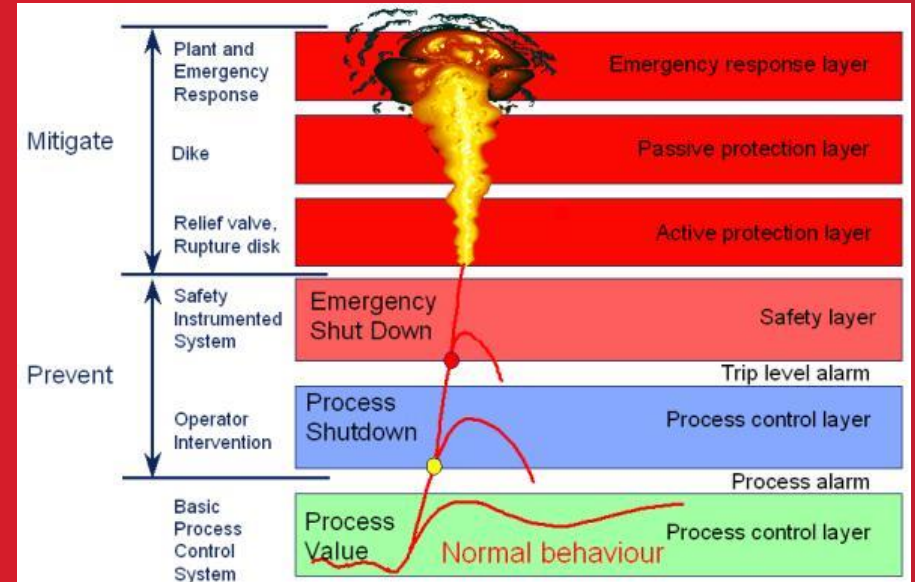
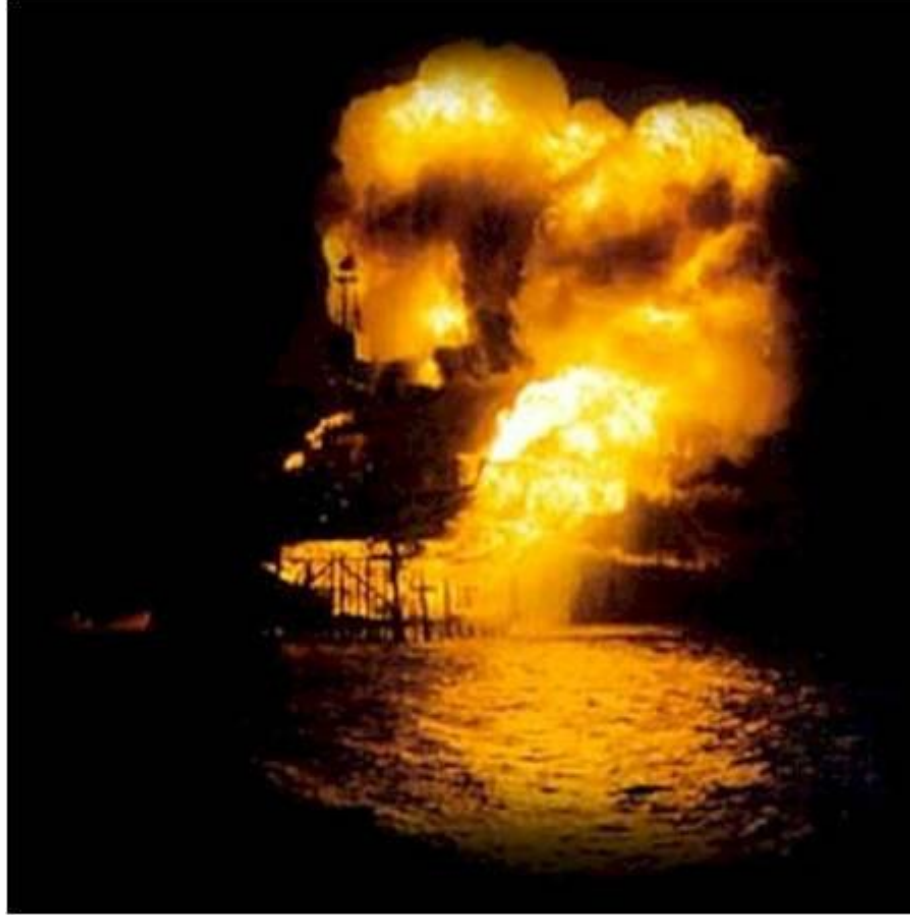


Tüpraş SIS Yaşam Döngüsü Yönetimi

Ömer Yiğit Astepe



Piper Alpha (6 Temmuz 1988)



167 kiři yařamını yitirdi, sadece 61 kiři hayata kalmayı bařardı.

Texas City Rafinerisi (23 Mart 2005)



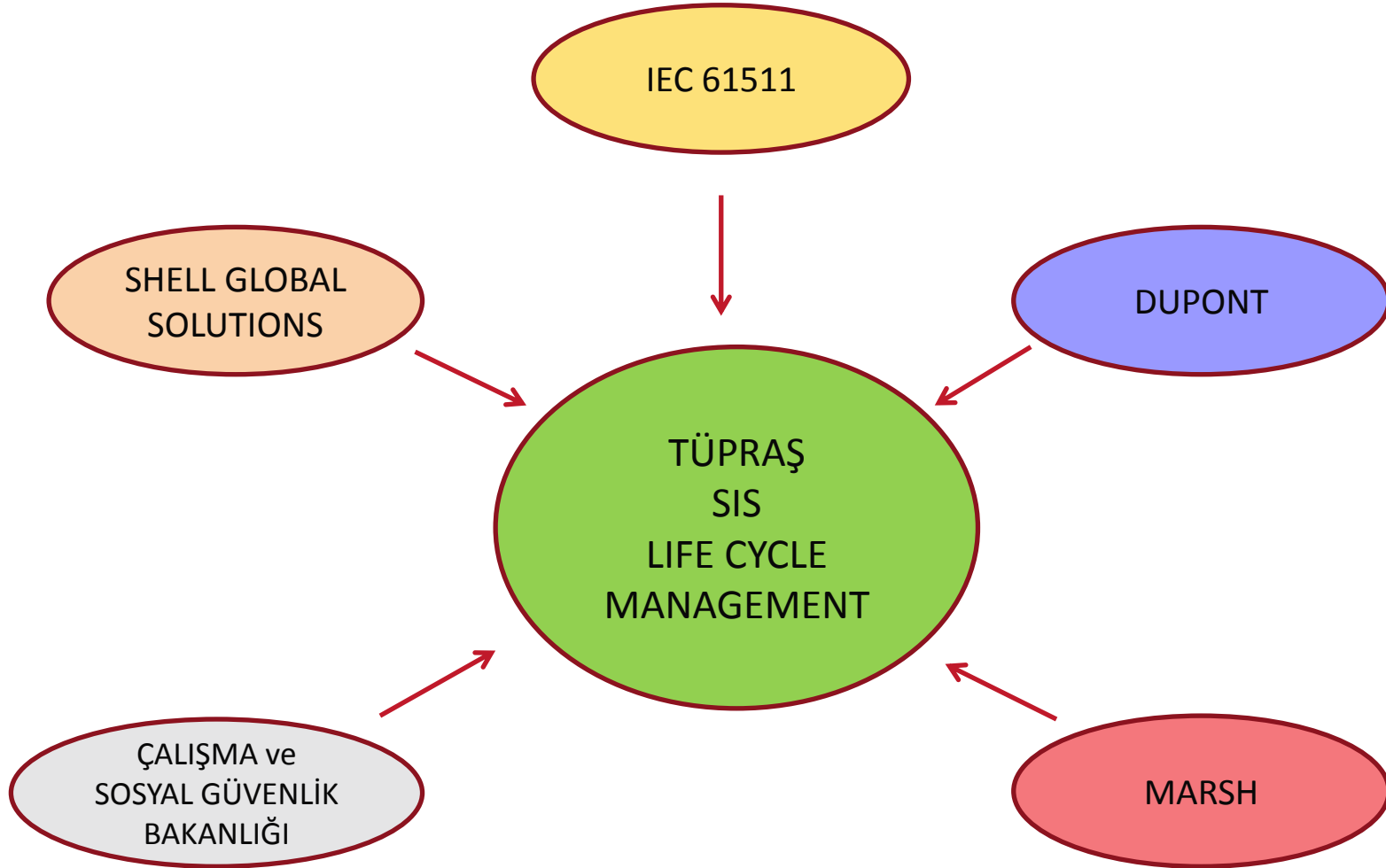
15 kiři yařamını yitirdi, 170 kiři yaralandı.

Deepwater Horizon (20 Nisan 2010)



11 kiři hi bulunamadı, ok byk evresel hasar oluřtu.

İhtiyacın Tanımlanması



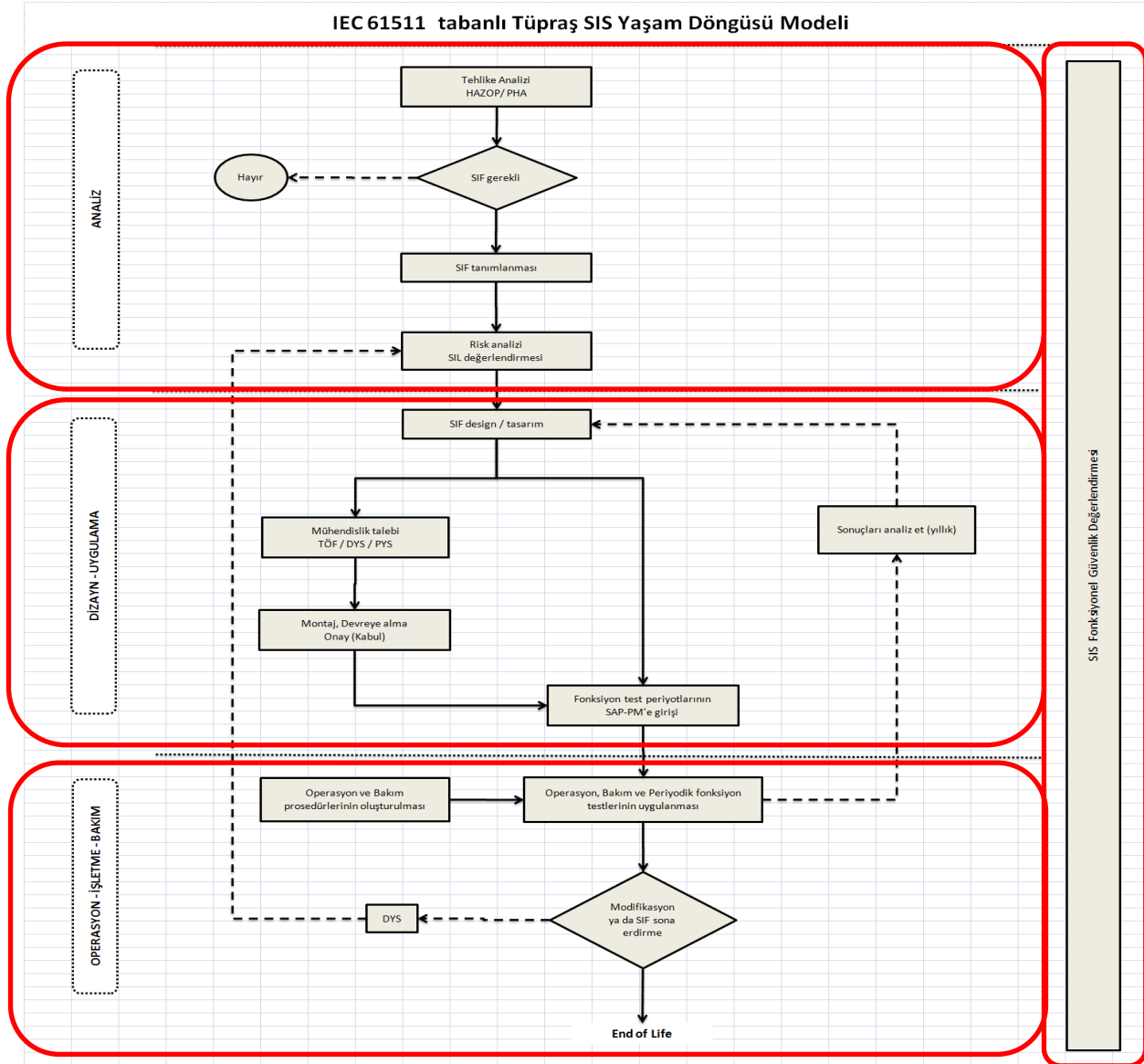
Gap Analyses

Ref. no.	Phase	Issue	Discussion	Recommendation	Priority	Urgency H: <6M M: <1Y L: >1Y	Do-ability (H = easy)	Action party	Target date
1	Lifecycle management	Role of SIF focal point is assigned, but not formally documented.	Clear descriptions of these roles is required to effectively implement the SIS management plan.	Define roles and responsibilities of SIF focal point and SIF process owner in SIS management plan.	H	H	H	Cagri	15.11.2014
2	Lifecycle management	Role of SIS process owner is not assigned.	The role of SIS process owner is to ensure visibility of management commitment to implement and sustain the SIS process, and to ensure that conflicts will be resolved.	Assign the role of SIS process owner. The SIS process owner should be of sufficient seniority in the organisation to 'make it happen'.	H	H	H	Cagri	15.11.2014
3	Lifecycle management	SIS management plan is being developed.	The SIS management system comprises all procedures, work instructions, etc. related to SIS. The SIS management plan should provide the coherence between these procedures for the sub processes.	Develop and implement the SIS management plan as an umbrella procedure.	H	M	M	Yigit	31.12.2014
4	Lifecycle management	Some but not all Key Performance Indicators for successful monitoring of the health state of the SIS management system exist.	Missing KPIs may result in gaps or non-performance in SIS management going unnoticed.	Complete the set of KPIs and implement periodic review of SIS management system performance with the SIS process owner.	H	M	H		First Quarter of 2015
5	Lifecycle management	There is no plan of Functional Safety Assessments.	Functional Safety Assessment is required by IEC 61511 to assess the ability of a SIS to achieve the necessary functional and integrity requirements.	Include planning and requirements of Functional Safety Assessments in the SIS lifecycle management plan and related procedures.	M	L	M		Including in Management plan. Completion of related procedure will be end of 2015
6	Design and development	Project engineering relies heavily on the procedures, work processes and tools of the contractors. There are many gaps in the SIS management system for project engineering.	The gaps result in inconsistencies with other activities in Tupras. It is anticipated that actions to align will take considerable time to implement.	Develop and implement a roadmap for the SIS engineering process in project engineering.	H	H	M		Tüm yeni projelerde önce HAZOP, ardından onu baz alan SIFpro çalışması yapılmalı. Gözde ve Hicran Hanım'larla değerlendirilecek. Hedef 2015 sonu.
7	Risk analysis	SIL assessment is carried out in accordance with contractors' practices instead of a common Tupras practices.	SIL assessments by reliability and maintenance departments often results in the need for additional hardware to meet the new SIL, which is expensive and difficult to implement after commissioning of the project. It also results in lower SILs, which means that too much hardware may have been installed by the project.	Develop and implement a uniform SIL assessment procedure to be used by all relevant work processes in Tupras.	M	M	M		
8	Design and development	SIS requirements specification is not verified against the requirements of IEC 61511, section 10.3.	This may result in incomplete and non-compliant SIS documentation	Map the requirements for SRS in IEC 61511 against the typical engineering documents in Tupras	M	M	H		SIS'lerle ilgili proje çalışmalarının standardını belirleyen, ve yandaki tüm başlıkları içeren yeni bir standart yazılmalı. Hedef 2015 sonu.
9	Design and development	The engineering contractor does not provide test intervals for periodic proof tests of SIF equipment.	If PFD validation has not been carried out, then the PFD required for the SIL may not be achieved and the risk not adequately reduced.	Implement the requirement for the project to deliver PFD calculations and corresponding test intervals.	M	H	M		
10	Design and development	There is no procedure that specifies the purchase requirements for SIF equipment.	Equipment without SIL certificates and Write Protect facilities may be procured.	Develop and implement the procurement requirements for SIF equipment.	L	M	H		
11	Design and development	There is no procedure that specifies the minimum requirements for FAT and SAT.	FAT and SAT may be incomplete.	Develop and implement a procedure that specifies the minimum requirements for FAT and SAT.	L	M	M		
12	Design and development	There is no handshake process to convey the requirements for non-SIF barriers that are credited for in the SIL assessments.	The barriers may not meet the reliability that is assumed in the SIL assessments.	Develop and implement a handshake process to formally convey the requirements to those responsible for these barriers.	M	M	H		
13	Design and development	Proof test procedures for SIF equipment in projects are not validated for completeness and effectiveness.	SIFs may not be adequately tested and may not perform as per the requirements.	Use common (validated) test procedures for both maintenance and projects.	M	M	H		
14	Design and development, installation, commissioning and validation	Competence requirements for contractors that perform critical roles in SIF design, installation and validation for projects are not defined.	Activities may be performed by people that are not sufficiently competent.	Define competence requirements for contractors that perform critical roles in SIF activities for projects.	M	M	L		
15	Design and development	The rationale of trip settings is not documented.	Trip settings are not traceable and their correctness is difficult to verify.	Document the rationale of trip settings and the responsible discipline.	L	M	H		
16	Installation, commissioning and validation	Pre Start-up Safety Review is not independent.	Lack of independency may result in bad practices being overlooked.	Consider to implement Pre Start-up Safety Reviews by people that are independent from the project.	M	L	M		

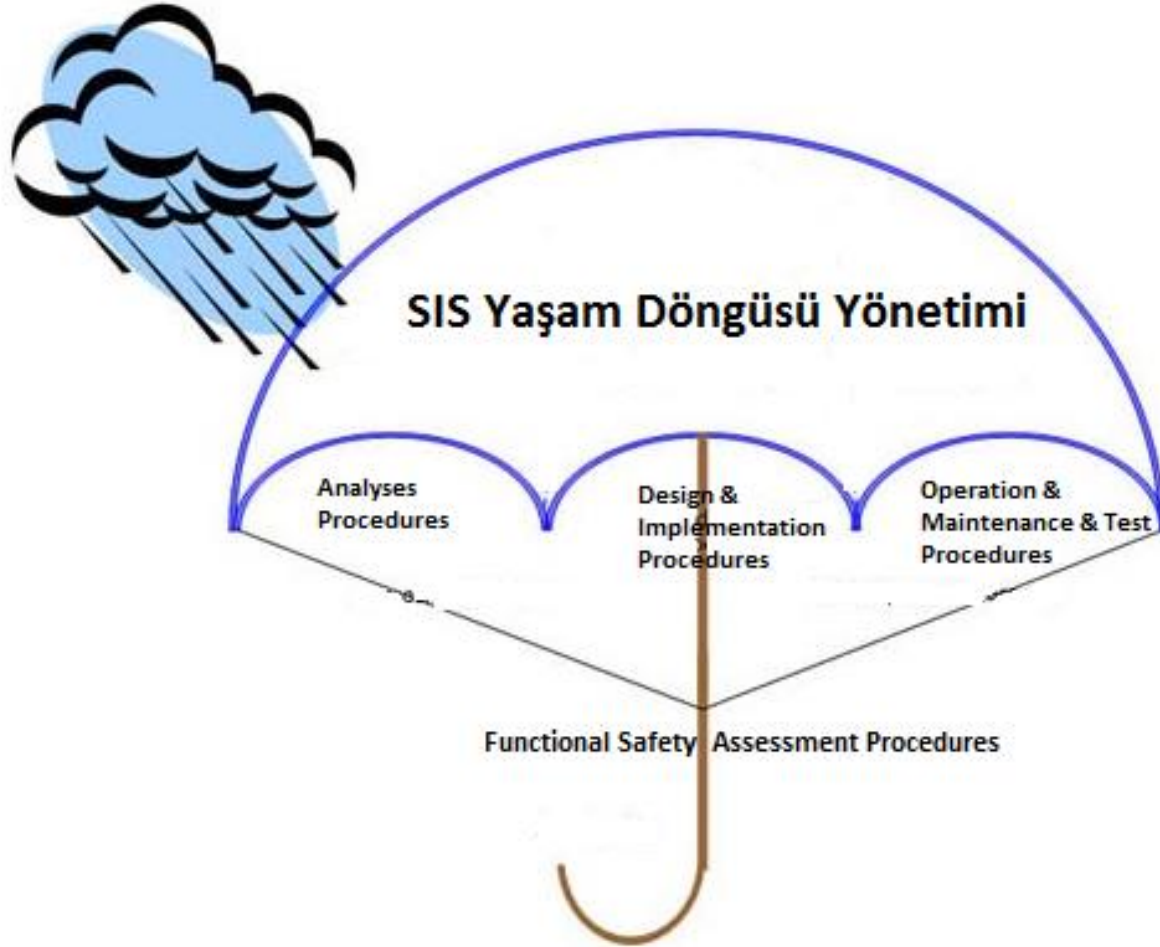
Gap Analyses

Ref. no.	Phase	Issue	Discussion	Recommendation	Priority	Urgency H: <6M M: <1Y L: >1Y	Do-ability (H = easy)	Action party	Target date
17	Maintenance	Extension of due dates of SIF tests are not adequately analysed and approved.	The increased risk of deferred testing is not properly understood and accepted.	Develop and implement a process for the initiation, risk assessment, approval and implementation of due date extensions.	H	M	M		First Quarter of 2015
18	Maintenance	Test reports of SIF tests are not checked for the correct execution of the tests and reporting.	Incorrect testing practices or inaccuracies in test procedures are not identified.	Define and implement a process of checking completed SIF test reports.	L	M	H		First Quarter of 2015
19	Maintenance	Defects that cannot be repaired during testing are not given a separate notification for repair.	This often results in completed SIF tests being reported as overdue tests in SAP. This distorts the overview of test compliance.	Consider to create a separate notification in SAP for defects that cannot be repaired during the test.	L	L	M		Second Quarter of 2015
20	Maintenance	There is no overview of equipment that could result in downtime and other trouble if it could not be repaired due to obsolescence issues.	This could lead to significant downtime and costs of urgent replacement if the equipment becomes unserviceable. Certain SIF equipment, such as logic solvers and in-line field equipment, require a significant lead time and planning to implement.	Develop and implement an obsolescence plan for critical SIF equipment.	M	L	M		End of 2015
21	Maintenance	There is no procedure or instruction that describes the requirements for SIS software management.	This could result in damage to software by e.g. the introduction of viruses and malware on engineering work stations, loss of software because of lack of back-ups, and incompetent people working on SIS software.	Develop and implement a SIS software management procedure that includes the design, change and implementation of the software, back-up procedures, access control and passwords, and cybersecurity.	M	M	M		End of 2015
22	Operation	In some units and for some new projects operators do not readily have information in the DCS that shows the expected actions of a SIF.	This information is required to quickly verify that trip actions were successful.	Implement 'live' Cause and Effect diagrams in the DCS operator interface of units that do not have this yet.	M	L	L		Pilot unit will be selected and starting study in first quarter of 2015
23	Operation	In some units and for some new projects operators do not readily have information in the DCS that shows the expected actions of a SIF.	This information is required to quickly verify that trip actions were successful.	Implement the requirement for 'live' Cause and Effect diagrams in the DCS operator interface in the project procedures.	M	M	H		
24	Operation	Operators and maintenance technicians have not received formal SIF training	Operators and maintenance technicians need to have awareness of what constitutes a SIF, failure modes and requirements in the Operate & Maintain phase	Implement formal SIF introduction training for operations and maintenance personnel (work in progress, RAYEP project).	M	WIP	WIP		End of 2015
25	Operation	Mitigation plans are developed at the moment that an override is required.	Mitigation plans that are developed 'on the spot' may be incomplete and lacking adequate mitigation.	Develop pre-written mitigation plans that use the information from SIL studies. The plans should be written to avoid that multiple barriers in a threat scenario would become unavailable, and that overrides are not engaged if there is an increased probability of demands on the SIF. It shall include a section for risk assessment for the specific situation.	M	M	M		End of 2015
26	Operation	Not all trips are reported, e.g. in the shift log.	This hampers the analysis of trip performance and development of measures to reduce trips.	Develop and implement a procedure for reporting and analysing all trips (successful, unsuccessful, spurious).	M	M	H		First Quarter of 2015

Tüpraş SIS Yaşam Döngüsü Modeli



Çatı Prosedür



Tüpraş SIS Yaşam Döngüsü Yönetim Standardı

İÇİNDEKİLER

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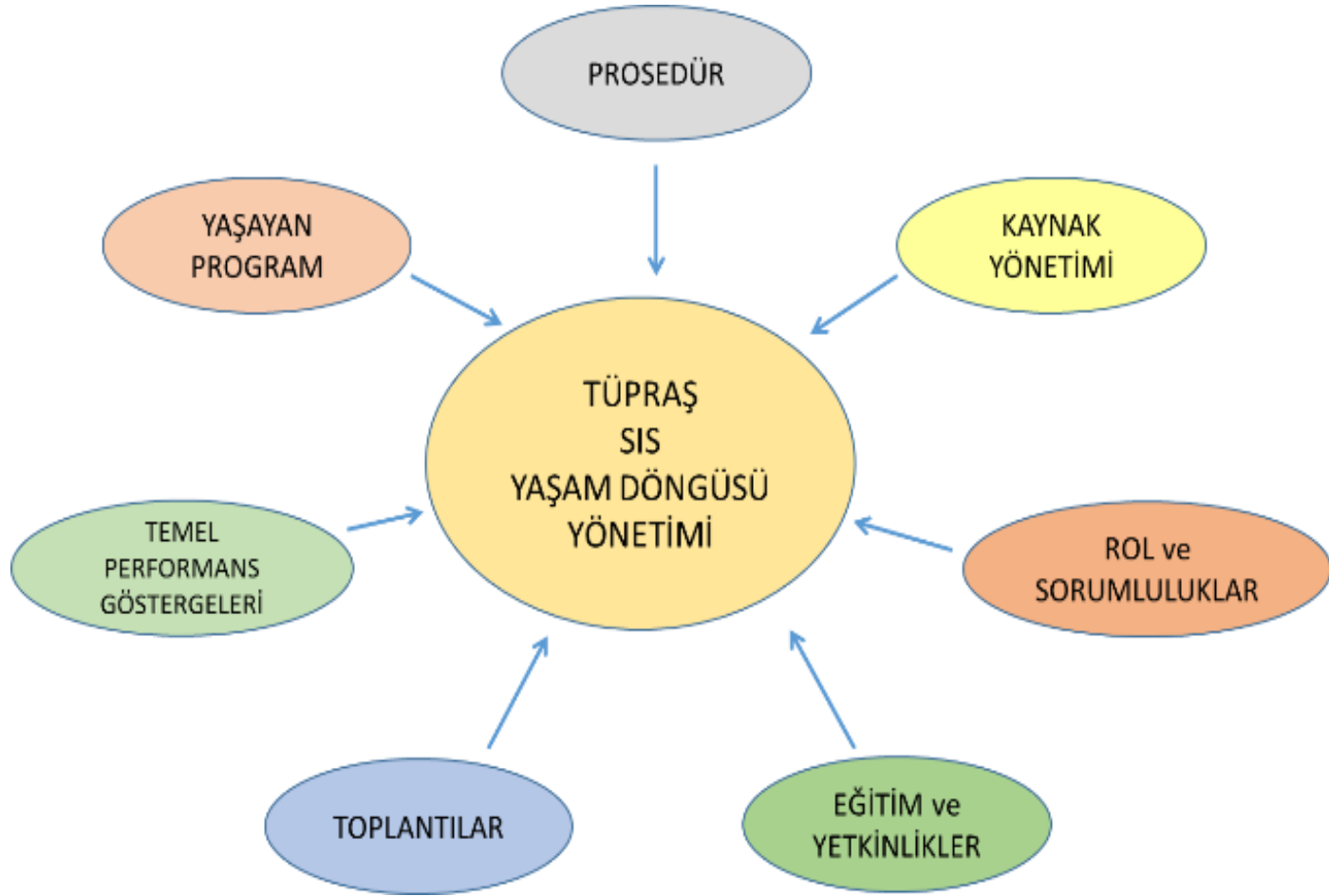
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HAZIRLAYAN		ONAYLAYAN	
ENSTRUMAN BASMÜHENDİSİ	ELEKTRİK/ENSTRUMAN MÜDÜRÜ	İŞLETME GÜVENİRLİĞİ DİREKTÖRÜ	GENEL MÜDÜR YARDIMCISI
ÖMER YIGİT AŞTEPE	ERGUİN SIVRIKAYA	HASAN VENEDİKOĞLU	YILMAZ BAYRAKTAR

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HAZIRLAYAN		ONAYLAYAN	
ENSTRUMAN BASMÜHENDİSİ	ELEKTRİK/ENSTRUMAN MÜDÜRÜ	İŞLETME GÜVENİRLİĞİ DİREKTÖRÜ	GENEL MÜDÜR YARDIMCISI
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Süreç Yönetim Elemanları



- ❖ **SIS Süreç Sahibi (GM)**

- ❖ ***SIS Çekirdek Ekibi (Rafineriler)***
 - SIS Odak Kişisi
 - Hazop (PHA) Lideri
 - SIFpro Rehber Kişisi
 - Proje Uygulama Lideri
 - Bakım Uygulama Lideri
 - Operasyon Uygulama Lideri

SIS Yönetim Planı KPI'ları



- İhtiyaç anında gerçekleşen (aktive olan) SIS tripleri
- Başarısız SIS tripleri (ihtiyaç anında görev yapmayan) **HEDEF → 0**
- Sahte SIS tripleri (ihtiyaç olmadığı halde aktive olan) **HEDEF → 0**

- Test periyodunu geçmiş SIS ekipman testleri **HEDEF → 0**
- Fonksiyon testi sırasında arıza tespit edilen SIF sayısı **HEDEF → 0**
- Yıllık programında bulunan SIFpro çalışmalarının (SIL analiz + dizayn) tamamlanma oranı **HEDEF → 100 %**
- By-pass'ta tutulan SIF ekipman sayısı **HEDEF → 0**
- Mühendisliği tamamlanmayan (SIL derecesini karşılamayan) SIF sayısı **HEDEF → 0**
- Test prosedürü olan SIF yüzdesi **HEDEF → 100 %**
- Etki azaltıcı (mitigation) plana sahip SIF yüzdesi **HEDEF → 100 %**

SIS Fonksiyonel Güvenlik Deęerlendirme Planı



- ✓ 6 ayda bir, her rafineride çekirdek ekip toplantısı
- ✓ Yılda bir, rafineriler arası SIS yaşam döngüsü QAQC toplantısı
- ✓ Yılda bir, SIS health check prosedürü ve süreç deęerlendirme araçları ile deęerlendirme
- ✓ Her SIF'in 5 yılda bir, ISA-TR84.00.04-2011 standardına göre gözden geçirilmesi

SIS Yönetim Planı – Anahtar Çalışmalar

- SIS Yönetim Standardının hazırlanması ve onaylanması
- Çekirdek ekiplerinin oluşturulması
- SIS KPI'larının oluşturulması, uygulamaya geçirilmesi
- Tüm SIS ekipmanlarının Safety Kritik olarak tanımlanması
- SIS triplerine dair OSAR takip araçlarının oluşturulması
- SIS süreç değerlendirme araçlarının (health check tool) oluşturulması
- Her bir SIF için mitigation planların oluşturulması
- İşletmenin «emniyet gerekliliklerinin» (SRS) belirlenmesi
- Online-offline proof test prosedürlerinin oluşturulması
- Modifikasyon ya da sonlandırmalar için MOC prosedürlerinin oluşturulması



Teşekkürler...