Rules for safeguarding good scientific practice

1 Purpose

Good scientific practice is a basic requirement for scientific work. The opposite of good scientific practice is scientific dishonesty - the infringement of elementary scientific basic rules. Although wrong conduct in scientific work cannot be categorically prevented by mandatory framework conditions, it can in fact be made more difficult.

In 1998, the Deutsche Forschungsgemeinschaft (DFG) (German Research Foundation) worked out the Empfehlungen zur Sicherung guter wissenschaftlicher Praxis (Proposals for Safeguarding Good Scientific Practice) and supplemented them in July 2013 (see Section 6.2).

In addition, the DFG and the Deutsche Akademie der Naturforscher Leopoldina e.V. (German Academy of Natural Sciences Leopoldina e.V.) have together formulated Empfehlungen zur Wissenschaftsfreiheit und Wissenschaftsverantwortung im Umgang mit sicherheitsrelevanter Forschung (Scientific Freedom and Scientific Responsibility - Recommendation for Handling Security-Relevant Research) for so-called “dual-use-problematics”.

A reference list (see Section 7) for the QM documentation of PTB is contained in the enclosure.

Against this background, the following rules are laid down for PTB for the purpose of internal systematic self-control. By means of these, the rules of good scientific practice, which have always been internalized and followed by the vast majority of scientists, are to be made as clear as possible, and proceedings for the handling of actual or alleged wrong conduct are to be defined.

2 Scope

The rules apply to all scientific staff members in the organizational units (OUs) of PTB and also to divisional and cross-unit research teams – if applicable, also with the cooperation of external cooperation partners.

They apply analogously also in the case of a collaboration in external bodies and other research institutions. The factual area of application extends to all scientific work in which PTB is involved through its staff members.
3 Terms, abbreviations

| Research team | An association of staff members – limited in time – for the purpose of working on scientific questions and projects. Here, the team members can come from various OUs of PTB. Also external cooperation partners can belong to these teams. In the case of third-party-funded projects, additional personnel is recruited and employed, as a rule, as personnel of PTB. |
| Primary data | Primary data (raw data) are data which are directly acquired within the scope of a data collection. They cannot be derived from other data. |
| Measurement data | Data and records which form a part of a measurement or are produced in connection with performing a measurement, or are derived from it. 
QP “Handling of Measurement Data and Measurement Data Processing Systems” |
| Dual-use problematics in research | Risk that research intended for peaceful purposes is misused for warlike/terroristic purposes. |

see above, Quality Procedures (QP) "Terms and abbreviations"

4 Competencies and Responsibilities

| Task | 1 | 2 | 3 | 4 |
| Management of appropriate Charter of PTB, Section 5 | R | I | I | I |
| Ensuring the operation of the „PTB Ethics Committee“ | R | I | I | I |
| Appointing the liaison officers for safeguarding good scientific practice | R | I | I | I |
| Initiation of formal proceedings in the case of scientific misconduct in coordination with the responsible liaison officers for the safeguarding of good scientific practice and the responsible persons at Division Z | R | I | I | I |
| 1 President of PTB | 2 Senior Quality Manager of PTB | 3 Central Quality Management | 4 Heads/Quality Managers of divisions/ bodies |
5 Description

5.1 Good scientific practice

5.1.1 Good scientific practice manifests itself in exemplary conduct. To this end, it is a matter, above all, of:

1. working according to the rules of practice (lege artis) in accordance with the state of the art,
2. documenting and keeping accessible the results obtained and the course of an experiment, measurement or investigation in generally available reproducible technology according to the QP "Records" as well as of approving a retesting (thereby, the measurement data are to be retained traceably in accordance with the QP “Handling Measurement Data and Measurement Data Processing Systems”)
3. critically questioning results consistently before publishing them and putting them up for a technical discussion, e.g. in internal lectures and discussions,
4. maintaining strict honesty in terms of the contributions by predecessors, partners and competitors ("PTB-Drittmittelkodex zur Annahme von F+E-Mitteln" (PTB Third Party Funds Code for the Acceptance of R+D Funds) is applicable, see below, Section 6.1),
5. maintaining good cooperation and responsible management in the OUs and research teams,
6. suitably supervising young colleagues (the “Policy for the support of Doctoral Candidates at PTB” (“Doctoral Candidate Concept”) is to be observed),
7. spotting internal quality control testing of publications, also retroactively, e.g. according to the QP “Internal Audits”.

5.1.2 Exemplary scientific conduct is encouraged, when - e.g. in the case of hiring, advancement and appropriation of funds - scientific achievements are evaluated according to qualitative rather than quantitative criteria and the "Leitlinien für Führung und Zusammenarbeit" (Guidelines on Management and Cooperation) are observed.

5.1.3 PTB research serves to expand knowledge and is committed to human wellbeing as well as to the protection of – above all, constitutionally protected – goods. The researchers are to avoid both direct and indirect damage to these goods as far as possible. In addition to judicial rules, they are to also observe ethical principles. The researchers must, as a matter of principle, be aware of the risk of misuse of research.
critical cases, they must, based on their knowledge and their experience, make a personal decision as to what they can justify in their research. The Empfehlungen zur Wissenschaftsfreiheit und Wissenschaftsverantwortung im Umgang mit sicherheitsrelevanter Forschung (Scientific Freedom and Scientific Responsibility - Recommendation for Handling Security-Relevant Research) for so-called „dual-use problematics“ (see Section 5.7) are to be observed.

5.2 Primary data protection

Primary data, for example measurement data (see also QP “Handling of Measurement Data and Measurement Data Processing Systems”), collections, studies, cell cultures, material samples, questionnaires which are the basis of a scientific publication (publications, conference articles, reports on scientific cooperations, testing and tasks) are maintained traceably according to the QP “Handling Measurement Data and Measurement Data Systems” and kept available for at least ten years under the responsibility of the publishing OU and/or the research team. The divisions/bodies may, in justified cases, stipulate having shortened retention periods for such primary data that cannot be stored on durable and secured carriers.

Details of organizational and technical methods of storing data and documents as well as of the possibly needed supplementary documentation are to be stipulated in the QM documents of the divisions/units (see also QP “Control of the Quality Documents”). This also applies to the work of the research teams. In this connection, after the work of the research team has been concluded, the records and data are to be handed over to an OU of PTB. Binding documentation regulations exceeding these regulations - e.g. due to legal or technical approval requirements - remain unaffected.

Within the scope of on-going research projects, the OU or the research team concerned decides to what extent it makes the acquired primary data available to third parties.

If also external contractual partners are participating in a research project, a contractual provision is recommended for the use of primary data by third parties and by possible new contractual partners. As a rule, the original data remains at the source of origin and duplicates are made of these or access authorizations are granted.

5.3 Authorship of scientific publications

5.3.1 A co-author can be named as such only if he has contributed considerably to at least one of the following aspects of a (scientific) paper:

- Scientific question
- Research plan
- Conducting the research work
- Analysis or interpretation of the results
- Drafting the manuscript or critically working it out in terms of content.
Neither a purely technical involvement nor a mere allocation of financial resources nor the general management of a publishing OU and/or a research team constitutes a co-authorship. The release of a manuscript for publication should be confirmed by the signature of all co-authors and the contribution of an individual person and/or OU or of the research team should be documented.

5.3.2 All authors of a scientific publication named by mutual agreement always bear the responsibility jointly for its content. In case the contributions are broken down by individual authors, this responsibility applies to its fullest extent only to the respective contribution.

5.3.3 Should a staff member feel disregarded, then he can contact the liaison officers as provided in Section 5.5.

5.3.4 If a person is named co-author without his consent and against his will, then it is expected that he will object to it explicitly in the appropriate form, as soon as this fact becomes known to him. Otherwise, this is regarded as tacit consent to an authorship with the corresponding joint responsibility for the publication.

5.3.5 In the publication, one's own preliminary work and that of others (quotations) are to be verified completely and correctly. To this end, previously published results are to be repeated only in the already existing form and only insofar as necessary for understanding the correlation. Thanks for the technical support of the work in terms of content should be shown in an appropriate form.

5.3.6 The administrative operations for the publishing and translation of publications at PTB are regulated in an in-house directive (see HV 01/09).

5.3.7 The German version of the BIPM brochure "The International System of Units (SI)", 8th edition dated 2006, PTB-Mitteilungen 117(2007), issue 2, June 2007 (see Section 6.2 below) provides a detailed overview of the use of the SI units. It should be categorically taken into account in publications.

5.4 Scientific misconduct

5.4.1 Deviations from good scientific practice are deemed to be scientific misconduct. Scientific misconduct exists particularly in the case of:

- Fabrication and falsification of data;
- unfounded information, e.g. in the case of publications, job applications, etc.;
- infringement of intellectual property by
  - unauthorized exploitation under the presumption of authorship (plagiarism),
  - presumption or unfounded assumption of scientific authorship or co-authorship, assumption of an honorary authorship,
  - exploitation of non-published scientific ideas or approaches to research of others (theft of ideas) as well as
  - publication or making accessible without the consent of the authorized person;
5.4.2 A part of scientific honesty is to not silently tolerate the scientific misconduct of others. Accordingly, PTB expects its staff members to assist in the case of concrete suspicion in clarifying the circumstances and, if necessary, in correcting or rectifying the circumstances. The usual procedure in this connection should be to address the originators about the possible misconduct and ask for clarification and, if necessary, correction.

5.4.3 Here it is possible to encounter difficulties for various reasons. Therefore, a procedure is implemented in Section 5.5 in case a suspicion of scientific misconduct cannot be clarified in direct talks.

5.5 Procedure in the case of scientific misconduct

5.5.1 The president will appoint for the sites Braunschweig and Berlin two experienced scientists who will be available as liaison officers to all staff members of PTB for the purpose of consultancy and assistance for questions in connection with the safeguarding of good scientific practice. The appointment is effective for a period of two years and can be extended.

5.5.2 The liaison officers act as a substitute for each other in the case of absence and are entitled to exchange information with each other at any time.

5.5.3 The liaison officers undertake to maintain confidentiality in the course of their task. At the express request of the staff member seeking advice, his anonymity must be preserved.

5.5.4 When a liaison officer becomes aware of problems in the safeguarding of good scientific practice, he will immediately work out - at his discretion and together with the persons affected - solutions (e.g. erratum or cancellation of a scientific publication, information of the cooperation partners) for resolving the problems. In the course of their task, they can avail themselves of the professional assistance of other PTB staff members at any time.

5.5.5 In the case of a conflict of interest due to direct professional responsibility, the liaison officers represent each other mutually.

5.5.6 The liaison officer is entitled to propose to the president that formal proceedings be initiated in the case of a concrete suspicion becoming known to him of a considerable breach of the rules for safeguarding good scientific practice. The duration of the entire proceedings should not exceed a period of two years.

5.5.7 The liaison officers are to inform the president of PTB annually in a joint report. At the end of their two-year task, the liaison officers will prepare a general report for the president of PTB. This will contain in particular the solutions and proposals worked out and may not contain any inference to the involved parties. It is a part of step 2 of the Management Review (see also QP “Management Review”). In addition, the liaison officers will contribute to the formulation of supplementary internal standards.
5.6 Consequences of scientific misconduct

5.6.1 Grave scientific misconduct can - depending on the circumstances of the individual case - have the following consequences:

(1) consequences under civil service law: Initiation of a disciplinary action, recourse for culpably caused damage;
(2) consequences under labour law: Notice of a (formal) warning or extraordinary termination, liability in the case of culpably caused damage;
(3) consequences under civil law: e.g. issuing an off-limits order (order to stay away from the premises), damage claims made by financial supporters;
(4) consequences under criminal law: e.g. penalty in the case of illicit exploitation of copyright protected works.

5.6.2 PTB will, if a margin of discretion is available in the decision on the initiation of formal proceedings or in the evaluation of the resulting findings, strive to work out the conflict jointly with the liaison officers and to take the solution found into consideration, insofar as this is possible.

5.7 Ethically responsible safety-relevant research

5.7.1 Risk analysis
The researchers have to analyze the consequences as well as the possibilities for application and misuse of their work and their controllability. In this connection, also the risks which a forgoing of research create are to be taken into consideration. If they arrive at the conclusion that their research could be safety-relevant, then they have to take care of minimizing the risk, and of the respective checking of publications, and of the documentation and notification of the risks involved in the manner described below.

5.7.2 Minimizing risk
The researchers are to minimize the risks of performing and applying their work through the use of the respective safety measures as well as the careful selection and commitment (see QP “Protection of Confidence, Impartiality and Integrity“) of reliable staff members and cooperation partners.

5.7.3 Checking of publications
The consequences of publishing the results of high-risk research are to be assessed. In the case of an increased risk of misuse, as matter of principle, partial publications, time-delayed publication, and even complete waiving of publication are recommended.

5.7.4 Abandoning research as a last resort
The risk-benefit analysis of the research as well as the estimation of effort needed to avoid the occurrence of damage can result in abandonment of the project, even if it is not barred by a statutory ban.

5.7.5 Documentation and notification of risks
If research leads to risks for human dignity, for life or health of human beings, for the environment or for other important constitutionally protected goods, then these risks, their comparison with the probable benefit, and the measures taken for minimizing
these must – before beginning work and, in the case of changes, also during the work – be documented and be submitted to the responsible heads of the divisions for decision.

5.7.6 PTB Ethics Committee
For the concluding assessment of ethical and legal aspects of research as well as to render advice to the responsible researchers, a PTB Ethics Committee was set up.

6 Explanatory notes and comments
6.1 Other applicable documents
• PTB-Drittmittelkodex zur Annahme von F+E-Mitteln (PTB third party funds code for the acceptance of R+D funds) dated 14 November 2005
• HV 01/09 “Rules for publications by PTB authors”
• Policy for the support of doctoral candidates at PTB (“Doctoral Candidate Concept”)

6.2 References
• Proposals for Safeguarding Good Scientific Practice, Recommendations of the commission on Professional Self-Regulation in Science, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim 2013

6.3 Remarks
Granting of funds
Applications for the granting of funds of the Deutsche Forschungsgemeinschaft (DFG) (German Research Foundation) must, in addition to the information in the "Merkblatt für Anträge auf Sachbeihilfen mit Leitfaden für die Antragstellung" (Information on applications for grants with a guideline for the application) of the DFG, also contain the following statement:

"The recommendations of the Deutsche Forschungsgemeinschaft (German Research Foundation) for the safeguarding of good scientific practice have been integrated into the quality management system of PTB since January 2001."

7 Appendices
Reference list of the DFG recommendations for the QM documentation of PTB