UiT The Arctic University of Norway

Report Evaluating Safety Culture at UiT

Deanna L. Wolfson, Sofia E. Kjellman, Marc Boomgaren,

Janne Oppvang, and Eva Katrin Bjørkeng

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Author information:

Deanna L. Wolfson
Department of Physics and Technology, UiT The Arctic University of Norway
https://orcid.org/0000-0001-6059-2472

Sofia E. Kjellman
Department of Geosciences, UiT The Arctic University of Norway
https://orcid.org/0000-0003-1165-8601

Marc Boomgaren
Department of Chemistry, UiT The Arctic University of Norway

Janne Oppvang
University Museum, UiT The Arctic University of Norway

Eva Katrin Bjørkeng
Department of Chemistry, UiT The Arctic University of Norway
https://orcid.org/0000-0002-4660-071X

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1. Executive summary

1.1 English summary

Problems and current situation

Safety at UiT The Arctic University of Norway primarily relies on an inefficient patchwork of locally developed and applied solutions. Central training and routines are incomplete, unenforced, and often inaccessible. Reported safety issues are frequently left unresolved for months or years. This has been further exacerbated by problems with official reporting mechanisms, both in the incident report system, and the lack of a coordinating head safety representative for the last year. Some of these safety issues require action by Level 1 at UiT, and many others could be much more efficiently handled (or have been prevented) by similar central action. Unfortunately, the recent trend has been the opposite, with Level 1 delegating downwards without consultation, transition or training plans, or even ensuring that it is even possible, much less advisable, for lower levels to take on these tasks.

This investigative committee has identified several common themes underlying many of the safety challenges at UiT, namely communication, accountability, and training. It is incredibly challenging to find safety information from UiT online or anywhere else, and the information that can eventually be found is often incomplete, irrelevant, and lacking practical information. Changes in policies and routines are typically made without consultation with end-users, and apparently without plans for disseminating the information. There appears to be no central system for tracking, much less enforcing, safety training requirements, and the training itself, when even available, is insufficient to prepare employees to work with many of the hazards associated with working in the lab or field. Additional training thus needs to be offered at lower levels, but this appears to be a completely voluntary system, without guidance, support, or oversight from Level

1 – and one that poses even more risks related to interdisciplinary work. This unaccountable delegation of responsibility similarly passes down through lower levels, resulting in a safety culture that is entirely voluntary and generally unsupported, unenforced, and frequently uncompensated. In effect, safety programs are often developed at the group level and frequently lose information or need to be reinvented as the temporary staff they rely on leave – assuming the group even decides to implement a safety program at all. A similar lack of accountability can be found related to reporting safety issues: even for officially reported issues, many are left unresolved and without response, particularly when responses are needed from higher levels; for incidents that can be handled at lower levels, there have been reports of employees being told and sometimes pressured to not file incident reports, thus leaving the only likely response to the employee a negative one.

The committee has additionally identified a number of more specific problem areas. Chemical storage, use, and disposal are problematic across disciplines, with common challenges including adequate storage infrastructure and access to knowledgeable experts. Risk assessments generally lack access to timely and/or expert review, when they are even performed at all. Safety during cruises and fieldwork varies significantly across groups, but particular areas of note are a need for more field-specific training, including e.g., first aid and use of safety equipment. Both in the field and on campus, those working alone must often rely on friends and family to respond if they miss a pre-designated check-in time, but those individuals are unlikely to have the necessary response training or to even be UiT employees. Similarly, there is a distinct lack of incident response training or documentation for UiT employees, such that employees often do not know how to respond in an emergency situation, making the risks of injury and damage much more severe. Additional topics are detailed in the full report.

Consequences

UiT is lacking a culture of safety, which makes enforcement of good practices even more challenging and inefficient at lower levels. Employees may not feel safe in their work environment, and staff working to implement safety programs on their own face fatigue and risks to their career with this often uncompensated extra work, especially when their leadership prioritizes time or money over safety. The inefficiency of needing to create an entire safety program at the local level wastes resources, and promising young researchers may instead decide to pursue their careers and bring their grants to a location with better central services and less risk to life, health, and their ability to do research.

Several safety-related incidents have already been covered in local and national media, but to our knowledge these have not been related to particularly severe outcomes. Without significant improvements to the system, however, it is only a matter of time until an incident will cause major injuries and/or damage, which could easily have been prevented. The incident itself would have a high risk of damaging UiT's reputation, but a look into the lack of safety oversight and the history of reported but unresolved problems will be even more damaging. Rather than waiting until after an incident has occurred, UiT needs to take action now to both reduce the damage and likelihood of such events.

Proposed changes

This report primarily aims to identify the problems, and recommends that UiT commit the necessary resources to determine and implement proper solutions. The recommendations provided here should only be used as a starting point for identifying further actions. UiT clearly needs to make safety information more accessible, starting with ensuring that all safety information can be found from a central, easily-accessible, and well-maintained safety website. The pipeline of information needs to start early, so that new employees already know their

training expectations and safety obligations from day 1. There needs to be a central system of accountability that ensures everyone working in a risky environment has had the necessary training in advance, including regular refresher training. Additionally, every level of leadership connected to working in a hazardous environment (including Level 1) needs increased knowledge and training about both safety practices themselves and their responsibilities for these as leaders. Centrally-provided safety training overall needs to be improved, especially in regard to practical details, risk assessments, and incident response; but also by offering more types of training and making it more accessible. Risk assessments need more support and guidance, especially with respect to providing relevant expert feedback when needed. Experts in topical safety areas (e.g., chemicals, radiation, genetic modifications, etc.) should generally be made easily accessible to any UiT employee who has related safety concerns, and these experts should also be used to proactively risk assess or audit existing facilities to catch safety issues that might be otherwise have been missed (e.g., chemical storage incompatibilities). UiT needs to commit sufficient resources (including infrastructure, equipment, and trained personnel) to fulfill its safety obligations, instead of relying on uncompensated volunteer labor and good luck. Critical safety roles should have backup and transition plans, so that employees aren't left without resources when someone becomes sick, goes on vacation, or otherwise leaves. Changes affecting safety need to be made in consultation with relevant end-users, and communication, training, and transition plans need to be in place before changes are implemented. Costs (both financial and human) should be evaluated in total: central 'savings' from not providing central resources are paid for many times over by requiring many duplicates of them at each lower level; similarly, additional costs due to sick leave, damaged equipment, and loss of opportunity need to be considered compared to the cost of prevention, even

though they may be paid by different levels. UiT needs to show, both in its actions and its messaging, that safety is a priority.

1.2 Norsk oppsummering

Problemer og nåværende situasjon

Sikkerheten ved UiT Norges arktiske universitet er primært basert på et ineffektivt lappverk av lokalt utviklede og anvendte løsninger. Sentral opplæring og rutiner er ufullstendige, ikke håndhevet og ofte utilgjengelige. Innrapporterte sikkerhetsproblemer blir ofte stående uløst i måneder eller år. Dette blir ofte forverret av problemer med de offisielle rapporteringsmekanismene, både i avvikssystemet og mangelen på koordinerende hovedverneombud det siste året. Noen av disse sikkerhetsproblemene krever handling fra nivå 1 ved UiT, mens mange andre kunne vært håndtert (eller forhindret) mer effektivt gjennom lignende sentrale tiltak. Dessverre har den siste trenden vært motsatt, hvor nivå 1 delegerer nedover uten konsultasjon, overgangs- eller opplæringsplaner, eller til og med å sikre at det er mulig, langt mindre tilrådelig for lavere nivåer å ta på seg disse oppgavene.

Denne undersøkelseskomiteen har identifisert flere gjennomgående tema som ligger til grunn for mange av sikkerhetsutfordringene ved UiT, nemlig kommunikasjon, ansvarlighet og opplæring. Det er en svært utfordrende oppgave å finne sikkerhetsinformasjon fra UiT på nett eller andre steder, og informasjonen som til slutt kan finnes er ofte ufullstendig, irrelevant og mangler praktisk informasjon. Endringer i retningslinjer og rutiner blir vanligvis gjort uten å konsultere sluttbrukeren, og tilsynelatende uten planer om å formidle informasjonen. Det ser ikke ut til å være et sentralt system for å spore, langt mindre håndheve, krav til sikkerhetsopplæring, og opplæringen selv, når den er tilgjengelig, er utilstrekkelig for å forberede ansatte til å jobbe med mange av farene knyttet til laboratorie- eller feltarbeid. Ytterligere opplæring må derfor

tilbys på lavere nivåer, men dette ser ut til å være et helt frivillig system uten veiledning eller tilsyn fra nivå 1. Dette medfører enda mer risiko knyttet til tverrfaglig arbeid. Denne uansvarlige delegering av ansvar overføres på lignende måte til lavere nivå, noe som resulterer i en sikkerhetskultur som oppleves frivillig og generelt uoppfordret, ikke håndhevet og ofte ukompensert. I praksis blir sikkerhetsprogrammer ofte utviklet på gruppenivå og mister ofte informasjon eller må gjenoppfinnes når midlertidig personale de er avhengig av forlater, under forutsetning av at gruppen i det hele tatt bestemmer seg for å implementere et sikkerhetsprogram. En lignende manglende ansvarlighet kan også finnes når det gjelder rapportering av sikkerhetsproblemer. Selv for offisielt rapporterte problemer blir mange stående uløst og uten respons, spesielt når det kreves svar fra høyere nivåer; for hendelser som kan håndteres på lavere nivåer, har det vært rapportert at ansatte blir bedt om eller presset til å ikke rapportere hendelser. Dermed blir den eneste sannsynlige responsen til den ansatte negativ.

Komiteen har også identifisert flere og mer spesifikke problemområder. Lagring, bruk og avhending av kjemikalier er problematisk på tvers av fagområder, med felles utfordringer som inkluderer adekvat lagringsinfrastruktur og tilgang til kyndige eksperter. Risikovurderinger mangler generelt tilgang til rettidig og/eller ekspertvurdering når de i det hele tatt blir utført. Sikkerheten under ekspedisjoner og feltarbeid varierer betydelig mellom grupper, men spesielle områder som bør nevnes er behovet for mer feltspesifikk opplæring, inkludert førstehjelp og bruk av sikkerhetsutstyr. Både i felt og på campus må de som jobber alene ofte stole på venner og familie å respondere hvis de ikke følger opp forhåndsdefinerte innsjekkingstider, men disse personene har sjelden nødvendig opplæring til å håndtere slike situasjoner eller er selv ansatt ved UiT. På samme måte er det mangel på responstrening eller dokumentasjon for ansatte ved UiT, slik at ansatte ofte ikke vet hvordan de skal reagere i en nødsituasjon, noe som gjør risiko for

person- og tingskader mye mer alvorlig. Flere tema er beskrevet i den fullstendige rapporten.

Konsekvenser

UiT mangler en sikkerhetskultur, noe som gjør håndhevingen av gode praksiser enda mer utfordrende og ineffektivt på lavere nivåer. Ansatte kan føle seg utrygge på arbeidsplassen, og de som arbeider med å implementere sikkerhetsprogrammer på egen hånd møter utmattelse og risiko for karrieren med dette (ofte ukompenserte) ekstra arbeidet, spesielt når deres ledelse prioriterer tid eller penger over sikkerhet. Ineffektiviteten ved å måtte utvikle hele sikkerhetsprogram på lokalt nivå er sløsing med ressurser. Unge, lovende forskere kan i stedet velge å følge karrieren sin og ta med stipendene sine til et sted med bedre sentrale tjenester og mindre risiko for liv, helse og muligheten til å drive forskning.

Flere hendelser knyttet til sikkerhet har allerede blitt dekket av lokale og nasjonale medier, men disse har så vidt vi vet ikke hatt spesielt alvorlige utfall. Uten betydelige forbedringer av systemet er det imidlertid bare et spørsmål om tid før en hendelse vil forårsake alvorlige skader på mennesker eller materiell, som lett kunne vært forhindret. Selve hendelsen ville ha høy risiko for å skade UiTs omdømme, men en granskning av mangelen på sikkerhetstilsyn og historien med rapporterte, men uløste problemer, vil være enda mer skadelig. I stedet for å vente til etter at en hendelse har skjedd, må UiT handle nå for å redusere skader og sannsynligheten for slike hendelser.

Foreslåtte endringer

Denne rapporten har som hovedmål å identifisere problemer, og anbefaler at UiT stiller nødvendige ressurser til rådighet for å finne og implementere passende løsninger. Anbefalingene som er gitt her bør bare brukes som et utgangspunkt for

å identifisere ytterligere tiltak. UiT må gjøre sikkerhetsinformasjon mer tilgjengelig og starte med å sikre at all sikkerhetsinformasjon kan finnes på en sentral, lett tilgjengelig og godt vedlikeholdt sikkerhetsnettsted. Informasjonsflyten må starte tidlig slik at nyansatte vet hvilke forventninger til opplæring og sikkerhetsforpliktelser som stilles allerede fra første dag. Det må være et sentralt ansvarlighetssystem som sikrer at alle som jobber i en risikofylt arbeidssituasjon har fått nødvendig opplæring på forhånd, inkludert regelmessig oppfriskning. I tillegg trenger alle ledernivåer knyttet til arbeid i et farlig miljø (inkludert nivå 1) økt kunnskap og opplæring om både sikkerhetspraksisene selv og deres ansvar som ledere for disse. Sentralt tilbudt sikkerhetsopplæring må generelt forbedres, spesielt med hensyn til praktiske detaljer, risikovurderinger og hendelseshåndtering, men også ved å tilby flere typer opplæring og gjøre denne mer tilgjengelig. Risikovurderinger trenger mer støtte og veiledning, spesielt når det gjelder å gi relevant ekspertuttalelse når det er nødvendig. Eksperter innen relevante sikkerhetsområder (for eksempel kjemikalier, stråling, genmodifisering osv.) bør generelt være lett tilgjengelige for enhver ansatt ved UiT som har relaterte sikkerhetsbekymringer. Disse ekspertene bør også brukes til proaktive risikovurderinger eller revisjoner av eksisterende fasiliteter for å avdekke sikkerhetsproblemer som ellers kunne blitt oversett (for eksempel kjemisk lagringsinkompatibilitet). UiT må stille tilstrekkelige ressurser til rådighet (inkludert infrastruktur, utstyr og opplært personale) for å oppfylle sine sikkerhetsforpliktelser i stedet for å stole på ukompensert, frivillig, arbeidskraft og flaks.

Kritiske sikkerhetsroller bør ha beredskaps- og overgangsplaner, slik at ansatte ikke blir stående uten ressurser når noen blir syke, går på ferie eller på annen måte slutter. Endringer som påvirker sikkerheten må gjøres i samråd med relevante sluttbrukere, og kommunikasjons-, opplærings- og overgangsplaner må være på plass før endringene gjennomføres. Kostnadene (både økonomiske og

menneskelige) må evalueres totalt sett: sentrale «besparelser» ved å ikke tilby sentrale ressurser betales mange ganger mer ved å kreve mange kopier av dem på lavere nivå. Tilsvarende må ekstra kostnader knyttet til fravær, skadet utstyr og tapte muligheter vurderes sammenlignet med kostnadene av forebygging, selv om de kan betales av ulike nivåer. UiT må vise, både gjennom sine handlinger og sin kommunikasjon, at sikkerhet er en prioritet.

2. About the committee and scope of the report

This report has been prepared by a committee of volunteers who are concerned about the lack of an effective, comprehensive safety program at UiT. The goal is to draw attention to common underlying problems in UiT's approach to laboratory and field safety so that it can be addressed and solved systematically, rather than with the current, inefficient method of applying small patches and relying on volunteer labor and good luck to avoid serious problems.

The committee includes representatives from a variety of science disciplines who work in different types of research labs and fieldwork; several are current or former verneombud[1], and most have been involved in trying to improve or implement safety programs within their local area. The committee includes both temporary and permanent staff, Norwegians and immigrants; however, since the lowest level of English proficiency was significantly higher than the lowest level of Norwegian proficiency, and in order to make this report more broadly accessible to all interested parties, the working language for the committee was English. The committee's report primarily relates to safety at the Tromsø campus as well as sea

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1 The direct translation of verneombud is health and safety representative, but the concept does not translate as neatly. The representative is elected by employees to serve as a safeguard of both the physical and mental work environment; the representative works as a link between employees and the employers. More information about their responsibilities can be found in The Working Environment Act § 6. At UiT, a hovedverneombud is elected from the verneombud within a faculty.

and field expeditions related to the work there; many of the findings are likely to relate to other campuses, but there may be unique challenges or systems at other campuses that the committee is unaware of.

As this is a volunteer effort on top of many other volunteer efforts, the committee has not had the resources to explore every topic or to write the report in a seamless, fully comprehensive manner within a reasonable timeframe. However, we have tried to supplement our own experiences with a survey sent out to the greater UiT employee group (>70 responses with varying levels of detail; a summary is available in 6.2) as well as a review of anonymized incident reports from recent years. The report identifies some topics which are important for safety but where we are aware of our own lack of knowledge. Additionally, there have been other questions and concerns raised about topics outside of lab and field safety, but which tie in closely to the theme of safety, such as violence, harassment, building and grounds maintenance, ethical considerations, or technological security; these generally have not been considered by the committee but some may be briefly noted in the report as areas that can be considered as part of a systemic implementation of safety.

The goal of the committee was primarily to identify and bring attention to the safety issues present at UiT; however, where we have had the capacity, we have additionally tried to identify actual past and potential future consequences of the status quo. Furthermore, we have suggested some changes to address the issues, as well as draft timelines of regularly-repeating actions needed at different levels of UiT, e.g., steps to ensure employees take at the start of new employment (see 6.1). If not otherwise specified, suggestions for UiT should generally be taken to mean UiT centrally wherever possible, rather than delegated down to lower levels. These suggested actions, however, should generally be considered to be outside the scope of the committee's work and should be used only as a starting point for

when further (specifically non-volunteer) resources are committed to addressing the problems.

Committee Members

- Deanna L. Wolfson

  Department of Physics and Technology, Researcher and Group Leader

- Sofia E. Kjellman

  Department of Geosciences, Postdoc

- Marc Boomgaren

  Department of Chemistry, Postdoc and Vara Verneombud

- Janne Oppvang

  University Museum, Head Engineer and Hovedverneombud

- Eva Katrin Bjørkeng

  Department of Chemistry, Senior Engineer and Hovedverneombud

Acknowledgements

3. Interconnected safety areas

A safe working culture generally cannot be broken down into isolated issues, and deficiencies in one area can compound problems in another. Additionally, there are common topics, e.g., communication, which relate to all or nearly all topical safety domains. This section tries to address some of these common or interconnected safety topics.

3.1. Communication

Having policies and plans for safety are completely useless if the relevant parties do not have knowledge or access to that information. In our safety survey, <40% of users agreed that they could easily find safety information when they needed it. Additionally, poor communication adds significant inefficiency, leading to staff fatigue and lower research output. Some aspects of safety communication have very simple fixes and others may be more complicated, but any improvements in safety plans are meaningless without properly communicating them outwards.

3.1.1. Website

Problems and current situation

This is one of the most visible and most complained about aspects of UiT safety (see the survey summary in 6.2). Safety information is not easily accessible; the closest thing to a safety website, the HMS/HSE handbook[2], is lacking significant information, particularly in English (sometimes with blank page placeholders), and does not include links to where the relevant information can be found. It does not inform of practical obligations and how to carry them out, or of resources for safety-related issues. Additionally, login is required in order to access the handbook, but the act of logging in often redirects to a main page instead of the

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[2] HMS = Helse, miljø, og sikkerhet (manual in Norwegian); HSE = Health, safety, and environment (manual in English)

page which was originally clicked on or linked to. Users without login access, either due to not having an account or not having access to 2-factor authentication at the time, cannot access this safety information. Within the handbook, navigation can be confusing, with information under misleading tabs and non-intuitive navigational links on both the left, right, and upper panes of each page (see **Error! Reference source not found.**). Searching for safety information on UiT's main page yields many irrelevant pages such as (non-safety) course pages from 10 years ago, pages which were once useful but are now out of date, and pages with broken links. Users with safety problems have little hope of trying to find help for the incident they are trying to respond to; even verneombud, group leaders, and department heads – who should be more familiar with this information than most – struggle to find information they know exists due to a haphazard structure. Often the needed information is hidden in a completely different website or system (e.g., an external
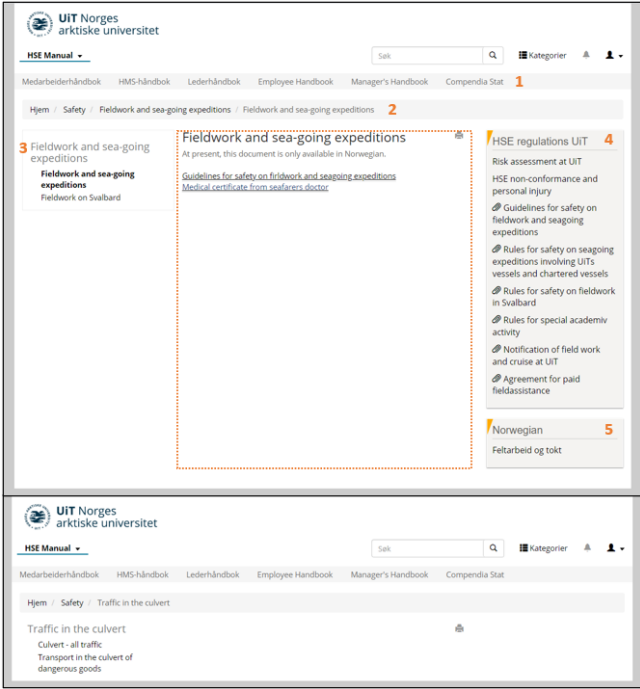
Figure 1 Two examples of HSE handbook pages, which are only available with login. In the upper example, orange numbers have been included to show five different navigation options, each with access to different information. The main text area is surrounded by orange dashes; here the main content indicates that most information is not available in English. There are multiple spelling errors in the various links, further compounding the difficulty of searching for information. In the lower example, no information is displayed in the main text area or in the right-hand navigation at all. Choosing a link from the left leads to a notice that the information is not available in English. Screenshots taken on 25 Sept. 2023.

administrative non-safety page or inside the incident report system), which may or not be searchable, and with a misleading heading or title.

Consequences

Safety policies are not followed because users do not know and cannot find out that they exist, leading to unsafe situations for users and the environment (e.g., ordering restricted chemicals, working in unsafe conditions). Significant work hours are wasted looking for information, and many more are wasted trying to create resources locally to make up for what cannot be found centrally (faculty, department, group, and PI-level support pages). Slowed incident response leads to worse and sometimes irreversible outcomes. The culture of safety decreases as users perceive that UiT does not care about maintaining a safe environment. Individuals may skip basic safety precautions to save time and effort, and staff working to ensure safety experience increased fatigue. Lacking accessible safety information may also cause negative media attention due to poor incident response or preventable incidents, as well as reduced recruitment and retention of those who value safety.

Proposed changes

Safety information should be easily findable, especially when it is needed for incident response. Users and managers should be able to go to one central, fully-accessible (no login needed) website for safety-related information. This information should be in English due to the international nature of the work. It is recommended to also be in Norwegian, but the number of users who do not

understand English is significantly lower than the number who do not understand Norwegian; regulations require that training information (which this can be considered to be a part of) be given in a language that the workers understand[3]. The safety website should be indexed and searchable; headings and structure should be well-considered so that users can find what they need easily. Links and/or contact information should be given whenever the information itself cannot be included directly on the page, and checked at least annually to ensure they still work and are up-to-date. Someone with sufficient work capacity should be assigned the duty to maintain the page, including assessing and incorporating updates suggested by local safety officials and/or users. Include a log of changes so users know if something has changed, and a list of safety contacts which includes (amongst others) who has been delegated responsibility or has knowledge of particular safety areas. The website should be accessible through an easily-remembered URL, e.g., uit.no/safety or uit.no/HSE.

3.1.2. Change planning, implementation, and employee feedback
Problems and current situation

Significant changes which affect safety routines and infrastructure are decided at level 1 without meaningful consultation with lower levels (faculties, departments, or users) to see if they are logistically possible, much less practical, and safe. For example, a central chemical waste storage facility was closed and new guidelines on waste disposal implemented immediately, but nothing was done to ensure that there were waste facilities available at each of the faculties (which can take months or years to plan and implement) or that training for all of the users was available for the new procedures; nothing was even communicated to users centrally. Responsibility was delegated down to lower levels for proper waste disposal with

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[3] [Forskrift om organisering, ledelse og medvirkning § 8-1 Gjennomgående krav til opplæring](#)

some training for those designated as contacts, but only minimal training was provided to these new contacts with no requirement that they have the background knowledge needed to ensure the new waste disposal is done safely. With better advance notice, faculties could have come up with their own response plans or suggested alternate ways of implementing a new system, or at least alerted level 1 to the challenges of the new system they may not have been aware of.

There seems to be a habit at UiT level 1 to decide implementation of new systems without meaningful participation of the end-users. Both the Working Environment Act and additional regulations require employee participation, including that the employer must ensure that participation is given[4]. Other examples of this are the implementation of the deviation system (at UiT called CIM) and the new chemical inventory system. Generally, end-users aren't consulted about problems, solutions, or changes, even though they are those most impacted and most familiar with the actual work being done. Additionally, changes don't seem to include good plans for how to communicate them and how to train the users, which further hampers the ability to actually implement the new plans. When training is offered, it is primarily to super-users or delegates, who are then left to train (or not) regular users in their own time and without training materials provided.

However, changes asked for by lower levels are routinely ignored; these include requests from individual users, those raised through verneombud channels, through incident reports (see also 3.2.4) and through department or faculty administration. Even small, easy-to-implement changes are ignored: as an

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[4] Arbeidstilsynet's guidance on employee contribution; Arbeidsmiljøloven § 3-1; Forskrift om organisering, ledelse og medvirkning § 2-1

example, during the pandemic, there were broken links and missing or incorrect translations on the English version of UiT's corona virus page. One of this committee's members provided corrections, some of which only required copying and pasting by someone with website access. However, even with the faculty's HSE advisor following up multiple times with those responsible for the site, the same information was still missing or incorrect several months later. Unsurprisingly, larger issues have had even less of a response from upper levels of management; indeed, this is a driving reason for the formation of this committee. Several committee members have been trying for many years to resolve issues which cannot be fixed at the local level; some of these may have appeared as consequences in incident reports, some have been discussed with verneombud and with hovedverneombud, some have been raised with department heads and administrative leaders, and some with all of these. The most common response seems to be none; the second most common is likely 'I will have to look into it' followed by no response. UiT has additionally been without a coordinating hovedverneombud for approximately a year, even further reducing the ability to actively participate in feedback and change processes at UiT[5]. Currently, it appears that employees have no working route by which to provide feedback on their working environment, much less a route to work together with the university to implement larger, meaningful changes.

Consequences

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[5] This is a further example of a dysfunctional feedback mechanism. Due to lack of support and effective systems from UiT, the role of verneombud and hovedverneombud are already significantly larger than what UiT is currently willing to pay for. The role of coordinating hovedverneombud across the faculties is even larger, thus none of the current hovedverneombud are willing to take the role as it is currently prescribed by UiT, at least in part because it would effectively require working a significant amount of unpaid, uncompensated time. Despite requests for additional personnel hours to be budgeted for the role, and the same role being full time at other Norwegian universities, UiT has not taken corrective action for about a year, leaving UiT's employees without an effective verneombud support system.

Policies and systems exist which are impossible or impractical to apply. This creates a culture of disregarding rules and policies. Unsafe conditions appear due to removal of safety features before their replacements are confirmed to work. Known problems continue without improvements or resolution for years, which can and has led to increased injuries and incidents at UiT. Serious safety problems are unlikely to get fixed until after a major incident has attracted significant negative attention from either the media or a government agency, leading to much more serious direct and indirect consequences. Arbeidstilsynet [6] may impose penalties both for specific incidents and for lack of participation or response. Staff fatigue increases due to having to develop workarounds for non-functional systems, and an adversarial relationship may develop between employer and employee with continued lack of response to feedback. Opportunities for better safety systems and increased efficiency are missed, and staff recruitment and retention become more strained.

Proposed solutions

When developing a new system or policy, survey users to find out what the pros and cons are of the current system, and to see if there were any hidden factors that should be considered. Discuss, and potentially test, proposed changes with a small but representative group of end-users, and adapt as needed before full implementation. Include key persons who are familiar with the old system and can bring valuable input on behalf of the end-users, such as verneombud, end-users suggested by verneombud or employees who have previously proactively provided feedback on related topics. Develop a training and communication plan for changes before implementing them. Consider the efficiency of the changes not just in direct costs (i.e., to level 1, or whichever level is implementing it), but

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[6]Arbeidstilsynet is the Norwegian Labor Inspection Authority: a government agency tasked with protecting the work environment.

throughout the full chain down to end-users; costs can include personnel hours, money, space, etc., and should especially consider impact to vulnerable groups (e.g., pregnant women, temporary employees). Develop a training and communication plan for changes before implementing them. Some elements in this plan could include publishing a list of changes and dates on a central safety website, similar in style to software version updates; additionally, disseminate announcements similar to those currently produced by UiT's IT services[7], which would include the topic, who it applies to, details of what is changing and when, resources for adapting to the change, and contact information for any resulting questions. Develop and deploy a system for listening to and implementing employee feedback, including sufficient resources to effect changes.

3.1.3. Interdepartmental and cross-disciplinary work

Problems and current situation

Rules, procedures, guidelines, and enforcement of each of these vary across departments and faculties, without much transparency in where a rule is coming from or why it exists. Training and guidelines from one faculty may come with assumptions of basic knowledge common to its disciplines, but be insufficient for those with a different background, thus causing problems when someone changes location either temporarily or is hired in a new position. This has been particularly apparent when samples are shared across faculties; some examples include 'harmless' biological samples in PFA[8] which were then handled without proper protective equipment; and transfer of genetically modified material (GMM) without confirming that the receiving facilities were approved for and

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[7] Example of a useful IT announcement
[8] Paraformaldehyde (PFA), is a hazardous chemical commonly used in biological sample preparation; this has several times been confused by those outside the field for PBS (phosphate buffered saline). Biologists use many TLAs (three letter acronymns) whose meanings are not nearly as clear to other disciplines.

knowledgeable in handling GMM, and without the receiver actually knowing that the sample was genetically modified. Waste handling procedures are different, with some departments autoclaving all or most of the yellow risk waste containers as routine, and others almost never, with users typically unaware of the difference. Lack of enforcement or training in regulations has led to frustration on both sides; various forms of 'we do this all the time in our department' and 'I've never even heard of this requirement you are insisting on' are unfortunately common to hear. With a lack of relevant, visible, and enforced university-level safety guidelines and procedures, it is difficult to tell what the common assumptions and practices are across disciplines.

Additionally, cross-discipline risk is difficult to assess, particularly when only one discipline is involved in the assessment, and/or when a group is newly branching into a field. In the examples above, physicists, mathematicians, geologists, and computer scientists, amongst others, would generally not be expected to have knowledge of how to identify GMM or PFA and flag them as hazardous; yet UiT scientists in these fields are increasingly becoming active in projects handling just such hazards, and UiT itself is encouraging additional cross-disciplinary work. Despite its prevalence, UiT is lacking training, guidelines, and resources to address these challenges. For example, risk assessments are currently, in the most generous scenario, handled at the department level, with no requirement to be evaluated by someone knowledgeable in the relevant fields; in practice risk often does not seem to be considered when sharing facilities, materials, or samples across disciplines.

Consequences

GMM mishandling which requires reporting to Helsedirektoratet[9] has already occurred; thankfully the incident was relatively minor, but future incidents could easily be more severe, leading to release of hazardous materials into the environment, regulatory sanctions, and severe damage to the public's trust in UiT as an institution. Injury, illness, environmental damage, and all other consequences of research work apply here as well; the cross-disciplinary challenges that currently exist at UiT increase the likelihood of incidents and decrease the likelihood of proper response in the event of an incident, effectively acting as a risk-multiplying factor for all other hazards. There are additional stress and career risks added to those who are seen as creating unnecessary work (i.e., following guidelines not followed by other departments) and jeopardizing new collaborations. The lack of support facilitating interdisciplinary work makes UiT less competitive for NFR (Norges forskningsråd) and EU funding, and reduces recruitment and retention of talented researchers. UiT students miss out on cross-disciplinary opportunities, putting them at a competitive disadvantage compared to institutions with an integrated approach.

Proposed changes

Training for all lab and field employees should include basic information on how to identify if more training is needed (and available) or if regulations or policies apply; examples include cell culture, genetic modifications, ionizing radiation, animal work, fieldwork, hazards requiring annual reporting etc. Employees should be able to find all safety courses listed on a single page with a short description of what is covered in each, so that even those from a different field can easily see if it is applicable to them. Additional courses should be offered, both for safety and for background knowledge for those from another field. Some of this could be

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[9] The Norwegian Directorate of Health; one of their roles is overseeing usage of genetically modified material.

achieved by simply opening up training already available in some faculties or departments and advertising them in a central location, e.g., as an additional part of a safety training page; alternatively, those with experience working with and teaching those topics could be hired (or provided salary support) to provide the training more centrally as needed. Examples where this could be used are cell culture and sterile handling, genetic modifications, autoclave use, animal work, cryogenic material, machinery (saws, lathes, etc.) and many more. Training should be provided by those who have a background and experience working with those topics, and can provide practical advice. Similarly, UiT should support a central panel of experts who can advise on cross-disciplinary risk assessments; this group should be easily accessible to all employees who have questions about risks related to their current or upcoming work. UiT should evaluate their guidelines on risk assessment and update them to account for interdisciplinary risks. Training should improve such that anyone giving or receiving material to another will actively inform or ask about the risks of the transferred material in advance. At the Department of Physics and Technology, incoming biological samples need to be registered in advance using a form[10] which effectively functions as a simple risk assessment; this form has successfully prevented multiple risky situations where receivers did not understand the risks or have the proper safety training for the incoming samples, and provided clear documentation during a routine Helsedirektoratet GMM audit. While the form may not scale for every group or department, it could be used as a starting point for cross-disciplinary material transfer risk assessments for elsewhere at UiT.

UiT should consider a strategic plan for improving cross-disciplinary work which also includes training and safety considerations. UiT already has many resources

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[10] [Biological sample registration form via Nettskjema](#)

and strategies related to interdisciplinarity, such as the Aurora Outstanding and Strategic Funding programs, several research centers (e.g., iC3, CANS), and many researchers with significant successful track records in interdisciplinary work. However, many of these have had to develop their own infrastructure and strategies to deal with interdisciplinarity, and the knowledge may be institutionally lost when projects are phased out and employees leave; it is also inaccessible to many others outside of those specific projects. UiT should seek to integrate and disseminate this knowledge, and to support the development of future cross-disciplinary collaborations and education; safety training is one aspect where this can have a significant impact. Proactive training in cross-disciplinary communication will additionally reduce safety risks.

3.2. Accountability, enforcement, and documentation

3.2.1. Culture of safety

The lack of central awareness and guidance towards safety leads to a contagion effect downwards in the UiT system. This creates a poor culture of safety and a lack of 'safety-thinking' in everyday work life. The blame for this culture may easily be placed downwards in the system, however all changes must be made from the top, showing that this is something the organization values and prioritizes. Instead, the most visible and basic central safety resources at UiT send the opposite message, with e.g., safety training insufficient and inaccessible; safety procedures and resources challenging to find, fragmented, out of date, irrelevant, and often not in English; and documentation and enforcement of policies and training almost completely nonexistent, much less visible. Safety is frequently left to the lowest levels to implement without necessary resources or authority; temporary employees acting as lab managers often have to choose between enforcing time-consuming safety procedures in their lab or keeping the PI who pays their salary happy. Even in friendlier, more stable environments, strain is added when one colleague wants to have a safe working environment with

everyone following safe working practices and other employees don't see the value of all the practices, particularly while UiT itself doesn't care enough to check or even offer training for much of it. UiT does not appear to have mechanisms or resources to enforce safety policies. For example, no consequences are spelled out for users or available for managers for even repeated, willful breaking of policies outside of those that would cause immediate harm to life[11]. UiT's current culture puts the most strain on those working towards a safe work environment; we need to shift the culture so that the burden is instead placed solidly on those who work against safe practices.

3.2.2. Documentation of training

Currently there is no common, central system for ensuring and documenting that an employee/student has undergone needed safety training before starting their work in a laboratory or in the field. Lab managers and leaders are not even given access to check if their employees have completed the training courses which are documented by UiT, e.g., courses run through Canvas or requiring central registration. This means that it is difficult to impossible to enforce required safety training before access is given to a lab or fieldwork approved. No template is provided to groups or departments for tracking required training, nor is there any check from higher levels that lower levels are ensuring documented training. Asking employees directly about their own safety training, even with a complete assumption of honesty, is prone to errors due to misremembering or renaming of course titles and what material they covered; e.g., 'HMS-0501' sounds very close

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[11] While a temporary work stoppage can be ordered for activity immediately likely to cause harm, it is not clear that this would apply to cases with less-immediate harm (e.g., exposure to chemical vapors which increase the risk of cancer), cases which would lead to damage to equipment, or cases which negatively impact other employees' work (e.g., ruining the results of an experiment or requiring an engineer to spend hours cleaning up after them). There is also no mechanism for enforcing a work stoppage, as current policy does not allow lab access to be removed without a lengthy administrative process.

to 'HMS-0502' particularly when several years have passed since they were taken; and many employees will have remembered taking 'the standard safety courses'. Course material changes and should generally be refreshed after a period of time, but without records it is easy to lose track of when the last time a course was taken, or for a department or faculty to automatically recommend refresher training to those who haven't taken refresher training within a designated timeframe.

3.2.3. Regulatory tracking and approval

Multiple types of work at UiT have mandated tracking and/or require notification or approval from government agencies for that work. Examples include tracking exposure to certain hazardous factors, such as mutagenic chemicals, or pre-approval for labs which will be handling biological factors. However, UiT does not seem to have a good overview or good communication about what these areas are. As an example, NT-Fak annually sends out a form for those who have been exposed to certain hazards, but it asks people to report information from the preceding year (or more), which is often too late to check as conditions or storage locations may have sense changed; NT-Fak also only recently realized that working with biological factors (biosafety level 2 or higher) required government approval, not just internal UiT notification.

At a minimum, basic safety training should proactively alert users what topics require tracking, notification, or approval, so no one inadvertently begins working without them. However, UiT should also provide supporting information and resources for those working in these application areas, and templates or models for tracking and approvals which are done at the local level. They should implement process controls, such as automatic flags when requesting a purchase order for supplies or equipment related to one of these areas, and notifications from the chemical inventory system for anyone approved to be working in the same physical area as a regulated chemical is used. UiT should keep a central

system of all approvals or notifications, so that it is easy to check (by any employee working in or near an affected area) if a certain lab or process is approved. UiT should proactively conduct internal audits to ensure documentation and approvals are in order.

3.2.4. Incident reports

Implementation of an incident report (avviksmelding, also called deviation report) system was long awaited. Students and employees have gradually gotten used to reporting incidents, however there is a long way to go until all incidents are reported. For all to be willing to report incidents it is important that all incidents are taken seriously, that feedback is given, and action taken, and for those that report incidents to be protected from retaliation for reporting; these areas still seem to be in need of improvement. Many incident reports have still not been resolved even after a year, even for those which are likely to have the problems reoccur. Employees and students report a lack of feedback and response especially when the incident is reported from level 3 and action should be taken from level 1. Some examples are the lack of campus lights and slippery roads and walkways in wintertime. Many employees and students also seem to be met with negativity from their leadership when reporting, including being told that they should not report incidents; this obviously leads to greater hesitation or resistance to reporting. Others are not aware of the deviation system and how to report. Instead of submitting a non-conformance report, they turn to their nearest leader or the local administration directly. In this way, reported issues are not documented properly and risk being overlooked or not delegated to the right person; patterns may be missed due to the lack of documentation, and useful details from incidents may also be lost when reported by a second or third person in the chain.

It is also not clear to users who will be receiving or having access to the reports, much less the responsibility to follow up. This may lead to even lower reporting, for example if reporting a problem with a specific person or something which the reporter was told to ignore or not report. It is also hard to tell if the problem is being followed up on; sometimes the only responses someone will get are automatic out-of-office replies, particularly in the summer, with no indication if someone who is in office has also received the message. To the committee's current knowledge, department heads only are informed about incident reports in their area after redirection from faculty advisers, leading to potentially significant delays in response during holiday or other absence periods, and a lack of ownership of the problems by the departments responsible for resolving them. This is particularly problematic for issues which need an immediate response. Even those who do have access to reports may not know of their access and responsibility to follow up, as there does not appear to be a clear plan to teach those with leadership roles how to check and use the system.

3.3.   Training

Employees frequently lack sufficient training. In our safety survey (summary available in 6.2), one fifth of the respondents answered that the UiT safety training does not (partly or fully) prepare them to work safely in the laboratory or in the field. This is an alarmingly high number, showing that the safety training is not good enough and in need of revision. Due to a lack of routines (either not existing or not enforced), employees new to UiT are not regularly informed about courses they are required to take (and if/how often they need to be refreshed), where to find information about HSE routines, or guidelines for working safely. In practice, this is left to supervisors and project managers, who also sometimes leave it completely to the new employee to inform themselves using UiT's incomplete and hard-to-navigate web resources (discussed more in 3.1.1). Many supervisors also lack the knowledge to properly train new employees, particularly if their training

was through the same insufficient system or if their own individual work is different from their employees'; other supervisors don't see safety as a worthwhile time investment and may skip over some or all aspects of it in favor of additional research time. This results in employees who often do not know and thus cannot fulfill legally- or UiT-mandated safe working practices. It leads to frustration and a lack of trust with new employees, a reduced-safety working environment for all employees, development of hard-to-break bad habits, and a culture which prioritizes research results and timesaving over safety. This in turn will reflect badly on UiT in the event of an accident or an emergency. UiT needs to increase the understanding of HSE needs and requirements at all levels of UiT, so that leaders understand both the practical aspects of the work being done and know what their responsibilities are for HSE in their given role.

As it is currently, delegation of core safety training to lower levels results in important factors being overlooked, even more so when training responsibility is passed from temporary employee to temporary employee as is common practice. Local training done by someone who is not employed in a safety capacity often lacks breadth, instead focusing on what the individual remembers and/or is familiar with from their own long-ago training or on recent experience. Creating a new comprehensive training program takes a significant time investment which temporary academic staff don't have; those that do invest it thus jeopardize their own research career to cover a responsibility which UiT should be centrally responsible for. It is even more inefficient because each individual at the local level needs to learn to teach multiple topics outside of their core competency, instead of having someone or a small team who are already dedicated experts in safety and training produce higher quality, more comprehensive and effective training centrally and in less time. This material then doesn't need to be completely reinvented by the next individual after the end of a short-term (often 2-3 year) employment contract.

3.3.1. Availability and accessibility of training

Problems and current situation

Even when a person knows about and wants to take safety courses, they are often inaccessible. Online training currently requires a Feide login, which can sometimes take months for new employees to receive, and for short-term visitors (who are also required to take the courses according to current UiT policy) is effectively unavailable. Even with a Feide login, the online courses require registration through EVUWeb, which can have a delay of multiple days and appears to be buggy or uncertain in its response and delays. In some cases, Feide login does not work, and/or relevant and mandatory courses are missing, and employees have to contact IT services and/or the admission service to be signed up to courses manually. The practical steps of how to register and access the course afterwards are not clearly laid out, and new employees have trouble navigating the steps of sign-up which are only in Norwegian. After registration, there is no immediate email indicating where to access the course, what to expect next, or when the employee should expect to hear about the next steps; this information also isn't on the safety training website. The new employee is left in limbo, not knowing whether their registration was successful, if they should wait, contact someone for help, or try to access the course another way.

Once an employee does manage to register and get access, the basic safety course has had problems with important images failing to display (e.g., hazard identification signs), and the English version of the quiz has at least one question where, due to a translation issue, the officially correct answer is different from the apparent correct answer. 100% is required to pass the quiz, but since the person taking it is not told which answer they got wrong, this has led to random guessing on multiple questions (usually changing some right answers to wrong for a few iterations), which can lead to confusion on what the actual policies and safe practices are.

In-person training generally has an availability problem; e.g., first aid training is required for all employees working in a lab or in the field, but the number of training slots available (especially but not only in English) is far lower than the number of employees who need the training, particularly if the courses are to be repeated to keep the knowledge current; the availability has increased in recent years, but is still insufficient if everyone working in the lab or field should have this training. As another example, a recent announcement for a compulsory seminar was sent to over 450 people, but all the timepoints combined only allow for a maximum of 200 participants. Other courses (e.g., laser safety) are only offered once or a few times a year and are poorly announced, officially meaning that some new employees should not be doing the job for which they were hired for almost a year after they start, and current employees lack resources to learn about working safely in a new area they are starting to research. Examples like these undermine UiT's credibility on what is actually mandatory and what they expect of their employees when it comes to safety. The solution cannot just be to move all training online to increase accessibility, as experience in using equipment and spaces is needed for effective learning, and may be additionally required by Arbeidstilsynet[12].

Additionally, UiT is missing centralized safety training on important topics, such as cell culture work or first aid for fieldwork. This puts a much higher burden on local safety training and makes interdisciplinary work much less accessible, as those looking to move into another field lack the resources to do so safely. However, since local safety training is not enforced or supported centrally, it is generally left to each individual PI, some of whom see it as important and others who see it as something that takes away time and possibilities from their own research.

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[12] Some information about general training requirements including both regulations and Arbeidstilsynet's commentary on those

Furthermore, it is unrealistic to expect every PI to be an expert at assessing and training risks on every aspect of cross-disciplinary work, or most areas outside their core competence. Thus, they are likely to miss certain risks unless externally alerted to them as well. A physicist with a general understanding of biology is likely to miss risks of working with human samples, genetically modified material, or antibiotic resistance transfer, for example, unless specifically trained for it. Many departments work with hazardous chemicals, but most outside of chemistry can easily miss inherent hazards to working with those chemicals, for example choosing the right glove material. Training in these risks should therefore come from someone with specialized knowledge in the field, and not just be passed down from person to person, losing more information with every step in the chain.

A further issue is how to handle visitors and short-term guests. Guests can be at UiT anywhere from 1 day to 1 year and have a need to work in our labs; indeed, that is often the point of these visits. Current UiT policy requires that a 1-day guest attend the same mandatory safety training as UiT employees, which in total lasts longer than 1 day, if the guest can even get access to it in time. There is no system for recognizing safety training they have had elsewhere, for providing abbreviated training for the short visit, or for approving work under supervision of a trained individual. Similarly, UiT does not appear to offer certificates for many of its safety courses that an employee could offer to a host institution where they may be a guest; HMS-0502 is one exception, but the topics listed on the certificate don't provide a completely accurate view of the material that was covered. While there are hands-on and practical exercises for some topics, others are only briefly mentioned in passing; this can cause serious issues if a supervisor is relying on a student having those critical skills in an emergency situation. This is particularly problematic for fieldwork, which no longer has supplemental topical first aid courses available, and for which professional emergency help may take significantly longer to arrive.

Consequences

The consequences are often that personnel start working in a laboratory or in the field without having the necessary formal training, thus may pose a potential risk to themselves and others. This also signals to the outside that UiT does not take HSE seriously and that HSE work is mainly up to each individual, if they choose to take an active role in it at all. Employees cannot be certain that they are working in a safe environment even when they are responsible themselves, as they can have a reasonable expectation that those working around them are not fully trained or working in a safe manner. Safety comes second, or third, but certainly not first in this setting. Employees participating in field or cruise work may not have the knowledge to sufficiently treat injuries that arise in remote areas, and may suffer permanent damage or even death before professional help can arrive. Injuries or damage caused by lack of training may also result in sanctions from Arbeidstilsynet as well as damage to UiT's reputation for events covered by the media.

Proposed changes

Make safety training accessible without a UiT login, and include a link to the training in the employee welcome/hiring letter. Increase the number of available courses, both in quantity (e.g., first aid) and topics (e.g., fieldwork, biology), plus improve existing content to improve relevance and accuracy; availability of these courses should also take into account the language needs of both new and existing employees. Have a notification list where people can sign up to be notified when new classes are scheduled for the modules they are interested in. Routinely seek out and respond to feedback regarding what additional topics should be centrally covered; feedback should be received from all different levels (students, regular employees, lab managers, verneombud, department leaders, etc.). Provide guidance on what training guest researchers actually need to work in our labs; this

may be an area to cooperate with other Norwegian universities on in order to recognize common safety training programs. Ensure that course descriptions are accurate and consider adding certificates or other documentation that can be used by UiT employees as evidence of training when they are working at another institution, or even just another department within UiT.

Create good routines including a regular, centralized enforcement method to ensure that all new employees who will be working in the field, labs, or in other risky conditions receive the information they need about courses, HSE routines and safety guidelines *before* the work begins, and that this information is refreshed at regular intervals for all employees. Faculties, departments, and their verneombud should get regular, actionable reports about how many of their employees have not met all of the training and refresher requirements. Allow lab managers to easily check if someone has completed the required training modules required for access to their lab.

3.3.2. Incident response training

Problems and current situation

Employees are not sufficiently trained in how to practically handle even mid-level incidents, much less serious emergencies. There is much uncertainty about who to even call in the event of an emergency – standard emergency numbers (e.g., 110), UiT's emergency response number, Avarn (or other security company), or someone else entirely? For lesser injuries or possible exposures, there is similar uncertainty: walk over to the hospital (if on the main part of campus in Tromsø), go to urgent care (legevakt), make an appointment with the regular doctor (fastlege), contact the occupational health service (Hemis), call poison control, contact the lab manager or supervisor, or…? Both employees and supervisors are lacking training in what to do with more specific but critical cases; for example, UiT already has had at least one incident where HIV testing was not offered fast

enough after an accidental needle stick, missing the important window where preventative treatment could have been offered. Employees have generally not been trained to think through actual serious incidents and the practical steps that would follow. Even if they know the general steps, they are unsure of the specific implementation (e.g., which number to call) and how to prioritize which specific actions to take first, second, and third; this becomes even worse during the stress of an actual emergency, and is further compounded by the inability to find information on how to respond on UiT's website. In our safety survey (summary in 6.2), there was also a request to include training on procedures to follow in case of accidents in the field and how to contact help.

Employees and managers are additionally lacking information on the steps to take after the immediate resolution of an incident, as also mentioned in the section on incident reports (3.2.4). Information is missing regarding follow-up care, including the availability of medical evaluations or psychological treatment and who is responsible for organizing those, as well as practical and administrative follow-up, including how to get reimbursed for costs related to the incident (e.g., taxi fare for legevakt visits, doctor fees, damaged clothing) and who is responsible for filling out incident reports. There is no apparent system in place to notify others who may have been unknowingly exposed to hazards from either emergency or past ongoing conditions; for example, notifying lab users that bottles of chemicals were found to be leaking hazardous material for months or years[13]; this was also visible during the early stages of the pandemic when exposure notifications happened too late to prevent subsequent transmissions and without sufficient information to determine if someone had been an area of possible exposure.

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[13] This situation is not just theoretical – it has occurred multiple times in the last few years at UiT, including in different faculties.

The committee notes that students in clinical practice (e.g., medical, dentistry) have additional serious risks of adverse events with patients, such as being attacked or patient decline or death during treatment; the committee does not have knowledge of current UiT or UNN training or procedures regarding these events, but would like to emphasize the importance of having clear training and support plans for these apparently common and potentially traumatic incidents.

Consequences

Improper and delayed response can lead to significantly increased damages and injuries. Insufficiently trained employees may seek treatment at the wrong location, which may not have the expertise to treat their injury, or even worse, not seek treatment at all if it 'seems' minor and is too confusing or stressful to figure out what they should do. Mitigating steps may not be taken, e.g., removing rings after a burn before the fingers swell, removing contact lenses after chemical splashes to the eyes, or screening for cancer after increased exposure. Similarly, uncertainty about who will pay can affect the decision to get faster treatment (taxi, doctor fees) or take action which can damage personal belongings (tearing open clothing to treat an injured area, abandoning backpacks to get faster treatment, or falling in a worse direction while trying to protect electronics from being smashed in a fall). Some actions may be taken which make the situation even worse, such as getting two unconscious people when one tried to rescue another from hazards they were not sufficiently aware of or capable of handling (gas, electrocution). Overall, short term sick leave and permanent disability or illness are likely to increase, both from direct injury and from increased stress. Costs may also go up from having to reimburse for inadvisable expenses or from damages which could have been minimized with a better response.

Proposed changes

Update current training and safety website to have clear and easy-to-find information on what steps to take in an emergency. Include specific contact information about who can help with which situations (a long list of generic contacts can add to confusion and delays under stress – be specific). Follow-up steps should also be clear, including reimbursement for expenses. Include this information in regular refresher training, and, whenever possible, include interactive simulated emergency situations as part of in-person safety courses (e.g., 'you see a colleague get electrocuted; show us what steps you take next'). Add a mitigation plan as part of the risk assessment, ensuring that employees not only assess the risks associated with their work but also know what to do if an accident should occur.

3.3.3. Refresher training

Problems and current situation

Proper responses to crisis situations, as well as everyday good routines, are far more likely when training on these has been recent and up-to-date. Therefore, it is important to repeat HSE courses at regular intervals. According to our current knowledge, there is no requirement at UiT to take refresher courses at all. If there are such requirements these are not communicated to students and employees. Regulations require training to be repeated when necessary, and Arbeidstilsynet notes that this especially applies when there are changes in the work[14]; in an academic and research environment, change is highly likely.

As far as we know, the documentation of initial training completion varies across faculties and departments; some do not seem to track it at all. The use of simple Word and PDF lists in SharePoint is one form of documentation. Without this proper documentation, tracing back which courses a specific person has

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[14] Forskrift om organisering, ledelse og medvirkning § 8-1 Gjennomgående krav til opplæring

completed and when is difficult, and thus knowing when to recommend refresher training becomes even more challenging.

Consequences

Lacking documentation leads to an uncertainty of who has gone through the training and when, and takes excess time to trace backwards when this documentation is needed (e.g., for access to another department or during an audit). Without refresher training, more senior employees can easily miss changes in rules, regulations and best-known practices.

Most importantly, by not regularly reviewing safety information employees can easily forget, thus either creating dangerous situations or not knowing how to react during an emergency, which can be the difference between e.g., a small fire and an entire building being damaged, or between a temporary injury and lasting major disability or even death (as described above in 3.3.2).

Proposed changes

A centralized digital system with registered completed HSE courses and a reminder function for refreshing HSE courses would save a lot of time and enable interdisciplinary work in different buildings. Furthermore, it would create clarity in insurance-related matters in cases of damage caused by lack of specific knowledge of the person(s) involved. One possibility to explore would be integrating it with university human resource software which already has documentation and records for each employee, e.g., DFØ. If technically possible, a solution would also need to be found to include guests, students, and others not already in DFØ. At a minimum, the university should have a systematic way of checking that each subunit (faculty, department) has a list of their own employees which is checked

annually to ensure that everyone with lab access has taken the required courses and that fieldworkers have received sufficient training.

Significant changes in university policies, resources, or infrastructure should have a plan for retraining the relevant parties as part of its implementation plan, including the resources (particularly employee time to develop and carry out training) that will be used for this. A list of smaller changes should be kept centrally to include in the next refresher training. Similarly, UiT should have a feedback mechanism for requesting additional topics or details to be included in training; these suggestions should be evaluated and then incorporated into refresher training or basic safety training as relevant. One example is to specifically mention how long eyes should be washed after chemical exposure, as the first aid course only said they should be washed, but did not stress how long (typically 15-20 minutes, which is longer than most would likely do on their own without being trained on this detail).

3.3.4. Risk assessment training

Problems and current situation

Risk assessment (also discussed in 3.4) is a fundamental component of risk mitigation. General instructions and examples are part of the HMS-0501 course, but more specific training is needed to ensure that the training is relevant and sufficient. This training should, as one component, include how to read and understand a safety data sheet (SDS), as it is a critical skill needed for many risk assessments. Training should also cover cross-disciplinary work, including how and where to seek external advice, and how to be aware of your own blind spots. Some but not all departments have different types of assessment templates adjusted to fit the tasks most relevant for their core research, but generally there aren't training plans on how to use these, and they may not match well for all research or field tasks. Preliminary risk analysis (PRA) should also be part of UiT's

risk assessment training, as it functions as a background document and support for the risk assessment. As for now, it is not always known that this document exists or where to find it. There is generally confusion on the difference between multiple types of risk assessment documentation, such as with PRA and safe job analysis (SJA), and when one should be used over another or if multiple types should be used. Risk assessments are currently viewed by many to be laborious and not useful; however, when done correctly they should be highly relevant and useful, and in many cases do not necessarily require significant time investments. A further issue is the lack of clarity on whether risk assessments need to be approved before use and by whom; requirements for them to be available to anyone working in the same laboratory do not seem to be well known.

Consequences

Without training it is easy to miss important risk factors, and employees might miss that they are expected to fill out risk assessments if it is not presented as an essential part of the preparations for risky work tasks. The current inefficient approval process in some departments can help catch some risks which were missed by the original employee writing it, but the lack of training of employees combined with lack of resources (especially time, but also knowledge of the included disciplines) results in excessive time to approval, often with multiple slow back-and-forth exchanges wasting significant time.

When tasks are not risk assessed or when the risk assessment is poorly done, accident likelihood and seriousness are increased, and the potential for regulatory breaches is raised. Risk assessments combined with oversight have prevented problems such as mixing incompatible types of chemical waste, handling GMM without realizing the risks and regulations, and the release of dangerous (to animals, if not humans) biological factors. They also reduce the severity of consequences during incidents, for example by storing combustible materials

away from emergency exit routes. The occurrence of serious incidents which could have been easily avoided with a simple risk assessment will reflect very negatively on UiT in the media and in academic circles; not providing oversight resources for cross-disciplinary work to prevent risks easily noticed by those in other disciplines will also be viewed very poorly. No matter who wrote the risk assessment, this is an employer responsibility (arbeidsgiveransvar), and UiT is ultimately responsible.

Proposed changes

To ensure that employees know how to properly assess the risks related to their specific work, training in how to complete and document risk assessments should be provided as part of the safety training and should be refreshed regularly. The PRAs should be reviewed and updated at least once a year; this work should include those working in the safety area and the verneombud; central experts should be available to consult on relevant topics such as chemicals, cruises, animal work, GMM, and so on. This work could be combined with refresher training to make both even more effective and relevant. The responsibility for assessing and approving PRAs and SJAs should be formalized as part of someone's position, with sufficient time available for this task; risk assessments and other relevant individual safety responsibilities should be explicitly stated to be part of every employee's work duties (including e.g., PhD and postdoctoral contracts).

3.3.5. Waste management and transportation training

Problems and current situation

Proper disposal of hazardous chemical or biological substances can be a demanding task. Until around mid-2022, departments that produced smaller amounts of chemical waste had disposal primarily handled centrally by a single person at UiT, both practically and administratively. Waste producers only had to provide information about the waste content and any potential hazards

associated with it. However, as of the beginning of 2023, this role was transformed by Level 1 into a predominantly administrative position, with little direct handling of waste. Consequently, each department was required to provide their own contact person for hazardous waste, which included responsibilities both for advising waste producers in that department, and documenting and preparing the waste for pickup. This shift has resulted in significantly increased responsibilities for waste producers and the contact persons, particularly since user training was not planned for this new system. It also has made the quality of advice and documentation highly dependent on who is available in each department to fulfill the role of contact person. Consequently, the level of basic expertise in handling hazardous substances can vary significantly between departments. So far, training has only been provided on filling out waste labels and transport documents – initially only to contact people and a few senior staff, and since then only to users in a few groups or departments. To our knowledge, no further courses have been offered to enhance knowledge about hazardous substances and danger awareness for the now more exposed contact persons, some of whom have no background and little experience working with these. Furthermore, the closing of a central chemical waste facility around the same time has resulted in individual groups and departments needing to store larger quantities of chemical waste locally and for a longer time; however, both the infrastructure and knowledge about chemical incompatibilities and storage hazards are lacking in these local environments, leading to potentially dangerous conditions. With these higher risks and decreased oversight, users need significantly more training not just on handling chemicals, but also on storing them and how to handle waste; similarly, the contact people need to be offered advanced training if they are expected to provide this oversight.

Additional topics regarding waste management that are needed but lacking in waste management are handling e-waste and mixed hazard waste, and

highlighting differences between departments or faculties. Batteries in particular are increasingly common and have already caused a few incidents at UiT; however, UiT does not appear to have developed or propagated a plan for risk management for these. Regarding mixed waste, training is lacking in how to handle both planned and unplanned mixed-hazard waste, such as pathogenic or GMM (bio) waste combined with hazardous chemicals, or either of these with broken glass, despite these being fairly common and/or predictable issues. Employees are also often unaware that different departments handle waste differently, especially (but likely not only) whether yellow waste containers are regularly autoclaved; local procedures can be confused for UiT procedures, leading to improper waste disposal when collaborating with or using facilities in other departments.

Consequences

Waste may be incorrectly labeled, stored, and/or disposed of due to time pressures or lack of knowledge or infrastructure. This can lead to chemical hazards, including fire, explosions, or production of poisonous gases; environmental hazards; and increased costs for disposal. Confusion or frustration from the process may lead some employees to improperly dilute waste to get it under the specified disposal limits for hazardous waste to be allowed to be disposed of in the drain; while it simplifies the process, dilution for this purpose is strictly not allowed and leads to much higher environmental exposure than acceptable for these chemicals. E-waste can and has lead to fires with particularly noxious fumes.

Proposed changes

Improve training on waste, both generally and within topical training modules; specify which policies and routines are local and which apply to UiT generally. Have a central person with relevant background available to provide support to users regarding waste disposal and management (not just an arbitrary person from

each department). This can be further supported by a system of local contact people, but it is critical to have someone centrally responsible and *accessible* who has the relevant background and knowledge for the role; if used, local contacts should be offered advanced training to support their roles.

3.3.6. Training of non-research personnel

Problems and consequences

Both incident reports and the safety survey indicate a need for increased training of personnel beyond those directly involved in research work. In particular, waste and hazardous material handling challenges appear to be a common theme across employment categories, from course instructors to maintenance and kitchen staff. Another problem area is access of laboratories by untrained personnel, from maintenance staff and contractors to administrators; there are many employees which are granted access to all of the rooms in a building or department without first ensuring even basic safety training or informing the lab manager, much less undergoing local safety training. The Salto key card system makes it difficult to determine the full list of who has access to a room[15], and general practices at UiT and with its contractors mean that lab managers are very frequently not notified if or when untrained staff has accessed a lab. In addition to the safety issues that come with having untrained individuals in hazardous environments, significant damage can be inadvertently caused to equipment or experiments in progress; in some cases, researchers may be led to the wrong

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[15] Some room-specific access lists are in the Salto system. However, there are many other access lists which include multiple rooms, and someone included in a multi-room access list will not automatically show up as having access to the room on the single-room list. To the committee's knowledge, there isn't a way to find all access lists which include a particular room, outside of manually checking every access list (impractical). Thus, it becomes quite difficult to get a full overview of who has access to which rooms.

conclusions if they are unaware that something may have been altered (e.g., vibration measurements, temperature or airflow changes, light exposure).

Proposed changes

Offer safety and related training to all employees, regardless of their position or organization unit. Require safety training for those teaching laboratory courses, and consider offering expert assistance for evaluating safety needs as part of course planning; this may include help with risk assessments, waste management plans, and safety training plans for students in the courses.

Develop a system to ensure that hazardous environments are only accessed by those who are properly trained. If general access will still be granted to categories such as maintenance and administrative staff, UiT should conduct systematic mapping of all laboratories and work areas to determine which risks may affect the staff who enter or what risks they bring to others or the environment with their entry. Those risks maps should be accessible and clearly communicated to those with general access, with more detail than is currently provided by the room cards/door signs; safety training covering the major risks in those access areas should be required, and rooms with specific and serious risks not covered in that training should be flagged as prohibited entry rooms without prior authorization. Consider adding new key card zones or alternative locking mechanisms to enforce this as needed. General policy should be to consult lab managers before any entry, in advance whenever possible. Consider having annual or more frequent local safety training days, where lab managers provide local safety training for any interested general-access employee (e.g., maintenance staff and department administrators). This can be combined with general safety refresher training for those same groups.

3.4.   Risk assessments

Problems and current situation

There are no established routines for submitting, checking, approving, and following up on risk assessments at UiT, something that was also mentioned by many of the respondents to our safety survey (summary available in 6.2). This gives the strong impression that risk assessments are not prioritized by UiT. Risk assessments which are being done are conducted and treated in different ways in different departments, and even department leaders are uncertain of the process. The templates given to employees for risk assessments are often provided only as inflexible standardized forms, which are often not applicable or practical in every work area, thus shortcuts are taken and separate systems are invented adding further inefficiency and confusion. It is unclear where to send risk assessments for approval and who should approve them, or if they even need approval at all. There is also a lack of routine for where the risk analyses should be stored or archived. Theoretically, they should be accessible to those who are performing the work, those who are in an environment affected by the work, and to the managerial chains of those people (both practical and administrative managers, who are usually different people). After risk assessments have been submitted, the response is highly variable: sometimes there is no approval or follow-up, sometimes meaningful feedback is offered, sometimes approval is given long after the work is completed, and in many cases, there is approval but no follow-up.

Consequences

When UiT does not prioritize the risk assessments, they cannot expect their employees to do so either. The lack of routines or predictability leads to fatigue when it comes to writing and trying to get the risk assessments approved, with the result that it is not done. Without routines for how risk assessments should be performed and processed, risks might be missed or underestimated, and more effective procedures may be overlooked. Without defining the risks, it is also difficult to have the proper safety gear ready, and to have clear instructions defined for responding to accidents. This can increase the severity of outcomes

and turn an easily addressed situation into one with permanent harm. For example, a chemical splash to the eye could have been prevented with proper safety glasses, but rinsing the eye and removing contact lenses can limit damage; without an eyewash available or if contact lenses are left in the eye during rinsing, permanent eye damage can occur. Another consequence of not having a culture for routinely assessing risk is that unsafe behavior (intentional or not) is never corrected and is thus transferred to generation after generation in the lab and in the field.

Proposed changes

There should be a common system for submission and storage of risk assessments, preferably as part of an already established system at UiT, such as DFØ or CIM. Templates for risk assessment should be modifiable at the department level, and possibly group level according to their needs; they must be relevant to the specific work being performed.

The preliminary risk analysis should be conducted by those closest to the tasks which will be performed, and should be done cooperatively such that as many risks and incident scenarios are covered as possible. Ongoing responsibility for the PRA should also be clearly delegated so it can be regularly updated. The updating of the PRA can be part of regular refresher training, and if there are changes, these should be disseminated to all relevant parties. Annual review of all risk assessments and their responsible individuals should ensure that the individuals are still at UiT and actively engaged in that work; otherwise responsibility should be reassigned and the assessment updated.

Responsibility for approving risk assessments must be clearly delegated, and with deputy responsibility to ensure that every submitted risk assessment receives a response within a reasonable time. Those who are given this responsibility should have relevant competence and experience, and be able to make a professional

judgement on whether the risk analysis is adequate or whether risks are underestimated or there are other hazards that should be included. For cross-disciplinary projects, this may mean that multiple delegates review and provide feedback on the risk assessment, and may therefore necessitate the ability to provide partial approval covering only particular topics. Risk assessment review should be budgeted for, and an appropriate number of working hours allocated to ensure these tasks are properly supported. Where employees who are asked to contribute to risk assessment approval outside of their expected work duties, they should be professionally compensated or acknowledged for this time, such that it does not detract from their ability to build their own career. Training related to risk assessments is discussed further in 3.3.4.

4. Topical safety areas

4.1.   Chemicals

Chemicals are widely used in various areas at UiT. Chemical handling and storage entail diverse and often serious risks both for the direct user as well as for adjacent workplaces. Accordingly, dealing with chemicals requires expertise, clear rules, and adequate infrastructure. Proper training for handling chemicals and the associated hazardous waste is essential, as are having an overview of the actual chemical inventory, and assessing the hazards and consequences associated with chemical handling, storage, and disposal.

Example:

In August 2020, there was a release of an aggressive chemical (chloroformate) in a kitchen-type refrigerator in a lab at UiT. NRK, iTromsø, and Nordlys all reported on the evacuation necessitated by this incident [16]. Chloroformates develop

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[16] iTromsø coverage; Nordlys coverage; NRK coverage

pressure in sealed containers over time due to their decomposition into carbon dioxide and hydrochloric acid gas. The bottle in question was older and rarely used, with the purchased quantity well above normal usage. Overnight, the bottle burst due to the built-up pressure, causing the refrigerator door to open. At that time, the refrigerator contained a large number of different chemicals, many of which required continuous cooling for safety and stability reasons and some of which exhibited high chemical reactivity. The leaking chemical rendered the labels on many chemical bottles unrecognizable and irreversibly contaminated the chemical containers, necessitating their disposal. Initially, the specific type of leaked chemical was unknown and could only be determined through process of elimination based on bottle size and a few letters from the label, and with the help of a thankfully well-maintained Excel spreadsheet containing information such as the chemical name, CAS number, supplier, quantity, and precise storage position down to the shelf in the refrigerator. In this situation, UiT's central chemical inventory, CHESS, did not play a decisive role in handling the incident. Fortunately, no personal injuries occurred, and no other chemical containers besides the ruptured bottle were structurally compromised, which could have triggered a further chain reaction. However, there were chemicals stored in the refrigerator that posed a potential subsequent fire hazard.

While this incident was ultimately resolved successfully, it exposed several vulnerabilities in UiT's chemical safety and handling system and has drawn negative media attention. Surprisingly, we had no established protocol for managing overpressure-forming chemicals in the aftermath of the accident. Moreover, the resulting introduction of a new routine for peroxide-forming chemicals has brought to light previously unrecognized risks within our chemical inventories. This incident highlights concerns regarding not only training in chemical handling and storage, but also the effectiveness and lack of oversight mechanisms.

Problems and current situation:

The storage of chemicals can be demanding and requires certain infrastructure and active maintenance. Not all groups or departments have the necessary infrastructure, which is sometimes due to the conditions and capabilities of the buildings they are in, and sometime due to a lack of investment in necessary storage systems and management plans. As a result, the quality of proper storage significantly differs. A visit and discussions with employees from different locations have further emphasized these differences. In some departments, there is a lack of infrastructure for storing flammable substances in fireproof cabinets. Generally, there is a shortage of explosion-proof refrigerators in many areas, and the storage of dangerous chemicals takes place in regular household refrigerators. Additionally, the infrastructure for storing chemical waste in an approved and separated room is not universally available, and often even ventilated cabinets are challenging to install due to poor ventilation infrastructure in some buildings. Chemicals in labs are often stored incompatibly; the causes range from inaccessibility of proper storage facilities to personal choice not to follow guidelines to lack of understanding of the chemical terminology/classification and hazards that come with that. Some research groups, particularly those outside of chemistry, may be unaware of ticking time bombs in their chemical storage, and may not even know how or what to check to counteract the risks. There is currently no system and no UiT resource person to regularly inspect, maintain, or improve chemical storage or verify routines for chemical handling and storage at the different working places.

Previously, several departments would deliver different types of chemical waste to the MH building (Medisin- og helsefagbygget) for storage and disposal. However, this option was closed down last year without advance notice, and the departments and groups were told to store it themselves locally, without any support to ensure that necessary storage infrastructure was available; it often is

not, so this further increases the likelihood of improper storage. The responsibility for classifying hazardous waste and training users similarly was passed down to the different departments, some of which do not have anyone with a background in chemistry who can properly train users. While some training on documenting what is in a bottle was provided to the new chemical waste contacts for each department, there was no plan to train individual users, making it even less likely that problematic waste storage and handling will be identified before a problem occurs. Some user training has since been offered in at least one department, but not in others, so there is a definite lack of knowledge in both users and chemical waste contacts within UiT. This also places a significant and unsupported responsibility on the waste contacts in each department, who generally have been uncompensated for this and who were not warned of the actual responsibility they were being given when they were asked to be 'contacts'.

E-waste may also be a problem, particularly with used batteries, as there does not appear to be regular disposal of these in all buildings, leading to e.g., a big bucket of old batteries just sitting around for months. Risk waste and infectious waste appear to have reasonably-functioning disposal systems in place currently. However, it is unclear how mixed-hazard waste (e.g., biological risk waste contaminated with chemical waste) should be handled in the current system.

Problems with poor storage conditions are compounded by inefficient chemical inventory lists; in the example above, a detailed and current inventory was able to mitigate some of the challenges of the accident cleanup and investigation. However, CHESS is insufficient both for this purpose and more generally. CHESS has the task of fulfilling the legal requirement to maintain a chemical substance register to ensure chemical safety, but can only practically do this in cases with low volumes of chemical stocks and without significant changes in the actual inventory. Users describe CHESS as a program difficult to access and as user-

unfriendly. In its current form, CHESS takes significantly more time to retrieve information from compared to simply looking up generally equivalent information from SDSs available from all chemical manufacturers' websites. Users gain no additional benefits from using CHESS over SDSs: e.g., it can't be used as a proper inventory with up-to-date information about a specific chemical container in a specific storage area. Our survey has also confirmed negative experiences with CHESS (summary available in 6.2). Furthermore, many people seem to be unaware that a substance register even exists. Noncompliance with CHESS registration requirements leads to a false understanding of security and a distorted view of the chemical inventory situation. CHESS only details which buildings or general areas chemicals have been stored in, but nowhere near the level of detail that was used to help identify the exploded bottle in the example above. It cannot even be used to identify which groups have chemicals which legally require reporting in the annual exposure register (mentioned in 3.2.3). UiT also does not provide training on how to maintain a supplemental chemical inventory list, or how to use one to improve safety (through e.g., inspections of expiration dates, shelf compatibility, or similar), much less ensure their effective use. As a result, at UiT there are many chemicals whose quantities, locations, and even hazards are effectively unknown.

Another problem with a lack of a functional central chemical inventory is unnecessary or inappropriate chemical purchases. Different groups and departments (and sometimes even individuals within a group) are generally unaware of what chemicals others have available, which repeatedly has led to unnecessary chemical purchases, often involving hazardous substances. UiT's policy generally advises purchasing the minimum quantity necessary for the work, but the minimum purchasable quantity is often significantly more than is needed. Larger quantities are also often economically advantageous and therefore preferred, sometimes without adequately considering subsequent issues such as

storage space, storage stability, and increased hazards, and frequently underestimating disposal costs. A comprehensive cleanup operation for the disposal of old chemicals at the Department of Chemistry in 2020 revealed the presence of many unused chemicals that had to be disposed of despite their containers being unopened, with many of them being highly reactive. Employees at UiT can generally order chemicals themselves without any check of what is available, allowed, or advised against; examples include chemicals which require tracking in the annual exposure register, or acrylamide, which has a well-hidden document[17] within UiT which advises against its use.

Additionally, many laboratory processes involve the production of specific solvent mixtures and reagents. With changing personnel and tasks, such special mixtures and reagents, as well as undefined waste, are often left without proper disposal or transfer to the next user. This subsequently leads to the accumulation of chemicals and the blocking of important storage spaces, posing potentially cumulative risks.

Consequences

The chemical incident described above is an excellent example of some of the consequences due to a lack of infrastructure, expertise, inspection, and enforcement. Serious injury, illness, or death, as well as building and equipment damage, are all easily possible due to either discrete incidents or through long-term exposure; had the explosion happened during regular working hours, the consequences could have been much worse. Negative media attention and

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[17] UiT login required. This document can be found in the HSE manual under the path Hjem / HSE regulations / Routines HSE as one of 38 miscellaneous, randomly listed routines. It does not appear to be linked to anywhere in the chemicals section of the manual (Hjem / Safety / Chemicals). A search on UiT's external website does not find it.

damage to UiT's reputation have both already occurred and are likely in the future without significant improvements.

UiT has already established numerous routines and regulations pertaining to the handling of chemicals, but without effective communication, support, inspection, and enforcement, such situations are likely to reoccur. These guidelines encompass various aspects such as the acquisition of chemicals, substitution requirements, safe practices while working with chemicals, proper storage, and disposal procedures, to name a few. Regrettably, many of these regulations lack effective oversight and practical applicability within our current operational context. Continuing to introduce new rules without enforcing and rigorously monitoring their implementation will inevitably lead to additional avoidable hazardous situations in the future. While it is impossible to completely eliminate the risk of chemical accidents, neglecting the enforcement of fundamental safety regulations for chemical handling and other dangerous goods will tarnish UiT's reputation. This tarnish will be further exacerbated should future events result in serious injury – an outcome which is unfortunately all too foreseeable given the present conditions.

Proposed changes

It is commendable that UiT has chosen to adopt an alternative system to CHESS to enhance the maintenance and inventory management of the chemical substance register. The Department of Chemistry, for instance, has had positive experiences with the ChemInventory program as a substitute for CHESS. The implementation of ChemInventory resulted in significant improvements for the inventory management, fostering increased sharing of chemical containers among research groups, and reducing the unnecessary procurement of chemicals. By using QR codes to label chemicals, they have streamlined their annual stocktaking process and facilitated the seamless movement of chemical containers between

laboratories. Additionally, this system grants access to SDSs. Moreover, the capability to conduct structure searches within the inventory simplifies the retrieval of compound structure elements relevant to research. It also allows for the creation of watchlists for potentially problematic chemicals, such as peroxide-forming compounds, which were the source of the chemical incident described above. We are hopeful that the new system will provide similar features, contributing to the reduction of hazardous chemicals across various faculties.

However, it is important to note that the absence of these essential features in the new system could potentially hinder compliance with the chemical substance register once again. As far as we are aware, there has been minimal to no consultation with end-users in the chemical-intensive departments to incorporate their valuable experiences into the decision-making process. If this system is rolled out to the rest of the university, significant training and support will be needed to ensure usability and compliance across research areas, particularly for those without a background in chemistry or working with similar systems. Compliance is also likely impacted by the perceived longevity of the new system; widespread adoption is unlikely if users think they will have to port their information over and learn a new system again in a few years.

 Proper equipment and a safe working environment are pre-requisites for any hazardous work, and are thus absolutely essential to UiT's ability to conduct ongoing research. Good equipment and facilities come at a cost, however, and pose challenges when dealing with limited budgets and differing leadership priorities. This is likely why chemical storage facilities are in desperate need of improvement at UiT, but it is something the university can centrally help address. The university can centrally work to improve building infrastructure and replace safety and storage equipment; it can develop audit and enforcement mechanisms to ensure that individual units are in compliance; and/or it can offer incentives and

financial support to facilitate improvements made by the units themselves, amongst other options. More specific recommendations are to assess whether normal storage cabinets can be partially replaced with good fireproof cabinets, and at least some of the chemical storage refrigerators should be certified as suitable for storing flammable substances. A common set of storage facilities, likely at the faculty level, should be considered for groups with low volumes, as incompatibilities and specialized storage requirements make it unlikely for each group to be able to have several different types of chemical storage infrastructure installed.

Independent inspections should be conducted to assess the current status of all chemical storage locations and equipment at UiT, and plans developed for improving co-storage. Inspectors should have a relevant chemical background or be part of an interdisciplinary inspection team with such knowledge, and should not be financially or professionally dependent on the unit they are inspecting (e.g., temporary staff employed by the PI of a lab under inspection); inspectors could be either internal UiT employees or an outside agency hired for this purpose. Subsequently, chemical inventories should be inspected at least once a year by someone with a sufficient chemistry background who is capable of identifying possible hazards and areas for improvement, including checking that chemicals and chemical waste are stored in appropriate facilities (temperature, ventilation, fire safety, secondary containment, etc.) and without any cross-reactivity hazards. Older chemicals in particular should also be inspected during these rounds for any age-related issues, such as container degradation or formation of hazardous byproducts; any potential hazards should be rectified and/or the chemical safely disposed of.

Similar to the improvements needed for chemical handling in general, e-waste and mixed (e.g., chemical + biological) waste need improvements related to storage,

handling, and disposal. Clear routines should be developed for these, and personnel designated to assist with advice and disposal. Every building should have at least one designated e-waste and battery disposal station which are regularly emptied by assigned personnel and contact information should be clearly posted in case the waste area becomes full before the next scheduled pickup.

4.2. Biology

Problems and current situation

Central training on biosafety includes nothing on cell culture work, which is used widely at UiT. Both at the individual level and administrative level, there is poor knowledge of regulatory requirements, which can, and has, lead to compliance issues with BSL2+ (use of biological factors, regulated by Arbeidstilsynet) and GMM (regulated by Helsedirektoratet); one example is the requirement to notify Helsedirektoratet of new work with GMM. Norway also has stricter laws regarding GMM than similar countries, leading to unintentional non-compliance with those trained abroad. Information about hazards and regulations are generally not transferred along with biological samples as they pass between colleagues, labs, and collaborators, and it is generally not checked if the people and facilities they are passed to are approved to work with that material. This is particularly a problem in NT-Fak: as biology is not a central part of any of these departments there is a lack of central biological expertise, but biological work is ongoing in most (if not all) departments. Additional issues are that logs are not always kept as required for GMM work, samples are often transported in non-leak-proof containers both within and between buildings, and biological safety cabinets outside of core biological areas (e.g., those in NT-Fak) frequently get left off the list for regular inspections/maintenance with slow or no response from the contracted service provider. Guidance is missing/contradictory on how to handle human-derived (e.g., patient) samples, which pose a risk of bloodborne pathogens

and generally increased risk to researchers, as well as guidance for waste which is biologically and chemically hazardous. Additionally, guidance is needed on how to handle mixed waste, including GMM or infectious waste which is also chemical or e-waste.

Note that animal work (e.g., with fish, mice, etc.) was not evaluated by this committee. Information about ethical approval and other requirements for animal work is likely something that should be included; similarly, ethical approval for working with human samples was not evaluated and should be included in basic training.

Consequences

Regulatory consequences may come from government agencies if they perform an audit or are notified of a problem; potentially leading to a work stoppage order. GMM can be, and has already been, released into the environment, which necessitated reporting to Helsedirektoratet[18]. Improperly handled GMM can lead to increased antibiotic resistance as most GMM has such genes built in as standard practice. Improperly handled samples can lead to illness in both human and environmental environments, with the spread potentially enhanced compared to non-modified equivalent pathogens; release of salmon pathogens, for example, could have devastating economic impacts on the region. Media attention from GMM mishandling has a higher likelihood of causing damage to UiT's reputation due to the public's general skepticism of GMM.

Proposed changes

Improve central biosafety training to, at a minimum, include information on what type of work is subject to regulatory or institutional approval. Include additional

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[18] In the situation the committee is directly aware of, the risk to the environment from this particular GMM was very small, thankfully limiting further consequences.

training modules on safe working with cell culture, BSL2+, GMM, human samples, and bloodborne pathogens. Emphasize that transfer of materials (biological or otherwise) to other locations and labs should be risk assessed, including if the receiver has the correct regulatory approval and training to safely handle that material. Include routines for disposal of GMM and biological factors on a central safety website (including what to do with mixed-hazard waste), as well as incident response information and a biosafety emergency contact (including a specific name and phone number).

What currently works well at the Department of Physics and Technology is an incoming sample registration form, which is evaluated by someone with knowledge of biological risks and regulations; this likely will not scale for departments working with significantly more biological material, and also has problems with vacation/sick leave, but could be used as a starting point especially if done centrally, and be particularly important for departments without their own significant biological expertise.

4.3.   Machinery

This topic was mostly outside the scope of the committee's experience, but issues that should be addressed include a lack of instruction manuals for equipment and a lack of training or plans for training in the use of machinery (e.g., specialized saws). Typically, safety instructions are passed on to new employees by more experienced users, which can lead to fundamental information being lost along the way. This can be in terms of how to safely operate the machine (e.g., forgetting/neglecting to explain details that seem obvious to someone with years of experience, but not to a beginner) and what safety equipment is required (e.g., passing down bad habits of not using safety goggles, hearing protection, face mask etc.). Working alone can also be an issue if there are no clear routines for telling someone when you will be working with what machine and letting them

know when you are done with your work. Exposure to harmful sound and vibrations from machinery should also be assessed and addressed as needed[19].

4.4.   Fieldwork

Fieldwork at UiT includes research cruises and land-based field campaigns of various lengths and in a wide range of settings, both in Norway and abroad. Fieldwork can be physically and mentally challenging, and introduces risks and hazards related to the surroundings, weather conditions, and/or limited access to communication, infrastructure, and medical assistance. These risks and consequences vary greatly depending on the type of fieldwork, the location, and the duration. The variety of hazards thus requires broad experience for safety planning (training, risk assessments, routines etc.), which means it should be done in consultation with experts from a variety of subject areas (across departments and types of experience).

Problems and current situation

Fieldwork is often coordinated and managed by research personnel. It is in many cases unclear who oversees field operations and safety at faculty/department level since no one with the right training and experience is assigned the overarching responsibility. Responsibility for the field personnel is also unclear for the same reasons. Today, there is for example no standardized system for registering who is in the field, where they are, and how long they will be away. Having an overview of where all employees are is crucial if a critical situation arises in an area. There are also no guidelines for registering contact information in case of emergency for temporary employees. Routines for communication between and with people in the field are in some cases entirely lacking, and in some cases rely on private persons not employed by UiT, a problem which was emphasized in

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[19] See also Forskrift om utførelse av arbeid § 14

the safety survey (see 6.2). The current system relies on specific local (and often temporary) personnel rather than overall good routines. When this person completes their contract, quits or is on leave, there is no routine in place to train or appoint someone new.

There are also no central routines or guidelines for the execution of fieldwork. Fieldwork with several temporary employes in addition to UiT students would especially benefit from more central guidelines. The apparent current system is that anyone who conducts fieldwork develops their own separate system. This is both cost-ineffective and makes the systems vulnerable.

When working in the field, the nearest help can be far away, meaning that injuries and illness can have more serious consequences. Proper risk assessments and mitigation plans help you prepare for and prevent risks that you may face. The available risk assessment templates are not adapted to all different types of fieldwork. Furthermore, some departments do not require risk assessments to be formally approved, and in some cases, risk assessments are not approved until after the fieldwork has been completed. It is also unclear who should follow up if something happens in the field. Most departments should have prepared PRAs in relevant areas, but these are not available to those who are to write the risk assessments, and many are not even aware that they exist or know there is an additional document relevant to the risk assessments.

The main safety course, HMS-0501, is not very relevant for those going on fieldwork, as the focus is on laboratories and safety; fieldwork is only mentioned under the risk assessment section, despite the significant additional risks. Overall, this course does little to prepare for actual fieldwork and how to be safe in the field. Similarly, the general first-aid course HMS-0502 is not adapted to fieldwork; although it covers some of the needed topics in theory, the content is not sufficiently detailed or with enough practical exercises to cover the needs of those

in the field. In our survey (see 6.2), several people mentioned a need for additional fieldwork-related first aid training. HMS-0503, which is focused on fieldwork, is neither particularly useful for the practical aspects of fieldwork nor compulsory.

Reports from our safety survey and experiences indicate that there is a wide range in the quality of local fieldwork safety training (see 6.2). While the research cruises overall appear to have more effective routines and training practices, this seems to depend somewhat on the specific research vessel, e.g., the training on RV Kronprins Haakon is more extensive than on RV Helmer Hanssen, and fieldwork training for situations other than cruises appears to be significantly lacking. Deficient safety training results in employees and students not knowing how to avoid accidents, or how to handle them if they should occur. They are also not trained in dealing with different conditions outside, or to solve or adapt to unexpected situations in the field. This has a major impact on how safely fieldwork can be carried out.

Local courses are organized at the program level as field courses for students at several of the faculties, but largely focus on the academic aspects, and to a lesser extent on HSE and the practical challenges of fieldwork. Courses involving fieldwork have a mandatory field safety requirement, but it is up to the course responsible to make sure that this training happens, without guidelines for what should be included or how comprehensive it should be. Non-student local safety courses further lack similar guidelines and mechanisms or documentation to ensure comprehensive training. If employees and students do not know how to prevent and handle accidents, it can also have consequences for the safety of their fellow students, teachers and colleagues.

Cost seems to be a factor for fieldwork safety training (likely other safety training as well): updating and conducting safety training takes significant personnel hours. The same seems to be the problem for the preparation and updating of

routines. Some groups budget for this in hiring someone who is delegated the responsibility, but most put it onto already overburdened staff as an afterthought or can't afford hiring someone for this part-time position. This signals that safety is not a priority at UiT.

Consequences

Incorrect response or slow response times to emergency situations in the field can be the literal difference between life and death, but also the difference between no/minor injuries, and dramatically increase the number of people negatively affected. For serious situations in the field and at sea, there is significant cost (as well as research disruption) when a rescue mission is required. Even for situations where a full physical recovery is eventually possible, delays due to poor risk assessment and training cost additional time and resources due to extended sick leave, more extensive medical treatments and workplace adaptations required for injured employees, and more extensive equipment repairs or replacements. Preventable accidents also negatively affect the morale and psychological well-being of both the directly affected employees and those in the same working environment. It also significantly lowers the level of trust, with potentially more long-term sick leaves and lower retention of talent at UiT due to not feeling safe or from being overburdened with additional work to fill in the safety gaps oneself.

Insufficient risk assessments leave field personnel unprepared to mitigate risks if they should occur. Missed or underestimated risks and consequences can result in severe and poorly handled accidents. The lack of routines for checking and approval of fieldwork risk assessments gives the impression that UiT is not taking field safety seriously, reduces the employees' trust in the system and discourage them from spending time and effort of completing risk assessments as part of their already exhaustive and time-consuming fieldwork preparations. The lack of

accountability that comes with this system may also cause insurance problems if the activity has not been formally approved by UiT.

Without correct registration of people's whereabouts, UiT has no way of knowing if they have personnel working in areas hit by e.g., a natural disaster, including who they are and how to contact them. This may delay or prevent getting help to affected people, and makes UiT look uninformed and passive.

Placing the responsibility of field safety and check-ins on untrained persons can have negative consequences for both parties; the person(s) in the field feeling like a burden and stressed about taking too much time in the field, and the check-in person feeling overwhelmed by the responsibility and uncomfortable and insecure about how to handle an eventual emergency. Untrained staff and inexperienced employees may not have the competence, expertise, or capacity to handle an emergency, resulting in delayed responses to missed check-ins or reports of accidents if there is no clear chain of command. If someone gets hurt or goes missing in the field, it may take a long time before the person is located and receives help, aggravating injuries and trauma. There may be additional costs through government regulatory responses (e.g., Arbeidstilsynet) as well as a lowered view overall of UiT for situations which are reported by the media. Relying on temporary scientific/academic staff for safety training costs significantly more in research time and/or money due to it requiring expertise outside of what they are trained for, repeatedly reinventing similar material, and generally with a worse result. Doing this multiple times for the same effective topic is also less cost-effective than providing the same service centrally, and it also risks overloading and burning out otherwise talented young researchers.

Proposed changes

A designated field safety responsible should be assigned locally or to each department to advise on fieldwork-related matters, to communicate guidelines

and routines and to help develop, update, and ensure compliance with these. This should be an official and compensated responsibility. This person can also oversee local safety training.

To ensure that the risk assessments are relevant and of high standard, user-friendly templates adapted to various types of fieldwork should be developed, and employees who work with fieldwork be included in the process. Make these templates available to those doing the risk assessments and provide guidelines for where to store the completed assessments. The risk assessment templates should also be regularly updated and actively used. For people with fieldwork spread out over the field season, a safety preparedness plan could be developed in addition to the risk assessment. This plan should discuss how to prevent and respond to the most likely types of emergencies and identify responsibilities, emergency contacts and chain of command. For more general recommendations on how to improve the routines for risk assessments, see section 3.4.

UiT needs a system where travel registration is submitted together with the risk assessment and emergency contacts. Some departments use the 'Register travel requests and advances' function in DFØ, whereas some have their own systems. These systems are unofficial and locally developed, and in many cases dependent on specific people with access. We need a unified system which gives those who need it the proper information: it should be a register of who is in the field, where they are, how long they will be there, who is in charge and what the risks are.

Routines for communication are especially important if you work alone or in areas without mobile coverage. There should also be a routine for check-in, along with a contingency plan in case of missed check-ins. Check-ins must be delegated to an employee at UiT who has been given this responsibility, has received training, and can be available around the clock. This person should have a protocol to follow in case of a missed check-in or if an accident is reported. A rotation scheme could be

used to share this responsibility between employees with managemental/supervision duties; some (but not all) of this responsibility could be managed with use of an app as mentioned in 4.8.1. UiT should have a pre-decided protocol for search and rescue operations. Today, this responsibility usually falls on a colleague or friend, without support from the UiT system. These persons are unpaid and untrained, and do not necessarily know the protocol to follow if an accident occurs or if someone does not check in as agreed. This is a big responsibility and not something that should be left to a random untrained person who may not even be employed at UiT. When working in remote areas, a satellite (e.g., Iridium) phone or emergency responder (e.g., Inreach) should be offered, along with an introduction in how to use them[20]. Some departments have these and use them. Some have satellite phones, but the employees are not informed or encouraged to use them, and some departments do not offer them at all. Extra resources should be committed to ensuring the safety of people working alone.

There should be a system that keeps track of field-active employees and the dates they completed each type of safety training (see also 3.2.2 and 3.3). This information should be available to the faculty, with a specific person at each department responsible for checking that all relevant employees are up-to-date on their training, both on a regular time schedule and additionally as needed (e.g., before a cruise), who will also follow up with the employees and their supervisors to correct any deviations. Furthermore, information on training requirements should be provided in the welcome letter for new employees, with links to both required and relevant training, so they are both aware and equipped to start from

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[20] As is already required by Forskrift om organisering, ledelse og medvirkning § 8-1 Gjennomgående krav til opplæring

the beginning of their employment.

We suggest implementing a similar system for land-based fieldwork as is currently used for marine fieldwork: namely, that all cruises or field trips start with a safety briefing. In some cases this can be one meeting at the start of a campaign or field season, but other cases may require briefings before every trip. This briefing should be used to inform employees about routines, protocols, guidelines, the chain of command, and available equipment; practical training in the use of communication devices (satellite phones and emergency responders) could be offered at the same time. The support team, e.g., the check-in responsible and those in the chain of command, should attend the same or a similar briefing even if they will not be in the field themselves.

The Justice, Equity, Diversity, and Inclusion (JEDI) group at the Department of Geosciences has developed a 'Fieldwork Code of Conduct'[21]. It is available to everyone, including temporary employees and students, and provides guidelines for what is expected of both managers and participants in fieldwork. It covers safety, responsibilities, inclusion, and harassment. This is a good example of guidelines that are usable, accessible, and understandable. We suggest that it can be adapted and adopted for use throughout UiT.

The main safety courses, HMS-0501 and HMS-0502 could be divided into two different parts, one of which deals with safety in the laboratory and workshops at UiT, and one which focuses on safety during fieldwork, not just rules and regulations, as HMS-0503 is today. In addition to making the target of each course clear, it would allow employees to only take the courses relevant to their own work, optimizing the use of everyone's time and resources. It should be clearly

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[21] JEDI's Fieldwork Code of Conduct

stated on the HSE website what the different courses cover to make it easier for employees to ensure that they complete all relevant courses; the current course descriptions do not accurately convey the depth and sometimes shallowness that the material is covered in, or indicate which parts include hands-on or other practical exercises versus theoretical or regulatory knowledge.

The field safety training should include how to make risk assessments relevant for different types of fieldwork, rules and procedures (with an emphasis on working alone), chains of command, and response if an accident should occur including how (and who) to call for help in different situations. First aid courses adapted to fieldwork should be offered regularly on their own, and/or as a practical part of HMS-0502. It should include themes like trauma, bleeding wounds, fractures and keeping warm, but also content about being flexible, using what is available and adapting to the conditions or situation; additional topics should also be considered based on expert recommendations and reported needs of those in the field. Some of these topics are, in theory, covered in HMS-0502, but mostly are only mentioned briefly due to course time constraints[22]. Additional field safety training can also be solved locally, or as a collaboration between faculties/departments that conduct fieldwork, if needed. These courses should be included in study programs with fieldwork and should have better-defined minimum curricula. The course should also prepare students for working under different and demanding conditions, and what to be aware of. An example of an institution with good mandatory safety training is the University Centre in Svalbard (UNIS). They offer mandatory courses adapted to the relevant field season and additional courses depending on e.g., mode of transport. The course responsible

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[22] As an example, HMS-0502 purports to cover animal bites, but a recent attendee reported that the content was primarily the instructor discussing how human bites were generally worse than animal bites, and not much information was given on how to actually treat them.

for the field course arranges for the students to take the safety course, but notably they are not responsible for the training itself. A similar system could be implemented at UiT, ensuring that all students and employees are prepared for fieldwork, and reducing the loss of knowledge and efficiency that comes from reinventing the course with each new temporarily responsible person.

Additional concerns about fieldwork include challenges associated with temporary employees and concerns about fieldwork conducted in conflict zones. Temporary employees often do not receive their contract in time to start in the field. Without a contract they are not covered by UiT's occupational injury insurance and should not go into the field. In practice this means that employees either work without insurance, or that valuable and time-limited working hours are lost because personnel have to sit for days and sometimes even months while waiting for a contract. Some employees have also expressed concerns about visiting conflict zones (both political and military) due to collaboration with researchers in e.g., China and Russia. This is an important topic and employees will need assistance when preparing for fieldwork in such regions; however, this topic was considered to be outside the committee's focus and should be more thoroughly assessed by others.

4.5. Radiation

This topic was mostly outside the scope of the committee's experience; particularly for ionizing radiation. It does appear there have been a few minor incidents with radiation, but to the committee's knowledge these have been caught early, thus preventing significant consequences. For laser safety, the only UiT-offered training is a course once a year; this course is generally not well publicized, and groups working with many lasers have generally only received a few days to sometimes a few weeks notice of when it will be. The course covered primarily regulatory requirements and very little practical

safety guidance. A more practical course should be developed, ideally that can be given at least partially on-demand (i.e., an online module), and there should be a way to subscribe to be alerted when any new training is scheduled. Suggestions for what to include in a course are: safe working practices (remove jewelry/watches and dangling items, close eyes when at beam-level, choosing the right safety glasses, fire prevention, blocking stray beams, work at lowest possible power, fiber alignment, working with invisible beams) and incident response.

Within general safety training, UiT should include information about when additional training or regulatory steps regarding radiation are needed, and some radiation safety should be included in general safety training directly. For example, a non-obvious problem with UV radiation is the generation of ozone, and UV light is used as part of many other common lab processes such as disinfection, curing, or optical detection. Ionizing radiation and certain classes of lasers should be specifically mentioned as requiring more training and regulatory procedures before use.

4.6. Safety equipment

Problems and current situation

Personal protective equipment (PPE, such as lab coats, gloves, and goggles) and other safety equipment such as extraction cabinets (fume hoods, biosafety cabinets, etc.) are essential to limit the consequences of inevitable mistakes and minor accidents which are inherent to human nature. However, multiple incidents have already occurred at UiT where improper use, problems with, or failure to use such equipment has resulted in injury or exposure. Some of these have been caused by insufficient training, such as choosing the proper gloves for the task or not covering the gap between gloves and a lab coat; some have been caused by unavailable or inaccessible equipment, such as proper face shields or heavy duty gloves; some by failure of safety equipment (e.g., extraction hoods), and some by

users' deliberate choices to not use the recommended equipment (which may also be due to insufficient or ineffective training). The lack of dedicated staff to ensure proper training, maintenance, and compliance with PPE and other safety equipment procedures exacerbates the problems.

Consequences

Injuries such as burns and splashes to the eyes have occurred in the recent past at UiT. More severe burns and chemical exposures are likely to occur in the future, which could lead to permanent injury. Much more serious consequences are easy to foresee in the future: for example, use of improper PPE while retrieving cells from a liquid nitrogen cooler could lead to the person dropping the box they are retrieving, potentially spilling a hundred or more vials of genetically modified or pathogenic cells throughout common hallways. Non-functioning chemical fume hoods can lead to poisonous vapors spreading through an entire lab, or potential explosions as volatile vapors react with flame or other chemicals used elsewhere in a lab. Lack of proper safety equipment is highly visible and strongly contributes to a poor culture of safety, leading to lower compliance generally and much higher stress for everyone working in that environment. Incidents that can be traced to these obvious problems with safety equipment will cause severe damage to UiT's reputation if covered by the media, and can lead to significant government/regulatory action.

Proposed changes

Safety training and documentation should be more specific, detailed, and frequently repeated to emphasize how and when to use which equipment and how to ensure it is properly functioning for its intended use. Gloves in particular seem to be a blind spot for many people, so training in choosing the proper glove should be specifically covered. Regular inspections (arranged at the faculty level or higher to ensure independence and to avoid the blindness of familiarity) of labs

should check for the availability, integrity, and proper functioning of all safety equipment, including cross checking the glove type compared to the hazards specific to each lab. Personnel hours should be budgeted for and assigned to ensure training and compliance. Cotton lab coats with elastic cuffs (to avoid sleeves dragging in the samples or chemicals being worked on) should be purchased and made easily available to all employees and students working in the lab; this purchase should be done at the university level as that type of coat is not currently available through UiT's chosen distributor. PPE should be easily accessible for all employees; one possibility is to have a free, or no pre-authorization required, 'store' where any employee can come to get PPE or similar safety equipment if they don't have it available in their lab; they can also try on different sizes and styles of PPE at this central location to ensure they get the proper fit, thus increasing the likelihood of compliance and effectiveness. Ensuring storage locations for PPE and other safety equipment should be part of a checklist for designing a new lab, and old labs should be audited to ensure they have places to make this equipment accessible; this can in practice mean installing extra coat hooks or eyewash bottles, for example. Annual inspections and maintenance should be arranged at the university level for every extraction hood so that it happens automatically; there should be an easy-to-find way to add new hoods to this inspection list for new purchases or when hoods are relocated. Ventilation hours for each building or ventilation zone should be posted in an easily findable location, and clearly announced, e.g., via targeted email lists for the employees using that area, when it is changed or disrupted.

4.7. Tunnel

Problems and current situation

It appears that the tunnel had a safety training plan at one time, but it has not been maintained. Documentation is found only by knowing the right people, and is missing from the central website (but referenced in the individually-sourced

training materials); maps in these training materials are out of date, and English translations are unavailable for many. Some corridors in the tunnel are missing signs indicating where they lead to, which can cause big issues during emergency situations, as individuals using tunnels often only know one or two of the pathways, and emergency responders are unlikely to know the tunnel layout at all. The 'door sign' method of notifying when someone is in the tunnel, i.e., a sign posted at the tunnel entrance stating who entered and when, does not work well when it is used to transport material through the tunnel and the person transporting it stays with the material in the other building (e.g., transporting biological material to use at the core imaging facility). There have also been reports of vehicles using the tunnel during restricted hours (i.e., waste disposal periods), but this appears to have been mostly addressed so far.

Consequences

Training is likely inconsistent across all users, and may potentially conflict, as well as be insufficient. The unique nature of the tunnel, including access and ventilation, makes users especially susceptible to emergency incidents which may occur in or affect the tunnel, including fires and gas leaks or events requiring emergency response (e.g., collision with a vehicle in the tunnel). This is particularly relevant as hazardous materials (e.g., yellow waste containers) should generally be transported through the tunnel to avoid the general population of the university, thus any incidents are more likely to involve extra hazards. Newer tunnel users often get slightly lost due to the lack of signage and distinct landmarks, which can be stressful on its own, but also lead to lower safety; even regular users may get lost and disoriented during an emergency situation, which could even be fatal for some situations (e.g., fire or gas leaks). Emergency response crews may not be able to respond to the right location rapidly, as they generally are not familiar with the tunnel layout or how to get access, and both they and the reporting person may not be able to identify their location.

Proposed changes

Tunnel safety protocols, training and documentation should be organized centrally, rather than at the local level – i.e., found on a common safety website. Some local policies may apply, but primarily central policies will be the most applicable. Location signs should be posted at all intersections, and tunnel maps posted either at all intersections or at least in several easily noticed locations. Mark which exits can be used by anyone (many require key card pre-authorization). Consider an app or other location-independent notification system so that users can indicate when they are in the tunnel even if they enter and leave from a different location.

4.8. Other safety areas

4.8.1. Working alone

UiT's procedures on working alone are frequently seen as impractical and are generally not followed. Some work may actually be safer to undertake alone, e.g., where there is a risk of exposure to mutagenic compounds but without risks to immediate health, or work in confined areas. Generally, employees are supposed to have someone who will check that they are okay if they have not heard from the employee by a pre-designated time. However, this has often been advised to be a friend, family member, or colleague. This is problematic for multiple reasons: 1) the contact may not be able to access the location the employee should have been in, e.g., due to distance related to fieldwork or to building entry restrictions; 2) the contact is likely to be untrained in the hazards of that lab, which is even more critical if an accident has in fact incapacitated the non-responsive employee; and 3) this is requiring uncompensated work from people who may not even be UiT employees, much less employed for this function; this is also discussed in relation to fieldwork in 4.4.

UiT should revise its procedures on working alone and also invest in systems to provide backup and support for those working alone. There are commercially available apps, including some with professional response services, or UiT could develop its own check-in/check-out app and use existing agreements with security and occupational health providers to follow up on non-responsive employees; this could potentially be done in collaboration with other Norwegian universities. Development of and investment in this service should be done in close consultation with representative inputs from employees who work alone under a variety of conditions; the needs and capabilities of those in the field vary significantly from those working in a chemistry lab, for example.

4.8.2. Gas and liquid nitrogen

The committee does not have in-depth knowledge on this topic. Some areas of concern are ensuring that gas bottles are always well-secured, particularly during transportation and just after delivery; sometimes bottles are left standing unattended and unsecured; gas cylinders which rupture, e.g., after a fall, can easily rocket through concrete walls. Lab-specific training should also include warning of signs of, and similarly and what to do in the case of a gas leak. Recent changes at NT-Fak requiring specific training and limiting gas handling to designated employees are a positive improvement. Liquid nitrogen has its own hazards which can lead to significant problems; mini explosions of potentially biohazardous cryogenic vials is likely, so proper training and easy-to find information on PPE and handling is needed.

4.8.3. Electrical

This topic was outside the scope of the committee's experience, but should be assessed as building and modifying electrically-enabled equipment is common practice for many research groups and in some study programs.

4.8.4. Nanotechnology and particulates

This topic was outside the scope of the committee's experience, but it is likely to be an increasing area of importance that should be risk assessed by UiT centrally. To the knowledge of the committee, it is already currently relevant in both the Department of Physics and Technology and the Department of Chemistry, as well as the Faculty of Health Sciences and the Faculty of Biosciences, Fisheries and Economics.

4.8.5. Vehicle use

This topic was mostly outside the scope of the committee's experience. However, the committee was made aware that UiT vehicles are sometimes poorly maintained enough to affect safety (e.g., missing seat belts), and that it is unclear or undecided who is responsible for or should be contacted regarding issues. Insurance and roadside service should also be clearly established and known to all users, as well as what to do in case of an accident, breakdown, or other vehicle malfunction.

4.8.6. Lifting and manual labor

Scientific staff are often not trained or in good condition for physical labor such as moving heavy equipment or lifting heavy boxes of supplies. However, some may still choose to do so either from overconfidence, lack of training, or lack of alternatives. Safety training should briefly cover risks and prevention for this category of activity, and specifically include resources for who can help with these tasks instead. This training should be updated regularly according to needs as discovered through e.g., incident reports.

4.8.7. Pregnancy

There have been several cases at UiT where pregnant women have reported a lack of support from their managers regarding risk assessments and reasonable accommodations to continue working, particularly with chemicals, but likely in

other research areas as well. Some have been told they are responsible for figuring out completely by themselves if there is anything in their work environment or tasks which would pose a risk to them or their child; when considered in the context of shared labs and the current lack of available risk assessments, this becomes effectively impossible. Such women are placed in the position of choosing between their child's health and their career, as they may lose an additional 6 months or more of time in the lab or field. Arbeidstilsynet's guidance indicates that (presumably reasonable) changes to the work environment should generally be made to accommodate expectant parents, and regulations require the employer to ensure that the work environment is assessed for threats to reproductive health, which includes to the unborn child.[23]. One suggestion is to routinely consider pregnancy as part of a risk assessment – a task which could be further supported by UiT maintaining a list of chemicals which pose a threat to pregnancies as part of their inventory, which could be cross-referenced with a list of chemicals used in a risk assessment. Another possibility would be to have centrally designated lab areas which are kept free of known risks to pregnancy, which can be made available to any pregnant or otherwise vulnerable person to use during the period they need accommodations; these can either be dedicated solely to this purpose or simply be existing lab facilities without those risks, but which have extra capacity. While this topic was generally outside of the scope of the committee, it is an area which is in need of further evaluation and support.

4.8.8. Building and grounds maintenance

While the committee focused primarily on lab and fieldwork safety, building and grounds issues were raised both internally and externally, which are worth

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[23] Arbeidstilsynet's guidance on Graviditet og arbeidsmiljø and regulations in Forskrift om utførelse av arbeid § 7-1.

mentioning. One issue includes multiple injuries due to falling on ice, including complaints of slippery areas which were reported or otherwise known but not taken care of; this is even more risky for cases where a person is transporting something hazardous. Another issue has been outdoor light bulbs not working; these should be routinely checked when it starts to get dark. Ventilation in buildings has sometimes been stopped without the users being notified, which can lead to problems both when working with chemicals as well as generally poor air quality. Testing and evaluation of building evacuation plans also appears to be lacking, and it can be difficult to locate where the rally point is for every building. A final problem area is poor communication on when building or maintenance work will be taking place or completed. Some lab hazards need to be secured in advance of work, particularly since the Department of Property Management and their contractors generally have not had local safety training. This also affects the ability to plan and complete research, and some experiments have non-adjustable timelines (e.g., cell culture maintenance) which require predictability and/or flexibility in scheduling.

5. Summary and conclusions

UiT is lacking a culture of safety; responsibility is repeatedly passed down the line and ultimately left up to the individuals who may or may not choose to prioritize safety over time and other resources. In order to be effective and long-lasting, cultural changes must occur at the top; UiT employees and students need to see that UiT as an institution prioritizes safety. This includes in part better messaging and communication as well as allocation of resources to ensure a good system of training, expertise, and accountability.

The majority of issues found by the committee tied into training and access to information; generally training at UiT is not accessible when it is needed, is lacking in depth and practicality, is missing multiple topics, is inconsistent, and is not

enforced or refreshed. Similarly, written documentation of procedures, risks, and considerations is significantly lacking and hard to find, even for those who are experienced in knowing where to look; UiT should have a central, openly-accessible, and regularly-updated safety website[24] where all information can be easily found either directly or linked.

Another common theme found by the committee is a lack of topical knowledge available; risk assessments are commonly left to lower-level employees who lack experience, and even within a larger group there is often a lack of knowledge about risks inherent to external disciplines. Many groups in NT-Fak work with chemistry or biology, but may not employ anyone with those backgrounds; even less likely are they employed as a general resource to evaluate risks for everyone around them. Having central resources to help evaluate topical risk would significantly reduce accidental oversights particularly with interdisciplinary work; these central resources could also improve training to proactively alert people of commonly overlooked risk areas. However, UiT currently appears to be moving in the opposite direction, e.g., chemical waste handling has been decentralized to, in many cases, non-chemists.

A final common theme is a lack of accountability and enforcement; UiT does not ensure that all employees have had the required safety training; on the contrary, UiT makes it difficult for managers to even verify if those in their own area have completed central training. Incident reports (avviksmelding) are often unresolved, even if officially closed, and those who are supposed to be responsible for the

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[24] Some committee members are already working together with Martin Petersen on building a faculty-level safety website. However, this should actually be done at the university level, use a platform with a bit more flexibility, and have more resources committed to providing full information rather than primarily relying on volunteers to develop the content.

avviksmelding system are sometimes even unaware of their responsibilities or how to use the technical system behind it.

As a result, safety at UiT seems to be primarily a voluntary system for the individual, according to their own priorities. At local levels, concerned individuals have often managed a patchwork of safety systems they have developed themselves, but this work is frequently uncompensated both in terms of salary and career considerations, and at UiT in particular has put an unfair burden on junior staff with temporary contracts. Critical safety roles should be proactively designated and budgeted for, including ensuring sufficient background or training for those filling them, and developing robust backup and transition plans for those roles. Similarly, UiT should recognize the contributions of employees who are performing important safety roles outside of their core job functions such that they receive professional recognition and compensation for their work.

The current culture of safety is strongly influenced by the experience of reporting a safety issue: you risk time and reputation to typically get no response, because there are no resources to handle it, including no person with the responsibility; blame or 'responsibility' is simply delegated to another level who may or may not respond with delegation to another and then yet another. Even the verneombud system has had limited success in addressing many issues due to lack of response or support from higher levels; UiT has further handicapped this resource by not ensuring the role of coordinating hovedverneombud for over a year. Indeed the primary motivation behind the formation of this committee and generation of this report has been the inability to inspire response and desperately needed change from the higher levels at UiT, despite years of efforts to draw attention to the problems by many different people and using the variety of channels (incident reports, faculty safety advisors, department administration, verneombud) which are intended to safeguard the work environment.

In addition to the changes listed elsewhere in this report, we strongly recommend increasing the knowledge about HSE work at all leadership levels at UiT. This should include both practical knowledge (e.g., what chemicals can't be stored together, check-in steps for working alone) as well as a better understanding of their roles and responsibilities as leaders, especially in regard to how safety-related tasks are delegated at UiT (including the distinction between delegation of tasks vs. delegation of responsibility). Training is needed for those already in leadership roles, and a system is needed to ensure those who are transitioning to a new role get similar training early on and on a continuing basis. Without an understanding of what is needed, effective, and affected by HSE policies at these upper levels, holes will continue to appear and widen in UiT's safety practices. There have already been multiple serious incidents risking the health and lives of employees as well as equipment and infrastructure; thankfully, to the knowledge of the committee, the consequences of these have mostly been on a smaller scale. However, without an improved and responsive system of safety it is only a matter of when, and not if, one of many near misses becomes a tragedy.

A good, centralized system of safety can be both more efficient (in time, money, and other resources) and produce better outcomes both in the long-term and short-term; this can include more time to do proper research, better training of the next generation of scientists, decreased time on training and developing training materials, fewer incidents which damage people and facilities and lead to negative publicity, lower stress on safety facilitators (often lab managers), an increased feeling of security for all employees, improved employee recruitment and retention, and a better reputation for UiT as a research and educational institution. We ask that UiT prioritizes safety by providing it the necessary resources (dedicated employees, funding, attention, accountability, etc.) to provide a safe working environment and an efficient foundation for outstanding research and education of future scientists.

6. Appendix

6.1. Proposed safety timelines

This section is intended as a starting point, not as a fully exhaustive and detailed list.

6.1.1. UiT and its subunits

Each level should ensure that their sublevels have completed these items. E.g., if primary responsibility is with a lab, the department should annually ensure they have done this, and the faculty should ensure each department has checked it for all of their labs, and the university should ensure each faculty has checked with each department. Some items may only need to be done at higher levels.

Digital/documentation annual review and tasks

- Safety training records (ensure everyone has updated training).
- Review of who has access to each lab.
- Avviksmelding – ensure that even those marked as closed have actually been followed up on.
- Ensure all regulatory authorizations are up-to-date, any changes in work have been properly reported (GMM, BSL2+, likely others e.g., radiation, animal work), required logs (e.g., GMM work, chemical exposure register) are up-to-date, and employees have been offered relevant health and safety consultations.
- Ensure that safety information is up-to-date on the website and in training material, including contact information, and that all links still work. Evaluate if additional training modules need to be developed.
- Risk assessments and templates for these – Are they available, accurate, up-to-date, and relevant?

In-person annual review and tasks

- Accuracy of laboratory hazard door signs, including contact information.
- Accuracy of maps, including tunnel system and building layout/fire maps; this includes updating them in central information systems and safety training materials.
- Building safety equipment is fully stocked and functioning:
    - Eye washes and chemical showers
    - Fire extinguishers and visibility vests
    - First aid supplies
    - Chemical and biological spill kits
    - Extraction hoods are inspected (fume hoods, biological safety cabinets)
    - Air filters inspected/replaced
- Inspect inventories, particularly for chemicals, but also relevant for other items such as biological material. Dispose of out-of-date or unneeded items, ensure that all items are properly labeled, and inventory lists are up-to-date.
- Lab cleanup and inspection days.
- Vehicle safety and maintenance.
- [Prior to the dark period] ensure all outdoor lights are functional.

6.1.2. Employees

This information should be conveyed to employees with sufficient time by their managers or by higher levels, and the information or tools needed should be provided.

Before or at the start of employment

- Central training: Basic safety course, first aid course, and relevant topical modules.
- Local training, including a tour showing safety equipment and hazards.

- Management training regarding their roles and responsibilities regarding safety (for leaders).
- Offered relevant health evaluations and vaccinations.
- Personal protective equipment should be ordered or arranged.

During employment

- When starting new work, be aware of additional training[25], approvals, notifications, logs, or documentation that may be required. Some (but not all) notable areas where this applies include:
  - Genetically modified material (Helsedirektoratet)
  - Biological factors, i.e., BSL 2 or higher (Arbeidstilsynet)
  - Animal work
  - Working with human-derived samples
  - Radiation, including ionizing, laser, and UV
  - Certain chemicals and materials (e.g., lead; chemicals with H340, 350, or 350i; acrylamide, ethanol)
  - Fieldwork
  - Compressed gases and liquid nitrogen
- Ensure that you maintain necessary documentation (see the list above for some topics this may apply to).
- At least once per year review that you have updated your risk assessments, notified relevant management or regulators of changes, and that you are up-to-date on safety training. Check that any storage/inventories you use are well-maintained, including properly disposing of items that are out of date or no longer needed, and that everything is properly labeled.

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[25] This can be cross-checked with Arbeidstilsynet's list of areas requiring additional training to see what else is relevant for UiT.

- Report any incidents, deviations, or safety concerns with an incident report ('avviksmelding'). There should be a low threshold for reporting – near misses, not-yet problems, and missing or non-maintained safety equipment can also be reported here, amongst other things.
- Be aware that you have occupational health service available to you, including e.g., ergonomic assessment, eye checks for need of computer glasses, vaccines and other work-related health checks, and mental-health discussions.

At the end of employment or when changing positions

- Go through inventories (e.g., chemical) and storage and either dispose of or transfer all items to the responsibility of one or more remaining employees (with their knowledge). This includes updating labels as needed.
- Fill out any annual logs/registration that are or will be required, or provide the information to management so they call fill them out when applicable:
  - Lead, mutagenic chemicals, biological factors
  - Radiation
- Assess safety protocols, training, and documentation. Reassign safety-related tasks and responsibilities including training someone else how to do them. Notify relevant authorities of the change in personnel where relevant (e.g., GMM work).

6.2.   Survey summary

The safety survey was advertised in the weekly UiT newsletter (12.05.2023) sent out to all employees by email, as well as announced as a 'Kunngjøring for ansatte' on the intranet. The survey was conducted through nettskjema.no and designed to capture both the general perception of the safety system at UiT (multiple-choice questions) and pinpoint specific safety aspects in need of improvement (open-ended questions). The respondents were asked to report challenges and

difficulties related to safety as well as aspects that function well, and to suggest programs or features they would like to see added. The respondents were encouraged to answer as many or as few questions as they liked (in Norwegian or English), and to decide whether they preferred to stay anonymous or to provide contact details. They were also asked to choose how their responses could be used: 1) to inform the committee members for internal discussions, 2) as part of a generalized description in the public report, 3) as a specific example in the public report and/or 4) as a specific example if the university administration asks for details. In total, 75 people responded to the survey.

We are aware that this survey might not capture a complete picture of the experienced safety situation at UiT. There are several possible reasons why more people did not respond to the survey, including 1) It is not relevant to their work and/or they do not experience any concerning safety issues, 2) It takes too much effort and time to answer yet another survey, or 3) People were not aware of the survey. It is also likely that people who have already raised their concerns (often repeatedly) about safety issues, but without getting proper help or seeing any attempts to solve the issue(s), do not trust that their voices will be heard. With that being said, we still believe that the survey provides a useful picture of reoccurring safety issues.

Out of the 75 respondents, 62 people answered that we could use their responses as part of a generalized description in the public report. In the following section, we present their answers to the multi-choice questions. The overall impression among the responders seems to be that the UiT safety system works well (52% responded 8 or higher on a scale 0-10), while 21% rated the overall impression as less than 5 (Figure 2). Only 21% of the respondents completely agreed with the statement 'Safety training at UiT fully prepares me to work safely in the laboratory or in the field' and one fifth of the respondents considered the safety training to
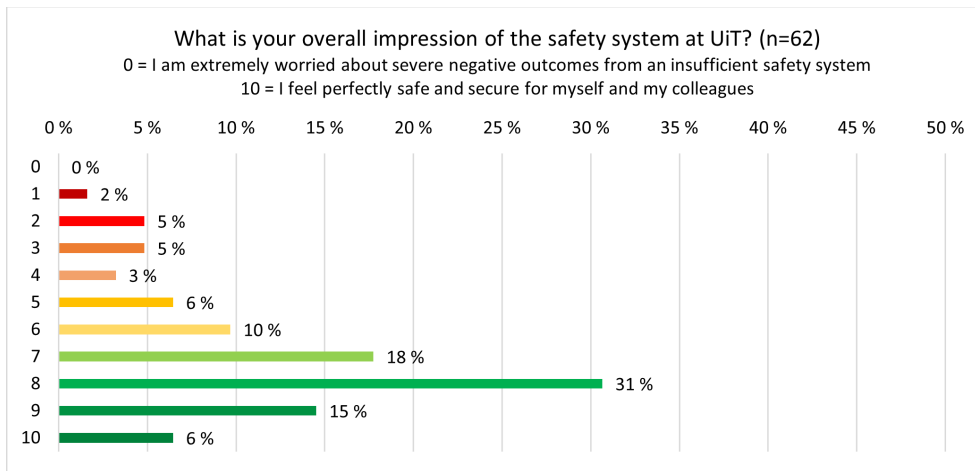
Figure 2 Survey answers to the question 'What is your overall impression of the safety system at UiT?' Responses were given on a scale of 0-10 where 0 is extremely worried and 10 is feeling perfectly safe and secure.

be insufficient (**Error! Reference source not found.**). To the statement 'The safety procedures and policies given by UiT and my department/working group closely match what I see used in practice', 50% agreed to some extent, 29% neither agreed nor disagreed, and 21% disagreed (**Error! Reference source not found.**). The most negative responses were to the question about how easy it is to find safety-related information. Of the respondents, 42% answered 'Completely disagree' or 'Somewhat disagree' to the question 'How much do you agree with the following statement: I can easily find the safety-related information I need at UiT when I need it.' (Figure 5**Error! Reference source not found.**).
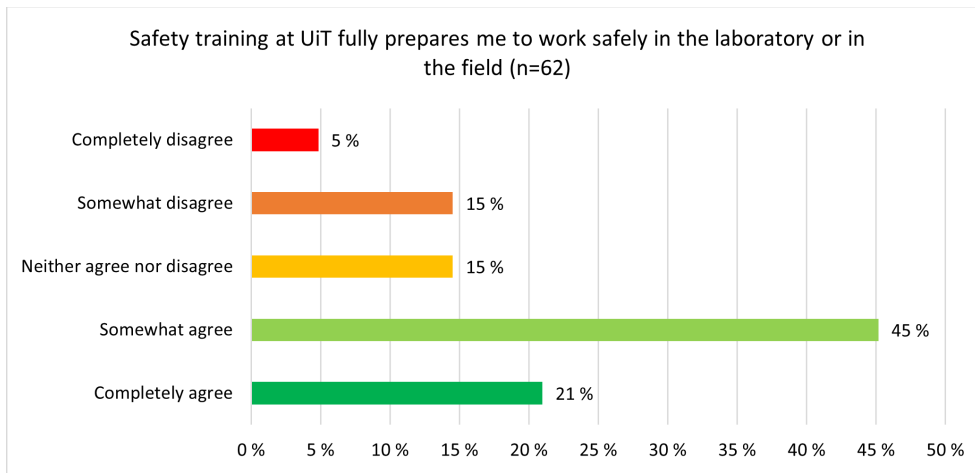
Figure 3 Survey answers to the question 'How much do you agree with the following statement: Safety training at UiT fully prepares me to work safely in the laboratory or in the field.'
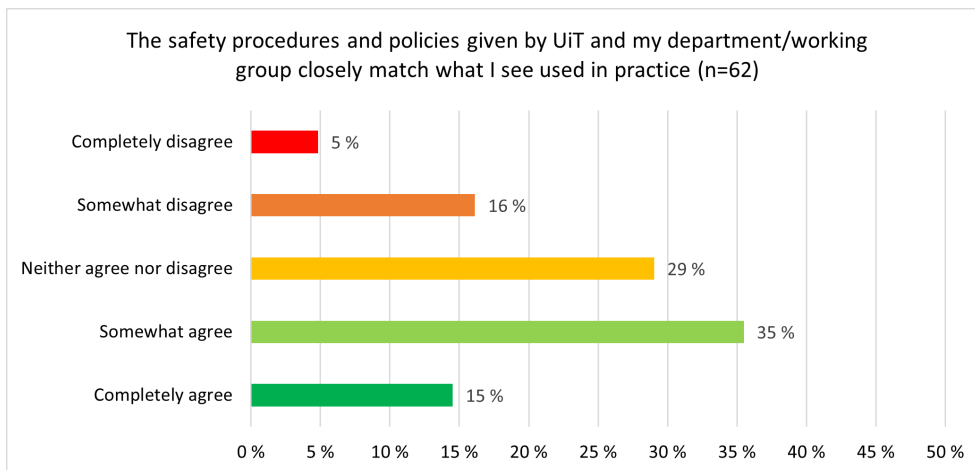

Figure 4 Survey answers to the question 'How much do you agree with the following statement: The safety procedures and policies given by UiT and my department/working group closely match what I see used in practice.'

Difficulties finding information were also frequently mentioned in the answers to the free text questions (i.e., 'Are there any aspects of safety at UiT that you feel are lacking or need improvement? Have you had any particular challenges or difficulties related to safety at UiT?' and 'Are there any programs or features you would like to see added to UiT's safety system?'). There is a high demand for an easier to navigate website and a better communication line. Documentation needs to be easier to find and to access, organized in a more intuitive way, and be available in English. One suggestion was to copy the structure of a well-functioning website from another university.
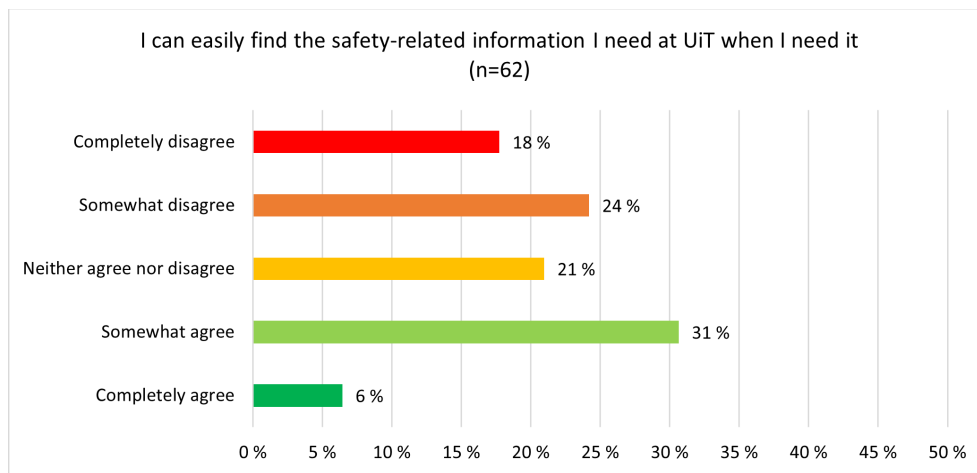
Figure 5 Survey answers to the question 'How much do you agree with the following statement: I can easily find the safety-related information I need at UiT when I need it.'

The responsibility for communicating safety information must also be clearly defined. Local HSE work is often left to concerned staff to do (uncompensated) in addition to their normal work, and a general impression seems to be that a lot of responsibility is put on supervisors or new/temporary staff without support, rather than designated permanent staff with appropriate training and experience. This leads to the impression that safety is not always prioritized and to variable knowledge of safety protocols. Furthermore, new rules and regulations are implemented without consulting the end users (e.g., the introduction of new waste contacts).

Another topic brought up was difficulty in getting actual help when safety issues arise. There is no clear chain of command and poor communication across the organization, resulting in safety concerns being bounced around between different levels. People experience that responsibility is put on the individual rather than being handled systematically. On a positive note, several people mention that they feel supported by their local safety representatives (verneombud). Economy also appears to be an important aspect, e.g., with difficulties getting reimbursed for taxi trips to the emergency room or safety measures not being taken due to costs having to be paid for by a specific project.

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In terms of lab safety, there are concerns about policies decided at level 1 and 2 without consulting the end-users. Involving experienced lab personnel in these decisions would ensure that the right precautions are implemented in a

reasonable way. There is also a demand for a more user-friendly chemical registry. The current system (CHESS) is not intuitive or practical to use: some features are missing, and end-users often have to ask more experienced colleagues how to deal with chemicals, which is inefficient and time consuming. Chemical waste handling and storage seems to be an issue in some laboratories but mentioned by others to have been improved lately.

Another common topic in the survey responses was field safety. Concerns were raised about the lack of safety guidelines and training before going into the field (e.g., relevant first aid training, practical training for how to act in an emergency), especially for land-based fieldwork. For sea-going fieldwork, hands-on safety courses and safety briefings were not reported to be a problem, although the extent of safety training varies between research vessels. Working alone and in inaccessible areas is another reported issue. Several of the respondents raised concerns about lacking routines for check-ins with people in the field. It appears to be common practice to ask a colleague or friend to be your contact person, thus leaving someone unpaid and untrained in charge, without any support from the UiT system. Furthermore, not everyone is informed and educated about available safety equipment, such as satellite phones. One suggestion was to assign a designated field safety responsible, who should have an overview of researchers/students in the field (check-in/check-out) and have a 24/7 duty phone. This person should also have knowledge of and advice on safety protocols.

Lack of appropriate templates for risk assessments, as well as associated unclear rules about approval, storage and follow-up, appears to be another weak spot, both concerning fieldwork and laboratory work. It is unclear who should approve the risk assessments (sometimes it is assigned to the head of department/head of admin, who often lack the necessary competence and experience), and at some departments official approval is not even required. This gives the impression that

no one is reading them anyway, and that UiT is not taking responsibility to ensure that their employees are taking safety precautions. Sometimes the available templates are not suitable for the relevant types of risks involved, and there is no system for how the risk assessments should be archived and followed up on. However, it should be noted that a couple of respondents were happy about the risk assessment routines, so perhaps this is an area which works well in some groups or departments but not others.

There are also concerns about the psychosocial working environment. Problems with bullying and other social safety issues are not always handled professionally by management. Reported matters are handled too informally and situations are not sufficiently resolved to prevent future problems. This critical topic is outside the scope of this report, but something that needs to be investigated further.

6.3.   Table of links

FOOT NOTE	PAGE	TEXT AND LINK
1	11	The Working Environment Act § 6 https://www.arbeidstilsynet.no/globalassets/regelverkspdfer/working-environment-act
2	14	manual in Norwegian https://cp.compendia.no/uit/hms-handbok
2	14	manual in English https://cp.compendia.no/uit/hse-manual
3	16	Forskrift om organisering, ledelse og medvirkning § 8-1 Gjennomgående krav til opplæring https://www.arbeidstilsynet.no/regelverk/forskrifter/forskrift-om-organisering-ledelse-og-medvirkning/8/8-1
4	18	Arbeidstilsynet's guidance on employee contribution https://www.arbeidstilsynet.no/hms/roller-i-hms-arbeidet/arbeidsgiver/arbeidsgivers-plikt-til-a-sorge-for-medvirkning
4	18	Arbeidsmiljøloven § 3-1 https://www.arbeidstilsynet.no/regelverk/lover/arbeidsmiljoloven/3/3-1
4	18	Forskrift om organisering, ledelse og medvirkning § 2-1 https://www.arbeidstilsynet.no/regelverk/forskrifter/forskrift-om-organisering-ledelse-og-medvirkning/2/2-1
7	21	Example of a useful IT announcement https://uit.topdesk.net/tas/public/ssp/content/search?q=KI%202745
10	24	Biological sample registration form via Nettskjema https://nettskjema.no/a/224691

12	32	Some information about general training requirements including both regulations and Arbeidstilsynet's commentary on those https://www.arbeidstilsynet.no/regelverk/forskrifter/forskrift-om-organisering-ledelse-og-medvirkning/8/8-1
14	38	Forskrift om organisering, ledelse og medvirkning § 8-1 Gjennomgående krav til opplæring https://www.arbeidstilsynet.no/regelverk/forskrifter/forskrift-om-organisering-ledelse-og-medvirkning/8/8-1
16	49	iTromsø coverage https://www.itromso.no/nyheter/i/4z4PvR/deler-av-uit-evakuert-etter-kjemikalielekkasje
16	49	Nordlys coverage https://www.nordlys.no/deler-av-universitetet-evakuert-lekkasje-fra-et-kjoleskap/s/5-34-1340909
16	49	NRK coverage https://www.nrk.no/tromsogfinnmark/lekkasje-pa-uit-i-tromso-1.15126360
17	54	Hjem / HSE regulations / Routines HSE https://cp.compendia.no/uit/hse-manual/210570
19	61	Forskrift om utførelse av arbeid § 14 https://www.arbeidstilsynet.no/regelverk/forskrifter/forskrift-om-utforelse-av-arbeid/3/14
20	67	Forskrift om organisering, ledelse og medvirkning § 8-1 Gjennomgående krav til opplæring https://www.arbeidstilsynet.no/regelverk/forskrifter/forskrift-om-organisering-ledelse-og-medvirkning/8/8-1/
21	68	JEDI's Fieldwork Code of Conduct https://en.uit.no/project/jedi_ig/fieldworkcodeofconduct
23	78	Graviditet og arbeidsmiljø https://www.arbeidstilsynet.no/tema/graviditet-og-arbeidsmiljo
23	78	Forskrift om utførelse av arbeid § 7-1 https://www.arbeidstilsynet.no/regelverk/forskrifter/forskrift-om-utforelse-av-arbeid/2/7/7-1
25	85	Arbeidstilsynet's list of areas requiring additional training https://www.arbeidstilsynet.no/arbeidsforhold/opplaring