Quality Management Plan

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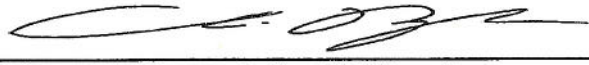
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APPROVALS
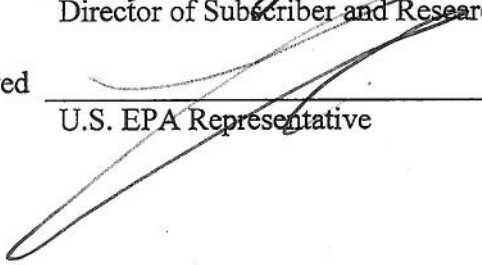
Approved ~~Robert C. Renner~~ Date: 9/13/11
Executive Director

Approved ~~C. Z.~~ Date: 9/13/11
Director of Research Services Development
(Quality Assurance Manager)

Reviewed ~~Richard J. Karlin~~ Date: 9/13/11
Director of Subscriber and Research Services

Approved _____ Date: 9/22/11
U.S. EPA Representative

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ACRONYMS AND ABBREVIATIONS

AMWA	Association of Metropolitan Water Agencies
ANSI	American National Standards Institute
ASQC	American Society for Quality Control
AWWA	American Water Works Association
BOT	Board of Trustees
EPA	U.S. Environmental Protection Agency
FAC	Focus Area Council
Foundation	Water Research Foundation
NAWC	National Association of Water Companies
PCDWR	Public Council on Drinking Water Research
PAC	Project Advisory Committee
PC	Project Coordinator
QA	quality assurance
QAM	Quality Assurance Manager
QAPP	Quality Assurance Project Plan
QC	quality control
QMP	quality management plan
RFP	request for proposals
RM	Research Manager
TAC	Technical Advisory Committee

CHAPTER 1
INTRODUCTION

The Water Research Foundation (the Foundation) is an independent non-profit research institution established December 5, 1966, and dedicated to the advancement of drinking water science. Since its inception in 1966, the Foundation has funded over $450 million in research on all aspects of drinking water treatment and supply.

Foundation research typically is done by sub agreements with water utilities, universities, private research organizations, consulting engineering firms, and other qualified organizations. The Foundation manages the projects and makes the research results available to the drinking water community, including federal, state, and other national and international agencies.

Currently over 900 water utilities, 50 consulting firms, and 16 manufacturers support the Foundation through its subscription program. These progressive organizations provide most of the income for a centralized research program that is advancing the science to ensure a reliable supply of safe, affordable drinking water for consumers throughout North America and worldwide.

The purpose of this *Quality Management Plan* is to describe the roles and responsibilities of the Foundation staff and volunteers in managing and performing their assigned tasks as they relate to quality; to describe the processes, procedures, and methods utilized to select research projects; and to manage project performance and evaluate the outcome of research activities to ensure that subscribers and users of the Foundation information can have confidence in the information.

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CHAPTER 2
FOUNDATION MANAGEMENT AND ORGANIZATION

MISSION, VISION AND STRATEGIC GOALS

The Foundation's **mission** is advancing the science of water to improve the quality of life.

The Foundation's **vision** is to be the essential source for credible water research.

The goal of the Water Research Foundation is to be the leader in drinking water research for the entire drinking water community. To accomplish this goal the Foundation has specific action plans that directly support the goals of:

1. **Research - Creating measurable value through strategically targeted research that meets the needs of our subscribers.** The Foundation strives to understand subscribers' research requirements and to target research that meets those needs. By doing so, the Foundation is the "go to" source for utility research needs.

2. **Communication - Communicating research results and benefits that are usable in a clear, effective and timely manner to our subscribers and that reinforce our identity, awareness and reputation as a world leader in water research.** Effective communications and marketing 1) makes the Foundation highly recognized and raise its identity to potential sources of funding and the public; and 2) increases the awareness of the Foundation and its research to subscribers, government, industry, and the public.

3. **Revenue - Growing revenue and diversifying revenue to support the research mission of the Foundation.** The Foundation increases revenue and diversifies revenue sources to address the increasing demand for water research.

4. **Efficient Operations - Maintaining efficient and effective stewardship of all resources that the Foundation uses for research projects and for its internal operations.** The Foundation optimizes operations enabling the maximum funding available for research and provide adequate resources, technologies and best practices to meet its goals.

QUALITY POLICY

Quality assurance and control activities are essential to the Foundation's mission. The achievement of our strategic goals is based on delivering high quality research products that our subscribers and the general public can use with confidence. It is the Foundation's policy that our quality program supports our mission and strategic research goals by:

- Applying controls to the development of proposals and selection of research projects;
- Ensuring that staff have appropriate qualifications and training;

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- Applying rigorous planning and management involving peer review to each stage of our research programs;

- Implementing a continuous improvement process to ensure that strategic issues, goals, and customer needs are addressed.

The Executive Director and the Director, Research and Subscriber Services are responsible for allocating personnel and financial resources for the development, implementation, and operation of quality programs and processes.

MANAGEMENT AND ORGANIZATION

The Foundation's management focus is achievement of our goals in support of the Foundation's mission and vision as described above. The quality program organization includes members who have primary or associate responsibility for establishing processes, assessing their effectiveness, and implementing actions that result in improvements in quality management. See Figure 2.1 for a graphical representation of their relationships. The following groups and individuals hold key positions relative to quality.

Board of Trustees

The Board of Trustees (BOT) is the policy and funding decision group of the Foundation. It provides direction to staff, approves all major activities and project concepts, and monitors financial and technical progression of all activities. The BOT defines the annual research agenda for the Foundation based upon input from the Focus Area Council (FAC), Public Council on Drinking Water Research (PCDWR), subscribers, and other Foundation stakeholders.

The BOT receives the annual quality program review and quality goals recommendations from the Executive Director for the yearly planning process.

Focus Area Council

The FAC is composed of up to twelve representatives from the Foundation's utility subscribers (supporting members). The FAC is responsible for programmatic oversight of the Foundation's Focus Area Program, which is the largest of the Foundation's three research programs in terms of overall funding and number of projects funded each year. The FAC is also responsible for monitoring results of the research efforts with respect to their implications for future plans and program direction.

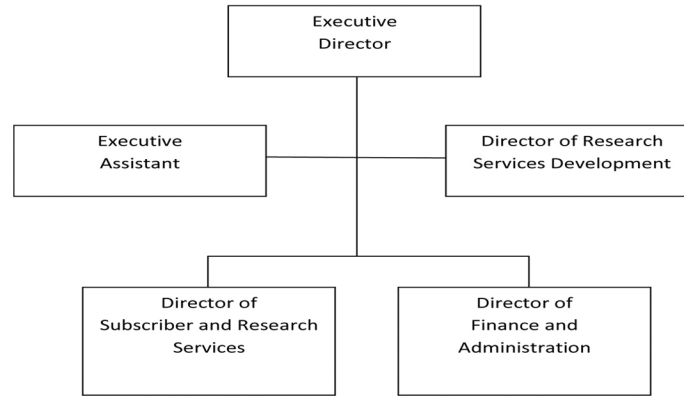The FAC receives the annual quality program review and quality goals recommendations from the Executive Director as input into the yearly planning process.
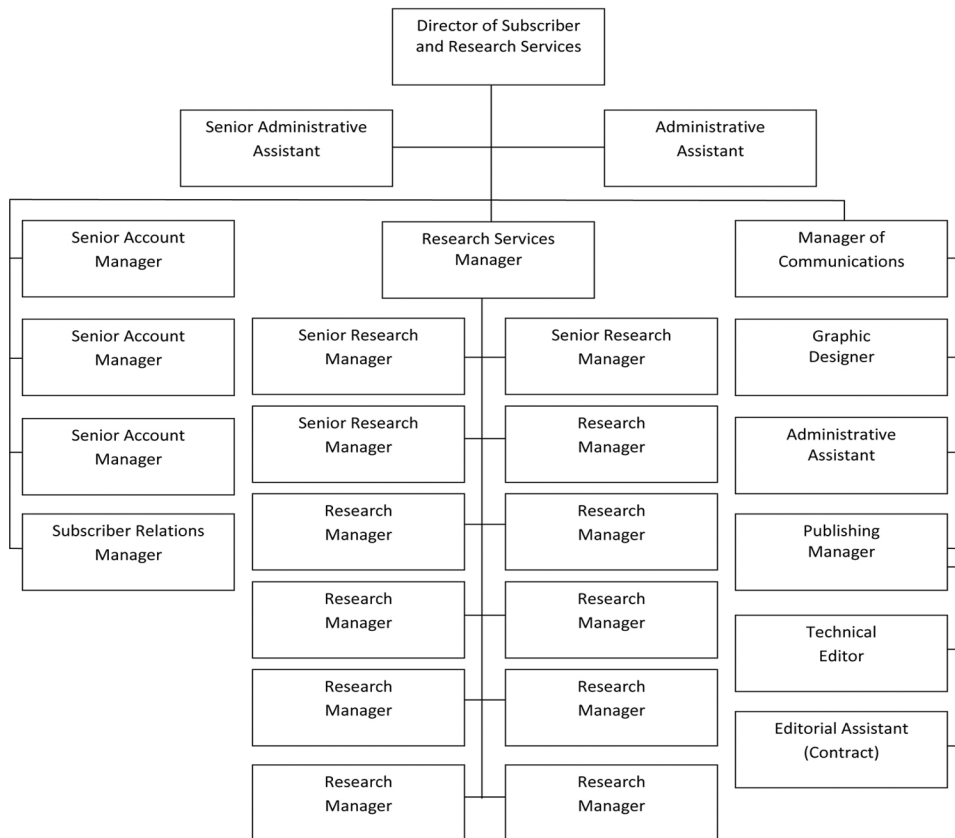
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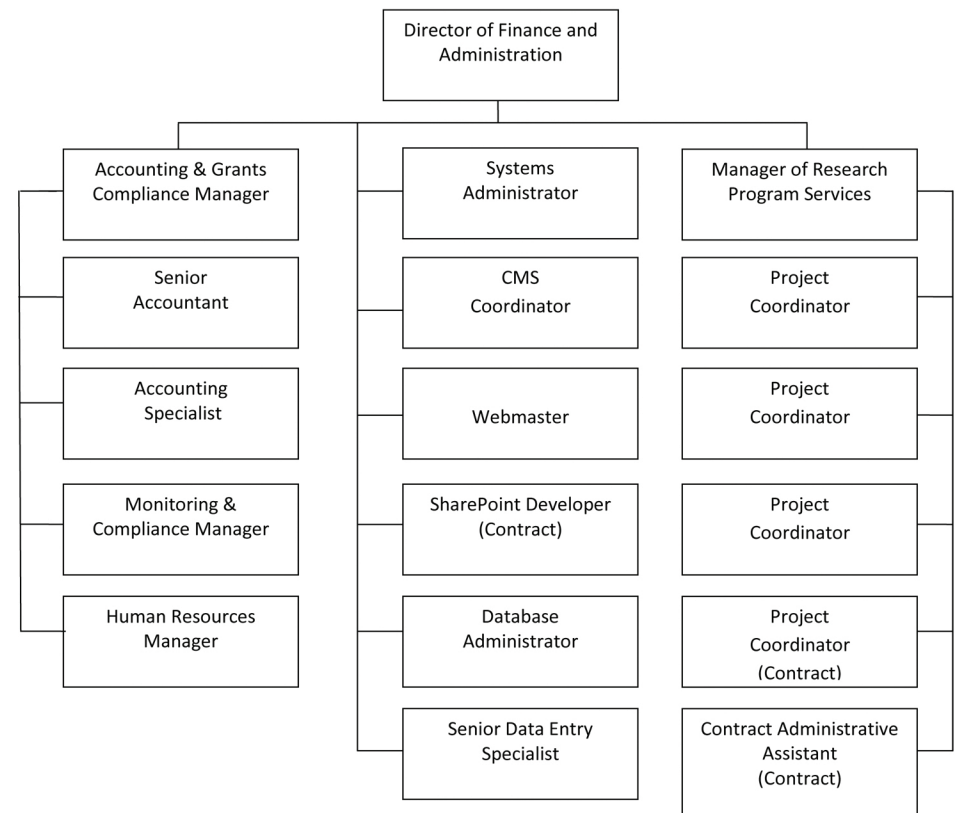The latest *controlled* version of this document is located on the Foundation website, www.WaterRF.org
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Water Research Foundation
Organizational Chart
Figure 2.1

Senior Management

- Executive Director
  - Executive Assistant
  - Director of Research Services Development
  - Director of Subscriber and Research Services
  - Director of Finance and Administration

Subscriber and Research Services

- Director of Subscriber and Research Services
  - Senior Administrative Assistant
  - Administrative Assistant
  - Senior Account Manager
    - Senior Account Manager
    - Senior Account Manager
    - Subscriber Relations Manager
  - Research Services Manager
    - Senior Research Manager
    - Senior Research Manager
    - Senior Research Manager
    - Research Manager
    - Research Manager
    - Research Manager
    - Research Manager
    - Research Manager
    - Research Manager
    - Research Manager
    - Research Manager
  - Manager of Communications
    - Graphic Designer
    - Administrative Assistant
    - Publishing Manager
    - Technical Editor
    - Editorial Assistant (Contract)

Finance and Administration

- Director of Finance and Administration
  - Accounting & Grants Compliance Manager
    - Senior Accountant
    - Accounting Specialist
    - Monitoring & Compliance Manager
    - Human Resources Manager
  - Systems Administrator
    - CMS Coordinator
    - Webmaster
    - SharePoint Developer (Contract)
    - Database Administrator
    - Senior Data Entry Specialist
  - Manager of Research Program Services
    - Project Coordinator
    - Project Coordinator
    - Project Coordinator
    - Project Coordinator (Contract)
    - Contract Administrative Assistant (Contract)

Water Research Foundation Quality Management Plan

Executive Director

The Executive Director provides leadership within the organization. He (or she) assures that the Foundation is recognized within the drinking water community as an innovative leader providing a valuable service to the community. He directs the coordination and integration of the activities and programs of Research and Subscriber Services, Finance and Administration, and Research Services Development, and supervises the directors of these programs. He pursues and develops relationships with appropriate national and international organizations. He provides representation of the Board of Trustees.

His responsibilities include:

- Assist in fulfilling the Foundation's mission and vision by implementing and upholding the Foundation policies and values.

- Approve the development and enhancement of operational guidelines and procedures.

- Review reports from the Quality Assurance Manager or on quality management, surveillance activities, and corrective actions, and provide a line of communication for the Quality Assurance Manager to report quality program reviews and issues to the Board of Trustees independent of project operations.

- Effectively manage the Foundation's organizational and intellectual assets, and all internal and external goodwill that are involved in the duties of this position.

- Actively participate in and support the principles and objectives of the Foundation's management system for continuous improvement, including participation in process improvement teams.

- Coordinate the Foundation's programs to assure optimum use of time and budget resources.

- Maintain good relations between and among internal staff and external organizations.

Director of Research Services Development (Quality Assurance Manager)

The Director of Research Services Development provides direction and leadership of the Foundation's facilitated research services program. He (or she) pursues and develops partnerships with appropriate organizations, and helps assure that the Foundation is recognized within the drinking water community as an innovative leader providing a valuable service to the community.

The Director of Research Services Development has been designated by the Executive Director as the Foundation's Quality Assurance Manager. In that capacity the Director of Research Services Development (hereinafter referred to as the Quality Assurance Manager) communicates with the Director of Subscriber and Research Services on day-to-day quality activities, and is directly responsible to the Executive Director for identifying and communicating quality issues relating to the planning, assessment, and improvement of the quality management system (see Figure 2.1, Foundation Organization Chart).

The Quality Assurance Manager responsibilities include:

- Provide leadership regarding institutional quality.

- Approve the Quality Management Plan, and quality program work instructions and procedures.

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- Ensure that provisions of the QMP are appropriately flowed down to the Foundation's Quality Management documents, as specified in Chapter 6.

- Recommend training for staff, as needed, on quality processes and procedures.

- Schedule and conduct assessment and response activities as outlined in Chapter 10, and report on the results to the Director of Subscriber and Research Services and Executive Director.

The Quality Assurance Manager has the authority and independence from project operations to stop work whenever there is evidence that work performance will not meet contract specifications, company policy, or regulatory requirements, or may result in hazards to the health or safety of personnel.

Director of Subscriber and Research Services

The Director of Subscriber and Research Services provides leadership and coaching to promote innovation, organizational and individual development, and continuous improvement in research management. He (or she) develops and improves a research management program that is recognized and respected, meets/exceeds current needs and anticipates the needs of the drinking water community worldwide, and results in scientifically accurate and broadly applied results.

The Director of Subscriber and Research Services responsibilities include:

- Assist in fulfilling the Foundation's mission and vision by implementing and upholding the Foundation policies and values.

- Review and approve development and enhancement of operational guidelines and procedures, including the Foundation's quality management plan.

- Provide resources to ensure that quality programs are adequately supported and implemented within projects to achieve their goals and objectives.

- Coordinate departmental activity with the Quality Assurance Manager in regard to the performance of quality programs and activities.

- Actively participate in and support the principles and objectives of the Foundation's management system for continuous improvement, including participation in process improvement teams.

- Maintain confidentiality on research ideas, nonselected proposals, and other information.

- Ensure the integrity of the research planning and management process.

- Participate in the leadership, management, and administration of the Foundation, including the development of programs, policies, procedures, staffing plans, and annual budgets, particularly that portion related to the technical research program.

- Respond to technical assistance inquiries from interested persons.

- Provide assistance to other Foundation programs and other duties as assigned by the Executive Director.

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Research Services Manager

The Research Services Manager develops, monitors and continually improves a research services program that (1) is recognized and respected; (2) meets/exceeds current needs and anticipates the needs of the drinking water community worldwide; (3) is flexible and responsive to subscriber needs; and (4) produces scientifically accurate and broadly relevant results. He (or she) provides leadership, supervision and coaching to promote innovation, organizational and individual development, and continuous improvement in research services that is consistent with the Foundation's goals and strategic initiatives.

Specific duties pursuant to these functions include:

- Oversee and direct the project management activities of RMs with an emphasis on mentoring, creative problem solving, and development of scientifically credible and applicable results for the drinking water community. Such activities may include but are not limited to: project advisory committee (PAC) selection, request for proposals (RFP) preparation, procurement, contractor procurement and selection, contract negotiation, project performance (completion of the scope of work), submittal and review of final deliverables, budget reconciliation, contract termination, and proper file and database maintenance.

- Assist the Director of Subscriber and Research Services in the identification of appropriate knowledge management tools and work products for teams.

- Assist the Quality Assurance Manager in implementing quality programs and processes, including leading or performing assessments as required.

- Assign responsibility for specific knowledge management work products to RMs, including self-assignment as appropriate, with attention to workloads of individual team members.

- Serve as primary point of contact and coordination between team and the Foundation's Communications group.

- Assist as requested in development and maintenance of the Business Plan, including revisions to improve the overall usefulness of the plan.

- Direct the timely implementation of research projects by drafting and issuing requests for proposals, selecting and recruiting PAC members, facilitating the contractor selection process, contributing to successful project contract negotiations as required, and monitoring/resolving possible conflicts-of-interest by the PAC members.

- Ensure that the projects produce scientifically credible and applicable results for the drinking water profession. Manage research projects in a timely manner and assure fiscal accountability, including direct communication with researchers, PACs, contractors, sponsors, and stakeholders. Determine the need for and coordinate conference calls and project meetings. Review technical reports, manage the Foundation's payables for project accounts, maintain accurate database information, and uphold contract provisions.

- Provide and coordinate technical review of final project products to ensure clarity, relevance, accuracy, and timeliness of the final products.

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Research Manager

RMs direct the timely implementation of research projects by drafting and issuing requests for proposals, selecting and recruiting PAC members, facilitating the contractor selection process, contributing to successful project contract negotiations as required, and monitoring/resolving possible conflicts of interest by the PAC members. Duties include:

- Ensure that PAC members' qualifications and experience are documented in project files

- Identify projects requiring EPA-compliant QAPPs, reviewing and approving, as required, plans from researchers.

- Communicate issues regarding QAPPs to the Quality Assurance Manager and coordinate their resolution.

- Review project quality requirements and determine the resources necessary to assess compliance with contract requirements.

- Monitor project performance and ensure that quality requirements per contract requirements or approved plan are being addressed.

- Help ensure that the projects produce scientifically credible and applicable results for the drinking water community.

- Manage research projects in a timely manner and assure fiscal accountability, including direct communication with researchers, PACs, contractors, sponsors, and stakeholders.

- Determine the need for and coordinate conference calls and project meetings; review technical reports; manage the Foundation's payables for project accounts; maintain accurate database information; and uphold contract provisions.

- Provide and coordinate technical review of final project products to ensure clarity, relevance, accuracy, and timeliness of the final products.

Project Coordinators

Project Coordinators (PCs) support the RMs in the administration of research projects. PCs are responsible for assisting with the procurement and implementation of research projects. They support the monitoring and management of project funding agreements, and maintain current and accurate project documentation, including project files and database information. Duties include:

- Assist with maintaining project fiscal responsibility, timeliness, and administrative and financial requirements.

- Assist with contractual compliance of agreement terms between the Foundation and its researchers.

- Work in conjunction with RMs to ensure that project deliverable due dates are met. Coordinate the receipt, review and distribution of research project deliverables.

- Work in conjunction with RMs to maintain current and accurate project files and database information.

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- Assist with the monitoring of researchers and maintenance of statistics with respect to their project performance.

- Maintain all essential documentation related to funding agreements and the administration of these agreements. Monitor and ensure that essential administrative tasks associated with funding agreements have been met.

Project Advisory Committee

Individual PACs are established for every project approved for funding by the Foundation. Volunteer members are appointed to them based upon their expertise in that particular research area. The responsibilities of the PAC are to:

- Review and refine the RFP issued for each project.

- Review all of the submitted proposals in accordance with policy and procedures.

- Select the best proposal.

- Monitor the performance of the contractor throughout the project.

- Provide peer review of the project draft and final reports.

An EPA representative is invited to serve on the PAC for each jointly funded project.

Director of Finance and Administration

The Director of Finance and Administration leads and directs the planning, development, and administration of the administrative support system that enables the staff to achieve the Foundation's mission and vision. The Director's responsibilities include financial, clerical, support, computer, facilities, meeting planning, contract administration, and personnel activities. Duties include:

- Participate in the leadership, management, and administration of the Foundation, including the development of programs, policies, procedures, staffing plans, and annual budget process, particularly that portion related to administrative services.

- Administer, maintain, and interpret personnel policies manual.

- Administer and coordinate the Foundation's benefits program.

- Administer and maintain document and record control procedures and policies. Communicate guidance on these procedures and policies and assist in their implementation.

- Develop procedures and policies and the resources necessary for management of the Foundation's computer system.

- Develop periodic and annual updates of the Foundation's staffing plan.

- Assist supervisors in developing and implementing individual staff training plans.

- Provide assistance to other Foundation programs and perform other duties as assigned by the Executive Director.

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Contracts Administrator

The Contracts Administrator is responsible for coordination of the Foundation's contracting process, including negotiation of standard agreements and co-funding arrangements. The Contracts Administrator assists staff with identifying contract needs for the Foundation's programs and provides guidance on the contracting process. Contract responsibilities are as follows:

- Prepare, negotiate, and coordinate with appropriate staff the Foundation's standard contract for research projects.

- Develop, prepare, negotiate, and coordinate with appropriate staff special contracts, co-funding agreements, and contract amendments.

- Assist in the development, preparation, and coordination of federal cooperative funding agreements.

- Ensure that Federal quality guidelines are documented in appropriate funding agreements.

- Coordinate Foundation's contracts processes including:

    - Documentation of and refinements to processes

    - Coordination with staff and functional units as necessary

    - Development and presentation of training documents for staff as necessary

    - Development of filing systems

    - General administration

- Serve as liaison to the Foundation's legal advisors.

- Maintain statistics on contract negotiations.

FOUNDATION WORK PROCESSES

The following steps describe the research agenda and RFP development process, proposal selection, contract, project management, research report review, and information distribution cycle that constitutes the basic annual research cycle of the Foundation (see Figure 2.2).

1. Board of Trustees selects focus areas and approves annual funding allocation

The BOT is responsible for selecting and approving focus areas under the Foundation's Focus Area Program, and for discontinuing focus areas which have satisfied their objectives or are no longer relevant to pursue. These decisions are based on information and recommendations provided by the FAC. The BOT is also responsible for annual allocation of funds to the Focus Area Program. These actions are taken each year at the BOT's winter meeting.

2. Technical Advisory Committees and staff identify/select projects

Technical Advisory Committees (TACs) are committees of 6-8 technical experts that are formed for each approved focus area under the Foundation's Focus Area Program. TACs are selected by the RM assigned to lead the particular focus area. Working together with the RM, TACs develop a multi-year

research agenda for the focus area and recommend projects to be funded for the focus area each year.

3. FAC meeting to select projects

The FAC meets each year in the early spring to review and prioritize focus area projects recommended by each of the TACs, and to select projects for funding. The review and prioritization is performed using established criteria that are uniformly applied to ensure that those projects with the greatest potential benefit to the drinking water community are funded. The FAC also annually evaluates the progress of existing focus areas, assesses the need for potential new focus areas, and develops recommendations for BOT consideration.

4. Project oversight

All projects, including those funded under cooperative agreements, are managed by the Foundation's technical staff. A RM with appropriate expertise is assigned to each project and is responsible for establishing a PAC, coordinating the development of the RFP with the PAC, facilitating the PAC review and selection of the winning proposal, corresponding with the researcher, and overseeing contract negotiations.. PACs are composed of volunteer professionals with expertise in the RFP topic area who are recruited by the Foundation's staff for their specific knowledge in the project research topic. Project Coordinators (PCs) support the RMs in the administration of all research projects.

5. Issuance of Requests for Proposals

Once the annual research agenda has been approved, RFPs are developed by RMs with assistance from PACs. Once RFPs are finalized, they are made available to the research community and public via the Foundation's Web site. Interested parties are provided with copies of the complete RFP and instructions for preparing a "solicited" proposal.

6. Researcher selection process

Review and evaluation of proposals is performed by an independent PAC for each project. Based on this review and evaluation, the PAC recommends a proposal for funding to the Foundation's RM, who is responsible for making the final selection. The general criteria for PACs to use in proposal evaluation are detailed on a "solicited proposal" rating sheet. The criteria include: technical merit, responsiveness to RFP, qualifications, originality/applicability, budget and schedule, and subscribing utility participation. Past researcher performance is also taken into consideration, when applicable. All proposals, reports, and reviews are privileged communications and are available only to the Foundation's staff, the Board of Trustees, and PAC members.

7. Funding agreements to awardees

Once selection has been made, awardees are notified and a project funding agreement (contract) is negotiated. The Foundation expects projects to be completed within the project period and proposers are informed that the timeliness of their past performance on the Foundation's projects is considered during the proposal selection process.

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8. Monitoring project progress

The RM, PC and PAC monitor the timeliness, performance of the contractor, and the progress of the work throughout the project. This includes a timely and thorough review of periodic reports, any intermediate deliverables, the draft final report, and the final report.
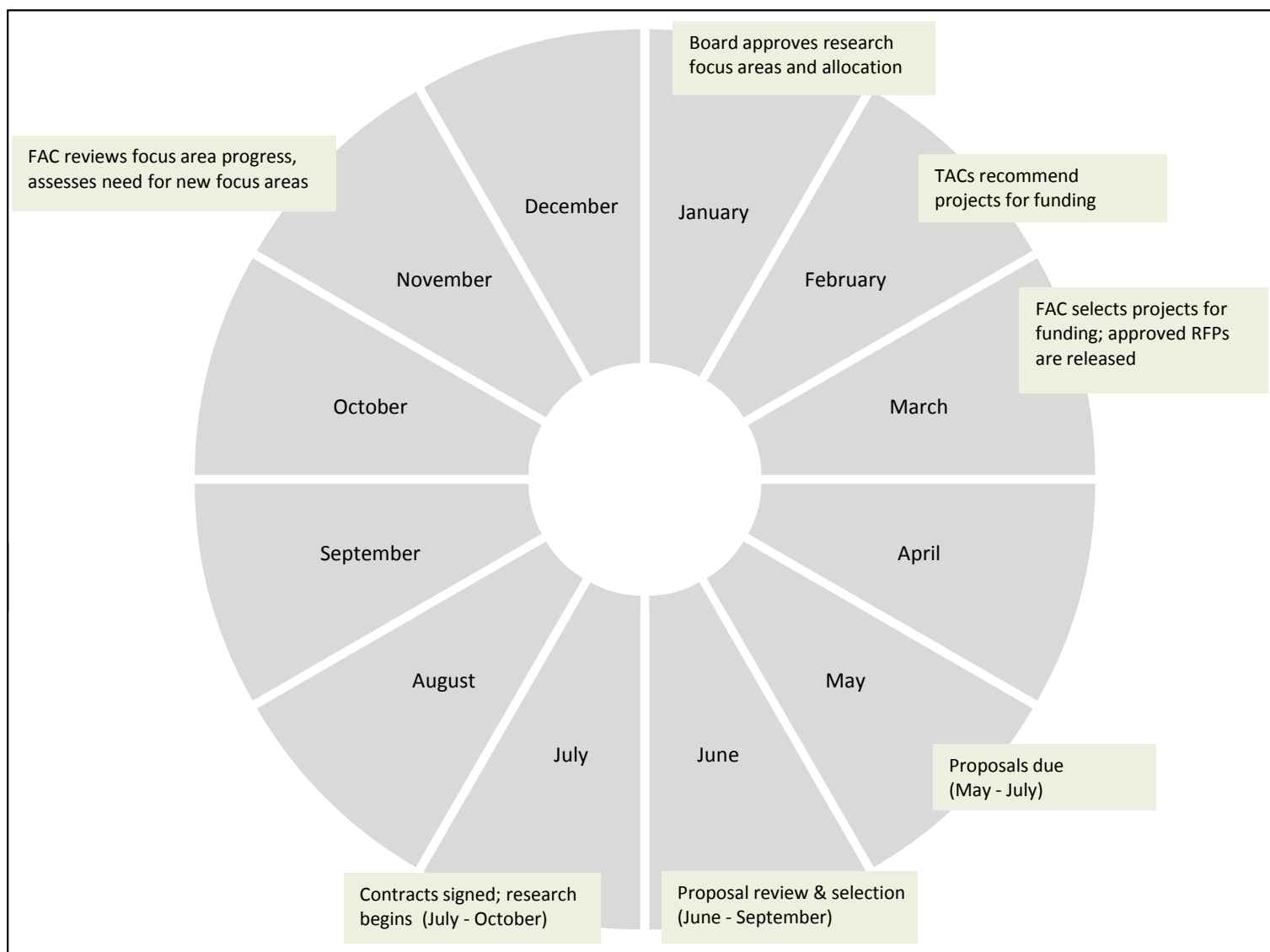
9. Producing research reports

All projects funded under cooperative agreement produce a final report or comparable final work product. The technical content of each report is peer-reviewed by the PAC, followed by copy editing to ensure clarity, completeness of references, quality artwork, etc. The Foundation provides a generous number of complimentary copies of the reports to EPA and state drinking water agencies. Reports are made publicly available as a downloadable document directly from the WaterRF website.

10. Communications and Marketing

The Foundation believes that the practical information gained and the technology developed as a result of these jointly sponsored projects are extremely useful to a large number of water utilities, water supply professionals, and state and federal agencies responsible for ensuring drinking water quality. Researchers are encouraged to publish their project results in peer-reviewed journals. The Foundation retains copyright to all documents and data created or developed from projects funded by the Foundation. All projects funded under cooperative agreement are made publicly available.

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Figure 2.2 Water Research Foundation Research Cycle

Board approves research focus areas and allocation

TACs recommend projects for funding

FAC selects projects for funding; approved RFPs are released

Proposals due (May - July)

Proposal review & selection (June - September)

Contracts signed; research begins (July - October)

FAC reviews focus area progress, assesses need for new focus areas

January
February
March
April
May
June
July
August
September
October
November
December

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CHAPTER 3
QUALITY SYSTEM DESCRIPTION

The Foundation's quality management system is planned, documented, and implemented to provide management and subscribers assurance that research activities are planned and performed in accordance with approved processes and requirements.

The information provided in this chapter identifies and defines when and how controls are to be applied to our technical or project processes and operations or makes reference to where in this plan quality assurance and control activities are planned, implemented, and assessed to ensure that the Foundation's research projects produce data that are credible and reliable. The rigor with which controls are applied is determined using a graded approach. Graded approach is defined as the process of basing the level of application of managerial controls applied to an item or work according to the intended use of the results and the degree of confidence needed in the quality of the results.

The Foundation's quality management system applies to research needs assessment, research planning, proposal solicitations and reviews, contractor selections, project management, report approval, and program assessment and improvement.

MANAGEMENT AND ORGANIZATION

The Foundation's management has established the mission, vision, and goals of the organization as described in Chapter 2. Our quality policy defines the objectives and goals of the quality program which are intended to ensure that processes produce the type and quality of results needed and expected. To this purpose, managers and staff as described in Chapter 2 have been assigned functional responsibilities, authority, accountability, and resources necessary for managing and implementing the Foundation's quality program as described in this Quality Management Plan (QMP). The Director of Research Services Development has been designated as the Quality Assurance Manager for the Foundation. His duties and responsibilities are as described in Chapter 2.

Management has identified its customers and the researchers who provide the services required to satisfy their needs and has communicated the requirements of this plan to its staff and research contractors. The quality program is regularly assessed to determine its implementation and effectiveness.

TRAINING

The qualifications and experience of both paid staff and volunteer personnel are evaluated by the Foundation's management staff and RMs. Further training, including the need for specific qualifications and certifications, shall be provided as required to ensure that personnel are trained and qualified based on project-specific requirements prior to the start of work. The Executive Assistant shall direct the creation and maintenance of training records. Training and qualifications duties and responsibilities for performing training and maintaining records of training are described in Chapter 4.

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PROCUREMENT

The procurement of research reports and other environmental data is planned and controlled in accordance with the Foundation's annual research agenda as developed from guidance of the Business Plan. Once proposals have been reviewed and approved (see Figure 2.2), project funding agreements are negotiated with the contractor. These agreements contain information that clearly describes the research service required and the quality requirements for which the contractor is responsible, and how conformance with requirements will be maintained via periodic performance reports. The funding agreements are reviewed for accuracy and completeness by the Contracts Administrator prior to release. Changes to the agreements receive the same level of review and approval.

QUALITY SYSTEM DOCUMENTATION

The Director of Finance and Administration is responsible for document and record control. Processes have been established for identifying, preparing, reviewing, approving, revising, collecting, indexing, filing, storing, maintaining, retrieving, distributing, and disposing of quality documents and records. Documents and records that describe control processes and outputs are reviewed and approved prior to use, distributed to the point of use, and revised as required. Personnel are retrained on the revised version of the procedure. See Chapter 6 for further information.

This QMP is the primary guidance for managing the Foundation's quality programs and processes. The QMP conforms to the American National Standard *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs* (ANSI/ASQC E4-1994) and has been approved for implementation by the Executive Director. It is supported by and refers to requirement procedures and guidance documents used in research planning, proposal creation and selection, project management, and research report creation, review, and approval. These procedures and instructions include RFP preparation instructions, proposal submission instructions, timeliness policy, the Foundation's project funding agreement, QAPP, report format and style guide, checklists for software media and Web site creation, periodic report procedures, and project report checklists.

Individual contractors are required to identify and document those operations in their QAPPs or research plans (as appropriate) that require quality system procedures. Contractor QAPPs shall "flow-down" the requirements of the QMP, describing the applicability of the quality system to technical activity-specific efforts. Such procedures shall contain sufficient detail and clarity, as ascertained by the Foundation PAC, to ensure that the desired results are achieved. For some cooperative agreements, the QAPP is reviewed and approved by the EPA's Project Officer.

COMPUTER HARDWARE AND SOFTWARE

The Foundation does not maintain computer hardware or software configurations that perform experimental design, design analysis, modeling of environmental processes, technology systems, or databases. Software that is created or generated by researchers as a project deliverable product is reviewed and the verification results are documented.

SYSTEMATIC PLANNING OF PROJECTS

The Foundation's annual research cycle is depicted in Figure 2.2. The cycle provides for systematic planning for the projects and the collection of environmental data during the projects.
Elements of the cycle with planning components include:

- The BOT approves research focus areas.

- The TACs meets to identify projects in the approved focus areas.

- The FAC approves funding for selected projects.

- RMs establish PACs.

- RMs develop RFPs with PAC assistance.

- RFPs and instructions for preparing proposals are distributed to interested individuals.

- RMs and PCs coordinate the project selection and award process. PACs review and recommend proposals for award; RMs are responsible for selection of proposals.

- The Contracts Administrator issues project funding agreements.

- RMs, PCs and PACs provide technical oversight and administration of projects, including monitoring the implementation and effectiveness of the quality assurance project plans, review and verification of report data, timeliness of research progress, and the production and distribution of the final research reports.

See Chapter 8 for a detailed description of the Foundation's planning cycle and control of projects.

IMPLEMENTATION OF WORK PROCESSES

Work is performed in accordance with approved planning and technical documents, including QAPPs as required, in the sequence described in the previous section. RMs and PACs oversee project performance using a level of surveillance that is commensurate with the importance of the project and its results.
Procedures have been developed in a readable format with sufficient detail to provide adequate guidance. Procedures have been implemented for routine, standard processes and critical or special operations, as needed, and their implementation and effectiveness is monitored to ensure their continued relevance. See Chapter 9 for further information regarding the implementation of work processes.

QUALITY ASSESSMENTS

Once proposals have been reviewed, awardees are provided a research contract that includes responsibilities for quality performance. Periodic project progress reports are required to be submitted in a pre-approved format with specific data fields. These reports are reviewed by the RM and PAC to identify any issues that may adversely impact project progress.

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Once a draft report has been submitted, it is reviewed by the RM and PAC for technical clarity and accuracy. The report is also reviewed for adherence to the Foundation's *Format-Style Guide for Preparing Research Reports*. The report is returned to the contractor for revisions and the review cycle continues until a final report is accepted.

The Quality Assurance Manager is responsible for developing and maintaining a program of assessment and surveillance of projects and internal processes to ensure that they conform to the Foundation's guidelines. Results are documented in reports and corrective actions as required. The results of assessments and other surveillance activities are compiled and presented as an element of the Foundation's yearly review process. Assessments will be planned, scheduled, and performed in accordance with Chapter 10 of this QMP.

CONTINUOUS IMPROVEMENT

The Foundation quality system is reviewed every year, not later than the last working day of the month of December. The review is conducted at the request of the Executive Director or Quality Assurance Manager and involves the Quality Assurance Manager and key members of the Foundation's Research Services staff. The management review includes consideration of the effectiveness of the actions taken subsequent to previous reviews, and an examination of corrective actions since the last review. Amendments to the quality system to increase effectiveness are also considered. Actions required to correct specified deficiencies are assigned to committees and management representatives. Minutes of the meeting are taken by the Quality Assurance Manager and are retained for a minimum of 3 years.

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CHAPTER 4
PERSONNEL QUALIFICATION AND TRAINING

GENERAL

It is the Foundation's policy that personnel shall have the knowledge, qualifications, and experience to perform their assigned duties. The Foundation's approach regarding personnel qualification is to hire staff or obtain as volunteers, knowledgeable, experienced individuals from within the water utility profession, and then provide training and professional development needed to acquaint them with the Foundation's processes and procedures for delivering quality research data.

RESPONSIBILITIES

The Senior Administrative Assistant to the Director of Subscriber and Research Services is responsible for directing the maintenance of training records and files created by the FAC, TACs, RMs, and PACs.

Foundation management staff and RMs will review the education, knowledge, and experience of staff and volunteers to determine their qualifications based on assignments and duties. They will provide training on the Foundation's procedures and processes to personnel as required and maintain training records and files within their areas of responsibility in accordance with direction from the Senior Administrative Assistant.

RMs obtain and Foundation staff maintain files on each committee member that contain information on the member's qualifications and experience. The RM shall ensure that PAC members have been familiarized with the Foundation's research project management, including report review procedures, and ensure that the familiarization has been documented in appropriate training records.

Revisions to procedures and processes will be communicated to the appropriate staff personnel and committees by the Senior Administrative Assistant and retraining will be scheduled and conducted to ensure that changes are effectively implemented.

Research staff meet periodically to discuss process and procedural issues, scheduling concerns, and other pertinent issues relative to project management. A second type of meeting is held for scientific educational purposes. Those meetings are held periodically for the purpose of discussing scientific topics, technologies, or other new information so that all project managers have a better understanding of environmental scientific subjects. In each of these two meeting types, staff participation is essential, and is achieved by rotating the duties for meeting planning and for providing leadership. A third type of meeting, the staff council meeting, is held weekly; it is focused on coordination among the Foundation's functional units.

CHAPTER 5
PROCUREMENT OF ITEMS AND SERVICES

Acquisition of technical services shall be planned and controlled to ensure that the quality of the services is known and documented, and meets the technical requirements and acceptance criteria established by the Foundation's committee processes, including proposal solicitation, contract award, and project management processes.

PROJECT SELECTION PROCESS

The FAC and TACs work together to develop the annual research agenda. The resulting projects are open for competitive award through the Foundation's RFP process. A PAC is established for each project to review the RFP and review and recommend the winning proposal. EPA is invited to appoint a representative to each PAC for cooperative agreement projects. Proposals must conform to the directions found in the Foundation's "Guidelines for Solicited Proposals." RFPs generally are released in the spring, with proposal deadlines ranging from early May to mid-July as determined by Foundation staff.

RFP projects funded entirely or in part with federal funds generally are awarded and started by December of the award year.

CONTRACT AWARD PROCESS

Proposals submitted to the Foundation initially undergo an administrative review. The Senior Administrative Assistant, RMs, and PCs conduct the administrative review. The review is for proposal completeness and to make certain that submissions adhere to Foundation guidelines and policies. The PAC for each project is tasked with reviewing submitted proposals and awarding the project. Proposals are rated based on their adherence to requirements using a proposal rating sheet as set forth in the "Guidelines for Solicited Proposals," that considers (1) technical merit, (2) responsiveness to RFP, (3) qualifications, (4) originality and applicability, (5) budget and schedule, and (6) subscribing utility participation.

Once contract negotiations have been successfully concluded, a Project Funding Agreement (contract) is completed. Any changes to the project funding agreement receive the same level of review and approval as the original contract.

CONTRACT REQUIREMENTS

Contract requirements are specified in the Project Funding Agreement. The specific deliverables such as research documentation and the preparation of the written report are performed in accordance with the project proposal, which is an attachment to the Project Funding Agreement. If necessary, a QAPP will be developed by the researcher, and reviewed and accepted by the RM as directed by the Quality Assurance Manager (see Chapter 9 for further information) prior to commencing work.

The Project Funding Agreement includes the project schedule of deliverables such as the scope of work, periodic reports, any interim deliverables, and the draft and final written research report or comparable final deliverable.

When periodic reports are received, they are distributed to the PAC and the original copies are filed. The RM or PC sends each report to the PAC with instructions for submitting

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comments. The RM or PC compiles PAC member comments and contacts members who are late with submitting comments, and then reviews the comments for consistency among the members and with the RM's review. The RM then seeks to resolve discrepancies, finalize comments, and provide clear guidance to the contractor. When the next periodic report is received, the RM and PAC are responsible for checking to determine if previously submitted comments have been adequately addressed. Often, the RM meets with the PAC and research team to discuss comments on deliverables.

Payments to contractors are based on the timely submission of their periodic and status reports detailing expenses incurred and the satisfactory progress of the project during the previous period.

RMs and PACs review draft and final versions of the final research reports or comparable deliverables. Final payment of retained funds is based on the acceptance and approval of the final research report by the RM.

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CHAPTER 6
DOCUMENTATION AND RECORDS

The Foundation has established procedures for maintaining and controlling records and documents used for research planning, research implementation, and project management. This chapter describes the requirements for filing, storing, and disposing of research and quality records.

GENERAL

The Director of Finance and Administration is responsible for developing, approving, and communicating document and record procedures and processes to users.

Documents are specified, prepared, approved, and maintained to achieve the required quality for the completed work and fulfill any statutory requirements. Documents used by staff, volunteers, and contractors to perform work are kept current for use by the Foundation's staff. Qualified and authorized persons review documents and revisions for conformance with the Foundation's requirements prior to document usage.

QUALITY MANAGEMENT DOCUMENTS

Quality management documents consist of policy statements, operating procedures, and work instructions needed to control work processes and outcomes. The major documents supporting the Foundation's quality system include:

- Quality Management Plan
- Guidelines for Establishing Project Advisory Committees
- Project Funding Agreement (Contract)
- Guidelines for Solicited Proposals
- Draft/Final Project Report Review Guidelines

Document Control

Quality management documents are created by knowledgeable individuals, and reviewed and approved by the appropriate management prior to release for use. Documents are reviewed annually and revised as necessary.

Staff, volunteers, and contractors are trained or familiarized on plans, procedures, and work instructions as required in accordance with training requirements (see Chapter 4).

The current, approved versions of the documents are made available to staff, volunteers, and contractors on the Foundation's Web site. Printed copies are considered uncontrolled and the version noted in a printed copy should be checked against the Web site document prior to use.

Changes and revisions to documents as well as the recall of obsolete or superseded versions are communicated to staff, volunteers, and contractors via the Foundation's Web site. The Foundation's staff maintains quality documents for historical and legal purposes as required and dispose of superseded, obsolete documents. Discontinued materials and superseded documents are retained in the archives for at least three years.

Project Documents

All records and documents pertaining to projects under contract are maintained in files. For electronic information, the Foundation's computers are linked via a local area network and each project is assigned a directory with appropriate sub-directories where all electronic files are located. These include information on all project concepts, RFPs, people and organizations submitting proposals, subcontractors, test sites, financial information, proposal scores and rankings, contract awards, and evaluations for responsiveness of contractors. For electronic mail, messages are archived for each project at the RM's discretion. The RM or PC who receives the transmission archives the email messages. These files are updated with quarterly reports or other correspondence with the contracting organization or PAC. Following project close-out, paper files are archived on site. The review of files for archiving occurs on an annual basis. The files for each project include the contract, all contract amendments, the project scope of work, project budget, correspondence with the principal investigator, quarterly reports, and PAC review comments, recommendations, and approvals. The paper file also includes the draft final reports along with comments.

RECORD CONTROL

Records relating to the Foundation work processes, project performance, and outcomes have been identified and controlled. Such records include:

- Approval of plans and proposals
- Researcher performance and timeliness database
- Proposal review and acceptance
- Approval of contracts/project funding agreements
- Project progress and performance reports
- Staff and PAC training records
- Review of draft and final project research reports and products

These records shall be reviewed, authenticated, and maintained to reflect the achievement of the required quality for completed work and/or to fulfill any statutory requirements.

The Director of Finance and Administration shall direct processes for the retention, protection, preservation, traceability, and retrievability of records. These processes shall ensure that steps are taken to protect records from damage, loss, and deterioration. Where records may be used as evidence, processes for establishing and implementing appropriate chain-of-custody and confidentiality procedures shall be established.

Records shall be retained based on contractual and statutory requirements, or if no requirement has been stated, for a minimum of three years.

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CHAPTER 7
COMPUTER HARDWARE AND SOFTWARE

This chapter describes the computer system and software used by the Foundation in managing its research programs, and the requirements it places on its contractors relative to the collection and handling of environmental data.

GENERAL

Much of the daily work of the Foundation involves processes designed to manage subscriber services. These services are as varied as developing and managing a subscriber database, determining research priorities, conducting research programs, disseminating information and products, managing finances, and providing staffing and resources for all Foundation operation. The Foundation is not involved in the creation, analysis, or control of environmental data or systems.

HARDWARE/SOFTWARE FOR ENVIRONMENTAL DATA

The Foundation does not directly conduct environmental research. It does not use environmental hardware or software for data collection and analysis, or have computer hardware/software configurations integral to measurement and testing equipment. Nor is it anticipated that any such hardware or software would be procured or used directly by the Foundation's personnel.

Software developed by contractors as an element of contract requirements is managed as a contractual deliverable under the Foundation's work processes and as described below.

CONTRACTOR REQUIREMENTS

Most of the Foundation's contractors perform data collection and analysis using computer hardware and software, and in some cases research projects involve the development of new software for the purposes specified in the contract scope of work. Contractors are required to specify the equipment available to them, or to be purchased, to support their project as part of their proposal.

Contractor-developed software or software purchased by contractors and used to perform design analysis, modeling of environmental processes and conditions, and operation or process control of environmental technology systems, including automated data acquisition and laboratory instrumentation and databases containing environmental data, and where the data will be utilized or referenced in research reports or other contract specified products, shall satisfy the requirements stated in the Foundation's "Software Criteria for Foundation Deliverables." The appropriateness of contractor computer software is reviewed, evaluated, and accepted or rejected by the Foundation's PAC.

CHAPTER 8
PLANNING

GENERAL

The Water Research Foundation is a private, non-profit organization that serves as a centralized research program for the drinking water community. The Foundation's research program is funded by more than 1,000 subscribers (utilities, consulting firms, and manufacturers) as well as federal agencies. The program is further supported by hundreds of volunteers who serve on various advisory and oversight committees. The Foundation is governed by a 23-member BOT that is primarily composed of water utility representatives.

The BOT approves the Foundation's overall strategic plan, which consists of a mission statement, vision, and specific goals that are set in order to achieve the mission and vision. The Foundation's strategic plan identifies its organizational mission and vision as follows:

The Foundation's **mission** is advancing the science of water to improve the quality of life.

The Foundation's **vision** is to be the essential source for credible water research.

The goal of the Water Research Foundation is to be the leader in drinking water research for the entire drinking water community. To accomplish this goal the Foundation has specific action plans that directly support the goals of:

1. **Research - Creating measurable value through strategically targeted research that provides timely solutions to the most important subscriber needs and challenges.** The Foundation strives to understand subscribers' research requirements and to target research that meets those needs. By doing so, the Foundation is the "go to" source for utility research needs.

2. **Communication – Develop communication that increases value to subscribers and key stakeholders.** Effective communications and marketing 1) makes the Foundation highly recognized and raise its identity to potential sources of funding and the public; and 2) increases the awareness of the Foundation and its research to subscribers, government, industry, and the public.

3. **Revenue – Grow and diversify revenue sources to support the research mission of the Foundation.** The Foundation increases revenue and diversifies revenue sources to address the increasing demand for water research.

4. **Efficient Operations – Balance the operations and resources of the Foundation to maximize subscriber value and to respond quickly to changes in subscriber needs.** The Foundation optimizes operations enabling the maximum funding available for research and provide adequate resources, technologies and best practices to meet its goals.

FOUNDATION BUSINESS PLAN

The Foundation's Business Plan is an internal document that provides a road map for organizational strategies, goals and objectives.   The primary focus is in the areas of research, communication, revenue growth, and efficient operations. The Business Plan identifies primary strategies, three-year goals, and one-year goals for each of these focus areas that will be pursued to support the Foundation's mission and vision. The plan also identifies key research drivers that are expected to shape the Foundation's research agenda for the coming several years, as well as financial/economic drivers that affect the commitment of resources to the research program. The Business Plan is reviewed and updated annually and is approved by the BOT.

RESEARCH STRATEGY COMMITTEE

The Research Strategy Committee (RSC) is a standing committee of the BOT that provides a bridge between the BOT and the Foundation's research program, and helps develop the strategic direction of, and identify initiatives for, the program. The RSC provides a defined mechanism for BOT input to the research program, recommending adjustments to current research areas of focus and recommending future areas of focus based on emerging trends or information, regulatory developments, operational changes, perceived gaps in knowledge, and subscribers' needs. The RSC assists with plans to sustain multi-year research on key topics, identify topics for emphasis, suggest new areas of interest, and explore ways to leverage research results and effectiveness. RSC members are appointed by the chair of the BOT from among the trustees. The chair of the Foundation's Focus Area Council (FAC) is a member of the RSC.

The primary means by which the RSC carries out its roles and responsibilities is the triennial assessment, a high-level strategic assessment that is conducted every three years. The committee conducts this assessment based on input from a wide range of sources, presents results and recommendations to the BOT for discussion and direction, and communicates BOT direction back the research program. The triennial assessment entails gathering and evaluation of information from four primary sources:

1. *Research program committees*. Input is obtained from existing Foundation program committees (e.g. the FAC), including a summary of projects and topics funded during the previous three years, ideas on future strategic direction and potential multi-year research initiatives, and ideas for improved alignment of the research programs. Input is obtained primarily through face-to-face discussion with the chairs of the committees, supported by a brief list of questions that are meant to stimulate discussion.
2. *Subscriber surveys*. The committee conducts a web-based survey of Foundation utility subscribers. Results from other subscriber surveys conducted during the previous three years (e.g. the bi-annual subscriber survey) are also reviewed. The committee has established core questions which are intended to be carried forward from one survey to the next to provide a baseline for comparison.
3. *Outside stakeholder survey*. Input is obtained by surveying stakeholders that may not otherwise be well-represented in the Foundation's current research planning processes. The intent is to provide the BOT with a broad-based public perspective on drinking water issues and research priorities. The committee develops a target list of individuals to be

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surveyed and conducts one-on-one conference calls with these individuals. The calls are supported by a brief list of questions that are meant to stimulate discussion. While the input received from these stakeholders may not drive the Foundation's research direction, it may help the Foundation to enhance the public perception of the research program as well as influence decisions regarding future research strategy.

4. ***Special research projects***. While many research projects identify needs and ideas for future research on specific technical topics, a small number of projects are designed specifically to explore trends and knowledge gaps at a more strategic level (e.g., the Foundation's "Futures" projects). The committee will consider results from such projects conducted by the Foundation and by other research organizations, including federal agencies and international partners.

The RSC evaluates the input from these four sources and develops recommendations on areas relevant to research program strategy. The committee presents results of the evaluation and recommendations to BOT for review, refinement and approval, then provides BOT direction back to the research program.

RESEARCH AGENDA

Through the Foundation's Focus Area Program, research needs and project ideas that best address issues of high priority to the drinking water community are identified through an extensive process that includes input from subscribing utilities and other water-supply stakeholders. The research agenda is reviewed annually and revised as necessary to reflect the most current needs and priorities of the drinking water community and to incorporate ongoing research findings and results.

The process for determining the focus and funding of the research agenda begins with the BOT. The BOT, with input from the FAC and Foundation staff, is responsible for selecting focus areas; topic areas that are of high interest and priority to Foundation subscribers because of a challenge or opportunity that is present, emerging, or anticipated, and for which research will help subscribers manage and address the challenge or optimize the opportunity. The BOT is also responsible for allocating annual funding to the Focus Area Program. Focus area selection and funding allocation are done at the BOT's winter meeting, typically in January.

In selecting the Foundation's focus areas, the BOT relies heavily on recommendations from the FAC. The FAC consists of the members of the RSC plus up to five additional members appointed by the BOT. BOT-appointed FAC members must come from utility organizations that are full participants in the Foundation's subscription program. FAC members are selected based on broad knowledge of the Foundation's community of subscribers and understanding of its needs, challenges and opportunities. A FAC Chair, who is appointed to one three-year term by the BOT, provides overall coordination, direction and leadership for the FAC. The FAC Chair is also a member of the BOT and of the RSC.

Foundation staff appoints a Technical Advisory Committee (TAC) for each BOT-approved focus area. TACs are comprised of experts on the various aspects of the particular focus area. The TAC, working together with staff, develops and maintains a research agenda for the focus area.

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TACs recommend projects to be funded each year for their particular focus areas. The FAC is then responsible for prioritizing these projects and determining which ones will be funded each year, based on funds available for the program. The FAC also annually evaluates the progress of existing focus areas, assesses the need for potential new focus areas, and develops recommendations for BOT consideration.

Ultimately, every project funded through the Focus Area Program must benefit the Foundation's subscribers. Research planning includes input on subscriber issues and challenges from the Foundation's Senior Account Managers, who represent the 130 largest Foundation utility subscribers. Input on subscribers' most challenging issues is also obtained in a biannual subscriber survey, and from research partners, who can offer unique perspectives based on their own planning efforts and customer bases. Industry trends identified in the Foundation's "Futures" reports are also reviewed to ensure that the final recommended agenda is responsive to important longer-term trends. Finally, the Foundation has established broad networks of water industry stakeholders to complement and augment its own expertise.

PROJECT PLANNING

Project ideas approved by the BOT are developed into RFPs by PACs and RMs. Once RFPs are approved, they are made public for contractors to review and develop proposals. PACs review the submitted proposals and recommend those best qualified using a proposal rating sheet.

Project contracts contain criteria for the evaluation of results or performance, including project requirements for timeliness, progress reports, quality assurance plan, and budget. Projects funded by the EPA that involve acquisition of environmental data shall provide a QAPP that is compliant with EPA R-5 "EPA Requirements for Quality Assurance Project Plans".

Contracts, quality assurance plans, and other documents as required shall be reviewed and approved or accepted for implementation by the Foundation's authorized personnel prior to beginning of project work. For some cooperative agreements, the QAPP is reviewed and approved by the EPA's Project Officer.

Managing and overseeing individual research projects is the responsibility of RMs with the assistance of PCs and PACs. PACs and RMs review periodic and summary project reports to monitor project performance and progress, communicating with and assisting the contractor on technical aspects of their research as requested.

PACs review and accept the contractors' final research reports prior to release for distribution.

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CHAPTER 9
IMPLEMENTATION OF WORK PROCESSES

Work processes shall be implemented in accordance with plans, policies, and guidelines to ensure that operations proceed as described in Chapter 2. Standard, special, or critical operational processes shall be identified by RMs and PCs. Documents used to control these processes shall be approved and controlled in accordance with guidance found in Chapter 6. Documents with technical requirements are reviewed by qualified personnel prior to being approved for use.

Documents are written in a format that is readily comprehended by users and contain sufficient information and detail to ensure that results are achieved effectively. These documents include:

- The development of RFPs in accordance with the Foundation's guidelines for submitting proposals.

- The review of the selection of proposals in accordance with the Foundation's Proposal Rating Sheet.

- Contracts containing specific direction to contractors regarding quality requirements.

- The development, review, and approval of QAPPs, where required, to ensure project conformance to requirements.

- Project guidelines and checklists for project report format (see Format-Style Guide), for review of draft and final reports, and for electronic media and Web site development.

The implementation of project work processes, their effectiveness, and performance are monitored by RMs, PCs and PAC members in accordance with their duties as described in Chapter 2.

EPA-funded projects shall develop a QAPP where applicable in accordance with the requirements of EPA R-5 "EPA Requirements for Quality Assurance Project Plans". A QAPP is required where "environmental data is acquired, generated or compiled" and the project is funded by the EPA. The RM and PAC shall review QAPPs and provide feedback, where appropriate to the researcher. For some cooperative agreements, the QAPP is reviewed and approved by the EPA's Project Officer.

During implementation of project procedures, the RM can authorize changes or amendments to documents where there is need for an immediate revision and ensure that the change is communicated to PAC members. He or she shall notify the document approver of the change, and take appropriate action and ensure that obsolete or superseded procedures are identified and removed from use. The PC will maintain a current version of the QAPP in the project files

The level of project oversight applied is commensurate with the importance of the particular project and the intended use of the project research results. The Quality Assurance Manager is responsible for monitoring the quality system and in-house work processes as described in Chapter 10 to verify that they conform to documented procedures and are effective in satisfying the goals as described in the Foundation's Business Plan.

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CHAPTER 10
ASSESSMENT AND RESPONSE

GENERAL

Assessment of the Foundation's quality system programs and processes, as well as periodic assessments of selected projects, are planned, scheduled, and conducted in accordance with the following guidance. Assessment findings are documented and their resolution evaluated to measure the effectiveness of the quality system and to determine whether the programs are meeting the goals and mission of the organization. This chapter describes the formal processes and less formal practices that lead to assessments of the Foundation's programs, and the responses to those assessments. Various assessment and surveillance methods are used by the Foundation. Each is designed to meet the specific subject and quality needs for its defined purpose.

PERFORMANCE REVIEWS (TECHNICAL ASSESSMENTS)

The review of project periodic progress reports allows RMs and PACs to ascertain whether projects are on track contractually, technically, and from a quality perspective based on the requirements stated in the QAPP. If an issue or problem is identified, typically the RM begins an investigation, including discussions with the contractor that may lead to conference calls or a site visit with the PAC to get the project back on track. The volunteers on the PAC may use informal communications to help the contractor, but the Foundation maintains the records of formal calls, meetings, and written communications that affect the project scope of work and budget. The intent is to be helpful and interactive, but some projects may require stronger measures.

In these cases, a stop-work order may be issued until technical, quality, or budgetary problems can be resolved. If the problems are insurmountable, the contract may be terminated. Stop-work order and termination clauses are included in the Foundation's standard contract.

During the review of reports, the RM or PAC may determine that changes to the scope of work or budget are necessary. Likewise, the contractor may request a change order, supported by appropriate justification. In either case, the contract may be amended by a change order. The RM may authorize project extensions. Technical changes that amend the scope of work must be acceptable to the PAC.

Once a draft report has been submitted, it is reviewed by the RM and PAC for technical clarity and accuracy. The report is also reviewed for adherence to the Foundation's *Format-Style Guide for Preparing Research Reports*. The report is returned to the contractor for revisions and the review cycle continues until a final report is accepted.

ANNUAL REVIEW AND ASSESSMENT

The Quality Assurance Manager schedules a review and assessment of the quality system each year, usually in the fourth quarter. The assessment evaluates the implementation and effectiveness of quality programs and processes as described in this Quality Management Plan. The Quality Assurance Manager can use the results of independent assessments and project reviews to assist in his evaluation of the quality system. The results of the annual review and assessment are used to identify needed revisions to documents, areas for improvement, and changes in quality goals and objectives. The results are communicated to the Executive Director and other directors as an element of the annual planning activities.

The objectives of the annual review and assessment are to:

- Identify and document problems that affect quality;

- Identify and cite noteworthy practices that may be shared with others to improve the quality of their operations;

- Propose recommendations (if requested) for resolving problems that affect quality;

- Independently confirm implementation and effectiveness of solutions; and

- Provide documented assurance (if requested) to RMs and PCs that, when problems are identified, further work is monitored carefully until the problems are resolved.

Findings of nonconformance to processes or procedures as well as recommendations for improvement shall be documented and forwarded in a timely manner to the appropriate manager or individual for processing. The manager shall determine the corrective action and provide an appropriate response to the Quality Assurance Manager. The Quality Assurance Manager shall track assessments for completion and document findings. He or she shall review responses from the responsible manager to ensure that the issue was fully addressed. The Quality Assurance Manager shall schedule another review at a future date to ensure that the actions stated have been implemented and corrected the original issue.

INDEPENDENT ASSESSMENTS

On an as-needed basis, independent assessments may be performed by individuals other than those immediately responsible for overseeing and/or performing the work. Independent assessments are planned and scheduled as directed by the Quality Assurance Manager based on the status and importance of the project, which is determined by evaluating the intended use of the results and the degree of confidence needed in the quality of the results. These assessments are intended to measure the performance or effectiveness of the QAPP in regard to documented specifications and objectives.

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CHAPTER 11
QUALITY IMPROVEMENT

The Foundation is committed to a quality improvement philosophy. To this end, the Foundation's quality management system was established, including the establishment of critical success factors and evidence of success measures.

The Foundation has dedicated resources to develop, monitor, and continually improve its quality management programs. This quality system is intended to continuously refine and improve the technical and management programs as described in this document.

QUALITY IMPROVEMENT PROCESSES

Quality improvement activities are ongoing and occur at many levels, as required by the activity being undertaken. As such, these activities are incorporated into the daily staff work, whether working with the volunteer bodies and contractors, or working internally on personnel, financial, or administrative issues. Procedures have been established and implemented to prevent, detect, correct, and track problems that may adversely affect quality during all phases of management and research activities. The processing of findings from surveillance, assessment, and review activities are discussed in Chapter 9.

The Foundation conducts internal and external surveys of subscribers and staff to obtain feedback on subscriber needs, research topics and agenda priorities, customer satisfaction, and staff opinions. Results from surveys are used to revise the strategic plan and the annual research agenda as needed, and customer feedback is analyzed and plans developed and implemented based on the findings of the analysis.

To accurately track the Foundation's organizational performance, both metric and performance benchmarks are used. The BOT's Executive Committee annually publishes the "Performance with Respect to Organizational Goals" report which states the yearly accomplishments analyzed according to the strategic planning areas.

ANNUAL REVIEW AND ASSESSMENT

On an annual basis, the Quality Assurance Manager chairs a review and assessment of the Foundation's quality management program, as discussed in Chapter 10. One purpose of the annual review and assessment is to identify areas for improvement and necessary changes in quality goals and objectives.