# Safety rules at the Gothenburg refinery





## Main principles

 According to Nynas HSSEQ policy strive to improve the HSSE&Q performance by minimizing the risk of major and minor accidents, the risk to people's health and the environment

- To succeed we all need to:
  - Cooperate
  - Think before we act Take2
  - Acquire knowledge
  - Report, investigate and learn from incidents
  - Follows instructions and regulations
- Our safety regulations provides general requirements and information with the intent to minimize risks and ensure that the requirements of health and safety legislation as well as environmental legislation and environmental permit compliance
- The refinery's safety regulations should be followed



Cooperation

Proactivity

**Dedication** 

## Safety training

- Requirements for entering the refinery area (obtain a personal badge to pass):
  - Entre Basic
  - Entre Chemistry
  - Internal safety training
- Visitors and staff not undergone training may be accompanied by visitors receiver (Nynas staff or external staff with written permission) and report to reception on arrival
- As a visitors receiver you are responsible for informing your visitors about relevant risks, and that the visitor complies with applicable safety regulations
  - Every meeting held the office where visitors present are to begin with information about what to do in case of fire (emergency)



Observe, think and act

# Specific hazards and regulations (1)

- Specific hazards at the Gothenburg refinery:
  - Flammable products
  - High temperature products
  - Hydrogen sulfide may occur
  - Nitrogen
  - Health and/or environmental hazardous products/chemicals
- Examples of other present risks:
  - Trip and slip risks
  - Falling objects



#### Observe, think and act

# Specific hazards and regulations (2)

- Flammable products of all different classifications
  - Rules to prevent ignition and ease consequences

#### High temperatures

- Risk for burn injuries if exposed; use required protection equipment!
- Hydrogen disulphide (H<sub>2</sub>S)
  - Accumulates in the vapor space of hot bitumen tanks and may there reach dangerous concentrations
  - Present in for example AD-gases, VD-gases, OX-gases and in the VOC system as well as in the odor from the process water
  - Outdoors it's not likely that H<sub>2</sub>S composes a health risk, but it's important to be aware of the existence in order not to end up in dangerous situations
- Nitrogen (N<sub>2</sub>)
  - Inert gas (= non reactive) BUT unfeasible use of nitrogen may cause deaths due to asphyxiation!
  - All connections to the nitrogen system are normally blinded
  - Connections are <u>only</u> to be applied temporarily for a well defined and risk assessed purpose with stated in a work permission
  - Pipes in the nitrogen system are marked with the warning text "Kvävgas" or "N<sub>2</sub>"

#### H₂S

- A very toxic gas, that may kill if breathed
- It smells like rotten eggs, but the sense of smell may be stunned by high concentrations
- Higher density than air and may therfore accumulate in low areas
- Concentration decreases rapidly with heigh (distance) from the source

## Nitrogen

- Nitrogen diplaces air and therefore oxygen → asphyxiation risk!
- Nitrogen is not visible, senseble and don't smell



# Specific hazards and regulations (3)

#### Chemicals

- Chemicals that are dangerous to health and/or to the environment are handled knowledge is important apply correct handling
  - Crude oil and distillate are dangerous to the environment → Seveso plant (risk for major chemical accidents)
  - Carcinogenic substances are handled for example Naphtha Laguna /AD top and crude oil containing benzene; exposure may occur
    through inhalation and via skin contact
  - Corrosive chemicals are handled for example Phosphoric acid and Hydrochloric acid
- New chemicals must be approved by the Chemicals review group before deliverance
  - Knowledge about risks and protection
  - Product selection principle try to select chemicals that have little impact on the environment
- Tanks and containers must be labeled with the contents and possible danger symbol
- Storage in designated areas and bunding requirements
  - Liquid chemicals and dangerous waste are to be stored in weather protected bundings or spill trays that can hold the whole stored volume
  - · Storage in designated areas
  - Some chemicals are not to be mixed and can thereby not share the same bunding

#### - Handling of leakage and spill

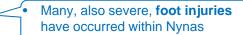
- Stop spreading immediately
- If the spill consist an acute risk to the environment or ignition risk the control room is to be alerted
- Spreading via the sewer system to the waste water plant is eliminated by using the well seals
- All spills are to be reported in the NMS CI module
- Major spills (that impacts the environment and PSAs) are to be reported immediately to the Production manager, the Environment manager and to the Refinery manager to enable further reporting internally and to the authorities
- Acute remediation should take place as soon as possible (suction, isolation, etc.)
- A full clean-up should take place within 4 days
- Spill trays are not to be left unemptied in the plant are to be emptied at the waste station

#### Observe, think and act

# Specific hazards and regulations (4)

#### Slip and trip risks

Potholes, uneven surfaces and slipping hazard requiring safe behavior

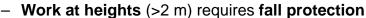




- · Seal off when necessary
- Select the appropriate way is there a safer one?
- Take it easy if it's slippery weather do not rush
- Brace yourself with your hands where needed (hands free and use gloves)
- Wear shoes that provide good support for your feet
- Use spikes when it's slippery if suitable
- Please tell if extra gravelling/deicing is needed

Nynas group decision that everyone must use the handrails in office stairs - a small contribution to increased safety





- When fall protection is missing, fall protection equipment is to be used special rules apply according to NMS 002535 PPE
  - Barrier is required at the rise / stairs to the workplace where fall protection or removed, respectively when digging of pit
  - If the barrier is removed, the area should be monitored even during short breaks
  - Barriers is the service provider's responsibility

#### Ladders

- Work from a ladder is forbidden no matter how high / low you climb
- You are allowed to transport yourself on the ladder if holding on with at least one hand
- Inquire for alternatives to ladder if needed!

#### **Scaffoldings**

- Only scaffoldings with a green sign may be entered
- Assembling, disassembling and rebuilding may be made only by certified scaffolding fitter
- Need for scaffolding or other protective equipment must always be determined in the planning of the work

#### Use of lifts for personnel

- Special rules apply according to NMS 004 290 "Goteborg Use of lifting equipment for lifting persons (lifts)"
- Use the checklist in the instruction



- Doesn't give support to the whole feet
- Easy to fall while not holding hands
- If you fall you easily hurt your feet







## Observe, think and act

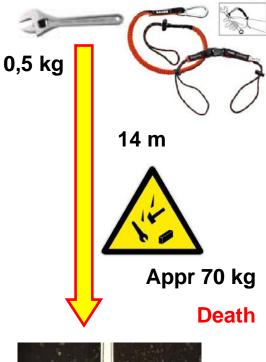
# Specific hazards and regulations (5)

## Falling objects

- During equipment lifting roadblocks should be set up and respected
- Special rules apply to the use of hoists and lifting equipment
- Tools should be secured so as not to fall down when working at height where a fall hazard is present
  - Eyelet / holes are required
  - Under 2 kg can be secured to the body (by wrist or belt bands)
  - More than 2 kg secured in the adjacent solid construction
  - Each safety line has a maximum tool weight and should be used thereafter
- Safe transport
  - **Tool bag** for the transport of tools and equipment in ladders, etc.
  - Use lifting devices special rules apply!
- Loose items like nuts, bolts, etc. should be stored in eg a bucket never to be left directly on scaffolding or grating planes











## **Environment**

- Nynas is certified under ISO 14001, an environmental management system:
  - Work consistently and systematically to reduce the environmental impact of our operations
  - Also environmental legislation and requirements in for example our environmental permits must be met by Nynas
- You are affected by environmental Nynas because all rules apply to both employees and contractors
- Within Nynas, we work with many questions, but perhaps most of us have the most influence over the following:
  - Waste
    - Disposal according to instructions a prerequisite for recycling
    - · Never outside the waste bins
  - Leakages and spills
    - · Prevent occurrence and spreading
  - Energy efficiency etc.







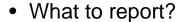


## Observe, think and act

## Incident reporting

- Nynas requirement to report accidents, "near miss"/unsafe conditions etc.
  - To ensure action
  - To learn and hopefully prevent repeating
- How to report?
  - I NMS CI module or to your contact person





- Complaint
- Personal safety classified as fatality, LTA, RWC, MTC, First aid, or occupational injury
- Fire
- Other accident for example Product quality, Environment, Process safety, Security, technical /slowdown/shut-down, Nynas Technical Standard and Other
- Near miss
- Improvement proposal
- Finding from audit
- Finding from risk assessment









Fire











Finding from risk assessment



Personal safety

Other accident

Near miss

Improvement proposal

Finding from audit

## Alarms and evacuation

- The internal alarm calls for evacuation due to process risks
  - Emits a "straight" persistent tones without pauses both in the field and in the office
  - The internal alarm is tested every Monday at 15:00





- The fire alarm calls for evacuation due to fire in building (office building & control room)
  - Emits a local bell signal and an alarm in the control room
  - Automatically activated, but can also be activated from local alarm buttons
  - A fire alarm, but not an internal alarm, will automatically open speed gates in the office





- Fixed gas monitors for combustible gases in the distillation plant
  - Alarm with flashing orange light signal in addition to ordinary process alarm signal
  - Vehicle engines are to be stopped immediately
  - Evacuate the area (perpendicular to the wind direction to a safe place)



In case of an alarm – leave the vicinity and write a CI report



- Activation of emergency showers and opening the door to foam cabinets
  - An alarm will be activated in the control room

## In case of internal alarm or fire alarm

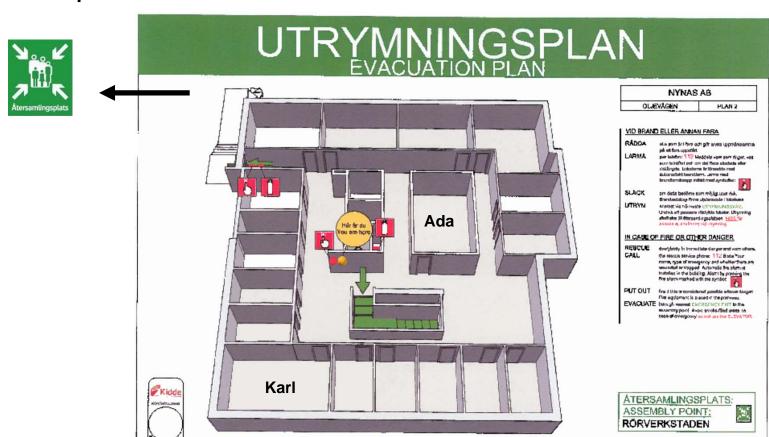
- Stop work immediately and do not collect your belongings
- Leave the buildings as evacuation plans shows
- Head to the assembly point outside the workshop building
- Wait for further instructions





# Top floor

#### **Process area**

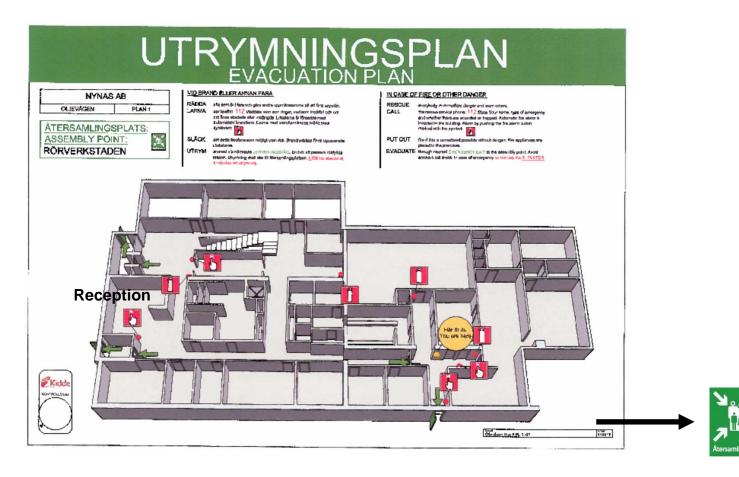




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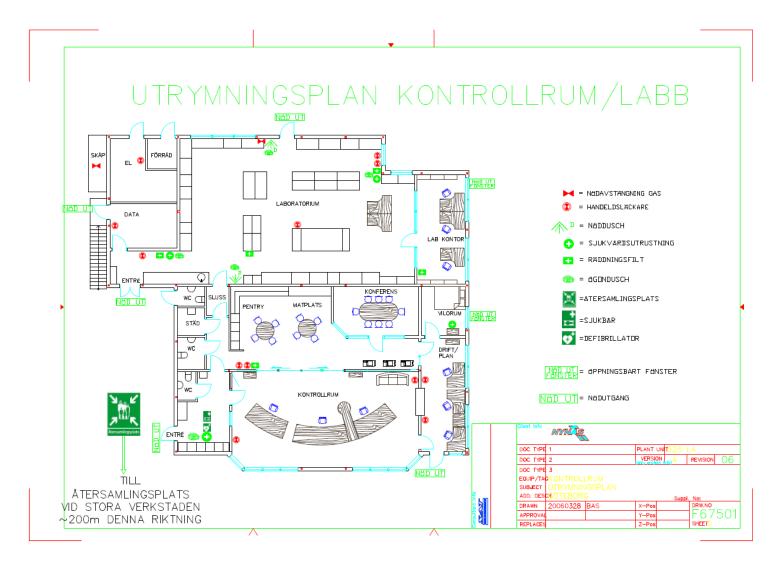
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## Ground floor

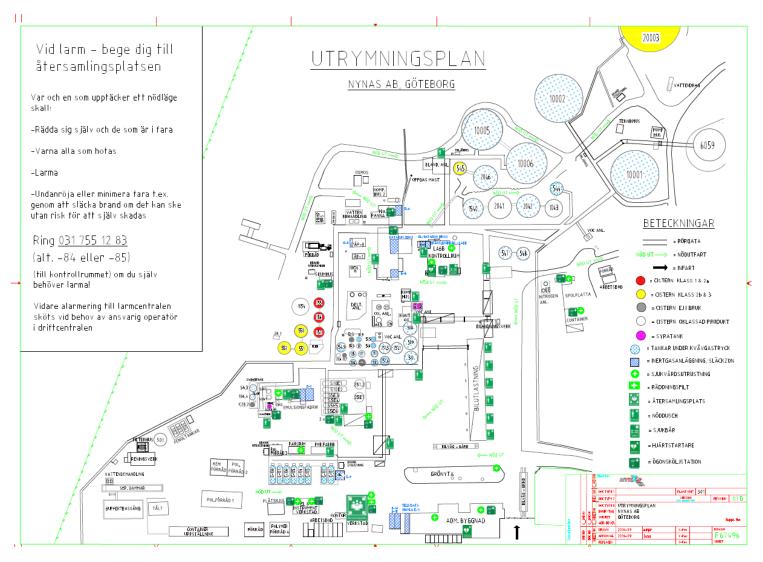


**Process area** 









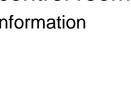


## Alerting in case of fire, accident etc.

- Anyone who discovers an emergency situation shall:
  - Save himself and those who are in danger
  - Warn all in danger
  - Call the control room
  - Eliminate or minimize acute danger if it is deemed that you can manage the situation safely
  - Greater efforts during incidents that may affect plant safety must always be led by Nynas team leader
- If you need to raise the alarm call the control room
  - Phone number are found at the back of the pass
  - Tell who you are
  - Describe the emergency

In case of emergency, call För att larma vid nödläge, ring +46 31 755 1283 (-1284, -1285) int. 1283 1284 1285 who you are - vem är du what has happened - vad har hänt

- Alerting to the Resque service is done by the operator in the control room
  - In case of illness or injury it may be useful that the one that has the most information communicates with the Rescue service
  - The operator in the control room must then be informed immediately!
- Fire Extinguishers
  - Extra extinguishers for lending are stored in the Large pipe workshop (to be refu
  - Emptied / used fire extinguishers to be brought to the storehouse



## Restrictions in emergency situations

In case of emergency/internal alarm the following applies:

- Work permits and entry permits are invalid
- Loading and unloading is not allowed, ongoing loading / unloading is interrupted
- No traffic in the area and all machines must be stopped

**Shift manager** and Rescue officer decide jointly when the emergency is ended. New work permits and entry permits are to be issued.



# General (1)

- Smoking is not permitted
  - Only in allowed area
  - Prevents ignition of flammables and fume exposure to human
- Cell phones and other non-classified equipment
  - May cause ignition in classified areas
  - Are not allowed in pockets in order not to be brought into classified area
  - Are not allowed in the process, tank and loading / unloading area with the exception of inside vehicles
    and along the walkway to the control room the same border as for general requirements for PPE



- Written permission from Refinery manager is required
- Hot work permit is required in classified areas



- Are not allowed in the refinery area
- Alcohol and drug tests are performed randomly, on suspicion, and after some incidents
- Food, drink, tobacco and make-up
  - Must not be handled where chemicals are handled; in process areas, workshops and lab
  - Wash your hand carefully before eating, snuffing etc. and please use gloves to avoid ingesting harmful substances
- Thefts can and should never be accepted
  - All thefts of Nynas property will be reported to the police
  - Theft of property not owned by Nynas is not handled by Nynas and you are responsible for protecting your personal valuables and your company's property
  - Generally, you should have an export license by the Maintenance Manager, Production and Refine Manager to bring material from the area













## General (2)

#### · General duty of care

- If signs of leakage cancel work immediately and contact the responsible
- Checking that the workplace is left in a safe condition at the end of work, in particular:
  - · That no fire hazards exist
  - That the electrical switch has been turned off
  - That the gas bottles valves are closed and that the gas bottles are recovered in designated areas
  - That necessary barriers are in place

The work supervisor is responsible for controlling

- Regular checking to detect any damage that may make unwanted parts of the equipment energized
- We are all responsible for one another please confront a person showing a risky behavior!

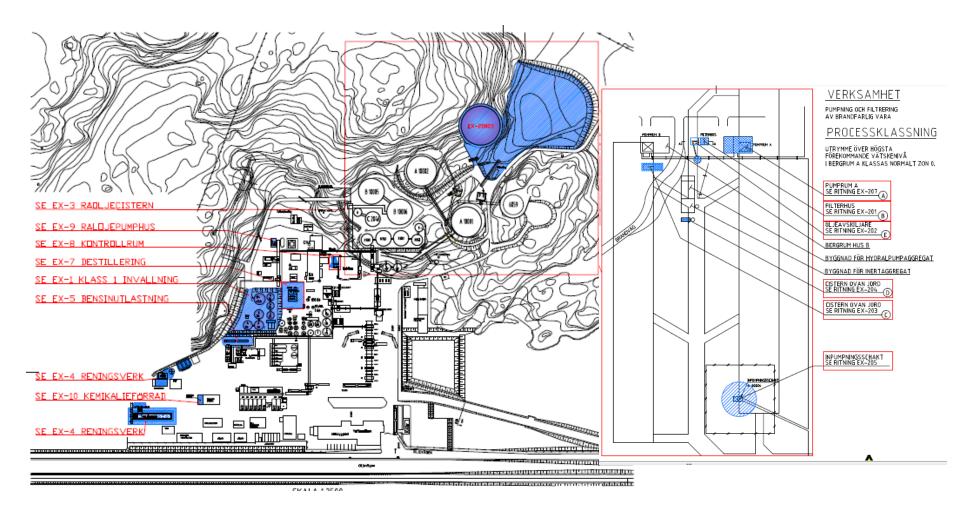
## House keeping

- During work to make sure the one performing work isn't hurt
- After work to maintain a nice work environment for everybody practical work isn't fished until the final cleaning is done
- Workplaces must be kept clean and in good order
  - To ease mobility and access
  - · To prevent trips and slips
  - · To prevent fire hazards
  - To increase job satisfaction etc.
- To be applied also for common areas such as conference rooms, kitchen and changing rooms
- Materials must be placed only in locations that are intended for storage of materials and no storage of personal belongings in common areas





# EX plan (classified area) - refinery and rock cavern





## PPE - basic requirements



Full cover



Safety shoes



Safety glasses



Helmet



PPE is required also in the rock cavern area



- Helmets to be marked with name and company



- H<sub>2</sub>S monitors
  - In a cohesive group, it is sufficient, however, that someone in the group is wearing a  $H_2S$  monitor

Nynas provides the gas meter for detecting svavelväte/H2S, while entrepreneurs themselves provide other protective gear.



## PPE - special situations

- In certain areas and for certain operations, additional PPE such as
  - Within 6 m from a tank truck loading or unloading bitumen
    - Comprehensive clothing, safety helmet, safety glasses with side shields
    - as well as visors, headrests, gloves and safety shoes with a toe cap and high shaft handing over ankles
  - Covering clothing, safety shoes and safety glasses should be used in the lab and in the Stora rörverkstaden where splashes and flying particles can occur
    - However, additional protective equipment such as welding mask required depending on the type of work performed
  - Covering clothing and safety shoes used in stores and other workshop premises together with appropriate protection required for the jobs carried out
  - Helmets must be used during all repairs, building and construction throughout the refinery area
  - Ear protection in noisy environments
- You are required to use protective equipment as specified in the work permit, instructions and according to the signs in the plant
- Nynas contact person responsible for ensuring that the requirements of Nynas instructions made known to the attachment of staff
- Exemptions from the requirements requires a documented risk assessment which may show need for an alternative protective measure or conclude that the risk is acceptable anyway



## Entrance requirements and passage system

## The passage system has the following purposes:

- Let inside competent people (those who work for Nynas and fulfils safety training requirements)
- Listing people who is inside the refinery area in case of an emergency situation

## Pass is required for entry/exit to/from the refinery area:

- On foot through turnstiles or speed gates, one person at a time
- Several cars may pass at a time during the same car gate opening although each driver must ensure that his key card is registered by the card reader at both the entry and exit
- Passengers must leave the vehicle and walk through turnstiles while the driver drives through the vehicle gate



It should be carried during the entire stay in the refinery area.

- Minors, i.e. persons under the age of 18 may only stay and work in the administration building
- Language requirements for taking on foreign staff at least one Swedish or English speaking person who can communicate with the foreign staff in place
- Overnight stay (sleeping) in the refinery area is not permitted





# Traffic (1)

#### Risk to hit

- People
- Equipment which may result in
  - Expensive reparation costs
  - Production interruption
  - · Leakage or fire





#### Measures

- Speed is limited to 15 km/h
- Work machines and service vehicles needed to manage the business may, when the need arises, be used within the refinery area



- Motor vehicles may be used for transport of materials (no pure passenger transports)
- Mainly counter clockwise driving (however this is not a requirement)
- Road markings shows suitable ways to turn large vehicles don't genic through narrow passages

#### Driving permission

- Permission to pass through the car gate is handled through the management of access cards
- Permits for driving process and tank park areas mentioned in work permit (permit only applies to the current work area and access)
- Driving inside the bars to the distillation only
  - · With valid work permit
  - · For transports to the control room/lab or
  - With trucks where the driver has a special permit / training
  - · When the bar is closed, the operator must be contacted prior to entry



# Traffic regulations (2)

#### Parking

- Private motor vehicles on the staff car park
  - · Visitors parking is for visitors
  - Only for vehicles that are used to get to/from work
- Nynas vehicles and external corporate service vehicles, assigned to the selected P-place in the refinery area of the Maintenance Manager may park on these
- For temporary parking, the following applies:
  - · Avoid EX-areas, fire equipment and area under/beside piping and generally blocking
  - Always leave the keys in the vehicle
  - Trucks are allowed to park only along the north side of the grass area by the driver shed
  - Vehicles used for the transport of materials to Distillation and control room / lab may be parked south of the wall south of the control room

## Vehicle damage

- Nynas assumes no responsibility for vehicles within the refinery area, the staff car park or visiting car park

## Licenses and driving permits

- Drivers of construction equipment (eg cranes, lifts, forklifts, loaders, etc.). must have a valid license / certificate
- Permission from Nynas is required for truck driving and use of lift

## • Not registered vehicles etc.

- Vehicle / motorized equipment that do not require external inspection must be controlled and kept in a roadworthy condition by the user
- Not registered vehicles and vehicles with a driving ban must not be used within the refinery area
- Cycling is prohibited in icy/slippery weather



## Work permission (1)

## Work permissions are required for

- All new construction, repair and demolition work throughout the refinery area and cavern area (including control system)
- But not for operating staff's ordinary tasks, bitumen loading drivers and work in permanent workshops
- Work permission applier must divide the work in stages, and obtain separate permits for each part

## Different types of work permissions

#### - Hot work category 1

- Hot work with direct ignition source; open flames, welding, cutting, grinding, dry sand blasting etc. ie considerable ignition risk
- Requires fire guard, completed checklist and coverage of combustible materials, wells, etc., and ev. gas sampling

#### Hot work category 2

- Hot work with indirect ignition source (no open flame), internal combustion engines, non EX-classified equipment, etc. that may lead to ignition
- Requires fire guard and completed checklist and ev. Sampling (note the EX areas etc.)

#### Cold work category 1

 Cold Work that involves equipment that contains or has contained flammable, corrosive or toxic substances, as well as steam, condensate and nitrogen opened but where the work is not in itself a source of ignition

#### Cold work category 2

• Cold Work that covers all other types of work where the work is not in itself a source of ignition

#### Confined space entry

- Upon entry into the confined space (tank, basin, pit etc.) with insufficient ventilation where flamped or toxic gases may accumulate, or where the danger of suffocation is present
- A Not alone work requiring entry guard and gas sampling (continuous or periodic)

## Work permission (2)

- Applications for work permits shall contain the following information:
  - What work to be performed and exact location on or in the equipment work will be performed
  - What **methods**, tools, machines that will be used
  - Who will perform the work
  - Working period and execution timing
  - Risks relating to the performance of work, related to damage to personnel and equipment based on the choice of working, non EX classified work equipment, location, and use chemicals, sparks, risks of working near, environmental risks, etc.
  - Planned **measures to minimize the risks** (safety device, gas monitoring, instructions, etc.)
  - Suggestions for where each gas sample should be taken and what should be measured based on activities eg during welding in confined space
  - Applier's risk assessment must relate to the operation activities carried out by maintenance personnel and/or contractors; while process aspects shall be assessed by the permit issuer before the work permit is granted
  - The applier shall, by planning, ensure that jobs do not collide in space and time
- The content of the permit must be known by the relevant personnel
  - Anyone who checks out a work permit shall inform the other performers on the potential risks with the work to be performed and the service providers should be well aware of the potential risks
  - Take2 and checklists to be completed by service providers
  - The performer must have a valid work permit (copy) with them during the work while the original will hang up in the control room as long as the work is in progress
  - On completion of work the executor must notify the permit issuer that work is complete and the permit terminated
  - Operators must keep themselves informed about issued work permits in the process they operate

# Work permission (3)

G14-00074T TILLSTÅND Godkänd för arbete Gäller datum: 2014-01-14 Nynas AB, Göteborg Tillståndstvp Kalla arbeten kategori B Beställare Per Ostberg/GBG/SE/Nynas Tel: +46-31-755 12 64 / +46-768 243 794 Ytterligare beställare Repr Ställningskompaniet 507- CA, 510- DA ansöker att vid på objekt Rörgatan i slänten mellan 1:a klass och destillation utföra följande arbete Ställningsarbete för renovering rörstöd och därvid använda Handverktyg, fordon för materialtransport med följande entreprenör Ställningskompaniet 2014-01-14 - 2014-01-16 Önskad arbetsperiod Tider utanför mån-fre 7-16 Risker förknippade med Se bilaga arbetet Beställarens åtgärder för Se bilaga att minimera riskerna Kontroll av riskminskning Önskemål om gasprov (plats, ? typ, tidpunkt...) Bilagor

Gäller datum: 2014-01-14 Nynas AB. Göteborg Tillståndstyp Heta arbeten kategori 2 Beställare David Hasslof/GBG/SE/Nynas Tel: +46-31-755 12 00 / 0761 632301 Ytterligare beställare Robin Oldenburg/GBG/SE/Nynas Tel: +46-31-755 12 00 / 0733241488 ansöker att vid 507- CA på objekt Cistern 20003 utföra följande arbete Invändig rengöring av cistern och därvid använda Hetvattentvättar, kompressor och fordon för transport (te.x bil, traktor och truck). med följande entreprenör City Industriservice 2014-01-13 - 2014-01-19 Önskad arbetsperiod Tider utanför mån-fre 7-16 Ja, vid behov Risker förknippade med 1.) Luftföroreningar. 2.) Cancerogena ämnen i cistern (Råolja). 3.) Dålig belysning. 4) Brännskador 5.) Hög temperatur i cistern vid arbete. 6.) Svårt att kommunicera mellan luckvakt och sanerare i cistern. 7.) Ex-klassat område. I övrigt se City Industriservice arbetsmiljöpärm (finns hos utsedd luckvakt). Beställarens åtgärder för 1.) Friskluftsmask används ALLTID inuti cisternen, luckvakt använder gasfilter. att minimera riskerna Heltäckande kemskyddsdräkt används ALLTID inuti cistern. 3.) Under rengöringsarbetet används Ex-klassade pannlampor. 4.) Heltäckande klädsel och helmask används. 5.) Korta och effektiva arbetspass inuti cistern. 6.) Det kommer alltid finnas en person inuti cisternen som övervakar den/dem som sanerar, övervakaren har i sin tur ständig kontakt med luckvakten. På detta sättet kommunicerar man även om det skulle ske en olycka. Luckvakt är utrustad med intern telefon så denna kan larma vid olycka. 7.) Ex-klassade pannlampor används och all annan utrustning, så som kompressor och hetvattentvättar är placerade utanför Ex-området. Hela arbetsområdet kommer spärras av för obehöriga! I övrigt se City Industriservice arbetsmiljöpärm (finns hos utsedd luckvakt) Kontroll av riskminskning Önskemål om gasprov (plats, Ja på morgonen, genom den västra manluckan och runt omkring på planen utanför typ, tidpunkt...) Portabel gasmätare kommer placeras ut på av Nynas avnisad plats

G14-00056T

TILLSTÅND

Godkänd för arbete

Riskanalys Ställning Gunnilse.pdf

Driftmästare

Tillståndsgivare

## Coordination responsibility

- Nynas has responsibility for coordinating the activities going on within the refinery area - responsible for coordination only applies to coordination
- Contractor and consults companies, however, still have the normal responsibility for the work environment for their own personnel
- Each company is obligated to ensure that their activities or devices at the worksite does not expose anyone else working there for illness or accidents
- Representatives from both Operations (Shift manager) as well as Projects and Maintenance (supervisor for each discipline), any BAS-U and HSE coordinators and HSSE Manager will participate in the Refinery Coordination



# Thank you!

