

# **OPERATIONS MANUAL**

## **BIOLOGICAL EXPOSURE INDICES COMMITTEE**

Adopted by ACGIH<sup>®</sup> Board of Directors: April 2004



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## **1. COMMITTEE GOAL AND MISSION**

The Biological Exposure Indices (BEI<sup>®</sup>) Committee was established by the Board of Directors of the American Conference of Governmental Industrial Hygienists (ACGIH<sup>®</sup>). This Committee's goal is to be a respected, worldwide leader in the development and dissemination of occupational health-based biological exposure guidelines.

The mission of the Committee is to develop occupational biological exposure guidelines that are:

- Scientifically valid and supported by professional judgment
- Up to date
- Well documented
- Understandable and clear
- Produced by a clearly-defined process that is balanced and free of conflict of interest

## 2. MEMBERSHIP

### ***Eligibility***

Members of the BEI<sup>®</sup> Committee must be members of ACGIH<sup>®</sup>. The Committee may have up to 20 members who should represent the disciplines necessary to establishing BEI<sup>®</sup>. Under current ACGIH<sup>®</sup> policy, a committee must maintain a simple majority of Regular members. All members of the Committee have full voting rights for the purposes of the business of the Committee. (Each member must have participated in the annual Conflict of Interest declaration and signed an annual Conflict of Interest statement.)

### ***Consultants***

Periodically the Committee may need specialized technical expertise or assistance in completing a particular BEI<sup>®</sup> and utilize the help of volunteer Consultants to the Committee to fill that void. These Consultants are identified and vetted by Committee members—in a similar fashion to candidates for BEI<sup>®</sup> membership—and nominated by the BEI<sup>®</sup> Chair for review and appointment by the ACGIH<sup>®</sup> Board of Directors. Consultants are utilized when the expertise needed is not present within the current Committee membership. Consultants do not have voting privileges and attend meetings only at the invitation of the Chair.

### ***Member Selection***

Anyone interested in joining the Committee will be asked to complete an application form (Appendix A) and provide a resume or curriculum vitae. The Full Committee will review these documents and determine whether the applicant is eligible and fits the needs of the Committee.

The following criteria will be used to evaluate an applicant for membership:

- Disciplinary training and education
- Professional background
- Past relevant experience
- Personal attributes necessary to meet Committee goals

The following criteria will be used to assess the overall membership of the Committee and each new member applicant:

- The Committee should have a mix of persons who have expertise in one or more of the following: occupational medicine, epidemiology, toxicology, industrial hygiene, analytical chemistry, or other related specialties (e.g. statistics etc.).
- A preference will be given to individuals with 10 or more years of professional experience, with multi-disciplinary backgrounds and experience, and with an advanced degree in his or her field of expertise.
- Individuals should demonstrate effective writing capabilities and communication skills through publications, presentations, and/or other activities.
- The membership should reflect the demographics of the industrial hygiene and occupational health workforce.

Persons with multi-disciplinary backgrounds and experience are encouraged to apply.

Recruitment of new members for the BEI<sup>®</sup> Committee may be accomplished by a variety of methods, including advertisements and personal communications.

Applicants will be informed of Membership Expectations and Responsibilities of the BEI<sup>®</sup> Committee (Appendix B) and will be asked to review and accept these responsibilities as part of their application. Staff will review the completeness of applications received and issue a letter

confirming receipt of the application. Complete applications and resumes will be sent to the Chair of the BEI<sup>®</sup> Committee, and the Steering Subcommittee.

The Committee will review and consider all new applicants at least once per year or more frequently if necessary. All BEI<sup>®</sup> Committee Members will be notified by the BEI<sup>®</sup> Chair of the names of applicants under consideration and asked to forward their comments to the Steering Subcommittee within two weeks.

If the Steering Subcommittee indicates its interest in an applicant, the BEI<sup>®</sup> Committee Chair will extend an invitation to attend and participate in a full Committee meeting.

The Steering Subcommittee will ask the Committee members for an assessment of the applicant. If the applicant is acceptable and continues to express an interest in becoming a member, the BEI<sup>®</sup> Committee Chair will invite the applicant to participate in BEI<sup>®</sup> Committee activities for a one-year probationary period. Applicants will be referred to as member-candidates during this period. As such, they will be expected to attend all meetings of the Committee. The BEI<sup>®</sup> Committee Chair will identify and assign responsibilities to the member-candidate during the probationary period. These responsibilities will include the assignment of a document to be developed as a draft during the probationary year, administrative activities, and other duties. The member-candidate will not be allowed to vote in Committee meetings during the probationary year, but will be expected to participate fully in Committee discussions.

Member-candidates who have completed their probationary period satisfactorily will be evaluated by the BEI<sup>®</sup> Committee. Names and resumes of recommended member-candidates will then be forwarded by the BEI<sup>®</sup> Committee Chair to the Board for formal appointment.

Should a member-candidate not fulfil the criteria of membership, a letter will be sent by the BEI<sup>®</sup> Committee Chair thanking the member-candidate for his/her interest. Should a member-candidate not be selected for other reasons, a letter will be sent by Staff thanking the person and asking for interest in remaining in the pool of applicants for future consideration.

### ***Member Responsibilities and Expectations***

The BEI<sup>®</sup> Committee follows the Membership Expectations and Responsibilities requirements as described in Appendix B.

Expectations for each member include working on two BEI<sup>®</sup> *Documentation* annually; at least one of which should be for a new substance. These expectations may vary for individual members, depending on other activities undertaken within the Committee. Individual members will negotiate their activities with the Committee Chair.

Members are expected to contribute annually approximately four weeks of their time to the work of the Committee. This estimate includes time spent attending two meetings each year and preparing and reviewing BEI<sup>®</sup> *Documentation*. More senior members will also be expected to provide guidance and mentorship to new members.

Members are expected to comply with the Committee's confidentiality guidelines and Conflict of Interest Policy. They are expected to interact at all times in a collegial fashion with other members of the Committee and Staff.

Participation on the Committee is a privilege that must be continually earned, through on-going productivity, participation and collegial behaviour. When considering re-nomination, the Chair will review a member's participation in light of membership expectations and length of tenure on the Committee. As members serve additional terms they are expected to take on a greater role in the Committee, which may include preparing additional *Documentation* and other activities as

needed.

### **Conflict of Interest**

BEI<sup>®</sup> members and Consultants are required to follow the ACGIH<sup>®</sup> Policy and Process on Bias and Potential Conflicts of Interest, published on the website at <http://www.acgih.org/TLV/COIPolicy.htm>. BEI<sup>®</sup> members and consultants should review all of the details of this policy. Information relevant to the BEI<sup>®</sup> Committee and its Conflict of Interest process are described below.

Bias is defined as “views stated or positions taken that are largely intellectually motivated or that arise from close identification or association of an individual with a particular point of view or the position or perspectives of a particular group.” Conflict of interest means “any financial or other interest which conflicts with the service of an individual because it (1) could impair the individual’s objectivity or (2) could create an unfair competitive advantage for any person or organization.”

In the case of bias, the Committee attempts to create a balance of opinions and views by maintaining a diversity of professional affiliations, disciplines and activities among its membership.

In the case of conflict of interest, the Committee has created a number of avenues for minimizing or eliminating the potential effects of conflict of interest while allowing a member to participate as fully as possible in Committee activities. The Committee believes that it is the primary responsibility of the individual member to identify his/her potential conflicts and to consider carefully the level of participation that is appropriate.

At least once each year, the Committee Chair will conduct a presentation and discussion of Conflict of Interest with the full membership of the Committee. This presentation will include a variety of scenarios and possible methods for resolving conflicts while maintaining participation. Every member of the BEI<sup>®</sup> Committee will be asked to briefly describe, orally, relevant information concerning his/her background, current employment and professional activities, consultancies, financial holdings, and research funding. This description will focus on all activities and associations that may have relevance to the activities of the Committee. The BEI<sup>®</sup> Committee will thus identify for itself and its members any substances or issues that represent a conflict of interest for any of its members.

In addition to the annual discussion of conflicts of interest described above, the Committee Chair will begin the review of new substances with a request for notification of Conflict of Interest from the Committee members. In addition, any member who develops a new conflict of interest for an ongoing chemical *Documentation* will be expected to notify the other members of the Committee.

It may not always be in the best interests of the BEI<sup>®</sup> Committee for a member who has a significant conflict of interest to remove himself or herself entirely from the BEI<sup>®</sup> development process when s/he is very knowledgeable about that particular substance. In such cases, the Chair should work directly with a member to assure this conflict is minimized while allowing for the fullest participation practical. Should a member who works for an entity with a direct interest in a substance undertake the initial authorship of a *Documentation* concerning that substance, a variety of paths may be utilized to address and minimize the effects of this conflict of interest. These may include:

- assigning a co-author who will review all of the literature and assist in the preparation of the *Documentation*;

- review by an expert external to the Committee (the latter is recommended only rarely).

All members who have participated fully in the BEI<sup>®</sup> Committee discussions about Conflict of Interest and who have made their best effort to eliminate or minimize personal conflicts will be eligible to participate in all votes. In situations where the conflict cannot be eliminated or removed to the satisfaction of the Committee, members may need to excuse themselves from any discussions and reviews, and must excuse themselves from votes related to that substance.

Failure by any member to report a Conflict of Interest is grounds for immediate termination of that member's service on the Committee. This decision will be made by the Chair after review and deliberation with the Committee. The Chair will conduct a review with the Committee and make a recommendation to the Board. Depending on the status of the BEI<sup>®</sup> (Under Study, proposed, or adopted), it may be necessary to carry out a complete review of the decision-making process for the substance to determine appropriate action.

### ***Confidentiality of Committee Activities and Authorship***

Individual members are encouraged to carefully guard information about their own activities, keep Committee discussions confidential, and respect the confidentiality of other members of the Committee. Draft *Documentation* and positions must not be shared with anyone external to the Committee. Authorship of *Documentation* is a confidential matter. Methods for seeking information from external parties while ensuring anonymity should be discussed with the Committee Chair.

### ***Terms***

Members serve three-year terms, generally beginning January 1. They may be re-nominated to additional three-year terms. The Committee Chair will consult with the members of the Committee prior to recommending re-nomination.

Expectations for continuing membership include:

- Attendance at and constructive contributions to meetings;
- Participation in scheduled conference calls;
- Satisfactory progress in completing assignments, as recorded in meeting minutes and the Committee work plan.

A member's contributions to the work of the committee and progress on assignments will be evaluated by the Steering Committee annually and by the Full Committee during the re-nomination process.

### 3. COMMITTEE STRUCTURE

#### *Position Descriptions*

##### **BEI<sup>®</sup> Committee Chair**

**Method of Selection and Appointment:** The Chair of the Committee is nominated through an internal Committee selection and vote process, the results of which are recommended to the Board for final selection and approval. Six months prior to the expiration of the current Chair's appointment, the Committee will seek nominations from Committee members for candidates. Candidates may be drawn from current members of the Committee or may be people from outside the Committee. The latter must meet the criteria for voting membership within ACGIH<sup>®</sup>, as well as the membership criteria of the BEI<sup>®</sup> Committee. All Committee members will be asked to vote for one of the nominees. The Committee Chair and Vice-Chair will tally votes. The slate of nominees and number of votes they received will be sent to the Board of Directors for final selection and approval.

The Chair of the BEI<sup>®</sup> Committee will hold the appointment for three years. This appointment may be renewed for more than one term, following the nomination and selection process described above.

**Duties:** The Chair leads the Biological Exposure Indices Committee and works closely with the Vice-Chair and Steering Subcommittee to ensure the Committee's progress toward fulfilling its mission and goals. The Chair:

- Assists and oversees Committee activities, including conducting Committee meetings,
- Oversees budget management, spending, meeting plans (with assistance from Staff Liaison)
- Monitors overall workload and makeup of the Committee,
- Assures regular, clear communications with Staff and Board of Directors by interacting with the Board Liaison, Staff Liaison, and other Staff or Board members, as necessary,
- Assures regular, clear communications with external parties by reviewing all comments received and providing input to replies sent by Staff,
- Assures communication between all members of the Committee and that the Committee is functioning according to guidelines and policies by consulting regularly with the Steering Subcommittee,
- Consults regularly with the Vice-Chair to assure proper functioning of internal Committee activities,
- Assures the Committee is functioning according to guidelines and policies,
- Represents the BEI<sup>®</sup> Committee to outside parties,
- Represents the BEI<sup>®</sup> Committee to the ACGIH<sup>®</sup> Board of Directors and communicates and consults regularly with the Committee's Board Liaison, and
- Is responsible for developing a workplan and budget for review by the full Committee.

**Reporting:** The Chair reports directly to the Board of Directors of ACGIH<sup>®</sup> and the Committee's Board Liaison.

### **BEI<sup>®</sup> Committee Vice-Chair**

**Method of Selection and Appointment:** The Committee Chair recommends the Vice-Chair to the Board of Directors for approval and appointment. The Vice-Chair may be re-nominated by the Chair and re-appointed by the Board for more than one term.

**Duties:** The Vice-Chair is responsible for assisting the Chair in assuring that internal Committee functions are adequately cared for. The Vice-Chair may be a candidate for future consideration as Committee Chair. The Vice-Chair

- Assists the Chair as necessary,
- Participates in the Steering Subcommittee,
- Assists the Chair to oversee internal Committee activities that support *Documentation* preparation and membership, and
- Serves to fulfill the responsibilities of the Chair when s/he is unable to do so.

**Reporting:** The Vice-Chair will report to the Chair of the Committee on his/her individual activities.

### **BEI<sup>®</sup> Committee Liaison to TLV<sup>®</sup>-CS**

**Method of Selection and Appointment:** The Committee Chair selects any Committee member, including the Chair, to serve as the Liaison to TLV<sup>®</sup>-CS Committee. The Committee must approve the selection, and the identity of the Liaison is communicated to the officers of the TLV<sup>®</sup>-CS Committee and to the Board.

**Duties:** The Committee Liaison represents the BEI<sup>®</sup> Committee at meetings of the TLV<sup>®</sup>-CS Full Committee and Subcommittees, and serves as a non-voting participant of the TLV<sup>®</sup>-CS Committee. The BEI<sup>®</sup> Chair and the Liaison will cooperate to assure that the BEI<sup>®</sup> Committee is represented at meetings of the Full Committee. The Liaison

- Attends most or all of the regularly scheduled meetings of the full TLV<sup>®</sup>-CS Committee,
- Participates in the discussions of the Full Committee and Subcommittees,
- Reports to TLV<sup>®</sup>-CS on the actions and agenda of the BEI<sup>®</sup> Committee,
- Reports to BEI<sup>®</sup> on the actions and agenda of the TLV<sup>®</sup>-CS Committee, and
- Acts to assure that the decisions of the two committees are mutually consistent, by maintaining open communication and, when necessary, defending the decisions of the BEI<sup>®</sup> Committee.

### **BEI<sup>®</sup> Steering Subcommittee**

**Method of Selection and Appointment:** The Steering Subcommittee consists of the Chair, Vice Chair, and Immediate Past Chair. In the event that the Immediate Past Chair is not a current member of the BEI<sup>®</sup> Committee, an additional member will be chosen from the Committee. The Chair of the Committee serves as the leader of this group.

**Duties:** The Steering Subcommittee:

- Assists the Chair in setting the agenda for each meeting,
- Assists the Chair in the selection of a member of the Committee for Committee approval as Liaison to the TLV<sup>®</sup>-CS Committee,
- Monitors the activity of the TLV<sup>®</sup>-CS Committee through the Liaison,
- Reviews Committee productivity, progress toward goals and mission, spending and budget,
- Sets specific annual goals and recommends an annual Committee workplan to the

ACGIH<sup>®</sup> Board,

- Reviews, changes, and updates Committee policies, with Board approval,
- Is responsible for assuring that Committee resources are properly allocated,
- Is responsible for recruiting, reviewing, and recommending new members to the Committee, and for monitoring the probationary progress of applicants considered potential members,
- In consultation with Board Liaison, may identify and use external resources, as necessary, and
- Reviews special projects and requests from members.

## 4. BEI<sup>®</sup> PRODUCTION GUIDE

### **Substance Selection**

The Steering Subcommittee will develop, on an annual basis, two lists of substances that should receive a high priority for the development of new or revised BEIs<sup>®</sup>. One of these lists will identify substances that do not have BEIs<sup>®</sup>, while the other will identify substances that already have BEIs<sup>®</sup> but which should be reviewed to update their *Documentation* and possibly revise the BEI<sup>®</sup>.

The Committee will be responsible for identifying BEI<sup>®</sup> *Documentation* that have not undergone a complete review or revision in the past 8 years.

### **Description of BEI<sup>®</sup> Development Process**

The BEI<sup>®</sup> Committee follows the TLV<sup>®</sup>/BEI<sup>®</sup> Development Process: An Overview, posted on the ACGIH<sup>®</sup> website (<http://www.acgih.org/TLV/DevProcess.htm>).

Once a substance has been identified as a candidate for a new or revised BEI<sup>®</sup> or *Documentation*, the Steering Committee and Full Committee will determine the development path appropriate for that Substance. The following is an overview of this process.

- Substance/Issue identified for study (by decision of the Committee).
- Member assigned to prepare a *Feasibility Assessment (Appendix C)*.
- Substance/issue published on Under Study List in the Annual Report for the Committees on TLVs<sup>®</sup> and BEIs<sup>®</sup>, the *TLVs<sup>®</sup> and BEIs<sup>®</sup> Book*, and information posted on the ACGIH<sup>®</sup> website. This is done to notify the public of this action and to solicit public review and comment. A substance for which the *Feasibility Assessment* is negative is also listed in the above resources.
- When the *Feasibility Assessment* is positive, Committee member(s) gathers information and prepares draft *Documentation*.
- One or two members of the Committee are assigned the task of collecting information and data from the scientific literature, reviewing results of the search and developing a draft BEI<sup>®</sup> *Documentation (Appendix D)*.
- The draft *Documentation*, with its proposed BEI<sup>®</sup>, is then reviewed and critiqued by additional Committee members as appropriate, and eventually by the Full Committee. This may result in several revisions to the draft *Documentation* before the Full Committee accepts the proposed BEI<sup>®</sup> and *Documentation*. When the Full Committee accepts the draft *Documentation* and its proposed BEI<sup>®</sup> (see Committee Voting Procedure, Appendix G.), the *Documentation* is then recommended to the ACGIH<sup>®</sup> Board of Directors for ratification. If ratified, the proposed BEI<sup>®</sup> is published in the Notice of Intended Changes (NIC). At the same time, the draft *Documentation* is made available through ACGIH<sup>®</sup> Customer Service or online at [www.acgih.org/store](http://www.acgih.org/store).
- A proposed BEI<sup>®</sup> must be held on the Notice of Intended Change for about one year. During this period, the BEI<sup>®</sup> and *Documentation* are open for public comment.
- During the NIC stage the Committee Chair will propose one of the following actions:
  - 1) withdraw the BEI<sup>®</sup> from the NIC and from further consideration,
  - 2) withdraw the BEI<sup>®</sup> from the NIC and return the substance to the Under Study List,
  - 3) retain the BEI<sup>®</sup> on the NIC for an additional year,
  - 4) revise the BEI<sup>®</sup> and or the notations, and place it for an additional year on the NIC, or
  - 5) recommend adoption of the BEI<sup>®</sup> and its *Documentation*.

The above actions are determined by Committee vote.

- If the recommendation is to adopt, the recommendation is sent to the Board of Directors for ratification.
- If ratified by the Board of Directors, the BEI<sup>®</sup> and its *Documentation* are adopted and published.

### **BEI<sup>®</sup> Feasibility Assessment and Documentation Templates**

An outline of a BEI<sup>®</sup> Feasibility Assessment is included in Appendix C

An outline of a BEI<sup>®</sup> *Documentation* is included in Appendix D.

The purpose of the BEI<sup>®</sup> *Documentation* is to clearly describe, present, and interpret the appropriate scientific information supporting the derivation of the BEI<sup>®</sup> and its associated notations for a given chemical. It should be kept in mind that a BEI<sup>®</sup> *Documentation* is not a complete review of all the literature available on a particular substance. It has as its purpose the derivation of a value and the identification of notations, for the purpose of protecting employees in occupational settings. The primary users of the BEI<sup>®</sup> *Documentation* are occupational hygienists and other occupational health professionals.

### **Literature Search**

For new and revised BEIs<sup>®</sup>, the Committee Member should conduct a full literature search using the appropriate databases. If assistance is needed from the ACGIH<sup>®</sup> Staff, the request form shown in Appendix E should be used. Basic references (a list is included in Appendix F) should be consulted. Staff or other Committee members may provide assistance with those references to which a member does not have access.

For BEIs<sup>®</sup> requiring revision, the Committee Member should request an electronic copy of the original BEI<sup>®</sup> *Documentation* from ACGIH<sup>®</sup> and any references currently on file. A full literature search should then be conducted (by member or Staff) starting with the date of the last reference listed in the BEI<sup>®</sup> *Documentation*, using databases and references listed in Appendix F.

Primary references should be relied upon whenever possible. Members are encouraged to use local libraries; however, if such access is difficult they may request that Staff obtain copies of the references for them. It should be kept in mind that peer-reviewed, published materials will serve as the backbone of a *Documentation*, particularly for the justification of the BEI<sup>®</sup>; if non-peer-reviewed materials are necessary, the member should discuss this with the Committee Chair. If these references are considered necessary and acceptable, the member is expected to provide a copy of these materials to ACGIH<sup>®</sup> upon completion of the draft *Documentation*. If unpublished data are used, the owner of the data must first provide ACGIH<sup>®</sup> written permission to use, cite, and release the data/report to an outside party upon request.

Copies of primary references used in a previous BEI<sup>®</sup> *Documentation* should also be obtained, particularly if used to justify the BEI<sup>®</sup> value.

## 5. COMMUNICATIONS

The BEI<sup>®</sup> Committee follows the ACGIH<sup>®</sup> Public Affairs and Communication Policy, posted on the ACGIH<sup>®</sup> website at <http://www.acgih.org/About/Committees/ACGIHPubAffairsCommPolicy.pdf>.

### ***External to the Committee***

The Committee communicates with its public, its users, and interested parties by publishing its decisions in the Annual Report for the Committees on TLVs<sup>®</sup> and BEIs<sup>®</sup>, the *TLVs<sup>®</sup> and BEIs<sup>®</sup>* Book, and information posted on the ACGIH<sup>®</sup> website. The BEI<sup>®</sup> Committee is under no obligation to inform any particular group about its activities or decisions.

### **1. Education and Outreach**

A goal of the BEI<sup>®</sup> Committee is to foster educational and outreach activities. This includes reviewing and developing ideas and plans for future symposia (scientific presentations) and workshops (educational forums). For internal educational purposes and activities, the Committee will seek input from all BEI<sup>®</sup> Committee members and the Staff Liaison when deciding topics. For external educational and outreach activities, the BEI<sup>®</sup> Committee will work closely with the ACGIH<sup>®</sup> Education Development Manager and other Staff, (as necessary,) when formulating its ideas. External activities require review and approval from the Committee prior to their implementation.

To carry out this mission, the Committee will:

- Conduct a needs assessment, with the aid of ACGIH<sup>®</sup> Staff on who uses BEIs<sup>®</sup> and where Committee resources can cost-effectively be used,
- Identify and develop ideas for possible workshops, conferences, courses, symposia, meetings, or other outreach events,
- Assess the merit of each external or internal proposal in terms of its value to the Committee, users of the BEIs<sup>®</sup>, the ACGIH<sup>®</sup> membership, other professional bodies, and its potential for impact on workers,
- Communicate regularly to the Education Development Manager regarding the topics that are under consideration for possible future educational/outreach events,
- Provide assistance to the ACGIH<sup>®</sup> Staff in efforts to organize and plan events of value to the BEI<sup>®</sup> Committee,
- Work with Staff in developing educational tools and programs to assist in educational and outreach efforts,
- Work in developing additional publications (journal or newsletter articles, for example), that will educate users of the Committee's process or decisions, and
- Assist Staff in education evaluation to encourage excellence in educational and outreach activities of the BEI<sup>®</sup> Committee.

### **2. Communication with Groups That Set Occupational Exposure Values**

The BEI<sup>®</sup> Committee will undertake as one of its goals regular communication and interaction with other national and international groups responsible for determining occupational exposure guidelines. The BEI<sup>®</sup> Committee Chair and Staff Liaison will work together to build links with such groups. These activities will be reported to the Steering Subcommittee, the Committee, and the Board as they occur.

### **3. External Parties with Interest in BEIs®**

The Committee recognizes that there are many different parties with an interest in the BEI® process and its outcomes. At the same time, it is important that these external parties not compromise the Committee's decision process, which is based primarily on peer-reviewed scientific information. Thus, it has established written policies and procedures that allow input from external parties to the Committee concerning substances currently under review. These policies and procedures are described below.

**Invitations to Present at Committee Meetings:** The Committee may receive requests from external parties to make a presentation about specific substances or issues. It is *strictly by exception* that such requests are granted. The Committee focuses on data that have been peer-reviewed and published and not on data presented in a private forum. The Committee may grant the request according to the guidelines in the TLV®/BEI® Development Process: An Overview, published on the ACGIH® website. This may occur when the data is significantly new, has received peer review, is the best vehicle for receipt of the information, and is essential to the Committee's deliberations. Requests for this type of presentation must be sent, with appropriate materials, to the Staff Liaison. Staff will forward the information to the Chair and other Committee members as needed. Formal invitation to present, if desired, will be extended by the Chair after review of the issue and materials.

External parties are encouraged to send their comments and input to the Committee in writing. Comments and requests should be sent in electronic form, via the ACGIH® Science Group at [science@acgih.org](mailto:science@acgih.org). The Chair will review all written comments and make adjustments to the *Documentation* if necessary. The Chair and designated author of BEI® and *Documentation* will help prepare the appropriate response, which will be sent only by the Staff Liaison. All such correspondence must be initiated and followed up by the Staff Liaison only. No external correspondence (written or oral) should be undertaken by any member of the Committee (including the leadership). Exceptions may be made, but only after thorough consultation with the Staff Liaison and Committee Chair.

### **4. Policy of the BEI® Committee regarding Guests and Student Participation at Meetings**

The BEI® Committee, at its discretion and under the conditions noted below, may invite outside parties to its meetings for the purposes of sharing experience and expertise, to add an additional or international perspective to development of a BEI® and its *Documentation*, or to present data and research. Guests will not participate in BEI® Committee deliberations or votes and may be asked by the Chair to leave the meeting following their presentation in order to avoid conflict of interest or the suggestion of outside bias. Guests will not be present during discussions of policy, or bias and conflict of interest declarations. The meeting minutes will reflect when guests were present and detail the extent of their participation.

A Committee member (s) may sponsor the participation of a graduate student (s) in a particular meeting, as an observer. Students will not be allowed to observe the meeting without reading and agreeing to the ACGIH® Policies on Confidentiality and Communications. The Chair may exclude a student from any portion of the meeting.

## ***Internal to the Committee***

### **1. Communications Within Committee**

The BEI<sup>®</sup> Committee relies on meeting minutes for documenting its activities and tracking its progress.

Formal minutes will be taken at all Full Committee meetings, generally by the Staff. These minutes are used to document the activities and formal votes of the Committee (without identification of individual names, except for abstentions due to Conflict of Interest). Copies will be sent to all members of the Committee and the Board Liaison.

### **2. Communications Between Committee and ACGIH<sup>®</sup>**

The Committee assures timely and consistent communication with the ACGIH<sup>®</sup> organization through its Board and Staff Liaisons. The Staff Liaison or other Staff member attends all Committee meetings. The Staff communicates regularly with the Committee Chair about Committee activities. The Staff works closely with the Committee Chair on all issues, including budgeting and spending, meeting arrangements, publications, harmonization, communications with external parties, etc.

The Board Liaison attends Committee meetings, providing input to the Committee from the Board of Directors and relaying Committee concerns and thoughts to the Board. The Board Liaison also works with the Chair during budgeting, policy-making, and other issues that bear directly on the organization.

The Committee Chair, Liaison to the TLV<sup>®</sup>-CS Committee, and Board Liaison will work together to assure effective communication with the TLV<sup>®</sup>-CS Committee and with the Board. For example, if any actions of the BEI<sup>®</sup> and TLV<sup>®</sup> Committees appear to be in conflict with each other, the matter will be resolved by the parties named above, in co-operation with the TLV<sup>®</sup>-CS Committee, as soon as possible, and prior to approval of the actions by the Board.

## **6. APPENDICES**



**Biological Exposure Indices (BEI) Committee  
Membership Application**

Thank you for your inquiry into membership on this ACGIH® committee. To assist ACGIH® in its review and selection of new candidates for the BEI® Committee, please provide the following information and **submit your current resume and/or curriculum vitae**. Feel free to expand the size of this application as needed to accommodate responses larger than the space allocated.

Applicant's Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone (s): \_\_\_\_\_

FAX: \_\_\_\_\_

Cell: \_\_\_\_\_

Preferred E-mail: \_\_\_\_\_

---

1. Name of Employer: \_\_\_\_\_

If employed by a regulatory/government agency, do your current activities relate to the development or setting of occupational health standards?

\_\_\_\_\_ Yes      \_\_\_\_\_ No

If yes, please indicate how your activities relate to regulations or regulatory policies, and provide a list of substances or agents with which you have worked in relation to the development or setting of occupational health standards.

2. Check your area(s) of professional expertise. Use ++ for your major area(s) of expertise and + for minor area(s).

\_\_\_\_\_ Industrial Hygiene  
\_\_\_\_\_ Epidemiology  
\_\_\_\_\_ Chemistry

\_\_\_\_\_ Occupational Medicine  
\_\_\_\_\_ Toxicology  
\_\_\_\_\_ Other, please specify

\_\_\_\_\_

3. Within your area(s) of professional expertise, do you have specific fields of specialization (e.g., field industrial hygiene, analytical chemistry, statistics, aerosols, carcinogenicity, risk assessments, etc.)? List up to three fields in which you consider yourself specialized or could provide particular expertise to the BEI<sup>®</sup> committee.

4. How many years have you spent in your major area of professional expertise?

< 5 years                       11-20 years  
 5-10 years                       >20 years

5. Check all relevant professional certifications you hold.

CIH     PE     CSP     DABT     ROH  
 Medical Boards, please specify: \_\_\_\_\_  
 Other, please specify: \_\_\_\_\_

6. Check all degrees that you hold:

BA     MA     DrPH     DVM     MD  
 BS     MS     ScD     VMD  
 MPH     PhD  
 Other, please specify: \_\_\_\_\_

7. Describe your writing and verbal communication experience.

8. Check the number of years experience serving on professional and scientific committees.

< 3 years                       6-9 years  
 3-5 years                       >9 years

9. What are your primary reasons for wanting to join the BEI<sup>®</sup> Committee?

10. Have you reviewed the “Expectations and Responsibilities of Members of the ACGIH® BEI® Committee” form at the front of this application package?

\_\_\_\_\_ Yes      \_\_\_\_\_ No

11. Participation on the BEI® Committee requires a considerable amount of your time annually to attend Committee Meetings, write/review documents, and prepare/contribute to meetings. If you have questions about the time involved, please contact ACGIH® at the telephone number below. Do you have adequate time to devote to the activities of the BEI® Committee?

\_\_\_\_\_ Yes      \_\_\_\_\_ No

Please submit your application and current resume and/or curriculum vitae in one of the following three ways:

- Mail to the Chair of ACGIH® in care of the Headquarters Office at 1330 Kemper Meadow Dr., Suite 600, Cincinnati, Ohio 45240
- FAX to the Chair of ACGIH® in care of the Headquarters Office at 1-513-742-6170
- E-mail to the Chair of ACGIH® in care of the Headquarters Office at [mail@acgih.org](mailto:mail@acgih.org)

If you have questions, please contact ACGIH® at 1-513-742-2020.

Thank you for offering to serve on the ACGIH® BEI® Committee.

## ***Appendix B: Membership Expectations and Responsibilities***

### **Expectations and Responsibilities of Members of the ACGIH<sup>®</sup> Biological Exposure Indices (BEI<sup>®</sup>) Committee**

- Appointments to the BEI<sup>®</sup> Committee will normally be for terms of three years, with an annual review by the Steering Committee. Reappointment to successive three-year terms is possible.
- Each Member is expected to make satisfactory progress toward completing Committee assignments, as documented in the meeting minutes and in the BEI<sup>®</sup> Committee work plan.
- Members are expected to attend the meetings of the BEI<sup>®</sup> Committee. The duration of these meetings is generally 2-3 days. Members are expected to read meeting materials prior to the meeting and come prepared to contribute to Committee discussions and decisions.
- Members must comply with the confidentiality requirements of the Committee, and be willing to disclose conflicts of interest and other sources of possible bias.
- Members are expected to interact in a collegial and professional manner.
- Members with more than three years tenure on the BEI<sup>®</sup> Committee are expected to mentor and otherwise assist more recently appointed Members and, at the request of the Chair, serve as members of the Steering Committee or other ad hoc committees.

## **Appendix C: BEI<sup>®</sup> Feasibility Assessment and Template**

### **BEI<sup>®</sup> Feasibility Assessment**

#### **General Instructions for Feasibility Assessment:**

The goal is to provide a brief report of the evaluation of the scientific literature as a basis for a possible new BEI<sup>®</sup>. Because extensive data of good quality are needed to develop a BEI<sup>®</sup>, the feasibility assessment is critical to the efficient use of Committee resources. The criteria for feasibility will generally include, but may not be limited to:

- The number of industries using the agent and the number of workers exposed,
- The availability and quality of data that relate any proposed biological indicators to exposure conditions or to health outcomes,
- The routes of exposure, with special emphasis on inhalation and dermal contact,
- The routes of elimination, emphasizing the type of specimen to be collected,
- The severity of the health risks associated with exposure, and
- The availability and utility of analytical methods for measuring the determinant in the sample.

If the judgment of the Committee, after discussing the feasibility report, is affirmative, the author of the report is generally assigned to proceed with development of a proposed new BEI<sup>®</sup> and *Documentation*. Another member of the Committee may be assigned to be the author at the discretion of the Steering Subcommittee.

If the judgment is negative, the report is placed on file at ACGIH<sup>®</sup>, and the substance is listed in the Feasibility Assessment table under Chemical Substances and Other Issues Under Study in the *TLVs<sup>®</sup> and BEIs<sup>®</sup>* Book. This is intended to encourage the development and publication of new data, and the negative feasibility assessment should therefore identify the important shortcomings of the existing information.

## *Feasibility Assessment Template*

# **Feasibility Assessment BEI<sup>®</sup> for [Insert Agent] [Date]**

### **Occupational Exposure**

(One or two paragraphs describing extent of exposure, identifying industries where the agent is used, routes of exposure, and any data on non-occupational exposure. When available, list the following:)

OSHA Permissible Exposure Limit:  
Threshold Limit Value  
NIOSH Recommended Exposure Limit:  
ATSDR Minimal Risk Level:  
German BAT:

### **Health Risks**

(Two to three paragraphs on human and animal data, including occupational studies when available.)

### **Toxicokinetic Information**

(Describe uptake, metabolism, storage and elimination of parent compound and major metabolites. Emphasis should be on data in humans. Include data on partition coefficients and elimination half lives.)

### **Biological Sampling Issues**

(Comment on likely requirements for timing of samples, presence of interferences, methods for avoiding contamination, and sources of variability.)

### **Relationship of Biological Indicators to Exposure Guidelines**

(Discuss correlation between indicator and TLV<sup>®</sup>.)

### **Relationship of Biological Indicators to Health Risk**

(Discuss correlation between indicator levels and risk to health, where data are available.)

### **Summary (including judgment of feasible or not feasible)**

(One to two paragraphs, with recommendation on whether to proceed. General criteria for feasibility include substantial worker exposure or increasing trend, at least two human studies showing substantial agreement on toxicokinetics, existence of TLV<sup>®</sup> based on systemic

effects, availability of good analytical method for determinant, and absence of serious interferences, such as from background.)

### **Literature Cited**

(Typically 6 to 12 citations.)

## **Appendix D: BEI<sup>®</sup> Documentation and Template**

### **General Instructions for Preparing Main Body of the BEI<sup>®</sup> Documentation**

The primary purpose of the BEI<sup>®</sup> *Documentation* is to describe and analyze the scientific literature that specifically supports the derivation of a BEI<sup>®</sup> and any associated notations. Although the *Documentation* is not intended to be a comprehensive review of the literature for a substance, it should describe the key literature studies that define the data associated with a substance. To facilitate an organized description of this literature, the BEI<sup>®</sup> *Documentation* template is divided into appropriate sections for description and analysis of the relevant studies. The review of the literature should not be just a recitation of the findings and conclusions of individual reports, but also must provide appropriate integrated analyses as to which study(s) are most appropriate for consideration (i.e., weight-of-evidence analysis) in derivations of the BEI<sup>®</sup>. When a study seems to suggest the BEI<sup>®</sup> should be different from that selected, the reason for discounting this study should be provided.

Bibliographic references in the body of the draft *Documentation* should be presented as follows:  
...text (Smith et. al., 1999; Smith and Jones, 1999; Smith, 1999)

If no studies are available for a major heading (e.g., Absorption, Elimination, etc.) indicate this with the standard statement “No studies available”; if no data are available for a subheading (e.g., Pulmonary), do not include the subheading in the outline. Any comprehensive literature reviews relevant to a major heading should be discussed first, before any subheadings. Information in reviews relevant to subheading topics should be summarized there.

For each major heading and subheading, it is not necessary to describe all studies, but only those regarded as reliable and relevant to the BEI<sup>®</sup> recommendation (adequate description of methodology, reported in peer-reviewed literature, evidence or reproducibility report, etc.). Use of unpublished information requires that the entire study or communication be on file at ACGIH<sup>®</sup> headquarters and that full disclosure must be transferred to ACGIH<sup>®</sup> so the Committee may cite these data as necessary to be available for public release if requested.

The text of each section should present the studies regarded as most relevant and reliable to derivation of the BEI<sup>®</sup> first, followed by descriptions of studies deemed of lesser, but corroborative value. For studies that describe differential or contradictory findings, a brief rationale should be presented for weighting the information of greatest value to the BEI<sup>®</sup> evaluation (e.g., appropriateness of route of exposure; full characterization of dose-response; adequacy of elements of study design; adequacy of description of study methodologies and results; etc.).

**Explanatory note:** This template is constructed such that section headings of the actual *Documentation* are described in Times New Roman font and the associated instructions for completion of each section are described in Arial. These are the font families used by ACGIH<sup>®</sup> to construct the TLV<sup>®</sup> *Documentation*. Make tables of data where possible using the table-making feature of Microsoft Word or WordPerfect.

## BEI<sup>®</sup> Documentation Template

**SUBSTANCE NAME** (use IUPAC convention, e.g., TRICHLOROETHENE)

CAS number:

Synonyms: (*local terminology, e.g., perchloroethylene*)

Chemical formula:

Chemical structure for organic compounds

RECOMMENDED BEI<sup>®</sup>

Determinant	Sampling Time	BEI <sup>®</sup>	Notation
List in decreasing order of priority			

### BASIS FOR THE BIOLOGICAL EXPOSURE INDEX

- Brief summary of the rationale for the index or indices, including discussion of the relationship of each index to the TLV<sup>®</sup> and/or to dose–response information for human health effects.
- Indicate the specific health end-point addressed by the BEI<sup>®</sup> (e.g., narcosis, organ damage).
- In the case of multiple determinants, a brief discussion of their priority should be included.
- Briefly describe why (a) specific notation(s) is/are assigned.
- If the BEI<sup>®</sup> is a revision, include a short history of the BEI<sup>®</sup> and explanation for the revision.

### CONVERSION FACTORS (DO NOT USE BULLETS)

1 mg/L = XX mmol/L

1 mmol /L = XX mg/L

### USES AND PROPERTIES

- One or two paragraphs describing the industrial settings where the material is used, together with an estimate of the number of workers exposed, if available.
- Properties should be limited to those relevant to biological monitoring, e.g., partition coefficients or other solubility data, saturation vapor pressure (check existing *TLV<sup>®</sup> Documentation* for other properties, but do not include those not specific for biological monitoring such as flash points, etc.).

### POSSIBLE NONOCCUPATIONAL EXPOSURE

One or more paragraphs, describing current data on non-occupational sources of exposure, as data provide. In particular, it will be important to assess the strength of non-occupational sources relative to workplace sources.

### ABSORPTION

- May be one paragraph or may be divided into the three categories below where data exist.
  - If divided into two or three categories, indicate which is(are) the dominant route(s) of exposure, e.g., “ABC is absorbed via respiratory, dermal, and gastrointestinal routes. Pulmonary absorption is the major route in the workplace.”
  - Indicate the kinetics of absorption for the different routes of exposure and an indication of the percent absorbed and the time it may take to reach a steady state concentration in the body.

## **Pulmonary**

## **Dermal**

## **Gastrointestinal**

### **DISTRIBUTION**

- Provide a summary on the distribution of an agent, including such information as distribution rate, target organ/tissue, storage site, etc.

### **ELIMINATION**

- Provide routes of elimination, and identify the principal route of elimination.
- Provide information on the rates of elimination. (In contrast to kinetics, this relates to the parent compound and how rapidly it is cleared from the body)
- Describe whether elimination is the same or different when acute and chronic exposures are involved.

### **METABOLIC PATHWAYS AND BIOCHEMICAL INTERACTIONS**

- Describe the biotransformation of the agent, including chemical reactions, organs involved, metabolites or adducts formed, and any other interactions with host tissues or molecules.
- Provide figure illustrating metabolic pathways, if appropriate. If figure is acquired from a publication whose copyright is held by another corporate entity or individual, please provide the ACGIH<sup>®</sup> Staff with point-of-contact information so that permission-to-reproduce may be obtained.

### **SUMMARY OF TOXICOLOGY**

- Brief summary of the current knowledge of toxicology of the substance.
- Emphasize human data but include animal data where they support the conclusions for human toxicity.
- If the *TLV<sup>®</sup> Documentation* includes a detailed summary of toxicology, as it often does, the reader is referred there.
- Other substantial reviews such as those produced by ATSDR, EPA, NIOSH, OSHA, WHO, and others should be cited but not repeated.

### **TLV<sup>®</sup>-TWA OR TLV<sup>®</sup>-C**

- Provide the TLV<sup>®</sup>-TWA or TLV<sup>®</sup>-Ceiling
- Briefly describe the basis for the TLV<sup>®</sup>-TWA or TLV<sup>®</sup>-Ceiling and the health effect(s) being addressed.
- List any notations attached to the TLV<sup>®</sup>.

### **FIRST DETERMINANT (E.G., METHANOL IN URINE)**

### **ANALYTICAL METHODS**

- Provide acceptable method(s) with citation(s), e.g., high-pressure liquid chromatography (HPLC) method with ultraviolet detection.
- Specify if hydrolysis is required to release conjugates or not recommended for measure of the “free” metabolite. Specify any pre-treatment that may be necessary before instrumental analysis.
- Describe standard methods in current use, such as those by the BAT group. Mention a definitive method if available as the gold standard.
- Describe why a currently accepted method would be unacceptable, if data exist.

## **SAMPLING AND STORAGE**

- Describe specimen collection, the type of container, and any preservatives/anticoagulants that may be necessary.
- Indicate preferred time of collection in relation to exposure and why.
- Indicate sample stability and temperature requirements for transportation to a laboratory.
- Indicate storage conditions to prevent deterioration if analysis may be postponed.
- Indicate stability of specimen under specified storage conditions if known.
- Indicate whether contamination of samples is possible, e.g., not possible if the determinant(s) are products of metabolism.

## **BIOLOGICAL LEVELS WITHOUT OCCUPATIONAL EXPOSURE**

- Indicate whether significant amounts of the determinant(s) may be found in an occupational unexposed population, e.g., ambient background levels, alcohol consumption.

## **KINETICS**

- Indicate the elimination kinetics of ABC or the determinant(s), the potential for buildup during a week of repeated exposure and the recommended sampling time.
- Describe any toxicokinetic modeling data that support the elimination kinetics of ABC or its metabolites.

## **FACTORS AFFECTING INTERPRETATION OF MEASUREMENTS**

- May be one or more paragraphs listing/describing what outside factors affect the determinant measurement. Section may be divided into the following three categories, where data exist.

### ***Analytical Procedure and Sampling***

- Specifics of any required hydrolysis, advantages and detection limits of recommended methods, contaminants or co-exposures that may interfere with the analytical determination.

### ***Exposure***

- Important points here are co-exposure to agents that (1) produce the same metabolite, (2) interfere with the metabolism of the determinant, and (3) the impact of ethanol consumption on the rate of metabolism of the determinant.

### ***Population***

- Discuss any information concerning the influence of ethnic, cultural, genetic, or other factors that may differ across populations and would affect interpretation of the measurements.

## **JUSTIFICATION**

Provide discussion for the justification of the determinant or provide discussion under any or all of the following:

### ***Toxicokinetic Approach***

- Describe briefly the linkage between the index and airborne concentration, or between the index and health risk, as the justification for the proposed value.

### ***Field Studies (if data available)***

- Include numbers of subjects and controls, type of workplace, brief description of exposure assessment methods, use of PPE, and exposure results. Also include brief description of sampling and analysis parameters and an assessment, if available, of the expected value extrapolated to a typical workplace exposure at the current TLV<sup>®</sup>-TWA.

### ***Laboratory Studies (if data available)***

- Include number of subjects and controls, type of exposure conditions, duration of exposure and route,

nature of workload if not at rest, and an extrapolation to a typical workplace exposure at the TLV<sup>®</sup>-TWA.

***Simulation Studies (if available)***

- Toxicokinetic modeling that supports the proposed value should be described, including a brief discussion of the important assumptions and parameters used in the model. Experimental data that support the model are especially valuable.

***Other Subheadings*** (as appropriate)

**SUMMARY**

- One to two paragraphs summarizing preceding paragraphs for this determinant with an assessment of whether available data are sufficient to support a BEI<sup>®</sup> — usually the answer is "yes," but it may be "no" where data are ambiguous and another determinant is proposed.

**RECOMMENDATION**

- One paragraph stating the recommended value for this determinant together with timing, explanation of any notations, and any advice to user regarding interpretation of the results.
- For a urinary determinant, a comment may be needed on the use of creatinine or specific gravity for sample screening or correction.
- Add a final sentence giving the recommended BEI<sup>®</sup> in SI equivalent units.
- For those determinants with an Nq notation, some guidance values for the occupational health professional as an aide to interpretation of results.

*[End of Section on First Determinant]*

**SECOND DETERMINANT, IF ANY  
(e.g., FORMIC ACID IN URINE)**

**ANALYTICAL METHODS**

- Provide acceptable method(s) with citation(s), e.g., headspace gas chromatography with a flame ionization detector (FID).high-pressure liquid chromatographic (HPLC) method with ultraviolet detection.
- Describe why a currently accepted method would be unacceptable, if data exist.

**SAMPLING AND STORAGE**

(headings as in first section . . .)

*[End of Section on Second Determinant]*

**OTHER REFERENCE VALUES**

Short description of other organizations/jurisdictions index/indices using the same determinant(s) as the BEI(s)<sup>®</sup>. Provide basis/bases, if known.

**OTHER INDICATORS OF EXPOSURE**

Include here any other proposed determinants that are not recommended as BEI<sup>®</sup> due to insufficient data, etc. Include brief descriptions of studies and summary of why the determinant was not considered acceptable by the Committee.)

## BEI<sup>®</sup> CHRONOLOGY

The purpose of this section is to describe only the historical and/or pending/actionable activities (dates) associated with the *BEI<sup>®</sup> Documentation*. It is not intended to describe the detailed history of actions completed on the *Documentation*. The ACGIH<sup>®</sup> office will create/update as necessary. See example below:

## REFERENCES

- List citations in alphabetical order by author, rather than in the order cited in the text.
- Use author, date for citation in the text, rather than citation number.
- Unlike the reference style of the past, use a modified MedLine style, all extraneous punctuation and capitalization are eliminated in journal citations (e.g., article titles are treated as a sentence).
- Avoid personal communications.
- Use of unpublished information requires that the entire study or communication be on file at ACGIH<sup>®</sup> headquarters and that full disclosure must be transferred to ACGIH<sup>®</sup> so the Committee may cite these data as necessary and also make the information available for public release, if requested.
- Samples appear in Appendix F.

<b>BEI<sup>®</sup> Chronology: Cadmium</b>					
<b>Date</b>	<b>Action</b>	<b>Determinant</b>	<b>Sampling Time</b>	<b>BEI<sup>®</sup></b>	<b>Notation</b>
1986	Proposed	Cadmium in urine	Not critical	10 µg/g creatinine	†
		Cadmium in blood	Not critical	10 µg/L	†
1987	Proposed	Cadmium in urine	Not critical	10 µg/g creatinine	B
		Cadmium in blood	Not critical	10 µg/L	B
1988	Adopted	Cadmium in urine	Not critical	10 µg/g creatinine	B
		Cadmium in blood	Not critical	10 µg/L	B
1991	Proposed	Cadmium in urine	Not critical	5 µg/g creatinine	B
		Cadmium in blood	Not critical	5 µg/L	B



## Appendix F: Reference Samples

### REFERENCE SAMPLES

#### Journal Articles

List all authors when there are four or less. If five or more, list the first three, followed by “et al.”

Monster AC; Boersma G: Simultaneous determination of trichloroethylene and metabolites in blood and exhaled air by gas chromatography. *Arch Occup Environ Health* 35:155–163 (1975).

Ogata M; Takatsuka Y; Tomokuni K: A simple method for the quantitative analysis of urinary trichloroethanol and trichloroacetic acid as an index of trichloroethylene exposure. *Br J Ind Med* 27:378–381 (1970).

Triebig G; Trautner P; Weltle D; et al.: Investigations on neurotoxicity of chemical substances at the workplace. III. Determination of the motor and sensory nerve conduction velocity in persons occupationally exposed to trichloroethylene. *Int Arch Occup Environ Health* 51:25–34 (in German) (1982).

#### ONLINE CITATIONS

**NOTE:** Print or download section(s) used and include with other references sent to the ACGIH® office.

U.S. National Library of Medicine: **Substance name**. In: Hazardous Substances Data Bank. Toxicology Data Network (TOXNET). Online at: <http://toxnet.nlm.nih.gov/> [print or download section(s) used and include with other references sent to the ACGIH® office.]

U.S. Environmental Protection Agency: Integrated Risk Information System (IRIS) Substance File: **Substance name**. U.S. EPA, Washington, DC (1996). Online at: <http://www.epa.gov/iris/subst/0373.htm> [print or download section(s) used and include with other references sent to the ACGIH® office.]

U.S. National Toxicology Program: **Substance name**. In: Testing Information and Study Results, Results and Status. Online at: [http://ntp-server.niehs.nih.gov/main\\_pages/NTP\\_ALL\\_STDY\\_PG.html](http://ntp-server.niehs.nih.gov/main_pages/NTP_ALL_STDY_PG.html)

#### FEDERAL AGENCY PUBLICATIONS

U.S. National Toxicology Program: Toxicology and carcinogenesis studies of manganese (II) sulfate monohydrate (CAS No. 10034-96-5) in F344/N rats and B6C3F1 mice (feed studies) Technical Report No. 428. DHHS (NIH) Pub. No. 94-3159. NTP, Research Triangle Park, NC (1993).

U.S. Agency for Toxic Substances and Disease Registry: Toxicological profile for manganese (update). U.S. Department of Health and Human Services, ATSDR, Atlanta, GA (September 2000).

U.S. National Cancer Institute: Carcinogenesis Bioassay of Trichloroethylene CAS No.79-02-6. National Cancer Institute Technical Report Series No. 2. DHEW (NIH) Pub. No. 76-802. NCI, Bethesda, MD (1976).

### ***With Author(s)***

Anderson HA; Dally KA; Hanrahan LP; et al.: The epidemiology of mobile home formaldehyde vapor concentration and residents' health status. Pub. No. EPA-905/1-83-001. U.S. Environmental Protection Agency, Washington, DC (1983).

## **BOOKS**

### ***Sections/Chapters with Specific Author(s)***

Nelson, D.L.; Webb, B.P.: Acetone. In: Kirk-Othmer Encyclopedia of Chemical Technology, 3rd ed., Vol. 1, pp. 179–191. M. Grayson, Ed. John Wiley & Sons, New York (1978).

Beliles RP: The metals. In: Patty's Industrial Hygiene and Toxicology, 4th ed., Vol. 2C, Toxicology, pp. 2106–124. G.D. Clayton and F.E. Clayton, Eds. John Wiley & Sons, New York (1994).

Matanoski GM: Risk of cancer associated with occupational exposure in radiologists and other radiation workers. In: Cancer Achievements, Challenges, and Prospectives for the 1980s, Vol. 1, pp. 241–254. J.H. Burchenal, Ed. Grune and Stratton, New York (1981).

### ***With Editor(s) Only***

Angerer J; Schaller KH (Eds): S-Phenylmercapturic acid. In: Analyses of Hazardous Substances in Biological Materials, Vol. 5, pp. 143–162. Deutsche Forschungsgemeinschaft: German Research Foundation. VCH - Verlagsgesellschaft, Weinheim, Germany (1996).

Hathaway GJ; Proctor NH; Hughes JP (Eds.): **Substance name**. In: Proctor and Hughes' Chemical Hazards of the Workplace, 4th ed. Van Nostrand Reinold, New York (1996).

### ***Without Editor(s)/Just an organization***

Deutsche Forschungsgemeinschaft: Carbon tetrachloride. In: List of MAK and BAT Values 2003: Maximum Concentrations and Biological Tolerance Values at the Workplace, p. 195. Report 39. Commission for Investigation of Health Hazards of Chemical Compounds in the Work Area. Wiley-VCH Verlag GmbH & Co. KgaA, Weinheim, FRG (2003).

## **PROCEEDINGS**

Andersen I: Formaldehyde in the indoor environment — health implications and the setting of standards; and discussion. In: Indoor Climate: Effects on Human Comfort, Performance and Health in Residential, Commercial, and Light Industry Buildings, pp. 65–87. PO Fanger and O Volbjorn, Eds. Proceedings of the First International Indoor Climate Symposium, Copenhagen, August 30–September 1, 1978. Danish Building Research Institute, Copenhagen (1979).

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## Appendix G: Committee Voting Procedure

### ACGIH<sup>®</sup> Committee Voting Procedure

This procedure is not intended to be inclusive, but rather as basic information/instructions.  
Refer to Robert's Rules Of Order for additional information and guidance.

#### 1. Motion / Voting Process According to ACGIH<sup>®</sup> Practices:

- Establish a quorum. At ACGIH<sup>®</sup>, a quorum is a majority (> 50%) of the voting Committee members (hereafter referred to as members). Although member candidates and consultants are full participants in discussions, they do not have voting privileges.
- Assure that motions are presented clearly and concisely and that all voting members are aware of the exact language/intent of the motion (**Note:** Any motion that requires Board of Directors approval must begin with a "Vote To Recommend (VTR) to the Board that . . .").
- Procedure for handling a motion:
  - Member (not Chair) makes motion ("I move that . . ."),
  - Another member seconds motion,
  - Members debate motion (When a motion is on the table, keep remarks to the motion under consideration),
  - Chair puts question to members for vote,
  - Chair announces result of vote.
- All members present have an obligation to cast a vote (**Note:** Chair only votes to make or break a tie).
- Recording motions and votes:
  - Identity of who makes or seconds a motion is not recorded in the meeting minutes.
  - The number of "YES" and "NO" votes is not recorded in meeting minutes.
  - ABSTENTION votes are recorded in the meeting minutes as follows:
    1. When ABSTENTIONS are for reasons other than conflict of interest (COI), the number of members abstaining is recorded, but not the names or reasons for the abstention. Abstentions should be rarely used unless for COI.
    2. When ABSTENTIONS are for conflict of interest, names of members abstaining for COI are recorded along with a note that the abstentions are for COI.

#### 2. Matters that require a vote:

- Any Committee business that may require formal Committee approval, and/or approval by the Board of Directors. When in doubt, use the voting process.
- *Documentation* and their respective TLVs<sup>®</sup>, BEIs<sup>®</sup> and/or notations for substances or agents that are proposed for Committee approval (and Board ratification) to:

- adopt as final,
- add to NIC (and NIE: Physical Agents Committee),
- retain on NIC (and NIE: Physical Agents Committee),
- withdraw from NIC (and NIE: Physical Agents Committee), or
- remove an existing substance or agent from the adopted TLV<sup>®</sup>/BEI<sup>®</sup> list  
(Note: If a proposal to remove is approved and ratified, the substance or agent must remain on the adopted TLV<sup>®</sup>/BEI<sup>®</sup> list and the proposed action so listed on the NIC for public notification and comment. The reason(s) for the proposed removal must be stated).
- *Documentation* for an adopted TLV<sup>®</sup> or BEI<sup>®</sup> that was significantly revised (A note should be added to the history section of the *Documentation* indicating the date and what type of change(s) was made.)
- Revision(s) to the *TLVs<sup>®</sup> and BEIs<sup>®</sup>* Book (e.g., appendices, etc.) that may warrant public comment or an NIC (and NIE: Physical Agents Committee) listing.

### 3. Matters that do not require a vote:

- Revisions (i.e., additions or deletions) made to Under Study list.
- Editorial changes/updates made to adopted TLV<sup>®</sup>/BEI<sup>®</sup> *Documentation*, when such revisions are minor, supportive of the adopted value(s)/notation(s), non-controversial, etc. When such changes are made:
  - They should be brought to the Committee's attention.
  - A note should be added to the history section of the *Documentation* indicating the date and what type of change(s) was made.

### 4. Conditions that must be met before Full Committee votes on Draft *Documentation* and their respective TLV(s)<sup>®</sup>, BEI(s)<sup>®</sup>, and/or notation(s):

- The draft *Documentation* must be reviewed by the Subcommittee (TLV<sup>®</sup>-CS Committee) or the author/co-author/assigned reviewer (TLV<sup>®</sup>-PA Committee, BEI<sup>®</sup> Committee, Bioaerosols Committee) and agreed upon that the *Documentation* with its numerical TLV(s)<sup>®</sup>/BEI(s)<sup>®</sup> and notation(s) are in order for Full Committee final consideration/vote (Note: For the BEI<sup>®</sup>, PAC, and Bioaerosols Committees, this draft *Documentation* should include/address comments received from previous Full Committee reviews).
- The draft *Documentation* with its numerical TLV(s)<sup>®</sup>/BEI(s)<sup>®</sup> and notation(s) must be in final (or near final) form and circulated in advance of the meeting to allow for full review by the Committee's members. The *Documentation* should be of sufficient quality to prevent the need for an inordinate amount of discussion or rushed review by the Full Committee before vote.
- As needed, the principal author should be available to the Committee when the *Documentation* and its numerical TLV(s)<sup>®</sup>/BEI(s)<sup>®</sup> and notation(s) are up for Committee vote.

### 5. Miscellaneous:

- Withdrawing or Modifying/Amending a Motion: Before a motion has been stated

by the Chair, it can only be withdrawn or modified by the maker with agreement by the seconder. Once the motion is stated by the Chair, it can only be withdrawn or modified by general consent or a majority vote by the members.

- **Motion to Reconsider:** Hasty or ill-advised action can be corrected through the motion to reconsider. This motion can be made only by an individual who voted on the prevailing side and must be made on the same day or the next succeeding day after the original vote was taken (not counting a day which no business meeting is held during a session).
- **Motion to Table:** A Motion to Table can be made at any time an issue is before the Committee. The objective is to postpone the vote on the main motion. [The motion can not specify a time for resumption; if it did, it would be equivalent to a motion to postpone definitely (which might be in order and even preferable.)] Such a motion is not in order when another member has the floor. The motion is not debatable, requires a second and a majority vote to pass. If passed, the issue before the Committee cannot be discussed further until another item has been considered and voted upon. Motions to Table are designed to be temporary in nature and merely reschedule the decision of an issue for a later time. When the Committee wishes to resume consideration of a tabled motion, any member may move to take a motion from the table. Such a motion requires a second, is not debatable, and requires a majority vote. If passed, the Chair announces the main motion and consideration is resumed. A tabled motion will expire if not acted on during the same session (if the group meets less than quarterly) or by the conclusion of the next session (if the group meets more than quarterly).
- **Call the Question (Call the Vote):** A Committee member may desire to have the vote taken before the Chair calls for the vote or before all members have finished discussing the issue. Rationale for this action could include moving a meeting along in a timely manner or determining how many members have already formed a conclusion. The motion (I call the question) is not in order when another member has the floor. The motion requires a second, is not debatable, and requires a 2/3 vote for passage. This vote determines if the discussion continues (No vote) or if the discussion ends (Yes vote). If passed, there can be no further discussion, and the Chair will ask for the vote on the motion under question. Note: Members must be very cautious about employing this method as it can restrict open dialogue.

## ***Appendix H: Symposia and Workshops***

### **Procedure for Developing a Symposium or Workshop**

The education of BEI<sup>®</sup> Committee members is an important aspect of the development of BEIs<sup>®</sup> and BEI<sup>®</sup> *Documentation*. Suggestions for educational symposium topics should be forwarded to the ACGIH<sup>®</sup> Education Development Manager in writing. Symposium topics can come from Committee members, ACGIH<sup>®</sup> Staff, and external parties. The proposal should include a justification for the necessity of the symposium, the topic's relevance to the BEI<sup>®</sup> Committee, a suggested list of participants, and if possible, a list of potential academic, governmental, or industrial sponsors.

Several criteria will be used to determine the appropriateness of the symposium as being of interest to the BEI<sup>®</sup> Committee. A symposium must be the most efficient format in which to present BEI<sup>®</sup> Committee members with new information that will assist in the scientific judgment used in the setting of BEIs<sup>®</sup> and in the writing of supporting *Documentation*.

Because of the timing of BEI<sup>®</sup> setting and *Documentation*, it is important that a symposium be suggested as early in the process as possible. Symposia require considerable time, commitment, and manpower to develop and, thus, proposals should preferably be submitted while a substance is on the "Under Study" list. Symposium suggestions submitted while a substance is on the NIC will be considered, but usually this will be too late in the decision-setting process. A symposium will not be favorably reviewed if its purpose is solely to provide a forum for voicing opinions about existing data. Rather, there must be on-going research, scientific uncertainty about currently available data, or another scientific reason for the symposium. The Committee will focus its review on how well a symposium adds to the scientific understanding and decision-making of the BEI<sup>®</sup> Committee.

Representatives of external organizations may have expressed a desire to meet with the BEI<sup>®</sup> Committee because the Committee might benefit from discussions of the scientific data or because the many issues to be discussed on a given chemical are likely to be important and of interest to a wide range of interested parties. Yet symposia require commitment of substantial resources and presentations and discussions are often scheduled for a period as long as two days, far more time than the BEI<sup>®</sup> Committee could commit to a single topic. Thus, it is important that care be taken in the review and selection of topics for symposia.

The Committee will review the proposal (see Symposium Proposal Form) in a timely fashion and rate its relevance to the ongoing BEI<sup>®</sup> process. The Committee may seek additional input from members of the BEI<sup>®</sup> Committee or other experts, as necessary, during its review. The timetable for proposing and approving symposia is in the next section.

The Steering Subcommittee will make a final recommendation to the Education Development Manager, indicating whether the BEI<sup>®</sup> Committee has an interest in and wishes to participate in the development of a particular symposium. It will communicate its recommendation to the individual(s) who proposed the symposium topic as well.

If a symposium proposal recommended by the BEI<sup>®</sup> Committee is accepted by the Education Development Manager, the BEI<sup>®</sup> Steering Subcommittee will identify a small "task force" to work with ACGIH<sup>®</sup> Staff during the development phase. It is recommended that a member of the Steering Subcommittee serve as a member. The task force will work closely with the Education Development Manager and will seek input and ideas from BEI<sup>®</sup> Committee members about sponsors, speakers, format, etc. The task force will be responsible for ensuring that the

BEI<sup>®</sup> Committee's scientific decision-making needs are met and that all relevant external parties have an opportunity to give input to the planning of a symposium.

If a symposium proposal is rejected, the Education Development Manager will be informed of the proposal and the Committee's review. The individual who submitted the proposal will also be notified. The Education Development Manager may decide to proceed without the BEI<sup>®</sup> Committee's formal sponsorship or involvement. In this latter case, potential symposium sponsors and attendees must be made aware that the BEI<sup>®</sup> Committee has expressed no interest in formal sponsorship or participation. In addition, it must be made clear that BEI<sup>®</sup> Committee members will not attend the meeting in their capacity as members or representatives of the BEI<sup>®</sup> Committee, although they may, of course, attend as interested scientists.

### **Symposium Timetable**

1. Written proposal to BEI<sup>®</sup> Steering Subcommittee Chair
2. Steering Subcommittee reviews, determines relevance to BEI<sup>®</sup> process, seeking input as necessary, and makes a written recommendation to the Education Development Manager.
3. The Education Development Manager will review the proposal and Committee recommendation.
  - If the Committee has approved the proposal and the Education Development Manager decides to go forward with planning, the Steering Subcommittee will identify a task force to work with the Education Development Manager. The task force will report regularly to the Steering Subcommittee and will seek input and ideas from the Committee, as necessary.
  - If the Committee has not approved and the Education Development Manager decides to proceed, individual members of the BEI<sup>®</sup> Committee may participate in planning activities, but will do so as individuals, not as members of the BEI<sup>®</sup> Committee. Sponsors and attendees will be informed that the BEI<sup>®</sup> Committee is not formally interested in the symposium and has not been a formal participant in its planning or execution.

### **Symposium Proposal Form**

1. Purpose of symposium - statement delineating what is of interest to BEI<sup>®</sup> deliberations and why
  - Topics relevant to agents under study will receive higher priority. Agents on the Notice of Intended Change may be considered, but there must be compelling scientific reasons.
  - Presentation of new information that facilitates setting of BEI<sup>®</sup> using best available data and scientific judgment
2. Description of expected participants
3. List of potential sponsors

See Appendix I: ACGIH<sup>®</sup> “Tab P” Event Planning Worksheet.

**Appendix I: ACGIH® "Tab P," Educational Event Planning Worksheet**

**ACGIH® Educational Event Planning Worksheet  
(Also known as "Tab P")**

For assistance in filling out this worksheet or for any other question about educational events, please contact the ACGIH® Education Development Manager.

**Purpose and Focus**

◆ *What is the name of this event?*

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◆ *What is the purpose/scope of this event?*

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◆ *Reasons why this proposed event will contribute to the body of knowledge in OH&S.*

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◆ *What will be the focus of the event? Describe the content of the sessions.*

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**Logistics**

◆ *What location is preferred and why?*

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◆ *Second choice of location:*

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◆ *What dates are preferred and why? (NOTE: Dates must be at least one year from submittal)*

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◆ *Second choice of dates:*

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◆ *Projected attendance:*

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◆ *Proposed format -- conference, seminar, symposium, course....*

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◆ *Reasons why this format is preferred.*

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## **Tentative Program Schedule**

◆ *How many days?*

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◆ *General/Plenary Sessions (How many per day?)*

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◆ *Concurrent Sessions (How many per day?) (\*number of speakers or presentations and time allotment)*

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◆ *Tutorials (How many per day?)*

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◆ *Roundtables or Discussions (How many per day?)*

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## **Target Audience(s)**

◆ *Description of potential audience.*

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◆ *Possible sources of additional funding and contact name(s).*

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◆ *Recommendations about places/ways to advertise/market the event.*

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## Technical Program Task Force

◆ *Number of persons required on Technical Program Task Force.*

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◆ *Suggested Committee Members for Technical Program Task Force.*

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◆ *Session Chairs /Technical Session Titles.*

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◆ *Names of other experts for the Technical Program Task Force. Please list areas of expertise.*

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◆ *Expected number of meetings and conference calls needed to develop technical program.*

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◆ *Number of speakers (i.e., plenary, platform, tutorial discussion leaders).*

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◆ *Names or projected number of persons, if any, who will receive complimentary registrations. Please explain reason for complimentary registrations.*

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◆ *Projected number of persons who will receive travel support, or other reimbursement.*

*Please specify the type of reimbursement that you would like to offer.*

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- ◆ *Specify whether an abstract book should be produced; a proceedings; other publication.  
\*Please note there are standard procedures for abstract and proceedings processing,  
which could involve peer review and/or technical committee review.*

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- ◆ *A registration fee will be set after the expense budget is completed. Are there any  
extraordinary expenses you anticipate? (e.g., international travel, honorarium, etc.)*
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