PROGRAMM
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PROGRAMME

Status 08-04-2016

Sunday, 8 May 2016

Evening	International Organizing Committee meeting

Monday, 9 May 2016

10:00	Registration, light refreshments
12:15	Welcome *Organizing Committee* *PROF. ALTARELLI, Massimo – European XFEL*
12:45	Presentation DESY and European XFEL
13:30	*Coffee break*

Session 1: Cooperation/Collaboration on a Campus site - Collaborate Safely

Panel discussion

14:00	Introduction and Discussion DESY – European XFEL
15:30	*Coffee break*

Session 2: Continuous improvement in HSE Matters (new HSE management aspects and tools)

Chair: A. Trudel

16:00	Development and Implementation of a new Register of Hazardous Substances at DESY *CIOBANU, Anca S. - DESY*
16:25	Highlights from TRIUMF's Strategic Plan for Safety *Dr. TRUDEL, Anne - TRIUMF*
16:50	New safety training scheme for access in CERN beam facilities *BALLE, Christoph; GAIGNANT, Christelle, TAVLET, Marc – CERN*

Tuesday, 10 May 2016

08:00	Work shop introduction - working groups *HOPPE, A. - DESY/KOZIELSKI, S. – European XFEL*	
08:30	Workgroups 1-3	
09:30	*Coffee break*	
10:15	*Group presentations*	
Session 3: Risk Assessment *Chair: A. Hoppe*		**Session 5: Special Session FCC Fire Safety Collaboration** Chair: E. Cennini
10:45	Management of the safety documentation for extended projects like the LHC Injectors Upgrade (LIU) project *FUNKEN, Anne; KOBSEVA, Liza and TAVLET, Marc – CERN*	Evacuation modelling for underground nuclear research facilities *RONCHI, Enrico - Lund University, Division of FSE.*
11:15	Access Controls for DESY and external Institutes *BRINKER, Sabine – DESY*	An overview of different cable design fires *VAN HEES, Patrick - Lund University*
11:45	Issues with preventive safety concepts and the reality at the construction site *SARETZKI, Fabian* - DESY	An overview of the LBNF Underground Far Site Convential Facilities - Cavern Fire Life Safety Smoke Management preliminary design *PRIEST, James - FERMILAB*
12:15	*Lunch*	
	Session 4: Lessons learned - Best practice *Chair: B. Manzlak*	**Session 5: Special Session FCC Fire Safety Collaboration** *Chair: E. Cennini*
13:15	Preventive measures against the megathrust earthquake and tsunami in the J-PARC *Dr. NAKANE, Yoshihiro - J-Parc*	An overview of the development of the fire model for the LUX-ZEPLIN (LZ) Project LAB transfer operation in the LN room located subsurface at the 4800 Level Davies Cavern at Surf *PRIEST, James – FERMILAB*
13:45	Maintenance Error Results in Bypassing Enclosure Electrical Lock Out Tag Out (LOTO) *ANDERSON, John Jr. - FERMILAB*	Fire-induced aerosol release and deposition calculations for accelerator facilities using the example of CERN´s SPS underground geometry *PLAGGE, Michael – CERN*
14:15	Lock-Up Incident at TRIUMF *ARDRON, Kevin - TRIUMF*	CERN cable design fires *HEHNEN, Tristan – CERN*
14:45	Lessons learned at the ESRF *LANDURÉ, Véronique - ESRF*	An overview of the National Swedish Rescue Services incident reporting system *THORSTEINSSON, Dadi - MAX IV Laboratory*
15:15	*Coffee break*	
15:45	Risk assessment SASE1 Control Hutches - Balancing of legal requirements and present existing conditions *PROLLIUS, Michael – European XFEL*	Knowledge transfer for physics laboratory fire statistics *JÖRUD, Fredrik – ESS*
17:00	**Tour 1**: European XFEL Campus Site and Experimental hall, Schenefeld **Tour 2:** European XFEL Accelerator on DESY Campus + HERA Tunnel, AMTF Halle **Tour 3:** FLASH I+II, PETRA III + PETRA Extension (PXN), CFEL	

Wednesday, 11 May 2016

09:00	Director's talk *Prof. DOSCH, Helmut - DESY*	
10:00	*Coffee break*	
	Session 6: Technical Risks (laser, electrical risks, Certifications etc.) *Chair: S. Mohr*	**Session 7: Experimental Safety (Biological/Chemistry/Nano Risks a.o.)** *Chair: Sigrid Kozielski*
10:30	Integrated Safety System for Multi-Laser Accelerator Facility *Procházka, Petr - ELI*	Launch of new biological laboratories and experimental stations at European XFEL *Dr. KOZIELSKI, Sigrid – European XFEL*
11.00	High Powered Laser Safety at European XFEL *BOYD, Eric – European XFEL*	Steps to Bringing Tritium Experiments to Jefferson Lab Safely *MANZLAK, Bert - JEFFERSON LAB*
11.30	How CERN HSE units strives for environmental sustainability *RIO, Dora - CERN*	Technical Scope of Work (TSW) and the Operational Readiness Clearance (ORC) Process for Experiments at Fermilab *Mc HUGH, Eric - FERMILAB*
12.00	*Lunch break*	*Lunch break*
	Session 8: Technical Risks (pressure vessel, cryogenic, laser, etc.) *Chair: John Anderson*	**Session 9: Fire safety** *Chair: Enrico Cennini*
13:00	Vacuum flight tube improvements at ALBA Synchrotron facility *AGUILAR, Jose - ALBA*	Fire Safety engineering for CERN's High Luminosity LHC upgrade *LA MENDOLA, Saverio - FSE CERN*
13:30	Equipment from USA without CE certification *HOPPE, Andreas - DESY*	The inert gas firer extinguish system of the ALICE detector *BARTH, Klaus- CERN*
14:00	Experiences with an Electric Modulator from a Non-EU country *SCHRADER, Stefan - DESY*	First experiences with the high pressure extinguishing system *SARETZKI, Fabian - DESY*
14:30	*Coffee break*	*Coffee break*
15:00	Environmental incidents at CERN *KLEINER, Sonja - CERN*	Fire in the motorway tunnel due to a car: criticality and management of the event in the Gran Sasso Underground Laboratories *Dr. GIAMPAOLI, Antonio - LNGS*
15:30	Interactive and Informative Tools for the Users and Activities' Management in the peculiar site of Gran Sasso National Laboratories *Dr. PERRUZZA, Roberto*	CERN IS23 and IS41: Internal regulations on cables, plastics and other non-metallic materials *PLAGGE, Michael, FSE CERN*
17:30	*Bus transfer to Harbour boat tour*	
18:00	*Harbour boat tour*	
20:00	*Social dinner*	
22:30	*Bus Transfer back to DESY*	

Thursday, 12 May 2016

	Session 10: New projects/challenges *Chair: S. Schrader*
08:00	Transition period for an Occupational Risk Prevention Service and priority lines to improve the results of the internal audit *MARMOL MORENO, Maria del Carmen*
08:30	The E-ELT - Safety aspects when astronomy goes to the next level *MUCKLE, Christian – ESO*
09:00	Wendelstein 7-X – a new fusion device in IPP Greifswald *WIESELER, Detlef – IPP*
09:30	General Safety studies and considerations for FCC *TRANT, Ralf - CERN*
10:00	*Coffee break*
	Session 11: Sustainability/Energy efficency *Chair: A.Hoppe*
10:30	Sustainability activities at DESY - an overview *LEISTER, Eva – DESY*
11:00	Integrating Sustainability into Operations at Fermilab – Successes and Challenges *MIELAND, Eric – FERMILAB*
11:30	ESS Sustainability Program – Some issues *Erica L/JAKOBSSON Peter –ESS*
12:00	*Lunch*
	Session 12: Accident/incident management *Chair: M. Prollius*
13:00	Cryogenic Hazard at ESS – strategy, safety studies and lessons learnt *Duy Phan – ESS*
13:30	Drills for the various emergency situations in the J-PARC accelerator facilities *Dr. BESSHO, Kotaro - J-Parc*
14:00	Evaluation of different hypothetical accident scenarios for improving people evacuation in the Gran Sasso National Laboratory *Dr. BASTI, Andrea (LNGS)*
14:30	Application and results of the Gran Sasso National Laboratory Safety Management System: A Near-accident Case Study *Dr. TARTAGLIA, Roberto (LNGS)*
15:00	*Coffee break*
	Session 13: Safety Culture and Behavior *Chair: E. Cennini*
15:30	Condition Assessment - ES&H Programs at Jefferson Lab *RAINEY, Bill - JEFFERSON LAB*
16:00	Systematic Work Environment at ESS *WINER Bertil /Jörgen M –ESS*
16:30	Training programme at the ESRF *RICOT, Stéphanie – ESRF*
16:30	Who's running the show? - Understanding and communicating requirements for hazardous work *Dr. MILDENBERGER, Joe – TRIUMF*
17:00	The human factor analysis inside a peculiar work environment as the LNGS *Dr. TARTAGLIA Robert – LNGS*

Friday, 13 May 2016

	Session 14: Miscellaneous **(Safety training/web-Training…)** *Chair: P.Jacobsson*
08:00	Safety during tests of superconducting RF cavities and cryomodules for the European XFEL at Accelerator Module Test Facility (AMTF) at DESY *PROCHAL, Boguslaw - IFJ-PAN Krakow*
08:30	Integration of safety in the ESS construction/installation/operation *JACOBSSON, Peter – ESS*
09:00	XENON1T Project: Construction, Engineering, Safety *Dr. TOBIA, Marco LNGS*
09:30	*Coffee break*
10:00	Chair presentations from Tuesday
10:45	Chair presentations from Wednesday
11:30	Wrap up *DESY – European XFEL*
12:00	*Refreshments*
13:00	*End*

Prof. Dr. Dr.h.c. Helmut Dosch
Chairman of the DESY Board of Directors

Dear participants,

It is my great pleasure to welcome you at DESY for the International Technical Safety Forum 2016.

Technical safety is paramount in any research environment, in fact it is a key element of success. At large scale infrastructures we are used to collaborating with colleagues from almost all over the world. DESY's free electron laser FLASH and our synchrotron light source PETRA III alone attract about 3000 users from more than 40 countries every year, not to mention the countless colleagues from partnering institutions on our campus, who we work with every single day. To make sure our staff scientists and guests collaborate safely, common safety standards that everyone is aware of and agrees on are essential.

At ITSF, you have a forum to share your experience, exchange state of the art ideas, and discuss procedures and technologies in personnel, equipment, and also environmental safety.

I would like to express my sincere gratitude to the organizers, speakers, and chairs for all their efforts and I wish you a most successful and inspirational workshop. Enjoy your stay in Hamburg and please: Collaborate safely!

Prof. Massimo Altarelli
Chairman, Managing Director European XFEL

We are very pleased to welcome you to the International Technical Safety Forum 2016 that is jointly hosted with our partner DESY in Hamburg.

Safety at work is a fundamental aspect that ensures the success of our research. The exchange of ideas, processes, procedures, and technologies in personnel, environmental, and equipment safety can therefore result in important contributions for high-energy physics and synchrotron radiation laboratories throughout the world.

At European XFEL, the experiences and lessons learned from the international community, especially concerning fire safety in underground areas, were of great value to us during the planning, construction, and installation period of our facility.

The European XFEL facility—once in full operation—will host about 2000 users per year for experiments in biology, chemistry, materials science, and plasma physics. The construction of most buildings and tunnels is complete and machine installation of the X-ray free-electron laser is now in full swing. Our staff will move to the Schenefeld campus in June and next year we will start with the first user experiments. Technical safety has always been a fundamental part of this project in a joint effort with our partner DESY.

The program shows that research institutions from all over the world have very similar challenges to deal with regarding technical safety. I would like to thank the organizers and speakers for their commitment, and I wish you a successful and inspirational workshop. Enjoy your stay here in Hamburg!

General Information:

Sessions	Oral and poster sessions will be held in the FLASH Seminar room (Bldg. 28c) and in the CFEL building (Bldg. 99)
Registration	The registration will start on Monday 9 May 2016 in front of the seminar room
Social event	The conference dinner will take place on 11 May 2016 at "Fischerhaus", St. Pauli Fischmarkt 14 Before the conference dinner, you are invited to join a boat trip at the DESY harbor, starting at "Fischmarkt".
Supermarkets	*Supermarkets in the vicinity* LIDL From the main gate at Notkestrasse turn right and follow the street (700 – 800m). LIDL will be clearly visible on the left side of the street at the next junction. PENNY Form the main gate at Notkestrasse walk straight down the street "Zum Hünengrab". On the right side, at the end of the street you will find the supermarket
Cash machine/ATM	You will find a cash machine in the foyer of the DESY canteen (Building 9)
DESY WLAN	DESY has set up a wireless LAN for this workshop. Name:ITSF2016 WPA/WPA2-PSK:v4fhwCwp
Emergency number	In emergency cases please call 2500. From a mobile phone +49 40 8998 9 2500.
Conference phone	Andreas Hoppe: +49 151-17104612 Matthias Kreuzeder: +49 40 8998 9 4130 Sigrid Kozielski: +49 171 3324510 Conference Desk: 3400

ABSTRACTS

Session 2: Continous improvement in HSE matters (new HSE management aspects and tools)	
Monday 9th May 2016	

1. Mrs. CIOBANU, Anca S. – DESY:
Development and Implementation of a new Register of Hazardous Substances at DESY

The availability of a hazardous substances register is legally required and of a great importance for the management of chemicals.
In March 2015 an inventory of substances was implemented for the DESY Photon Science groups as a pilot project. The register was integrated into the existing DESY geo-information- and facility management system, which is hosting building documentation like maps and site plans.

2. Dr. TRUDEL, Anne – TRIUMF:
Highlights from TRIUMF's Strategic Plan for Safety

Several significant incidents over the last 18 months highlighted deficiencies in TRIUMF's processes for managing safety and lead to a review of core programs. As a result of the review a strategic plan was launched to address significant change in the following areas: project management; controlled work processes; and site access processes impacting safety. In addition, an outside consultant was retained to assist with an assessment of TRIUMF's safety culture. This presentation will focus on highlights of these initiatives and share lessons learned.

3. C. Balle - CERN
New safety training scheme for access in CERN beam facilities

Training is a concept behind which lie different expectations and objectives. What is training about and why do we train people for? For some this may be giving information, for others providing people with instructions, knowledge, good practises. There may also be legal motivations for setting up training. Training is that immaterial system by which an organization conveys key messages to a defined audience. As an employer, we may expect some output from the people we have trained. And as well, our stakeholders have expectations from the training they receive. CERN has recently reviewed its safety training strategy to better tackle the challenges of a complex and complicated site. This new scheme aims at solving the difficult equation of addressing a multitude of audiences and their large number. To achieve this, a co-ordinated action between the different services is necessary. And most of all, it should place the trainee at the heart of every action taken

Session 3: Risk Assessment Workshop

Tuesday 10th May 2016

Session 3a: Risk Assessment
Tuesday 10th May 2016

4. Anne Funken, Liza Kobseva, Marc Tavlet - CERN
Management of the safety documentation for extended projects like the LHC Injectors Upgrade (LIU) project

The LHC Injectors Upgrade (LIU) project has the ultimate goal of making the CERN injectors capable of delivering reliably the beams required by the High Luminosity LHC (HL-LHC) project. In addition to the construction of a new linear accelerator (Linac4), the project covers the upgrade of five different existing accelerators: Linac3, the Low Energy Ion Ring (LEIR), the PS-Booster (PS), the Proton Synchrotron (PS) and the Super Proton Synchrotron (SPS). As for all projects, a safety documentation is required to demonstrate that the new systems or facilities involved are being designed respecting safety principles and that they can be constructed, commissioned, operated and dismantled safely. Due to the specificity and extend of the project, a new strategy for the management of the safety documentation has been developed. The concept of Safety Package was introduced. The LIU project is divided in sixteen Safety Packages. Each of them comprises a set of systems located in a same location under the responsibility of several groups, which requires a safely collaboration. The safety documentation which includes the hazards identification, the assessment of the risks induced and the appropriate mitigation measures, is produced at the level of each Safety Package and then attached to the safety documentation of the corresponding accelerator

5. Mrs. BRINKER, Sabine – DESY:
Access Controls for DESY and external Institutes

The access control system DACHS (DESY Access Handling System) has been established at DESY in 2007 starting with the installation at accelerator doors. The RFID card reader system in combination with a data base application is used to restrict the access to areas with a higher risk level and it has interfaces to several interlock systems. Meanwhile the system has spread over the campus and will also be used at the European XFEL. It is presented with a focus on the challenges caused by one system managing personnel data being used by several institutes like XFEL, EMBL, DESY and others.

6. Mr. SARETZKI, Fabian - DESY
Issues with preventive safety concepts and the reality at the construction site

Large-scale-projects like the European XFEL accelerator in Hamburg come with a variety of safety requirements. To ensure fast intervention in case of an emergency inside the more than 2 km long accelerator tunnel XTL, DESY SAVE decided to design and order two electrical vehicles for rescue and firefighting purposes. In addition to these vehicles a trailer was bought in order to carry injured persons out of the tunnel on stretchers. The vehicles and the trailer are equipped with firefighting and rescuing gear. Unfortunately these vehicles become useless if there is an accelerator module transport or other transport path blocking work in the tunnel. These kinds of commonly occurring events were not taken into account when the safety concept was developed. The safety concept for emergencies in the XTL had to be revised. What are the possibilities to get information about transport work happening in the tunnel when there is an alarm and how could the technical emergency service pass these obstacles? DESY SAVE reacted by designing and ordering two electrical bikes to allow fast intervention when help is needed. A tracking system for transport vehicles is currently in its trial period. To enable us to track and visualize obstacles in the tunnel we got into closer contact to the transport group. Now in case of an emergency the technical emergency service uses radio to get information about ongoing transport work. The lesson learned is that safety measures must be carefully considered from the beginning to the very end.

Session 4: Lessons learned – best practice
Tuesday 10th May 2016

7. Dr. NAKANE, Yoshihiro - J-PARC – JAEA:
Preventive measures against the megathrust earthquake and tsunami in the J-PARC

The catastrophic earthquake and tsunami devastated the Pacific coast of north-eastern Japan on Friday, March 11, 2011. The Tohoku region, north-eastern region of Japan, was most seriously damaged. The J-PARC, Japan Proton Accelerator Research Complex, was also affected by the earthquake that the facilities were placed in the Ibaraki Prefecture located next to the Tohoku region. Fortunately, since the height of the tsunami was not so large around the J-PARC, there was no damage to the facility by the tsunami.
In this presentation, the impacts and the restorations of the facilities damaged from the earthquake are shown, and various preventive measures shown below on the basis of the lessons learned from both the earthquake and the tsunami are introduced.
1) Set up the command post in case of a large earthquake
2) Establishment of the emergency assembly areas located on high-altitude more than 15 meters above sea level in case of tsunami warning
3) Installation of disaster prevention warehouses stored the equipment necessary in emergency
4) Emergency drill confirming basic evacuation procedures in case of a large earthquake, followed by a tsunami warning

8. Mr. ANDERSON JR., John – FERMILAB:
Maintenance Error Results in Bypassing Enclosure Electrical Lock Out Tag Out (LOTO)

In an effort to improve employee electrical safety, Fermilab installed a remotely operated 13,800 VAC disconnect switch to turn off AC power to the Neutrinos at the Main Injector (NuMI) beamline enclosure magnetic loads. The remotely operated switch allowed for switch operations to occur with the employee well outside of the possible Arc-Flash hazard zone. Once the switch was verified in the open position, the key used for remote switch activation was locked in a cabinet. Employees entering the beamline enclosure would overlock the cabinet as part of the beamline access Lock Out Tag Out (LOTO) procedures.

Approximately three months after the NuMI beamline had been locked out, an electrical technician working on the beamline power supplies discovered the AC power was available at the inputs to the power supplies while LOTO locks were still overlocking the remote switch activation key. This talk will provide an overview of the sequence of events that led up to a maintenance error being able to bypass the enclosure LOTO.

9. Mr. ARDRON, Kevin – TRIUMF:
Lock-Up Incident at TRIUMF

A near-miss incident occurred in September 2014 at TRIUMF when a worker was missed during the lock-up search of a hall housing a new electron accelerator, prior to beam delivery. Although the worker responded to start-up alarms and exited the hall using emergency breakout hardware on an area door (removing any hazard through an interlock system) the incident initiated a root cause analysis report by an internal incident investigation committee. The committee made fifteen corrective action recommendations, including one for a human factors analysis of all exclusion areas where delivered beams require areas to be locked and unoccupied. The subsequent analysis identified where improvements in administrative procedures and engineered systems could be made. The improvements have since been made in all of TRIUMF's forty exclusion areas.

10. Ms. LANDURé, Véronique
Lessons learned at the ESRF

A review of the major incidents that happened at the ESRF since the last ITSF conference will be presented. It concerns 2 incidents involving lead panels during beamlines construction and preventive measures against redundant electrical accidents.

11. Mr. PROLLIUS, Michael – European XFEL
Risk assessment SASE1 Control Hutches - Balancing of legal requirements and present existing conditions

The European XFEL is a facility still under construction. During the planning stages as well as the construction phase legal requirements according to occupational health and safety have to be taken into account. The requirement specifications and demands to a control hutch for the experimental beamline defined by the scientific groups using these rooms often collide with legal requirements for such work places. The work safety risk assessment is the tool to find a balance between specifications, demands, conditions of use and legal requirements. This talk will present the solution used to find a balance adapted to the needs and the given reality of the control hutches.

Session 5: Special Fire Session
Tuesday 10th May 2016

12. Enrico Ronchi, Lund University
Evacuation modelling for underground nuclear research facilities

Nuclear research facilities such as ESS, CERN and Fermi lab often present unique characteristics in terms of evacuation safety. Performance-based design is generally the only viable solution to design an adequate level of safety in this type of underground infrastructures. Evacuation modelling tools can be used to evaluate different fire safety designs and evacuation strategies, permitting to avoid safety design mistakes and predict possible human behaviour in case of an emergency. This presentation will discuss the characteristics of current evacuation modelling techniques starting from simplified models (e.g., hand calculations) up to more complex agent-based software in light of the specific design needs of underground nuclear research facilities. Recommendations on the variables to take into account when modelling underground evacuation in nuclear research facilities will be provided. In particular, the presentation will discuss modelling issues concerning possible fire/human interactions and people movement in reduced visibility conditions.

13. Patrick van Hees – Lund University
An overview of different cable design fires

Cables are an important possible fire source or fire propagation mode in research facilities such as ESS, CERN and Fermi. Cables vary from low to medium voltage power cables to telecommunication and data transfer cables. Each of these types has very specific construction and composes of different type of sheath, insulation and filler materials as well as different possible conductors (metal or glass fibre). They can include even different type of mechanical or electrical screens. The type of design fire with cables does not only depend on the type of cable but also on the way how they are installed and mounted, vertically or horizontally, with or without spacing, bundled, closed or open trays etc. Furthermore the geometry and ventilation conditions are also important in the final design. In this presentation a way how to define the design fire of a cable installation will be given depending on the type of fire scenario. Such design fires can then be used as input for a performance based design of the facility.

14. PRIEST, James – FERMILAB
An Overview of the LBNF Underground Far Site Conventional Facilities – Cavern Fire Life Safety Smoke Management preliminary design

In this presentation I will present the preliminary LBNF Far Site Conventional Facilities – Cavern Fire Life Safety sprinkler limited Smoke Management Preliminary Design Smoke Management Report, Issue 1, dated October 5, 2015. The LBNF Far Site Conventional Facilities will be located in Lead, South Dakota, at the Sanford Underground Research Facility, formerly the Homestake gold mine. The report was prepared by Arup and discusses the sprinkler limited fire scenario, egress modeling, and the elements of smoke control system within the Cryostat Cavern Central Utility Cavern.

15. PRIEST, James – FERMILAB
An Overview of the Development of the Fire Model for the LUX-ZEPLIN (LZ) Project LAB transfer operation in the LN room located subsurface at the 4800 Level Davis Cavern at Surf

In this presentation we will define the anticipated fire size (kW) and duration(s) for a reasonably bounding fire within the LN storage room and quantify the hazard, both in terms of the thermal insult to the room and migratory aspects of the resultant hot gas layer.
The Davis LUX-ZEPLIN (LZ) Project is located in the Davis Facilities located in Lead, South Dakota, at the Sanford Underground Research Facility, formerly the Homestake gold mine. The fire model was developed by Rob Plonski using CFast v 7.0.1 for James Priest review of the process for Davis LZ project.

16. Michael Plagge – CERN
Fire-induced aerosol release and deposition calculations for accelerator facilities using the example of CERN's SPS underground geometry

By design a particle accelerator emit more or less ionizing radiation, depending on its geometry and the type of particles used. Fire incidents in such installations are rare. Nevertheless, the occurrence of a fire and its possible consequences has to be taken into account. In addition to standard damage arising from thermal, mechanical and chemical impact, special consideration should be given to the consequences due to combustion of activated materials.

CERN's accelerator complex offers a broad variety of linear and ring-shaped particle accelerators. Using the example of the SPS underground installations, preliminary results of three-dimensional computational fluid dynamics calculations will be shown for a typical fire scenario of a cable fire of up to 5 MW heat release rate, including aerosol release and deposition.

17. Tristan Hehnen - CERN
CERN cable design fires

Simulation of the spread of fire and smoke is a useful tool in risk assessment and for the design of safety measures. It is often based on predefined design fires, but fire propagation depends on the geometry of the fuel distribution and its surroundings. For a proper assessment of different fire scenarios and smoke propagation in complex facilities, it is essential to cover this behaviour. One possibility would be an accurate simulation of fire spread, based on the local conditions. To achieve this goal, material parameters have to be chosen that yield similar results as those measured by fire experiments. Furthermore it is desirable to obtain material parameters from simple, bench scale experiments. Though it is difficult to implement experimental data into a simulation without treatment. This is an area of active research.
One approach is the use of optimisation algorithms to fit the material parameters, so that the simulation results match the experimental data. There are already different software applications available with different algorithms implemented.
An overview shall be presented on how one can use such applications. As an example simulations of a Cone Calorimeter test of electrical cables shall be discussed. In the process of verifying the derived material parameters simulations with increasing complexity are conducted. Beginning with tests of the basic functionality and progressing to a representation of the Cone Calorimeter. The simulations are based on experimental data of the CHRISTIFIRE project. For the fire simulation itself the Fire Dynamics Simulator FDS is used.

18. Dadi Thorsteinsson - MAX IV Laboratory
An overview of the National Swedish Rescue Services incident reporting system

In order to achieve mutual learning from incidents and accidents it would be beneficial to develop common approaches to registration and categorization of said incidents. In this respect there may be lessons to be learnt from how rescue services report the incidents they respond to.
In this presentation I will describe the Swedish national system for municipal rescue service incident report registration, partly from development perspective and partly from database content perspective. This could be useful input for the development phase of a common incident/accident registration routine for collaborating research facilities and also it may give some idea of what kind of information there could be available for our facilities to utilize if we are successful in this endeavor.

19. Fredrik Jörud - ESS
Knowledge transfer for physics laboratory fire statistics

Lack of documented data from particle physics laboratory has pushed the importance to also display data from the nuclear industry as background information for consideration. The database “OECD FIRE” contains prior to the main reference report 344 fire events covering all plant operational modes. OECD FIRE agreement includes Canada, Czech Republic, Finland, France, Germany, Japan, Korea, The Netherlands, Spain, Sweden, Switzerland and United States. The fire frequency is approximately 0.25 fires per reactor year
An interregional exchange of information, to increase the accuracy on decision support activities for prevention of fire- and explosion accidents, is considered as the proper path on further development of fire- and explosion safety for particle accelerator facilities.

Session 6: Technical Risks Part I
Wednesday 11th May 2016

Dr. Procházka, Petr
20. – ELI Beams:
Integrated Safety System for Multi-Laser Accelerator Facility

ELI-Beamlines is the Czech Republic based pillar of the Extreme Light Infrastructure, a European Research Infrastructure Consortia, for the next generation of high energy and high intensity lasers. It aims at the development of high-brightness sources of X-rays and the acceleration of proton, electron, and ion beams, to be used both for pure research and practical applications.

Such research facility must account for a number of specific hazards including ionizing radiation, high intensity laser, high voltage, flammable and oxygen depleting gases. To respond to these hazards two major safety systems are being developed, namely the Personal Safety Interlock System and the Monitoring System which monitors both ionizing radiation and technical gases. Despite the fact that these systems are independent, the greenfield installation allows to integrate them. Integrated systems can represent an efficient engineering control, able to provide solid and reliable support to Safety management system.

The routine operation of the experimental activities is managed by a dedicated control system. In case of emergency, the routine operation control system is overridden by the Personal Safety Interlock system and the permission for further operation is withdrawn. The online information provided by the Monitoring System enables the Personal Safety Interlock system to assert an emergency and trigger an efficient early stage response.

The present contribution will address the integration of the aforementioned safety systems.

21. Mr. BOYD, Eric - European XFEL:
High Powered Laser Safety at European XFEL

When the European XFEL begins its operational phase, its experimental hall will house two high powered class IV optical lasers each capable of producing ionizing radiation. These lasers will be used for the High Energy Density Physics (HED) experiments and will include a 100 TW short-pulsed ultrahigh-intensity optical laser (UHI-OL) and a 100 J/10 ns long-pulsed high-energy optical laser (HE-OL) to study plasma physics. These high powered lasers will operate in many different modes. Some of these modes require only laser safety measures, while other operating modes will require both radiation safety and laser safety measures. This requires careful coordination and planning to ensure all appropriate safety measures are in place for the giving operating conditions without hindering or confusing the user.

We will report on our efforts to develop a safety concept that includes intergradation of its shielding, interlocks, emergency off concept, and administrative controls to accommodate both laser safety and radiation protection over multiple areas.

22. Dora Rio - CERN
How CERN HSE Unit strives for environmental sustainability

CERN HSE Unit incorporates the notion of environmental sustainability in its daily tasks. The Unit provides legal support and advice on requirements or good practices that shall be followed within the Organization and spreads environmental awareness especially among CERN employees. HSE Unit defines environmental requirements at the early state of new projects, reviews technical specification from an environmental point of view, identifies environmental issues through periodic safety inspections in internal industrial buildings and carries out an exhaustive environmental monitoring programme focussing on radiological and physico-chemical parameters. In the field of environmental awareness, HSE Unit promotes environmental awareness target to both, CERN employees and the local public throughout the provision of internal training and participation to CERN public events.

Session 7: Experimental Safety
Wednesday 11th May 2016

23. Dr. KOZIELSKI, Sigrid - XFEL
Launch of new biological laboratories and experimental stations at European XFEL

In early summer 2016 the biological laboratories of European XFEL will be put into operation. These are laboratories of containment level 1 and 2. Shortly after that the small biological lab located in the underground experimental hall near the biological XFEL instruments in SASE1 will start. Both laboratories the one in the above ground building and the one in the hall will be connected by an elevator for transport of biological samples. In this presentation the planning, the legal requirements and follow ups with the authorities are presented especially when handling hazardous biological substances and genetically modified organisms.

24. Mr. MANZLAK, Bert – Jefferson Lab:
Steps to Bringing Tritium Experiments to Jefferson Lab Safely

A tritium target is foreseen to execute four approved nuclear science experiments in Hall A at Thomas Jefferson National Accelerator Facility. One experiment (E12-14-009) aims to measure the ratio of elastic scattering of 3H and 3He and improve on the radius of 3H as compared to the radius of 3He. The aim is to reduce this uncertainty by a factor of five. This can then be compared with state-of-the-art nuclear science calculations. An experiment of quasi-elastic knockout of protons from 3H and 3He (E12-14-011) is a quantitative measure of the pairing mechanisms in the nucleus. The measured ratio can again be compared with state-of-the-art nuclear science calculations. A similar measurement of the ratios of quasi-elastic electron scattering off 2H, 3H, 3He, and 4He (E12-11-112) gives a count of the amount of short-range paired nucleons. The comparison of 3H and 3He will test the isospin character of this pairing. Last but certainly not least, a measurement of deep-inelastic scattering off 3H and 3He (E12-06-118) will map the ratio of proton to neutron structure functions with minimal nuclear uncertainty and will then constrain the ratio of down to up quarks in nucleons. In the kinematic limit of quark momentum fraction x → 1 there are definite QCD predictions for this ratio.

The laboratory experimental review process requires the experimental apparatus, including the tritium target, for these experiments to undergo several readiness reviews. To date the reviews have resulted in the collaborators conscientiously following up on numerous recommendations which have resulted in an intelligent design carefully folding in safety considerations to minimize risk and having layers of containment both for beam operations and shipping. There will be a final review scheduled some months before the actual physics experiments and it will concentrate on documentation and operational procedures.

This talk will provide some review details and safety concerns to bringing tritium experiments to Jefferson Lab safely.

25. Mr. MCHUGH, Eric – FERMILAB:
Technical Scope of Work (TSW) and the Operational Readiness Clearance (ORC) Process for Experiments at Fermilab

Fermilab operates several user experimental facilities as part of its High Energy Physics program. To address the hazards from potential experimental operations, a

Technical Scope of Work (TSW) document is required before considering an experiment. The TSW identifies the experiment's hazards, hazard mitigations, and the roles and responsibilities of those involved with the experiment.

After an experiment is approved and installed, an Operational Readiness Clearance (ORC) review is conducted by Subject Matter Experts to verify appropriate safety requirements and controls have been implemented. This talk will outline the TSW and ORC processes used for experimental and user safety.

Session 8: Technical Risks Part II
Wednesday 11th May 2016

26. Mr. AGUILAR, Jose – ALBA:
Vacuum flight tube improvements at ALBA Synchrotron facility

ALBA is the Spanish synchrotron facility formed with a 3GeV electron synchrotron accelerator generating bright beams of synchrotron radiation, located in Cerdanyola del Vallès (near Barcelona city).
The electrons are accelerated in a 100 MeV linear accelerator (LINAC). Then, the electron beam enters in a synchrotron accelerator named Booster that increases the energy up to 3GeV. Finally, the electron beam is stored in a synchrotron Storage Ring with a current up to 400 mA emitting synchrotron radiation (mainly in the X-ray range), tangentially to the e- trajectory. Around the Tunnel and outside the concrete shielding and tangentially to the Storage Ring, there are the experimental research laboratories; named beamlines (nowadays there are 7 installed and 2 under construction). At each beamline the scientists use the synchrotron light generated by the accelerator for a wide variety of experiments.
The aim of this work is to explain how we improve in safety terms, developing new mechanisms in order to reduce the risks as much as possible.

One of our seven beamlines is dedicated to Non Crystalline Diffraction (NCD). This beamline use a SAXS vacuum flight tube to study a wide range of fields (medicine, biology, chemistry, physics, archaeological, environmental and conservation sciences and materials). The vacuum flight tube contains a kapton window which separates the ambient pressure from the vacuum pressure inside the tube. We find that in case of the window breakage, due to installation and maintenance tasks, some hazardous situations arise: high noise level and entrapment risk.
During 2015 we had two incidences related to the window breakage. There weren't any personal damage in any of both cases, but ALBA considered that some actions must be taken. Collaboration between different departments has been performed in order to reduce as much as possible the window breakage. As a result of this collaboration, a noise measure was done and a new set-up has been designed. This set-up is formed by a "sash metal window", pneumatic system and traffic light system.

In this work we will show the system's development, its usage and how we avoid the risk during the staff's presence doing experiments and maintenance tasks.

Summary
In this work we will show the system's development in one of our beamlines, its usage and how we avoid the risk during the staff's presence doing experiments and maintenance tasks in the SAXS vacuum flight tube.

27. Mr. HOPPE, Andreas – DESY
Equipment from USA without CE certification

Normally need tools and machines when they are imported into the European Union must have a declaration of conformity, to meet certain safety requirements. The declaration of conformity issued by the manufacturer or importer, confirmed by what (safety) standards the device was built. The external sign, so-called CE sign must be affixed to the device.
This is connected to a corresponding expense for a risk analysis and documentation. How to proceed is if the manufacturer refuses not to issue the declaration of conformity for reasons of cost so an experiment cannot be started or should!
The example illustrates how an electrical control device is still enabled for the experiment without a CE-sign.

28. Mr. SCHRADER, S. – DESY
Experiences with an Electric Modulator from a Non-EU country

CE – sign: useful or nonsense?
The HSE-department was asked to evaluate the equipment and release it if possible. What more can we accept? How far we can go not to spoil the party?
Experiences DESY has made with a purchased non EU device as an In-Kind contribution.

29. Kleiner, Sonja – CERN
Environmental incidents at CERN

CERN experienced over the last years a series of environmental incidents, mainly linked to aging infrastructure. These incidents were related to the presence of chemical agents in equipment and facilities. CERN sites are surrounded by small watercourses which preservation is a priority for the Organization, the local Host States Authorities and fisher associations. Hence, CERN decided to set up a working group assessing the soil and water pollution risks for areas concerned by the presence of chemical agents. As outcome, CERN reinforced already its water pollution detection means, to enable a quick intervention of the internal Fire and Rescue Service. Ongoing actions are the planning of global retention measures before CERN outlets into watercourses and consolidation works at the source.

30. Dr. PERRUZZA, Roberto - LNGS

Interactive and Informative Tools for the Users and Activities' Management in the peculiar site of Gran Sasso National Laboratories

Gran Sasso National Laboratories are inserted in a complex system. First of all, the LNGS facility is made up of two main areas:
- External Operations Centre in Assergi, L'Aquila;
- Underground Laboratories.

The underground facility is located in the Gran Sasso Massive, under a rock layer of 1.400 m thickness, under the Monte Aquila Peak in the area of the National Park of Gran Sasso and Monti della Laga. Moreover, the access to the Laboratories is strictly connected with the Gran Sasso motorway tunnel: two highway tunnels managed by the "Strada dei Parchi SpA" Company. From an environmental point of view, a huge water reservoir in the Gran Sasso massive, which supplies drinkable water both to L'Aquila and Teramo counties, surrounds the underground labs.

This configuration, the activities and the experimental apparata hosted make the LNGS subject to a very strict and wide spectrum of European and Italian Regulations: form the Administrative ones, to the Occupational Health and Safety passing through the Control Major Accident Hazard regulation.

As a matter of fact, the working conditions and peculiarities can be summarized as follows:
- Close & Confined Spaces;
- Non-routine work conditions;
- Needing to work in night/holiday shifts sometimes;
- Complex and high technology apparatuses;
- International environment (different behaviors, different standards, etc.);
- Direct connection with highway;
- Storage and processing of dangerous substances.

The continuous improvements on the organizational matters and on the development of procedures is mandatory to reach and maintain high safety standards during ordinary and extraordinary activities. A way to ensure those high standard is also to provide informative and interactive tools helping both Users and Staff of the LNGS.

Aim of the work is to present the improvements that LNGS, and in particular, the SPP (Prevention and Protection Service) are trying to set up in order to ensure a good control and management of interferences in matter of safety. Different informative tools have been proposed to the LNGS Directorate and Services concerning:
- Users and their access at LNGS;
- Experimental Groups working at LNGS;
- Working activities in the LNGS.

A discussion on the way of managing these matters in the different Laboratories participating at ITSF arising from the presentation could be a good and fruitful comparison to better define and improve these tools.

Session 9: Fire safety
Wednesday 11th May 2016

31. Saverio La Mendola - CERN
Fire Safety engineering for CERN's High Luminosity LHC upgrade

The High Luminosity LHC (HL-LHC) project aims at extending the performance of the LHC by increasing its luminosity by a factor of 10. It foresees the creation of new underground infrastructures to host some of the new technological systems required for its operation. These new volumes must be designed in order to meet the fire safety requirements, in particular for what concerns the protection of occupants in case of fire. Unfortunately, prescriptive fire codes applicable by law in the Host States are not adapted to such a peculiar infrastructure, so the performance-based approach to fire safety was followed. Fire safety engineering studies were carried out by four students (Master's and Bachelor's degree) coming from the university of Lund. They allowed to make a differential assessment of two different design proposal from a fire safety standpoint. Studies included identification of design scenario, design fires, evacuation modelling and computational fire dynamics modeling.

32. K. Barth – CERN
The inert gas fire extinguish system of the ALICE detector

ALICE (A Large Ion Collider Experiment) is a general-purpose, heavy-ion detector at the CERN LHC, designed to address the physics of strongly interacting matter and the quark-gluon plasma at extreme values of energy density and temperature in nucleus-nucleus collisions. The ALICE experimental cavern, where the detector is installed, is as big as a volume of 17x45x15 cubic meters and is located 55 meters below ground level. Before starting the ALICE operation phase a N2 Fire Extinguishing System has been installed to protect the L3 (1000 m3), FASS (15 m3) and ITS (2 m3) volumes. For different reasons the system was not performing as expected and ALICE has decided to go for a refurbishing, which is now almost completed. The presentation shows an overview of the refurbished system with respect to the revised requirements and the first performance results obtained during commissioning

33. Mr. SARETZKI, Fabian – DESY
First experiences with the Hifog extinguishing system

As mentioned at the 2014 ITSF, DESY will use a high pressure extinguishing system to deal the risk of fire caused by the pulse transformers, containing large loads of oil, in the 2 km long XTL tunnel. Since the first extinguishing sections have been installed, I would like to inform you about the special experiences and difficulties, regarding the implementation of requirements made by other work packages we had during the installation process. Particularly the design of the framework to mount on the pulse transformers and the fog walls to divide the tunnel into fire compartments which came into conflict with requirements of the machine installation work packages.

34. Dr. GIAMPAOLI, Antonio (LNGS)
Fire in the motorway tunnel due to a car: criticality and management of the event in the Gran Sasso Underground Laboratories

The Gran Sasso National Laboratories (LNGS) of the National Institute of Nuclear Physics (INFN) are located in Assergi, at about 120 km Eastward from Rome. The underground facility is located in the Gran Sasso Massive, under a rock layer of 1.400 m thickness, under the Monte Aquila Peak in the area of the National Park of Gran Sasso and Monti della Laga. The underground laboratories are part of the Gran Sasso complex system, which comprehends also two highway tunnels managed by the “Strada dei Parchi SpA” Company and a huge water reservoir in the Gran Sasso massive, which supplies drinkable water both to L’Aquila and Teramo counties. Moreover, since 2002, the LNGS are subjected to the European Directive 2012/18/UE, because of the storage and use of substances classified as dangerous for the environment.

A central element required by the regulation is the clear definition and implementation of an Internal Emergency Plan (PEI). This plan contains all the information, safety measures, procedures and resources needed to ensure the limitation of the consequences of a major accident and, in general, to define how to manage an emergency situation. Furthermore, a General Emergency Plan (PEE) has been agreed and approved, under the co-ordination of L’Aquila Prefecture.
As a matter of fact, logistic for the underground lab is strictly and unavoidably connected with the motorway tunnel availability. No independent tunnel for accessing or escaping from the Laboratories are present, indeed.
The close and evident interconnection between the Gran Sasso tunnel and the underground labs is such that any event in the tunnel might cause some effects in the underground labs and vice versa, both as regards the evacuation procedures and as regards the rescue and first aid intervention, having impact and representing a critical issue for the emergency management.
For this reason, one of the Operating Procedures of the Internal Emergency Plan concerns the managing of an “accident in the motorway tunnel with a fire development”.

In this work, we are reporting on an event happened in the Gran Sasso motorway tunnel, its impact on the LNGS activity and the criticality highlighted by the event. Specifically, on March 2015 there has been a problem in the motorway tunnel: a fire started due to a failure on a car transiting in the tunnel. Smokes propagated in the tunnel reaching the Underground Laboratories and penetrating in the Assembly Point n. 1 of the LNGS. In fact, a previous problem, not yet solved at that time, led to the not full availability of one of the fireproof and compartmentalizing door leaf at the entrance of the labs.
Aim of this work is to understand the event, highlight causes and the criticality emerged during the event management.

35. Michael Plagge – Saverio La Mendola – CERN
CERN IS23 and IS41: Internal regulations on cables, plastics and other non-metallic materials

To regulate the use of cables, plastic and other non-metallic materials at CERN, especially in the experiments and underground installations, two internal regulations have been issued in the past. Both give details on which material to choose, in terms of fire safety and radiation resistance. Being in place for more than 30 years, this presentation will give an overview on the content and its application by introducing some examples to the audience.

Session 10: New projects/ Challenges
Thursday 12th May 2016

36. Ms. MARMOL, Carme – ALBA:
Transition period for an Occupational Risk Prevention Service and priority lines to improve the results of the internal audit

ALBA is the Spanish synchrotron facility formed with a 3GeV electron synchrotron accelerator generating bright beams of synchrotron radiation, located in Cerdanyola del Vallès (near Barcelona city).
Firstly, the electrons are accelerated in a 100 MeV linear accelerator (LINAC). After, the electrons enter in a synchrotron accelerator named Booster that increases the energy up to 3GeV. Finally, the electron beam is stored in a synchrotron Storage Ring with a current up to 400 mA emitting synchrotron radiation (mainly in the X-ray range), tangentially to e- the movement when the trajectory is modified. Around the Tunnel and outside the concrete shielding and tangentially to the Storage Ring, there are the experimental research laboratories; named beamlines (nowadays there are 7 installed and 2 under construction). At each beamline the scientists use the synchrotron light generated by the accelerator for a wide variety of experiments.

The Spanish law, which regulates the Occupational hazards, depends on the Industry Ministry of the Spanish Government, but the ionizing radiation hazards are under an independent organism from the Spanish administration called Nuclear

Safety Council, which is the entity that authorizes commissioning and operation of any radioactive facility in Spain.

This council forces ALBA to create an internal Radioprotection Service, but this is not the case for the rest of the hazards presents in our facility, which are under the Industry Ministry according to the Law on Prevention of Occupational Risks of 1995. This law does not specify any requirement regarding how to manage this issue for Radioactive facilities under 250 staff.

According the law, there are four organization models to manage the prevention of occupational risks at work, but according the characteristics of a Synchrotron facility only two of them are feasible:
- External Service (an external company).
- Internal Service (own staff).

Since the beginning of the project up to now ALBA has had an external contractor who makes all the requirements established by the law and with whom ALBA Safety Office has to coordinate the follow up of the activities.

As a result of an internal audit based on ALBA Safety Management System, realized during 2015, ALBA Management has planned to migrate to an internal Occupational Risk Prevention Service in the near future.
Nowadays we are combining the two models during a transition period until we have established completely the internal changes to create ALBA's Occupational Prevention Risk Service.
The aim of this work is to explain how we manage this transition period, the changes occurred in our Safety Office and the improvements that we expect. In addition, we would like to explain our "shock plan", to stablish the prior activities to improve the results of our internal audit based on ALBA Safety Management System, which has been elaborated by our office, and already approved by the Direction, and also presented to all ALBA staff.

Summary
According the Spanish law, there are four organization models to manage the prevention of occupational risks at work, but according the characteristics of a Synchrotron facility only two of them are feasible:
- External Service (an external company).
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results of our internal audit based on ALBA Safety Management System, which has been elaborated by our office, and already approved by the Direction, and also presented to all ALBA staff.

37. Mr. MUCKLE, Christian – ESO:
The E-ELT - Safety aspects when astronomy goes to the next level

World-wide, there are three thirty-meter class optical telescopes about to be built; ESO's E-ELT is one of those, and size-wise the largest of the three. Not only are they enormous mechanisms of extreme precision, but to ensure their optimal observation potential they are as well set in rather inaccessible, sometimes hostile, locations. Obviously, the sheer size of the new class of telescopes poses new challenges in terms of compliance and safety. But also the foreseeable operation of the thirty-meter class optical telescopes will require an adapted, more industrial, process approach. This will inevitably have an impact on safety.

38. Mr. Wieseler, Detlef – IPP
Wendelstein 7-X – a new fusion device in IPP Greifswald

The research conducted at IPP is concerned with investigating the physical basis of a fusion power plant, which, like the sun, is to generate energy from fusion of atomic nuclei.
Wendelstein 7-X at the Greifswald branch of IPP is a large stellarator with modular superconducting coils which enable steady state plasma operation in order to explore the reactor relevance of this concept.
Wendelstein 7-X is the world’s largest fusion device of the stellarator type. Its objective is to investigate the suitability of this type for a power plant. It will test an optimized magnetic field for confining the plasma, which will be produced by a system of 50 non-planar and 20 planar superconducting magnet coils.
With plasma discharges lasting up to 30 minutes, Wendelstein 7-X is to demonstrate the essential stellarator feature, viz. continuous operation.
The central part of the device is a wreath of 50 superconducting niobium-titanium magnet coils about 3.5 metres high. Cooled with liquid helium to superconduction temperature close to absolute zero, they need hardly any energy after being switched on. Their bizarre shapes are the result of the optimization calculations: They are to produce a particularly stable, thermally insulating magnetic cage for the plasma.
To allow the magnetic field to be varied a second set of 20 planar, likewise superconducting coils is superposed on the stellarator coils. A massive ring-shaped support structure keeps the coils in the exact position despite the high magnetic forces.
The entire coil wreath is surrounded by a thermally insulating outer shell 16 metres in diameter, viz. the cryostat. A refrigeration plant provides 5000 watts of helium refrigerating capacity in order to cool the magnets and their support structure, i.e. a total of 425 tons of material, down to superconduction temperature.

Inside the coil wreath is the steel plasma vessel composed of 20 sections, whose peculiar shape is matched to the twisted plasma ring. Through over 250 ports connecting the plasma vessel with the cryostat the plasma can be observed and heated.
The Wendelstein 7-X fusion device produced its first hydrogen plasma on February 3rd, 2016. This marks the start of scientific operation

39. Andre Henriques - CERN
General Safety studies and considerations for FCC

Future Circular Collider (FCC), under study at CERN, will face conventional safety challenges throughout its life-cycle, from fire prevention in an unprecedented large underground facility to environmental protection in the surroundings. These underground facilities will be equipped with installations that may represent important hazards, therefore, studies are ongoing in order to propose risk prevention and mitigation measures to achieve an acceptable risk level and ensure the safe operation of the installation. With the advancement on baseline tunnel layout and cross section(s) we were able to develop, more in depth, some general Safety studies for the underground areas. We will report on the status update on the recent deliverables achieved for fire Safety and air management studies for the protection of occupants and environment. In the presentation, we will also introduce new studies linked to the underground infrastructure like personnel transportation for evacuation and Oxygen Deficiency Hazard assessment in case of a cryogenic release inside the machine tunnel.

Session 11: Sustainibilitry/ Energy Efficency
Thursday 12th May 2016

40. Ms. Leister, Eva – DESY
Sustainable activities at DESY – an overview

As a national research laboratory in Germany, DESY operates for more than 50 Years as a large-scale research facility for physical and life sciences, which is very energy intensive, mainly due to the large accelerator complex. In the recent years several projects have been launched to generally enhance energy efficiency and to improve waste heat recovery on the campus.
One important aspect for a successful sustainable energy concept is the detailed knowledge of all energy sub-consumptions at different facilities, labs and buildings on the campus. For this purpose a large energy survey was started to collect all available counters and their consumers and to investigate how the data can be standardized, centrally stored and analyzed. Furthermore, a concept for detailed, automated metering was created.

41. Mr. MIELAND, Eric – Fermilab
Intergration Sustainibility into Operation at FERMILAB – Successes and Challenges

In 2015 Fermilab reported to the U.S. Department of Energy on 32 sustainability related goals. The range of goals include transitioning more quickly to renewable electricity use, planning for impacts to facility operations due to climate change, and the construction of net-zero energy buildings. Some goals are relatively easy for Fermilab to accomplish while others will be challenging. The tie that binds these goals together is a presidential directive to reduce greenhouse gas emissions that result from the operation of the federal government, including Fermilab. This talk will highlight the range of goals and focus on some of the bigger challenges for the laboratory.

42. Mr. PETER, Jacobsson – ESS
ESS Sustainability Program – Some issues

The European Spallation Source (ESS) will be the world's leading facility for research using neutrons. The European Spallation Source (ESS) will also be the world's first sustainable research facility. One of the challenges to accomplish this will be the facility's energy consumption. ESS's Responsible, Renewable, Recyclable energy concept is the primary tool for realizing this goal. ESS also use BREEAM, the world's leading sustainability assessment method for masterplanning of projects, infrastructure and buildings.

The presentation will give an overview and status of the work achieved so far and the planning of the future operation phase.

Session 12: Accident/ Incident Management
Thursday 12th May 2016

43. Duy Phan – ESS:
Cryogenic Hazards at ESS – strategy, safety studies and lessons learned

The European Spallation Source (ESS) is building a linear accelerator (linac) aiming at delivering a 2 GeV proton beam on a tungsten target wheel at 5 MW nominal power. The entire accelerator will be housed in an underground tunnel and will be fully operational by 2023.
The superconducting section of the linac is composed of 21 High Beta cryomodules, 9 Medium Beta cryomodules and 13 Spoke cryomodules, as well as a Cryogenic Distribution System (CDS) that will be provided with liquid helium. A total of 146 superconducting radio frequency (SRF) cavities operating at 2 K will be housed in those cryomodules. Additionally, cryogenic fluids will also be used for the cold hydrogen moderator surrounding the target as well as for several neutron instruments. In order to achieve a proper cooling, different facilities are being built to house the future cryogenic installation and therefore will be subject to Oxygen Deficiency Hazard (ODH).

In order to address cryogenic safety issues ESS wide, a long-term strategy has been prepared based on the selection of calculation models, the implementation of an ODH safety guideline as well as the identification of control measures.
At this early stage, some preliminary ODH assessments have been carried out in various areas such as the accelerator tunnel, the compressor building and some laboratories using simple calculation models as well as Computational Fluid Dynamics (CFD) simulations.
The presentation will provide an overview of the ODH concept at ESS, examples of safety studies, results and lessons learnt from CFD simulations performed in the accelerator tunnel and finally some upcoming activities.

44. Dr. BESSHO, Kotaro - J-PARC - KEK
Drills for the various emergency situations in the J-PARC accelerator facilities

In the Hadron Experimental Facility of J-PARC (Japan Proton Accelerator Research Complex), a radioactivity leak incident occurred on May 2013. In the wake of this incident, J-PARC reformed the safety management system and developed various measures to prevent incidents/accidents occurred in the accelerator facilities.
The points to prevent/minimize the accidents are (1) proper understanding of the accidental phenomenon and situation, (2) judging appropriate countermeasures, and (3) taking actions. In order to improve the judgements and the actions in emergency situations, we had carried out emergency drills for the following situations occurred in accelerator facility.
1) Abnormal release of radioactive materials from the facility
2) Fire in the accelerator facility (radiation controlled area)
3) Exposure of intense neutron to a worker in the accelerator tunnel
Some other topics, such as criteria and procedures for actions in emergency, safety education, are also reported

45. Dr. BASTI, Andrea - INFN-LNGS:
Evaluation of different hypothetical accident scenarios for improving people evacuation in the Gran Sasso National Laboratory

Gran Sasso National Laboratory (LNGS) is an underground high energy phisics laboratory located in the middle of a ten km long motorway tunnel.
The Gran Sasso National Laboratory, as far as safety is concerned, represents certainly a complex system, especially for its location inside a motorway tunnel.
To evaluate people evacuation inside Gran Sasso Laboratory, to the three safe area located near the motorway tunnel as estabilished in the Official Emergency Plan Solution, various simulations by Computer Fluid Dynamics software have been done.
To optimize the evacuation time, in terms of different accident scenarios that could occur inside LNGS, different accident and evacuation simulations have been done with FDS (Fire Dynamic Simulator) and EVAC software and several family of data about various human tenability parameters, have been analized.

For each accident scenario, chosen among some that could occur more frequently and have a bigger impact in terms of evacuation time reduction, the evacuation routes together with the safety measure able to reduce the evacuation time and/or to increase the available time for a safe evacuation, have been identified.
After the optimization of evacuation routes of the workers and safety measure that are able to reduce the evacuation time in terms of RSET (Required Safety Egress Time) and to increase the available time for evacuation in terms of ASET (Available Safety Egress Time), we have in mind to put in practice the different results on I-Fix - that is a Control and Management System software - , to automatize the safety routes indications depending on different various scenarios.

Summary

Gran Sasso National Laboratory (LNGS) is an underground high energy phisics laboratory located in the middle of a ten km long motorway tunnel.
The Gran Sasso National Laboratory, as far as safety is concerned, represents certainly a complex system, especially for its location inside a motorway tunnel.
To evaluate people evacuation inside Gran Sasso Laboratory, to the three safe area located near the motorway tunnel as estabilished in the Official Emergency Plan Solution, various simulations by Computer Fluid Dynamics software have been done.
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After the optimization of evacuation routes of the workers and safety measure that are able to reduce the evacuation time in terms of RSET (Required Safety Egress Time) and to increase the available time for evacuation in terms of ASET (Available Safety Egress Time), we have in mind to put in practice the different results

46. Dr. TARTAGLIA, Roberto - LNGS

Application and results of the Gran Sasso National Laboratory Safety Management System: A Near-accident Case Study

The Gran Sasso National Laboratories (LNGS) of the National Institute for Nuclear Physics (INFN) fall within the definition of “major accident hazard plant” because of the use of substances classified as dangerous for the environment according to the European Directive 2012/18/UE (Seveso Directive). These classified substances are used in two Experiments underground. This element is made more critical by the Gran Sasso complex system in which the underground laboratories are located: a rock layer 1400m thick in the area of the National Park of Gran Sasso and Monti della Laga; a huge water reservoir in the Gran Sasso massive; two highway tunnels managed by the “Strada dei Parchi SpA” Company.

A properly Safety Management System (SMS) has been developed, kept up-to-dated and actuated in order to fulfil the constantly changing experimental apparatus requirements.

In our “case study”, we are reporting an example of an application regarding the management of a near-accident. The event taken into account has been a near accident due to a failure of one of the eyebolts during the handling operations of the experimental apparatus shielding. The pursuance of the action with the winch and the stress on the eyebolts due to the non-planarity of the shielding led to the projection of one of the cables, determining a very dangerous situation for the operators and the experimental apparatus itself.
After the event, the Collaboration members involved, together with the Directorate and LNGS Services, analyzed the event through proper tools, such as root analysis and risk assessment in order to really learn from it, recording everything according to the Safety Management System and defining and actuating management and technical measures that have been implemented by the experimental collaboration.

Aim of this work is to understand the event, highlight causes and mistake done, to show the follow up of the near accident and the results of the process.

Session 13: Safety Cultur and Behavior
Thursday 12th May 2016

47. Mr. RAINEY, Bill – Jefferson – Lab:
Condition Assessment - ES&H Programs at Jefferson Lab

Jefferson Lab’s industrial safety and environmental system, called Integrated Safety Management (ISM) weaves environment, safety and health into the fabric of daily operations; thereby ensuring the safety and health of all employees as well as the user community, and protection of the public and environment. ISM is a formal, organized process to plan, perform, assess, and improve the safe and environmentally aware conduct of work.

In order for ISM to be successful, each and every worker at the lab has to participate. They are required to make safety related decisions based on, in ISM parlance, Competence Commensurate with Responsibilities. It is the primary mission of the cadre of environmental, safety and health (ESH) professionals to make sure the workers have this competence through a variety of tools including training, policies and procedures, operational oversight and mentoring, and organizational learning. The development, maintenance and delivery of these tools are complicated by the wide variety, and sometimes unique, hazards present at Jefferson Lab. And, as is always the case, resources are finite.

Across this spectrum of program elements, how does a manager decide where to apply his or her resources, and how can we measure the impact of these decisions? Jefferson Lab has developed a tool to aid in this process (see Figure 1).

The “scope” of the ES&H program is broken down into 20 separate technical areas – subject matter that requires a unique set of tools. We then rate each of these technical areas based on six elements we feel are critical to programmatic success:

1. Subject Matter Expert (SME) Skills – how does our incumbent compare against the ideal combination of experience, education, certifications, etc. to support this area?
2. ESH Situational Awareness – what is our level of field oversight related to this subject?
3. Training Content – is the training up-to-date, relevant and clear?
4. Manual Content – are our internal procedures up-to-date, relevant and clear?
5. Findings – have recent event investigations or assessments resulted in findings of program weaknesses in this area?
6. Line Performance – do observations indicate how well the workers and supervisors are managing this element?

Areas that have been rated as less than acceptable are addressed through improvement actions.

JLab has observed several benefits from reviewing this high level output:

- Assurance that action is being taken to improve areas of need
- Identification of specific technical areas that are underperforming (see fall protection)
- Identification of consistent weaknesses in programmatic infrastructure (see manual content)
- Improved communication with leadership and subordinates on priorities, resource needs, etc.

Summary

Jefferson Lab has developed a tool to measure its ability to provide ES&H services as well as measure the impact of those services.

The “scope” of the ES&H program is broken down into 20 separate technical areas – subject matter that requires a unique set of tools. We then rate each of these technical areas based on six elements we feel are critical to programmatic success.

JLab has observed several benefits from reviewing this high level output:

- Assurance that action is being taken to improve areas of need
- Identification of specific technical areas that are underperforming (see fall protection)
- Identification of consistent weaknesses in programmatic infrastructure (see manual content)

• Improved communication with leadership and subordinates on priorities, resource needs, etc.

48. Mr. WINéR, Bertil – ESS
Systematic Work Environment Management at the European Spallation Source, ESS

The European Spallation Source (ESS) will be the world's leading facility for research using neutrons. ESS is cohosted jointly by Sweden and Denmark, and so far, 17 European countries are partnering the project. ESS is a green-field facility constructed in the outskirts of Lund, Sweden.

Being a new facility, without the back up of an existing research institute or university, ESS is given the possibility to start from scratch in many different aspects. The occupational health safety work is one of these aspects. Using the term "Systematic Work Environment Management", ESS is covering different aspects of staff workers well-being, from the design discussions to the actual construction, installation, commissioning and test operation of the facility.

The presentation will give an overview of the Systematic Work Environment at ESS as its functioning today covering internal safety aspects as well as legal requirements.

49. Ms. RICOT, Stéphanie – ESRF:
Training program at the ESRF

The ESRF is setting up this year a training programme for staff members aimed at identifying the mandatory safety training courses (classroom or on-line) which a person must complete. This training programme will be created by supervisors and approved by the Safety Group. The validity of the safety training courses identified will be connected with the building access rights programmed on the ESRF site entrance badge

50. Dr. MILDENBERGER, Joe – TRIUMF:
Who's running the show? - Understanding and communicating requirements for hazardous work

It is understood that "human factors" can play a significant role in safety-related incidents. The findings of the root cause analysis for an incident at TRIUMF reveal how the confluence of a number of different types of "human factors" – including the good intentions of conscientious workers - can result in a potentially serious situation with significant regulatory implications for the organization. The details of the incident and the resulting corrective actions are discussed

51. Dr. TARTAGLIA, Roberto (LNGS)
The human factor analysis inside a peculiar work environment as the Gran Sasso National Laboratories

The technical nature of safety related improvements, often, do not allow to effectively act on the primary cause of accidents: human error. This is the reason why a greater focus on aspects concerning the human factor (Human Factor - HF). This evolution presents various problems:

- sometimes, the industry approach focuses more on the behavior of operators, human error and compliance to procedures, neglecting the real human contribution and limiting the study of the root causes and yet essential;
- companies are often marked by a strong technical background and rarely have expertise in organizational and human factors;
- there is still little reference documentation designed to promote the transferring of scientific knowledge acquired to those who deal with safety (industrial, trade unionists, supervisory authorities, etc.).

Therefore, integrating human and organizational factors in the policies and activities of industrial safety required the ability to use new knowledge belonging to social sciences (ergonomics, psychology, sociology…). This knowledge must still be connected to operational problems, in the particular case of our research, they included the emergency response of security guards (GPG) manning the security service within the Gran Sasso National Laboratories (LNGS).
In particular, it is important to point out the peculiarity of this service: the GPG in question, even during the night, serve in the underground with shifts envisaged by their national collective bargaining agreement: in this context, these activities are included in the list of assets classified as "particularly arduous" by Italian law. For this reason, it is of greater interest to assess what entails working in a so peculiar work environment, trying to propose management measures to improve the mental and physical health of workers.
Aim of this research is to integrate into the analysis of the human factor with psychodynamic investigation techniques, capable, indeed, to investigate the unconscious component to identify those sub-threshold disorders and further assess what it means to work in an particular working environment such as the Gran Sasso National Laboratories (LNGS).

Session 14: Miscellaneous
Friday 13th May 2016

52. Mr. Prochal, Boguslaw - IFJ-PAN
Safety during tests of superconducting RF cavities and cryomodules for the European XFEL at Accelerator Module Test Facility (AMTF) at DESY

The basic intention of this presentation was to highlight our problems and our concerns related with work at AMTF.

We demonstrated in sufficient way the safety procedures which we have introduced in order to assure a safe work conditions.
We would like to share our experience, lessons learned and acquired specific knowledge to other participants which could face similar challenges and similar safety problems.

The European XFEL is a new research facility currently under construction at DESY in the Hamburg area in Germany.
The main part of the superconducting European XFEL linear accelerator consists of 100 accelerator modules with 800 RF-cavities inside.
The accelerator modules, superconducting magnets and cavities are currently tested in the accelerator module test facility (AMTF) at DESY.
Performance of all cavities and cryomodules tests is a part of Polish in-kind contribution for European XFEL lead by IFJ-PAN Team from Cracow.
Usage of a complex large high- and low-power RF testing equipment, vacuum and cryogenic infrastructure, as well as a huge number of transport operations is necessary to accomplish this task and presented on slides.

This presentation gives an overview of this task from the safety point of view concerning personnel and equipment.

At the very beginning of the tests a complete evaluation of all risks for the health and safety of the workers, including all kinds of hazards, existing during tests of accelerator modules and RF-cavities was performed. This well-documented safety risk assessment was mandatory in accordance with German legal requirements.

Subsequent to this evaluation, we implemented and integrated the preventive measures and the working methods to assure an improvement in the level of protection afforded to workers with regard to safety and health into all our activities.
Additionally, in order to establish a necessary legal framework between IFJ-PAN Team and DESY, a Safety Officer for all kind of activities at AMTF has been appointed as responsible person for safety.
In this work we will show the big challenges concerning our task.
One of these was preparation of the test team to safe work.
Large scale testing of SRF cavities and cryomodules requires engineers and technicians for a long period of time – currently over 30 engineers and technicians from IFJ PAN are working at AMTF.
So far, to the test team has been involved about 90 people. Engineers stay at DESY on a long term contracts, however their amount increased continuously in the past.
Engineers attend to the regular safety instructions organized by DESY. A team of technicians is replaced every three months.
Many technicians come to work many times, at different intervals. These constant changes of the test team cause the need for continuous safety training of many people starting work for the first time or after a long break. We have established a

broad safety training process for all members of our test team. A list of these mandatory and additional safety instructions is presented.

Before start of the work, our colleagues were trained how to safely use our work equipment and have been learned the safety working methods at work places as well as about the safe behavior.
Our team members are aware, that any mistake in our safety procedures could have significant consequences, however, we additionally incorporated Personal Safety "extract" to our procedures. The aim of this step was to constantly remind, in clear and accessible way, main principles of occupational safety and accidents prevention, important for particular AMTF procedure, and refreshing these issues at every opportunity.

To improve safe work, we are using also the working safety instruction, in German it´s called "Betriebsanweisung", that means, the most important safety aspects are summarized from the risk assessment in this sheet for a short and intensive training/information for the employees.
These working safety instructions are also presented on the hall and are permanently available for inspection by employees.
The reliable facility equipment properly operated and maintained is also an essential issue for obtaining safety working condition at AMTF and allows limiting the exposure to hazards at workplaces. In order to keep these safe working conditions, a regular checks of all king equipment, installations and safety systems are performed.
We took care also about the organizational factors which could affect the safety (e.g. during transports of heavy loads, handling with activated during tests elements or disconnecting mains and protecting against unintentional reconnecting during works with modulators).
Despite the fact, that our colleagues follow and perform work activities according to written procedures, one electrical incident occurred due to a fault in electrical system. There were no serious health consequences for workers.
In Accident Prevention, in order to avoid errors resulting from routine, we recollect continuously to our team members that they need to follow the recommended forms of safe behaviour and their work requires attention.

53. Mr. PETER, Jacobsson - ESS
Integration of Safety in the Construction/Installation/Commissioning of ESS

The European Spallation Source (ESS) will be the world’s leading facility for research using neutrons. In all, 17 European countries is part of the effort of achieving this goal. From the 17 countries, more than 20 partner research institutes, universities, and laboratories are individually responsible for leading one or several work packages, each containing multiple work units, with leadership distributed among all participants.

One of many challenges is the overall safety for the final product, the ESS facility especially concerning installation and commissioning of different components and systems.

The presentation will give an overview and status of the work achieved so far and the planning of the future ESS operation phase.

54. Dr. TOBIA, Marco LNGS
XENON1T Project: Construction, Engineering, Safety

Xenon1T is an international experiment to search the dark matter, located in the Hall B of the underground labs of Gran Sasso National Laboratories (LNGS) of the National Institute for Nuclear Physics (INFN) in L'Aquila, Italy. It is based on 62 kg liquid xenon target that is operated as a dual phase (liquid/gas) Time Projection Chamber (TPC) to search for interactions of dark matter particles. An interaction in the target generates scintillation light which is recorded as a prompt signal by two arrays of photomultiplier tubes (PMTs) at the top and bottom of the chamber. In addition, each interaction liberates electrons, which are drifted by an electric field to the liquid-gas interface with a speed of about 2 mm/µs. There, a strong electric field extracts the electrons and generates proportional scintillation which is recorded by the same photomultiplier arrays as a delayed signal. The time difference between these two signals gives the depth of the interaction in the TPC
with a resolution of a few mm. The hit pattern of the signal on the top array allows to reconstruct the horizontal position of the interaction vertex also with a resolution of a few mm. Taken together, the experiment is able to precisely localize events in all three coordinates. This enables the fiducialization of the target, yielding a dramatic reduction of external radioactive backgrounds due to the self-shielding capability of liquid xenon.
Xenon1T is led by an international Collaboration of more than 120 physicists and engineers from 20 different institutes or universities of 10 countries over the world. The Spokesperson is prof. Elena Aprile from the Columbia University in the city of New York, USA.
The goal of this article is to present the progress of the construction of the experiment and a safety review through an analysis of three topics: 1) Construction site management, 2) Engineering and 3) Quantitative Risk Analysis. The three phases were carried out in parallel through a complex and dynamic management of the entire project with the aim of respecting the schedule, compliance with the law on health and safety in the workplace, the Seveso Directive ter about the control of major accidents and the delicate management of the risk of interferences with other activities and experiments present in the Hall B.
The article describes the management phase of the construction sites needed to implement the various infrastructure parts of the experiment: Water Tank, Service Building, Structure and Support Cryostat, Muon Veto-PMTs, facilities for cryogenics, special systems for cooling and gas-fire detection. The analysis of the Construction Management allows to get an accurate description of:
• Technical and economic analysis of financial statements of the resources employed in the yards;
• Analysis of technical & operational solutions for risk mitigation of interferences generated by the phases of decommissioning of ICARUST600, WArP and equipping

temporary storage areas in Hall B for the OPERA experiment dismantling in the Hall C;
• Criticality Analysis of the positions of responsibility involved: Collaboration Working Groups, external companies, Construction Managers, GLIMOS, RAE, Commissioning and Technical Manager.
In the second part the main systems for engineering, with the characterization in terms of reliability and safety, are described:

- Liquid Xenon Detector/Cryostat
- Cooling System
- ReStoX – Recovery and Storage Xenon system

In the third part of the talk the results of the QRA performed according to the Safety Management System in place at LNGS are presented. The QRA is composed of two successive stages, the first qualitative and the second quantitative:

1. HazOp Analysis
2. Failure Mode and Effects Analysis
3. Fault Tree Analysis

With this talk the authors would like open a discussion into the ITSF about a dynamic global management model for the construction of new experiments in underground laboratories. There are many elements and topics that contribute to the realization of a new experiment, such as site safety, interference management, logistics, engineering structures, reliability, emergency management, budget: an effective control of the project needs more and more specialized figures and of high level, coming both from the experimental collaboration, both from the LNGSs, which have given and will give an essential technical support to achieve the goal of Xenon1T.

Harbour Boat Trip and Social Dinner

Bus Transfer from DESY-Site **05:30 p.m.**

Meetingpoint **06:00 p.m.** for Harbour Boat Trip

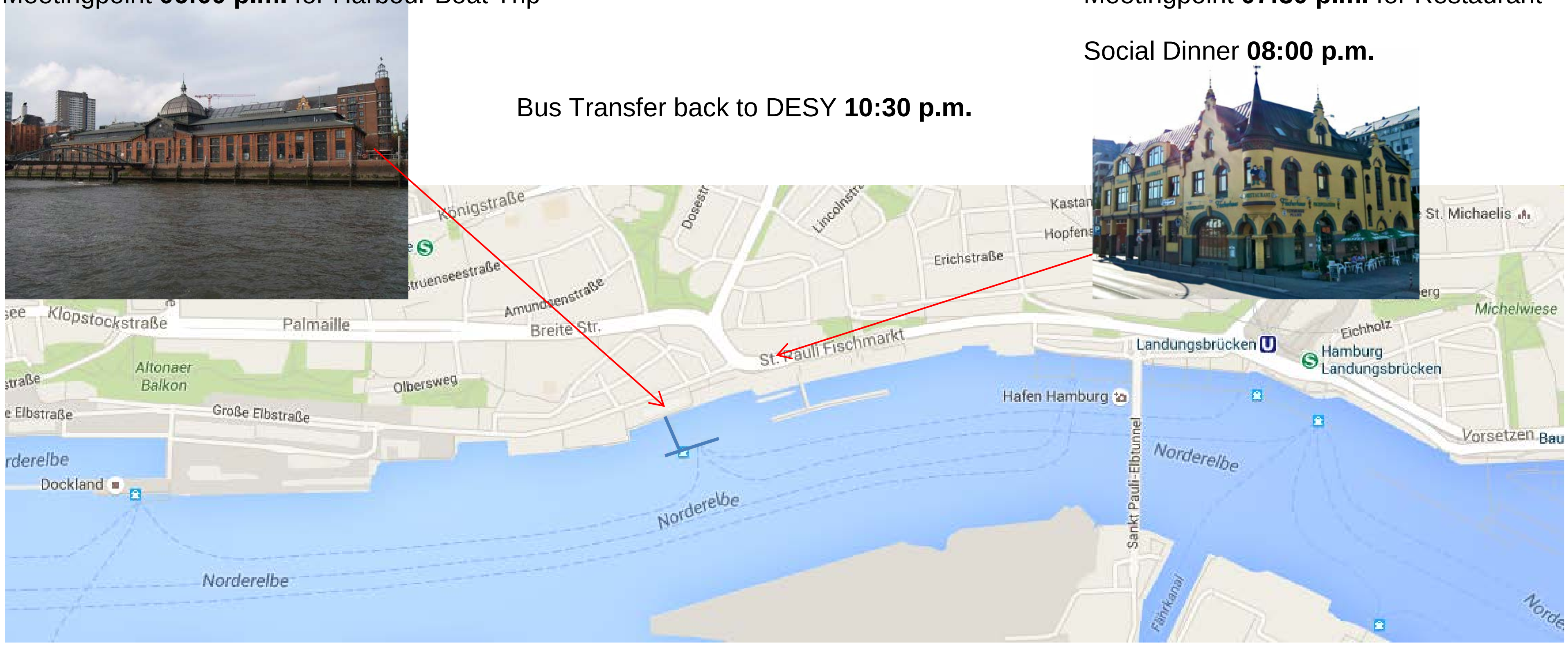
Bus Transfer back to DESY **10:30 p.m.**

Restaurant: Fischerhaus

Fischmarkt 14

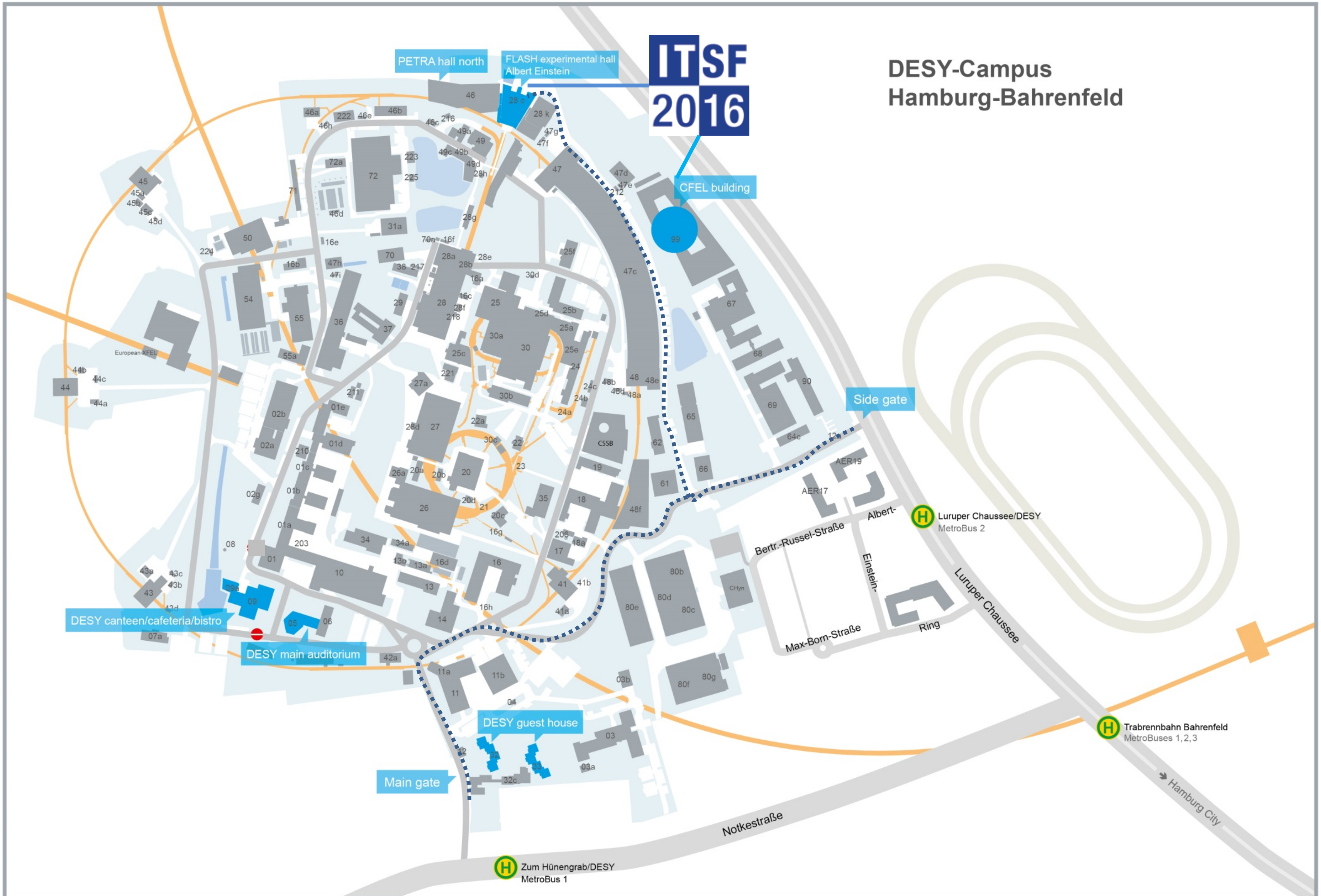
Meetingpoint **07:30 p.m.** for Restaurant

Social Dinner **08:00 p.m.**



If you have forgotten which meal you have choosen, feel free to ask the organization team!Have a beautiful day!

Your ITSF 2016 Organisation Team from Hamburg


DESY-Campus
Hamburg-Bahrenfeld
ITSF
2016
PETRA hall north
FLASH experimental hall
Albert Einstein
CFEL building
Side gate
DESY canteen/cafeteria/bistro
DESY main auditorium
DESY guest house
Main gate
European XFEL
CSSB
CHyn
Bertr.-Russel-Straße
Albert-Einstein-Ring
Max-Born-Straße
Luruper Chaussee
Notkestraße
Luruper Chaussee/DESY
MetroBus 2
Trabrennbahn Bahrenfeld
MetroBuses 1,2,3
Hamburg City
Zum Hünengrab/DESY
MetroBus 1