

Safety Review Report and Expedition Safety Package Guidelines

IODP Environmental
Protection and Safety Panel



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IODP Environmental Protection and Safety Panel (EPSP): Safety Review Report and Expedition Safety Package Guidelines

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Introduction

The Environmental Protection and Safety Panel (EPSP) provides independent advice to the *JOIDES Resolution* Facility Board (JRFB), the *JOIDES Resolution* Science Operator (JRSO), and other entities as requested with regard to safety and environmental issues that may be associated with general and specific geologic circumstances of proposed primary and alternate drill sites. The EPSP also provides advice on appropriate drilling strategies and monitoring for avoidance of drilling hazards and protection of the environment. This document describes:

- Part A: EPSP Safety Review Report and Presentation
- Part B: Expedition Safety Package
- Part C: Responsible Parties
- Part D: Chart of Proposal / Expedition Activity Surrounding an EPSP Review

Document Terminology:

- **EPSP Preview** and **EPSP Review**: The EPSP assesses proposed drill sites in either a preview or review mode. In either case, a representative proponent attends the review meeting and makes a presentation to the panel (see below for Safety Presentation Guidelines). The **preview** is an opportunity for the panel to identify key issues that should be addressed before the final review is made. These issues could include drilling strategy, operations plan, geologic limitations, data processing requirements and the need for additional data, including shallow hazard assessments. The **review** is considered the final presentation before the EPSP, where drilling recommendations are made for each of the proposed sites.
- The **Safety Review Report** is a PDF document written by the proponent(s). The report's contents, in distilled form, are presented by a proponent during an EPSP review (or preview) of proposed sites (see Safety Presentation below).

- The **Safety Presentation** is a PowerPoint (or PDF) presentation summarizing the information in the Safety Review Report. The presentation is given by a proponent(s) at the EPSP meeting.
- The **Expedition Safety Package** is a collection of documents and site survey data assembled by the Science Operator with the assistance of the expedition Co-Chief Scientists, proponent(s), and the IODP Science Support Office, as described in Part B of this document. This package includes the Site Survey Data Package.
- The **Site Survey Data Package** is the collection of all site survey data required for an expedition.
- The **Site Survey Data Bank (SSDB)** (<http://ssdb.iodp.org>) is the repository for all IODP proposal- and expedition-related site survey data. All site survey data within the site survey data package must be housed in the SSDB.

Note that in addition to safety reviews by the EPSP, the safety panel for the Science Operator performs an independent review of proposed sites. The Science Operator's safety panel has the authority to override decisions made by the EPSP. See Part D of this document for the typical procedural steps and required actions for a proposal as it moves beyond the scientific review process through scheduling and subsequent preparation for the expedition.

Part A: EPSP Safety Review Report & Presentation

(1) Safety Review Report & Presentation General Guidance

Under normal circumstances, a representative proponent will be asked to attend an EPSP meeting and present to the panel. The proponent making the presentation should be aware of the scientific justification for the proposal and the technical details associated with the site survey data presented during the panel meeting and in the Safety Review Report, including acquisition and processing parameters. Often the presenter is the data lead, but if no single proponent is capable of making this presentation, two presenters may represent the proposal.

The proponent will be required to submit a Safety Review Report and Safety Presentation to the IODP Science Support Office for distribution to the EPSP panel. The Safety Presentation is typically organized into two general sections: an overview and a site-by-site review. The overview is typically 15-30 minutes in duration and normally includes: an overview of the proposed scientific program, status of the site survey information, the proposed drilling program (e.g., number of sites, types of coring, logging program), and a description of key safety and environmental issues as understood by the proponents.

For the site-by-site review, all relevant information should be presented including reason(s) for the selection of each site location, and planned type(s) of coring, sampling, and logging at each site. Specifically, EPSP needs to know:

1. proposed depths of penetration, including the required “rat-hole” for logging tools,
2. nature of the section to be penetrated, including the identification of any potential hydrocarbon reservoirs and seals,
3. an expression of the degree of confidence in the velocity control for the depth calculation and the proposed lithologic column,
4. possibilities of thermally mature hydrocarbon source rocks in the vicinity of proposed drilling targets and effective migration pathways,
5. results of any industry and/or previous scientific drilling,
6. likelihood of either abnormal pressure or subsurface fluid flow,
7. environmental and safety issues that may be specific to the expedition (e.g., how sites will be located, availability of crossing seismic lines, order of drilling, position of sites relative to munition disposal sites and biologic communities, migratory pathways, etc.).

When bringing requests to the EPSP for approval, proponents should consider (a) locating sites on existing seismic lines, if possible (if not, explaining the rationale for locating offline), and (b) locating sites on a cross-line, if available and possible. The locations of sites should not be presented near the end of the seismic line to ensure an understanding of geologic context.

Under certain circumstances, the EPSP may require a shallow hazards or other special survey, or a drilling protocol document from the appropriate Science Operator, which may include a request for an interpretation of hazards survey data by an independent entity.

(2) Safety Review Report Guidelines

The Safety Review Report is a PDF document created by the proponent(s). Some exemplary previous Safety Review Reports can be obtained by request from the IODP Science Support Office. The Safety Review Report should include:

- A summary of the scientific objectives and environmental issues of the proposed expedition.
- Completed site summary forms.
- A contoured seafloor bathymetry map with an appropriate contour interval to illustrate the topography. In areas of complex bathymetry (e.g., reefs), bathymetric maps should be at the highest resolution possible and be labelled appropriately.
- Multibeam maps (contours at 50 or 100 m intervals, preferably). Shaded relief maps are also helpful in areas of complex bathymetry.
- Track chart of available seismic data. Data included in the report should be highlighted. This chart should be at the same scale as the bathymetry maps, which is usually best done by co-registering and overlaying the seismic acquisition lines

on the regional and multibeam bathymetry maps. This map should also identify any known hazards, communication cables, and/or protected areas, as well as any prior commercial wells or scientific drilling sites.

- When appropriate and data are sufficient, key horizons and intervals should be mapped when anticlines are present in the near-surface section.
- At a minimum, an uninterpreted section with the drill-site annotation should be shown. It is recommended to include the same seismic profiles with and without interpretation.

The following types of basic information should be included on all maps:

- Indicate North either with arrow or grid lines.
- Include scale bar or other indication of distance at a regular interval (e.g., 100m, 500m, 1km, 10km).
- Label any contours present at a regular interval and ensure that the contour interval is easy to identify.
- Indicate the grid resolution in meters for any maps showing gridded data (e.g., seafloor bathymetry), and include the color bar in the legend.
- Label all tracklines with line names and shot points at a regular interval.
- All charts should use the same projection and the projection should be identified.

The following basic information should be included on all seismic data presented:

- As much information as possible about acquisition and processing of the seismic data used, particularly the phase and polarity of data.
- A comprehensive summary of the data used to determine the best time-depth conversion possible.
- Labelled shot points along the x axis.
- The horizontal and vertical scales distance or depth (see below) clearly labeled on each traverse, preferably on axis, not just a scale bar.
- All records (e.g., strike and dip sections) associated with a single site presented at the same vertical and horizontal scales.
- Drill sites marked with “sticks” indicating anticipated depth of penetration based on best time-depth conversion.
- The vertical scale on seismic profiles should be in depth rather than in two-way travel time.
- Intersection of cross-line(s) if present should be clearly marked.
- Highlight on seismic records any structures or features that are important to both the science case and safety issues. For example, identify potential structural traps (e.g., anticlines), stratigraphic traps (sand bodies and cap formations), bright spots, and washout zones (e.g., potential free gas).

(3) Safety Presentation Guidelines

The Safety Presentation is a PowerPoint or PDF document presented during an EPSP review (or preview) by the proponent(s). Some exemplary previous Safety Presentations can be obtained on request from the IODP Science Support Office. When preparing the presentation, proponents should observe the following guidelines:

- Keep all text, maps, and diagrams simple and clear to read from a distance of 10m. Do not include lots of pages of text or complex tables of data; this material may be included in the Safety Review Report.
- Maps and seismic data included in the Safety Presentation should include the same basic and labeling information that are included in the Safety Review Report.
- The presentation should include high-resolution digital images of the seismic sections. A PDF file with as much detail as possible to allow zooming in to seismic sections is one way this may be accomplished.

Specific to questions to consider when preparing seismic data for the Safety Presentation:

- Is the seabed signature clearly visible and can the polarity be established?
- Have the seismic data been displayed with and without an interpretation?
- Have both a time and a depth section been presented?
- Do the final site displays result in the drill stick representing about half of the vertical section? (This is not required for regional displays.)
- Has the depth of proposed penetration been marked? (This should include the target depth and the total depth of penetration if a logging tool is to be used. The marking “stick” should also include an estimate of uncertainty.)
- Have key geologic and/or safety issues (e.g., amplitude anomalies or flat spots) been highlighted on the seismic data?
- Have seismic attributes been presented in color rather than black and white?
- Are the vertical and horizontal scales on associated strike- and dip-sections the same?
- Have intersections with cross-lines been clearly labeled?
- Have CDP or shot points been appropriately labeled?
- Are both vertical and horizontal scales present (preferably on the axis)?
- Has a summary of acquisition and processing been provided?
- Is the processing appropriate for imaging the target depth?
- Has the information utilized to establish the time-depth conversion been provided?

Specific to questions to consider when preparing maps for the Safety Presentation:

- Has map orientation been established for true north or grid north with an arrow or a grid?

- Has a suitable map scale been provided?
- Are contours appropriately labeled with units identified?
- Are all necessary seismic track lines identified on maps, with shot points labeled at a regular interval?
- Has the resolution of the grid been provided? And, has the appropriate scale bar been presented?
- Do all maps share a common coordinate reference system?

The IODP Science Support Office may ask the proponent to submit a draft of their Safety Presentation with a subset of the proposed sites (e.g., primary drill sites) a couple months before the EPSP review. The draft Safety Presentation would then be examined, with feedback provided back to the proponent, to assure that the slides conform to EPSP requirements.

The Safety Presentation presented during the EPSP meeting will be included as part of the final Expedition Safety Package.

(4) Possible EPSP Actions

After each site is reviewed, the EPSP will make a recommendation that will be forwarded to the JRFB and JRSO, or other appropriate Facility Board and Science Operator.

Possible site recommendations are:

- Approve as requested,
- Approve to a specified depth other than that originally requested,
- Approve at a new site based on discussions between panel members, proponents, and operator,
- Defer any recommendation until additional specified information is provided, or
- Not approve.

In addition, the panel may recommend a specific drilling order and/or specific monitoring requirements. Approvals will be based on the judgment of the EPSP that a proposed site can be safely drilled in light of the available technology, information, and planning.

Depending on the EPSP recommendations, proponents may be required to submit an Addendum to the Proposal Database System (PDB) that documents the approved changes and that includes a new site map. The IODP Science Support Office will provide the proponents with the deadline for this submission.

(5) Frequently Asked Questions by EPSP members

When preparing the Safety Review Report and associated presentation, the proponents should prepare themselves to answer the following frequently asked questions:

- How and when were the data collected?

- How were the seismic data processed? What is the phase and polarity of the data?
- What was the velocity control used to establish target depths? What is the uncertainty associated with these estimates?
- Are there any velocity anomalies on the profiles near the proposed drilling sites?
- Do additional industry data (e.g., seismic, drilling) exist in the relevant area and could these be accessed?
- What was the navigation used? This information is especially important for older data.
- Are all of the map projections and coordinate reference system consistent?
- If applicable, have the requested depths accounted for any logging tools?
- Have you considered alternative locations if the EPSP cannot approve the sites as proposed?
- Have you proposed alternate sites that would be operationally different from those of the primary site if the drilling objective cannot be reached?
- Have alternative and contingent sites been prepared if weather, currents, ice, etc. prevent drilling or if additional time is available during the planned expedition?
- What would happen to the expedition's science plan if the proposed depth of penetration cannot be approved?
- Do you have a recommended drilling order and why?
- Are there any biological communities within 100 meters of any of the proposed drill sites, what are they (e.g., vents, deep-water reefs), and what is the evidence for their existence (e.g., sampling, visual)? When and by whom were these data collected?
- Is the proposed drilling location in the vicinity of a fisheries (e.g., species, typical gear), known breeding/feeding ground or migration route, or "home" of threatened or endangered species?
- Is there a probability of encountering H₂S or hydrates during coring or core recovery?
- Are there any reasons to suspect that an over-pressured section will be encountered?
- Is there petroleum industry interest in the area? Are the proposed drilling sites located within current or proposed license blocks?
- Have any commercial "dry" wells been examined to determine whether hydrocarbon shows may actually be present?
- Are there any indications of active (or previously active) vent systems or hydrocarbon seeps in the area of proposed drilling?
- Is there an expectation that reservoir facies may be present?
- Are there any other environmental or safety issues that the EPSP should be aware of?

Part B: Expedition Safety Package

The Expedition Safety Package contains all data and documentation necessary to support a safe operation, including:

- The Safety Review Report prepared by the proponent(s) for EPSP.
- The Safety Presentation prepared by the proponent(s) for EPSP.
- Any required shallow hazard or special survey reports required by the EPSP or the Science Operator.
- The portions of the EPSP and Science Operator safety panel minutes that are relevant to the specific expedition(s), including the panel's recommendations.
- The Scientific Prospectus, which would normally include images of key seismic profiles.
- The Site Survey Data Package (SSDP), which is defined as all site survey data necessary to conduct a safe expedition and to address all safety and scientific contingencies, such as the need to relocate or add a new drilling location.
- Any required governmental approvals for the expedition that may limit site relocation and/or modification to the approved drilling plan.

Part C: Responsible Parties

Site Survey Data – Prior to an EPSP review, the proponent is responsible for ensuring that all data (i.e., raw digital data and/or image format data) presented in the Safety Review Report are submitted to the Site Survey Data Bank. When an expedition is scheduled, the Co-Chief Scientists, and proponent, with the assistance of the Science Operator, are responsible for ensuring that all data (i.e., raw data and image format data) required for the expedition are submitted to the Site Survey Data Bank (SSDB).

Expedition Safety Package – The overall responsibility for the assembly and distribution of the Expedition Safety Package rests with the Science Operator. The Expedition Safety Package needs to be distributed prior to the onset of the expedition. Responsibilities for preparing and delivering the components of the package are as follows:

- **EPSP Safety Review Report** – Proponents and/or Co-Chief Scientists, if assigned, will prepare the Safety Review Report. The proponents and/or Co-Chief Scientists will electronically forward the report directly to the IODP Science Support Office. The report is generally due four weeks in advance of the EPSP meeting. The IODP Science Support Office will distribute the report to EPSP members for review at least two weeks prior to the EPSP meeting.

- **Safety Presentation** – Proponents and/or Co-Chief Scientists, if assigned, will prepare and deliver the presentation at the EPSP meeting. The IODP Science Support Office will forward the presentation to the EPSP members, the Science Operator, and other meeting participants.
- **EPSP Recommendations** – The EPSP chair will forward the panel’s recommendations to the IODP Science Support Office, EPSP members, and the proponents when the minutes are finalized.
- **Science Operator Safety Panel Actions** – The Science Operator’s safety panel will forward required actions to the Science Operator.
- **Scientific Prospectus** – The Science Operator will create the Scientific Prospectus and published when completed.
- **Site Survey Data Package** – The Science Operator obtains the site survey data from the SSDB prior to the expedition, which is taken to the ship for use by the science party for safety and science access, as needed.
- **Expedition Specific Approvals** – The Science Operator is responsible for providing all expedition specific site approvals as necessary.
- **Shallow Hazard or Special survey Reports and/or Drilling Protocol Documentation** – The Science Operator is responsible for forwarding any additional documentation to the IODP Science Support Office for distribution to EPSP members together with the Safety Review Report.
- **Expedition Safety Package** – The Science Operator is responsible for packaging together the components described at the top of Part B to be provided on the ship in case required by the science party.

Part D: Chart of Proposal / Expedition Activity Surrounding an EPSP Review

Time	Stage	Proposal/Document (green: EPSP-related)	Created by	EPSP review	Note	
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	SEP	Pre	Proponents	(Preview)	- A proposal may be invited to EPSP meeting more than once.	
	↓	Full		} Proponents	↓	- Proponent submits SRR and presentation to SSO for the EPSP meeting.
		(Full2)				
		Add	(SRR2)			
	↓	(Add2)	(SRR3)	} Proponents	↓	- EPSP recommendation: Approve / Limit depth / Reposition / Not approve
		(Add3)				
		Scheduled				
	↓	Co-chief assigned	SP	SO with proponents and Co-Chiefs	↓	- Proponent submits Addendum after EPSP meeting if requested.
			SSDP	SO with SSO		
			ESP	SO		
↓	Exedition			(extra review for unexpected change)		
				↓		

Acronyms - organization/group

EPSP: Environmental Protection & Safety Panel
 SO: Science Operator
 SSO: IODP Science Support Office
 SEP: Science Evaluation Panel
 FB: Facility Board

Acronyms - document

SRR: Safety Review Report
 SP: Scientific Prospectus
 SSDP: Site Survey Data Package
 ESP: Expedition Safety Package

Acronyms - proposal

Pre: Pre-proposal
 Full: Full proposal
 Add: Addendum