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Letter to operators, rig owners and onshore facilities

Our case officer
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Your ref.	Our ref. (please quote when replying)	Date
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Follow-up of artificial intelligence (AI)

Goal
With this letter, we wish to contribute with professional guidance and information about artificial intelligence (AI) follow-up.

The HSE regulations in the petroleum industry are function-based, technology-neutral and based on principles of risk management. This makes the regulations as they currently exist equally applicable when following up AI solutions. This letter must be viewed in the light of the latest applicable HSE regulations.

Target group
We disseminate a significant amount of information about AI and safety, however we find that the information does not always reach target audiences.We are therefore sending a letter directly to the companies, as well as publishing the information here on the website.

We request that managers and employees responsible for acquiring, developing and operating systems that use AI, as well as employees' representatives, are made aware of this letter and it's content.

Background
The Government's national strategy for artificial intelligence was published in January 2020. The strategy emphasises that the supervisory authorities, within their areas of responsibility, should follow-up that companies using AI operate under the principles of responsible and trustworthy use of artificial intelligence. The Norwegian Ocean Industry Authority (Havtil) uses the national strategy's definition of AI. This strategy is available at regjeringen.no [1].

In 2024, the Ministry of Digitalisation and Public Governance published a new national digitisation strategy.[2] Concerning AI, this sets out that, leading up to 2030, the Government will establish a national infrastructure for AI, placing Norway at the vanguard of ethical and safe AI use.
Norway has established an overview of national AI resources, which is available at regjeringen.no[3].

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[1] https://www.regjeringen.no/no/dokumenter/nasjonal-strategi-for-kunstig-intelligens/id2685594/?ch=1

[2] https://www.regjeringen.no/no/dokumenter/fremtidens-digitale-norge/id3054645/

[3] https://www.regjeringen.no/no/tema/statlig-forvaltning/it-politikk/KI-strategi/ki-ressurser/norske-ki-rapporter/id2641577/

Knowledge base and follow-up in the industry

We have published a number of articles andresearch reports on our website about risks associated with AI. One example is DNV GL's report "Responsible use of artificial intelligence in the petroleum sector" (2024).

This report describes the fundamental risk factors involved in development and use of artificial intelligence in the petroleum industry, especially with regard to major accident risk.
This report, as well as other studies, relevant to our follow-up of digital technologies such as AI, are available under the Artificial Intelligence topic here on the website. This is knowledge that companies should deploy in their own risk management activities.

In recent years, a number of international publications and overviews have also been prepared that provide information about possible risks and key mechanisms for the proper development and use of AI. This is knowledge that has been key to the design of European regulations and standards, as well as various national and international strategies. These have also been important sources of knowledge for Havtil's work on AI and follow-up of the industry.

AI in the petroleum industry also represents uncertainty. There is currently a limited basis for knowledge-based decisions related to safe use of AI in safety-related systems. In many cases, the technology is not sufficiently documented and reliable. There is limited knowledge about incidents that may occur, or how AI may be one of several underlying causal factors in potential incidents. A weak knowledge base and high uncertainty suggest that the precautionary principle must apply to the responsible development and use of AI.

The introduction of systems that include AI is developing at a rapid pace. Through our audits, we often meet decision makers who have limited familiarity with how AI is regulated. The industry has repeatedly expressed the need for professional guidance and information on how the development of technology should be seen in the light of the design and purpose of the regulations.

Based on this industry trend of increasing deployment of AI systems, we see a need to strengthen our follow-up of the companies' risk management pertaining to the development, use and maintenance of AI. Havtil's attention is primarily directed towards the responsible use of AI in the petroleum industry as a major accident industry.

AI in the light of the design and purpose of the regulations

Petroleum activities are associated with major accident risk. Havtil's regulations have a risk-based approach, where necessary risk reduction and a prudent level of safety are prerequisites for the activity. The companies are responsible for safety. This responsibility also includes the responsible use of AI.

The use of AI in the petroleum industry can affect risks related to major accidents, safety systems, barriers or critical infrastructure. AI in planning, operations and as decision support can directly and indirectly affect safety, the working environment, emergency preparedness and security.

The table below presents selected regulatory requirements and how they may be applied (Table 1). AI is a discipline that is evolving rapidly, and efforts are underway to establish new standards in the field. We will consider the need for updates to our regulations as well as references to new standards in the future. We therefore ask you to keep up-to-date on any changes in our regulations at www.havtil.no.

Regulatory requirements that are relevant in the assessment related to follow-up of AI systems (the list is not exhaustive) [4]	Examples of how the regulations may be applied in the follow-up of AI systems
Framework Regulations, section 11 concerning risk reduction principles, second and third paragraphs In reducing the risk, the responsible party shall choose the technical, operational or organisational solutions that, according to an individual and overall evaluation of the potential harm and present and future use, offer the best results, provided the costs are not significantly disproportionate to the risk reduction achieved. If there is insufficient knowledge concerning the effects that the use of technical, operational or organisational solutions can have on health, safety or the environment, solutions that will reduce this uncertainty, shall be chosen.	This entails choosing solutions that reduce the likelihood of the use of AI contributing to the occurrence of failures, hazard and accident situations. This also means choosing solutions that reduce known AI risks, and that technical, operational and organisational measures contribute to further risk reduction. Risk reduction is essential throughout the lifecycle of the AI system.
Framework Regulations, section 23 concerning general requirements for material and information The responsible party shall prepare and retain material and information necessary to ensure and document that the activities are planned and carried out in a prudent manner. The responsible party shall ensure that documentation demonstrating compliance with requirements stipulated in or pursuant to these regulations, can be provided. The responsible party shall establish criteria for what constitutes necessary documentation. The extent of the documentation shall be adapted to the nature of the enterprise and the activities carried out. Such material and information as mentioned in the first subsection shall be available in Norway free of charge to the authorities mentioned in Section 67 of these regulations.	This entails the responsible party securing technical documentation of AI systems, when purchasing, modifying or developing them in-house. This includes documenting the development and use of the AI system. This may include, for example, information about what data is included, as well as training, testing and validation of the AI system. Documentation of the AI system shall also be made available to the supervisory authorities so that audits and investigations can be conducted.
Framework Regulations, section 13 concerning facilitating employee participation, first paragraph The responsible party shall ensure that the employees and their elected representatives are given the opportunity to participate in matters of	This entails that the knowledge and experience of both users and employee representatives is included in the work of developing and

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[4] The English translation provided below is unofficial. Any disputes over the wording of the regulations shall be decided on the basis of the Norwegian text at www.havtil.no.

importance for the working environment and safety in the petroleum activities, according to requirements stipulated by and pursuant to the Working Environment Act and these regulations. Such participation shall be ensured in all the various phases of the activities.	implementing AI systems that affect the working environment and safety. When the introduction of new technologies such as AI leads to changes in work processes and other organisational changes, the employee representatives must be given the opportunity to participate.

Management Regulations, section 5 concerning barriers, first, second and fourth paragraphs
 	
Barriers shall be established that at all times can
   a. identify conditions that can lead to failures, hazard and accident situations,
   b. reduce the possibility of failures, hazard and accident situations occurring and developing,
   c. limit possible harm and inconveniences.
 	
Where more than one barrier is necessary, there shall be sufficient independence between barriers.
 	
Personnel shall be aware of what barriers have been established and which function they are intended to fulfil, as well as what performance requirements have been defined in respect of the concrete technical, operational or organisational barrier elements necessary for the individual barrier to be effective.
 	
Guideline:
Performance as mentioned in the fourth subsection, means verifiable requirements to, inter alia, capacity, reliability, accessibility, efficiency, ability to withstand loads, integrity and robustness.
	Where the use of AI will be included as part of barrier functions related to various failures, hazard and accident situations, the same requirements regarding reliability, availability, functionality, integrity, robustness and independence will apply.

Management Regulations, section 11 concerning the basis for making decisions and decision criteria, first and fourth paragraphs Before decisions are made, the responsible party shall ensure that issues relating to health, safety and the environment have been comprehensively and adequately considered. Assumptions that form the basis for a decision, shall be expressed so they can be followed up.	This means that decisions informed by AI must have the requisite quality. .Decisions informed by AI must be expressed in such a way that they can be followed up. This requirement also addresses decisions included in the company's risk management of AI. It is important to ensure an adequate knowledge base by involving relevant professionals and user groups.

Management Regulations, section 16 concerning general requirements for analyses, first, second and third paragraphs The responsible party shall ensure that analyses are carried out that provide the necessary basis for making decisions to safeguard health, safety and the environment. Recognised and suitable models, methods and data shall be used when conducting and updating the analyses. The purpose of each risk analysis shall be clear, as well as the conditions, premises and limitations that form its basis. The individual analysis shall be presented such that the target groups receive a balanced and comprehensive presentation of the analysis and the results.	This entails using recognised and fit-for-purpose AI models. This means that the purpose of the model, and the representativeness, validity and limitations of the data must be made visible. Decisions that can affect health, safety and the environment and that are informed by AI systems must be reliable. Results from analyses from AI systems may be inaccurate or incorrect as a result of error sources from, for example, training of models, discrepancies between training and operational data, or use of outdated data. It is important that users of safety-related AI systems are made aware of the AI system's characteristics, and that AI system results are communicated to the target audience in a nuanced and holistic manner.
Management Regulations, section 13 concerning work processes, second and third paragraphs The interaction between human, technological and organisational factors shall be safeguarded in the work processes. Work processes and associated interfaces of significance to health, safety and the environment shall be described. The level of detail in the description shall be adapted to the importance of the process for health, safety and the environment.	This means that where AI systems are included in work processes, it is important to pay heed to their interaction with human and organisational factors. AI systems included in work processes and interfaces between them must be described.
Facilities Regulations, section 9, and Technical and Operational Regulations, section 9, concerning the qualification and use of new technology and new methods Where the petroleum activities entail use of new technology or new methods, criteria shall be drawn up for development, testing and use so that the requirements for health, safety and the environment are fulfilled. The criteria shall be representative for the relevant conditions of use, and the technology or methods shall be adapted to already accepted solutions.	This entails establishing representative criteria for the development, testing and use of AI systems. This also applies to systems which include AI systems. Criteria for the development and testing of AI systems should be representative of the area of use. Test criteria must cover both normal and failures, , hazard and accident situations.

The qualification or testing shall demonstrate that applicable requirements can be fulfilled using the relevant new technology or methods.	It is important that the design of AI systems is human-centred and that test criteria for system performance are developed, i.e. interactions between people, the AI technology and the organisation.
Facilities Regulations, section 21, and Technical and Operational Regulations, section 21, concerning human-machine interface and information presentation, first and second paragraphs Monitor-based equipment and other technical equipment for monitoring, controlling and operating machines, installations or production processes, shall be designed to reduce the risk of mistakes that can have an impact on safety. […]The presented information shall be correct and easy to understand.	This entails AI systems presenting correct and easily accessible information to the user. This also includes the quality of information presentation, transparency, and explainability in the user interface. AI systems shall be supervisable, measures to assure quality in output from the AI system shall be available. This means that the interface communicates limitations and uncertainties in the AI system's results in a correct and easily understandable manner. The AI system must also support the user's ability to easily and quickly perform necessary actions, and be dimensioned for both normal and critical situations.
Facilities Regulations, sections 32-34 concerning fire and gas detection system, emergency shutdown system and process safety system, first paragraph The system shall be able to perform the intended functions independently of other systems.	For systems where independence is currently required, the independence requirement will also apply if AI solutions are integretedin the systems.
Facilities Regulations, section 34a concerning control and monitoring system Facilities shall have control and monitoring systems which, using associated alarms, warn of incidents, nonconformities or faults that are significant for safety.	This entails the AI system being protected against cyber related hazards and the system itself having robust protection against attacks that can affect the reliability of the AI solution.

Guideline: […] protecting against ICT-related hazards.	
Activities Regulations, section 31 concerning monitoring and control, first and third paragraphs and **Technical and Operational Regulations, section 57 concerning monitoring and control** The responsible party shall ensure that matters of significance for prudent execution of the activities as regards health and safety, are monitored and kept under control at all times, cf. Section 19 of the Management Regulations. Personnel with control and monitoring functions shall at all times be able to efficiently collect and process information on such conditions, cf. also Section 14 of the Management Regulations.	This entails that where AI is used in systems of importance for safety, it shall be possible for users to perform monitoring and control functions in a safe and effective manner at all times. This also involves sufficient manning and competence to perform these tasks.
Activities Regulations, section 45 concerning maintenance The responsible party shall ensure that facilities or parts thereof are maintained, so that they are capable of carrying out their required functions in all phases of their lifetime. **Technical and Operational Regulations, section 58 concerning maintenance** The responsible party shall ensure that land facilities and parts thereof are maintained, so that the required functions are safeguarded in all phases of the lifetime.	This entails AI systems being maintained from a lifecycle perspective, including the maintenance of data comprised in the AI system.
Activities Regulations, section 23 concerning training and drills, first paragraph and **Technical and Operational Regulations, section 52 concerning practice and exercises** The responsible party shall ensure that necessary training and necessary drills are conducted, so that the personnel are always able to handle operational disturbances and hazard and accident situations in an effective manner.	The requirement for training and drills also applies to personnel using AI systems. Training, practice and exercises are essential for enabling personnel to use AI systems in a responsible manner.
Activities Regulations, section 47 concerning maintenance programme, first and second paragraphs	

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Failure modes that may constitute a health, safety or environment risk, cf. Section 46, shall be systematically prevented through a maintenance programme. This programme shall include activities for monitoring performance and technical condition, which ensure identification and correction of failure modes that are under development or have occurred. **Technical and Operational Regulations, section 59a concerning maintenance programme, first and second paragraphs** Failure modes that may constitute a health, safety or environment risk, cf. Section 58, shall be systematically prevented through a maintenance programme. This programme shall include activities for monitoring performance and technical condition, which ensure identification and correction of failure modes that are under development or have occurred.	This entails that failure modes and model biases are systematically prevented through the use of a maintenance programme for the AI system. This also entails activities to monitor the performance and technical condition of the AI system so that failure modes or model biases are identified and corrected from a lifecycle perspective.

The Facilities Regulations and Activities Regulations apply to offshore operations. The Technical and Operational Regulations apply to onshore facilities.

Yours sincerely

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