

Center for Resource Recovery and Recycling (CR³) Bylaws

I. Mission

The mission of the CR³ is in accord with the National Science Foundation's IUCRC (Industry-University Cooperative Research Centers) Program, which is to collaborate with industry. For CR³, its mission is to:

- § *Establish generic basic recovery and recycling science;*
- § *Develop technologies to identify and separate scrap materials from the waste stream;*
- § *Build strategies and technologies to enable greater scrap utilization within materials processes; and*
- § *Establish materials recovery and recycling curricula that in combination with university research experience will grow an engineering workforce equipped to address the challenge of achieving materials sustainability.*

II. Vision

It is the overall goal of the CR³ to be the premiere industry-university alliance dedicated to the sustainable stewardship of our earth's resources. We will serve consortium members needs by establishing the needed knowledge base, and by educating future leaders of the industry. Technologies will be developed and transferred to industry with the goal of achieving materials sustainability from initial product design through manufacture to end-of-life disposition in a manner that yields both energy savings and profitability.

The primary sub-goals of CR³ are:

- a. *Directly support research needs of industry and government partners in a cost-effective manner with pooled, leveraged resources and maximized synergy;*
- b. *Enhance the educational experience for a set of top quality graduate and undergraduate students with industry mentoring and;*
- c. *Advance knowledge and technologies in this emerging field and ensure commercial relevance of the research with rapid and effective technology transfer, lending high value to industry.*

III. Philosophy and Operational Vision for CR³ as a Multi-Institutional Industry Center

CR³ is an alliance between the industrial sector and university researchers to collaboratively address short term and long term needs of the recycling industry. It is the Center's intent to enhance the position of those involved in the recycling industry by applying research to solve industry needs. This research will be member driven and will provide enhancements to industry's technology base, profitability, public image, and education of its members.

CR³ is comprised of multiple university sites that are loosely coupled logistically but operate together by a written agreement (titled MOU) as a single, multi-institutional research center. A copy of the MOU will be made available to Center members upon request. As new university partners are added into CR³, each will be required to sign the MOU. Each university site must have a robust research program and expertise relevant to CR³ members in order to strengthen the value proposition. Concomitantly, inter-site collaborations are an equally vital component for CR³. These collaborations will be both formal and informal. For instance, the nature of the semi-annual CR³ Industry Advisory Board (IAB) meetings involving all CR³ members and review of all projects will help ensure that a true multi-institutional Center is realized with minimal overhead. Frequent interactions between faculty members, industry and graduate students at the different sites will occur via teleconferencing, meetings at professional conferences, trips to visit each other's sites, student exchanges, etc. Within each site, each research project will be structured to attain the critical mass of personnel and other resources necessary to ensure success. It is also envisioned that a single project could be conducted by a team of students, and the team comprised by students from different affiliated universities.

IV. Membership Overview

Members who support the launch of CR³ during the initial two years are termed Founding Members. The Founding Members will be the leading corporate entities. The Founding Members will play a leading role in establishing the Center and will lead this organization through its initial phases. The Center Director located at WPI along with his/her staff will manage CR³. The researchers who are addressing the technical issues and managing the technical projects will be coordinated through CR³.

Industry membership shall be comprised of commercial recyclers, captive recyclers, industry equipment suppliers, manufacturers of industrial products using recycling technologies, and interested parties.

All members will be entitled to participate in all symposia and educational events. They will be eligible to receive all information as it is developed, receive newsletters and publications of the Center. All members will be eligible to participate in focus groups that are used as a venue and mechanism to assist and direct research projects. All members can be directly involved in the industry internship program at CR³ universities, in which students are working with the industry on specific projects funding their graduate work. All members will have royalty free use of intellectual property resulting from the research conducted by and for CR³ (see Membership Agreement for details).

In order to facilitate the business of CR³, an Executive Committee of the IAB (EIAB) will be formed (see article XVII). In addition, a Project Selection Committee (PSC) is formed to assist the IAB in project solicitation and selection.

All members of the IAB will be eligible to serve on the EIAB and PSC. The EIAB will work to facilitate agendas, oversee Center business, and make recommendations to the IAB, keeping in mind that the IAB has to approve projects and funding. Membership on the EIAB and PSC will be on a rotational basis.

Termination of membership: For voluntary termination a minimum of 90 days written notice is needed to terminate membership. The notice should be sent to the Center Director. Involuntary termination of membership is a decision made by the full CR³ membership - IAB.

V. Support of Graduate Students and Thesis

As is typical at research-centric universities, CR³ projects will be maximally leveraged to support doctoral and master's students and their thesis work. While projects can be defined, undertaken, and completed within a year, it is anticipated that projects in CR³ will contain sufficient breadth and depth so as to merit possible continuation for a second and perhaps third year. In this manner, a doctoral student serving on a project may leverage key scholarly research components of the project for his/her doctoral dissertation. The same is true for thesis-option MS students should the work span beyond the first year.

VI. Offices / Alliances

The Center shall be managed by the Metal Processing Institute located on the campus of WPI, in Worcester, Massachusetts. The CR³ EIAB may suggest other alliances as necessary to meet the objectives of the Center, which must be approved by the full IAB.

VII. Role of the Industry Advisory Board (IAB)

All Industry Members will serve on the Industry Advisory Board (IAB) of the Center with primary responsibility for recommending projects to the PSC, reviewing the status of on-going research projects, and participating in project focus groups of their choice. The IAB is comprised of one official liaison person from each industry member or company.

Members of the IAB elect the IAB Chair for a two-year term, which thereafter the IAB may extend for additional one-year terms. On decisions requiring a vote, industry members hold one voting seat per member company. A quorum for an IAB vote is two-thirds of the voting IAB members or their proxies. A simple majority outcome to a vote will carry an action, except for Bylaws changes, which require a two-thirds majority.

VIII. Role of the Center Director and Responsibilities

The role of the Center Director is to lead, organize, and manage activities between sites and serve as the contact point on issues that span the entire Center. The Center Director also serves as Site Director for the lead institution and as faculty member on one or more research projects.

The Center Director shall be responsible for the overall supervision and development of CR³. The Center Director's responsibilities shall also include: the recruitment of new industry members and academic research staff; interfacing when necessary with industry members to obtain their help and input on research projects; promoting an awareness of CR³ activities throughout the industry; promoting the purpose, objectives, and philosophy of CR³; monitoring and acting on grant and funding opportunities from federal and state governmental agencies; development of a network base to ensure the best facility is used for various projects that provide the maximum return to the members; and overall supervision of CR³ research projects, staff, and administration.

The Center Director shall, at his/her discretion, have the authority to appoint a Director-at-large for Industry Liaison activities, which will serve CR³ in any capacity that, might be required. These would include but not be limited to an advisory role, industry liaison activities, or the performance of a specific task or study.

IX. Role of Each Site Director

The role of each Site Director at the various partner universities of CR³ is to lead, organize, and manage activities within their respective university site and serve as the contact point on issues that span that entire university site. Each Site Director also serves as Associate Director of the overall Center and as a faculty member on one or more research projects at their respective site.

X. Role of Each Participating Faculty Member

The role of each participating faculty member is to lead, organize, and manage activities within their project and serve as the contact point on issues specific to that project at their respective university.

XI. Role of Each Participating Graduate Student

The role of each participating graduate student is to undertake and complete research tasks assigned by the faculty advisor of the project to which they are assigned, leverage their activities for success in publications, thesis, and dissertations required for graduation, collaborate and work effectively with project focus group members and other students on the same project, and interact with others at the same site and across sites with related interests and activities.

XII. Role of the NSF Assessment Coordinator or Center Evaluator

The role of the Assessment Coordinator or Center Evaluator is to gather data by observation and survey of IAB members and faculty in order to provide objective feedback on Center processes and outcomes and thereby assist in refinement of Center operations and ensure that the needs of all members are met. The National Science Foundation (NSF) must approve the Assessment Coordinator that has been recommended by the Center Director.

XIII. Meaning and Characteristics of a Full Membership

A Full Membership each year is one in which the annual fee has been contributed by the industry or government member in cash. Each Full Membership has associated with it the full rights and privileges of the Center, including but not limited to standard IP rights as defined by IUCRC in the CR³ standard membership agreement and voting rights in the IAB on center policies and projects.

XIV. Fee Structure

The annual industry membership fee is due to CR³ by January 31 of each fiscal year (January 1 through December 31). The EIAB on an annual basis will review the fee structure, budget, and expense. The fees will be used to pay for carrying out research work and for support of the research staff and graduate students dedicated to the research. The annual fee will be recommended by the EIAB and must be approved by the general membership.

The annual fee for members is \$40,000.00. The fees can be paid on a 50% basis semi-annually, in which case the first installment is due by January 31 and the second installment is due by July 31. Any other invoices related to membership fees will be due within 30 days of the invoice date.

XV. Formal Schedule for Participation

Center Industry Advisory Board (IAB) meetings will be scheduled semi-annually, where on-going and completed research is reviewed and new research projects are proposed for selection using the IAB's project selection process. The business of the IAB is also conducted at these meetings. Also focus group meetings of current research projects will be held. IAB meetings are tentatively scheduled two times per year one in May and the other in October. Projects are typically funded to operate for periods that closely match the calendar year and the semester calendar at each university site. Outside of the normal IAB meetings, the IAB Chair may at his or her discretion call for decisions by other means (e.g. via email or telecom).

IAB meetings are open to CR³ members and approved invited guests only. The Center Director, with the input and consent of the CR³ EIAB and IAB, will decide on IAB meeting locations about a year in advance.

XVI. Attendance at the IAB Meetings

Attendance at IAB meetings will normally be limited to the following: Center and Site Directors; industry members and their technical representatives; university faculty, staff, and students participating in the Center; the NSF Assessment Coordinator or Center Evaluator; NSF program managers and staff; and guests invited with the approval of the Center Director. Guests will need to sign a Non-Disclosure Agreement (NDA) as the presentations by the research staff may have proprietary information. IAB meeting participation by companies attending as guests is limited to two meetings.

XVII. IAB Executive Committee (EIAB) Responsibilities

The Center Director and a total of four (4) members will constitute the EIAB thus making a total of five (5) members. The four (4) members should represent a cross section of the CR³ membership. Each will serve a term of two years with a rotating schedule. The Chair of the IAB will also serve as the Chair of the EIAB and will not be subject to the two year term limit or rotating schedule while in that position. Center staff and faculty will also participate in the EIAB, but, of this group, only the Center Director will have a vote.

The EIAB membership will be decided by the current IAB Chair and Center Director.

The EIAB shall meet a minimum of twice each year and have the following responsibilities:

- a. *To facilitate, oversee, and review research programs.*
- b. *To ensure the IAB is functioning well.*
- c. *To review all normal business activities such as, but not limited to, budget, annual dues, administration, policy changes, new members, strategic planning, etc.*
- d. *To set dates for CR³ events and EIAB meetings.*
- e. *To form other committees of CR³ as might be required to meet its mission and objectives.*
- f. *To appoint a Project Selection Committee. (Per Section XVIII)*
- g. *To recommend dues/fees level.*

XVIII. Project Selection Committee

During the initial two years, the EIAB shall select six Founding Members, along with the Center Director, to serve as the Project Selection Committee (PSC). The PSC members elect the Chair of the PSC.

Thereafter, the Project Selection Committee will be comprised of three IAB members, with the Center Director, Associate Directors, and IAB Chair serving in an advisory capacity as necessary.

Members shall serve on a rotational basis for a period of 3 years rotating one member in and one out each year. The PSC's responsibility is to oversee and administer the project selection process.

PSC members are appointed by the IAB with consideration of input from Center faculty and staff.

XIX. Focus Groups

In an effort to engage all members in the management of CR³, focus groups for each project are formed to execute the mission of CR³ as an industry-university alliance. Any employee from CR³ member companies can attend focus group meetings, however, only one person from each member company can vote on focus-group related issues. Each project will have a Focus Group Chair elected by the focus

group. The CR³ Industry Advisory Board and/or the supervising faculty member may offer suggested candidates for Focus Group Chair based on knowledge of the initial project submission or other considerations, but typically the Focus Group Chair is a representative of the member company that initially proposed the project. The roles of the Focus Group Chair are to:

1. Assist the supervising faculty and the research team in communicating project milestones and schedule, semi-annual meeting reports, and interim project reports to CR³ members.
2. Ensuring that the university R&D team is accepting and acting on the advice of the focus group.
3. Seek input from all members and ensure there is agreement among the members.
4. Provide guidance to the research team about providing resources from industry, e.g. sample materials or equipment.
5. Arrange and hold interim focus group meetings (in between the two semi-annual meetings) as necessary to overcome project resource roadblocks or provide project direction clarification.
6. Upon project completion, assist the supervising faculty and research team in communicating with the focus group members on the following:
 - § Final Report Executive Summary
 - § Final Report
 - § Strategy for disseminating application information to member companies, i.e. training on software, presentation for internal use, etc.
 - § Strategy and timing of public dissemination of the project's results.
7. In concert with the research team, construct a 2 to 4 page implementation strategy consisting of a brief project summary, how to apply what was learned, and case studies, for widespread distribution to the industry when allowable.

XX. Procedure and Voting Policy

CR³ business, IAB, EIAB, and PSC meetings shall be conducted in accordance with "Robert's Rules of Order", latest revision. The Center Director will have one vote on: decisions requiring a vote at Industry Advisory Board Executive Committee (EIAB) meetings, Bylaws amendments and revisions, and adoption of the Center's Technology Roadmap. IAB member representatives will have one vote per member company on: Bylaws amendments and revisions, adoption of the Center's Technology Roadmap, project selection (ranking), approving late project extension requests for inclusion in the next round of project selection, special project assignment decisions, project timeline issues, processes used within the Center such as the Project Selection Process, selection of an IAB Chair, membership dues changes, and other matters requiring an IAB vote.

A quorum shall be necessary for all business, IAB, and EIAB meetings. A quorum is defined as two-thirds of the total voting body, either present in person or represented by proxy.

A simple majority vote of the above-defined quorum shall be required for approval of all business matters. Alternate methods of voting can be allowed – i.e., mail, phone, e-mail, etc.

XXI. Related Research Contracts and Grants

As needs for proprietary research or unique applications may develop, a separate contract or grant may be negotiated between an industry member and one or more of the university sites in CR³. Such contracts and grants are handled outside the Center membership agreement and would be expected to have confidentiality, patent, copyright, and financial agreements that are different from Center programs.

XXII. Equipment for Research Acquired at Each Site

Equipment donations from vendors are highly encouraged and will be supported by visibility with CR³ on the website and in various other publications. Some Members may choose to donate or loan equipment to support the mission of the Center independent of their membership fee. In-kind contributions will not and cannot be considered in lieu of membership fees.

XXIII. Publication Review Policy

As detailed in the Membership Agreement, each university is free to use the results of its CR³ research for its own educational, research, and publication purposes. The term "publication" (and "manuscript" as set forth below) shall extend to any form of public release, including but not limited to posters and oral presentations.

In accordance with Section E of the Membership Agreement, each Company, through its IAB representative, shall have the opportunity to review a substantively complete draft of any manuscript containing results of Center funded research prior to its submission for publication and shall further have the right to request a reasonable time delay in publication submission as necessary to protect Intellectual Property. Approval of such delay by the IAB shall not be unreasonably withheld.

The formal manuscript review procedure is as follows: (a) copy of Center-funded manuscript is distributed to IAB for review prior to submission for publication and/or presentation; (b) IAB Member has 60 days to review the manuscript/presentation and, if appropriate, to request a publication delay; if no request for delay is received within this period, the manuscript/presentation is approved; (c) to delay publication for up to 6 months, IAB Member must make a written request to the submitting university within the 60-day review period.

When Center funded research results will be presented at a conference and there will be no associated manuscript published in conference proceedings or in a journal, the review process will be different. IAB members will be notified of the conference details and given an abstract of the presentation within two weeks of that information becoming available. IAB members should notify the Center within 30 days if there are any concerns about the contents of the planned presentation based

on that information. In the case of presentations without accompanying manuscripts there often isn't enough time between the availability of the final presentation and the conference for IAB review. The final presentation will be sent to the IAB for their information prior to it being presented.

XXIV. Intellectual Property

Intellectual property ("IP") resulting from university research will be treated in accordance with Section F of the Membership Agreement. Per Section H of the Membership Agreement, the rights set forth in Section F of the Membership Agreement shall extend for a given invention only to those industry members who meet both the following criteria:

- a. Memberships are current and valid at the time of the conception of the invention
- b. Memberships are current and valid at the time of reduction to practice or the filing of a non-provisional patent application, whichever is earlier

To retain status as licensee to an invention, the licensee (whether or not a current Member at the time a particular cost is incurred) must pay its share of the documented and reasonable costs incurred by university for filing, prosecuting, and maintaining patents covering the invention. University is responsible for timely provision of such documentation to the licensees.

New members of the CR³ shall not have retroactive access to IP created prior to the date of joining.

As set out in Sections E and F of the Membership Agreement, university has the obligation to pursue a patent if requested by IAB Member during the Manuscript Review or IP review processes. All Center Members will be provided the opportunity to share in the patent costs as described above, and the costs shall be distributed equally among those Members who so elect.

Electing Members who meet the criteria described above shall enjoy the rights set forth in Section F. The NERF license set out in Section F of the Membership Agreement shall be a nonexclusive, royalty-free, fully paid up, worldwide, perpetual license to make, have made, use, sell, offer for sale, and import the invention, with right to sublicense.

XXV. Other Types of Memberships

Other than Full Memberships funded entirely in cash, all other forms of membership in CR³ will be proposed to and decided upon by the CR³ IAB on a case-by-case basis, thereby ensuring that the objectives of the Center are sufficiently furthered to warrant approval. In each case, one of the site directors will formally propose to the CR³ EIAB a special membership; the EIAB will recommend to the IAB who has final approval authority.

XXVI. Bylaws Amendments

Amendments recommended by the EIAB shall be made by a two-thirds majority vote of the full IAB membership on record at the time of the proposed amendment notice, provided each Member receives the proposed amendment in writing a minimum 30 days prior to the vote.

XXVII. Calling of Special Meetings

A group representing 25% of the Industry Members (IAB) may call for a meeting at any time, upon giving the balance of the membership at least thirty days prior written notice of the meeting, the location and the purpose of the meeting.
