



Norsk Olje og Gass arbeidsseminar

Filosofi – desgn/bygging/installasjon, spesielle krav til løsninger - Goliat

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Innholdet i presentasjonen

- Data- og erfaringsinnhenting
- Vinteriseringsløsninger
- Materialhåndtering
- Støy
- Oppfølging under bygging
- Relevante FoU prosjekter



Goliat - arbeidsmiljø

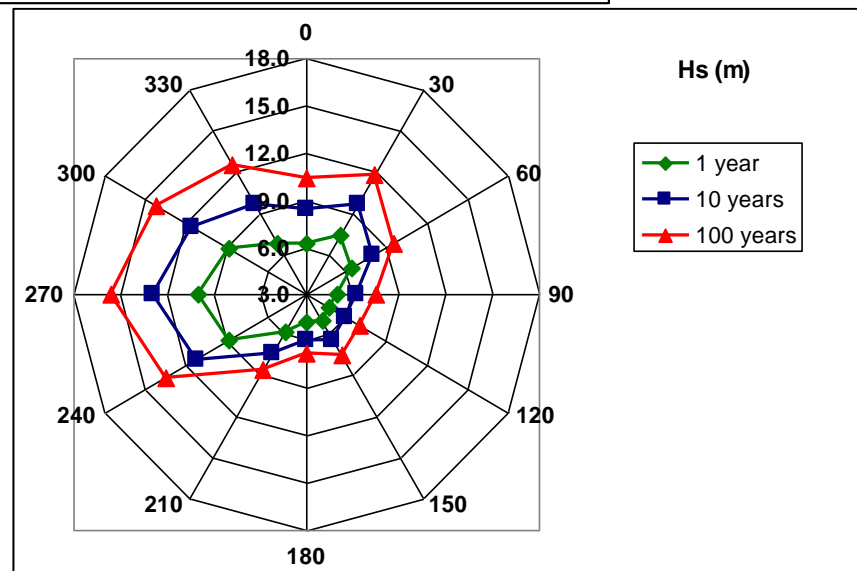
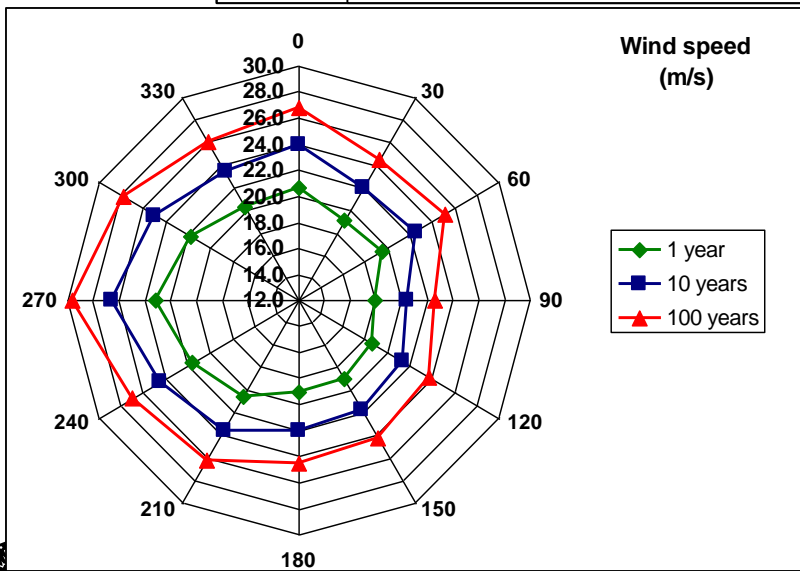
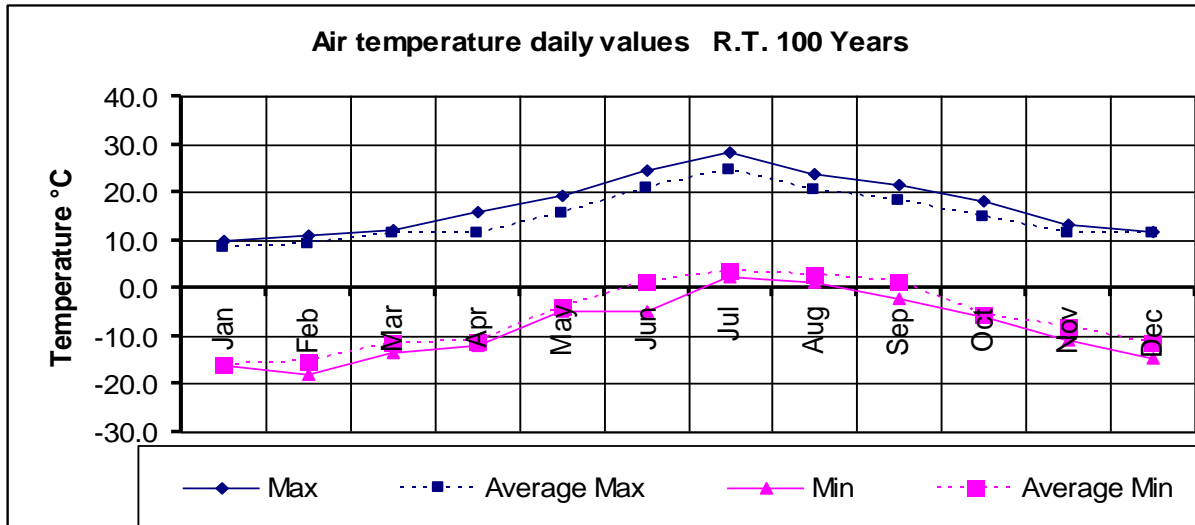
- Goliat
 - Sub-arktisk miljø
 - Kulde og ising
 - Mørke
- Værdata fra området er samlet inn ifm PUD
 - Erfaringer fra leteboring i området
 - Fiskere
 - Kystvakta
 - Canda, Alaska og Kasakstan
- Samler inn data fra Scarabeo 8 og fartøyene



Arrangement

System	Description	Requirement		Reference	Vessel's attainment	
		Shall	Should		Yes	No
1. Arrangement	1. The vessel shall be arranged specially for working in cold areas. That means covered working areas. Superstructure areas and decks with a smooth surface and with as little as possible of obstructions. Masts and equipment arranged to minimize accretion of ice.	X		DNV		
	1. The navigation bridge shall be completely closed.	X		ENI requirement		
	1. All superstructure fronts and sides shall have a de-icing system.	X		DNV		
	1. All gangways, stairways, bulwarks and railings shall have a de-icing system.	X		DNV		
	1. All freeing ports and scuppers shall have an anti-icing system.	X		DNV		
	1. All decks where not especially specified anti-icing areas shall have a de-icing system.	X		ENI requirement		

Metocean Data



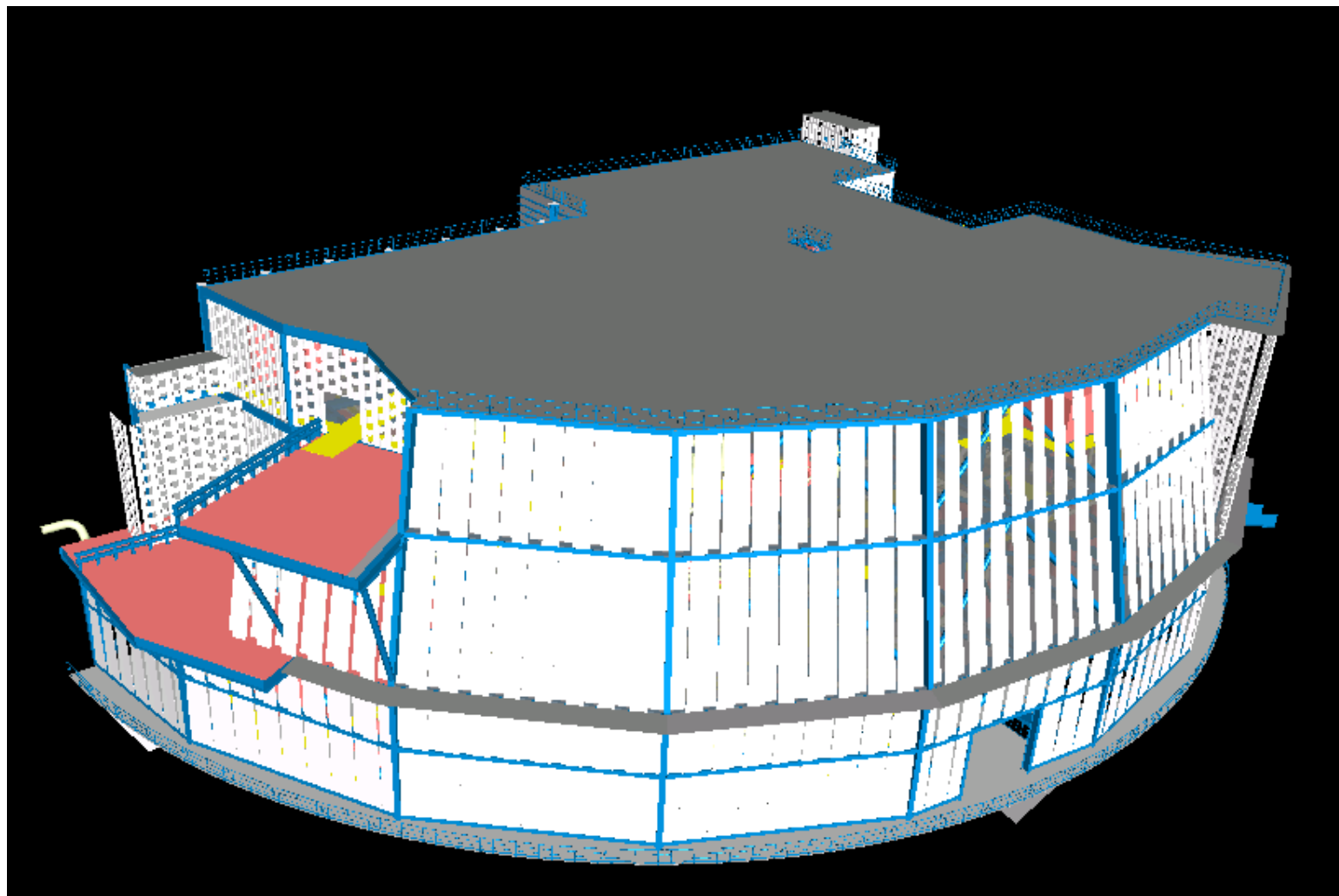
Risikobildet på Goliat

Risikobildet:

- + Høyt fribord
- + Beskyttet mot kollisjon
- + Stigerørene er beskyttet
- + Livbåtene plassering
- Eksplosjon og brann i prosessområdet
- Eksplosjon fra toppen av lagringstankene for olje



Vinteriseringsløsninger



Ekspløsjonsrisiko vs arbeidsmiljø

Omfattende analyser som basis for den valgte løsningen:

Ekspløsjonsberegninger fra PUD:

- Lokal ekspløsjonslast på ekspløsjonsveggen ~ 1.5 barg (4x4 meter panel)
- Global ekspløsjonslast i prosessområdet ~ 0.5 barg

Arbeidsmiljøanalysene:

Wind chill studiene viser gode resultater

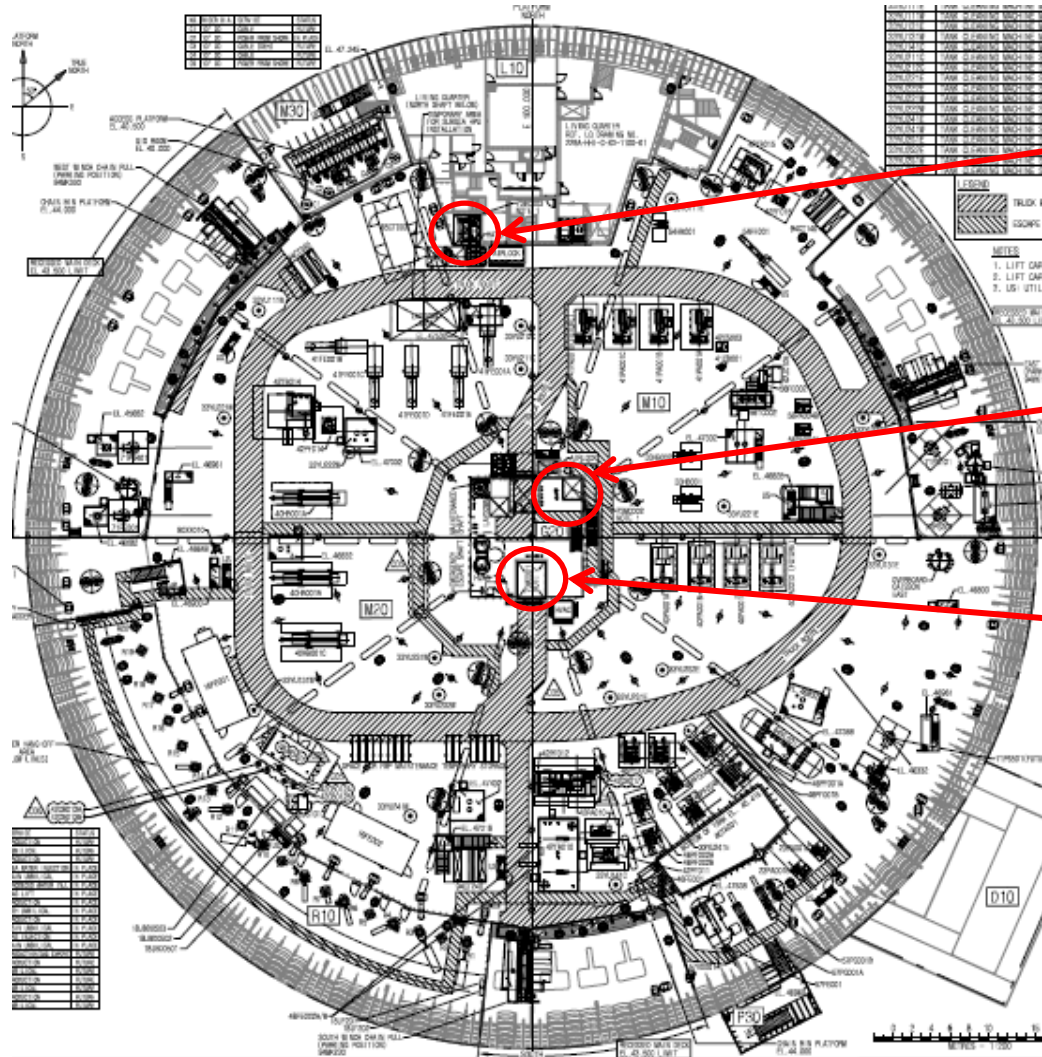
Ventilasjonsanalysene:

- Bare naturlig ventilasjon i prosessområdet
- Mer enn 12 luftvekslinger per time i 97.6% av tiden

Materialhåndtering og ergonomi

- Materialhåndtering – omfattende studie
 - Mer horisontal intern transport pga vinteriseringsløsningene
- Heiser
 - Boligkvarter, Prosess og hjelpesystemområdene, Sentral- og Nordskiftet
- Trapper
 - Ikke langt til nærmeste trapp

Lifts from Main Deck El 44000



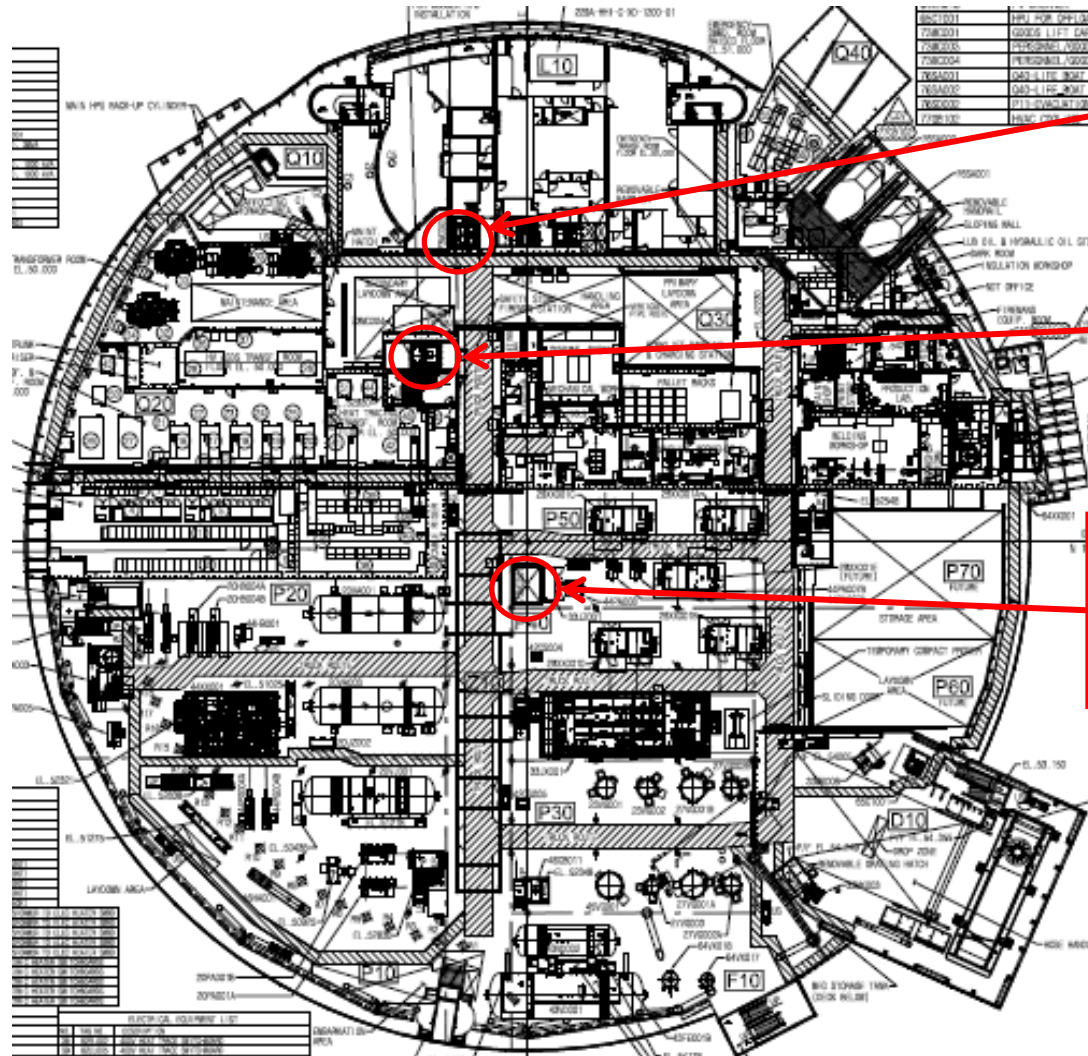
Lift no 3 down to North Shaft El 3000 and up to El 50000

Lift no 2 down to Center Shaft El 10400

Lift no 1 up to El 69000

Main deck Elevation 44000

Lifts from El 50000



Lift no 3 down to North Shaft El 3000

Lift no 4 up to El 69000

Lift no 1 down to El 44000 and up to El 69000

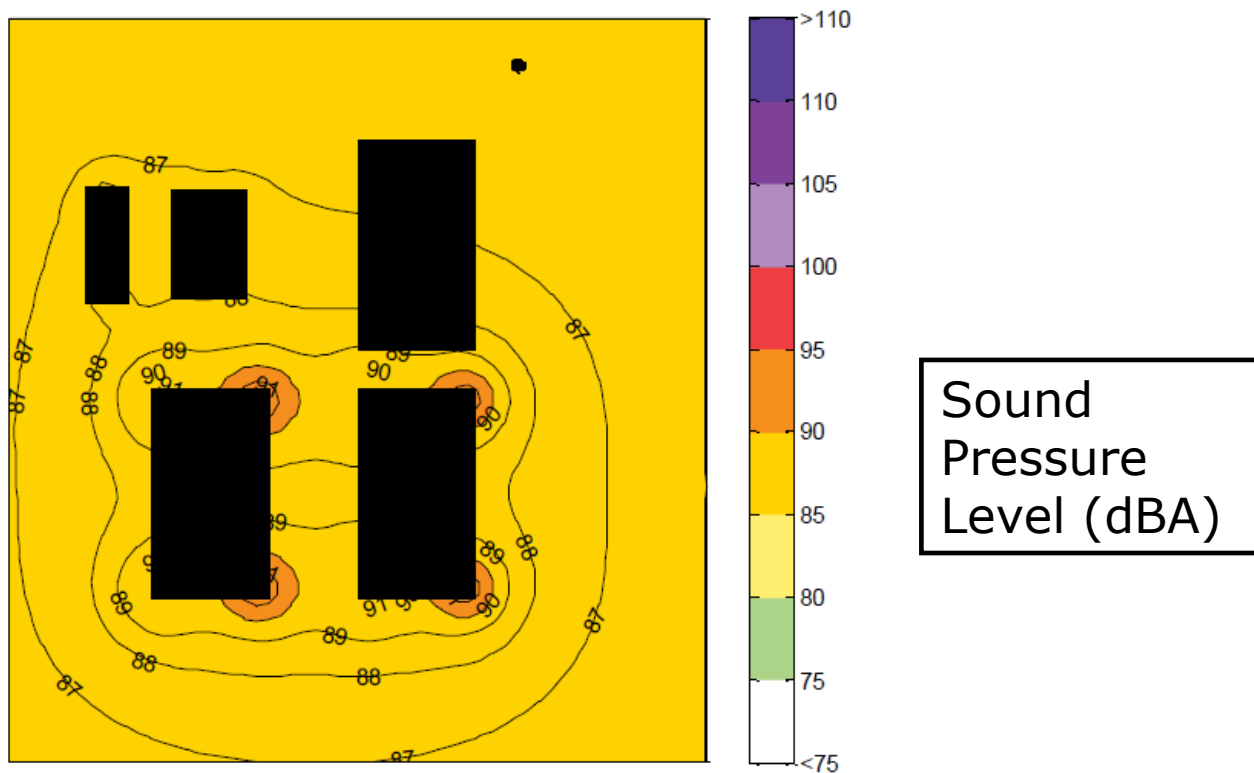
Elevation 50000

Støy

- Den høye graden av innebygging gir utfordringer
 - Interne støykrav er satt lavere enn regelverkskravene
 - Noen områder vil overskride egne krav
 - Kravene i regelverket vil bli etterlevd

Area with largest predicted exceedance of Project Area Noise Requirement

- Center Shaft G20 Elevation 36000 – Air Compressors
 - Project Area Noise Level Requirement is 85 dBA Sound Pressure Level
 - Predicted maks 89 dBA Sound Pressure Level 1 meter from equipment



The **WEOR system** is the system for identifying and resolving Working Environment Observations

WEOR = Working Environment Observation Report

The WEOR system – an overview

- Identify non-compliant WE issues
- Validation meeting with OPR and WFR
- Issue WEOR
- Develop corrective actions and record on Solution Sheet
- Track corrective works
- Reinspection of corrective works with OPR and WFR
- Close-out

WEOR Register

- The WEOR register is the **central document** within the WEOR system as it provides progress tracking of each WEOR
- The WEOR register provides a status overview to the FPSO management for the WE issues
- The WEOR register contains:
 - WEOR reference
 - Location and brief description
 - Date information
 - Status of WEOR resolution
 - Details of photographs and screenshots
 - Hot/Cold work | PA/PB | Hard/Soft fix
 - ProCoSys cross-reference information
 - Deviation Request cross-reference (soft fix)
- The WEOR register is updated **daily** by the ENI WE Technical Assistant and the Field Engineering team

WEOR ref	Subject	Observer name	WEOR Issue date	Tag	Item/Object name	Plug Ref.	Previous Package WE Punch Ref.	Yellow Tag ref	WEOR validated by	WEOR validation date	Location (TU/Hub/LI)	Area code	
WEOR-A10-0158	Water ridge nearby valve handle	PB Tufts	28.Oct.13	S38001B	Fresh Water Chlorination	HQ24	23128-HE11						
WEOR-A10-0155	Valve handle is too near Tag plate	PB Tufts	28.Oct.13	S38001B	Fresh Water Chlorination	HQ24	23128-HE12		PB Tufts	24.Dec.12	Hub	N10	
WEOR-A10-0152	Low clearance between valve handles	PB Tufts	28.Nov.13	S3CA001A	UV Steriliser Unit	HQ24	23128-HE01		PB Tufts	14.Dec.12	Hub	N10	
WEOR-A10-0154	Low clearance between valve handles	PB Tufts	28.Nov.13	S3CA001A	UV Steriliser Unit	HQ24	23128-HE03		PB Tufts	14.Dec.12	Hub	N10	
WEOR-A10-0159	Low clearance between valve handles	PB Tufts	28.Nov.13	S3CA001B	UV Steriliser Unit	HQ24	23128-HE04		PB Tufts	14.Dec.12	Hub	N10	
WEOR-A10-0156	Low clearance between valve handles	PB Tufts	28.Nov.13	S3CA001B	UV Steriliser Unit	HQ24	23128-HE06		PB Tufts	14.Dec.12	Hub	N10	
WEOR-A10-0157	Limited access to valve for maintenance activities	WE Team	24.Dec.13		Control valve connected to line				VG-085	Y. Gargis	28.Dec.13	Hub	N10
WEOR-A10-0158	Limited access to valve for maintenance activities	WE Team	24.Dec.13		Control valve connected to line				VG-085	Y. Gargis	28.Dec.13	Hub	N10
WEOR-A10-0159	Limited access to valve for maintenance activities	WE Team	24.Dec.13		Control valve connected to line				VG-078	Y. Gargis	28.Dec.13	Hub	N10
WEOR-A10-0160	Limited access to valve for maintenance activities	WE Team	24.Dec.13		Control valve connected to line				VG-080	Y. Gargis	28.Dec.13	Hub	N10
WEOR-A10-0161	Limited access to valve for maintenance activities	WE Team	24.Dec.13		Control valve connected to line				VG-079	Y. Gargis	28.Dec.13	Hub	N10
WEOR-A10-0162	Limited access to valve for maintenance activities	WE Team	24.Dec.13		Control valve connected to line				VG-079	Y. Gargis	28.Dec.13	Hub	N10
WEOR-A10-0163	Valve with difficult access	WE Team	20.Dec.13		Access may not be respected				VG-070	Y. Gargis	28.Dec.13	Hub	N10
WEOR-A10-0164	Access may not be respected	WE Team	20.Dec.13		Access may not be respected				VG-067	Y. Gargis	28.Dec.13	Hub	N10

ENI Working Environment – personnel

The control of Working Environment is a process which involves various departments within the ENI organisation:

- **ENI Working Environment** – lead engineer and 2no discipline engineers
- **ENI Operations and Work Force Representative** – attend the regular field inspections and validation meetings
- **ENI Field Engineering** – developing solutions to the WE issues with HHI
- **HHI** – presenting the documented solutions

Bekledning



- Gjennomført et prosjekt
 - Teste arbeidsbekledningen som brukes på Scarabeo 8 og som planlegges brukt på Goliat
- Hansker og sko løsninger må forbedres
- Utvikle løsninger sammen med utstyrsleverandørene
- FoU prosjekt sammen med Statoil

Redningsutstyr

- Beredskap
 - FoU – redningsdrakt
 - for Goliat
 - MOB drakter
 - Design temperatur lavere enn 20 grader – nye materialer



Arbeidsmiljø - konklusjon

Utbygging i nord gir flere utfordringer mht arbeidsmiljø:

- Tidlig integrering av arbeidsmiljøkompetansen
- Oppfølging av leverandørens arbeidsmiljøkompetanse i teori og praksis

Takk for oppmerksomheten