PRCI Final Report and Software Specification

September 4, 2019

Last Revised by

Gary Choquette

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1 - Final Reports

The primary purpose of final reports is to efficiently and effectively convey knowledge from the researcher(s) who performed the work to the audience. Typically, the audience of final reports are the PRCI operating and associate members but readers can also include the general public and regulatory agencies. It is a best practice, and is highly recommended, that the research contractor meet with the project team after significant research results have been produced but before there is significant development of the draft final report. It is the responsibility of the research contractor to identify the appropriate time in the project schedule for this meeting. At this meeting, the principal investigator, PRCI project team leader, and a representative subset of the project team should:

- Review the research results to date and the associated conclusions,
- Determine the intended audience of the report including:
  - PRCI membership only,
  - Public for sale in addition to PRCI members, and/or
  - Courtesy copies to be provided to related industry organizations, standards bodies, and/or regulatory agencies, and
- Develop an outline for the draft final report.
  - Identify any key points, conclusions, or recommendations that should be included in the report.

What information is to be included and how it is presented in the report will depend on the state of the technology readiness level (TRL) of the research being performed. In general, the content of the report should gravitate more toward how the audience should use and apply the results as the research approaches the higher TRLs. For high TRL reports, the related highly technical content should be excluded from the main body of the report but should be included in an appendix or a companion report; the main body of the report should be used to communicate specific recommendations and/or best practices that an operator should adopt based on the research conclusions.

The report should be technically precise and professional; specifically:

- Superlatives should be eschewed;
- Technical content based on other original work by others should be properly cited;
- Manufacturer’s name and model names or numbers shall not be used in titles or abstract,
- The use of the trademark symbol (™) is not permitted. The first time a trademarked name appears in the body text, it may be footnoted. The footnote will state that it is registered and the name of the owner;

a. Report format

Format must be in US paper format. A margin of at least 25mm (1 in) should be left on all sides of each page. Acceptable font for the normal text is Times New Roman, size 11 single spaced; headers should be larger variations of this style (bolded, italicized, underlined, etc.). Ariel,
Veranda, Tahoma, and Currier fonts styles may be used for other text such as the content of tables and captions. The document should be formatted for a standard paper format of US Letter (8.5” X 11”) with alternate US standard sizes (Legal – 8.5” X 14” and Tabloid – 11” X 17”) allowed for large tables or graphs in landscape and located in the Appendices. Text will be in English and use U.S. customary spelling.

Body text should be in a single column and the text justified with hyphenation turned on. Table text should be left justified for text and right justified for numeric values. Paragraphs should begin without indentations. Generally, only proper nouns should be capitalized.

Sections should be numbered. Subsections should use numbers (preferred, e.g., 1.2.1) or letters (e.g., A.), should be left justified, and use title case (e.g., ‘Value to Members’).

With the exception of the cover page, each page should be numbered. Pages prior to the Executive Summary section should use lower case Roman numerals and subsequent pages should be use numeric values. Use this document as an example. The easiest way to accomplish this is to use a section break in Word as demonstrated in the PRCI Final Report Skeleton example.

The report should NOT include any contractor proprietary header or footer information, including logos.

Working or draft versions of the report should be supplied on Microsoft Word format compatible with the Word 2007 format (docx) and should not contain macros. Final copies of the report should be provided in unsecured (editable) Adobe Acrobat files (PDF files). Files should be named beginning with the catalog number followed by the report title. For example:

PR-017-14321-R01 External Corrosion Impacts at Elevated Temperatures.pdf

The report should have a header section that contains a PRCI identifier and the Catalog number. The footer section should contain the document title and a page number as demonstrated in this document. See Appendix D – Catalog Numbers for details on determining catalog numbers.

To ensure compatibility with SharePoint and other similar document repository applications, special characters are not allowed in the Title and length restrictions apply. See Appendix F – Title Name Restrictions for more details.

b. Graphics

Graphics should be as clear as possible. Original photos, or precisely scanned files should be used to preserve the highest level of quality. File compression should be used for large files. If the graphics are to be used for the Web, use the highest resolution and color density possible within existing online graphics formats (jpg and png). The use of gif files should be avoided because of special licensing requirement for files that use that format. Excel graphs should be pasted into the final report as an enhanced metafile (Paste Special, Picture (Enhanced Metafile).

Graphs can be color but consideration should be given to the possibly the report will be printed in black and white. As such, it is recommended that colored graphs use symbols and/or line styles that would uniquely identify the information when printed in black and white.
Graphics from sources that are predominately text (for example, a table of data from an Excel spreadsheet) should be copied as RTF or HTML rather than in a picture format. This significantly reduces the file size of the document.

All graphics should have a caption added and referenced in a list of figures. Figures should generally be located near the first reference to that figure in the text (i.e., figures should not be located in an appendix). Captions for tables should go above the table, captions for figures should go below the figure.

c. Version Control

Version updates will be noted on the cover page of the report (see the cover page example in Appendix A). A separate revision log spreadsheet will be included with each revision of the document. The spreadsheet will list:

- The applicable document revision number where the change was first implemented
- The section of the document
- The page numbers in the previous version of the document (if applicable) and the page number in the revised document.
- The original content (if applicable)
- The new content
- Why the revision was made
- The date the revision was made
- Who made the revision

A single spreadsheet will be used for all revisions of the document with new revision tracking appended to the bottom of the spreadsheet. An example of the revision spreadsheet is found in Appendix E.

A PRCI project manager may allow alternatives to the revision tracking spreadsheet outlined above such as utilizing the revision tracking capabilities of word processing applications. Requests for alternate tracking methods must be formally approved by the PRCI project manager in advance of their use.

d. Cover Page

The cover page is required to have the following information:

- PRCI logo
- Catalog number (as outlined in Appendix D; NOTE: the –RXX in the catalog number refers to report number, not a revision number)
- Final Report Title (see section See Appendix F – Title Name Restrictions for more details)
- PRCI Research Contract Number
- Author’s Name
- Contractor Name
- Release Date (the date the author(s) made their final revision)
All of the information should fit on a single page. The cover page may also have some contractor specific information necessary to track the work or other contract specific relevant information. Examples include the contractor’s project number, document review/approval number, JIP project number, DOT project number, etc. It should not include contractor logos but in some cases may include the logo of project co-funders.

A sample cover page is included in Appendix A.

e. **PRCI Disclaimer**

Each report shall contain a disclaimer section that is located directly behind the cover page. A sample disclaimer is provided in Appendix B. The disclaimer must be edited to reflect the appropriate contract number, contract number, copyright year, and catalog number.

f. **Project Team**

A separate page following the disclaimer should list the PRCI project team members and their company affiliation. The research contractor is responsible for making sure that project team members wish to include their name in the project team list. The list should include an identification of the project team leader and any special acknowledgments to equipment suppliers and suppliers of in-kind support. The list for the project team should not include any contact information such as phone numbers or email addresses. An example is shown in Appendix C.

Reports should avoid identifying specific host sites by company name or facility name (e.g., Megapipline Station 407). Instead a generic description of the facility should be used (e.g., a large compressor located in northwestern Pennsylvania).

Note that not all reports are suitable to include project team membership. For example, reports that are intended to be used for technical background to support the development or revision of regulations as one example. The Principal Investigator should work closely with the PRCI Program Manager to assess if the project team should or should not be included in the document.

g. **Table of Contents**

The Table of Contents should have major section headings, and subsection headings, listed with page numbers. In addition, all references and appendices must be listed in the Table of Contents. A List of Tables and a List of Figures should follow the Table of Contents if they are used in the document. Note that the Abstract, List of Acronyms, List of Tables and Figures and other headings that are not part of the main body of the report should be excluded from the Table of Contents.

h. **Nomenclature and Abbreviation**

The Table of Contents section should be followed by a nomenclature list if formulas are used in the document. A list of abbreviations/acronyms should follow if the document uses them. If acronyms or abbreviations are used, they should be spelled out on their first use followed by the abbreviation in parentheses. Thereafter in the document, the abbreviation can be used provided it is listed in the table of abbreviations/acronyms. For example:

*The trapped equivalence ratio (TER) was much higher than stoichiometric. The TER was increased until the lean limit of combustion was reached.*
The content of the nomenclature table should be limited to symbols used in equations. The unbordered table should include a column for the associated engineering units. For example:

\[ q_v \quad \text{Volumetric heat flux} \quad BTU/ft^3 \]

### i. Abstract

The report abstract should be located on the first page after the disclaimer. The abstract is used to describe the purpose of the research effort and its potential value. The abstract should not divulge the results or conclusions of the research. It should provide enough detail such that one reading the abstract can determine if they want to read the full report. Generally, the abstract should be no more than 250 words.

### j. Executive Summary

The first full section of the document is the executive summary located directly after the Table of Contents, list of figures, etc. It is a key component of a report. The executive summary is a highly condensed version of the most important information contained in the full document. Many readers may only look at the executive summary when deciding whether or not to read the entire document. Therefore, the executive summary must be a well-written and concise summary that gives readers a substantial understanding of the research conducted and its results and benefits.

The executive summary is the report miniature (1 – 2 pages) and expands on the information presented in the abstract. It includes enough information for readers to become acquainted with the key objectives, results, and benefits of the research conducted without having to read the full document. The executive summary contains a statement of the project goal, necessary background material and information, a description of research conducted, and the major conclusions. An effective executive summary should communicate the main points and benefits of the research conducted without becoming bogged down in details.

It is likely that someone who reads only the executive summary will not have the technical background of the author or other technical experts involved in producing the Final Report. Therefore, detailed technical information, references, and vocabulary should be kept to a minimum.

### k. Introduction

The executive summary is followed by the introduction. The introduction is used to give the history of the research project and an overview of the report. This portion of the report conveys the need for the research, the results of the research, and the benefits of the research.

### l. Value to Members

Projects approved by PRCI’s Board of Directors will have proposed benefits listed in the Ballot Summary Sheet, which may be confirmed or revised by the Project Team subsequent to authorization. The Project Team will convey the proposed benefits to Contractor along with the Scope of Work when finalizing the contract document. Contractor will include a section in the final report entitled Value to Members addressing how the research results support the proposed benefits.
This section should provide guidance to the user on how they would measure the value of applying the research presented in the report. For example, if the research concludes that shorter piping runs are possible, the user may see one-time capital savings for each facility installed using the research through smaller land purchases, smaller buildings, less building heat, etc.

### m. Other Sections

The author can add other sections between the ‘value to members’ and ‘conclusion’ sections as needed to layout and communicate the approach and results of the research. Examples include but are not limited to:

- Literature Review
- Test Protocol
- Data Gathering
- Data Reduction
- Analysis

### n. Recommendations

If there are any follow-up recommended research efforts or specific recommendations to end users, they should be placed in a section preceding the conclusions.

### o. Conclusions

A summary of the conclusions that were developed in the report should follow the recommendations section.

### p. Referenced Publications

List all publications upon which contents of the report are based or which are essential to an understanding of the contents. Referenced publications should be formatted in the style of ISO 690. When referencing a specific publication in the document, a citation should be referenced to the document number in the bibliography with a specific reference to a page number if pertinent. The reference should be between square brackets and subscripted. For example:

*The yield strength was determined per section 3 of ASTM C774 – 88.* [16, p. 37]

### q. Data

While all data necessary to an understanding of a discussion should be included with the text at that point in the report, all data relevant to the report should be placed in an Appendix. If the dataset is too large to include in the report, it should be submitted to PRCI in a suitable electronic format (e.g., Excel, Access, etc.). Data in the report and any electronic formats must clearly identify any relevant engineering units; they may be either US Customary or SI based. In reports, the preference is to use US Customary units followed by SI units in parentheses (e.g., 1000 lbm (453.6 kg). The unit preference should be established with the PRCI project team well in advance of the drafting of the report.
r. **Hard Copies**
Three printed copies of the report as approved in final form shall be sent to the PRCI main offices in care of the project manager.

s. **Other Project Related Documents**
Information submitted in spreadsheet format should be compatible with Excel 2007. No earlier versions will be supported and documents generated using later versions should be saved to Excel 2007 format (.xlsx). If macros are used, the file should be saved as an .xlsxm file.

t. **Equations**
If equations are used, they should be numbered. The best way to achieve this is to create a two-column table without borders. Place the equation in the left cell and the equation number in the right cell. It is recommended that the ‘caption’ function within Word is used for equation numbering. Equation numbers and their corresponding references will be correctly maintained using this feature. A explanation of the variables (that haven’t already been explained should directly follow the equation. Examples:

Unit Utilization (UU) is the percentage that a compressor unit is operating. It is expressed as a percentage of the time the compressor unit is operating online vs. the total time in the measurement period. It is calculated from the equation:

\[
UU = \frac{\text{OperatingTime}}{\text{PeriodTime}} \times 100
\]  

Where

- **Operating-Time** The total unit operating time during the PeriodTime in seconds
- **PeriodTime** The total time in a given period in seconds

Unit availability – gross (UAG) indicates the amount of time a unit was available to run in a given time period. It is expressed as a percentage of the time the compressor unit is operating online (including warm-up and cool-down) or available to run vs. the total time in the measurement period. It is calculated from the equation:

\[
UAG = \frac{\text{PeriodTime} - \text{UnavailableTime}}{\text{PeriodTime}} \times 100
\]  

Where

- **UnavailableTime** The total time a unit is unavailable to operate during the PeriodTime in seconds
u. Video Files

Reports may contain video files to aid the transfer of knowledge with the following restrictions:

- The video must be one of the following formats:
  - Moving Picture Expert Group-4 (.mp4, .mpg, or .mpeg) or
  - Compiled Flash file (.SWF).
- Videos should be directly added to the final pdf document using the instructions: Adding multimedia to PDFs. For a draft final report review, a placeholder should be added to the Word version of the document with a separate file(s) of the video posted to PRIME with the file type ‘Project – Other Final Deliverables’.
- The total file size of the document in .pdf format should be less than 2 Gb.

2 - Software

a. Software Application

The contractor must provide for each software application, a set of elements produced as a result of the software development process including design documentation, source code, source code supporting documentation, compiled code in the form of executables and/or dynamic link library, help system, user manual, installation/setup and testing protocols. Source code for all custom developed dynamic link libraries must be provided upon the completion of the project.

b. Applied Software Technology Requirements

1. In the design of the software application, the Contractor shall use and apply software industry accepted standards and technologies for software application architecture. The proposed architecture must be identified prior to contracting with changes requiring prior approval by PRCI. The intent is to prevent changes to the proposed software architecture without agreement from PRCI. For example, switching from a standalone executable application to a cloud based application.

2. In the development process the Contractor shall use contemporary software programming technology, languages, and development tools which will produce stand alone executables. The programming technology, language, development tools, and third-party components will be identified prior to contracting. A change in the software technology will require prior approval by PRCI. The intent is to ensure that the application has long term support. For example, if the use of third party components may create licensing issues; switching development tools or esoteric languages may limit the ability to provide post production support or enhancements.

3. Software application source code shall be documented, and additional source code supporting documentation shall be provided by the Contractor. Source code supporting documentation should provide additional information such as list of files, third party components information, underlying technology, description of the math models and/or algorithms.

4. The preferred software development application is Microsoft Visual Studio using the languages of C# and/or Visual Basic. The use of other development platforms and/or languages requires prior approval by the PRCI project manager.
(5) The Contractor shall implement version control in the software application for both the (a) source code and (b) executables.

(6) In the design, development and implementation of the software application’s Graphical User Interface (GUI), the Contractor shall ensure that the GUI fully complies with the Microsoft guidelines for GUI design as described in the latest version (applicable to Microsoft Windows 7) of Microsoft Windows User Experience Interaction Guidelines for windows based applications. The design of applications for other platforms will be reviewed and approved by the project team and should follow conventional formats and conventions for the operating platform selected.

(7) The Contractor shall implement type checking, input error prevention, and error handling controls.

(8) The Contractor shall deliver a software application with an integrated Help system developed and based on Microsoft HTML Help Technology or other compatible systems. The Help system should contain all necessary elements and information for the user to properly run the software application. If approved by the PRCI project manager, a comprehensive users' manual may be used instead of an integrated help system.

(9) The Contractor shall provide a Software Application User Manual.

(10) The Contractor shall prepare the software application setup in accordance with Microsoft Installer (MSI) Technology or other current industry-accepted installation procedure for easy deployment and maintenance.

(11) The Contractor shall perform complete testing of the software application prior to submitting the application to PRCI for acceptance. The Contractor must test the software to ensure installation and operation under Windows 7, Windows 8 and Windows 10.

(12) The Contractor shall design and develop a set of benchmark cases that cover all the features and full range of conditions permitted by the software. For each benchmark case, the values of input parameters and expected output from the software should be clearly stated. The benchmark cases shall be fully documented in the supporting documentation.

c. Software Application Deliverables & Acceptance

(1) The Contractor shall deliver to PRCI the software application setup and corresponding user manual of final version with the software testing report form (test plan with test cases and verification that the test cases performed as expected) by posting to the PRCI PRIME site along with the Final Report.

(2) The Contractor shall deliver to PRCI the benchmark cases and demonstrate that the application software passes all the benchmark cases for acceptance.

(3) The Contractor shall deliver to PRCI for the software application source code, configuration project files (.proj, .res, .dll, etc.), and source code supporting documentation such that the application could be recompiled by an independent party.

(4) Should PRCI find any errors or malfunctioning in the software application during the acceptance process, the Contractor shall take immediate corrective action and resubmit the software once the software has been corrected and all the benchmark cases have been tested.

(5) The Contractor shall bear all risks relating to the software application until its final acceptance.
d. Ownership of the Software Application
Ownership and use rights will be as contained in the base contract between PRCI and Contractor.

e. Warranty Obligations
(1) The Contractor confirms the undertaking of all warranty obligations at no additional costs. Under the warranty software application will be kept functional during the warranty period at the level of functionality when initially developed and accepted by PRCI.
(2) The Contractor shall warrant that the software application at time of delivery is of the most recent version and incorporate current versions of software design and tools. Contractor shall further warrant that software application or its elements have no defect arising from design, development, tools or workmanship.
(3) The Contractor will be responsible for correcting/making well any defect in or damage to any part of software application which may appear or occur during the warranty period and which results from faulty workmanship or development of the software application, or any act of omission of developer.
(4) The Contractor will be committed to, at its own cost, correct/make well the defect or damage. If the Contractor is unable or unwilling to make the correction, PRCI will have the right to carry out the work at the expense of the contractor.
(5) The source code delivered by the Contractor will be signed with digital signature as a proof of origin and must be properly documented and packed in the form which will be convenient for PRCI or recipient organization to use for maintenance and further development or upgrade of the software application. If modifications are made to the source code by any other than the Contractor the warranty obligations for the Contractor will expire accordingly.
(6) The warranty shall remain valid for period of 1 (one) year after final acceptance of the software application by PRCI.

f. Software Application Upgrades
The Contractor shall be prepared to upgrade the software application upon request of PRCI, and the Contractor shall be separately remunerated for such additional work under separate agreement with PRCI. If no agreement can be reached between PRCI and the Contractor, PRCI retains the right to use any other software developer for any upgrades or other modifications.

3 - Software User Manuals
Software user manuals will conform to the PRCI report format requirements as applicable. The document will include screen shots and step-by-step instructions to perform key functions.
Appendix A – Sample Report Cover Pages

There are two formats used for the cover page. The first format is the most commonly applied format for PRCI projects. The second format is for consortium of joint industry projects.

Note, this document includes a footer but the actual cover page of a report would have neither a header nor footer.
[ReportTitle]

[PRCIProjectNumber]

Contract [ContractNumber]

Contractor Project Number: [ContractorProjectNumber]

Prepared for the

[PRCITechnicalCommittee]

Of

Pipeline Research Council International, Inc.

Prepared by:

[ContractorName]

Authors:

[PaperAuthor(s)]

Release Date:

[OriginalPublishDate]

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Contract [ContractNumber]

Contractor Project Number: [ContractorProjectNumber]

Prepared for the

The consortium [ConsortiumName]

Managed by

Pipeline Research Council International, Inc.

Prepared by:

[ContractorName]

Authors:

[PaperAuthor(s)]

Release Date:

[OriginalPublishDate]

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CONSORTIUM PROJECT, DISTRIBUTION IS RESTRICTED
Appendix B – Disclaimer

The disclaimer shall be copied into the report exactly as shown below with the information between and including the square brackets ([ ]) replaced with the appropriate information.

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Appendix C – Example Project Team

Below is an example format of the project team members that worked on the project. The list is usually the same as the project team listed in PRIME. The team should be listed in a two-column table that is left justified.

Project Team

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curtis Andersen*</td>
<td>ExTransCanada Pipelines, Ltd.</td>
</tr>
<tr>
<td>Bob Jackson</td>
<td>Urada Pipeline</td>
</tr>
<tr>
<td>Doug Benton</td>
<td>TransGas, Ltd.</td>
</tr>
<tr>
<td>Jeff Becket</td>
<td>Southern Florida Gas Company</td>
</tr>
<tr>
<td>Bill Gibson</td>
<td>Intermountain Natural Gas</td>
</tr>
</tbody>
</table>

*Team leader

Special thanks to Ron Witchburn and John Zygote for their assistance in developing the design assessment list and project related documents.

Acknowledgement

Below is an example of an acknowledgement. If an acknowledgement is included, it should be placed directly before the Referenced Publications section.

Special thanks to Ron Witchburn and Benton Mosfet for their assistance in developing the design assessment list and project related documents. Thanks also goes to Achelve Corp for their loan of specialized test equipment to the project.
Appendix D – Catalog Numbers

The catalog numbers are based on the contract number appended with an R (report), S (software), M (user or software manual), Z (zipped files), or E (other) and a two digit number representing the sequential number of the report issued under that contract. Related work of a different document types would have the same two digit number.

For example, for the second phase of work (and the project had a report that was published under the first phase) for contract PR-212-11200 that includes a report, software, and a software user’s manual would have the following catalog numbers respectively: PR-212-11200-R02, PR-212-11200-S02, and PR-212-11200-M02. If those files are combined into a master zipped file, it would have the catalog number PR-212-11200-Z02.

NOTE: the catalog number remains constant for all revisions of the same document. Specifically, the catalog number does not change from PR-212-11200-R01 to PR-212-11200-R02 for the second revision of the same report.
Appendix E – Report Version Control

Below is an example of a version control tracking spreadsheet. The purpose of the tracker is to allow a simplified method to track where revisions to a specific version of a document occurred. This allows reviewers to verify sections of the report were modified satisfactorily without having to review the entire document. The format used here may be revised if approved by the PRCI project manager to suit the specific needs of a project.

<table>
<thead>
<tr>
<th>Item</th>
<th>By</th>
<th>Document Version</th>
<th>Original Page, Paragraph</th>
<th>Type of Comment</th>
<th>Comment</th>
<th>By</th>
<th>Revision Version</th>
<th>New Page, Paragraph</th>
<th>Revision Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Choquette</td>
<td>Draft 1</td>
<td>1</td>
<td>Conformance</td>
<td>Cover page does not conform to PRCI requirements.</td>
<td>Smith</td>
<td>Draft 2</td>
<td>1</td>
<td>Cover page updated</td>
</tr>
<tr>
<td>2</td>
<td>Choquette</td>
<td>Draft 1</td>
<td>Multiple</td>
<td>Conformance</td>
<td>Catalog number should be PR-027-14201-R01. Missing a 'value to member section'</td>
<td>Smith</td>
<td>Draft 2</td>
<td>Multiple</td>
<td>Updated catalog number</td>
</tr>
<tr>
<td>3</td>
<td>Choquette</td>
<td>Draft 1</td>
<td>3</td>
<td>Conformance</td>
<td>The audit trail should include the original data and edits. If this is implied,</td>
<td>Smith</td>
<td>Draft 2</td>
<td>3</td>
<td>Added a value to member section</td>
</tr>
<tr>
<td>4</td>
<td>Becket</td>
<td>Draft 1</td>
<td>6, 2</td>
<td>Technical</td>
<td>The new approach to define the averaging method for DP, Ps, and Tf as flow dependent linear average in various parts of 1.4 is in direct opposition to Equation 6 which allows flow dependent formulaic averaging under certain conditions.</td>
<td>Jones</td>
<td>Draft 2</td>
<td>6, 3</td>
<td>Added a statement &quot;Original data must be retained and part of the audit package.&quot; Capitalized Coriolis throughout the document</td>
</tr>
<tr>
<td>5</td>
<td>Benton</td>
<td>Draft 1</td>
<td>Multiple</td>
<td>Editorial</td>
<td>Coriolis is a proper name it should be capitalized throughout the document.</td>
<td>Smith</td>
<td>Draft 2</td>
<td>Multiple</td>
<td>Deleted &quot;linear&quot; from all locations that are not specific to determining DPDynamic to include differential pressure, static pressure, and flowing temperature. The reader is also directed to a new Appendix C for a discussion on the acceptable averaging methods.</td>
</tr>
<tr>
<td></td>
<td>Author</td>
<td>Draft</td>
<td>Page</td>
<td>Type</td>
<td>Comment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>---------</td>
<td>-------</td>
<td>------</td>
<td>------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Holbrook</td>
<td>Draft 1</td>
<td>34, 3</td>
<td>Editorial</td>
<td>Hard to understand the last sentence.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Benton</td>
<td>Draft 1</td>
<td>9 &amp; 10</td>
<td>General</td>
<td>For Figure 8 and Figure 9, ISA symbols are being used. Include a reference in section 4.3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Jones Draft 2</td>
<td>Added a simple example to provide more explanation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Jones Draft 3</td>
<td>A new section has been added in 4.3 that includes a cross reference to ISA symbols.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Capitalized Coriolis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Benton</td>
<td>Draft 2</td>
<td>3, 4</td>
<td>Editorial</td>
<td>Coriolis is not capitalized.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Jones Draft 3</td>
<td>Jones Draft 3</td>
<td>Capitalized Coriolis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Jackson</td>
<td>Draft 2</td>
<td>8, 2</td>
<td>Editorial</td>
<td>What are &quot;other approved linear metering standards&quot;? Too vague, needs to be tighten up or de-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Jones Draft 3</td>
<td>Deleted phrase &quot;or other approved linear metering standards.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix F – Title Name Restrictions

The total length of the title may not exceed 90 characters in length. In addition, the following characters cannot be used anywhere in a file name:

- Tilde (~)
- Number sign (#)
- Percent (%)
- Ampersand (&)
- Asterisk (*)
- Braces ({ })
- Backslash (\)
- Colon (:) 
- Angle brackets (< >)
- Question mark (?)
- Slash (/)
- Pipe (|)
- Quotation mark ("")
- The period character consecutively in the middle of a title name (i.e., ..)
- The title cannot begin with an underscore character (_)

- In addition, file names may not end with any of the following strings:
  - .files
  - _files
  - -Dateien
  - _fichiers
  - _bestanden
  - _file
  - _archivos
  - -filer
  - _tiedostot
  - _pliki
  - _soubory
  - _elemei
  - _ficheiros
  - _arquivos
  - _dosyalar
  - _datoteke
  - _fitxers
  - _failid
  - _fails
  - _bylos
  - _fajlovi
  - _fitxategiak
Appendix G – Style Guidelines

**General**
Some helpful references are:

- Technical Writing Guidelines, TechProse
- Purdue Online Writing Lab
- Science & Technical Writing, A Manual of Style

**Abbreviations**

- Typically, abbreviate social titles (Ms., Mr.) and professional titles (Dr., Rev.).

- Follow most abbreviations with a period, except those representing units of measure (“Mar.” for March; “mm” for millimeter).

- Typically, do not abbreviate geographic names and countries in text (i.e., write “Saint Cloud” rather than “St. Cloud”; write “United States” rather than “U.S.”). However, these names are usually abbreviated when presented in “tight text” where space can be at a premium, as in tables and figures.

- Use the ampersand symbol (&) in company names if the companies themselves do so in their literature, but avoid using the symbol as a narrative substitute for the word “and” in the text.

- In text, spell out addresses (Third Avenue; the Chrysler Building) but abbreviate city addresses that are part of street names (Central Street SW).

- Try to avoid opening a sentence with an abbreviation; instead, write the word out.

- When presenting a references page, follow the conventions of abbreviation employed by a journal in your field. To preserve space, many journals commonly use abbreviations, without periods, in their references pages (e.g., “J” for Journal; “Am” for “American”).

**Acronyms**

- For uncommon acronyms infrequently used in the document (e.g., less than three times), consider only writing out the reference and not using the acronym.

- Unless they appear at the end of a sentence, do not follow acronyms with a period.

- Generally, acronyms can be pluralized with the addition of a lowercase “s” (“three URLs”); acronyms can be made possessive with an apostrophe followed by a lowercase “s” (“the DOD’s mandate”).

- As subjects, acronyms should be treated as singulars, even when they stand for plurals; therefore, they require a singular verb (“NIOSH is committed to . . .”).
• Be sure to learn and correctly use acronyms associated with professional organizations or certifications within your field (e.g., ASME for American Society of Mechanical Engineers; PE for professional engineer).

• With few exceptions, present acronyms in full capital letters (FORTRAN; NIOSH). Some acronyms, such as “scuba” and “radar,” are so commonly used that they are not capitalized.

• When an acronym must be preceded by “a” or “an” in a sentence, discern which word to use based on sound rather than the acronym’s meaning. If a soft vowel sound opens the acronym, use “an,” even if the acronym stands for words that open with a hard sound (i.e., “a special boat unit,” but “an SBU”). If the acronym opens with a hard sound, use “a” (“a KC-135 tanker”).

• As a general rule, when writing out the words to be used in an acronym, the words should not be capitalized unless they are proper nouns or trademarked names. For example, ‘American Association of Pipeline Engineers (AAPE)’ is correct but ‘Automated Detonation Detection (ADD)’ is preferred as ‘automated detonation detection (ADD)’.