

Dokumentation über die Übernahme von

"No. SF-1"

(Safety Fundamentals - The Safety of Nuclear Installations)

in die

"Sicherheitskriterien für Kernkraftwerke"

REVISION D

APRIL 2009

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2. Safety Objective

Stand Regelwerk: Revision D

Art.	Inhalt	Team	*Kennung	Kapitel im Modul	Begründung
2.1	<p>The fundamental safety objective is to protect people and the environment from harmful effects of ionizing radiation.</p> <p>This fundamental safety objective of protecting people — individually and collectively — and the environment has to be achieved without unduly limiting the operation of facilities or the conduct of activities that give rise to radiation risks. To ensure that facilities are operated and activities conducted so as to achieve the highest standards of safety that can reasonably be achieved, measures have to be taken:</p> <ul style="list-style-type: none"> (a) To control the radiation exposure of people and the release of radioactive material to the environment; (b) To restrict the likelihood of events that might lead to a loss of control over a nuclear reactor core, nuclear chain reaction, radioactive source or any other source of radiation; (c) To mitigate the consequences of such events if they were to occur. 	1	b	M1) Grundsätze M1) 2 (1) M1) 2.1 (1) M1) 2.1 (3) M1) 2.3 M1) 2.4 (1)	Übergeordnete diesbezügliche Regelungen sind im AtG bzw. in der StrlSchV angesprochen.
2.2	<p>The fundamental safety objective applies for all facilities and activities, and for all stages over the lifetime of a facility or radiation source, including planning, siting, design, manufacturing, construction, commissioning and operation, as well as decommissioning and closure. This includes the associated transport of radioactive material and management of radioactive waste.</p>	1	b	M1) Grundsätze	Die Module regeln ausschließlich den Betrieb von Kernkraftwerken.
2.3	<p>Ten safety principles have been formulated, on the basis of which safety requirements are developed and safety measures are to be implemented in order to achieve the fundamental safety objective. The safety principles form a set that is applicable in its entirety; although in practice different principles may be more or less important in relation to particular circumstances, the appropriate application of all relevant principles is required.</p>	-	-	-	Kein Regelungsinhalt.

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Art.	Inhalt	Team	*Kennung	Kapitel im Modul	Begründung
3.1	For the purposes of this publication, 'safety' means the protection of people and the environment against radiation risks, and the safety of facilities and activities that give rise to radiation risks. 'Safety' as used here and in the IAEA safety standards includes the safety of nuclear installations, radiation safety, the safety of radioactive waste management and safety in the transport of radioactive material; it does not include non-radiation-related aspects of safety.	-	-	-	Textinterne Definition, kein Regelungsinhalt.
3.2	Safety is concerned with both radiation risks under normal circumstances and radiation risks as a consequence of incidents ⁴ , as well as with other possible direct consequences of a loss of control over a nuclear reactor core, nuclear chain reaction, radioactive source or any other source of radiation. Safety measures include actions to prevent incidents and arrangements put in place to mitigate their consequences if they were to occur. ⁴ 'Incidents' includes initiating events, accident precursors, near misses, accidents and unauthorized acts (including malicious and non-malicious acts).	1	a	M1) 2.1 (1) M1) 2.1 (3)	
	Principle 1: Responsibility for safety The prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risks.				
3.3	The person or organization responsible for any facility or activity that gives rise to radiation risks or for carrying out a programme of actions to reduce radiation exposure has the prime responsibility for safety ⁵ . ⁵ Not having an authorization would not exonerate the person or organization responsible for the facility or activity from the responsibility for safety.	1	a	M1) Grundsätze	Rechtliche Regelungen, wie in der Fußnote angesprochen, sind nicht Gegenstand der Module.
3.4	Authorization to operate a facility or conduct an activity may be granted to an operating organization or to an individual, known as the licensee ⁶ . ⁶ For the purposes of this publication, the term 'licensee' is used; other forms of authorization such as registration may apply. Under some circumstances, the government or an employer may assume responsibility for the safety of facilities and activities.	-	-	-	Verwaltungsrechtliche Vorgaben sind nicht Gegenstand der Module.
3.5	The licensee retains the prime responsibility for safety throughout the lifetime of facilities and activities, and this responsibility cannot be delegated. Other groups, such as designers,	1	a	M1) 1(4)	

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	manufacturers and constructors, employers, contractors, and consignors and carriers, also have legal, professional or functional responsibilities with regard to safety.			Grundsätze	
3.6	<p>The licensee is responsible for:</p> <ul style="list-style-type: none"> - Establishing and maintaining the necessary competences; - Providing adequate training and information; - Establishing procedures and arrangements to maintain safety under all conditions; - Verifying appropriate design and the adequate quality of facilities and activities and of their associated equipment; - Ensuring the safe control of all radioactive material that is used, produced, stored or transported; - Ensuring the safe control of all radioactive waste that is generated. <p>These responsibilities are to be fulfilled in accordance with applicable safety objectives and requirements as established or approved by the regulatory body, and their fulfilment is to be ensured through the implementation of the management system.</p>	1	a	M1) 1.	
3.7	Since radioactive waste management can span many human generations, consideration must be given to the fulfilment of the licensee's (and regulator's) responsibilities in relation to present and likely future operations. Provision must also be made for the continuity of responsibilities and the fulfilment of funding requirements in the long term.	-	-	-	Behördliche Aufgabenstellung.
	<p>Principle 2: Role of government</p> <p>An effective legal and governmental framework for safety, including an independent regulatory body, must be established and sustained.</p>				
3.8	A properly established legal and governmental framework provides for the regulation of facilities and activities that give rise to radiation risks and for the clear assignment of responsibilities. The government is responsible for the adoption within its national legal system of such legislation, regulations, and other standards and measures as may be necessary to fulfil all its national responsibilities and international obligations effectively, and for the	-			Behördliche Aufgabenstellungen sind nicht Gegenstand der Module.

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	establishment of an independent regulatory body.				
3.9	<p>Government authorities have to ensure that arrangements are made for preparing programmes of actions to reduce radiation risks, including actions in emergencies, for monitoring releases of radioactive substances to the environment and for disposing of radioactive waste. Government authorities have to provide for control over sources of radiation for which no other organization has responsibility, such as some natural sources, 'orphan sources'⁷ and radioactive residues from some past facilities and activities.</p> <p>⁷ An 'orphan source' is a radioactive source that is not under regulatory control, either because it has never been under regulatory control, or because it has been abandoned, lost, misplaced, stolen or otherwise transferred without proper authorization.</p>	-			Behördliche Aufgabenstellungen sind nicht Gegenstand der Module.
3.10	<p>The regulatory body must:</p> <ul style="list-style-type: none"> - Have adequate legal authority, technical and managerial competence, and human and financial resources to fulfil its responsibilities; - Be effectively independent of the licensee and of any other body, so that it is free from any undue pressure from interested parties; - Set up appropriate means of informing parties in the vicinity, the public and other interested parties, and the information media about the safety aspects (including health and environmental aspects) of facilities and activities and about regulatory processes; - Consult parties in the vicinity, the public and other interested parties, as appropriate, in an open and inclusive process. <p>Governments and regulatory bodies thus have an important responsibility in establishing standards and establishing the regulatory framework for protecting people and the environment against radiation risks. However, the prime responsibility for safety rests with the licensee.</p>	-			Behördliche Aufgabenstellungen sind nicht Gegenstand der Module.
3.11	In the event that the licensee is a branch of government, this branch must be clearly identified as distinct from and effectively independent of the branches of government with responsibilities for regulatory functions.	-			Behördliche Aufgabenstellungen sind nicht Gegenstand der Module.

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	<p>Principle 3: Leadership and management for safety</p> <p>Effective leadership and management for safety must be established and sustained in organizations concerned with, and facilities and activities that give rise to, radiation risks.</p>				
3.12	<p>Leadership in safety matters has to be demonstrated at the highest levels in an organization. Safety has to be achieved and maintained by means of an effective management system. This system has to integrate all elements of management so that requirements for safety are established and applied coherently with other requirements, including those for human performance, quality and security, and so that safety is not compromised by other requirements or demands. The management system also has to ensure the promotion of a safety culture, the regular assessment of safety performance and the application of lessons learned from experience.</p>	1	a	M1) 1 (1) M1) 1 (4)	
3.13	<p>A safety culture that governs the attitudes and behaviour in relation to safety of all organizations and individuals concerned must be integrated in the management system. Safety culture includes:</p> <ul style="list-style-type: none"> - Individual and collective commitment to safety on the part of the leadership, the management and personnel at all levels; - Accountability of organizations and of individuals at all levels for safety; - Measures to encourage a questioning and learning attitude and to discourage complacency with regard to safety. 	1	a	M1) Grundsätze M1) 1 (1) M1) 1 (4)	
3.14	<p>An important factor in a management system is the recognition of the entire range of interactions of individuals at all levels with technology and with organizations. To prevent human and organizational failures, human factors have to be taken into account and good performance and good practices have to be supported.</p>	1	a	M1) Grundsätze M1) 1 (1)	
3.15	<p>Safety has to be assessed for all facilities and activities, consistent with a graded approach. Safety assessment involves the systematic analysis of normal operation and its effects, of the ways in which failures might occur and of the consequences of such failures. Safety assessments cover the safety measures necessary to control the hazard, and the design and engineered safety features are assessed to demonstrate that they fulfil the safety functions required of them. Where control measures or operator actions are called on to maintain safety,</p>	1	a	M1) 2.1 (1) M1) 2.1 (4) M1) 4 M1) 5 (1) M1) 5 (2) M1) 5 (7)	Der letzte Satz ist Gegenstand des AtG bzw. eine Vorgabe an behördliche Stellen.

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	an initial safety assessment has to be carried out to demonstrate that the arrangements made are robust and that they can be relied on. A facility may only be constructed and commissioned or an activity may only be commenced once it has been demonstrated to the satisfaction of the regulatory body that the proposed safety measures are adequate.			M1) 5 (8)	
3.16	The process of safety assessment for facilities and activities is repeated in whole or in part as necessary later in the conduct of operations in order to take into account changed circumstances (such as the application of new standards or scientific and technological developments), the feedback of operating experience, modifications and the effects of ageing. For operations that continue over long periods of time, assessments are reviewed and repeated as necessary. Continuation of such operations is subject to these reassessments demonstrating to the satisfaction of the regulatory body that the safety measures remain adequate.	1	A	M1) 5 (1) bis 5 (11)	Siehe auch Anforderungen im Hinblick auf periodische Sicherheitsbewertungen.
3.17	Despite all measures taken, accidents may occur. The precursors to accidents have to be identified and analysed, and measures have to be taken to prevent the recurrence of accidents. The feedback of operating experience from facilities and activities — and, where relevant, from elsewhere — is a key means of enhancing safety. Processes must be put in place for the feedback and analysis of operating experience, including initiating events, accident precursors, near misses, accidents and unauthorized acts, so that lessons may be learned, shared and acted upon.	1	a	M1) 3.1 (2) M1) 5 (3) M1) 5 (5)	
	Principle 4: Justification of facilities and activities Facilities and activities that give rise to radiation risks must yield an overall benefit.				
3.18	For facilities and activities to be considered justified, the benefits that they yield must outweigh the radiation risks to which they give rise. For the purposes of assessing benefit and risk, all significant consequences of the operation of facilities and the conduct of activities have to be taken into account.	-			Kein Regelungsinhalt der Module.
3.19	In many cases, decisions relating to benefit and risk are taken at the highest levels of government, such as a decision by a State to embark on a nuclear power programme. In other cases, the regulatory body may determine whether proposed facilities and activities are justified.	-			Kein Regelungsinhalt der Module.

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3.20	Medical radiation exposure of patients — whether for diagnosis or treatment — is a special case, in that the benefit is primarily to the patient. The justification for such exposure is therefore considered first with regard to the specific procedure to be used and then on a patient by patient basis. The justification relies on clinical judgement as to whether a diagnostic or therapeutic procedure would be beneficial. Such clinical judgement is mainly a matter for medical practitioners. For this reason, medical practitioners must be properly trained in radiation protection.	-			Kein Regelungsinhalt der Module.
	Principle 5: Optimization of protection Protection must be optimized to provide the highest level of safety that can reasonably be achieved.				
3.21	The safety measures that are applied to facilities and activities that give rise to radiation risks are considered optimized if they provide the highest level of safety that can reasonably be achieved throughout the lifetime of the facility or activity, without unduly limiting its utilization.	1	a	M1) 3.1 (1) M1) 3.1 (2) M1) 3.1 (3)	
3.22	To determine whether radiation risks are as low as reasonably achievable, all such risks, whether arising from normal operations or from abnormal or accident conditions, must be assessed (using a graded approach) a priori and periodically reassessed throughout the lifetime of facilities and activities. Where there are interdependences between related actions or between their associated risks (e.g. for different stages of the lifetime of facilities and activities, for risks to different groups or for different steps in radioactive waste management), these must also be considered. Account also has to be taken of uncertainties in knowledge.	1	a	M1) 2.1 (1) M1) 2.1 (3) M1) 3.1 (3) M1) 5 (9) M1) 5 (12) M1) 5 (13)	Siehe auch Anforderungen an periodische Sicherheitsüberprüfungen.
3.23	The optimization of protection requires judgements to be made about the relative significance of various factors, including: <ul style="list-style-type: none"> - The number of people (workers and the public) who may be exposed to radiation; - The likelihood of their incurring exposures; - The magnitude and distribution of radiation doses received; - Radiation risks arising from foreseeable events; - Economic, social and environmental factors. 	9	a	M9) 1 (1) M9) 1.1 M9) 1.2 M9) 2.1 (1)	Die Berücksichtigung der sozialen und wirtschaftlichen Faktoren bei der Dosisreduzierung („Optimierung“) ist in der Formulierung „unter Berücksichtigung aller Umstände des Einzelfalls“ in § 6 (2) StrlSchV enthalten

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	The optimization of protection also means using good practices and common sense to avoid radiation risks as far as is practical in day to day activities.				
3.24	The resources devoted to safety by the licensee, and the scope and stringency of regulations and their application, have to be commensurate with the magnitude of the radiation risks and their amenability to control. Regulatory control may not be needed where this is not warranted by the magnitude of the radiation risks.	1	a	M1) 1 (4)	
Principle 6: Limitation of risks to individuals Measures for controlling radiation risks must ensure that no individual bears an unacceptable risk of harm.					
3.25	Justification and optimization of protection do not in themselves guarantee that no individual bears an unacceptable risk of harm. Consequently, doses and radiation risks must be controlled within specified limits.	1	a	M1) 2.4	
		9	a	M9) 1,1(1) 1.2 (1)	Dosisbegrenzung ist in StrlSchV § 5 gefordert und für Bevölkerung in §§ 46/47 , für beruflich strahlenexponierte Peronen in §§ 56-58 konkretisiert. Modul 1, Nummer 2.4 (1) nimmt bei den radiologischen Sicherheitszielen Bezug dazu; in Modul 9 wird dies in Nummer 1.1(1) und 1.2(1) konkretisierend ausgeführt
3.26	Conversely, because dose limits and risk limits represent a legal upper bound of acceptability, they are insufficient in themselves to ensure the best achievable protection under the circumstances, and they therefore have to be supplemented by the optimization of protection. Thus both the optimization of protection and the limitation of doses and risks to individuals are necessary to achieve the desired level of safety.	1	a	M1) 2.4	
		9	a	M9) 1,1(1) M9) 1.2 (1)	§6 StrlSchV enthält das Dosisreduzierungsgebot, auf das in Modul 1 und Modul 9 konkretisierend Bezug genommen wird
Principle 7: Protection of present and future generations					

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	People and the environment, present and future, must be protected against radiation risks.				
3.27	<p>Radiation risks may transcend national borders and may persist for long periods of time. The possible consequences, now and in the future, of current actions have to be taken into account in judging the adequacy of measures to control radiation risks. In particular:</p> <ul style="list-style-type: none"> - Safety standards apply not only to local populations but also to populations remote from facilities and activities. - Where effects could span generations, subsequent generations have to be adequately protected without any need for them to take significant protective actions. 	-			Kein Regelungsinhalt der Module.
3.28	<p>Whereas the effects of radiation exposure on human health are relatively well understood, albeit with uncertainties⁸, the effects of radiation on the environment have been less thoroughly investigated. The present system of radiation protection generally provides appropriate protection of ecosystems in the human environment against harmful effects of radiation exposure. The general intent of the measures taken for the purposes of environmental protection has been to protect ecosystems against radiation exposure that would have adverse consequences for populations of a species (as distinct from individual organisms).</p> <p>⁸ In particular, assumptions have to be made owing to uncertainties concerning the health effects of radiation exposure at low doses and low dose rates.</p>	-			Kein Regelungsinhalt der Module.
3.29	Radioactive waste must be managed in such a way as to avoid imposing an undue burden on future generations; that is, the generations that produce the waste have to seek and apply safe, practicable and environmentally acceptable solutions for its long term management. The generation of radioactive waste must be kept to the minimum practicable level by means of appropriate design measures and procedures, such as the recycling and reuse of material.	9	a	M9) 3 (1) M9) 3.1(10) 3.1(11)	Der erste Teil der Forderung ist so explizit in Modul 9 nicht ausgeführt, jedoch bereits durch §1 AtG und §9a AtG und §§ 72-79 StrlSchV abgedeckt. Die Abfallbehandlung wird in Modul 9 konkretisiert. So wird in 3.1 gefordert die Menge an Abfällen zu minimieren. 3.1 (10) und (11) stellen Kriterien an den Umgang mit radioaktiven Abfällen.
	<p>Principle 8: Prevention of accidents</p> <p>All practical efforts must be made to prevent and mitigate nuclear or radiation accidents.</p>				

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3.30	<p>The most harmful consequences arising from facilities and activities have come from the loss of control over a nuclear reactor core, nuclear chain reaction, radioactive source or other source of radiation. Consequently, to ensure that the likelihood of an accident having harmful consequences is extremely low, measures have to be taken:</p> <ul style="list-style-type: none"> - To prevent the occurrence of failures or abnormal conditions (including breaches of security) that could lead to such a loss of control; - To prevent the escalation of any such failures or abnormal conditions that do occur; - To prevent the loss of, or the loss of control over, a radioactive source or other source of radiation. 	1	a	M1) 2.1 (1) M1) 2.1 (3) M1) 2.3	
3.31	<p>The primary means of preventing and mitigating the consequences of accidents is 'defence in depth'. Defence in depth is implemented primarily through the combination of a number of consecutive and independent levels of protection that would have to fail before harmful effects could be caused to people or to the environment. If one level of protection or barrier were to fail, the subsequent level or barrier would be available. When properly implemented, defence in depth ensures that no single technical, human or organizational failure could lead to harmful effects, and that the combinations of failures that could give rise to significant harmful effects are of very low probability. The independent effectiveness of the different levels of defence is a necessary element of defence in depth.</p>	1	a	M1) 2 (1) M1) 2.1 (1) M1) 2.1 (3) M1) 2.1 (5) M1) 2.1 (6)	
3.32	<p>Defence in depth is provided by an appropriate combination of:</p> <ul style="list-style-type: none"> - An effective management system with a strong management commitment to safety and a strong safety culture. - Adequate site selection and the incorporation of good design and engineering features providing safety margins, diversity and redundancy, mainly by the use of: <ul style="list-style-type: none"> o Design, technology and materials of high quality and reliability; o • Control, limiting and protection systems and surveillance features; o • An appropriate combination of inherent and engineered safety features. - Comprehensive operational procedures and practices as well as accident management procedures. 	1	a	M1) 1 (1) M1) 2.1 (12) M1) 3.1 (1) M1) 3.1 (2) M1) 3.1 (3) M1) 5 (3)	

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3.33	Accident management procedures must be developed in advance to provide the means for regaining control over a nuclear reactor core, nuclear chain reaction or other source of radiation in the event of a loss of control and for mitigating any harmful consequences.	1	a	M1) 5 (3)	
	Principle 9: Emergency preparedness and response Arrangements must be made for emergency preparedness and response for nuclear or radiation incidents.				
3.34	The primary goals of preparedness and response for a nuclear or radiation emergency are: <ul style="list-style-type: none"> - To ensure that arrangements are in place for an effective response at the scene and, as appropriate, at the local, regional, national and international levels, to a nuclear or radiation emergency; - To ensure that, for reasonably foreseeable incidents, radiation risks would be minor; - For any incidents that do occur, to take practical measures to mitigate any consequences for human life and health and the environment. 	1	a	M1) 2.1 (2) M1) 2.1 (3) M1) 2.1 (13)	
		7	b	M7) 1; M7) 5.1(2)	Bezüglich der anlageninternen Maßnahmen abdeckend berücksichtigt durch Zielsetzung des anlageninternen Notfallschutzes gemäß Kapitel 1 in Modul 7. Die anlagenintern vorzusehenden Maßnahmen umfassen auch die Unterstützung der (örtlichen) Katastrophenschutzbehörden. Darüber hinausgehende Regelungen zur Zusammenarbeit der Behörden auf nationaler und internationaler Ebene sind aber nicht Gegenstand von Modul 7.
3.35	The licensee, the employer, the regulatory body and appropriate branches of government have to establish, in advance, arrangements for preparedness and response for a nuclear or radiation emergency at the scene, at local, regional and national levels and, where so agreed between States, at the international level.	1	b	M1) 2.1 (13)	Vorgaben in den Modulen richten sich ausschließlich an die Betreiber.
3.36	The scope and extent of arrangements for emergency preparedness and response have to	-			Diesbezügliche Regelungen sind in den länderspezifischen

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	<p>reflect:</p> <ul style="list-style-type: none"> - The likelihood and the possible consequences of a nuclear or radiation emergency; - The characteristics of the radiation risks; - The nature and location of the facilities and activities. <p>Such arrangements include:</p> <ul style="list-style-type: none"> - Criteria set in advance for use in determining when to take different protective actions; - The capability to take actions to protect and inform personnel at the scene, and if necessary the public, during an emergency. 				Katastrophenschutzvorgaben festgelegt.
3.37	In developing the emergency response arrangements, consideration has to be given to all reasonably foreseeable events. Emergency plans have to be exercised periodically to ensure the preparedness of the organizations having responsibilities in emergency response.	7	a	M7) 1(2) M7) 2; M7 5.2(4) - 5.2(7)	<p>In Modul 7, Abschnitt 2 ist die Vorgehensweise bei der Ermittlung der für die Planung von Maßnahmen des anlageninternen Notfallschutzes zu berücksichtigenden Anlagenzustände, Ereignisabläufe und Phänomene dargestellt. Der Umfang der anlagenintern vorzusehenden Maßnahmen ist anlagenspezifisch festgelegt. Diese Festlegung erfolgt jedoch nicht im Rahmen von Modul 7.</p> <p>Die vorgesehenen Maßnahmen des anlageninternen Notfallschutzes sind im NHB dargestellt. Ebenso sind Regelungen zur Zusammenarbeit mit zu beteiligenden Organisationen dokumentiert.</p> <p>Jährliche Notfallübungen sind vorgesehen, die auch das Zusammenwirken der verschiedenen Organisationen und ggf. die Beteiligung zuständiger Behörden umfassen.</p>
3.38	When urgent protective actions must be taken promptly in an emergency, it may be acceptable	-			Diesbezügliche Regelungen sind in den

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3. Safety Principles

Stand Regelwerk: Revision D

Art.	Inhalt	Team	*Ken- nung	Kapitel im Modul	Begründung
	for emergency workers to receive, on the basis of informed consent, doses that exceed the occupational dose limits normally applied — but only up to a predetermined level.				länderspezifischen Katastrophenschutzvorgaben festgelegt.
	Principle 10: Protective actions to reduce existing or unregulated radiation risks Protective actions to reduce existing or unregulated radiation risks must be justified and optimized.				
3.39	Radiation risks may arise in situations other than in facilities and activities that are in compliance with regulatory control. In such situations, if the radiation risks are relatively high, consideration has to be given to whether protective actions can reasonably be taken to reduce radiation exposures and to remediate adverse conditions. <ul style="list-style-type: none"> - One type of situation concerns radiation of essentially natural origin. Such situations include exposure to radon gas in dwellings and workplaces, for example, for which remedial actions can be taken if necessary. However, in many situations there is little that can practicably be done to reduce exposure to natural sources of radiation. - A second type of situation concerns exposure that arises from human activities conducted in the past that were never subject to regulatory control, or that were subject to an earlier, less rigorous regime of control. An example is situations in which radioactive residues remain from former mining operations. - A third type of situation concerns protective actions, such as remediation measures, taken following an uncontrolled release of radionuclides to the environment. 	-			Kein Regelungsinhalt der Module.
3.40	In all of these cases, the protective actions considered each have some foreseeable economic, social and, possibly, environmental costs and may entail some radiation risks (e.g. to workers carrying out such actions). The protective actions are considered justified only if they yield sufficient benefit to outweigh the radiation risks and other detriments associated with taking them. Furthermore, protective actions must be optimized to produce the greatest benefit that is reasonably achievable in relation to the costs.	9	a	M9) 1 (1)	Die Kriterien in Modul 9 beziehen sich auf die Betreiber von Anlagen. Die Rechtfertigung einer Tätigkeit ist in §4 StrlSchV geregelt. Allgemeine Anforderungen an Dosisreduzierung und Vermeidung unnötiger Expositionen und sind nach §6 StrlSchV abgedeckt.

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