



REPUBLIC OF CROATIA

MINISTRY OF ENVIRONMENT
AND ENERGY

Example of planning to reduce risk and ensure integrity of the petroleum products storage depot

ISPRA, 14-16th June 2017.

Anita Milošić, senior environmental inspector
Miljenka Kliček, senior environmental inspector – specialist

Ministry of Environment and Energy
CROATIA

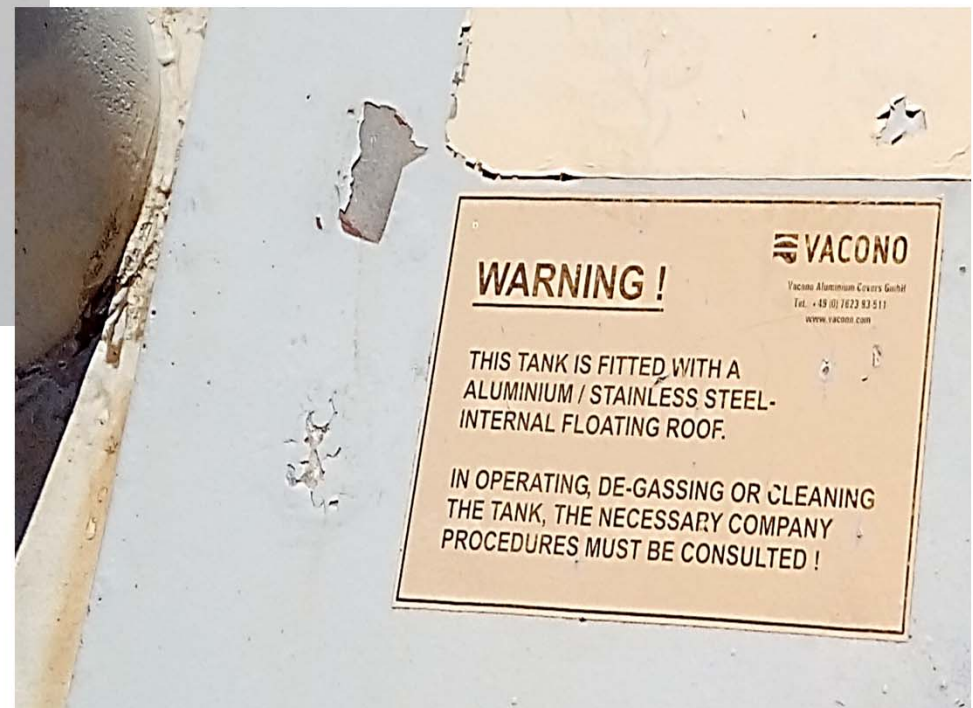
CONTENT

1. Petroleum Storage Depot
2. Ageing Plant
3. Planning to Reduce Risk
 - Monitoring and Control
 - Integrity of Installations and Equipment
 - Maintenance Program and Inspection
4. New Design
5. Conclusion

PETROLEUM STORAGE DEPOT



AGEING PLANT



AGEING PLANT

Plant & Assets condition

Operational integrity

Maintenance and Inspection

*Assets availability &
reliability*

Hazard potential & PSM

Environmental efficiency

- ▶ How to operate a Seveso plant safely in a sustainable way through many years?
- ▶ How to avoid “surprises”?

PLANNING TO REDUCE RISK

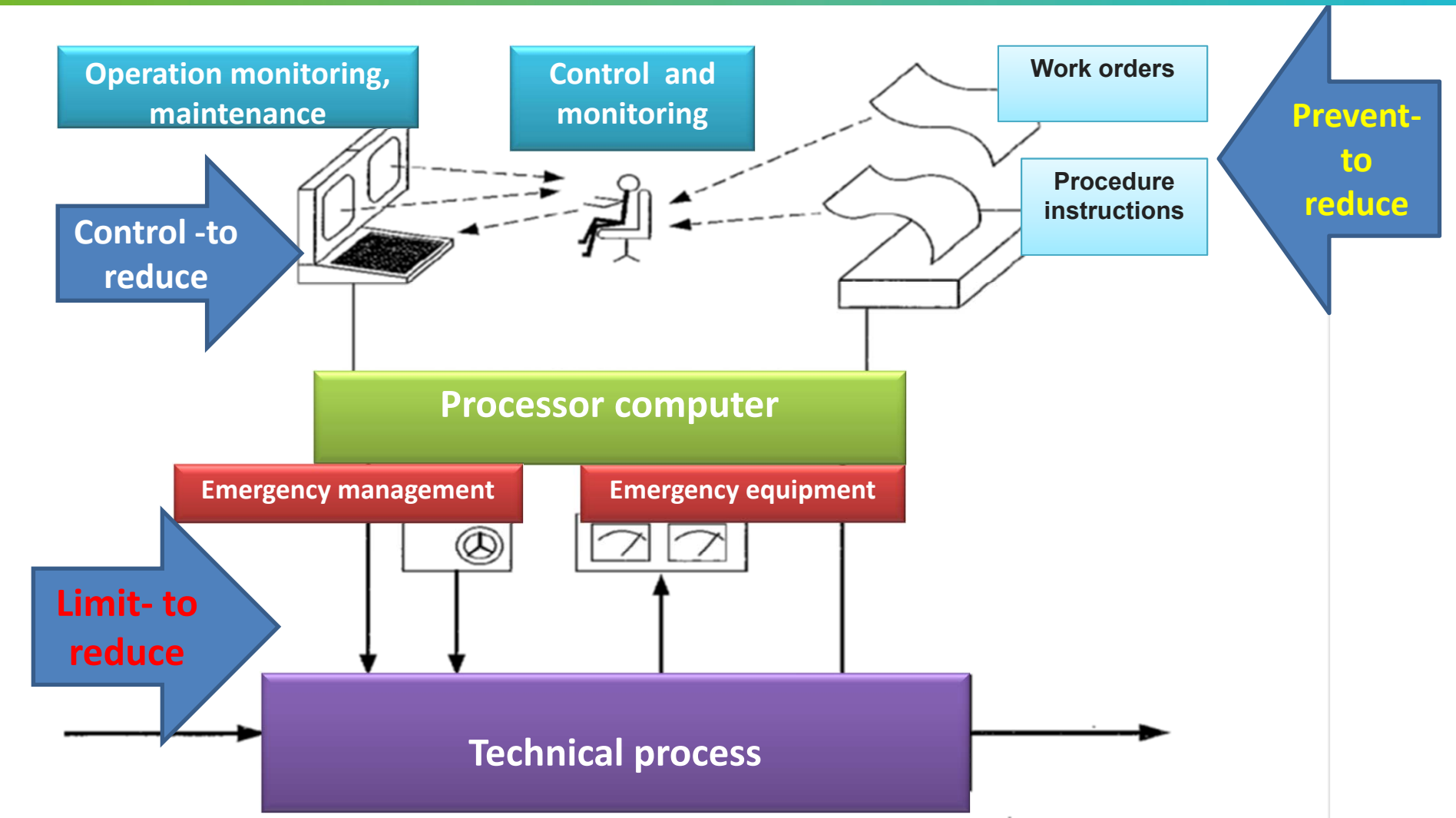
**Ageing is not about how old is your equipment,
it is about its condition and how that is
changing over time.**

**How to make a good plan to reduce risks from
ageing plant?**

PLANNING TO REDUCE RISK - Process Hazard Analysis

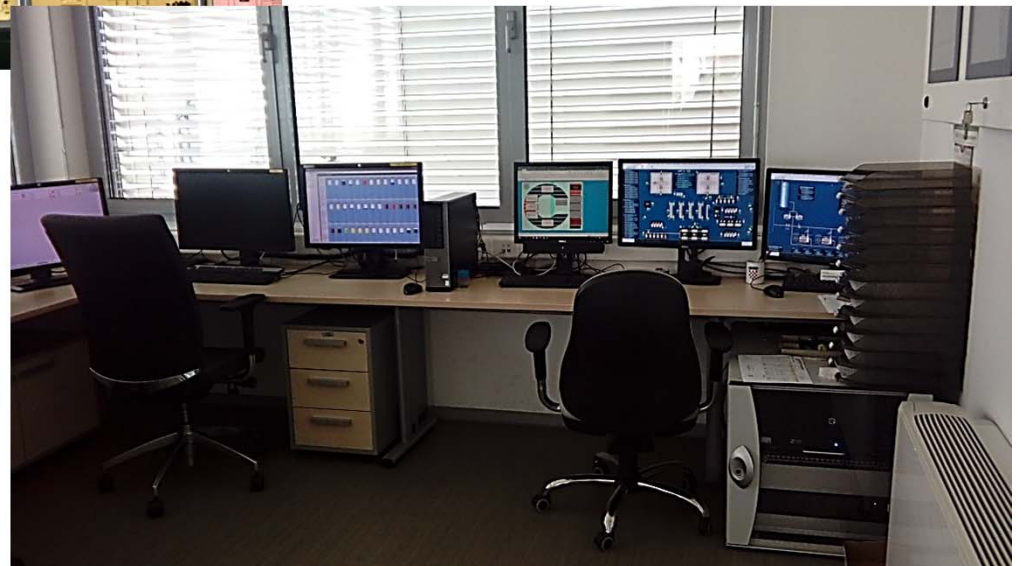
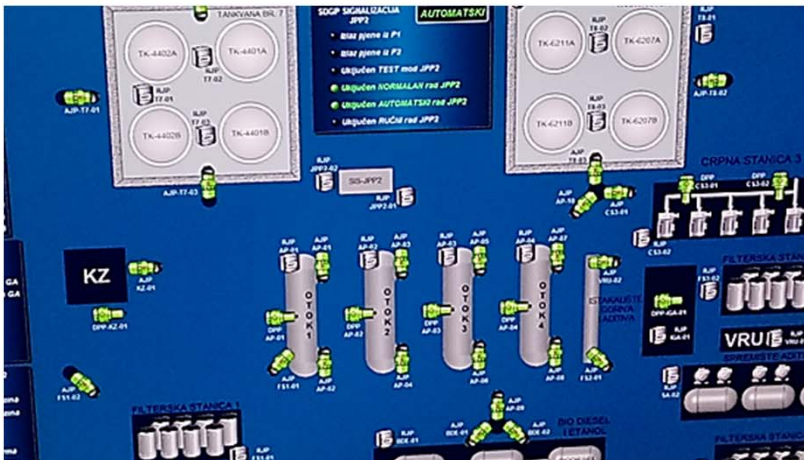
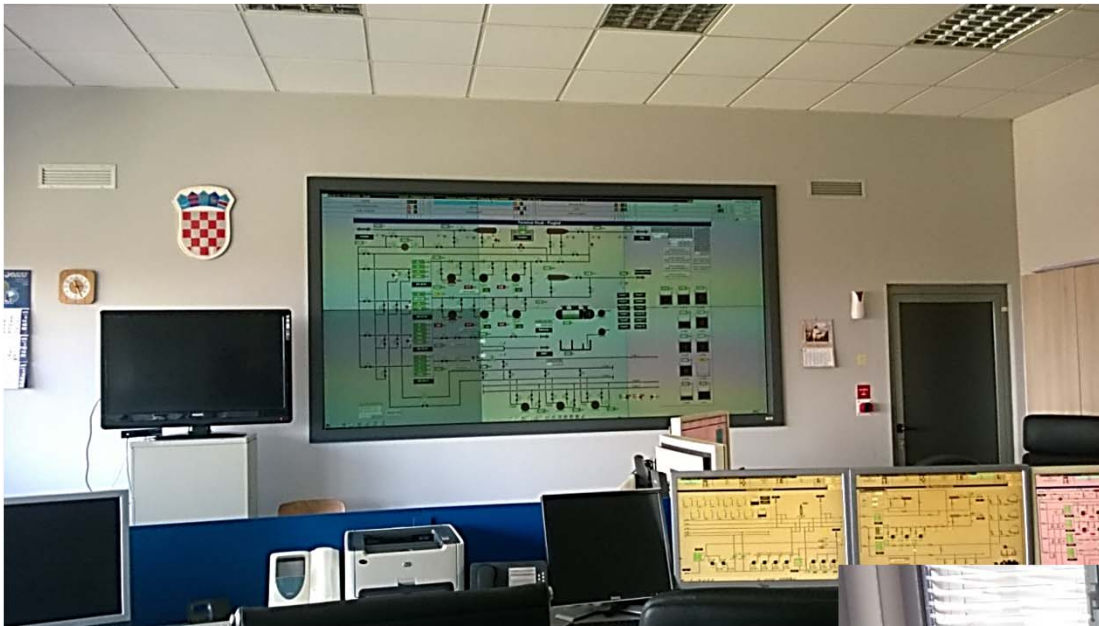
PLANT	PROJECT PROCESS PARAMETERS AND EQUIPMENT
CONSTRUCTION, CONNECTIVITY	Projected pressure
STARTING	Design temperature
PREPARATION FOR MAINTENANCE WORK	Projected load (vessels, pipes, compensators, structures)
STOPPING	Schedule of the plant
PROCEDURES (for work, maintenance, emergency situations)	Heating
DECOMPOSITION, REMOVAL	Isolation
INDEPENDENT WORK	Supports (pipes, compensators, vessels)
Process Regulation	Infrastructure (road, traffic)
.....	Access (working, maintenance, emergency situations, handrails, ladders, cranes, platforms, vehicles, fire extinguishers)
HARDWARE(DCS, ESD, cables, network, printers)	Flame retardants and detonators
SOFTWARE	Marking
Security (viruses, access)	Overheating and overpressure protection
Alarm and block settings	Restraint system and torch system
Security-critical loops (SIL)	Deviation from specifications / norms
Logic control, the sequence	Area classification / ATEX compliance (electric and non-electric)

PROCESS MANAGEMENT SYSTEM



MONITORING AND CONTROL SCADA

**Supervisory Control And
Data Acquisition
System for monitoring,
measuring and
managing
industrial systems**



INTEGRITY - STORAGE TANKS



- ✓ corrosion allowance
- ✓ ATEX control,
- ✓ control of fixed fire fighting systems;
- ✓ detection on presence of hydrocarbons,



INTEGRITY - STORAGE TANKS

- ✓ Floor plate thickness control
- ✓ Overfill control - top level switches / radar level measurement system
- ✓ Automatic fire detection



- ✓ Automatic start-up and shutdown
- ✓ Automatic valves on all pipelines

INTEGRITY - BUNDS

- ✓ Concrete bunds / steel bunds
- ✓ Double bottomed container / leak detection system integrated into the SCADA system.
- ✓ Rainwater removal system



INTEGRITY - BUNDS

- ✓ capacity,
- ✓ liquid tightness,
- ✓ water removal



INTEGRITY - VALVES

✓ automatic closing valves



INTEGRITY – TRUCK LOADING AREA



INTEGRITY - PIPELINES



- corrosion allowance
- overpressure resistance
- pig inspection

[illegible]

MAINTENANCE PROGRAM

R	RZ	Struk	Br.RN	U	OOS	Ex	Opis problema	Opis zadržavanja
			61400101					Opis zadržavanja
			61400102					- Građevinski radovi na uređenju remize vučnog vozila
			61400103					- Izrada betonskih stepenica za prilaz drenažnom ventilu tankvane sprem
			61400104					- Update novog softwera na Limitorque ventilima QX-1, QX-2 i QX-3 po te
			61400105					- Radovi na sanaciji (pranje, fugiranje, uklanjanje rastinja, premazivanje)
			61400106					- Rezanje plinskom garnitrom dijelova demontiranih cjevovoda u tankva
			61400107					Mjesečni periodični pregled spremnika s plivajućim krovom na terminalu Žitnjak
			61400108					Mjesečni periodični pregled spremnika derivata s fiksnim krovom na termi
			61400109					Redovni mjesečni servis sustava tehničke zaštite
			61400110					Mjesečni periodični pregled spremnika derivata s fiksnim krovom na termi
			61400111					Mjesečni periodični pregled spremnika derivata s fiksnim krovom na termi
			61400112					Provjera dišnog ventila sa zadnjačem plamena na spremnicima Terminala
			61400113					Redovni godišnji servis zadnjača plamena na Terminalu Žitnjak
			61400114					Redovni godišnji servis zadnjača plamena na Terminalu Žitnjak

Omogući izmjene

Zatvori izmjene

Pohrani

Osvježi

Ispis

Traži

Otključaj

Izlaz

Broj radnog naloga: 61400113

*Terminal: 6 ŽITNJAK

Datum zahleba: 9.12.2014

Pokrenuo: Tomislav Poljak

Datum zaprimanja: 9.12.2014

realiziran

izveden

periodični pregled

podmazivanje

umjeravanje

u tijeku

planirani radovi

obuhvaća Ex opremu

Knjiga stanja popravak

detaljni popis

izvedeni popis

tačna proba

ispitivanje

unutrašnji pre

Osnovni podaci

Polpisi/dozvole

Obračun

Analiza pogreške

Dokumenti

Oprema

*Nositelj - vanjska tvrtka: 79 Elektrocentar Petek d.o.o.

Voditelj radova vanjske tvrtke:

*Voditelj radova - JANAF:

*Nadzor/odg. osoba JANAF: 144 Tomislav Poljak

*Mjesto troška: 435 PJ Terminal Žitnjak

Rok: 31.12.2014

*Struka održavanja: 2 ELEKTRO

*Kategorija održavanja: 6 INVESTICIJA

Opis problema:

Opis zadržavanja: Elektromontazni radovi na sustavu grijanja filterskih stanica FS1, FS2, FS3.

Opis radova: Izvršeni su elektromontazni radovi na sustavu grijanja filterskih stanica FS1, FS2 i FS3.

Planovi

Stranica 1

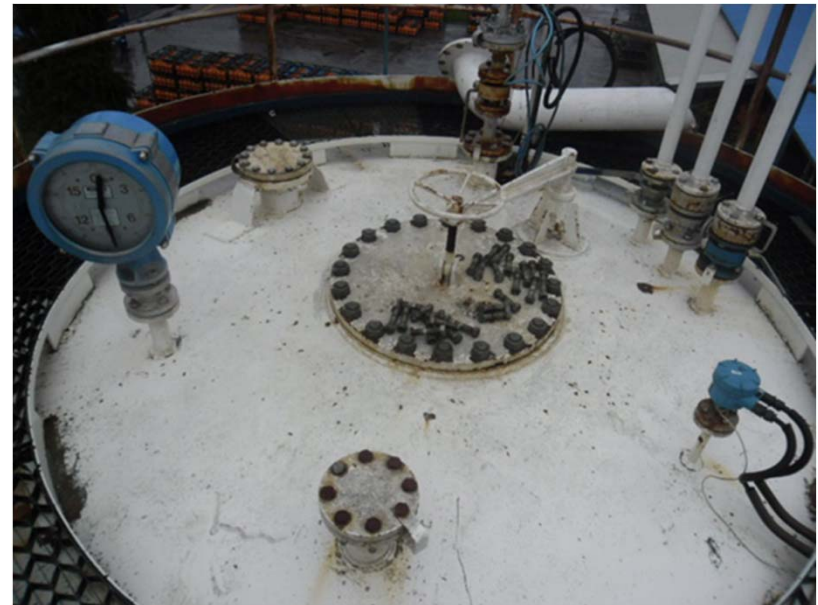
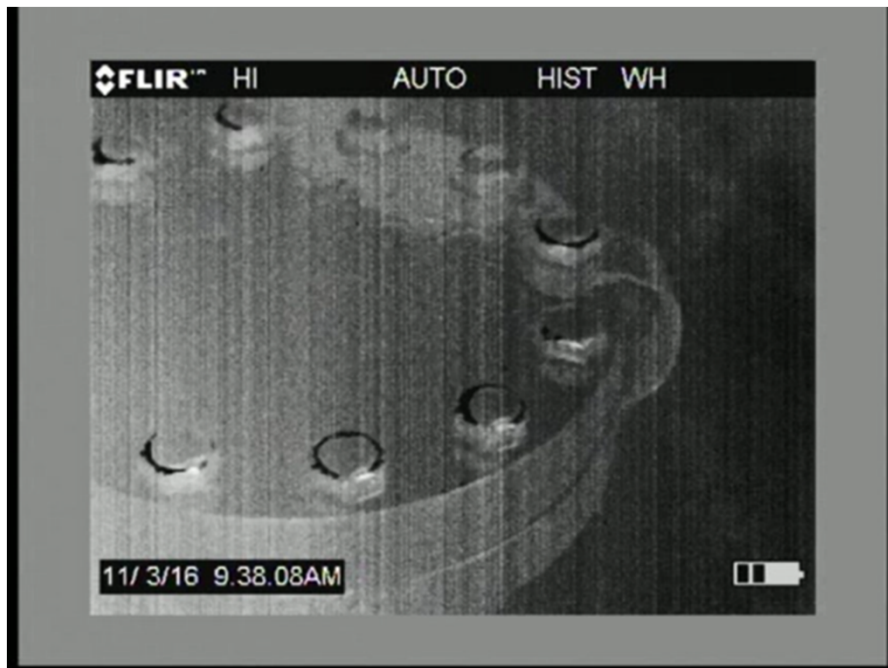
Prikazuje 1 - 20 od 55

STANJE	ID PL	OPIS	GODINA	PLANIRANI MJ POKRETANJA	NAZIV LOKACIJE	MJESTO TROSKA	OBJEKT	PL. POZ	GU	PROJEKTO
	2400	Gorivo za zagrijavanje poslovnog prostora (UNP)	2015		Terminal Žitnjak	435		4.48.435	Ne	30
	939	Nadogradnja vozila za vuču (ugradnja odbojnika i kuke)	2015		Terminal Žitnjak	435		4.3.435.23	Ne	
	938	Redovni servis DEA	2015		Terminal Žitnjak	435		4.3.435.3	Ne	
	937	Provođenje programa održavanja DM Perkins	2015		Terminal Žitnjak	435		4.3.435.32	Ne	
	936	Projektiranje i izrada nadstrešnice upravne zgrade	2015		Terminal Žitnjak	435		4.3.435.23	Ne	
	935	Izrada projektne dokumentacije	2015		Terminal Žitnjak	435		4.3.435.28	Ne	
	934	Nabava i ugradnja rampi za pristup vagoncisternama	2015		Terminal Žitnjak	435		4.1.435.28	Ne	
	933	Ugradnja automatskih odzračnika na istakacke rampe	2015		Terminal Žitnjak	435		4.1.435.28	Ne	
	932	Izrada aluminijjskih adaptera za istovar vagoncisterni	2015		Terminal Žitnjak	435		2.3.435.91	Ne	
	931	Potrošni materijal za manipulativno osoblje	2015		Terminal Žitnjak	435		2.3.435.91	Ne	
	788	Praženje spremnika sukladno građevinskoj dozvoli	2015		Terminal Žitnjak	435		4.3.435.17	Ne	
	760	Održavanje VRU jedinice	2015		Terminal Žitnjak	435		4.3.435.21	Ne	
	759	Održavanje sustava nadzora i upravljanja, sustava TAS i opreme sustava derivata Terminala Žitnjak	2015		Terminal Žitnjak	435		4.3.435.38	Ne	
	758	Održavanje sustava automatske dojava požara i aktiviranje sustava gašenja na Autopunilištu i Vagonpretakalištu derivata	2015		Terminal Žitnjak	435		4.3.435.14	Ne	
	757	GU: Redovito održavanje UPS uređaja	2015		Terminal Žitnjak	435		4.3.435.31	Ne	
	756	Baždarenje i servis TSV-a	2015		Terminal Žitnjak	435		4.3.435.28	Ne	
	754	Redovno održavanje održavanje i servis strojarne opreme	2015		Terminal Žitnjak	435		4.3.435.28	Ne	
	753	Digitalizacija željezničke vage	2015		Terminal Žitnjak	435		4.1.435.21	Ne	
	752	Izrada elaborata i izvođenje radova po elaboratu procjene rizika ugroženosti prostora od udara munje	2015		Terminal Žitnjak	435		4.1.435.3	Ne	
	750	Materijal za redovno održavanje	2015		Terminal Žitnjak	435		2.3.435.91	Ne	

MAINTENANCE



MAINTENANCE-INSPECTION



MAINTENANCE-INSPECTION

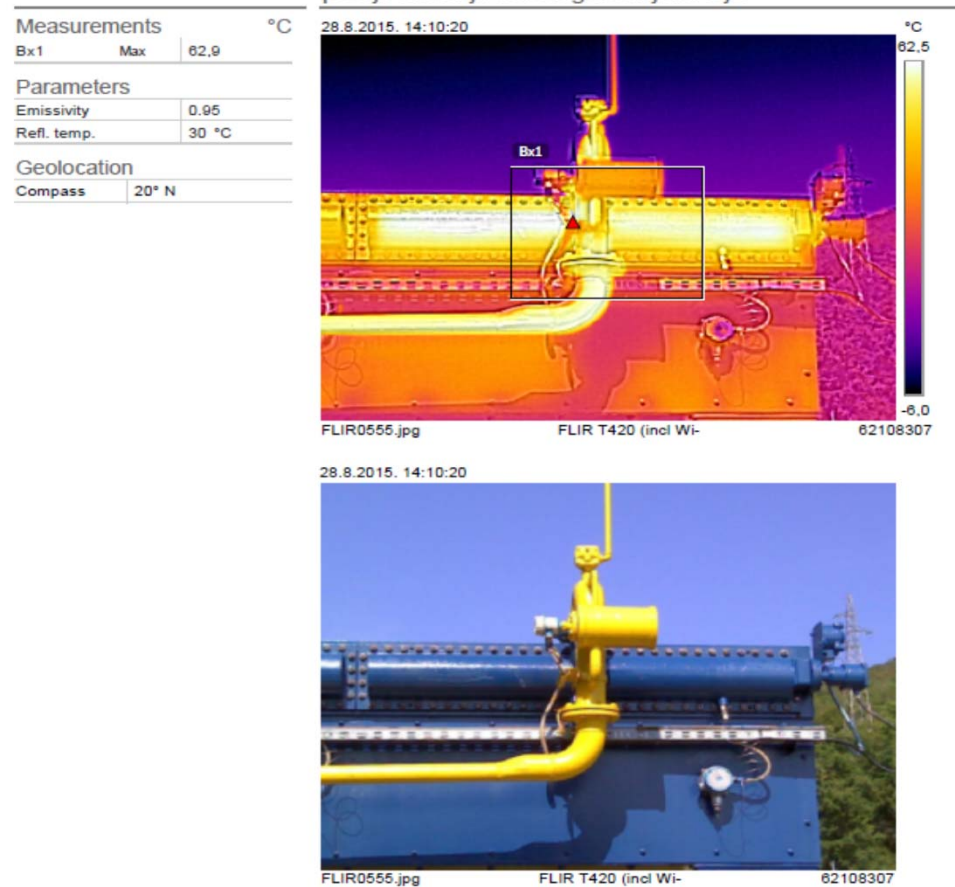
Presented inspection object - GasFindIR



MAINTENANCE-INSPECTION

Example:

- ✓ Control of aging
- Thermographic recording
of the main pumps cooler



NEW DESIGN

- **process safety management (PSM)**
- **all collected experience is used in new projects**



CONCLUSION

- ✓ **Good planning is crucial for risk reduction in petroleum storage depots**
- ✓ **Ageing increases the production cost**
- ✓ **Ageing increases the MAP (Major Accident Potential)**
- ✓ **It is necessary to define measures to continue operations in a safe and sustainable manner**
- ✓ **The balance between safety, cost and time pressure in any commercial hazardous installation is always difficult**

THANK YOU FOR YOUR ATTENTION

