



**Draft standard and guidelines for the preparation and implementation of  
emergency response and contingency plans**

**Developed by the Legal and Technical Commission**

**DRAFT FOR STAKEHOLDER CONSULTATION  
(DO NOT QUOTE OR CITE)**

**Background**

1. During the continuation of the twenty-sixth session, the Commission considered a draft standard and guidelines for the preparation and implementation of emergency response and contingency plans pursuant to draft regulations 33 and 53 of the Draft regulations on exploitation of mineral resources in the Area (ISBA/25/C/WP.1) on the basis of a document prepared by the secretariat with the assistance of a consultant.
2. Draft regulation 33 requires a contractor, *inter alia*, to immediately implement the emergency response and contingency plan approved by the Authority once it becomes aware of an incident. Draft regulation 53 directs the contractor to maintain the currency and adequacy of its emergency response and contingency plan, based on the identification of potential incidents and in accordance with good industry practice, best available techniques, best environmental practices and the applicable standards and guidelines. Annex V to the Draft regulations specifies the elements that an emergency response and contingency plan ought to contain.
3. In that regard, the Commission noted that the scope of an emergency response and contingency plan is clearly defined in the Draft regulations and that, as such, the draft standard and guidelines ought to be a tool for ensuring the effective application of the emergency response and contingency plan by contractors, as it pertains to the identification of hazards, preparedness and response.
4. The Commission noted that vessels engaged in exploitation in the Area will be subject to the jurisdiction and control of the flag State, while installations will be subject to the jurisdiction of the sponsoring State or States, and thus, several international instruments will apply. While the specific adequacy will depend on the types of vessels and installations, much is already covered by such international instruments in terms of emergency and contingency planning.
5. In that context, the Commission considered that the overall objectives and content of the draft standard (Appendix I) and guidelines (Appendix II) on the emergency response and contingency plan should provide a comprehensive and unified approach – that is outcome-based – as to the preparation and implementation of such a plan by contractors, while considering that it is currently difficult to fully foresee all issues involved, including the technologies to be used for exploitation and hence the seabed mining specific risks, hazards and incidents, to be potentially covered.

1 **Appendix I**  
2 **Draft Standard for the preparation and implementation of emergency response and**  
3 **contingency plans**  
4

5  
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27 **I. INTRODUCTION**

28

29 1. This Standard sets out the process to be followed for the preparation and  
30 implementation of emergency response and contingency plans for exploitation of mineral  
31 resources in the Area in accordance with the Regulations for exploitation of mineral  
32 resources in the Area (Exploitation Regulations).

33

34 2. This Standard is to be read in conjunction with the Exploitation Regulations, as well  
35 as other relevant ISA Standards and Guidelines, including but not limited to those related to:

- 36 • Environmental Impact Assessment and Environmental Impact Statement;
- 37 • Environmental Management and Monitoring Plan;
- 38 • Environmental Management Systems; and
- 39 • Safety management.

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41 **A. Scope**

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43 3. This Standard applies to assets intended to be deployed for exploitation of mineral  
44 resources in the Area, and sets out mandatory requirements for the preparation and  
45 implementation of emergency response and contingency plans.

46

47 4. This Standard shall be read in conjunction with the equivalent sections in the  
48 Guidelines

49

50 **B. Purpose**

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52 5. While identifying accidental scenarios, it is important to consider the mitigating  
53 actions towards controlling the risk of such incidents. An emergency response and  
54 contingency plan is seen as a vital contributor to mitigating such risks.

55

56 6. The objective of this Standard is to describe the process for preparing and  
57 implementing emergency response and contingency plans for managing accidental events that  
58 could potentially occur during mining operations in the Area.

59

60 **II. EMERGENCY PREPAREDNESS SCENARIOS**

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62 7. The Contractor shall carry out a hazard identification process that provides a balanced  
63 and most comprehensive possible picture of the hazards associated with the mining activities.  
64 The hazard identification process shall be appropriate as regards providing support for  
65 decisions related to the upcoming processes, operations or phases.

66

67 8. Risk analyses shall be carried out to identify and assess what can contribute to, i.e.,  
68 major accident risk and environmental risk associated with acute pollution, as well as  
69 ascertain the effects various processes, operations and modifications will have on major  
70 accident and environmental risk.

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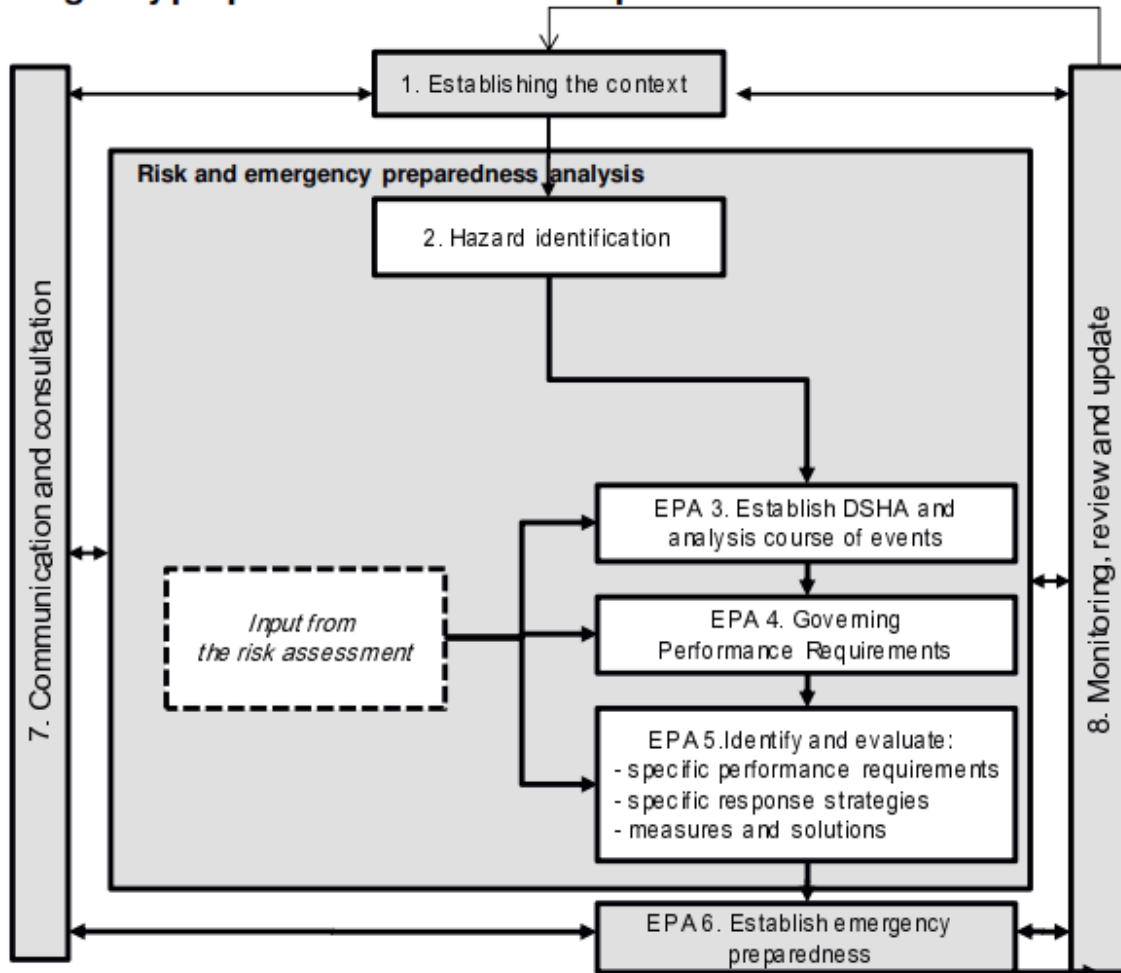
72 9. The Contractor shall prepare an emergency preparedness manual, which shall capture  
73 the essence of this Standard with relevant links to the Contractor's Health, Safety,  
74 Environment, Quality (HSEQ)/Management systems.

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76 10. An overview of the emergency preparedness assessment (EPA) process is as given in  
 77 Figure 2.1.

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**Figure 2.1 – Emergency preparedness assessment process**  
**Emergency preparedness assessment process**



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82 11. In the contingency planning, the Contractor shall consider and cover the major  
 83 categories of scenarios that are foreseen to occur such as collision, grounding, fire and  
 84 explosion, pollution incidents, safety incidents, security incidents, etc.

85

86 12. An EPA combines all the elements as shown in the Figure 2.1. EPA 1, or the first  
 87 element for EPA, starts with defining the basic parameters for emergency preparedness and to  
 88 set the scope. The establishment of the context for the emergency preparedness assessment  
 89 shall, as a minimum, include, but not be limited to, the steps outlined in this section.

90

91 13. EPA 2, or the second element of the EPA, is the hazard identification process, and is  
 92 followed by EPA 3, which is the third step and involves establishing a Defined Situations of  
 93 Hazards and Accidents (DSHA) and then preparing for each of the DSHA defined.

94

95 14. The Contractor shall carry out emergency preparedness analyses, which shall be part  
 96 of the basis for making decisions when e.g. defining hazard and accident situations,  
 97 stipulating performance requirements for the emergency preparedness, or selecting and  
 98 dimensioning emergency preparedness measures. The output from hazards identification/risk

99 assessments shall be used as a basis for establishing DSHA. The DSHA shall analyse the  
100 course of events and help identify the governing performance requirements for emergency  
101 preparedness, which are part of EPA 4 in Figure 2.1.

102

103 **A. Define the objectives**

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105 15. The Contractor shall define the objectives for the emergency preparedness assessment  
106 relevant for the project phase for the system(s). The objectives shall be suitable for the  
107 purpose of the assessment, particularly with respect to providing sufficient and appropriate  
108 input to the decision-making at the right time. The defined objectives for the emergency  
109 preparedness assessment (and its included elements) shall be documented.

110

111 **B. Define the scope**

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113 16. The Contractor shall define the scope of the emergency preparedness assessment,  
114 which shall include, as a minimum, a) defined analysis objects or, in other words,  
115 installation(s), plant(s), system(s), activity/activities, operation(s) and/or phase(s) that are the  
116 subject of analysis and b) a description of activities to be carried out. Guidance on subjects to  
117 include in the emergency preparedness assessment is included in the Guidelines.

118

119 **C. Describe premises**

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121 17. The Contractor shall identify and describe the premises for the emergency  
122 preparedness assessment. The premises shall, as minimum:

123

124 (a) define the purpose of the assessment in accordance with the needs of the activity;

125 (b) identify and describe the target groups for the results of the assessment;

126 (c) identify relevant regulations, possible classification society rules and applicable  
127 requirements and specifications;

128 (d) identify overall emergency preparedness philosophy;

129 (e) identify other internal company requirements;

130 (f) identify relevant risk assessment premises and assumptions that may influence the  
131 EPA; and

132 (g) identify relevant operational premises for the EPA.

133

134 **D. Define responsibilities**

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136 18. The Contractor, with other involved parties, shall define the responsibilities related to  
137 planning and execution of the entire process and the elements and the various tasks/activities.  
138 The involved parties mean the Contractor, Contractor's organisation, subcontractors if  
139 relevant and other external participants that are likely to play a role in the mining operations.  
140 This process shall be undertaken in consultation with the sponsoring State(s), the flag  
141 State(s), coastal States and other entities having relevant jurisdictional competence or rights  
142 and legitimate interests with regard to specific components of the plan.

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144 **E. Competence and participation in EPA**

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146 19. During the process of the emergency preparedness assessment, the relevant personnel  
147 with necessary competence shall be included and involved in all lifecycle phases. The  
148 Guidelines provide an example of relevant personnel.

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20. In addition, personnel with engineering/design competence shall be involved during project phases. Personnel from the emergency preparedness organization shall be involved for assessments in operational and modification phases.

**F. Methods, models and tools**

21. All methods, models and tools that are used shall be tailored to the needs of the decision support, the objectives and scope of the individual analysis.

**G. System boundaries**

22. The Contractor shall define and describe in a suitable manner the boundaries for the emergency preparedness assessment. The description shall, as a minimum, include the following main aspects:

- (a) the technical system (process, structure, utility, safety, emergency preparedness systems);
- (b) the period of time and types of operations and activities to which the analysis relates;
- (c) available resources on the facility;
- (d) interaction with relevant resources - company, field, area and external emergency resources;
- (e) definition of risk exposed groups, including possible 3rd party groups.

23. The boundaries set in the EPA process shall be documented.

**H. Define the execution plan**

24. The Contractor shall establish a plan for the execution of the EPA. The plan shall include the expected deliveries, schedule, decision milestones, target group for assessment etc. Responsibilities for executing, follow-up, and management of deviations from the plan shall be established and the plan, including the follow-up to the plan, shall be documented.

**III. INCIDENTS HAVING HARMFUL EFFECTS ON THE ENVIRONMENT**

25. The Contractor shall update the environmental risk and emergency preparedness analyses in case of significant changes affecting the environmental risk or the emergency preparedness situation. In any case, updating needs shall be assessed periodically (at least every 5 years). The Contractor's management systems and their alignment with the subcontractors', if any, is vital during the mining operations. Therefore, the emergency preparedness manual shall establish such links, common goals and objectives for the handling of an emergency incident. The emergency preparedness manual shall also refer to relevant parts of the subcontractor's safety management systems and environmental management systems and vice versa. The HSEQ manual or management systems manual shall contain sections including emergency preparedness as well as environmental management.

26. For environmental risk analysis, varying vulnerability in different geographical areas shall be accounted for.

199 27. The Contractor shall include and document, in the environmental risk analysis, an  
200 assessment of pollution hazards and the measures to prevent or reduce such hazards, for  
201 example, mining discharges and measures to control such discharges.

202  
203 28. The Contractor shall make a judgement on historical incidents, ensuring that the  
204 contingency shall be dimensioned in accordance with the environmental risk.

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#### 206 **IV. BARRIER MANAGEMENT**

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208 29. Barriers shall be established to identify conditions that could lead to failures, hazard  
209 and accident, reduce the possibility of such failures, hazard and accident, or limit serious  
210 harm to the marine environment. A description of the mining operations and equipment,  
211 including the emergency response plan and emergency response equipment, shall be listed as  
212 part of the emergency preparedness manual where the barriers are specifically identified.

213

214 30. Where more than one barrier is necessary, there shall be sufficient independence  
215 between barriers. The Contractor or the party responsible for operation shall specify the  
216 strategies and principles that form the basis for design, use and maintenance of barriers, so  
217 that the barriers' function is safeguarded throughout the asset's life.

218

219 31. Personnel shall be aware of what barriers have been established and which function  
220 they are intended to fulfil, as well as what performance requirements have been defined in  
221 respect of the concrete technical, operational or organizational barrier elements necessary for  
222 the individual barrier to be effective. Personnel shall also be aware of which barriers and  
223 barrier elements are not functioning or have been impaired. Details of the known natural  
224 marine environmental conditions that may influence the efficiency of response equipment or  
225 the effectiveness of a response effort shall be presented. Necessary measures shall be  
226 implemented to remedy or compensate for missing or impaired barriers.

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#### 228 **V. EMERGENCY RESPONSE ORGANIZATION**

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230 32. The EPA – hazards, DSHAs, barrier management etc., shall be the basis for  
231 developing an emergency preparedness organization. The EPA shall also be the basis for the  
232 contingency planning. The contingency plans shall be developed on a high level that  
233 highlights the processes for different scenarios such as collision, grounding, fire and  
234 explosion, pollution incidents, safety incidents, security incidents, etc. The processes shall  
235 have close links to emergency preparedness plans. The EPA, based on the risks identified,  
236 shall also have a process that identifies the risk ownership.

237

238 33. The organization, both on board and on shore, shall be set-up to function as one entity  
239 in terms of responding to an emergency incident. The Contractor shall present an onshore and  
240 on-board organization that clearly establishes the link to the EPA carried out in terms of  
241 preparedness in handling the DSHA's. Such an emergency preparedness organization shall  
242 indicate overlap of roles among the different functions. The organization shall also describe  
243 and present the different levels of emergency preparedness organization.

244

#### 245 **VI. COMMUNICATION LINES AND NOTIFICATION PROCESS**

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247 34. Together with the emergency preparedness organization, the Contractor shall also  
248 identify the communication lines within the organization. The communication process shall

249 also be included in the contingency plans that address the different scenarios being  
250 considered.

251

252 35. The communication lines shall be presented by means of flow charts, organograms,  
253 etc. complete with a list of functions expected to be fulfilled by a certain position, including  
254 the competence requirement for that position. The key functions shall participate in drills and  
255 exercises from time to time and the participation shall be recorded.

256

257 36. Together with communication lines, a notification process shall be established to  
258 inform or notify the relevant stakeholders in advent of an incident.

259

260 37. The Exploitation Regulations require that the Contractor shall not proceed or continue  
261 with Exploitation if it is reasonably foreseeable that proceeding or continuing would cause or  
262 contribute to an Incident or prevent the effective management of such Incident. The  
263 communication lines shall be prepared in accordance with the Exploitation Regulations. A  
264 deadline for notifications shall also be included. The subcontractors, if any, have a  
265 responsibility towards the Contractor in facilitating and therefore initiating such notifications.

266

## 267 **VII. DRILLS**

268

269 38. Drills and exercises are vital to the contingency planning. The drills and exercises  
270 shall be prepared and conducted according to the different scenarios considered under  
271 contingency planning as a minimum. The Contractor shall ensure that necessary training and  
272 drills are conducted, so that all personnel are always able to handle operational disturbances  
273 and hazard and accident situations in an effective manner. Personnel shall carry out training  
274 and exercises related to the specific facility where the work is to be performed.

275

276 39. Through drills, the Contractor shall verify that all the performance requirements  
277 towards emergency preparedness against serious pollution are fulfilled and that the  
278 emergency preparedness resources that are intended to be used are operational and available.  
279 The verification shall be completed prior to starting the planned activity. The documentation  
280 shall be made available to the ISA upon request.

281

## 282 **VIII. AUDITS – INTERNAL & EXTERNAL**

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284 40. Periodical audits shall be conducted, and the results of such audits shall be made  
285 available. There shall be three types of audit and the results for the same shall be  
286 documented.

287

288 41. The first type of audit involves the subcontractor who shall perform an internal audit.  
289 The level of authority of who shall execute such audits shall be documented with the  
290 expectation that such personnel are competent in carrying out audits with a high-level  
291 understanding of operations. Such audits shall be performed twice a year. While documenting  
292 the audits in the form of an audit report, a separate record of non-conformities and  
293 observations shall be documented.

294

295 42. The second type of audit involves the Contractor who shall audit the subcontractor  
296 and its asset(s). The Contractor shall be responsible for documenting such audits and  
297 maintenance of a separate register for non-conformities and observations along with the audit  
298 report. Such audits shall be conducted at least once a year.



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43. The third type of audit involves external party audit of the Contractor and the subcontractor. The basis for such an audit shall be the audit reports from both the subcontractor and the Contractor. However, the audit shall be carried out independently and may cover additional scope beyond what has been reported. It shall also be possible to align the audit to coincide with a drill to enable active participation from all parties.

#### **IX. PROCESS IMPROVEMENT**

44. The Contractor shall continuously improve health, safety and the working environment by identifying the processes, activities and products in need of improvement, and implementing necessary improvement measures. The measures shall be followed up, the effects evaluated and documented. Individual employees shall be encouraged to actively identify weaknesses and suggest solutions.

45. Applying experience from own and others' activities shall be facilitated in the improvement work.

46. The process improvement shall be part of the audits and this needs to be documented and demonstrated during the periodical audits.

#### **X. DEFINITIONS AND ABBREVIATIONS**

47. Except as otherwise specified herein, terms and phrases defined in the Exploitation Regulations shall have the same meaning in this Standard.

48. **Asset** means all vessels and installations used in the mining operation.

49. **Classification society** means a body or entity (known as Society) which is responsible for the development and maintenance of Rules, and the verification of compliance with the Rules throughout a Vessels' life, as well as assignment of Class to a ship upon the completion of satisfactory surveys.

50. **DSHA** means Defined Situations of Hazards and Accidents.

51. **EPA** means Emergency Preparedness Assessment.

52. **HSEQ** means Health, Safety, Environment, Quality.

53. **Subcontractor** means a party in a contractual relationship with the Contractor to support the execution of the mining operation.

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**Appendix II**  
**Draft Guidelines for the preparation and implementation of emergency response and contingency plans**

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- IX. Definitions and abbreviations**
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362 **I. INTRODUCTION**

363

364 **A. Background**

365

366 1. These Guidelines serve as supporting document for the Standard for the preparation  
367 and implementation of emergency preparedness and contingency plans for exploitation  
368 operations in the Area and should be read in conjunction with the corresponding sections in  
369 the Standard. The Standard describes the process to prepare and implement emergency  
370 response and contingency plans for managing accidental events that could occur during  
371 mining operations in the Area.

372

373 **B. Purpose**

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375 2. The objective of this document is to provide guidance on the requirements set out in  
376 the Exploitation Regulations and the Standard.

377

378 **II. EMERGENCY PREPAREDNESS SCENARIOS**

379

380 3. The scope of an Emergency Preparedness Assessment (EPA) is to update the response  
381 strategies, performance requirements, emergency preparedness organization and measures to  
382 cover the design, construction and operational phase. The objective of such an analysis is to  
383 provide the necessary basis for the emergency preparedness plan and the exercise and  
384 training plans, in accordance with the Standard.

385

386 **A. Define the objectives**

387

388 4. The objectives for the EPA should be clearly defined for each phase. The objectives  
389 may be function-based, goal-based or a combination of the two, depending on the framework  
390 chosen for establishing the EPA. Functional objectives are those that relate to the specific  
391 functions of a given phase while goal-based objectives are focused on achieving specific  
392 parameters within each phase.

393

394 **B. Define the scope**

395

396 5. The scope should clearly define the object being addressed, i.e. installation, system,  
397 plant, activity, etc. and the description of actions involved for the object being addressed.  
398 Depending on the system(s) subjected to the assessment and the objectives of the process, the  
399 emergency preparedness assessment may include establishment of escape, evacuation and  
400 rescue (EER) strategies.

401

402 **C. Define responsibilities**

403

404 6. While defining responsibilities, it is imperative to factor in the necessary competence  
405 of the personnel involved and ensure sufficient level of authority within the respective  
406 organizations to execute relevant tasks expected out of the responsibilities. As an example,  
407 organizational hierarchy should not hinder the level of authority while executing the  
408 aforementioned responsibilities.

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411

412 **D. Competence and participation in EPA**

413

414 7. An example of relevant personnel to be included and involved in life-cycle phases  
415 during an EPA is as follows:

- 416 (a) operational experience (e.g. senior marine crew, mining crew etc.);
- 417 (b) emergency preparedness assessment (regulatory requirements, methods);
- 418 (c) HSE personnel;
- 419 (d) external emergency resource representatives, if applicable and required.

420

421 **III. INCIDENTS HAVING HARMFUL EFFECTS TO ENVIRONMENT**

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423 8. For environmental risk analysis, a reference-based environmental risk analysis may be  
424 performed if updated analyses for a comparable activity in the vicinity is available. The data  
425 should be based on the best available input data sourced from a relevant entity. Justification  
426 of why the environmental risk will be similar or lower than in the reference activity should be  
427 provided. The analyses should give a brief description of the vulnerability of the selected  
428 environmental key performance indicators (KPI). Further, the selection of the environmental  
429 KPIs should be justified and the data source should be referenced.

430

431 9. The environmental risk analysis should have a description of critical functions that are  
432 used to assess the damage and the degree of seriousness of the damage (the consequence) for  
433 the different environmental KPIs. Any assumptions made in the estimations, for example  
434 based on insufficient knowledge, should be described.

435

436 10. For environmental emergency preparedness analyses, the Contractor should set goals  
437 for reduction of the environmental risk, including goals for protecting the vulnerable  
438 environmental KPIs prior to the emergency preparedness analysis. The analyses should also  
439 cover minor discharge incidents and measures to limit and combat these. The selection of  
440 historical incidents should be considered so that an incident with a significant consequence is  
441 not excluded.

442

443 **IV. EMERGENCY RESPONSE ORGANIZATION**

444

445 11. The emergency preparedness analysis based on the risk ownership identified could be  
446 further developed to assign different roles to handle a risk or a risk group. As an example,  
447 two Defined Situations of Hazards and Accidents (DSHAs) are described here for illustrating  
448 this point.

449

450 12. Two DSHAs considered are:

- 451 (a) Occupational/Acute medical condition (DSHA 1)
- 452 (b) Release of toxic gas/asphyxiant gas (DSHA 2)

453

454 13. The organization may consist of lifeboat 1 team, lifeboat 2 team, helideck team, MOB  
455 boat team, technical team, on scene commander, emergency response team, medic, first aid  
456 team etc.

457

458 14. For DSHA 1, the roles may be allocated to first aid team, helideck team, emergency  
459 response team and medic. For DSHA 2, the roles may be allocated to technical team, first aid  
460 team, emergency response team, on scene commander (in case of high fatalities) and medic.

461 In this setting, the overall risk ownership could lie with on scene commander but is  
462 distributed among different functions within the onboard organization.

463

464 15. A suitably well manned and competent organization should be put in place to handle  
465 events that could have large variations in terms of consequence and the probability of  
466 occurrence. It is also important to have links to the shore-based organization in coordinating  
467 efforts during an incident.

468

469 16. Examples of different levels of emergency preparedness organization are e.g first line,  
470 second line. The first line of emergency preparedness organization is expected to be  
471 responsible for the direct management and control of any emergency occurring onboard,  
472 including notification, mobilisation, handling and normalisation of the emergency. The shore-  
473 based organization is considered the second line emergency preparedness organization and  
474 constitutes the main onshore support centre for the asset in case of an emergency. More levels  
475 of such organization should be evaluated and, if found necessary, should be presented.

476

## 477 **V. COMMUNICATION LINES AND NOTIFICATION PROCESS**

478 17. The contingency plans are not expected to detail the communication lines as such but  
479 give an overview of the relevant parts of the emergency preparedness organization that can be  
480 linked to handling of different scenarios considered. The expectation with establishing such  
481 communication lines is to address the various stakeholder needs (ISA, Sponsoring State, Flag  
482 State, Coastal States, etc.), simplify the handling of incidents (roles and responsibilities), and  
483 establish the line of authority for onshore and offshore communications (who shall do what?).  
484 It is expected that the key positions within the line of authority are manned by sufficiently  
485 competent personnel with relevant experience.

486

487 18. The notification process should include a list of notifiable events, the relevant  
488 personnel to be notified – both internal and external and the means of notification. Personnel  
489 who are part of the Contractor and subcontractors are considered as internal while all  
490 personnel outside these are considered external. The contacts for relevant personnel should be  
491 easily available and the means of communication to each of the relevant personnel – email,  
492 fax, text message etc. should be well established. This is to ensure that there is clarity in  
493 terms of notification during an incident. Drills and exercises may follow the system for  
494 communication and notification as best practice.

495

## 496 **VI. DRILLS AND EXERCISES**

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498 19. In order to fulfil the requirements for training and drills, simulator training should be  
499 used for monitoring and control functions. Personnel who have emergency preparedness  
500 functions should practice their emergency preparedness tasks at least once during each period  
501 of stay. Mustering and evacuation routines should be included in the drill. At least one annual  
502 drill should be carried out for the emergency preparedness management and for personnel  
503 attending to collaborate on emergency preparedness against acute pollution.

504

505 20. Drills related to collaboration on emergency preparedness against acute pollution  
506 should include skill training in the individual emergency preparedness functions and co-  
507 training between the Contractor and other involved parties. The result of the drill should be  
508 evaluated.

509 When hired facilities or vessels are used, a drill should be conducted at an early point in time  
510 in accordance with a coordinated emergency preparedness plan for the Contractor and the

511 subcontractor, if any. If the same facility is used for a lengthy consecutive period, a major  
512 annual drill should be held involving both unit and area resources, relevant external  
513 resources, the Contractor's and subcontractors' onshore emergency preparedness  
514 organizations, as well as the supervisory authorities. A record of such drills is expected to be  
515 maintained and made available upon request by ISA.

516  
517 21. While performing drills, the communication and notification process should, as far as  
518 possible, be adhered to. This is to ensure the necessary preparedness in case of a real  
519 emergency.

## 520 521 **VII. AUDITS – INTERNAL & EXTERNAL**

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523 22. Periodical audits may be conducted either by the shore personnel or the personnel on  
524 board. However, it is recommended to conduct an audit by shore personnel as far as practical  
525 to ensure neutrality and also to avoid potential conflicts on board. The audits should have a  
526 structure that includes an audit intimation, an audit plan, minuting the meetings, logging of  
527 observations and non-conformities etc. The level of information capture from different types  
528 of audits may be categorised and logged according to the type of audit performed. Regardless  
529 of the type of audit, such logs should be made easily available upon request by ISA.

## 530 531 **VIII. PROCESS IMPROVEMENT**

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533 23. A sound health, safety and working environment culture can be observed in  
534 enterprises that organize continuous, critical and thorough work in order to reduce risk and  
535 improve health, safety and the work environment. Elements of a sound health, safety and  
536 working environment culture include:

- 537  
538
- 539 • that the effort and means in the health, safety and environment work are  
540 continuously subject to a critical assessment as regards potential goal conflicts  
541 and efficiency;
  - 542 • that there is a clear understanding in the organization that culture is not an  
543 individual quality but something that is developed in the interaction between  
544 people and given framework conditions;
  - 545 • that development and collective learning is facilitated through competence  
546 enhancement, participation and a systematic and critical reflection at all levels;  
547 and
  - 548 • that health, safety and environment work cannot be viewed independently  
549 from each other or from other value-creating processes in the enterprise.

550 24. Identification for improvements can be based, in part, on the results of analyses and  
551 surveys, investigation of hazard and accident situations, handling of non-conformities,  
552 experience gained from internal follow-up or experience gained by others. Applying  
553 experience can, for example, include information on faults and defects as well as examples of  
554 good problem-solving and practices.

## 555 556 **IX. DEFINITIONS AND ABBREVIATIONS**

557  
558 25. The terms and abbreviations in these Guidelines have the same meaning as in the  
559 Standard.

560 **X. APPENDIX**

561 **Identification of accidental events**

562

563 **A. For all assets, the risk analysis shall as a minimum consider whether the**  
564 **following accidental events are relevant:**

565

1. Collisions:

566

- Collision with supply ship.

567

- Collision with fishing vessel.

568

- Collision with standby vessel.

569

- Collision with transport vessel.

570

- Collision with underwater craft.

571

- Collision with drifting objects.

572

2. Incorrect weight distribution:

573

- Shifting of deck cargo.

574

- Swinging loads from cranes or derricks.

575

- Shifting of ballast.

576

- Icing.

577

3. Falling objects:

578

- Shifting, falling deck cargo.

579

- Falling crane booms.

580

- Falling crane lifts.

581

4. Drift:

582

- Line breakage.

583

- Multiple line breakage/dragging anchor.

584

- Failure of dynamic positioning system.

585

- Winch failure.

586

5. Helicopter accident on the unit.

587

6. Hull/structural failure.

588

7. Fires in enclosed spaces:

589

- Fire in accommodation spaces.

590

- Fire in machinery spaces.

591

- Fire in work rooms.

592

8. Explosions in machinery spaces and other equipment rooms.

593

9. Loss of control during transit:

594

- Collision during transit.

595

- Grounding.

596

- Towing failure.

597

10. Incorrect operation of systems, including systems treating foodstuffs (storage method etc.) and potable water.

599

11. Failure during ship-to-ship transfer of mined material

600

- Clogging of hose.

601

- Break of hose.

602

- Pump failure.

603

604 **B. Accidental events to be specially considered for mining operations:**

605

1. Hydrocarbon blowout:

606

- Shallow gas blowout on seabed.

607

- Reservoir blowout on drilling floor.

- 608                   • Blowout caused by various possible events.
- 609           2.    Release of toxic gases
- 610           3.    Potential fire scenarios related to mining operations:
- 611               • Fire in “high fire-risk” areas
- 612           4.    Explosion scenarios related to mining operations:
- 613               • Explosion in “high risk” areas
- 614           5.    Vertical riser system:
- 615               • Clogged buffer system
- 616               • Clogged riser pipe
- 617               • Break of riser pipe
- 618               • Failure of recovery system
- 619               • Pump leakage
- 620           6.    Seafloor collector
- 621               • Hydraulic / electrical failure
- 622               • Lack of or limited manoeuvrability
- 623               • Oil spillage
- 624               • Collision with other equipment (e.g. ROV, AUV, monitoring equipment)
- 625               • Collision with natural obstacles (rocks)
- 626               • Collision with artificial obstacles (anchoring remains / weights)
- 627               • A-frame failure
- 628               • Lift wire winch failure
- 629               • Umbilical winch failure
- 630               • Umbilical cable internal failure
- 631               • Severing of umbilical
- 632               • Surface equipment hydraulic power unit failure
- 633
- 634   **C.    Accidental events to be specially considered for vessels with diving capability:**
- 635           1.    Critical accidental events in connection with diving operations in general.
- 636
- 637   **D.    Accidental events to be specially considered for high number of personnel:**
- 638           1.    Smoke and gas due to fire, release from nearby installations.
- 639           2.    Accident involving gangway.
- 640           3.    Narrow escape routes.
- 641           5.    Evacuation possibilities, in view of a large number of persons, life-saving
- 642           appliances etc.
- 643
- 644   **E.    Notifiable events as per the Exploitation Regulations:**
- 645           1.    Fatality of a person.
- 646           2.    Missing person.
- 647           3.    Occupational Lost Time illness.
- 648           4.    Occupational Lost Time injury.
- 649           5.    Medical evacuation (MEDEVAC).
- 650           6.    Fire/explosion resulting in an injury or major damage or impairment.
- 651           7.    Collison resulting in an injury or major damage or impairment.
- 652           8.    Significant leak of hazardous substance.
- 653           9.    Unauthorized Mining Discharge.
- 654           10.   Adverse environmental conditions with likely significant safety and/or
- 655           environmental consequences.
- 656           11.   Significant threat or breach of security.



- 657 12. Implementation of Emergency Response and Contingency Plan.
- 658 13. Major impairment/damage compromising the ongoing integrity or emergency
- 659 preparedness of an Installation or vessel.
- 660 14. Impairment/damage to safety or environmentally critical equipment.
- 661 15. Significant contact with fishing gear.
- 662 16. Contact with submarine pipelines or cables