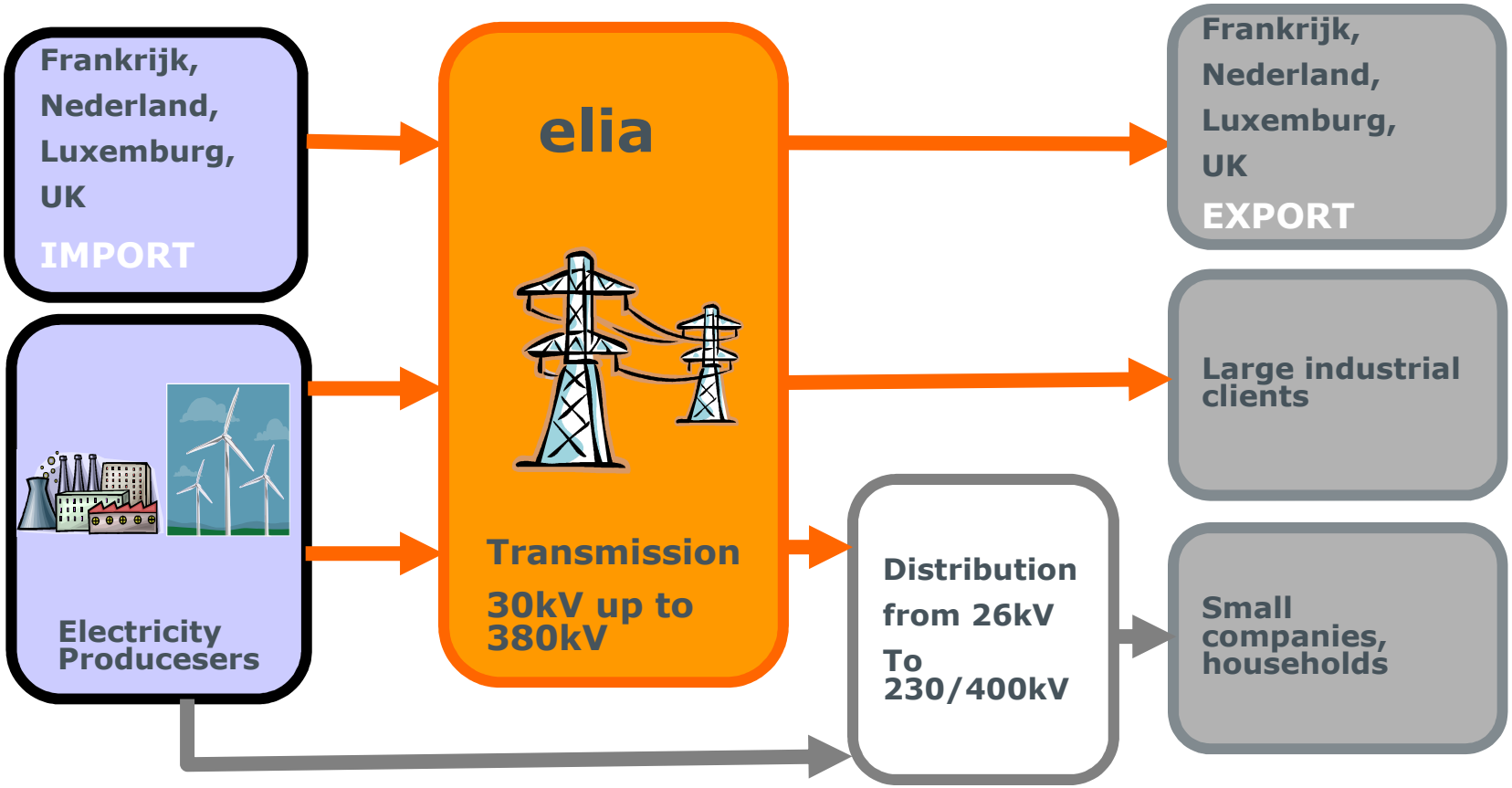
Society first

At every step we ask ourselves the question: What does society want and how can we add value?

Driven by excellence

We work efficiently and to a high standard in order to achieve or even exceed the objectives set. We go for the result.

Elia As Grid Operator



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Legislation

The Employer

- Must implement a prevention strategy in the company

Hierarchic Line

- Is responsible that the prevention strategy of the employer is respected and followed by all personnel

All

- Everybody is Legally responsible to apply all the safety procedures, respect the collective measurement and correct use of the PPE.
- We’re all responsible for our own safety and the safety of our colleagues.

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Legal Requirements

Law Welfare

TRAINING / INFORMATION + TEST

(Law Welfare 04.08.96 + K.B. 27.03.98)

Contractors

Valid for 2 or 3 years

Elia workers

Passed if 75%
No retake after the training

GO FOR ZERO!

Non-negotiable behavior within Elia

Outcome of an exercise facilitated between Elia Technician and our contractors

- For all works at height it is mandatory to attach, according to the applicable procedures at Elia.
- In the case of a secured installation, the card may only be removed by a mandated person (person who has the certifications and who has the permission).
- In no case may the double red markings be exceeded.
- In an 'Electrical Elia Room' no work may be performed without a work permit or WIK (work instruction card).
- The supervisor must always be present at the work site during a work
- The safety shoes and PPEs identified in the risk analysis or on the pictograms must be worn.

GO FOR ZERO!

Violations

Software tool Safe Guard =

- Database certificates (AVIx)
- Entering data violations regarding:
  - Safety
  - Environment
  - Access
- Violation is determined and qualified according to:
  - Severe breach
  - Normal breach
  - Small breach
- Consequence → sanction!
- Also feedback towards purchase department.

EX: WORKING WITHOUT PTW/RA,
EXCEED ENVIRONMENT RULES,
ON BOARD WITHOUT CHECK THE MANIFEST,
NOT WEARING PPE'S,
...

GO FOR ZERO!

AREI (Legislation **Electrical Installations**)

- Art. 28: Concepts concerning the protection against electric shock
- Art. 44: Protection by means of obstacles in the exclusive area of the electrical service
- Art. 47: Ordinary area of the electric service
- Art. 192: Precautions to take when working
- Art. 266: Work activities on electric installations

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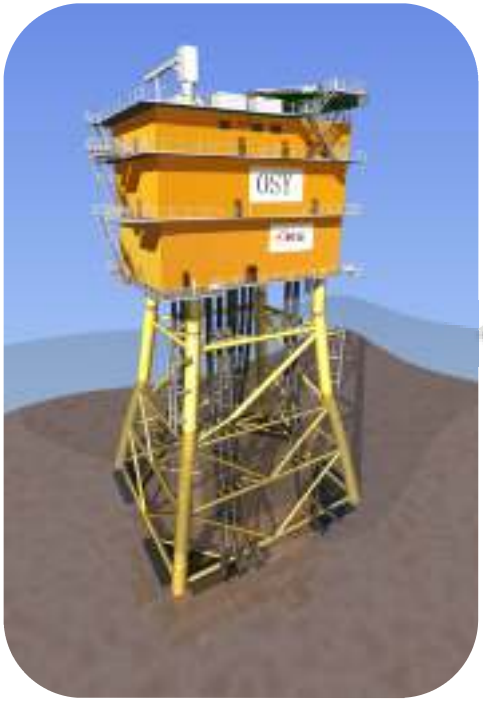
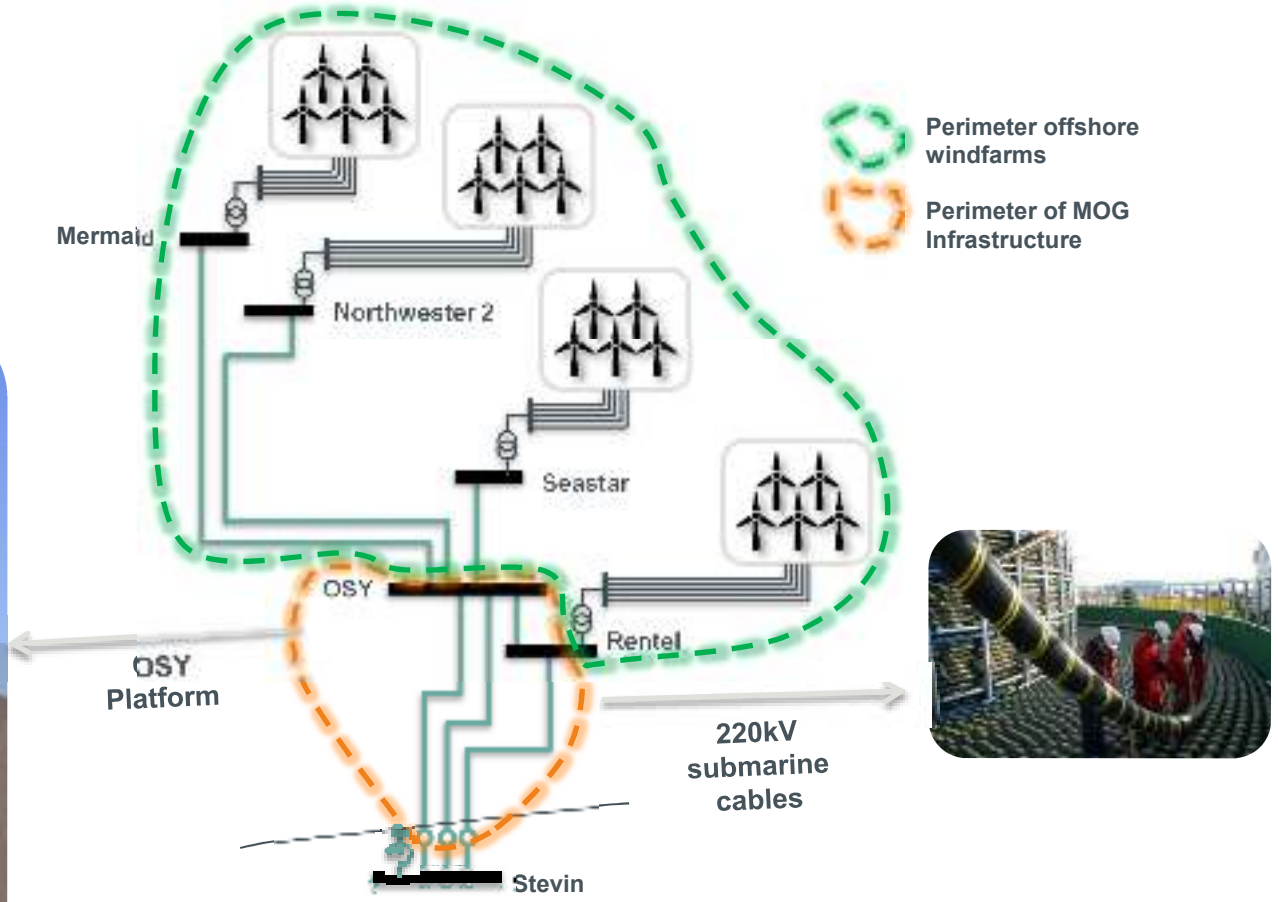
Modular Offshore Grid





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OSY Platform – Overall view

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Modular Offshore Grid

Main project characteristics		
AC grid parameters	AC Voltage	220 kV
	Connected capacity	1030 MW
Offshore parameters	Distance to shore	40 km
	Water depth	34 m
Topside	Weight	+/- 2000 ton
	Leg span	20 x 15 m
	H-deck level	40 m above LAT
Jacket	Weight	+/- 1500 ton
	Height	48 m
	Number of J-tubes	11
	Bottom leg span	31 x 26 m
	Piles	4 x 72” OD| L=+/-108 m
Offshore cables	Length (Elia scope)	85 km
	Length (Rentel scope)	40 km
	Cable capacity	390 MVA

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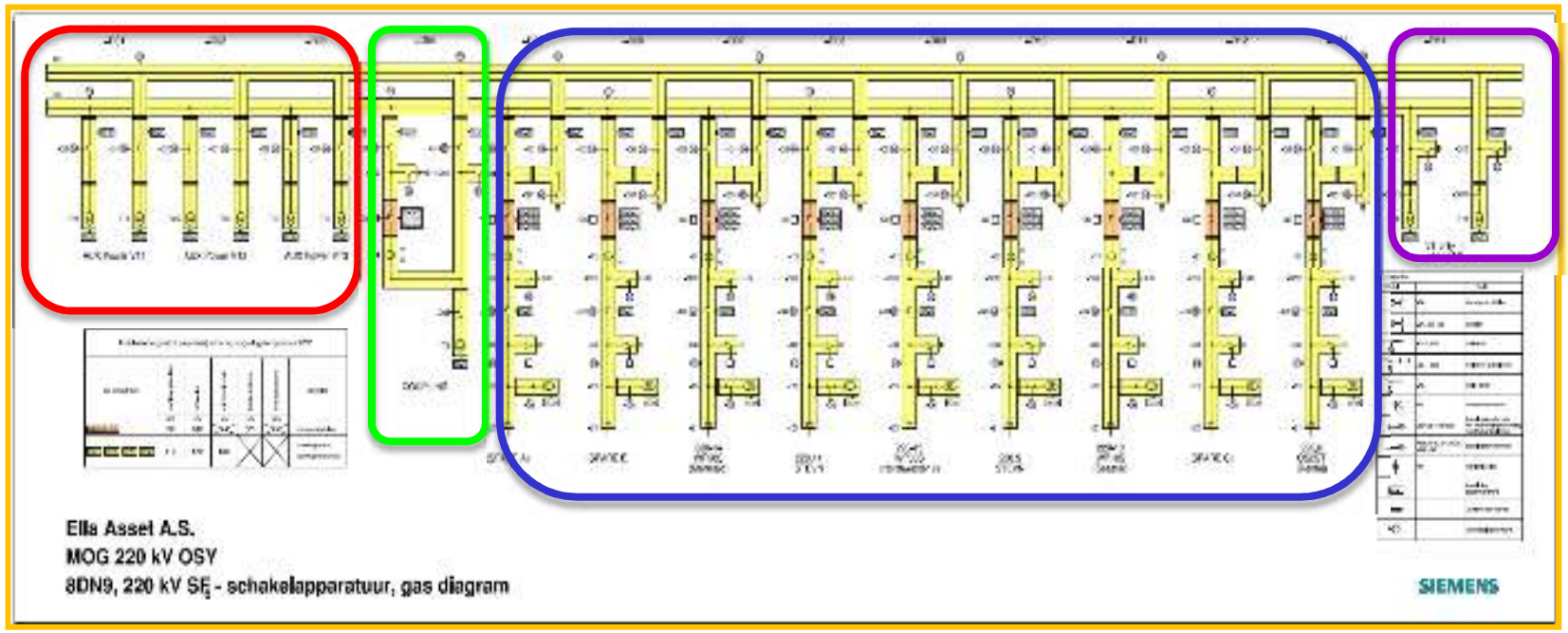
Modular Offshore Grid: GIS Installation



- Power VT's
- Coupling Bay
- Cable bays
- Rails TP

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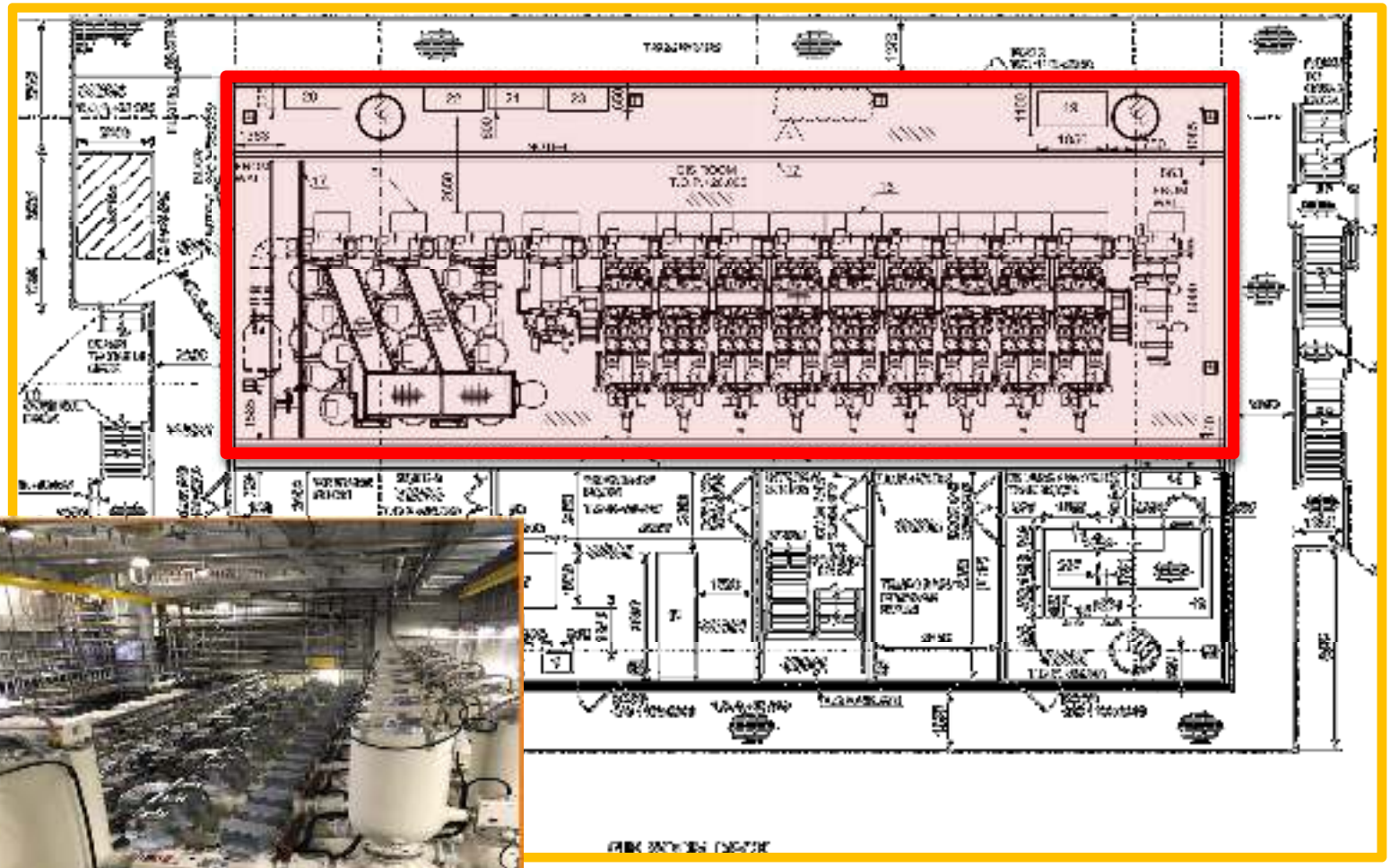
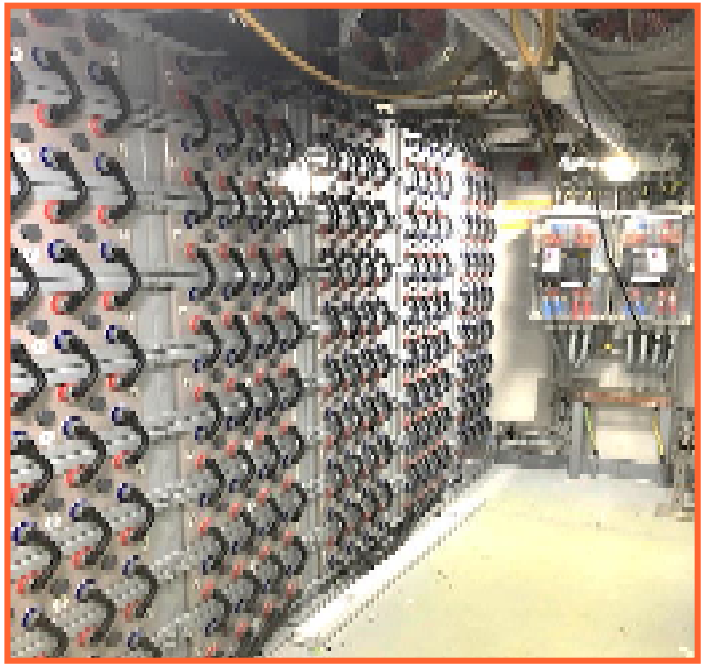
Modular Offshore Grid: GIS Installation

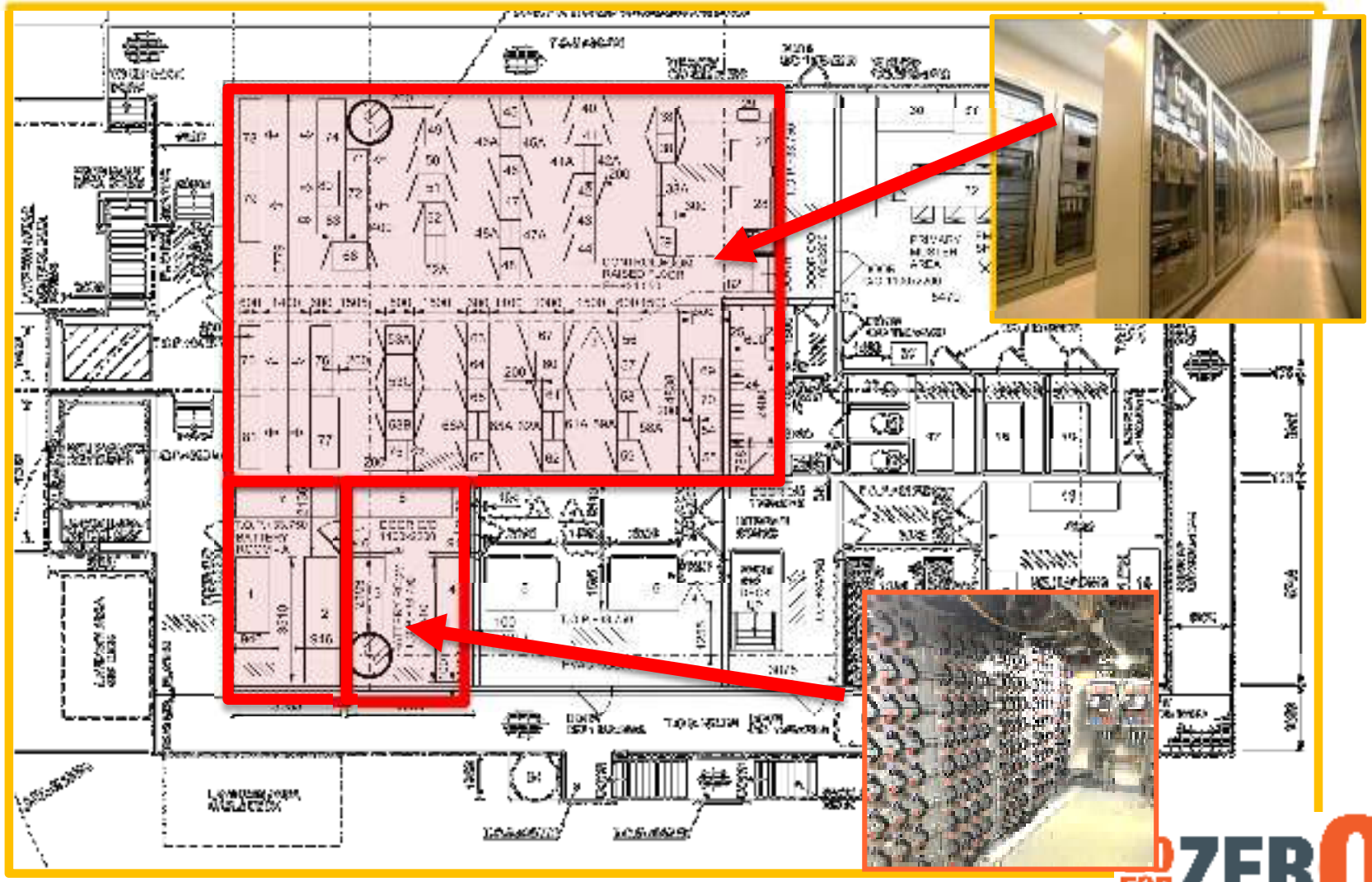


GIS Deck

Modular Offshore Grid: Low Voltage Equipment & Protections



Modular Offshore Grid: Low Voltage Equipment & Protections



Control Deck: Control room & Battery room

Modular Offshore Grid: Other equipment

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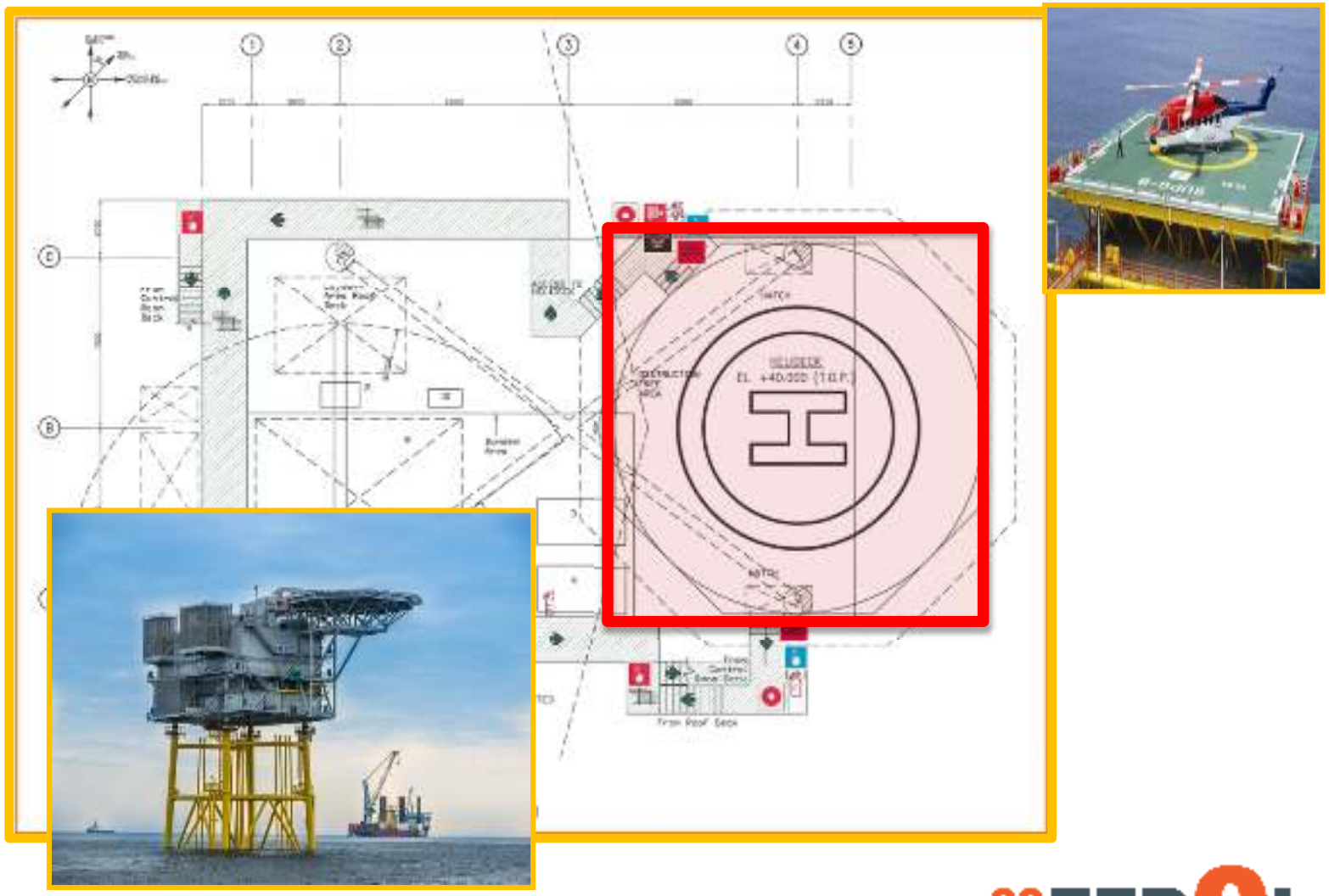
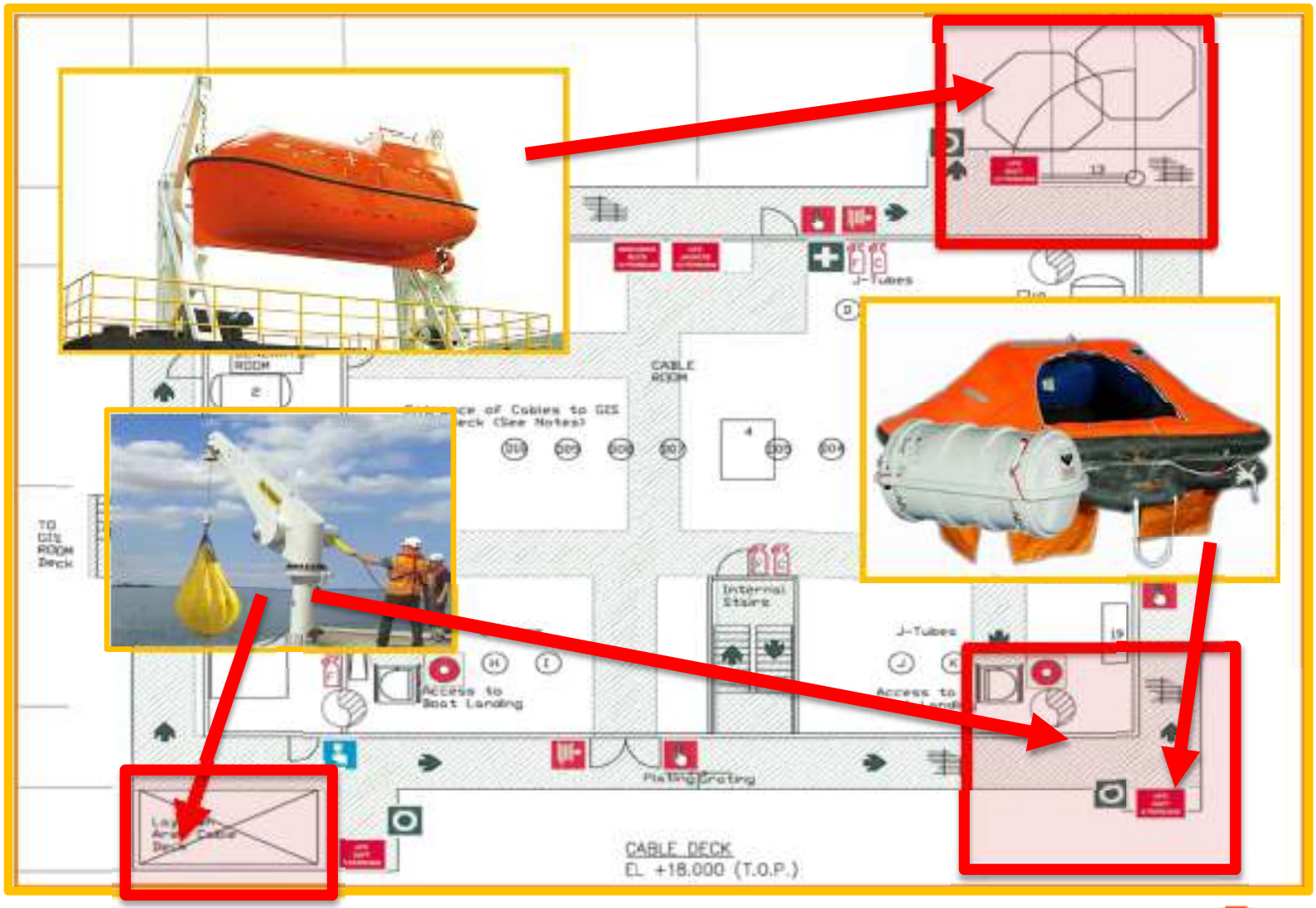
Modular Offshore Grid: Other equipment



Heli platform

Modular Offshore Grid : Other equipment



Cable deck

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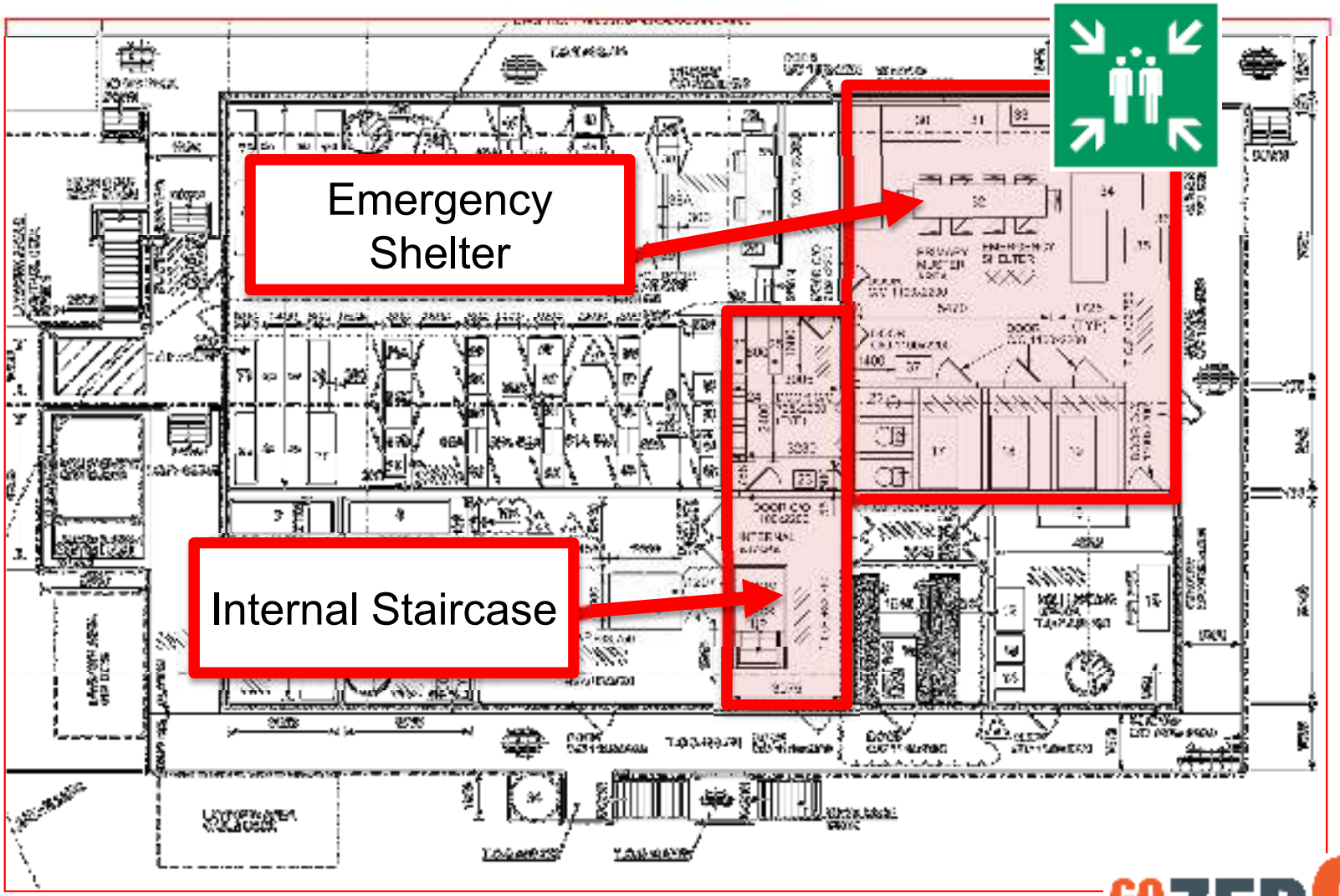
Modular Offshore Grid: Low Voltage Equipment & Protections



Control Deck

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Minimum training requirements

- Medically fit (NOGEPA Standard or equivalent)
- BA4/BA5 certified
- GWO Basic safety training (5 modules)
  - Working @ heights
  - First AID
  - Fire Awareness
  - Manual Handling (Ergonomics)
  - Sea Survival
- HUET / Helicopter underwater escape training
  (only for helicopter access)
- Elia AVIO training (extra module for workleaders not for Elia staf)
- Elia offshore induction

BA4/BA5 is granted by the own employer / hierarchy!

GO FOR ZERO!

Required Certificates & documents

For Belgian registered companies

- Valid offshore medical certificate (NOGEPA, OPITO, G41, STCW or equivalent)
- Valid GWO Basic safety training certificate and HUET (if helicopter access)
- Elia offshore induction
- BA4/BA5 certified
- Elia Offshore induction
- Elia AVIO training
- Recent NOK form (Next of Kin)
- Copy personal ID

All data received and stored is for HSE use.

Data will only used internally and in case of an emergency

GO FOR ZERO!

Required Certificates & documents

For foreign registered companies

- All certificates mentioned on previous slide
- A1 document (E-101 form)
  - Declaration regarding Social Security
- Limosa document (https://www.international.socialsecurity.be/working_in_belgium/en/home.html)

All data received and stored is for HSE use.

Data will only be used internally and in case of an emergency

GO FOR ZERO!

BA4/BA5 Certification

Classification in function of competence (AREI – Art 47)

- BA1 → Unskilled persons
- BA2 → Children in dedicated room
- BA3 → Disabled people

- BA4 → instructed persons (NL = VOP of Voldoende Onderrichte Personen)
  People informed about electric risks

AVIO Training « can » be sufficient to award BA4 Elia HV offshore-stations

- BA5 → Skilled persons (NL = Vakbekwame personen)
  Person who are trained to evaluate the risk of electricity by themselves, can take preventive measures to reduce the risks

BA4/BA5 is granted by the own employer / hierarchy!

GO FOR ZERO!

Access to the offshore installation

No Access to the platform without representative of Elia

Minimum 2 people required for an inspection. (No work activities)

- Example: Mandatory inspection EDTC, Inspector + Elia Rep.

Minimum 3 people required for other jobs

- Example: 2 contractors + 1 Elia Rep

Valid PTA or PTW with complete MST and RA in place

When arriving inform Dispatch Elia

Before leaving contact Elia Dispatch

GO FOR ZERO!

Minimum Personal Protective Equipment (PPE)

Always prefer collective protection : Railing, fencing, …

Working clothes + Safety shoes :


- **Mandatory at all time**
  - Everyone must be recognizable by the clothing (Company logo)
  - Fire retarded clothing

High Viz clothing + life jacket


- **On the quayside and during transfer**!

Safety helmet:

- **When required in work procedures**
- **During climbing activities, lifting activities**
- **Risk of bumping your head (obstacle, narrows spaces,…)**

Safety harnas:

- All work higher then 2m and no collective protection is present
- During climbing activities

Other:




- Required by risk

Minimum Personal Protective Equipment for the boat landing

Climbing helmet
(EN 397)

Climbing Harness
(EN 361 & 358)

Positioning lanyard
(EN 358)

Climbing Hooks
(EN 362 & 354 & 355)

Carabiner
(EN 362)

Frog Connector
(EN 362)

Immersion suit
SOLAS approved

Lifejacket 275N with
auto PLB & SOLAS
approved

Transfer: Immersion Suite is mandatory if seawater temperature is <12°C

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Matrix Minimum Personal Protective Equipment O&M phase (PPE)

Matrix use Personal Protection Equipment and Working cloths												
Locations	**Safety shoes**	**Standard Work cloths**	**Gloves**	**Climbing helmet**	**Climbing harnas**	**Safety googles**	**High-VIZ Clothing**	**Immersionsuit (SOLAS) seawater**	**Safety jacket (SOLAS)**	**Immersionsuit (ETSO)**	**Safety jacket (ETSO)**	**Earprotection**
Quay	x	x		x			x		x	nvt	nvt	
Inside CTV	x	x								nvt	nvt	
Deck CTV	x	x		x	x		x	x	x	nvt	nvt	
Platform - Boatlanding + platform below cabledeck	x	x	x	x	x		x	x	x	nvt	nvt	
Platform - Inside	x	x										
Platform -GIS room during use overhead crane	x	x		x			x					
Platform - Buiten rondom OSY	x	x	x				x					
Platform - outside during crane operations	x	x	x	x			x					
Platform - Heliplatform	x	x	x	x			x	x	x	x	x	
Helitransport	x	x					x			x	x	x
Described in specific method statement	x	x	x	x	x	x	x	x	x	x	x	x

Matrix Minimum Personal Protective Equipment Project phase (PPE)

Minimum Personal Protective Equipment Matrix Rev 2	Safety Helmet EN 397	Climbing Helmet EN 397 + EN 12492	Safety Glasses EN 166	Ear Protection * Noise > 80 Db(A) EN 352	Protective Clothing EN 470 or ISO 11611	Work Gloves Standard as per Risk Assessment Hazards	Safety Shoes (half high model, based CN ISO 20345 S3	Immersion Suit SOLAS 2010	Life Jacket (275N) incl. Personnel Locator Beacon (PLB) EN ISO 12402 2	Safety Harness EN 363
Locations										
Stevin (Elia substation)	X		X	X	X	X	X	X		X****
Zeebrugge Beach works	X		X	X	X	X	X	X		X****
Quay Sides	X		X	X	X	X	X	X	X***	X****
Crew Transfer Vessel (CTV)	X**	X**	X	X	X	X	X	X	X	X
Vessels Work Areas	X		X	X	X	X	X	X	X***	X****
Offshore Switch Yard		X	X	X	X	X	X	X	X	X
Rental Platform		X	X	X	X	X	X	X	X	X

* Ear Protection to have available at all times. Mandatory when over 85 Decibels and/or when indicated via signage

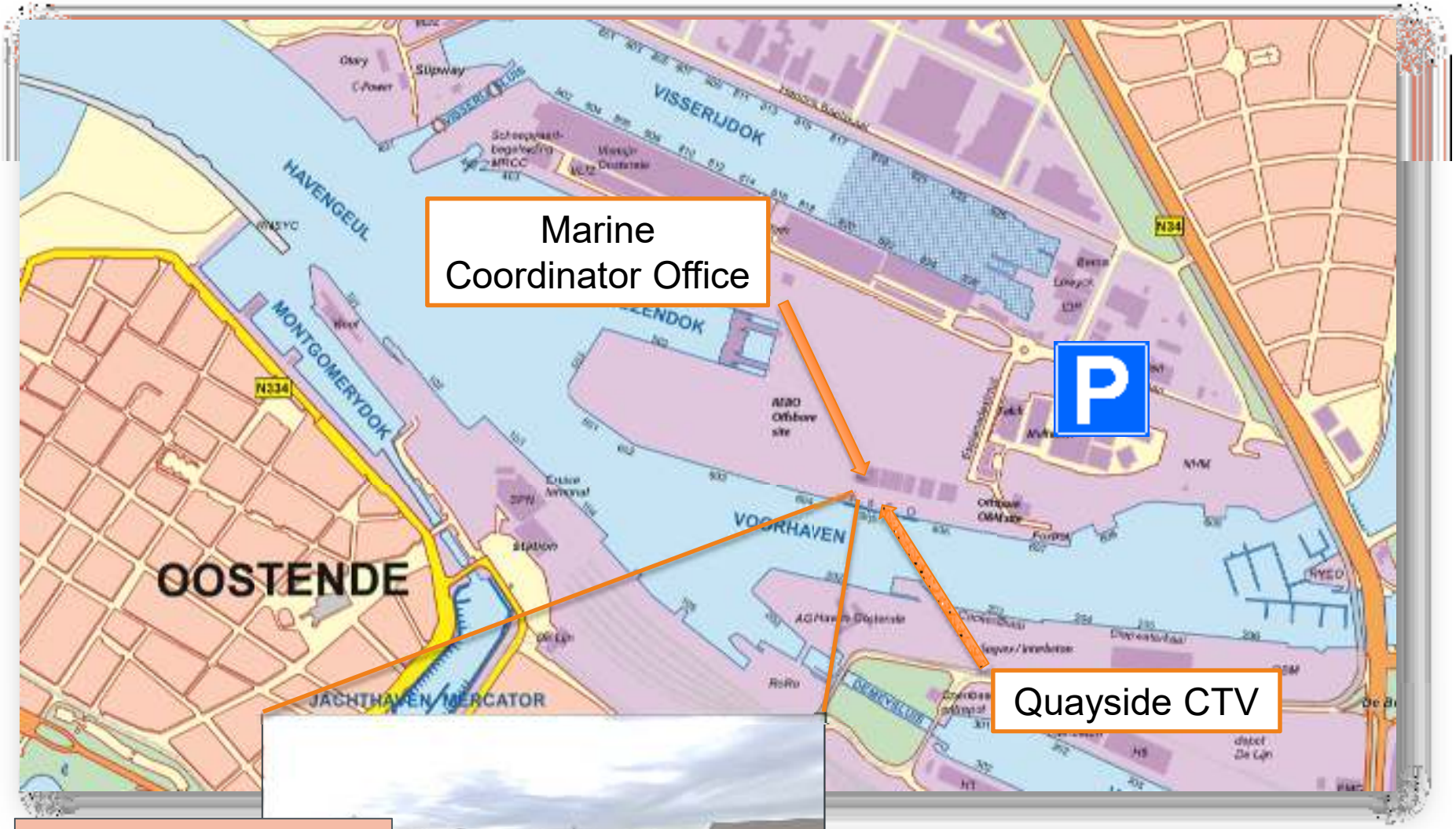
** When climbing boarding ladder, climbing helmet is mandatory. Normal helmet only allowed for transfer at **almost level conditions**

*** Life jacket mandatory when outside the railing or 1.5m from edge when no railing is present

**** Mandatory when there is a risk of falling & injury as per Risk Assessment

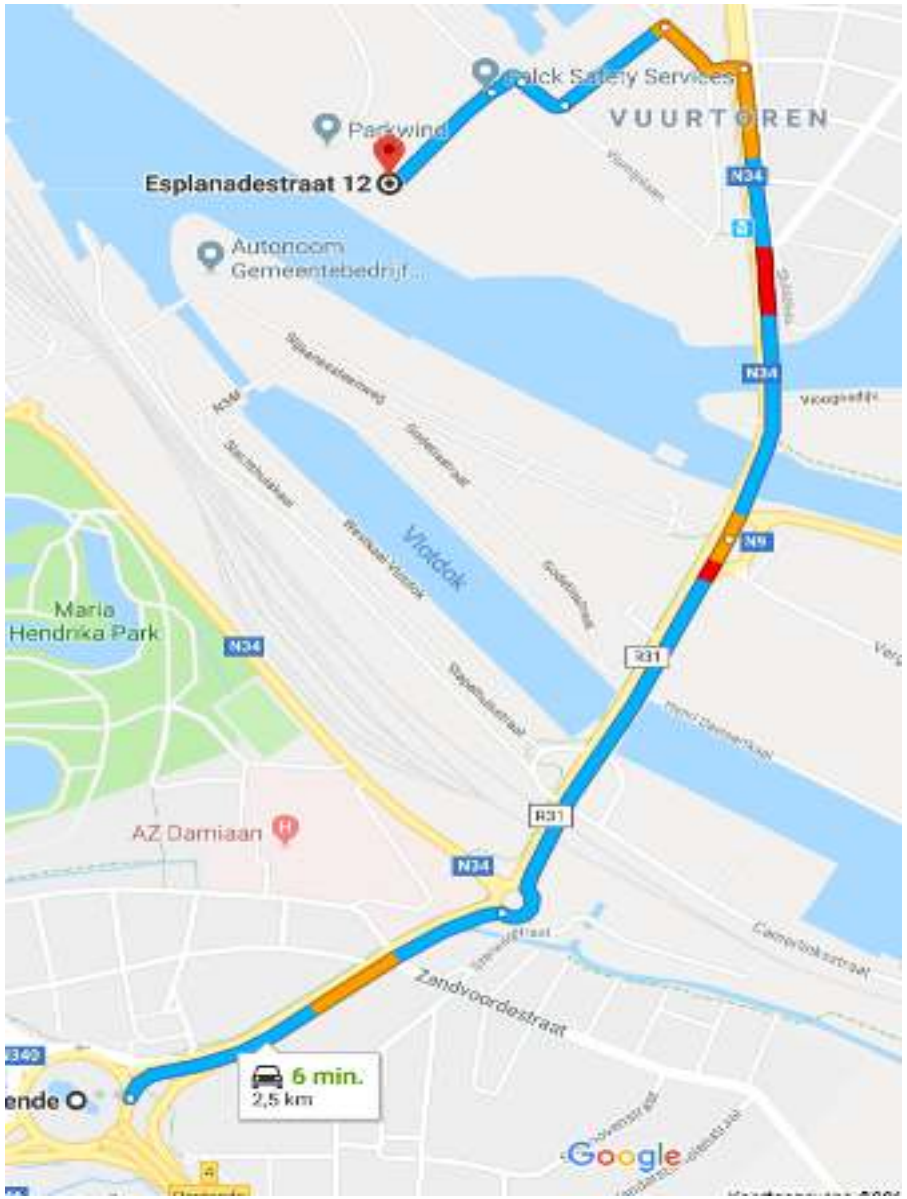
Note: Additional PPE as per Risk Assessment, Legal requirement or PTW requirements.

Contact Details



Esplanadestraat 10
8400 Oostende
Belgium

Contact Details Marine Coordinator



Marine Coordinator
Esplanadestraat 10
8400 Oostende

Telephone:

General number:
+32 (0) 483.73.70.14

Emergency number:
+32 (0)2.382.21.50

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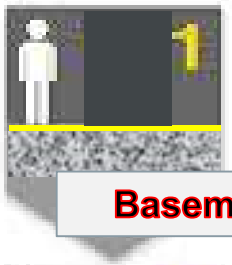
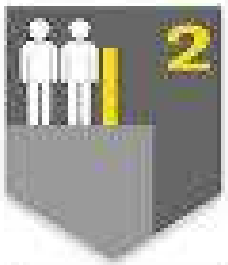
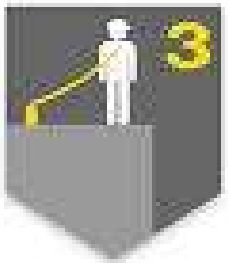
Use the principle regarding the prevention hierarchy

Example: Open basement hatch

Efficiently	Measure	Description	Sequence	Measure
👍👍👍👍		Eliminate the danger Reduce the risks		
👍👍👍		Use collective protection equipment		
👍👍		Use of personal protection equipment		
👍		Call attention to, fence off, Use of pictograms, foresee trainings, make the people aware, …		
				

Basement hatch

1. Dangers, Risks and Preventive Measures

4 different locations

1. Quayside

2. CTV Transfer

3. Helicopter Transfer

4. Offshore structure

1. Quayside

Risk and dangers offshore: Quayside

5 main risks:

- Lifting operations and use crane
- Traffic and personnel
- Gangway
- Pontoon
- Environmental Issues (freezing temp, rain, darkness)

GO FOR ZERO!

Risk and dangers offshore: Quayside

Lifting operations and use crane:

Danger: Falling loads, get crushed by loads

Risk: Severe injury or dead

Preventive:

- Only trained personnel
- Appoint task, who's doing what
- Do not walk under or between loads
- Follow general guidelines lifting and rigging procedure
- Check equipment before every use
- Use only certified equipment

GO FOR ZERO!

Risk and dangers offshore: Quayside

Traffic and personnel:

Danger: Collision with cars, forklift, etc.

Risk: Severe injury or dead

Preventive:

- Avoid unnecessary traffic
- Make up planning who's first etc.
- Use dedicated spot when waiting to embark (next to the entrance gangway)

Risk and dangers offshore: Quayside

Gangway and Ponton:

Danger: Risk of falling, slipping, collision CTV

Risk: Severe injury or dead

Preventive:

- Use three point contact on the gangway
- Only access to the pontoon if CTV is completed moored on
- Do not carry material on the gangway, use back pack or crane to put material on board

GO FOR ZERO!

Risk and dangers offshore: Quayside

Adverse weather:

Danger: risk of falling, incident during lifting

Risk: Severe injury

Preventive:

- Extra attention in wintertime
- No lifting when lighting or lightning risks
- Wearing high viz clothes, PPE
- Housekeeping
- Use road salt or sand

Risk and dangers offshore: Quayside

Embarkation CTV:

- Be on time (15 min before departure)
- All loads are pre-slinged stored in boxes or lifting bags
- Do not walk in the working area of the crane or under suspend loads
- Were correct PPE
- No access to the pontoon before CTV is fully moored
- Follow the guidelines of the captain, deckhand and Elia Representative
- Keep your hands free on the gangway, USE reeling
- Do not carry material on the gangway, use crane
- When arriving on board check the manifest if your name is on it and sign off, if not inform the captain
- Put your PPE on the designated area on board of the CTV

GO FOR ZERO!

2. CVT-Transfer

Risk and dangers offshore: CTV transfer

5 main risks:

- Seasickness
- Slip and trip
- Transfer CTV – Offshore Structure
- Man Over Board
- Lifting operations

GO FOR ZERO!

Risk and dangers offshore: CTV transfer

Seasickness (Motion sickness):

Danger: Dehydration, dizziness, falling

Risk: Severe injury

Preventive:

- Drink enough water
- No empty stomach
- Fix on the Horizon
- Psychological aspects (enough sleep)
- Adaptation programmes

Risk and dangers offshore: CTV transfer

Movement on the CTV during transfer

Danger: Slip and trip accidents, Man over board

Risk: Severe injury or dead

Preventive:

- Keep seated during transfer
- Sit down during approach offshore structure
- Respect housekeeping onboard of the vessel
- Stay inside cabin during transfer
- Access outside during transfer only allowed:
    - In case of sickness (need of fresh air)
    - Toilet visit (CTV with toilet outside)

ALWAYS INFORM CREW AND NEVER GO OUSTSIDE ALONE

LIFE JACKET AND HIGH VIZ CLOTHS ARE MANDATORY

Risk and dangers offshore: CTV transfer

Movement of the CTV during transfer

Danger: Risk of falling during climbing,
being stuck between fender and boat

Risk: Severe injury or dead

Preventive:

- Monitoring weather and wave limits (Captains decision)
- Follow the instructions deckhand
- Use of fall arrestor
- If no fall arrestor available climb with hooks
- No back-packs allowed during climbing
- 1 person at once on the ladder
- 3 point contact

Risk and dangers offshore: CTV transfer

Access platform via boat landing

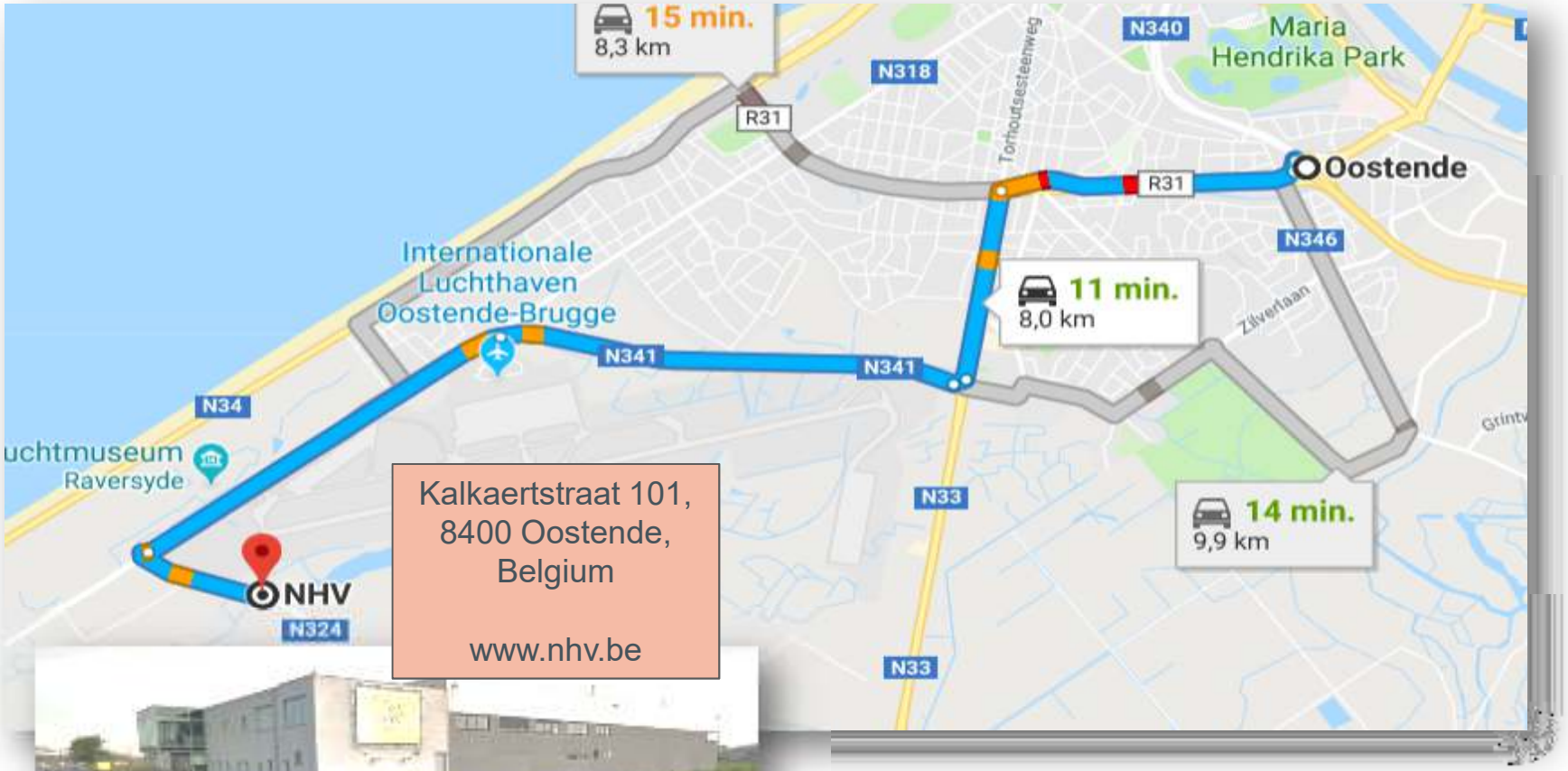
- Sit down until the boat is stable against the boat landing
- Wait for the green light of the captain to go outside
- Follow the guidelines of the deckhand
- On his sign move to the front of the boat
- He will attach the SRL (single retraction line) to your harness via a karabiner or frog connector
- Once attached he will give the sign to start climbing
- When arrived on the resting platform, attach yourself to the structure and remove the hook, and guided it back to the SRL.
- DO NOT let loose to avoid damaging the system
- Continue to the platform and take the last cage ladder to access the cable deck of the platform
- Follow the instructions of the Elia representative on the platform

Modular Offshore Grid: Other equipment

GO FOR ZERO!

3. Helicopter-Transfer

Helicopter transfer – address NHV Heliport Ostend



Helicopter transfer - Boarding info

- Present 30min in advance of take off
- No dangerous goods allowed
- No weapons allowed
- Emergency suit and life jacket supplied by helicopter company
- Max. weight of the luggage = 10kg
- Follow procedures NHV onshore
- Follow procedures HLO offshore

Risk and dangers offshore: Heli transfer

Turning Rotor, Noise, Ditching, Fire

Danger: Hit by turning rotor, get stuck during ditching, noise

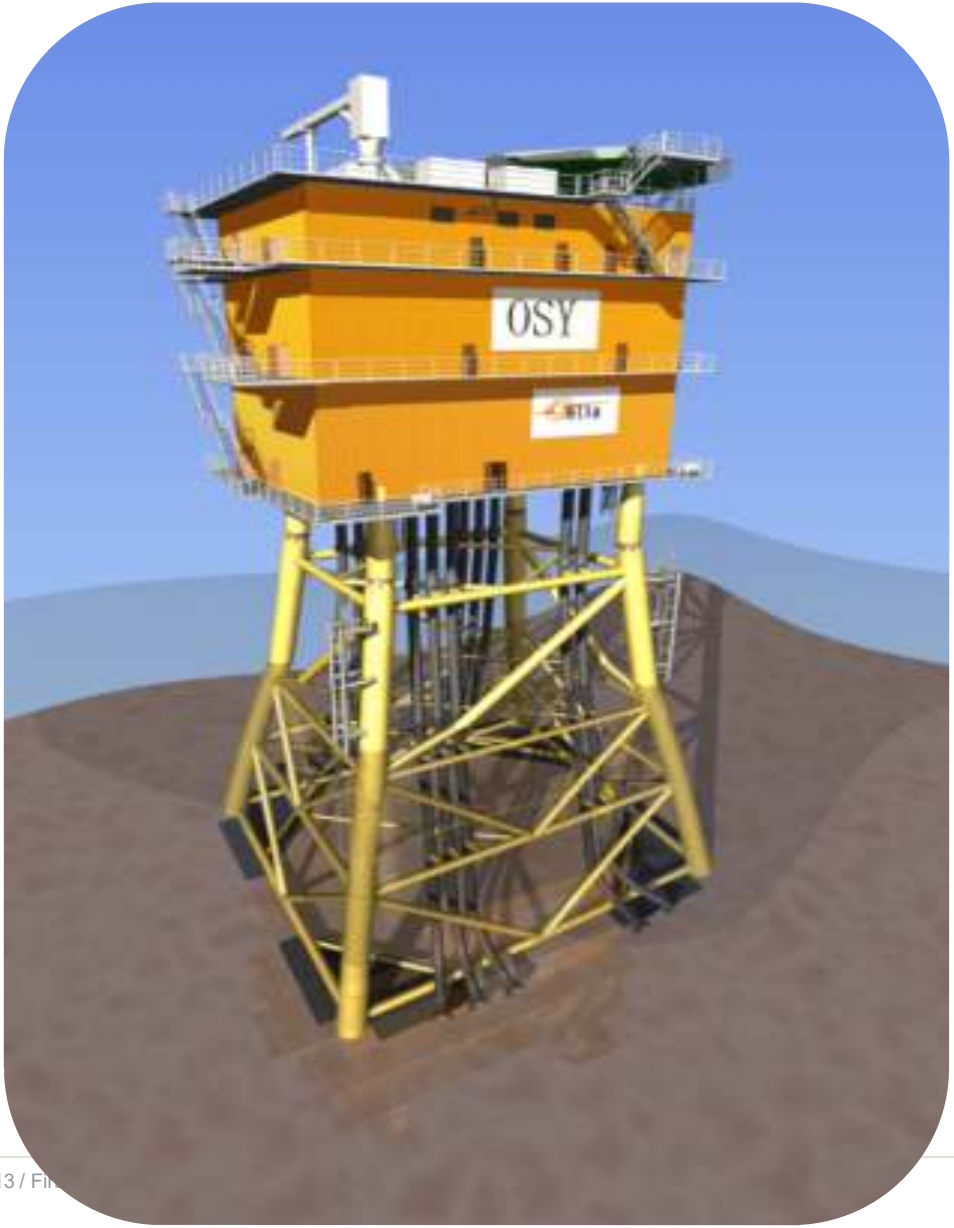
Risk: Severe injury or dead

Preventive:

- HUET training
- Induction helicopter company
- Use ear protection
- Use provided PPE by Helicopter company
- No access allowed on the helicopter platform for unauthorized personnel

GO FOR ZERO!

4. Offshore-structure



Risk and dangers offshore: Electricity

- Danger: HV, LV, Batteries
- Risks: electrocution, electrification, arc flash
- Prevention measures:

1. Switch off energy
2. Follow Procedures
3. Collective protection (fencing off)
4. PPE
5. Signalization (pictograms)

Risk and dangers offshore: Electricity

- Difference between an AIS & GIS High Voltage installation

AIS: AIR ISSOLATED SWITCHGEAR

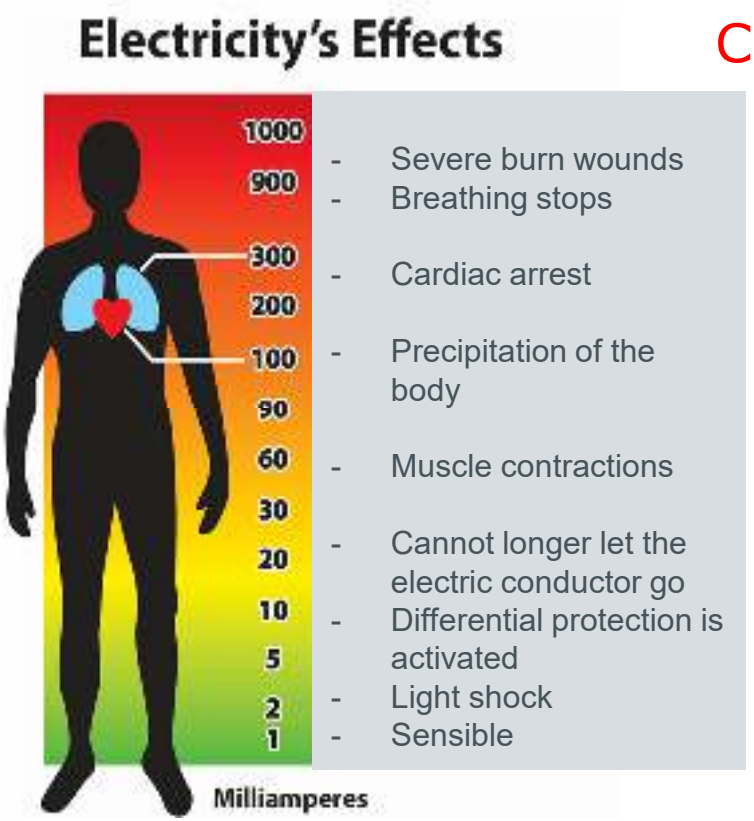
GIS: GAS ISSOLATED SWITCHGEAR

HV-Equipment (GIS: Gas Isolated Switchgear)

LV-Equipment

Risk and dangers offshore: Electricity

Electricity is invisible, odourless and silent and has specific and high risks involved!



Consequences:

- Muscle contractions
- Burn wounds (internal and external)
- Arterial fibrillation
- Damage to tissues, blood and nervous system

A power surge from 30 mA for a 2 seconds period can be deadly!

Risk and dangers offshore: Electricity
Electromagnetic fields (50Hz)

Electric field

Increased electric field in HV stations ≥ 220 kV

Magnetic field

Minimum safety distances:

Single phase power cables > 50 cm, ex.

During movements in basements

Persons with Electronic Implants:

Contact health & safety doctor of Elia

Risk and dangers offshore: Lifting & Rigging

Platform is equipped with 3 cranes:

- One Palfinger PSM 1500-12 (5,5T SWL)
- Two Palfinger Davit Cranes PF10000 (1T SWL)

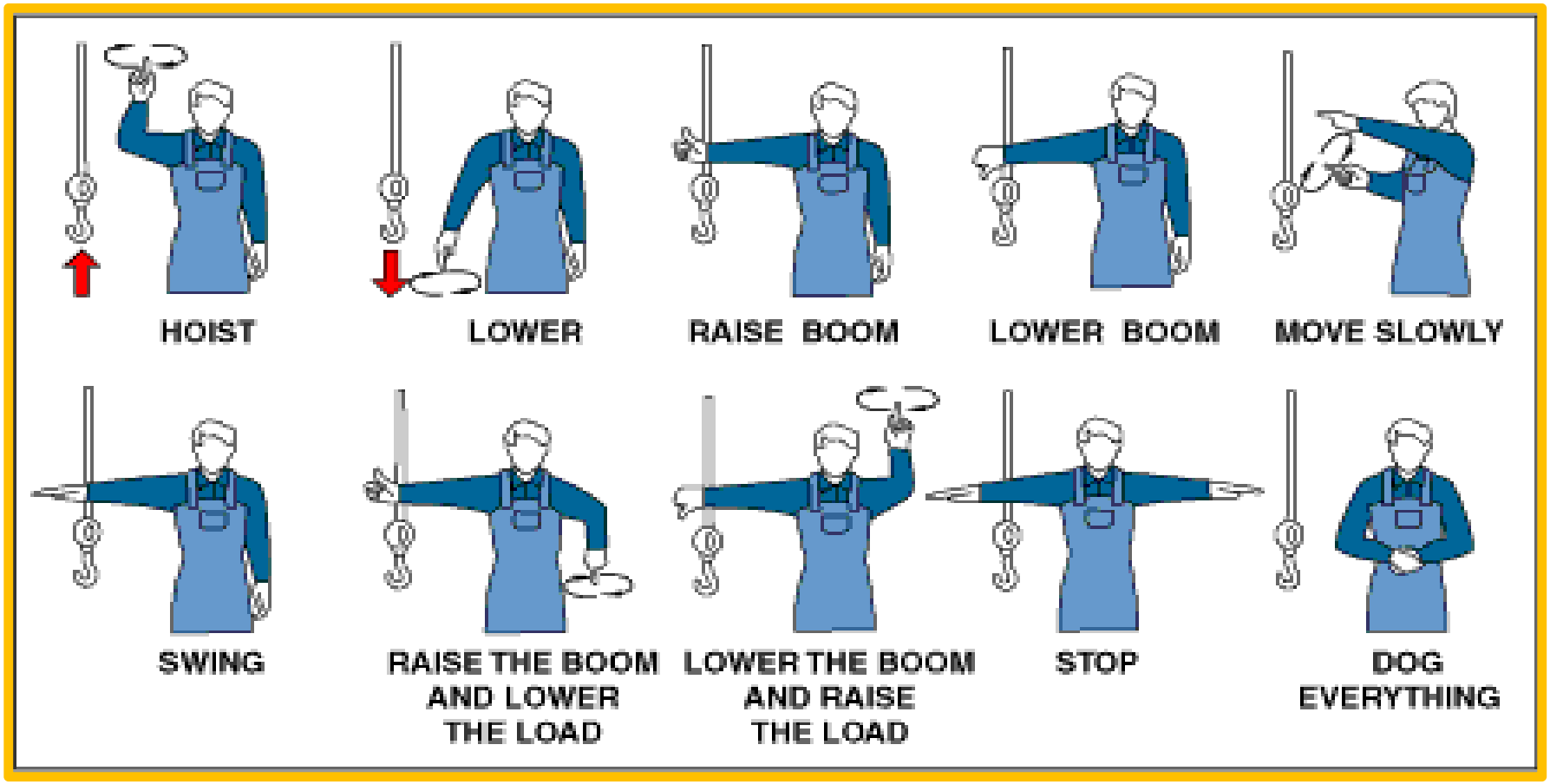
GO FOR ZERO!

Risk and dangers offshore: Lifting and Rigging

- Danger: Suspended loads, falling object, hit or stuck by moving load
- Risk: Severe injury or dead
- Prevention measures:
  - Training personnel lifting and rigging
  - Do not walk under suspend loads
  - Use correct and inspected lifting material
  - Use PPE (Helmet – High VIZ)
  - Good communication
  - Correct procedure
  - Visible contact between active parties
  - For non standard lifts, lifting plan is mandatory
  - All lifts must be pre-rigged at the quayside

Risk and dangers offshore: Lifting and Rigging

Communication



Risk and dangers offshore: Lifting and Rigging

Limiting factors (environment)

- Visibility
  - Fog
  - Daylight
- Windspeeds
  - <10m/s: no limitation
  - Between 10 and 15 m/s: standard loads ok, others must be evaluated
  - > 15 m/s no lifting
  - No lifting operations during helicopter operations!
- Lightning
  - No lifting allowed
- Sea state
  - Boat must be stable against the boat landing
  - Or in stable DP mode
  - Sea state <1,0m Significant

Risk and dangers offshore: Lifting and Rigging

Guidelines lifting and rules

- Crane driver and banksman/slinger are responsible for the job
- Never swing loads or crane above people or wheelhouses
- Never walk under the load
- Only people involved during lifting are participating, others stay in the safe area.
- Use tagline to guide objects if required
- Keep out the danger zone during lifting
- Do not use damaged or not certified lifting equipment
- All equipment is pre-slinged and prepared for lifting
- Take care and help each other
-

IF NOT SAFE: STOP THE JOB

GO FOR ZERO!

Risk and dangers offshore: Dangerous Goods

- Danger: paint, solvents, gasses, oil, flammable liquids
- Risk: Explosive, flammable, toxic, burn wounds, environmental risks,…
- Prevention measures:
  - Replace dangerous product by other less dangerous
  - Insure proper ventilation
  - Use correct containers (base & acids)
  - Read the labels H&P sentences (Hazard & Precaution) - (GHS-CLP) → use SDS
  - Do not mix products
  - Do not store more then daily use quantity in the working area
  - Use proper PPE
  - IMDG declaration for transport

Risk and dangers offshore: Dangerous Goods

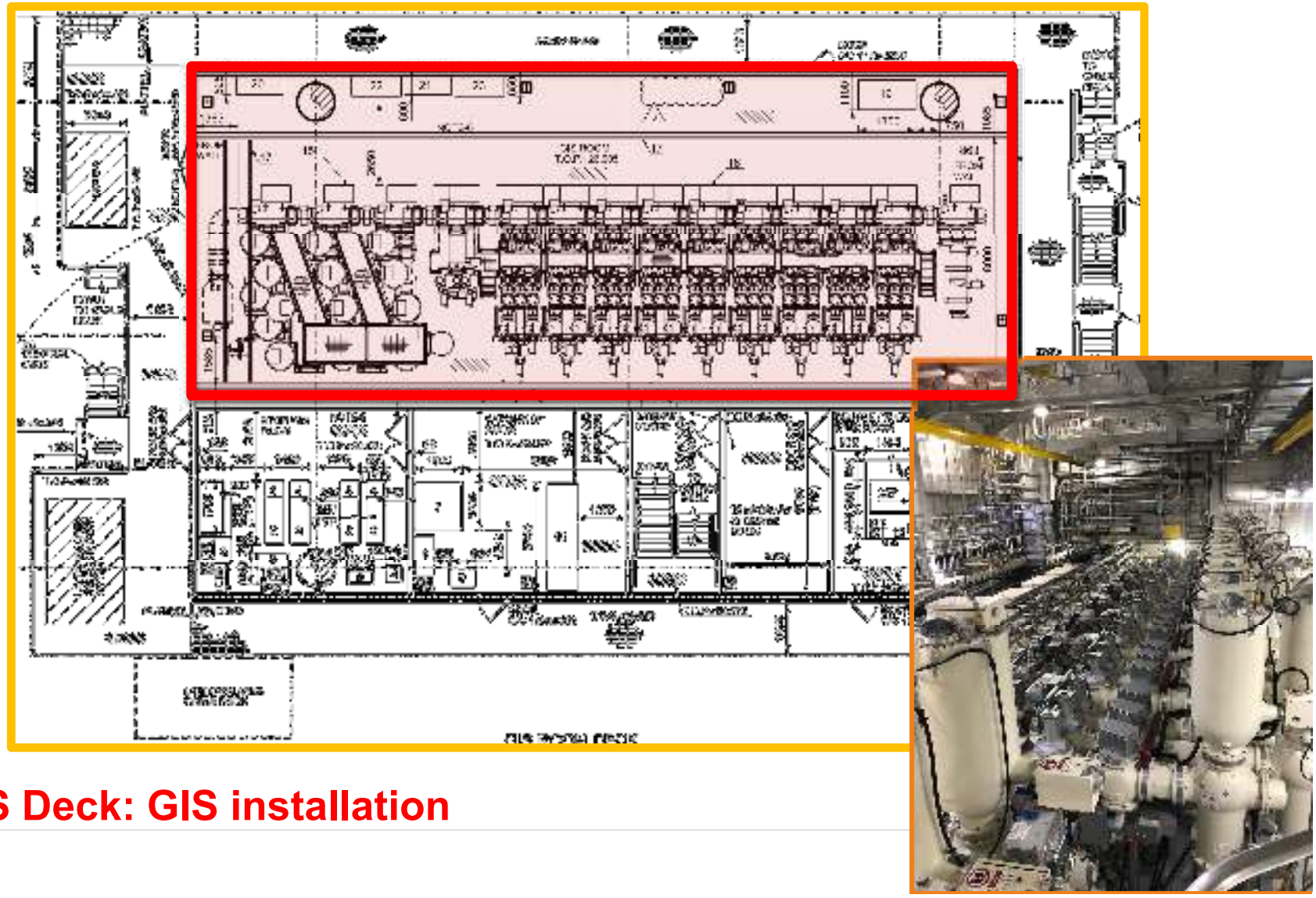
What:

- SF6 gas
- Fire Fighting systems
- Diesel
- Oil
- Acids
- Paint
- Waste water
- Etc.

List all dangerous product in the Risk Analysis

Risk and dangers offshore: Dangerous Goods

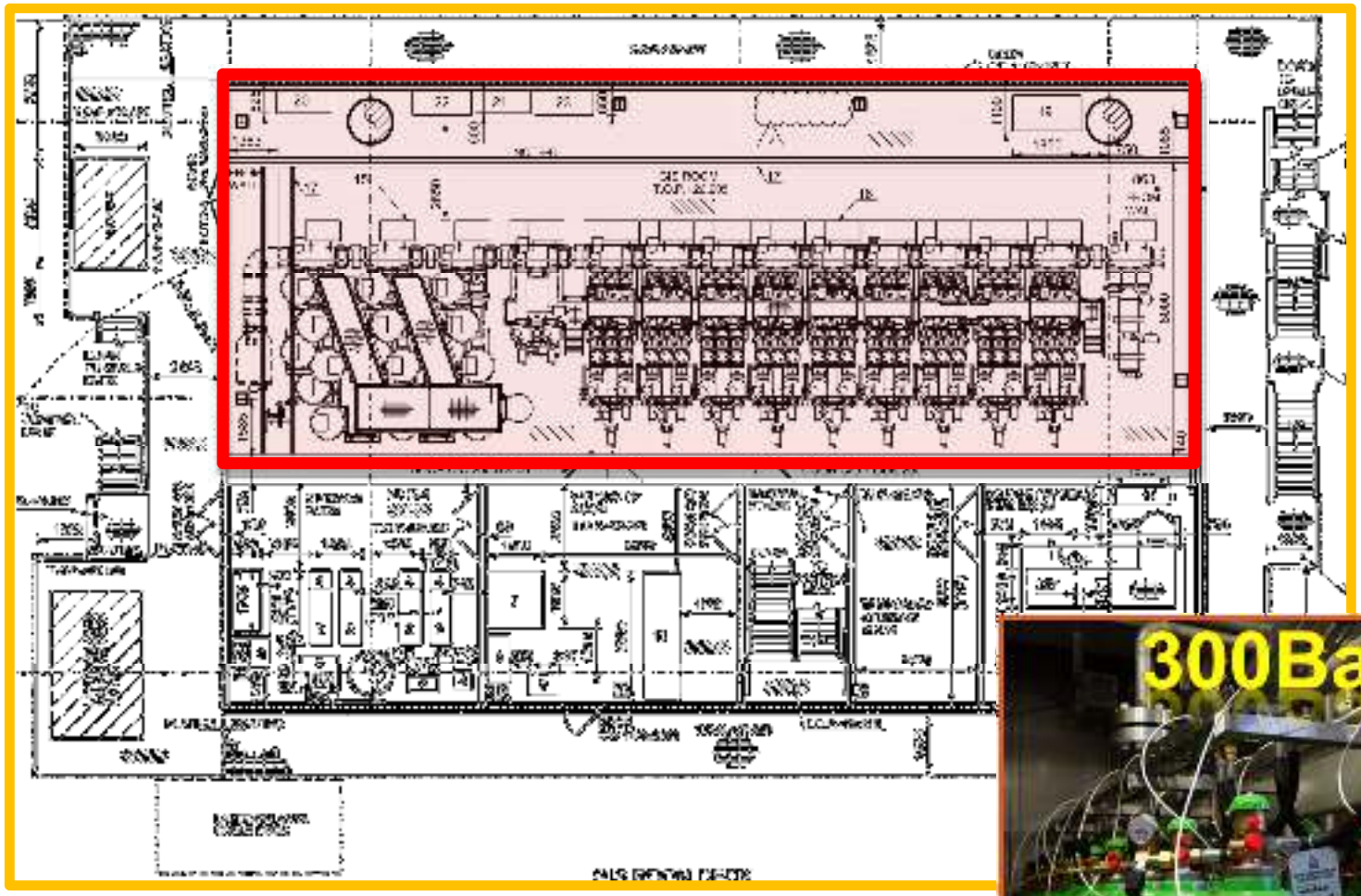
- Location(s) with SF6



GIS Deck: GIS installation

Risk and dangers offshore: Dangerous Goods

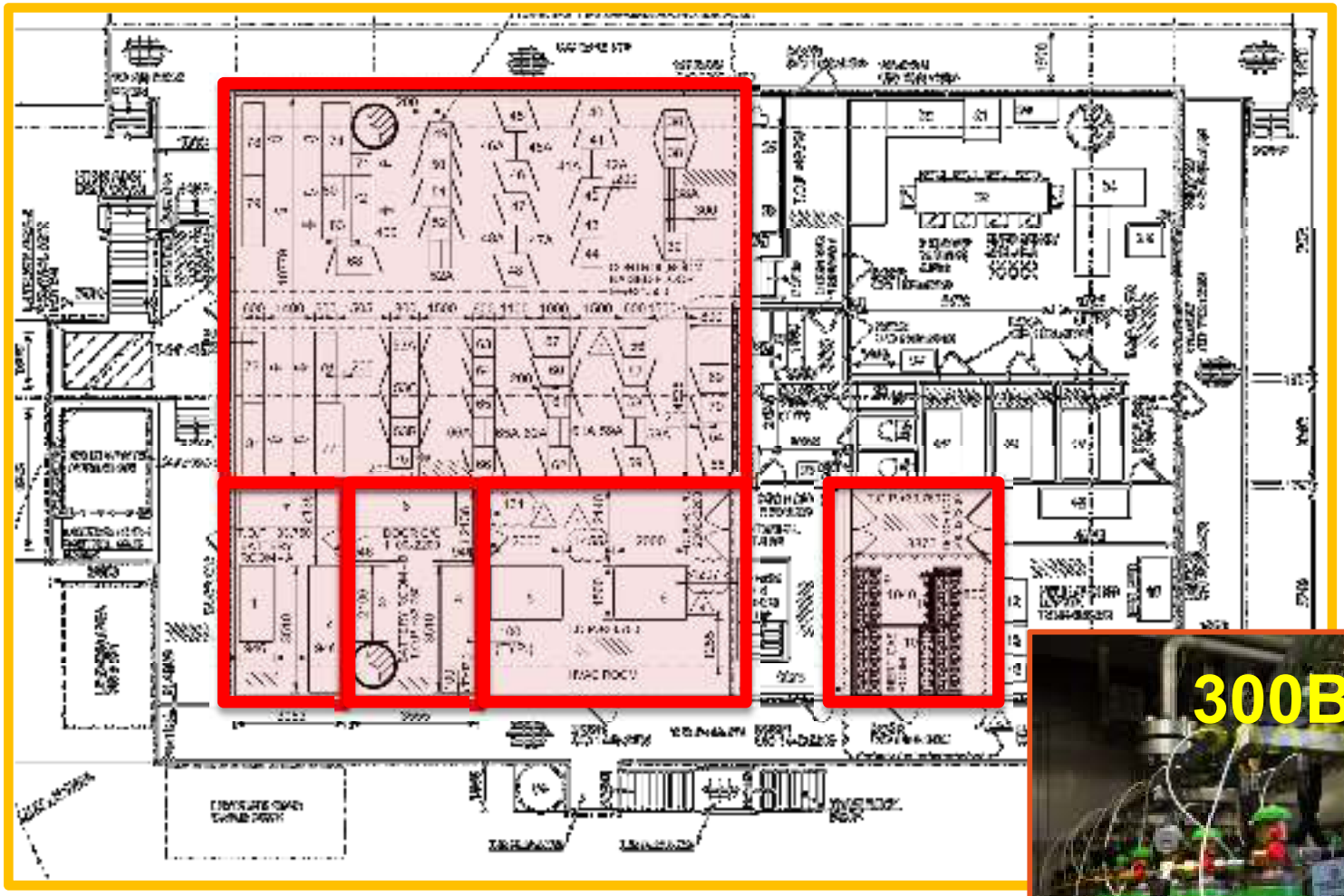
- Location with Inert gas (Fire fighting)



GIS Deck: GIS installation

Risk and dangers offshore: Dangerous Goods

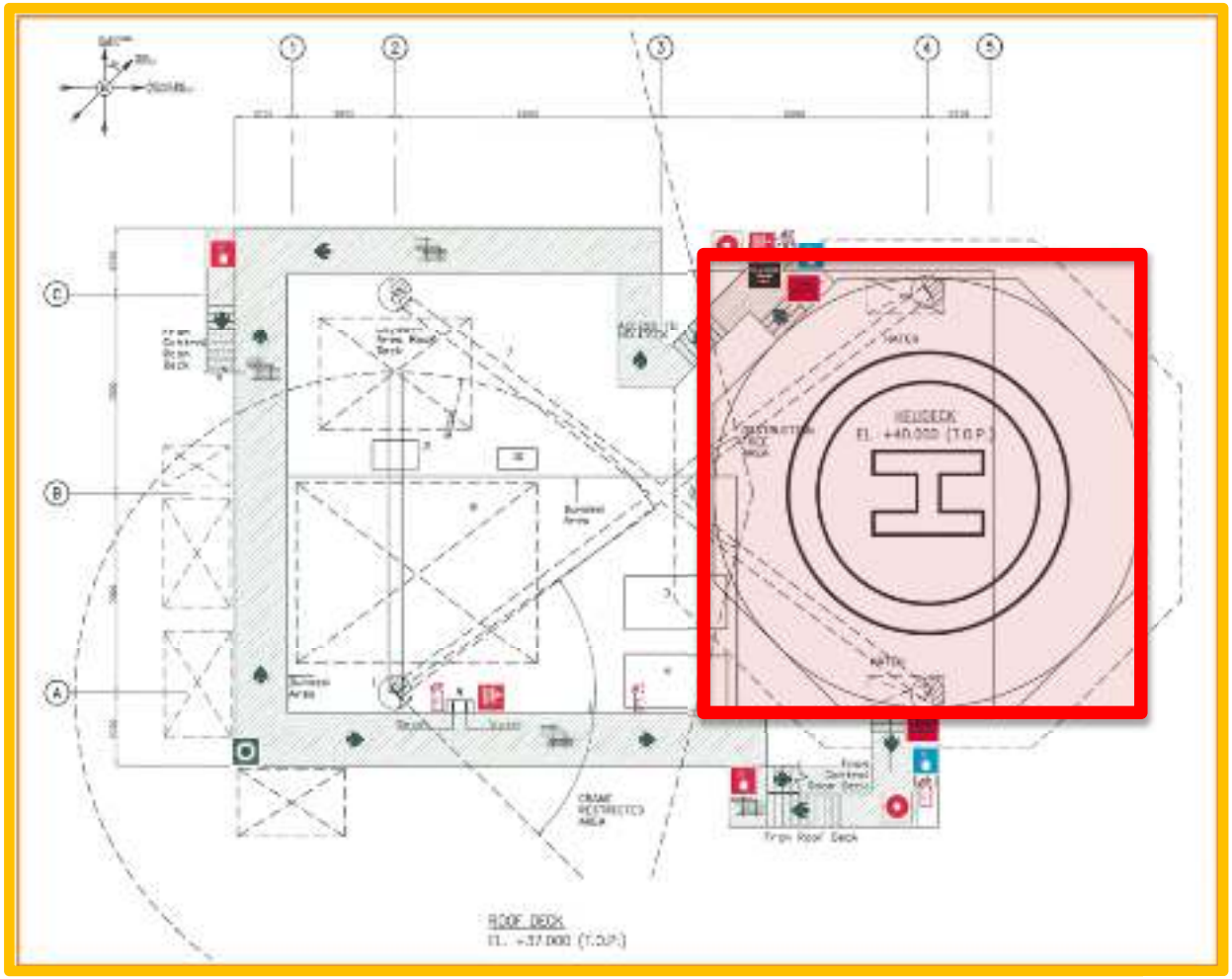
- Location with Inert gas (Fire fighting)



Control Deck: Control-, HVAC-, Battery- and Inert Gas room

Risk and dangers offshore: Dangerous Goods

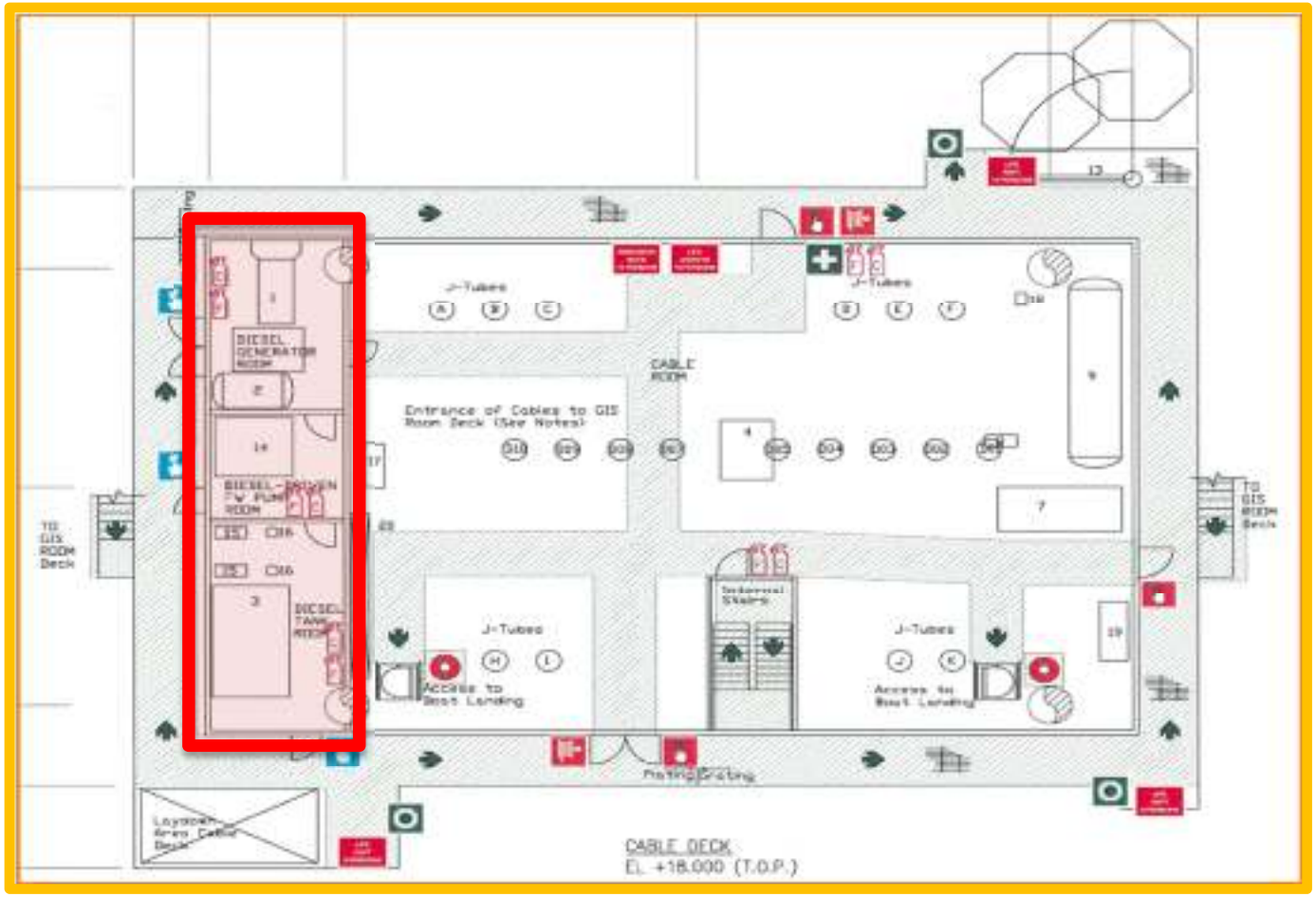
- Location with foam system (Fire fighting)



Top Deck: helicopter pad

Risk and dangers offshore: Dangerous Goods

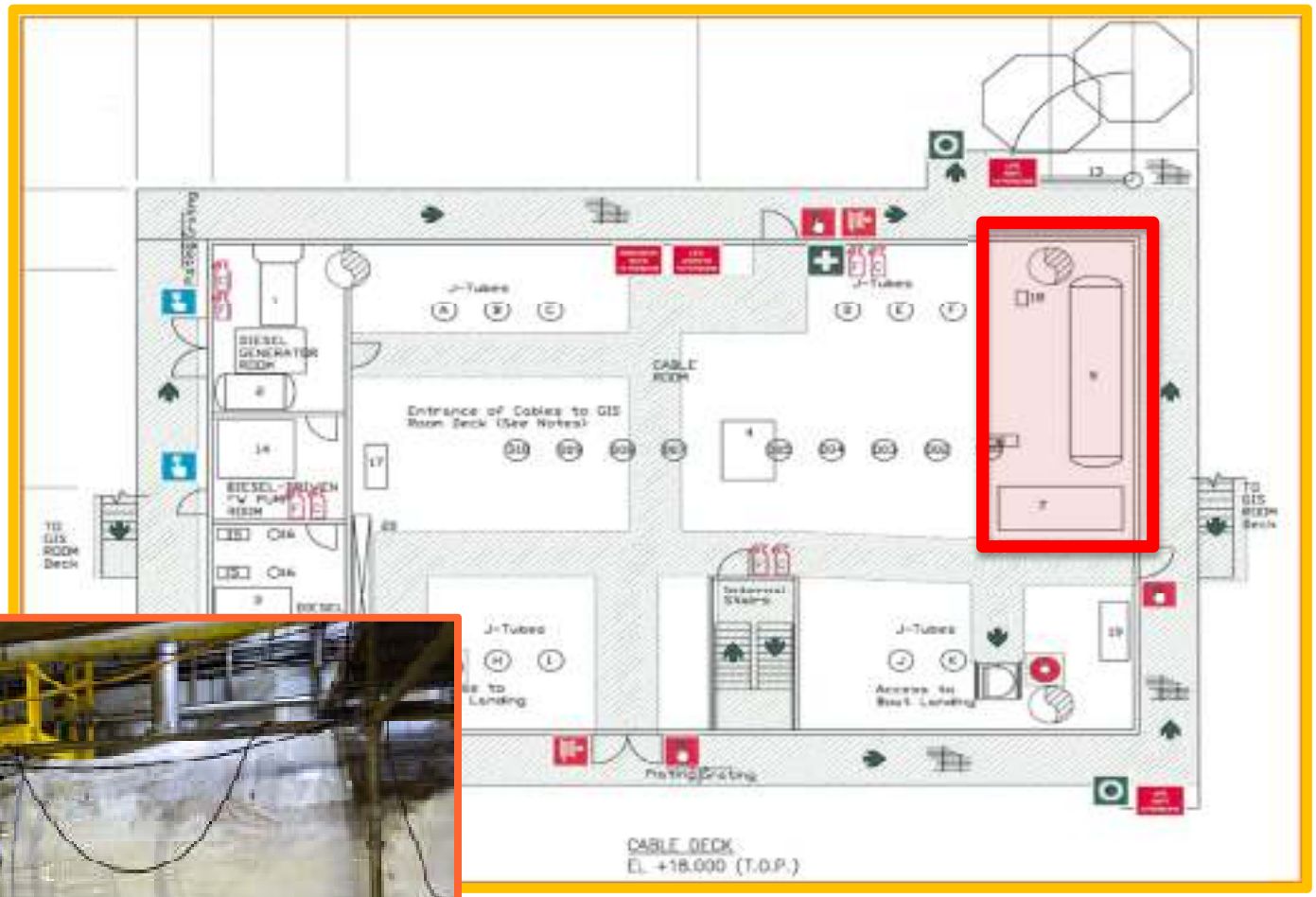
- Diesel storage



Cable deck: Diesel storage tank

Risk and dangers offshore: Dangerous Goods

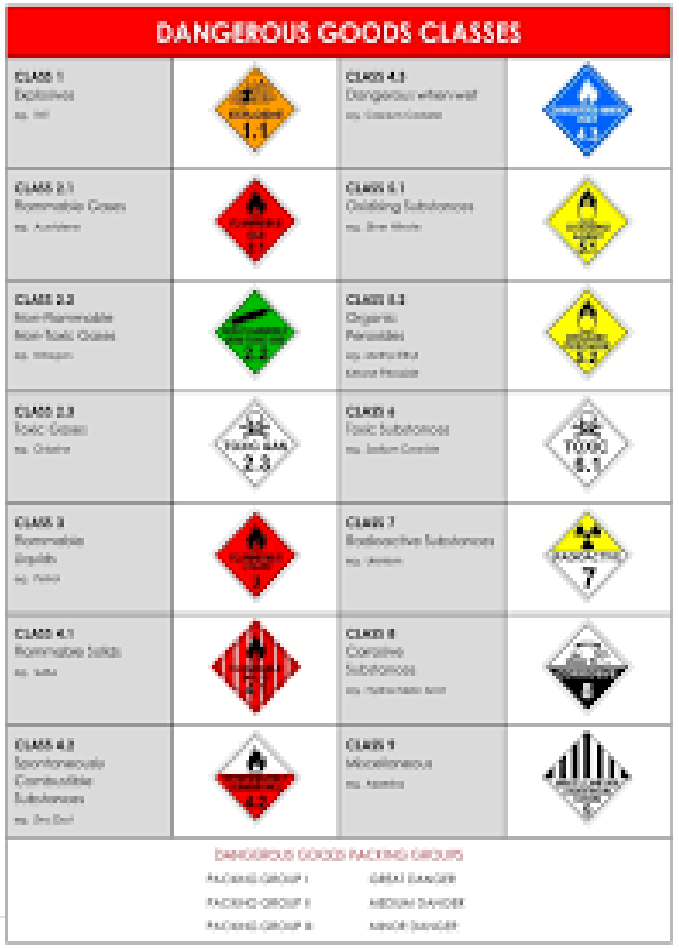
- Storage tanks waste water



Cable deck: sludge storage tank

Risk and dangers offshore: Dangerous Goods

- Transport of Dangerous Goods Offshore
  - According to IMDG standard (International Maritime dangerous goods standard)
  - All goods must be listed up
    - Quantity
    - Risks
    - Additional safety measures
  - SDS files must be available
  - Captain must agree
  - Same for empty packages that contained Dangerous Goods



Risk and dangers offshore: Weather conditions

Environmental factors when sometimes mitigating actions are required:

- Extreme low or high temperatures
- Rain or snow
- Sunlight (Use safety sun glasses)
- Dense fog
  - **Stop the activities** when team members of the team or parts of the installation can no longer be distinguished
- Thunder
  - In case of thunder or/and lightning stop all activities on the platform and go to the emergency shelter and wait on feedback of the marine coordinator who will monitor the weather
- Wind
  - No working at heights (external) or lifting activities when wind speed is higher then 60km/h or 15m/s

Environmental factors

<u>No helicopter flight or landing possible when</u>:

- **Fog**
- **Freezing temperatures**
- **Snow**
- **Lightning & Thunder**

Risk and dangers offshore: Noise

When sound becomes annoying → Noise

Noise contributes to:

- Limited intelligibility
- Misunderstood instructions
- Reduces concentration
- Environmental annoyance
- Deafness

Preventive measures:

- Remove noise source (generator, compressor, …)
- Use appropriate working tools
- Limit the exposure time
- Use hearing protection (> 85 dB(A))

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GO FOR ZERO!

Demarcation

2 types demarcation :

Mechanical risks:

Yellow-black

Electric risks

White,

Red/White,

Deep red

Demarcation colours used in Elia HV-stations

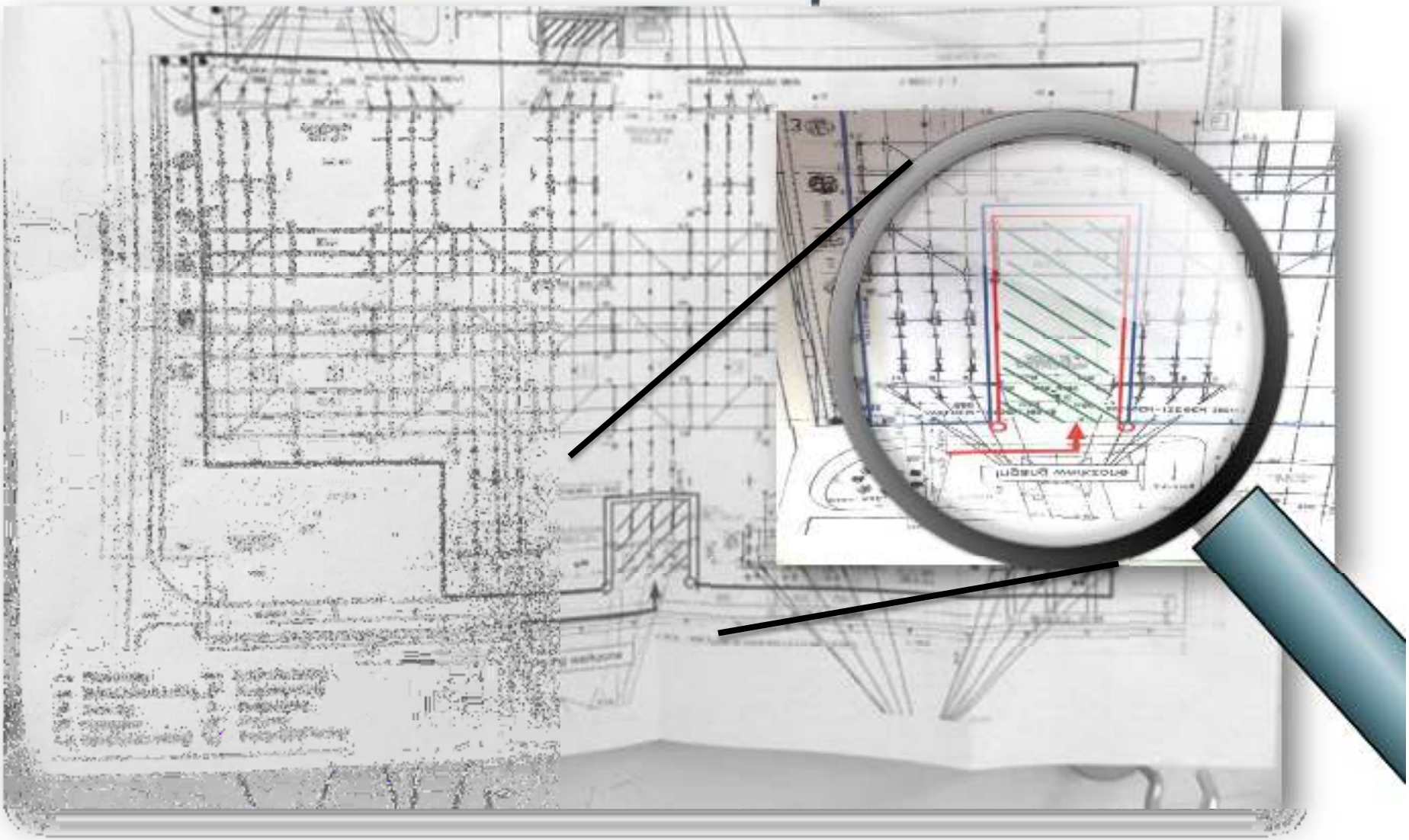
WHITE: Entry ways

RED/WHITE: Work and storage area

DEEPRED: Immediate and serious danger

YELLOW/BLACK: fall, trip and impact hazard

Demarcation plan

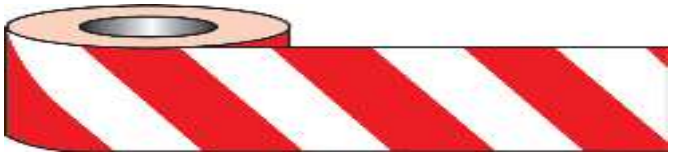


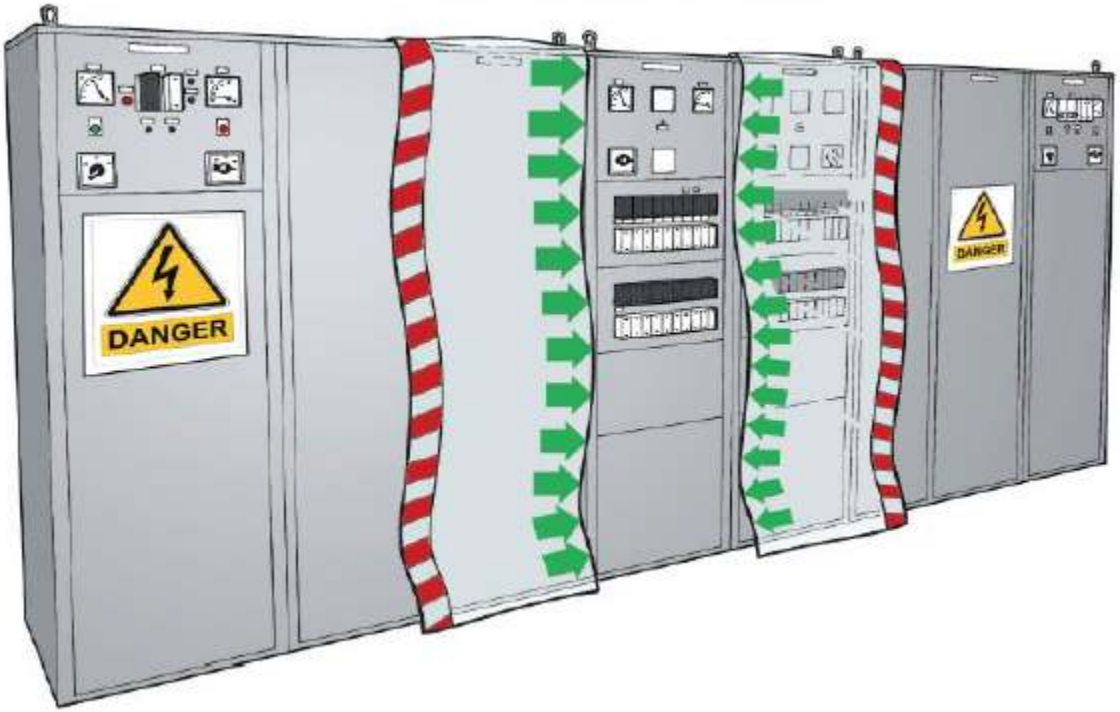
Drafted by WL, LSO or Elia responsible
Dated and signed off by both parties

White demarcation:
(additional) access roads

Entry
workzone

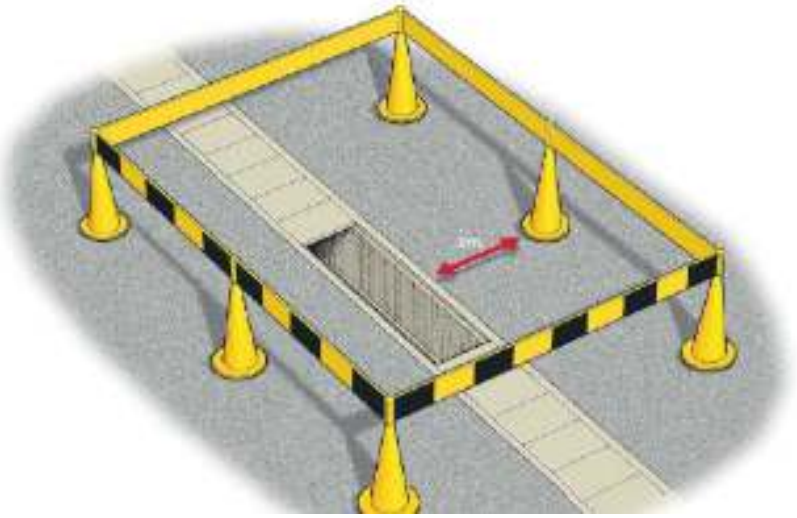
Demarcation
low voltage installation





Double deep red demarcation because. (temporary)
immediate and serious danger
ex. Cable measurements, dielectric tests, …

Yellow/Black: fall, trip and impact hazard



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GO FOR ZERO!

Test preparation and commissioning

- If possible, people not involved in the interventions/activities should be requested to leave GIS-Room
- The Switching Officer/Local Safety officer must install the signage in such a way that the live area cannot be approached or entered.
- The Local Safety Officer is responsible for coordination during this type of intervention.
- Further measures determined by the RA may also be applicable.

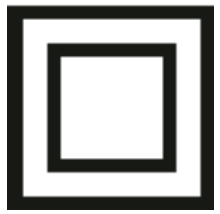
Tools and Machines

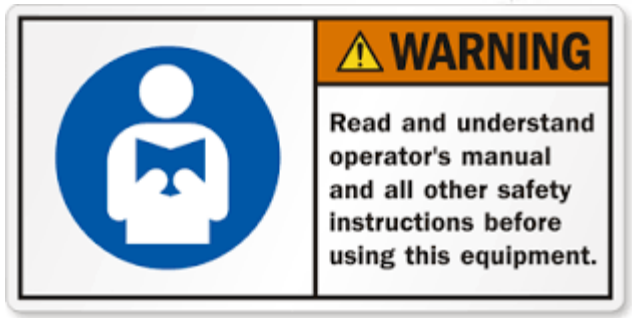
Conditions:

- Comply to machine guidelines and instructions
- IP 44 + preference double isolated

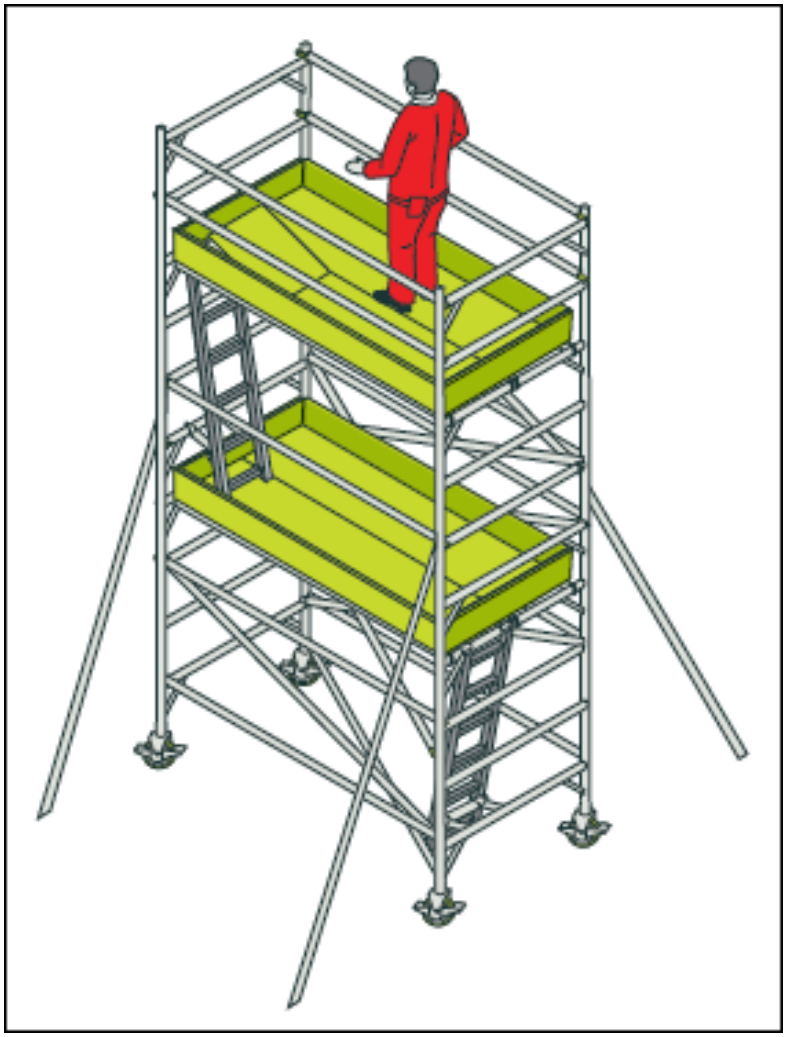
Use:

- In good condition and regular maintenance done
- If broken → do not use → repair first
- Condition electric plug and wire
- Use differential switch (value: 30 mA)
- Check protection before use
- Install gensets and compressors away from the work spot (noise, exhaust fumes, etc. …)
- The equipment must be enough waterproof or protected against water ingress (IP44)





Points of attention



Wheels must be block & do not roll manned scaffolding

Ladders

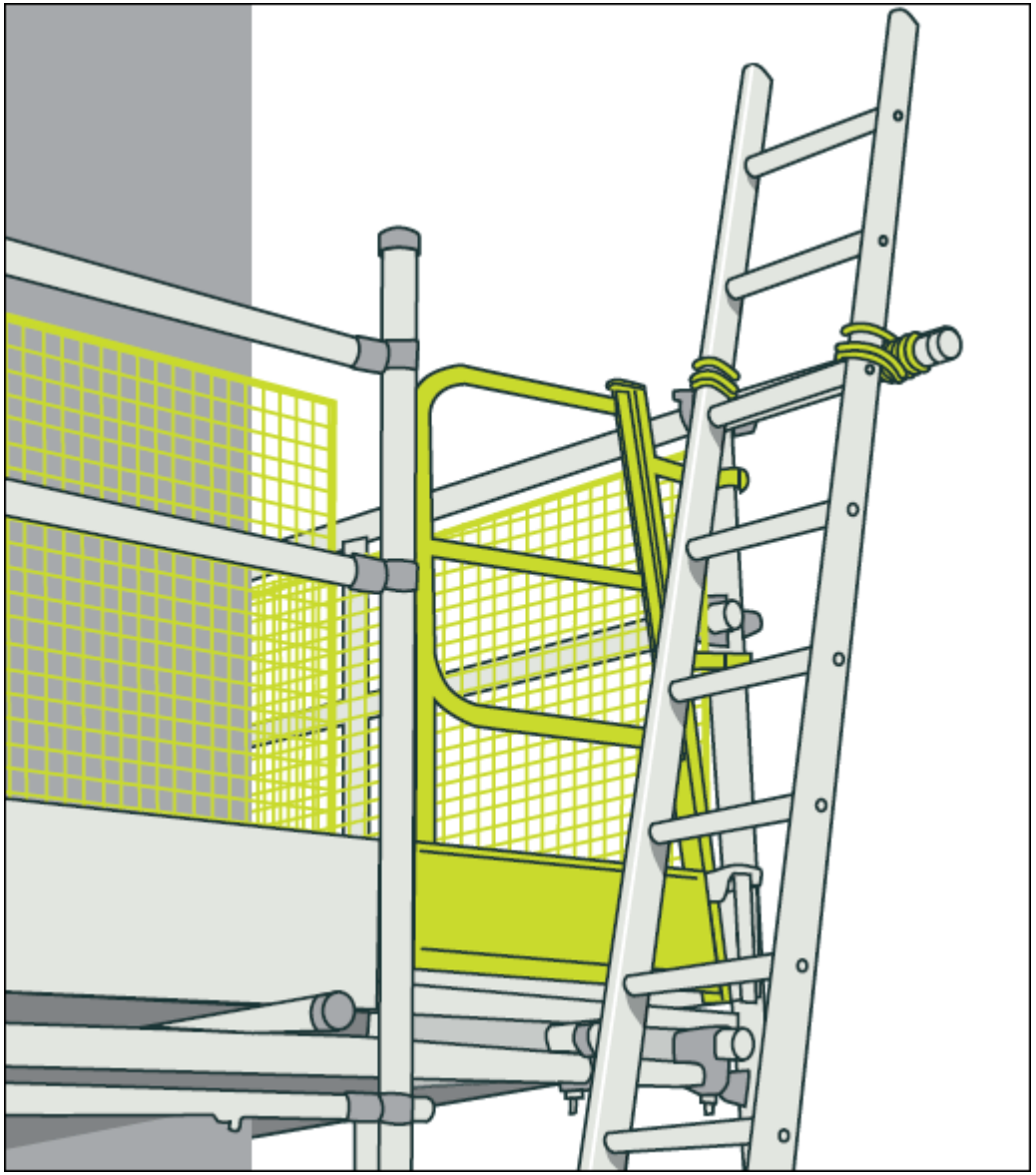
Conditions:

- Correct use according AVIO procedure
- Only fiberglass ladders allowed by electrical installation
- Periodic inspections (by competent person)

Use:

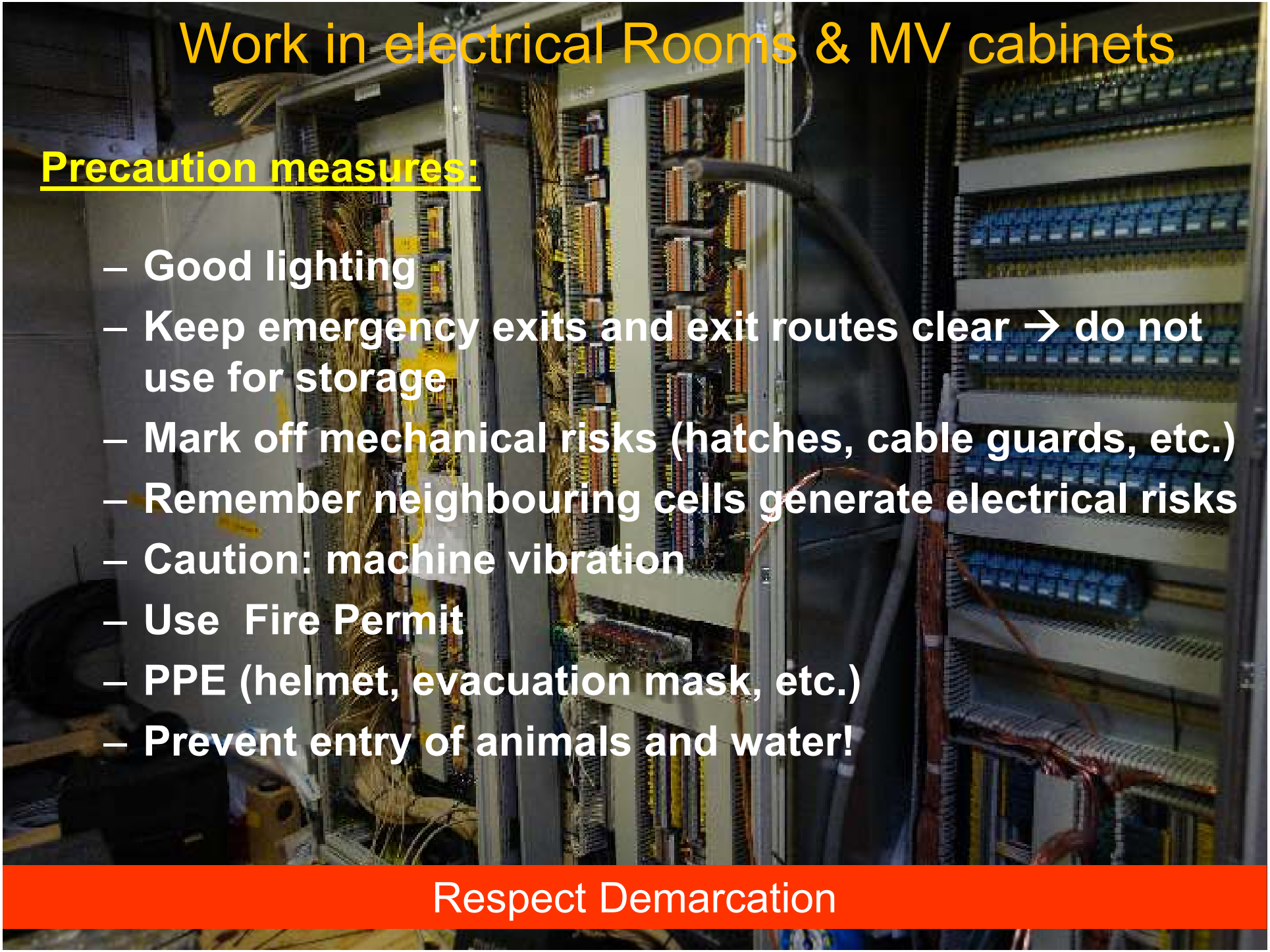
- Use ladder supports (if available)
- In theory, used only to climb (not as work platform)
- Works without force and limited in time:
  - Visual inspection
  - Short time
  - Limited height

Ladder supports



Use of ladder support + Ladder (isolated material) attached to structure

Work in electrical Rooms & MV cabinets



Precaution measures:

- Good lighting
- Keep emergency exits and exit routes clear → do not use for storage
- Mark off mechanical risks (hatches, cable guards, etc.)
- Remember neighbouring cells generate electrical risks
- Caution: machine vibration
- Use Fire Permit
- PPE (helmet, evacuation mask, etc.)
- Prevent entry of animals and water!

Respect Demarcation

Work on GIS installations

220.000V~
GAS: SF6

Precaution measures:

- Same measure as in MV cabinets + …

- Good ventilation
- Maintenance by at least 2 persons
- When opening of compartments:
  - Wear gloves and dust mask
  - Use vacuum cleaner with correct filter
  - Do not eat and drink
- Do not Smoke!

- In case of contact with metal fluorides:
  - Clean skin with soap and/or bicarbonate
  - If using disposable overall → use shower
  - Contact with eyes → rinse out with water + use of eyewash (First Aid kit)

When determing the smell of rotten eggs

(Sulphur compounds)➔ evacuate!!!

Work area with explosion risks

Precaution measures:

- Use appropriate equipment (non-return valves, hoses, …)
- Ventilation
- Use of Hot work permit
- Avoid leaks (trace them with water and soap) + repair
- Keep gas bottles straight up and fix them
- Keep only daily needed quantity on the work floor
- Respect storage requirements (temperature, humidity, …)
- Keep gas bottles away heat and ignition sources
- When gas and oxygen supply → protection against hose break
- Do not use oil or grease on the seal
- Use correct PPE (face shield, gloves, goggles,…)

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GO FOR ZERO!

Emergency Situation: Scale and Flow

The emergency is limited enough and the administrator can control the emergency with his own personnel and resources

YES

Administrator starts the internal emergency plan and informs the competent authorities

TIER 1

NO

Administrator immediately alerts the competent authorities

Public services take the lead of the intervention

TIER 2

Emergency Situation:
How & Who to communicate

Means of communication:

- IP phones on board offshore structures
- VHF radio (Short range)
- Cell phone if coverage is guaranteed
- Satellite phone

Who to contact in case of emergency: (by platform responsible)

- **Always contact the Marine Coordinator Call: +32 (0)2 382.21.50**
- If only VHF radio available contact the captain of the CTV
- Very last option use VHF channel to send out distress signal

What to report:

- Location of the incident
- What happened
- Condition of the victim (do not distribute names over the radio)
- Is the situation under control
- Proceed communication as needed

GO FOR ZERO!

In case of emergency call
MARINE COORDINATOR

Accidents:

Determine the cause and take care of own safety, do not take risks

Inform Marine Coordinator – Stay in line with the MC!

Take care of the vital functions (breathing, heartbeat) and non vital functions (bleeding, …)

First AID

Accident with electrocution :

Inform Marine Coordinator & Elia Dispatching

Have the installation secured

Use an isolated stick to remove the victim from the installation

First AID for electrical accidents

In case of emergency call
MARINE COORDINATOR

Fire or Explosion

Evacuate affected room, be aware for toxic

Inform Marine Coordinator

Describe the situation

Have the installation secured

In case you extinguish yourself → Use right means (CO_2 of powder ABC)

Burn wounds:

Main Rule: First Water, later all the rest!

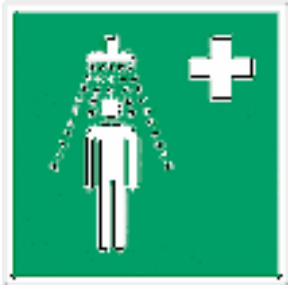
Clothing in fire → use fire blanket, work jacket or roll the casualty over the floor

Do not remove burned clothing unless entrapment or burn wounds caused by chemicals

Do not give anything to drink

Use emergency shower

In case of emergency call:
MARINE COORDINATOR

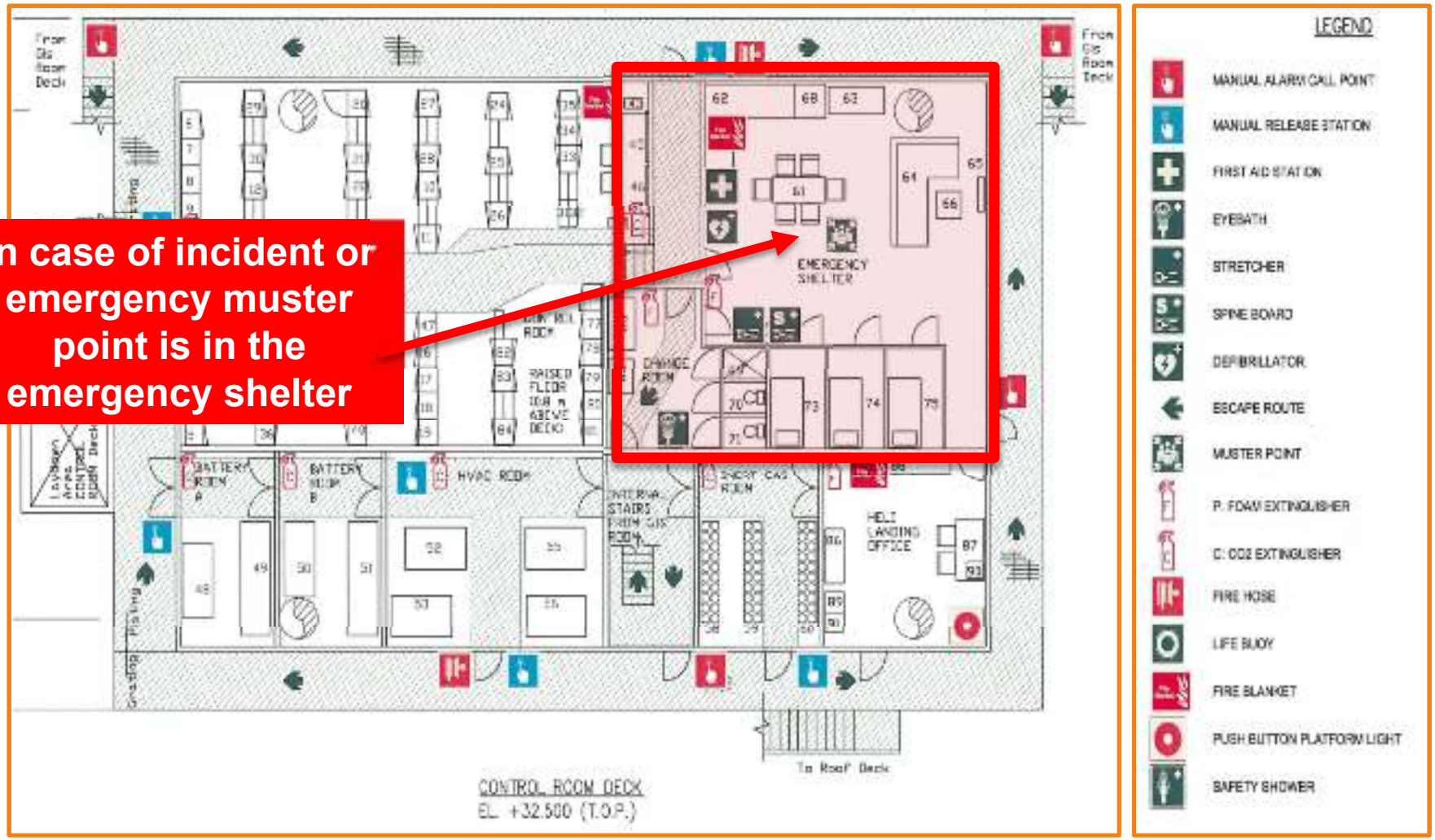


Marine coordinator

Call: +32 (0)2 382.21.50

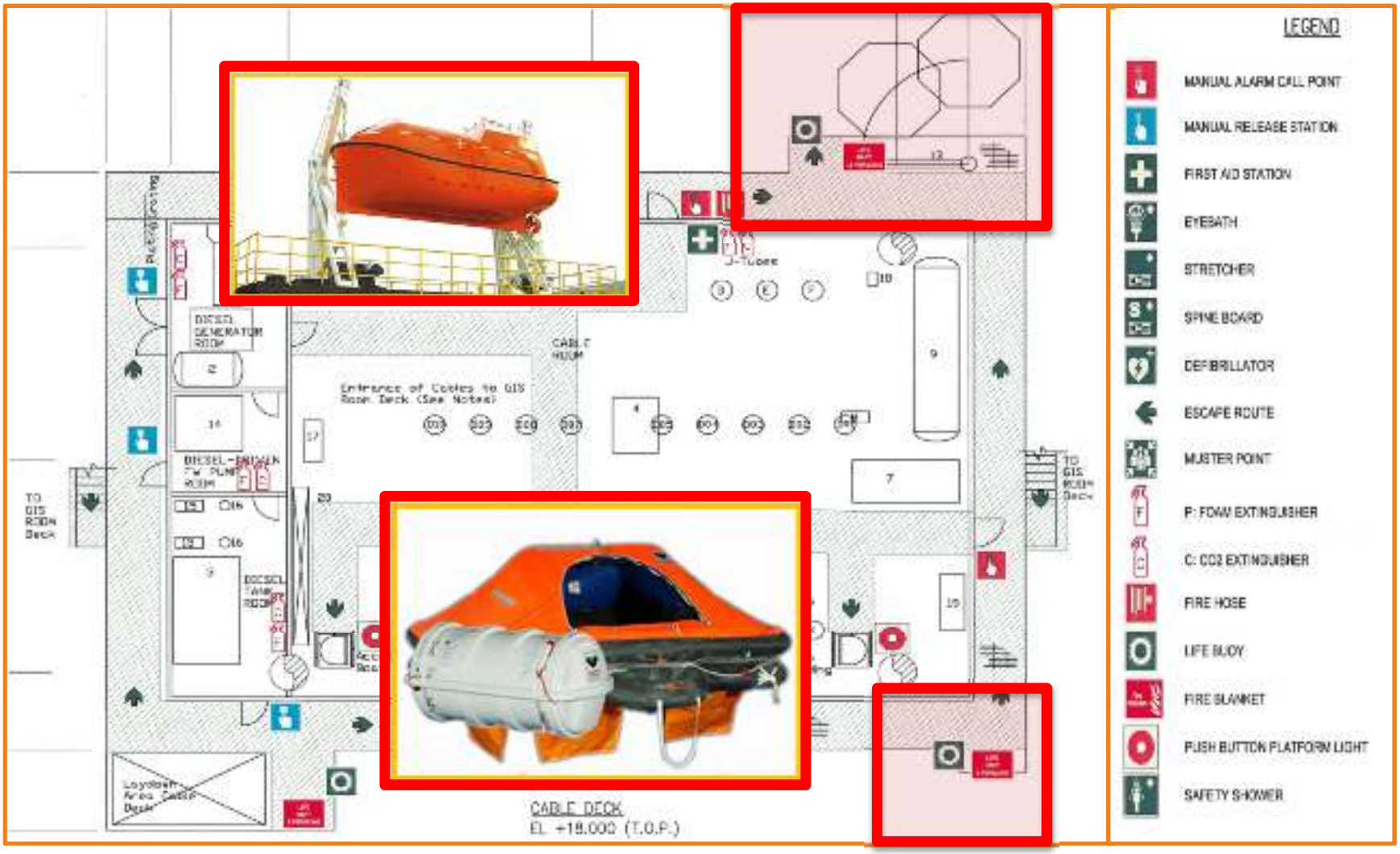
Report <u>all incidents</u> and near misses!
Contractors are obliged to report to Elia

OSY Platform layout – Safety Plan Control deck
Emergency Shelter



OSY Platform layout – Safety Plan Cable Deck

Life Boat and Life Raft



Adverse weather and staying overnight

When?

- No safe transfer is possible

What?

- Platform is equipment to house 6 persons for 5 days
- Food and water present on the platform
- Sleeping accommodation and sanitary equipment is foreseen
- Lifeboat and life raft present in case of evacuation
- Communication with shore is present, telephone, internet, television, etc.

Only in case of emergency

GO FOR ZERO!

Important telephone numbers

Dispatching Elia Merksem

General number: +32 (0)36 40 07 61

Emergency number : +32 (0) 36 40 16 66 – intern: (97) 66 66

Marine Coordinator

General number: **+32 (0) 483.73.70.14**

Emergency number +32 (0)2 382.21.50

MRCC (Maritime Rescue Coordination Center)

Emergency numbers MRCC

Tel: +32 59 70 10 00 & VHF CH16/67

Mobile: +32 474 78 03 17

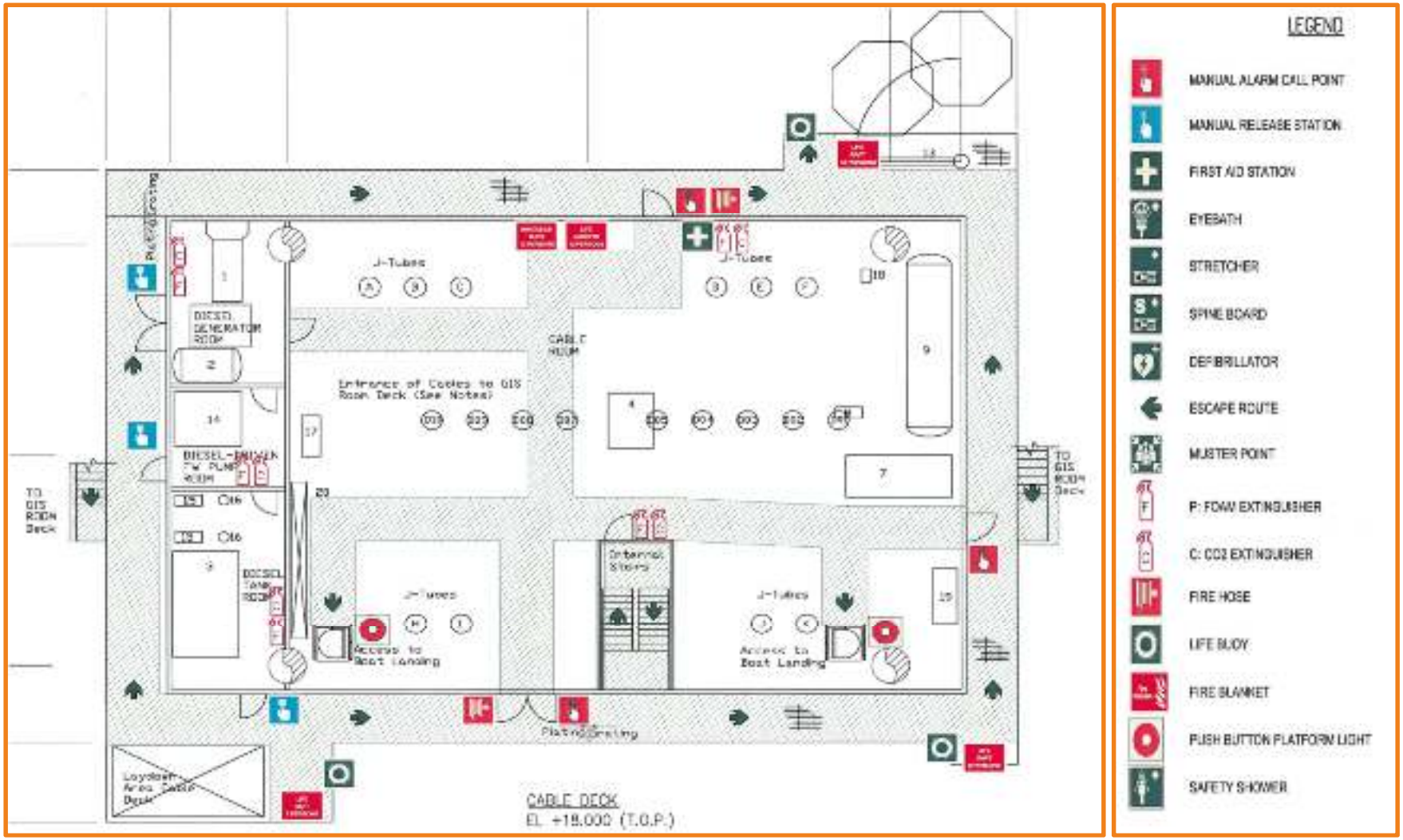
General Emergency number Elia :

0800 99 044

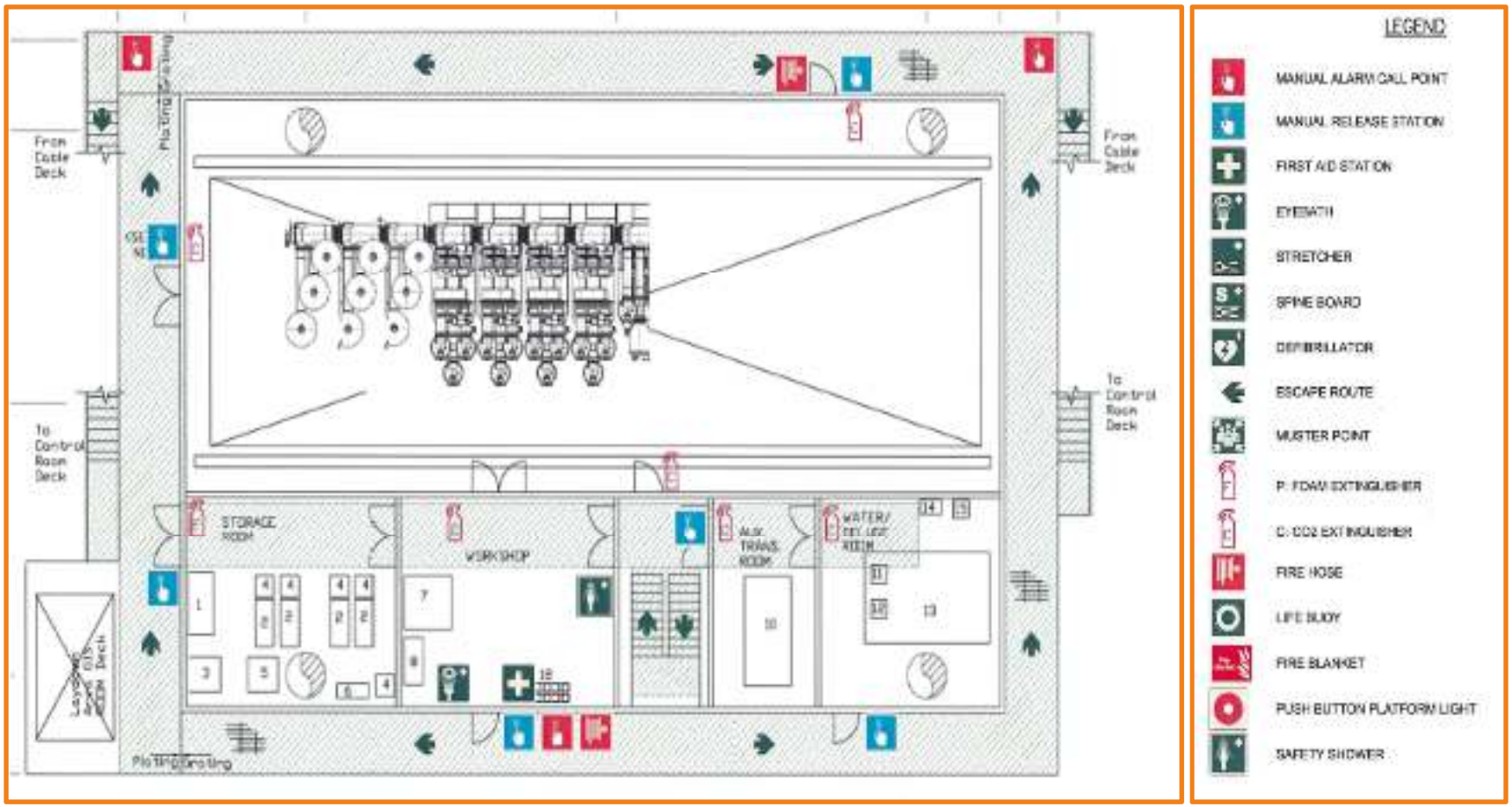
Sign up Elia via SMS: +32 (0)473 97 44 61

HS-Post + spanning + IN/OUT

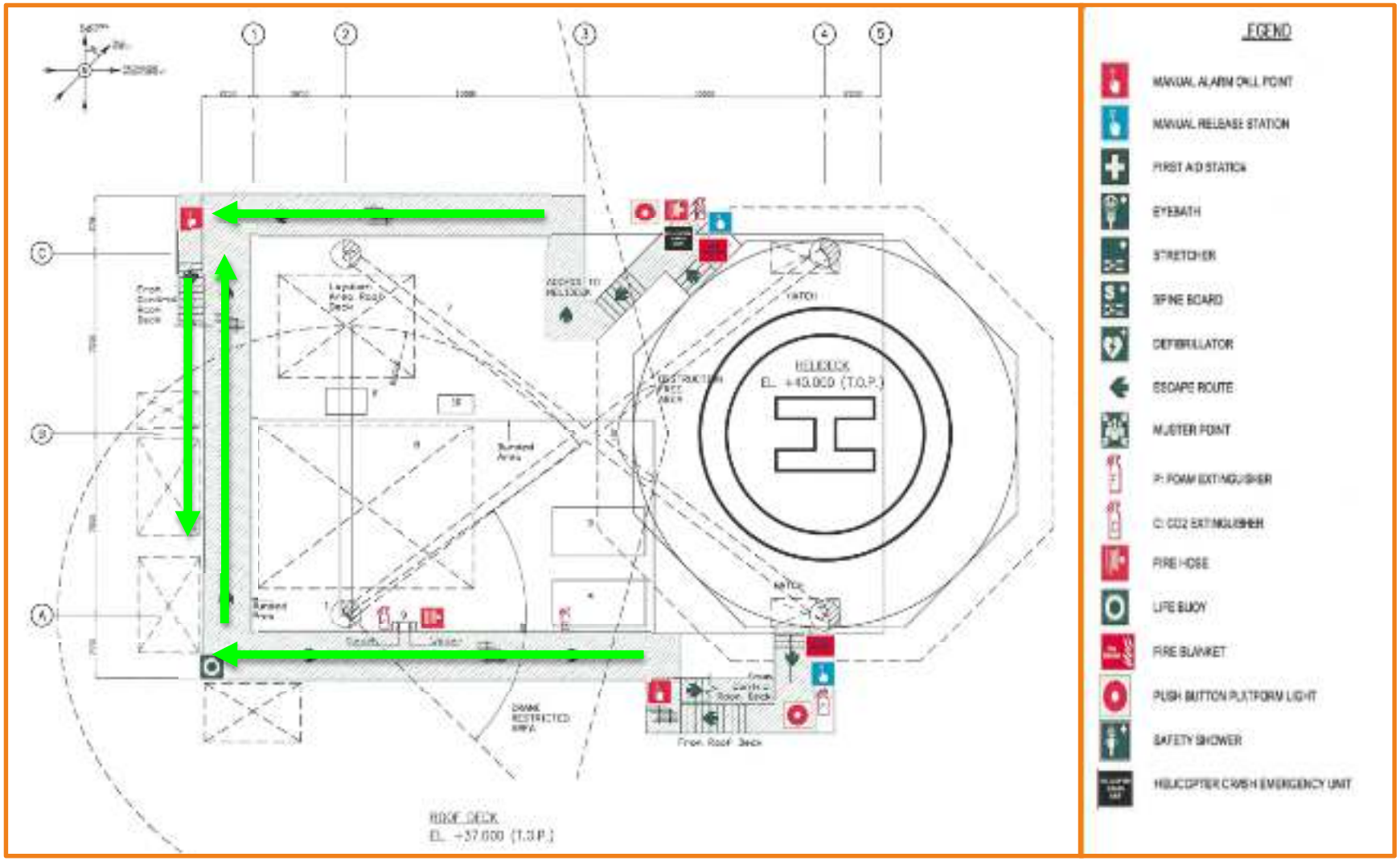
OSY Platform layout – Safety Plan Cable Deck Life Boat and Life Raft



OSY Platform layout – Safety Plan GIS deck

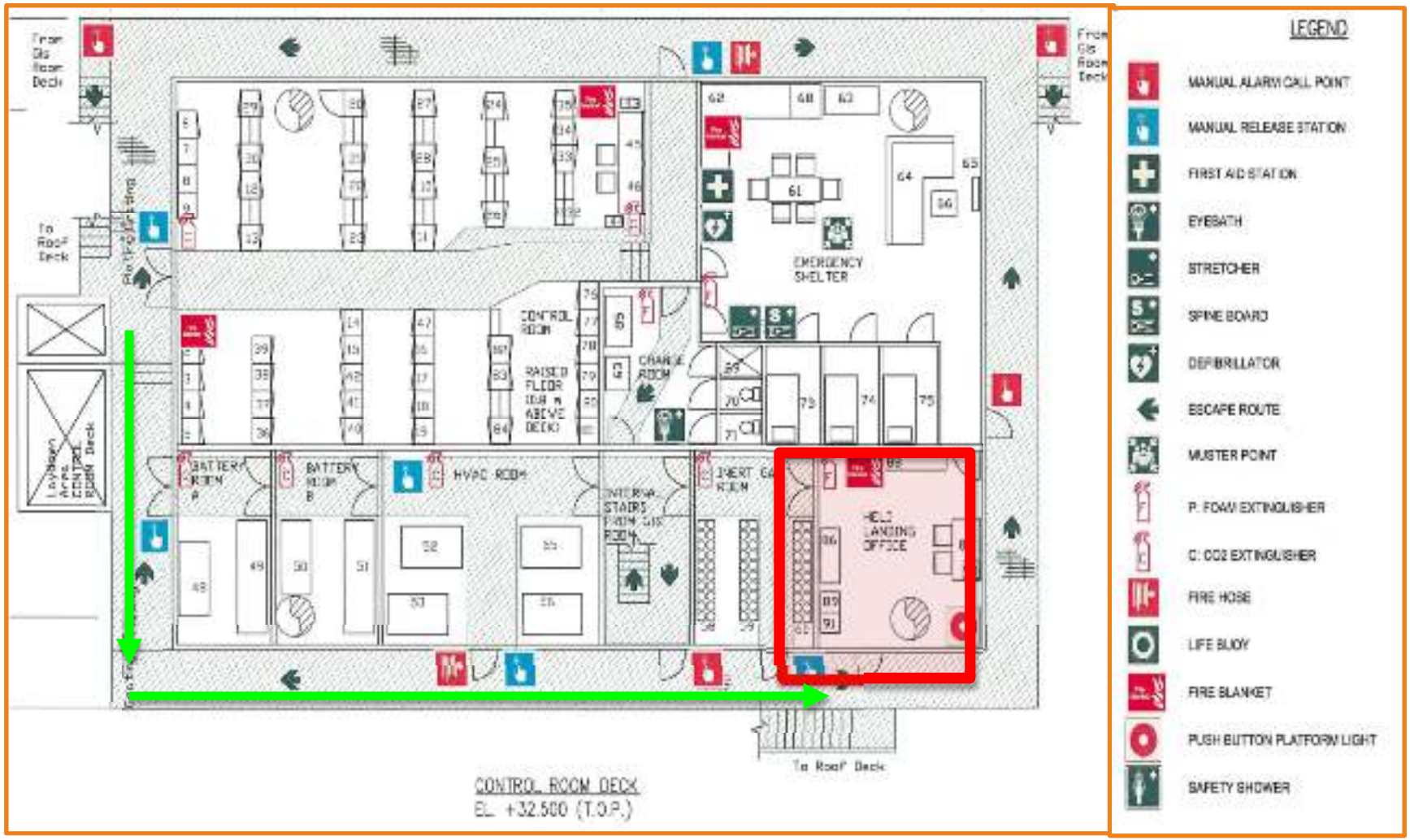


OSY Platform layout – Safety Plan Top Deck



OSY Platform layout – Safety Plan Control deck

HLO Office



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GO FOR ZERO!

Housekeeping + waste handling

Continuously: collect waste, sort and dispose

Dispose the waste in the correct bin (Plastic, paper, wood, metal)

Dailly :

- Remove objects that could limit the commissioning
- Clean sanitary
- Do not leave food waste (take back at the end of the day)

At each end of dayshift clean up the work floor!

Be ware for sharp objects,…

Keep (emergency)exits free, keep fire fighting equipment and signs free and visible

Environment

- Respect the Sea Environment
  - Do not throw anything overboard
  - Take preventive measures when working outside and if risks for spills
  - Take all waste back to shore
  - Sort all waste for recycling
  - Do not feed birds

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GO FOR ZERO!

General Rules

- DO NOT cross demarcation, respect signalization

- No works allowed without valid PTW
- Access to work areas or installation in service
  - Contractors: only with a valid APTW or PTW
  - Elia-personnel: BA4/BA5 certified

- Don’t run on stairs and use handrail, use internal stairs on the OSY platform

- No access to helicopter platform for unauthorized personnel only transfer or work activities

- All doors closed at all time on the platform
  - Avoid salt air inside

GO FOR ZERO!

General Rules

Smoking not allowed inside offshore installation
Smoking allowed on assigned place

Use mobile phones and / or hand radio's allowed except when operating machinery and walking on staircases

GO FOR ZERO!

General Rules

Alcohol

- forbidden to bring in or use alcoholic beverages
- forbidden to be under the influence of alcohol at work or during the guard duty.

Drugs

- forbidden to bring in, possess, trade or use drugs. The means that are legally tolerated are also not allowed.
- Forbidden to be under the influence of drugs at work or during the guard duty.

Medication

- Be attentive and talk to your attending physician when you need to take medicines that affect the state of consciousness.
- This applies in particular to employees who exercise a safety function or a function with increased vigilance.
- Inform your supervisor in case of use

GO FOR ZERO!

General Rules

Privacy Legislation

CCTV & GPDR

- **Installation is permantly monitored by CCTV**
  - Only for safety reasons
  - Monitor the condition of the installation
  - And in case of an emergency

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GO FOR ZERO!

The following slides are specifically applicable for work leaders

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Specifically additional for work leaders:

1. Safety documents
2. Cross-checking of the electrical safety measures
3. Safety cards
4. Additional and extra safety measures
5. Risk analysis (RA)

Overview Key Personnel

- Marine Coordinator
- CTV Captain + deckhand
- HLO officer (Helicopter Landing Officer)
- Coxswain (Life boat captain)
- Crane driver
- SO/LSO (Switching Officer/ Local Safety Officer)
- Elia Representative (platform responsible)
- …

Overview Documents

Start

Work inside Elia Electrical Room

NO → Work within an Elia Concession APTW is Applicable (Example: Survey)

APTW

YES

Work with an isolating HV element or with risk of a trip of the element

YES → CVM procedure is applied

PTW - CVM

SB/LVB is responsible For isolating HV installation (Red and yellow cards)

If installation is safe, the SB/LVB will hand over the documents to the Work leader

PTW + LoTo

NO → APTW Is the applied document to start to work

WL Elia is responsible for the isolation of the equipment (Blue cards are used)

APTW

Permission to start the work activities

(360, morning star, cross-check and hand-over documents)

Overview Documents

APTW → needed for all works inside an Elia Room

PTW + AIV (LOTO)→ applicable for works with an isolation of a HV element or if there's a risk of a trip.

(BVIO) → checklist specific instructions by HV installation

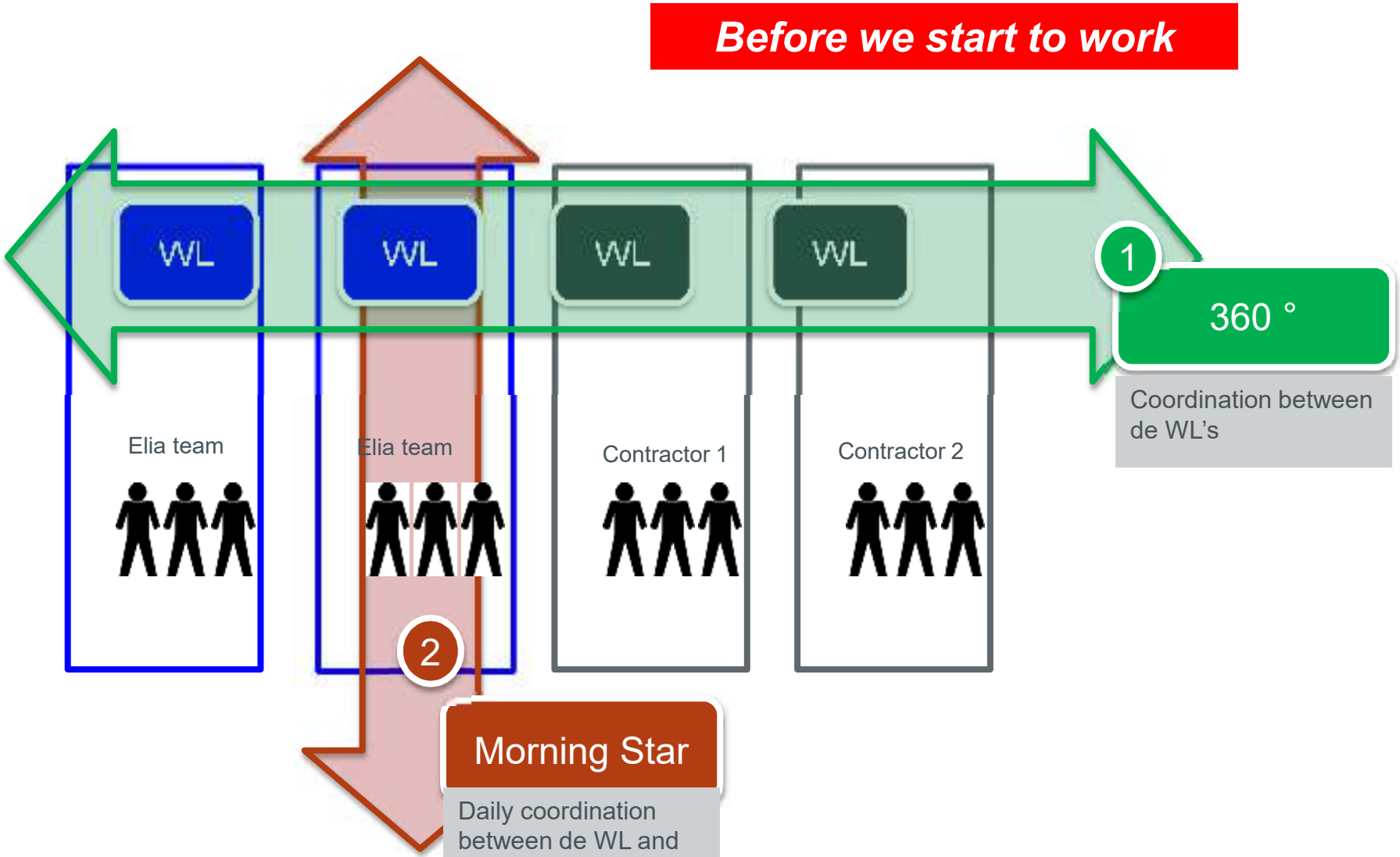
RA → is mandatory for each work

MST → description of the work that will be executed

Hot works permit → mandatory for all activities with a risk of fire

ATBE
- ATBN
Exchange of documents between grid users and Elia

Daily coordination



FIVE QUESTIONS

THAT I ALWAYS ASK BEFORE I START WORK

1. What work am I going to carry out?
2. What are the risks and how can I manage them?
3. What other work is being performed?
   And who is doing what?
4. Does this entail additional risks and how can I manage them?
5. Have the STAR principles been applied?
   Have all necessary safety measures been taken to ensure my safety and that of my co-workers?

GO FOR ZERO!

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Access and/or work permit→ APTW

Elia document that allows:

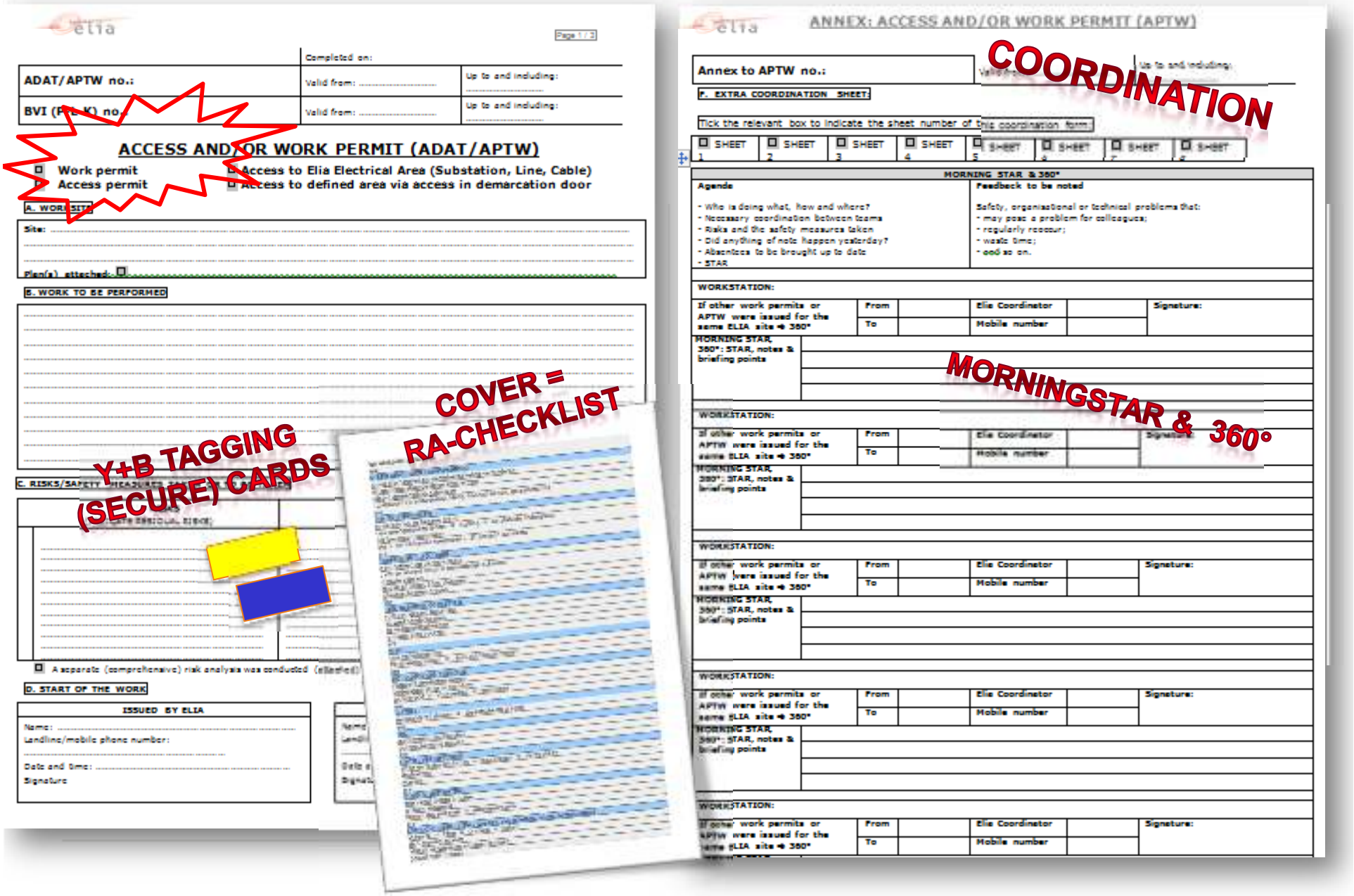
- **Receive access** to the described installation and/or
- to **use the gates inside the demarcation** and/or
- **to execute the** described **works**
- **To coordinate** the activities of other parties
- Formal announcement of the Morningstar-item or 360° meetings

- **The APTW must be handed personally by the Elia responsible**

Only applicable if NO ACTION needed on the HV-grid!

Dispatching (NetOp) do NOT take any ACTION.

Access- and/or Permit to work→ APTW



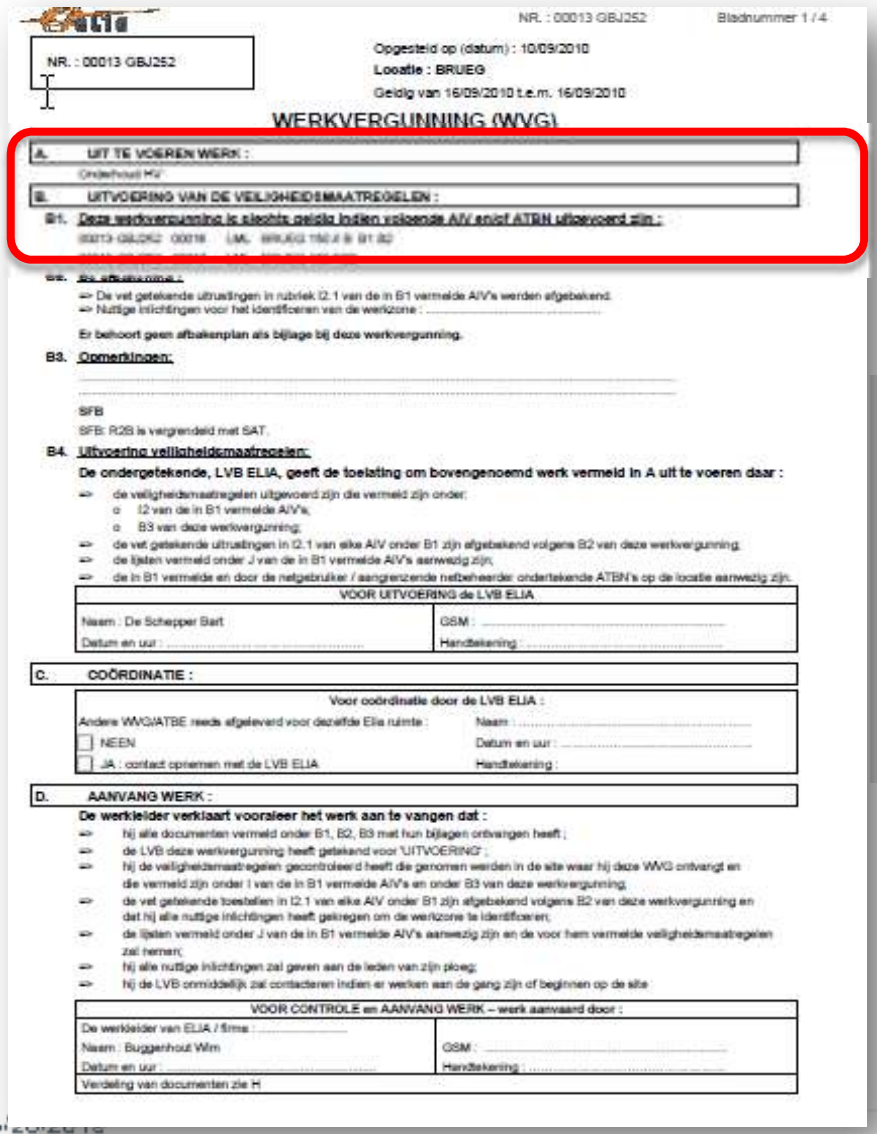
Permit to Work with lock out tag out certificate

PTW + AIV (LOTO certificate)

- Permit to work needed for activities with an isolation of a HV equipment or risk for the HV-grid
- The permit guarantees the main contractor that the HV-installation is safe to work on (vital 7).
- The taken safety measures are noted in detail in the AIV.
- Whit activities with Sub-contractors, the PTW is made up for the main contractor.
- (cascade principle)
- The PTW must be handed personally by the LSO to the WL→ **cross check of the safety measures is mandatory!**
- **APTW has two parts:**
  - **Part PTW:** describes the work, duration, who, LVB, coordination…
  - **Part AIV (LOTO):** Safety measure taken to isolate the electric installation (Vital 7)

Permit to Work with lock out tag out certificate

PTW + AIV (LOTO certificate)



NR. : 00013 GBJ252 Bladnummer 1 / 4

NR. : 00013 GBJ252

Opgesteld op (datum) : 10/09/2010
Locatie : BRUEG
Geldig van 16/09/2010 t.e.m. 16/09/2010

WERKVERGUNNING (WVG)

A. UIT TE VOEREN WERK :

B. UITVOERING VAN DE VEILIGHEIDSMAATREGELEN :

B1. Deze werkvergunning is slechts geldig indien volgende AIV en/of ATBN uitgevoerd zijn :

B2. De afbakening :
⇨ De vet getekende uitrustingen in rubriek I2.1 van de in B1 vermelde AIV's werden afgebakend.
⇨ Nuttige inlichtingen voor het identificeren van de werkzone : .....

Er behoort geen afbakenplan als bijlage bij deze werkvergunning.

B3. Opmerkingen:

SFB
SFB: R2B is vergrendeld met SAT.

B4. Uitvoering veiligheidsmaatregelen:

De ondergetekende, LVB ELIA, geeft de toelating om bovengenoemd werk vermeld in A uit te voeren daar :

⇨ de veiligheidsmaatregelen uitgevoerd zijn die vermeld zijn onder:
- o I2 van de in B1 vermelde AIV's;
- o B3 van deze werkvergunning;

⇨ de vet getekende uitrustingen in I2.1 van elke AIV onder B1 zijn afgebakend volgens B2 van deze werkvergunning;
⇨ de lijsten vermeld onder J van de in B1 vermelde AIV's aanwezig zijn;
⇨ de in B1 vermelde en door de netgebruiker / aangrenzende netbeheerder ondertekende ATBN's op de locatie aanwezig zijn.

VOOR UITVOERING de LVB ELIA	
Naam : De Schepper Bart	GSM : .....
Datum en uur :	Handtekening : .....

C. COÖRDINATIE :

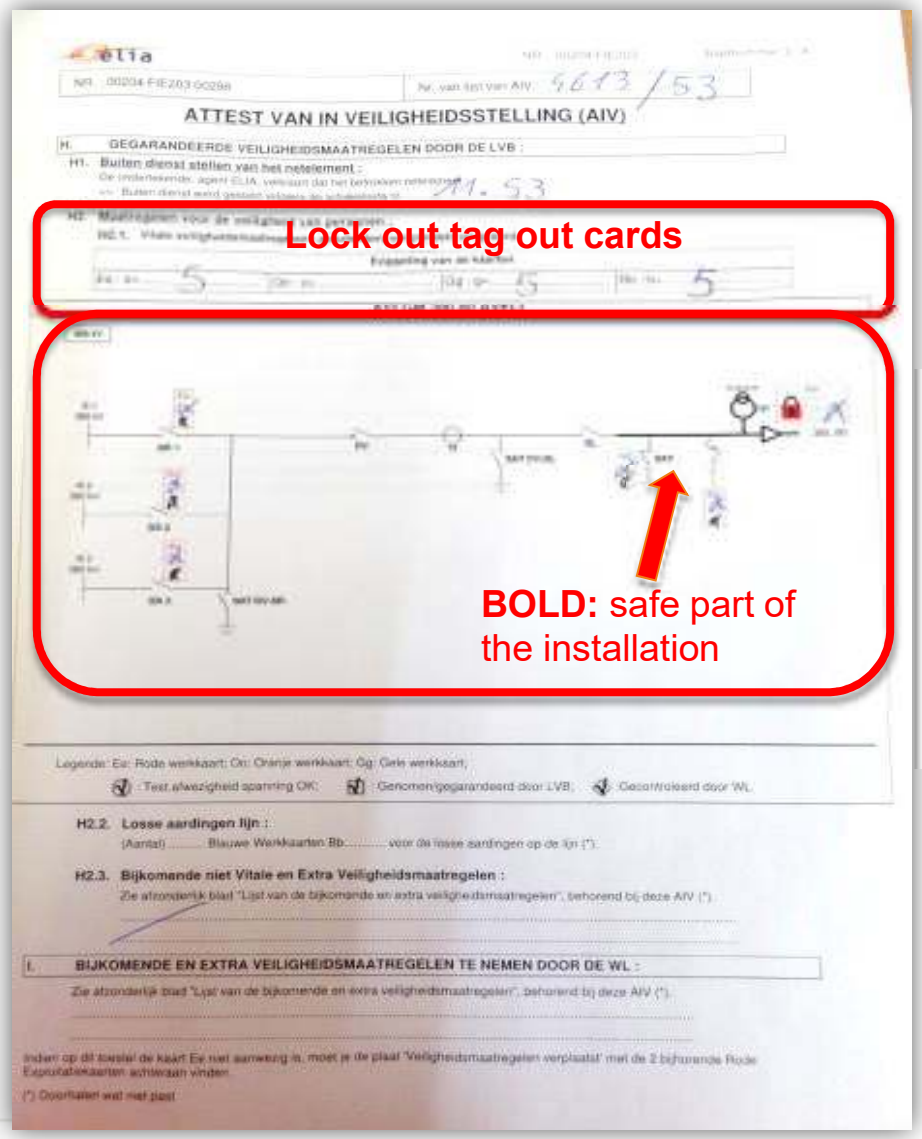
Voor coördinatie door de LVB ELIA :	
Andere WVG/ATBE reeds afgeleverd voor dezelfde Elia ruimte :	Naam : .....
☐ NEEN	Datum en uur : .....
☐ JA : contact opnemen met de LVB ELIA	Handtekening :

D. AANVANG WERK :

De werkleider verklaart vooraleer het werk aan te vangen dat :

⇨ hij alle documenten vermeld onder B1, B2, B3 met hun bijlagen ontvangen heeft ;
⇨ de LVB deze werkvergunning heeft getekend voor 'UITVOERING' ;
⇨ hij de veiligheidsmaatregelen gecontroleerd heeft die genomen werden in de site waar hij deze WVG ontvangt en die vermeld zijn onder I van de in B1 vermelde AIV's en onder B3 van deze werkvergunning;
⇨ de vet getekende toestellen in I2.1 van elke AIV onder B1 zijn afgebakend volgens B2 van deze werkvergunning en dat hij alle nuttige inlichtingen heeft gekregen om de werkzone te identificeren;
⇨ de lijsten vermeld onder J van de in B1 vermelde AIV's aanwezig zijn en de voor hem vermelde veiligheidsmaatregelen zal nemen;
⇨ hij alle nuttige inlichtingen zal geven aan de leden van zijn ploeg;
⇨ hij de LVB onmiddellijk zal contacteren indien er werken aan de gang zijn of beginnen op de site

VOOR CONTROLE en AANVANG WERK – werk aanvaard door :	
De werkleider van ELIA / firma :	
Naam : Buggenhout Wim	GSM : .....
Datum en uur :	Handtekening : .....
Verdeling van documenten zie H	



ATTEST VAN IN VEILIGHEIDSSTELLING (AIV)

H. GEGARANDEERDE VEILIGHEIDSMAATREGELEN DOOR DE LVB :

H1. Buiten dienst stellen van het netelement :

H2. Maatregelen voor de veiligheid van personen :

Lock out tag out cards

BOLD: safe part of the installation

Legende: Ee: Rode werkkaart; On: Oranje werkkaart; Gg: Gele werkkaart;
: Test afwezigheid spanning OK; : Genomen/gegarandeerd door LVB; : Gecontroleerd door WL

H2.2. Losse aardingen lijn :
(Aantal) ..... Blauwe Werkkaarten Bb:..... voor de losse aardingen op de lijn (*).

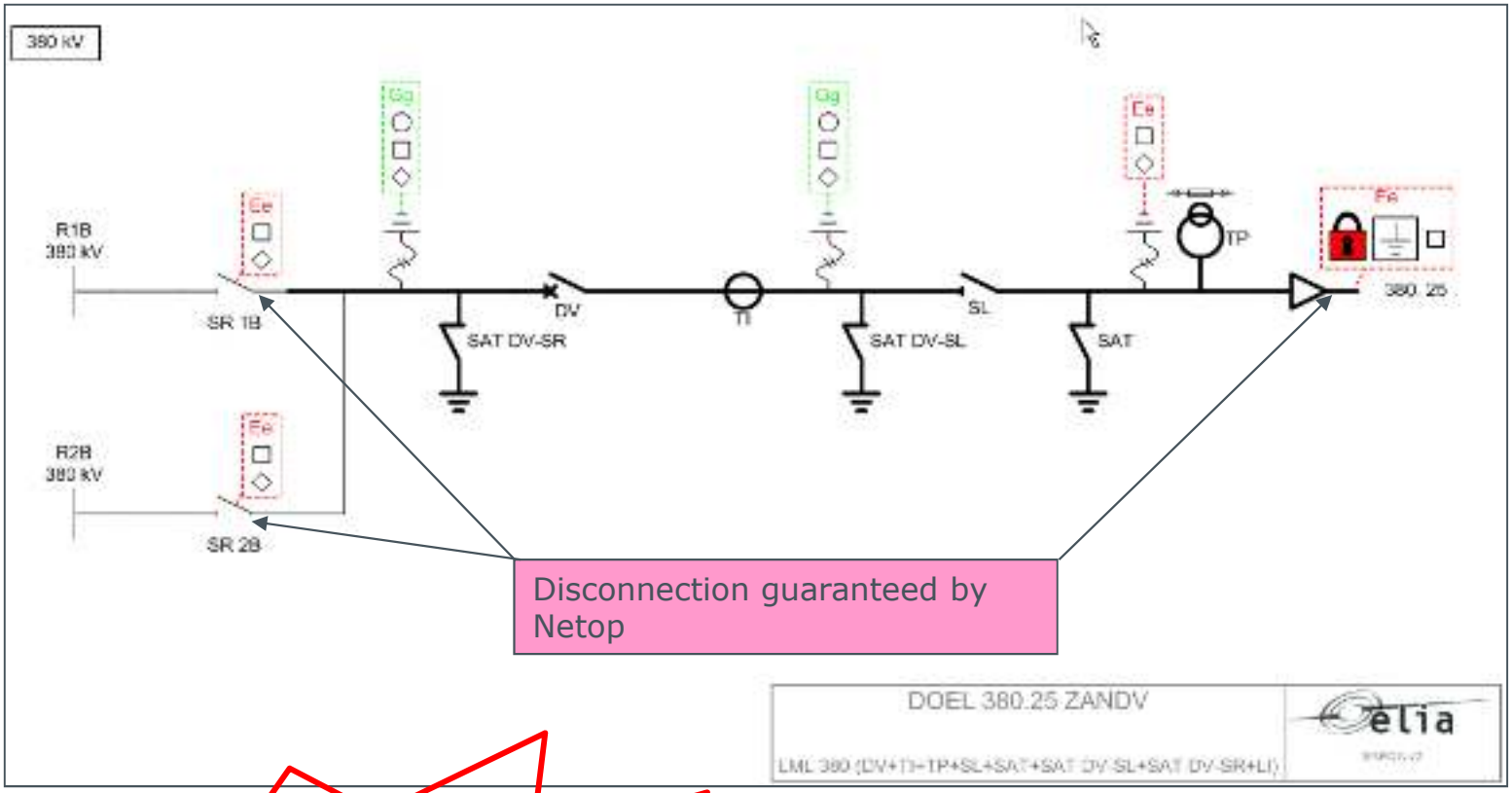
H2.3. Bijkomende niet Vitale en Extra Veiligheidsmaatregelen :
Zie afzonderlijk blad "Lijst van de bijkomende en extra veiligheidsmaatregelen", behorend bij deze AIV (*).

I. BIJKOMENDE EN EXTRA VEILIGHEIDSMAATREGELEN TE NEMEN DOOR DE WL :
Zie afzonderlijk blad "Lijst van de bijkomende en extra veiligheidsmaatregelen", behorend bij deze AIV (*).

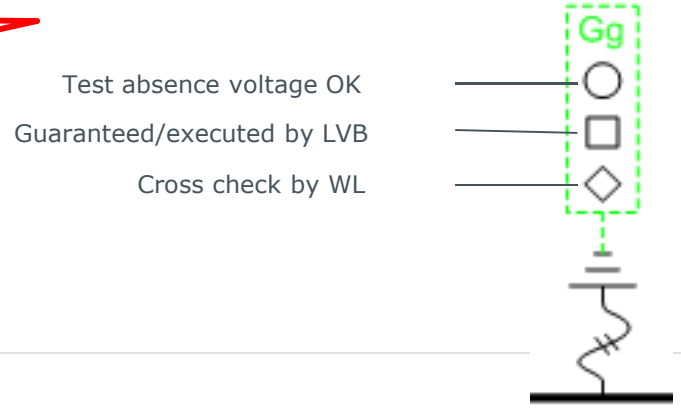
Indien op dit toestel de kaart Ee niet aanwezig is, moet je de plaat "Veiligheidsmaatregelen verplaatst" met de 2 bijhorende Rode Expirabelkaarten achteraan vinden.

(*) Doorhalen wat niet past

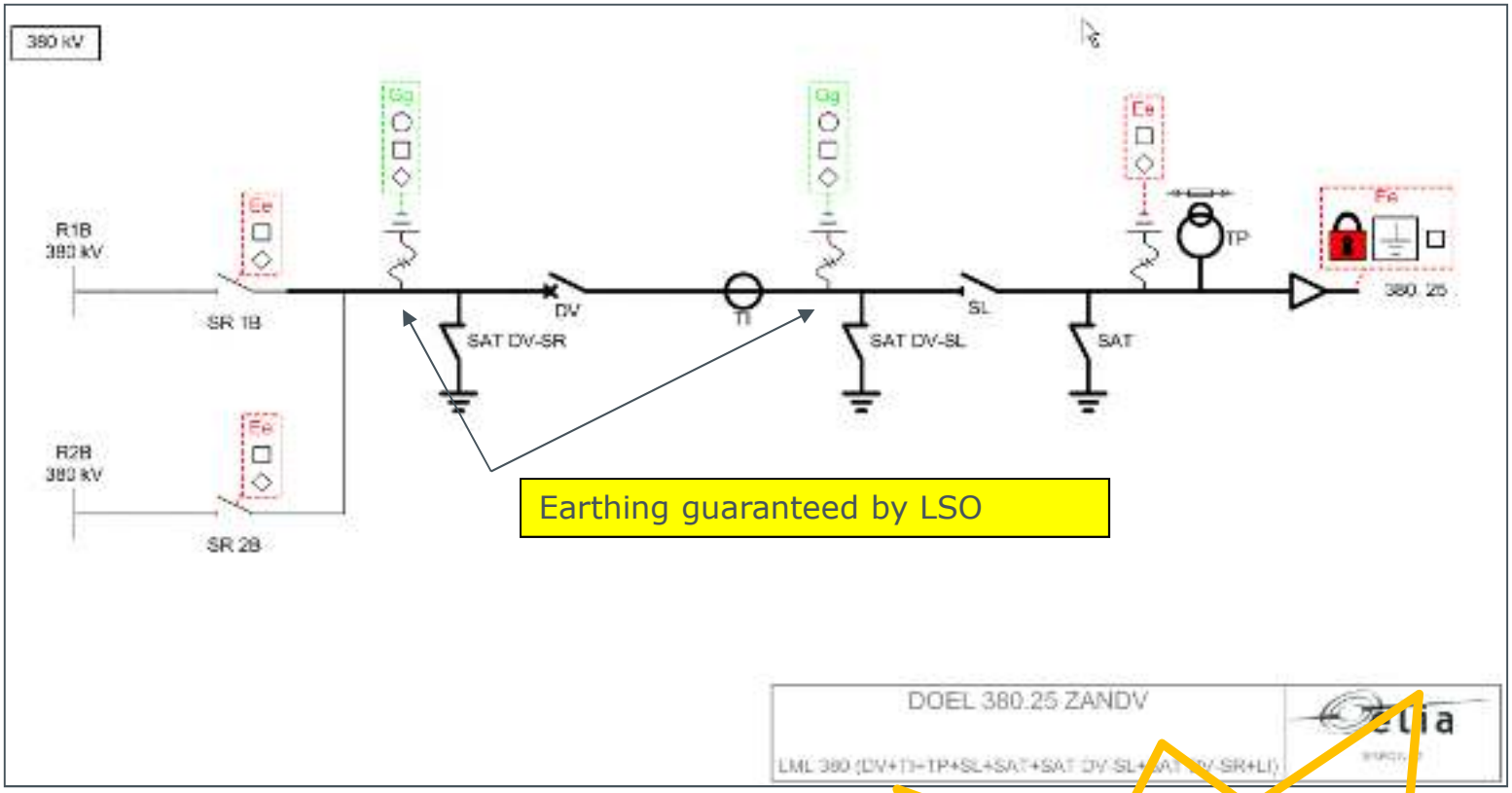
PTW en AIV

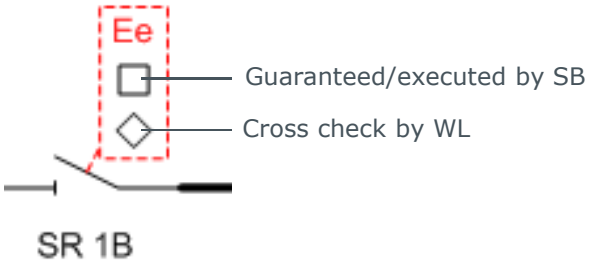

380 kV
R1B
380 kV
SR 1B
R2B
380 kV
SR 2B
SAT DV-SR
DV
SAT DV-SL
SL
SAT
TP
380.25
Disconnection guaranteed by Netop
DOEL 380.25 ZANDV
elia

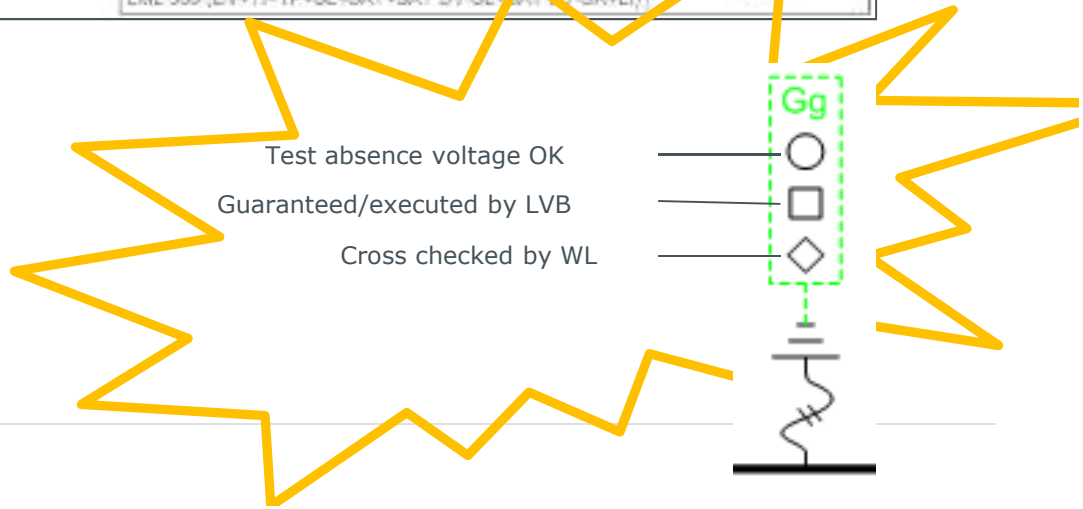

Ee
Guaranteed/executed by SB
Cross check by WL
SR 1B


Test absence voltage OK
Guaranteed/executed by LVB
Cross check by WL
Gg

PTW en AIV


380 kV
R1B
380 kV
SR 1B
R2B
380 kV
SR 2B
DV
SAT DV-SR
SL
SAT DV-SL
SAT
TP
380.25
Earthing guaranteed by LSO
DOEL 380.25 ZANDV


Ee
Guaranteed/executed by SB
Cross check by WL
SR 1B


Test absence voltage OK
Guaranteed/executed by LVB
Cross checked by WL
Gg

Risk analyses → RA

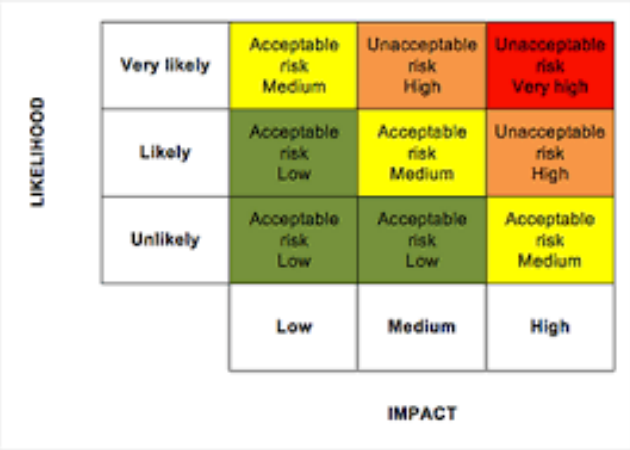
Work Safe =

- Exclude danger
- Reduce risks to an acceptable level

Make up risk analyses before start

Risk analyses =

- Detect dangers
- Assess the situation
- Define and impose safety measures



- The RA is a mandatory part of the work preparation.
- The RA must be present on the work floor (Elia & Contractors)

Hot Work Permit

= specific RA

The hot works permit contains all needed preventive measures to control the risks of fire or explosion.

The use of a Hot Work Permit is mandatory during works with an open flame or other equipment that can produce hot surfaces. (ex: grinding, heating, welding etc.)

This rule is applicable for everybody (Elia & contractors).

Permit is valid for 1 day, if needed longer must by renewed every day

Hot Work Permit

= specific RA

COPY FOR THE ISSUER

elia

HOT WORK PERMIT

No. 000000

A hot work permit is used to **PREVENT the potential RISK of FIRE and/or EXPLOSION** during work with an open flame, naked flame or hotspot such as welding, grinding, flame cutting or the burning off of paint, for instance, in rooms/areas not intended for this purpose and where there are flammable materials.

This permit is issued by the head of the company or their **authorised representative**[1] for any such work carried out within the company either by the company's own employees or those of other companies.

THIS PERMIT IS VALID FOR A LIMITED PERIOD OF TIME.

It does not cover fixed workstations where all necessary precautions are taken.

PERMIT ISSUED BY[1]:

Name: .....

Role: .....

Tel.: .....

PERMIT ISSUED TO:

Company: .....

Operator[2]:

Name: .....

Role: .....

Name: .....

Role: .....

WORK TO BE CONSTANTLY OBSERVED BY:

Name: .....

Company: .....

Role: .....

INFORMATION ABOUT THE WORK:

Date: From..... / ..... / ..... to ..... / ..... / ..... (maximum five consecutive days and subject to compliance with the requirements set out in this safety document FOCUS-hot work permit)

Start of the work: ..... o'clock

End of the work: ..... o'clock

Worksite: .....

Nature of the work (circle as applicable):

Welding	Grinding	Flame cutting	Open flame
Work on cables	Other:		

Description of the work to be performed: .....

General safety measures to be taken by the operator(s):

→ **see checklist on reverse!**

	DATUM	HANDTEKENING
VERLENING	... /... /...	
	DATUM	HANDTEKENING(EN)
UITVOERING	... /... /...	
	... /... /...	

- ☐ Uitschakelen brand-gas-rookdetectie
- ☐ Uitschakelen brandblusinstallatie
- ☐ Waterslang ter plaatse
- ☐ Brandbaar materiaal verwijderen of afschermen
- ☐ Elektrische leidingen lokaliseren
- ☐ Werkruimte afbakenen
- ☐ Afschermen leidingen

- ☐ Veiligheidsschoenen
- ☐ Veiligheidsbril met zijkap
- ☐ Handschoenen
- ☐ Brandvrije kledij
- ☐ Helm
- ☐ Gehoorbescherming
- ☐ Veiligheidsgordel/harnas
- ☐ Stofmasker
- ☐ Persluchtmasker

Andere: .....

GENERAL SAFETY MEASURES

1. BEFORE WORK

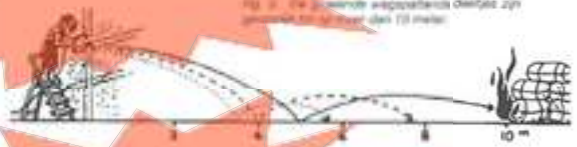
- ☐ 1. Remove, protect or cover (with a suitable screen) any flammable substances or materials located within at least a 10-metre radius of the working area, especially those located behind any walls close to the working area. Spray the working area with water to keep it moist (Fig. 1 and 2).
- ☐ 2. Remove any flammable substances from the place or the objects being worked on located within at least a 10-metre radius of the working area (Fig. 2).
- ☐ 3. Seal any openings, cracks, fissures and so on in the walls close to (within 10 metres of) the working area with sand, plaster, metal, tarpaulin, etc.
- ☐ 4. Place ready-to-use and appropriate extinguishing agents (e.g. portable fire extinguishers, fire hose reels or laid out fire hoses) in the vicinity of the working area, so that they can be used quickly.
- ☐ 5. Ensure that the work is constantly observed by someone who is familiar with the safety measures (the observer can be the operator's assistant).
- ☐ 6. Empty, clean with warm water, ventilate abundantly or fill with water those receptacles and pipes that have contained flammable substances, particularly liquids or gases. Use the **explosimeter** to check that this 'degasification' is complete (Fig. 1).
- ☐ 7. Check whether the devices are in good condition and work properly (e.g. voltage, hoses, fittings).
- ☐ 8. Choose the best place to easily interrupt the gas or electricity supply.
- ☐ 9. Never leave lit blowtorches unattended in the open air once they have been extinguished and have cooled down.

Fig. 1. Ontsmetting als gevolg van een onvoldoende vergassing.

Fig. 2. Ontvlamming door contact met onzichtbare verhitte leidingen

2. DURING WORK

- ☐ 10. Watch out for glowing sparks and where they fall as well as heated metal parts (Fig. 3).
- ☐ 11. Place hot objects only on heat-resistant surfaces that do not radiate heat.
- ☐ 12. Place electrode needles in a suitable container (filled with water or sand).



3. AFTER WORK

- ☐ 13. Carefully check the working area, adjoining rooms and areas within reach of sparks or heat transfer.
- ☐ 14. Monitor these areas for at least two hours after the completion of the work (many fires start in the hours following the end of work).

  If this monitoring cannot be guaranteed, any work involving an open or naked flame must be suspended two hours before work at the facility generally ceases.
- ☐ 15. Wait 24 hours before returning any objects to their original location.
- ☐ 16. Notify the issuer of the hot work permit that the work is complete.

AVAILABLE RESOURCES IN AN EMERGENCY

→ Call the Marine coordinator: .....

.....

.....

Dispatching: ..... Tel.: .....

First Aid team leader or First Aider: Tel.: .....

Other: ..... Tel.: .....

Exchange of documents between grid users and Elia

Exchange of documents between grid users and Elia

Certificate for grid-release by griduser → ATBN

- Is picked up by the SO (see switching note) at the grid user (customer)
- Minimum content is known, not the lay-out (document is made by the grid user/customer)

Certificate for grid-release by Elia → ATBE

Is made and distributed by the LSO Elia to the grid user

(document of Elia - **Elia is NOT the client**)

SO: Switching Officer
LSO: Local Safety Officer

Content

1. Elia Grid Operator
2. Legislation
3. MOG Modular Offshore Grid
4. Minimum Requirements to access ELIA Offshore Assets
5. Dangers and Risks
6. Demarcation in Electrical installations
7. Specific Activities (scaffolding, ladders, lifting activities,…)
8. Emergency Procedures (Fire, First Aid, Adverse weather, …)
9. Environmental and Waste Policy
10. General Rules
11. Safety Documents + Procedures
12. **Working on electric installations**
    - Functions, Vital 7, Safety Distances
    - Lock Out – Tag Out – Elia Card system (CVM

GO FOR ZERO!

Safe working on electrical installations

Safe distances

2 zones are defined

VICINITY ZONE ***(D_V):***

a limited area around the live working zone

<u>LIVE WORKING ZONE</u> *(D_L):*

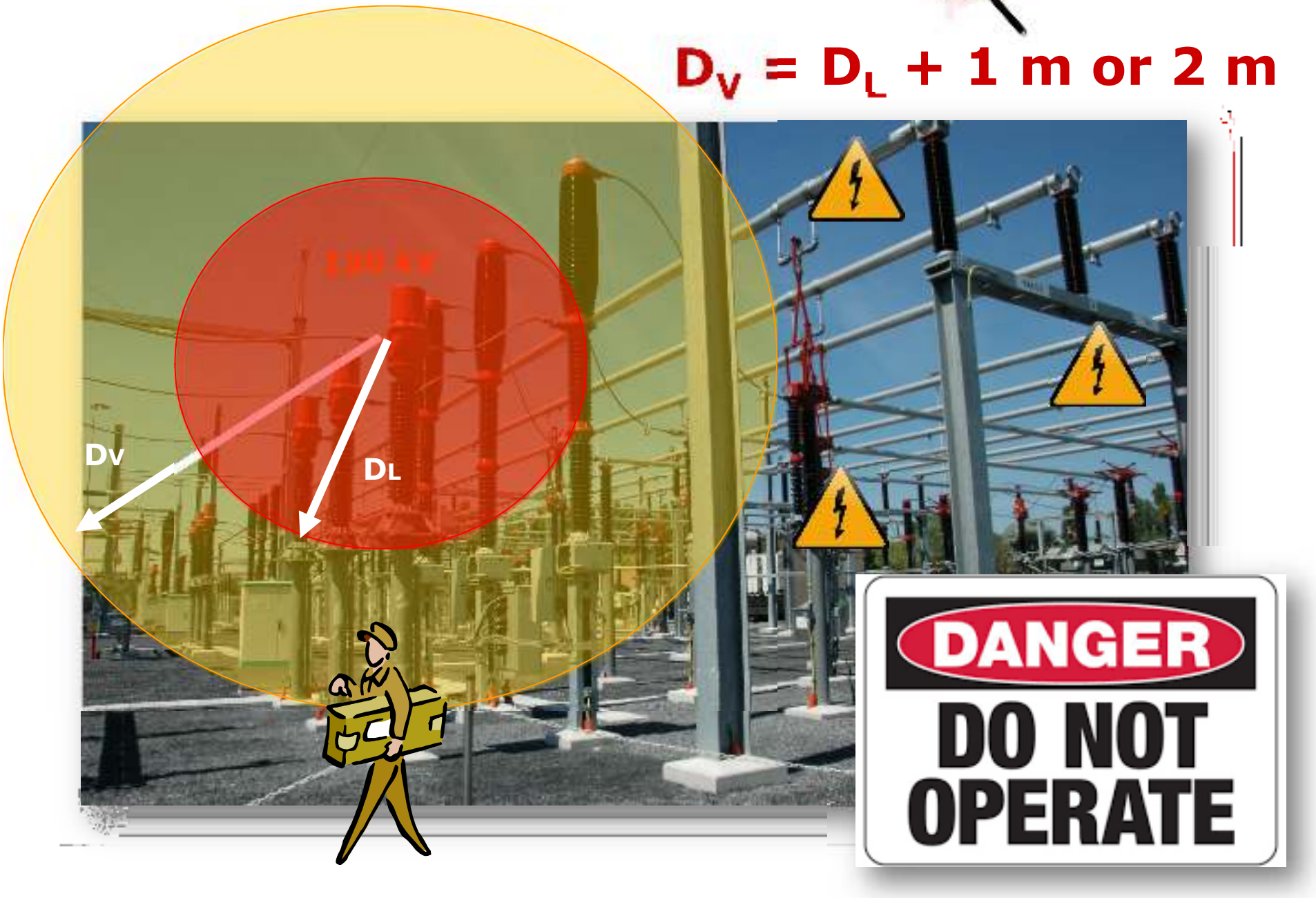
a limited area around the conducting live parts

Working on electrical installations

D_L = approximately insulator length

Working on electrical installations

$D_V = D_L + 1\ m \text{ or } 2\ m$



HV-installation on service

The 7 golden rules

Additional and extra safety measures

1. **Switch Off** (open CB's & Open Disconector) off the HV-installation

Exploitation authorized EB (dispatching) – placed by the SO. – person X | E-card

2. **Switch off installation** (earting & demarcation) off the HV-installation

Responsibility of the LSO – person X | Y (G)-card

Crosscheck

3.Further secure the installation + crosscheck (PTW) off the complete instalation

Responsibility of the WL – person Y | B-card

HS-installation → Safe Workplace

The 7 golden rules

Purpose = to create a safe work environment near HV facilities and/or for works on HV facilities

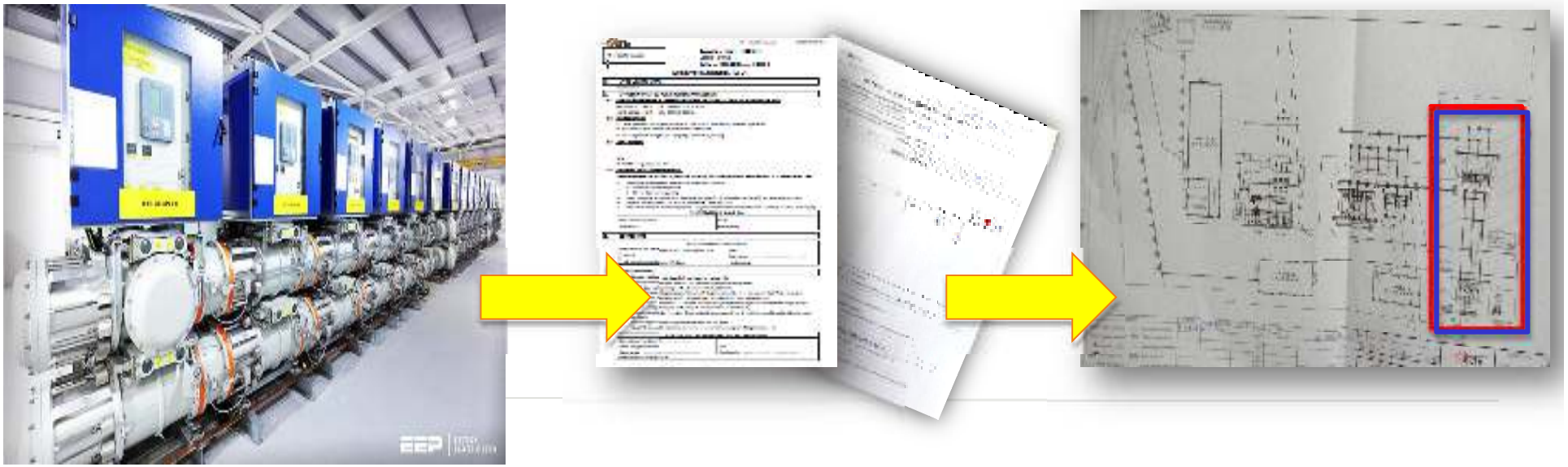
1. Prepare the work
2. Visible disconnection/switching
3. Padlock the facilities to prevent reactivation
4. Check that the work area is dead
5. Earthing
6. Work area identification (red/white)
7. Release of facility for work – PTW Permit To Work

The 7 golden rules

A. Work Preparation

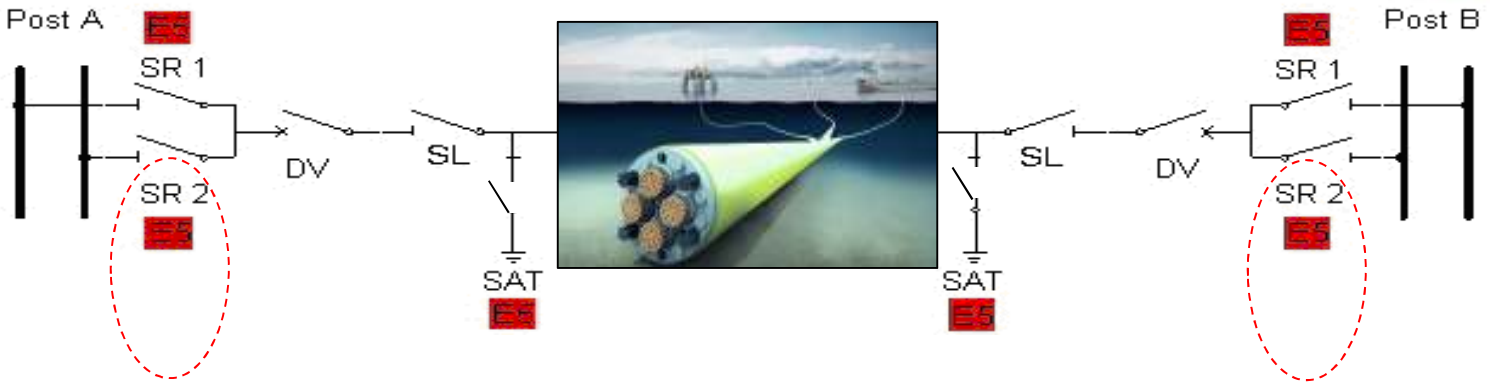
- Identify in a simple and clear way the equipment were to work on (HV-field, HV-cable, HV-equipment's, …)

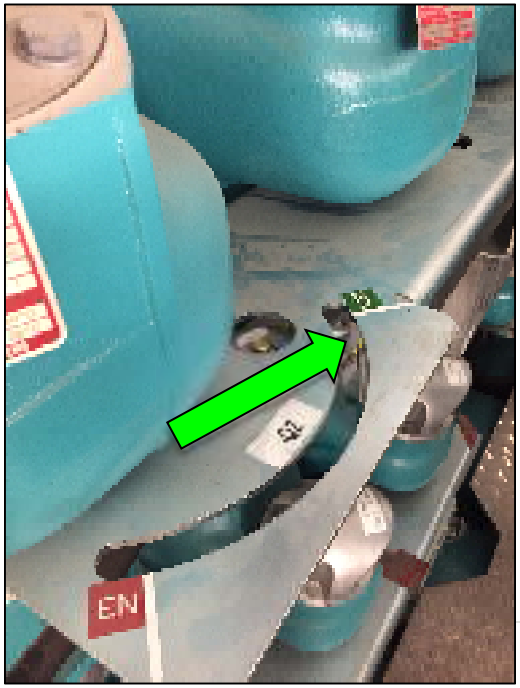
- Make up documents: PTW, RA works, Demarcation plan,…



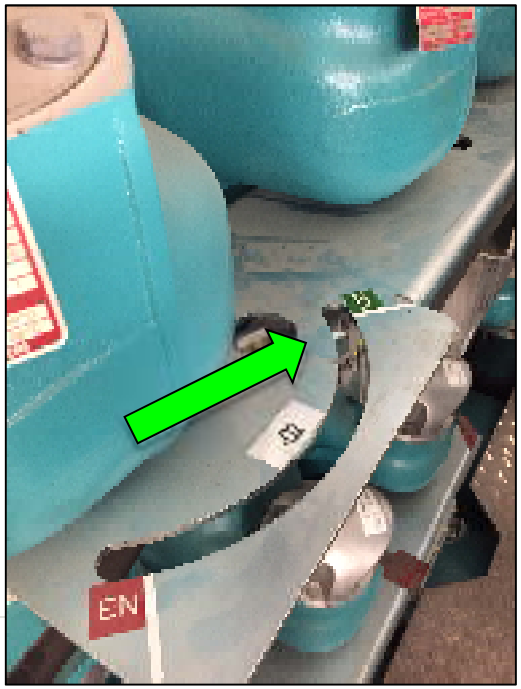
The 7 golden rules

1. Visible Disconnection



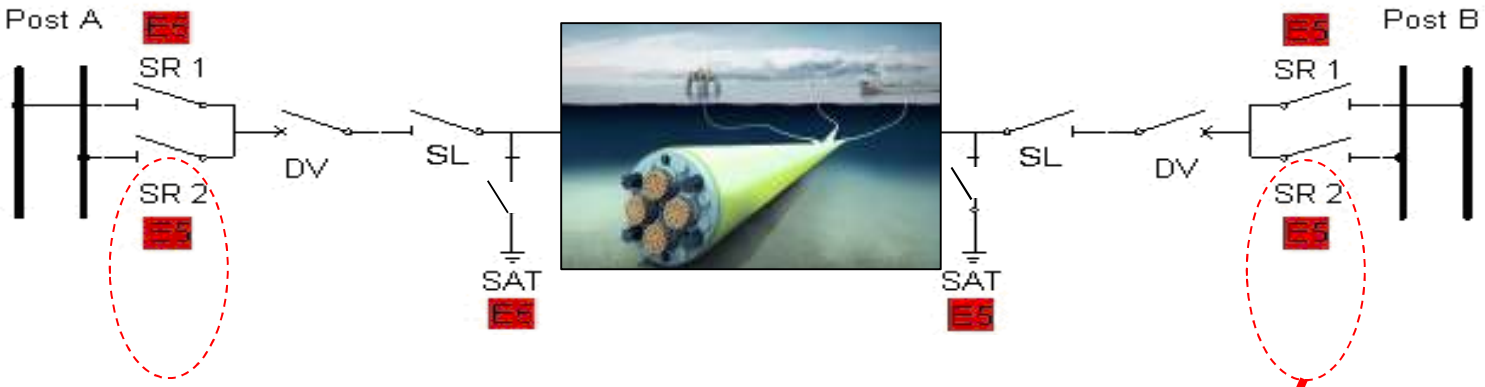


DISCONNECTOR IN OPEN POSITION



The 7 golden rules

2. Lock-out & Secure installation

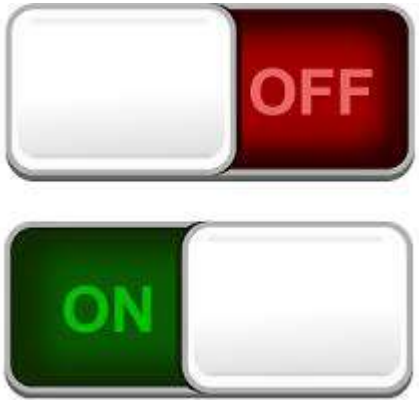


LOCK-OUT (MECHANICALLY)

SECURE (CARDS)

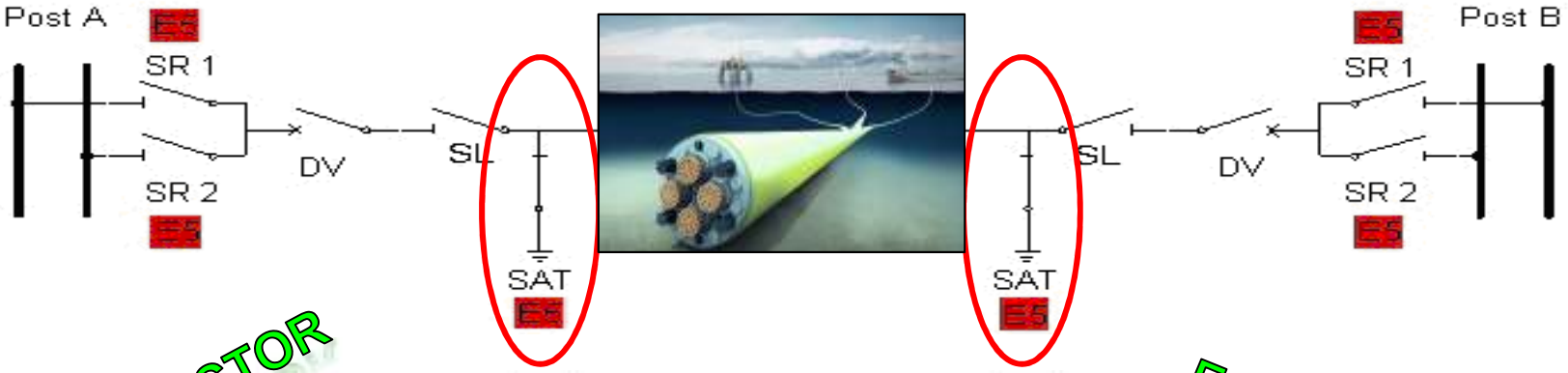
The 7 golden rules

3. Check absence voltage



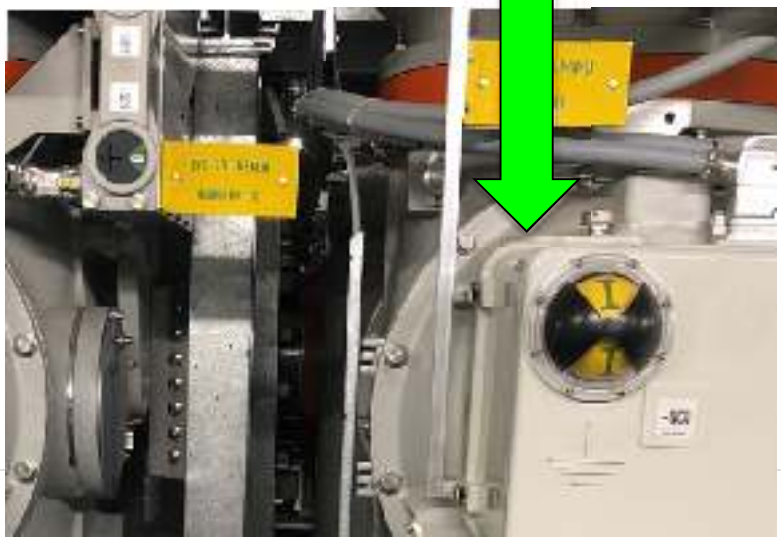
The 7 golden rules

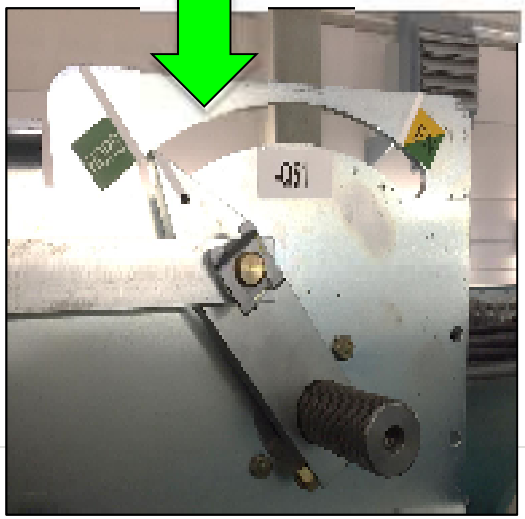
4. Earth and short circuiting



EARTHCONNECTOR

EARTHCONNECTOR





The 7 golden rules

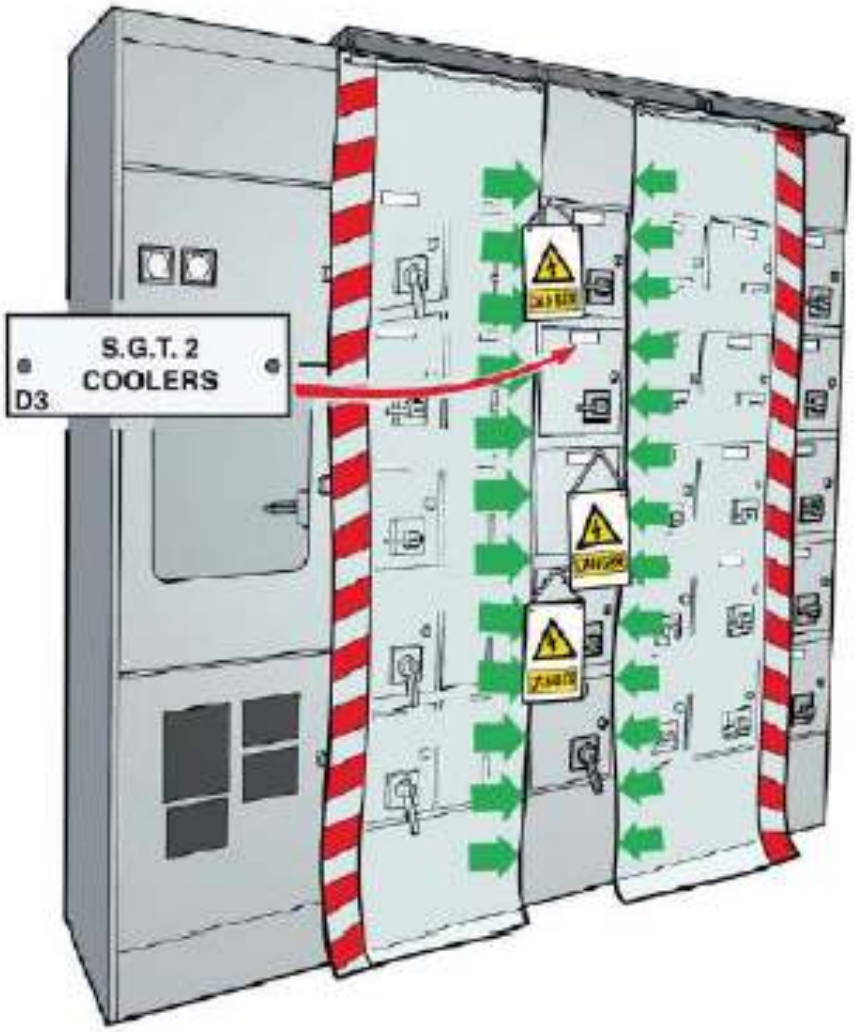
Work <u>always</u> between <u>two visible earthings</u>!

Only touch installations who are earthed locally and in the correct way!

Risk of induction voltage reduce to zero
+
Deriving incidental fault currents

The 7 golden rules

5. Demarcation



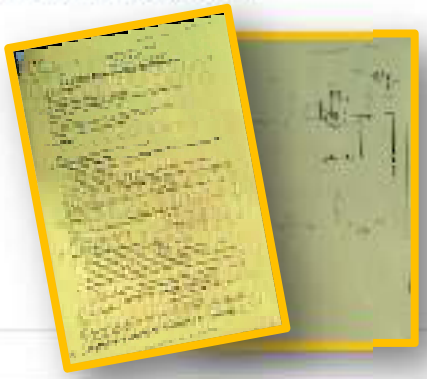
Electricity - de vital 7

B. Cross check + release installation for works

Installation responsible

Work responsible

- **Coordinates** on the work floor
- Animate the 360°
- **Sets the HV-installation safe**
- **Demarcate** the work zone
- Hand out **(A)PTW** personally
- Is **contact person** for the WL



- **Is in charge** for the activities
- Speaks the **language of the region**
- Is always present on the work floor
- Works RA based
- **Informs** the co-workers about:
  - Taken safety measures
  - Residual risks
  - Use PPE
  - The need on safe behavior
- **Controls**:
  - Attestation (AVIO)
  - If given info is understood
  - Progress of the works

Secure cards Elia – basic principles

Sarqaboard in HV-post

Every safety measure is indicated with a secure card (LOTO – Lock Out - Tag Out).

Only when the last cards is removed ➔ then the safety measure can be removed!

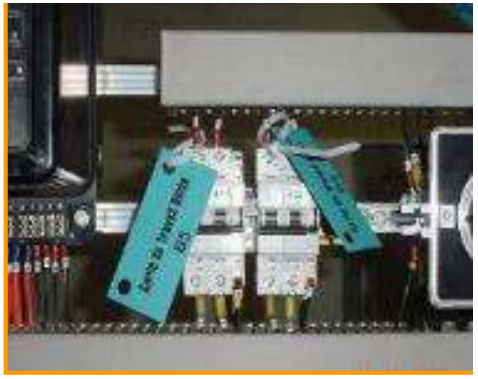
Card can only be removed by the responsible and if the condition is full filled!

The **WL** is obliged to place **Blue cards** on the safety measures that he takes.

He can place his cards above other cards placed on an equipment.

The 7 golden rules

Additional and extra safety measures noted on the AIV:

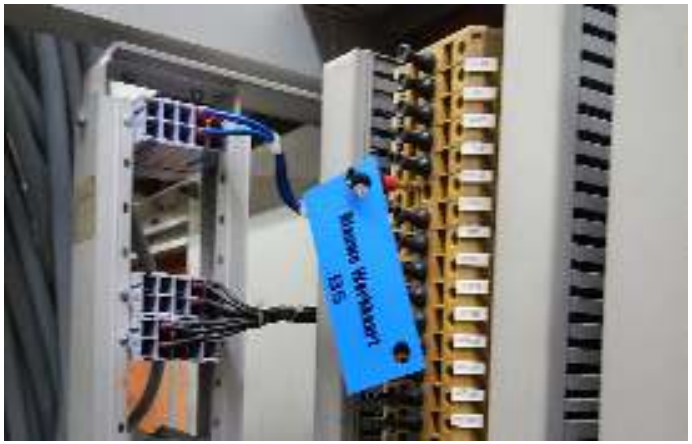


- Single cable earthings;
- Disconnect supply voltage;
- Disable automatic overtake system;
- Disconnect motor of circuit breaker
- Disable fire detection and fire fighting system
- ….

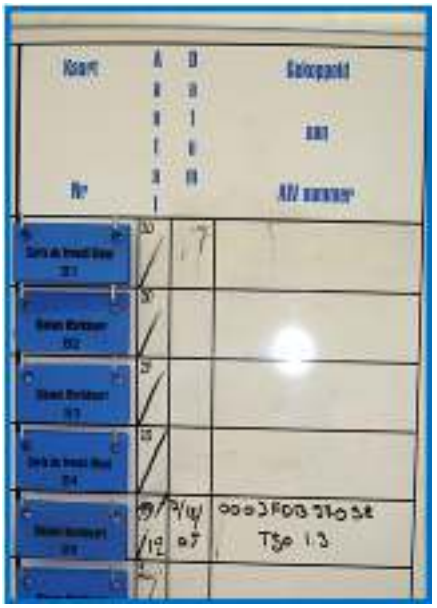
- Yellow - Black (or orange) demarcation (pits, slots,…)
- Deactivated springs
- Protect cables and tubes
- Venting of pressure vessels
- ….

These safety measures or always indicated with a **yellow** or **blue** card.

Additional safety measures



Extra safety measures



The additional and extra safety measures needed on top of the VITAL 7 must always be noted in the AIV (attachment of the PTW)

I2.3. Bijkomende niet Vitale en Extra Veiligheidsmaatregelen :

Zie afzonderlijk blad "Lijst van de bijkomende en extra veiligheidsmaatregelen", behorend bij deze AIV (*).

.....

.....

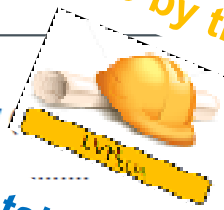
J. BIJKOMENDE EN EXTRA VEILIGHEIDSMAATREGELEN TE NEMEN DOOR DE WL :

Zie afzonderlijk blad "Lijst van de bijkomende en extra veiligheidsmaatregelen", behorend bij deze AIV (*).

.....

.....

To take by the LSO



To take by the WL

In practice secured with yellow/blue cards …

Secure cards Elia – responsibles

Red exploitation cards

competence and responsibility of the exploitation authorized EO (dispatching) - placed by the SO.

Orange secure cards

These are only used during project phase(PRC).

Yellow secure cards

Competence and responsibility of the LSO.

Blue secure cards

Competence and responsibility of the WL.

White secure cards

Abnormal operating conditions and securing disabled electric circuits of faulty units (heating, lighting, …)

Comments or Questions

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Many thanks for your attention!

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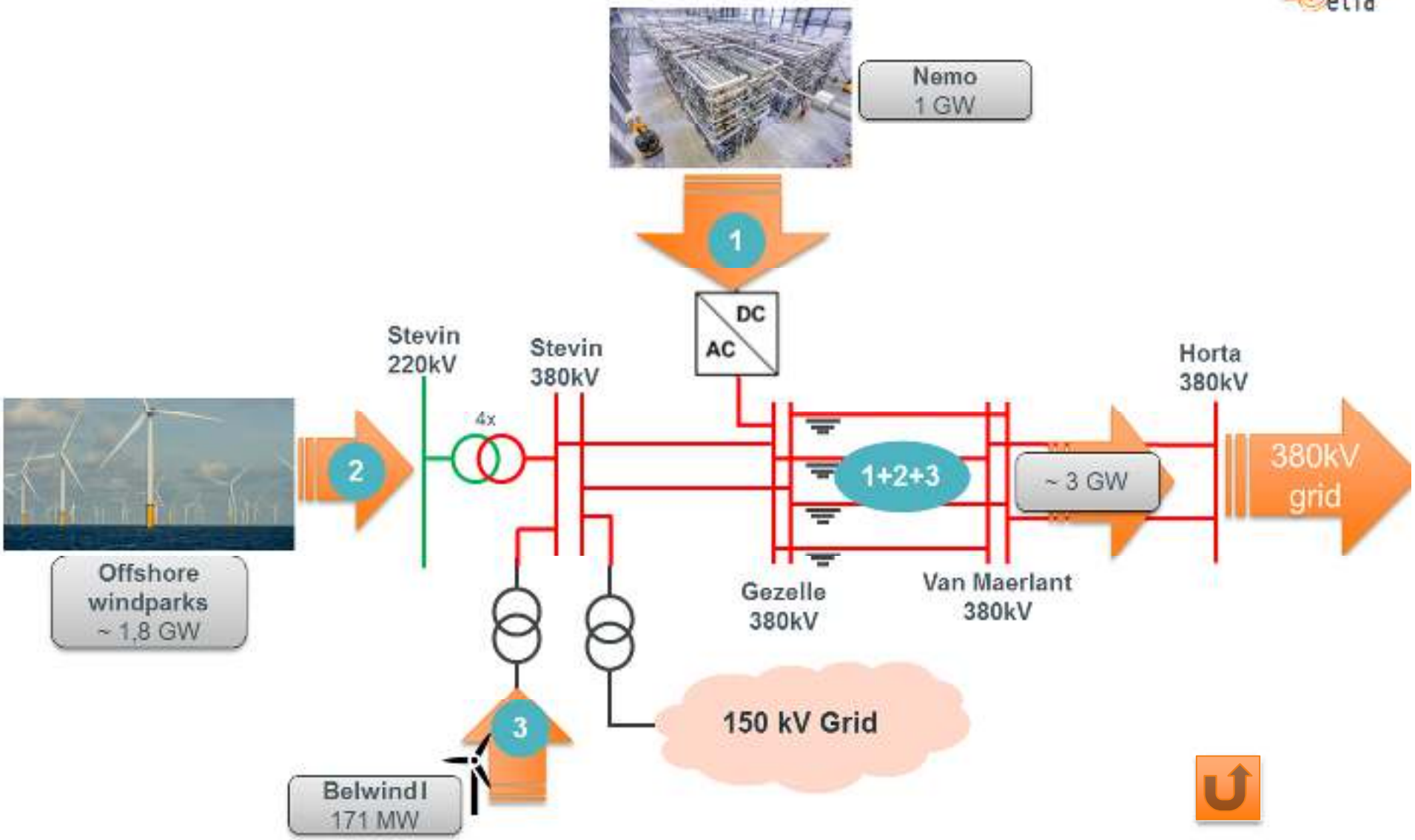
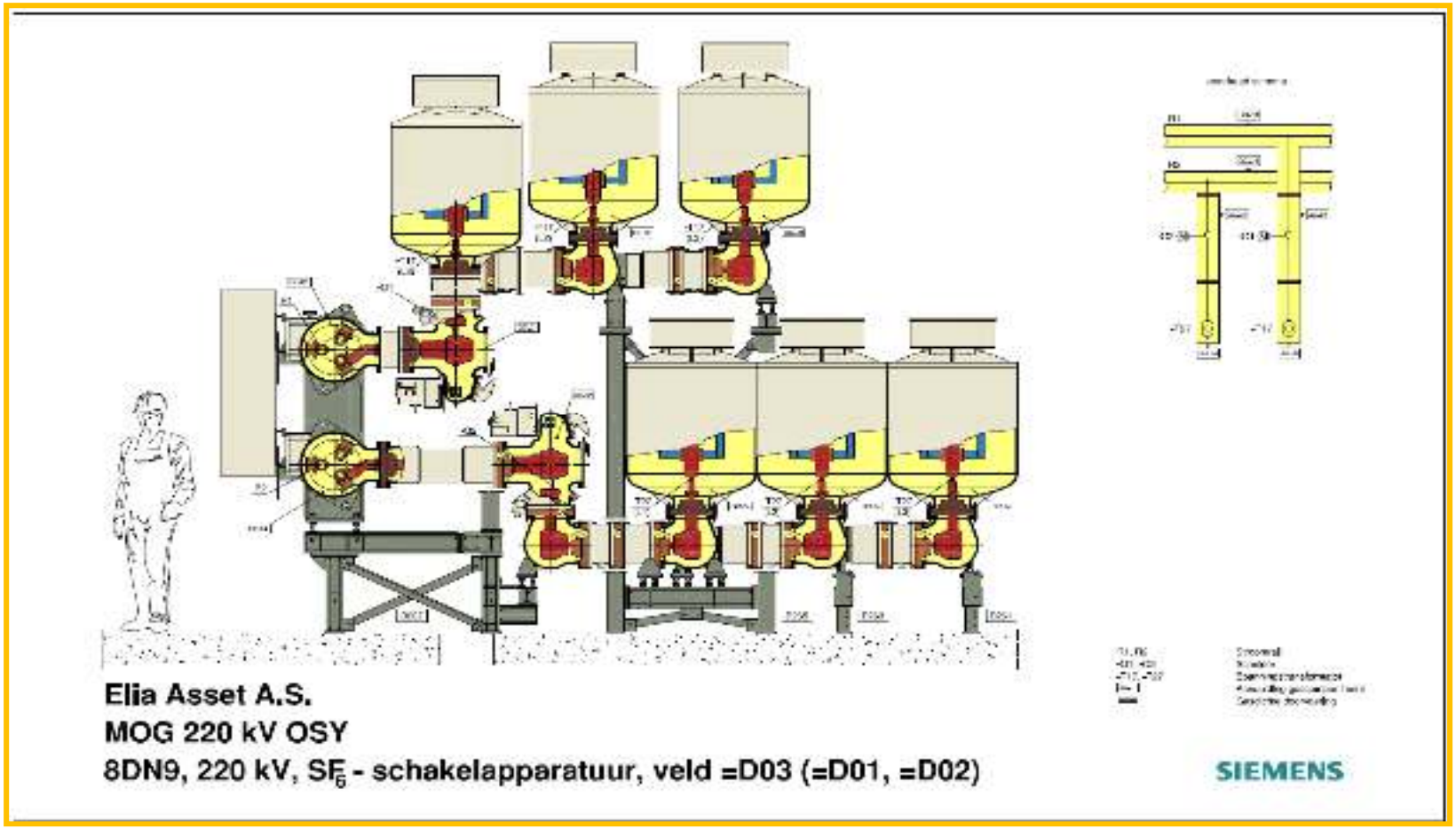
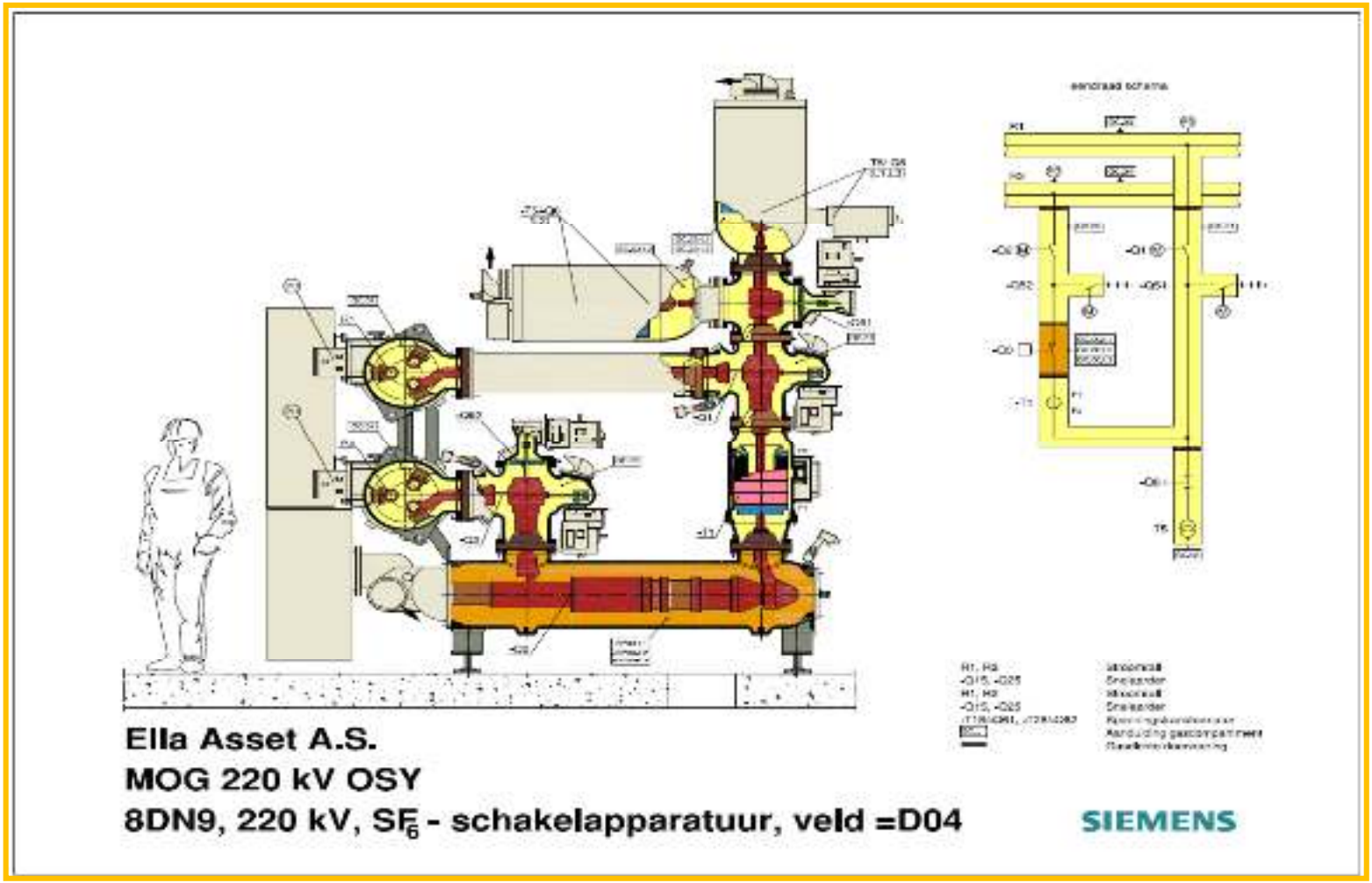

Nemo
1 GW
1
DC
AC
Stevin
220kV
Stevin
380kV
4x
Horta
380kV
2
1+2+3
~ 3 GW
380kV
grid
Offshore
windparks
~ 1,8 GW
Gezelle
380kV
Van Maerlant
380kV
150 kV Grid
3
Belwind I
171 MW

Modular Offshore Grid: PVT's

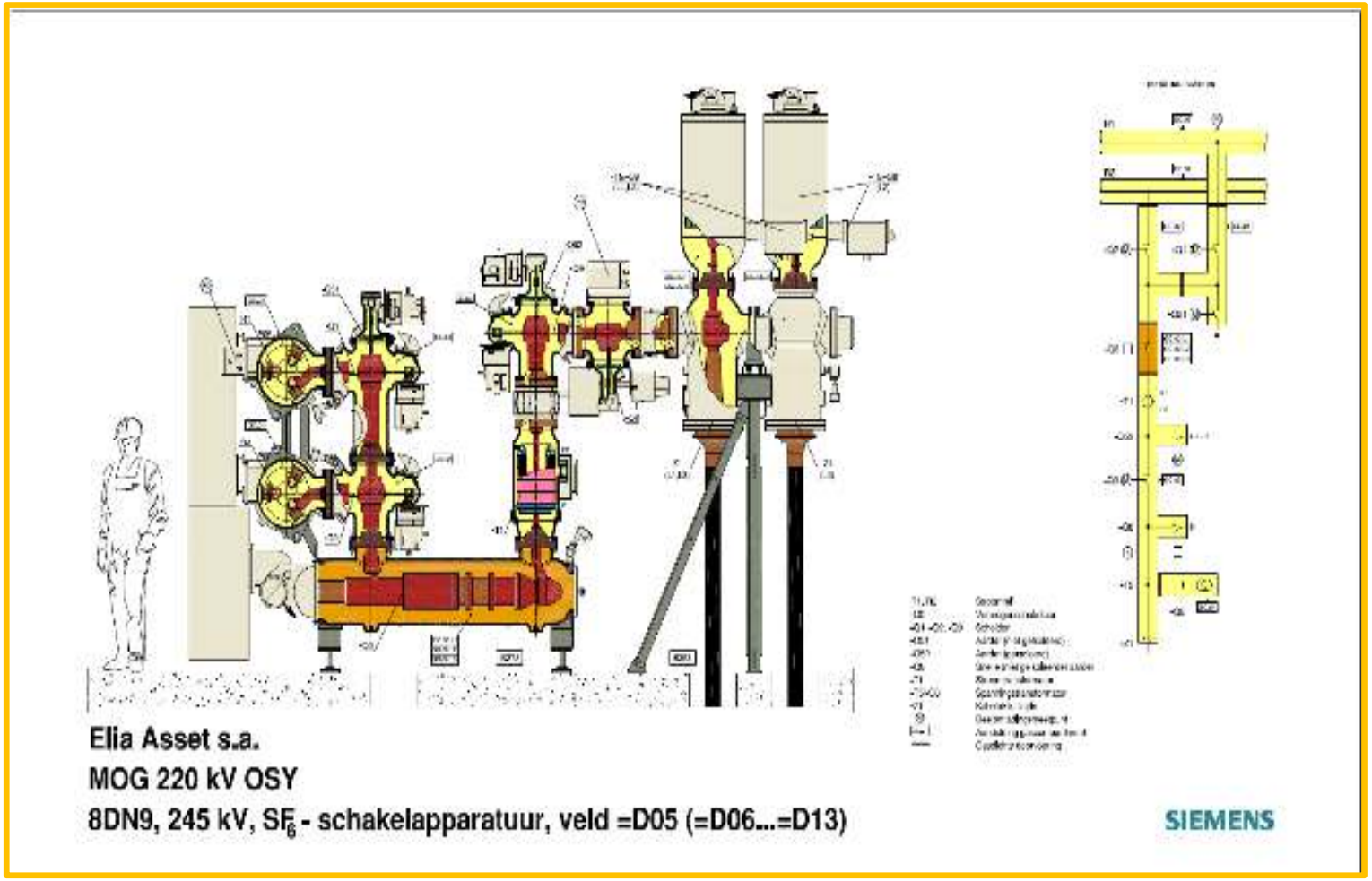


Modular Offshore Grid: Coupling Bay

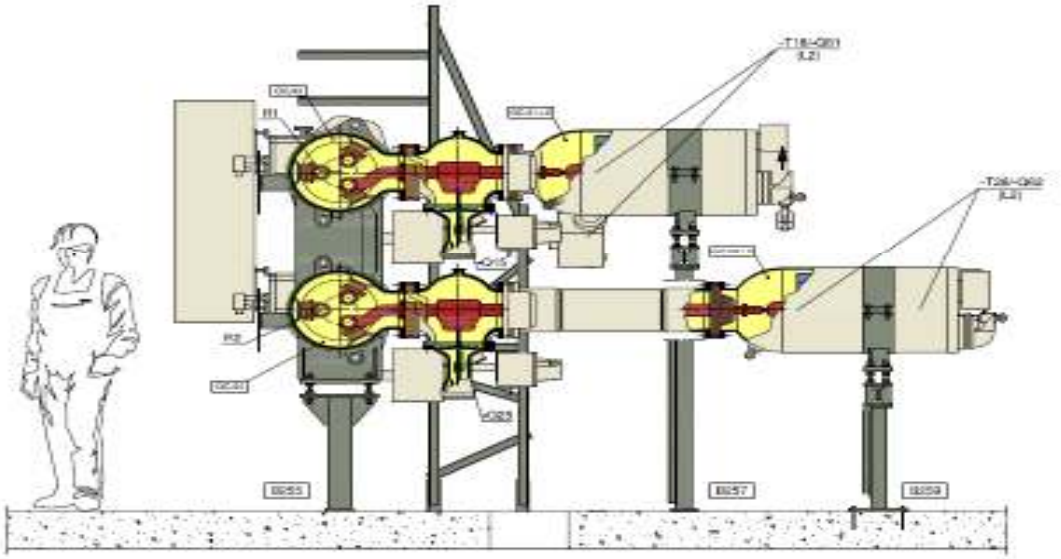


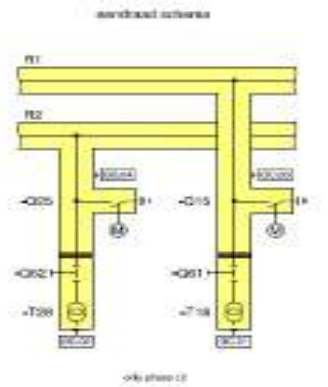
GO FOR ZERO!

Modular Offshore Grid: Cable Bay



Modular Offshore Grid: Rails TP





Elia Asset A.S.
MOG 220 kV OSY
8DN9, 220 kV, SF_6 - schakelapparatuur, veld =D14

SIEMENS

GO FOR ZERO!