



Society of Petroleum Engineers

Style Guide

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FOREWORD

The Society of Petroleum Engineers (SPE) produces print and electronic publications and marketing materials that are distributed to engineers and others in the oil and gas industry worldwide. Because SPE disseminates technical information for a worldwide readership, clear writing is essential to enhance the comprehension of SPE publications by readers from a number of geographic areas, nationalities, and language backgrounds.

SPE's rules of style are intended to promote clarity, conciseness, accuracy, and consistency in the society's publications. Guidelines on customary abbreviations, numbering, nomenclatures and reference lists, and punctuation are included in this booklet. The *Chicago Manual of Style*, 16th edition, may also be a helpful reference.

While SPE believes that many others may find the guidance in this document helpful, other publications or applications may have somewhat different needs that require some differences in style. SPE's objective in making this Style Guide available is to help authors and others understand the style that SPE uses in its publications. It is not SPE's intention to try to establish a style that is broadly applicable across the oil and gas industry; rather, the intent is to define how SPE will treat style questions in its own publications.

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SECTION 1: WRITING A GOOD TECHNICAL PAPER

1.1 Use active voice. The use of active rather than passive voice produces clearer, more concise writing.

- ◆ *Passive voice:* An improved method was recommended by the authors.

Results of the five experiments are shown in Fig. 2.

- ◆ *Active voice:* The authors recommended an improved method.

Fig. 2 shows results of the five experiments.

1.2 Minimize the Use of Long, Complex Sentences. Most technical writing experts recommend an average sentence length of approximately 25 words. A mix of long and short sentences and a varied sentence structure are most readable.

1.3 Limit the Use of Abbreviations. Limit the use of abbreviations to those that are used often in the article. Do not abbreviate terms used only once. When an abbreviation is used, spell out the term at the first use and present the abbreviation in parentheses following it; then use only the abbreviation in the rest of the paper or chapter. Spell out the term at its first use each time it is used in a new chapter, then continue use of the abbreviation only. In journal papers and at the author's discretion, an abbreviated term can be spelled out again when it is used as the title of a section, subsection, or as a figure or table caption.

- ◆ *Example:* We analyzed X-ray computed tomography (CT) saturation profiles of waterfloods, oilfloods, and miscible corefloods.

- ◆ *Note:* Rules on the use of abbreviations appear in Section 4, and a list of common oil-industry terms and their abbreviations can be found in Appendix B.

1.4 Write Concisely. Avoid repeating information. Eliminate unnecessary words and flowery language. A short word often is preferable to a longer word or phrase with the same meaning.

1.5 Avoid Jargon. The specialized term used for an object, place, or method in your geographic area or discipline might not be common elsewhere. Use the commonly accepted name or word rather than local industry jargon.

SECTION 2: COMMON ERRORS IN USAGE/GRAMMAR

ability, capacity	Ability is the human power to do; capacity is the power to receive.
about	Do not use as a synonym for approximately ; use that word instead.
albeit	Use though
all of	Except with pronouns, of is unneeded (e.g., “all the drill bits,” but “all of them”).
allow, enable	Allow means “to permit,” whether by letting something happen or by not preventing it from happening. Enable means actively making something happen or giving something the opportunity to happen.
alternate, alternative	Alternate means “one after the other”; alternative means “one or the other.”
among, between	Use among when referring to three or more and between when referring to two (e.g., “between Wells A and B”) or to reciprocal relationships shared by two or more (e.g., “unitization between the operators”).
as	Often imprecise when used as a subordinate conjunction indicating cause. Sometimes used to mean while , when , because , or since ; choose the precise word.
assure, ensure, insure	Assure means “to encourage”; ensure means “to make certain.” Insure should be used when referring to underwriting a loss.

based on	The main noun in a sentence is “ based on ” the subordinate noun contained in the “based on” phrase. <i>Correct:</i> Based on poor results, our decision was to terminate the project. <i>Incorrect:</i> Based on poor results, we decided to terminate the project. (On the basis of should replace based on here.)
below	Do not use as a synonym for less than .
by using	Generally substitute by use of or with .
commence, initiate	Use begin or start .
compare to, compare with	Compare to implies resemblances between essentially different ideas or things; compare with implies contrasts between essentially similar ideas or things. Thus, waterflooding operations compare to gas lift operations; Well 1 production compares with that of Well 2.
complement, compliment	Complement means (1) fill up or make complete; (2) the quantity required to complete something (e.g., the personnel of a ship); or (3) one of two mutually completing parts. Compliment means praise or respect . Complimentary means without cost.
comprise	Means to embrace or to include . The whole comprises its parts. Comprised of is incorrect.
connote, denote	Connote is to imply; denote is to be explicit.
currently, presently	Currently means it is happening now. Presently means it will happen soon.
data	Takes a plural verb. Datum is singular.
different from	One thing differs from another; different than is grammatically incorrect. For example, “Life in the industry was different than he had expected it to be” should be rewritten as “Life in the industry was different from what he had expected it to be.”

dilemma	Does not mean “a problem” but implies a choice between two unattractive alternatives.
domestic	Use the country to indicate the origin, because domestic will differ depending on the location of the reader. For example, use US to designate items of American origin.
dramatic, drastic	Dramatic denotes attention-getting or extreme results, while drastic refers to rapid, violent, or severe actions.
due to	Means because of . Replace with through, because of, caused by, resulting from, or owing to as necessary for clarity of meaning or to avoid overuse.
due to the fact that	Use because .
effect, affect	Effect means result (noun) or to bring about (verb). Affect means to influence .
employed	Use used instead.
etc.	Means and so forth and should be used at the end of a list that makes clear exactly what kinds of other things are implied. Not correct when used at the end of a list introduced by “such as” or “for example.”
fact	Actual fact and true fact are redundant expressions. All facts are true and actual.
farther, further	Use farther when physical distance is implied, further when referring to time, quantity, or expansion.
graph	A graph (noun) is a drawing that exhibits a relationship. Use plotted (verb) when you mean to locate points or figures on a graph.
having	It is better to use with .
hopefully	Do not use as a floating adverb, as in “Hopefully, the results will prove to be positive,” in technical writing.

if, whether	If implies uncertainty; whether implies an alternative.
imply, infer	Something suggested or indicated is implied ; something deduced from evidence is inferred . “A writer implies and a reader infers .”
in order to	Simply use to .
input	Use input as a noun. Replace with enter when used as a verb, as in “entering data into a computer.”
input well	Replace with injection well .
irregardless	Incorrect; use regardless .
knot	A knot is 1 nautical mile (6,076.1 ft or 1852 m) per hour. The expression knots per hour is redundant.
less, fewer	Less refers to quantity, fewer to number. “We used less cement and fewer truckloads.”
majority, minority	Use only when referring to numbers of things, not size.
minimal, minimum	Minimal refers to a small or very slight amount (of <i>minimal</i> interest); minimum references the least quantity assignable (the <i>minimum</i> temperature recorded).
none	Uses singular verb when meaning no one or not one .
on line, online/off line, offline	When something is started up, it is said to be brought on line (two words); when being turned off, it is said to be taken off line (again, two words). In nearly all other instances, online and offline are adjectives used as single words only.
only	Only goes next to the word it modifies. “The standard is based on data from only one source.” The same rule applies to primarily, largely, principally, mainly, partly, and completely .
optimal, optimum	Optimal denotes the best or most effective, while optimum indicates the amount or degree of effectiveness.

over	Use to mean above , across , or beyond the norm . Do not use as a substitute for more than or greater than .
principal, principle	Principal means first or foremost. Principle means a basic truth or determined course of action.
prior to	Use before .
proved, proven	Proved is the past tense of the verb <i>prove</i> , meaning to establish truth or validity. Proven is used as an adjective that is used directly before a noun, meaning verified, as in “a proven talent.” An exception is the phrase “proved reserves” (in which proved is an adjective), which has a long history of usage in the industry and is therefore considered acceptable.
seasons	Seasons of the year are not capitalized except in this construction: “Fall 1980.”
since	Implies passage of time; use because when meaning “the reason for.”
so as to	Use thereby .
subsequent to	Use after .
takes into account	Use accounts for .
that, which	That is the defining or restrictive pronoun; which is the nondefining or nonrestrictive pronoun. “The automobile that is out of gas is in the driveway,” tells which automobile. “The automobile, which is out of gas, is in the driveway,” adds a fact about the only automobile in question.
under way, underway	Two words if referring to something being in motion or in progress. Use the one-word form <i>underway</i> only if describing actions performed while in motion.
unique	Means without equal . There can be no degrees of uniqueness. Thus, almost unique, totally unique, partially unique , etc., are incorrect.

upscale	Use scale up as the verb form.
utilize	Use is preferable.
very	In technical writing, often overused and imprecise: “The results are very significant.” To express how significant the results are, report the <i>p</i> -value.
where, which	<p>Where refers to physical location; which (generally preceded by a preposition) refers to other circumstances, such as condition. Depending on the sentence, the preposition may be different: at which, by which, in which, with which, etc.</p> <p><i>Incorrect:</i> “There have been four studies where the results contradict these findings.”</p> <p><i>Correct:</i> “There have been four studies in which the results contradict these findings.”</p> <p>By convention, “where” is used in mathematical expressions (Example: “Suppose that $a = bq + r$, where $0 \leq r < b$.”)</p>
whose, of which	Use whose when referring to something owned or possessed by a person, company, or living creature. Use of which when referring to something possessed by or pertaining to a nonliving thing, as in, “The experiment, the results of which are widely accepted, has not been duplicated.”

SECTION 3: SPELLING

3.1 General

- 3.1a In the growing vocabulary of the industry, many verb/adverb or verb/preposition combinations are combined into one word. They should be written as two words when used as verbs.

workover well

to work over the well

at breakthrough

water will break through

buildup pressure

pressure can build up

3.1b Certain compounds formed by two nouns should be written as one word when combined to form an adjective.

casinghead gas

the casing head

oilfield problems

an oil field

oilwell tools

the oil well

3.1c With “fracturing” appearing commonly in mass media, many news organizations use the verb “fracking.” However, SPE style uses this only when directly quoting someone else; in all other cases the word “fracturing” is spelled out.

3.1d A number of words in English take the Latin plural form.

analyses

indices

strata

data

appendices

vortices

media

radii

criteria

phenomena

3.1e Preferred spellings of common oil-industry terms, except as noted in Section 3.2, are listed in Appendix A.

3.2 British/US Spellings

- 3.2a US spelling conventions are followed for SPE periodicals, books, and most other materials, with the exception of the *Journal of Canadian Petroleum Technology*, which follows standard spelling conventions for Canada.
- 3.2b Paper titles for all SPE event programs and proceedings follow whichever English spelling convention the author(s) elect(s) to use.
- 3.2c Programs and other promotional materials prepared for events organized by SPE offices in Dubai, Kuala Lumpur, London, and Moscow (most events held in Europe, the Middle East, the Indian subcontinent, Africa, and the Asia Pacific region) follow British spelling conventions.
- 3.2d SPE events organized from the SPE office in Dallas follow US spelling conventions. All program material, regardless of the responsible office, should be consistent throughout.

SECTION 4: ABBREVIATIONS

4.1 General

- 4.1a Use abbreviations sparingly.
- 4.1b Spell out the term at first use, place the abbreviation in parentheses after it, and then use the abbreviation in the remainder of the paper or chapter. For books, make sure to spell out the term at first use in subsequent chapters with the abbreviation in parenthesis after it; then continue use of the abbreviation.
 - ◆ *Note:* In journal papers and at the author’s discretion, an abbreviated term can be spelled out again when it is used as the title of a section, subsection, or as a figure or table caption.
- 4.1c Academic and honorary degrees should be abbreviated without periods or spaces. Adding the word “degree” after the abbreviation is optional.

PhD degree

MS degree

MBA

4.1d Abbreviations of names of societies and government agencies should have no periods or spaces.

SPE	IADC	SPWLA	NPF
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4.1e Use these abbreviations for these major political entities. Unlike other abbreviations, there is no need to spell out the full name of the political entity at first use.

UAE	United Arab Emirates	US or USA*	United States of America
UK	United Kingdom	EU	European Union

* Use USA only when listing a full location (i.e., Austin, Texas, USA).

4.1f Abbreviate units of measurement in the text only when used with numerical values (unless the abbreviation replaces a very long phrase, such as “several scf/D” for “several standard cubic feet per day”). A list of preferred abbreviations for oilfield units appears in Appendix C.

25 ft	50×10 ³ ft ³ /D	10 dm ³	3 cm ³
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- Use the same abbreviation for both singular and plural forms of measurements.

4.1g Abbreviate and capitalize “equation” and “figure” when followed by a number or designating letter. Do not abbreviate “table,” “appendix,” “column,” or “section,” and do not capitalize or abbreviate “page.” Abbreviate and capitalize “number” when it is part of the proper name of a well, but omit the word in other cases. Do not use # as an abbreviation for “number.”

Fig. 6	Eq. 5	Well 5	No. 4
Table 10	Appendix C	page 57	Section 3.1

4.1h With regard to acronyms, leave them all uppercase if they are “true” acronyms, in which each letter stands for an actual word. “False” acronyms are brought into downstyle (i.e., uppercase first letter only).

- ◆ *True Acronym:* BOM—bill of materials
- ◆ *False Acronym:* ANACO—analysis of core logs report

- 4.1i Many programming languages, some software applications, and a few other products have their names trademarked in all capital letters and are exceptions to the “true” acronyms rule; if the name is a trade name, capitalize the entire name—or the indicated portion of it—according to the trademarked style.

BASIC	Macintosh OS
COBOL	QuarkXPress
FORTRAN	UNIX

4.2 Units

- 4.2a Do not add “s” to abbreviated forms of plural units of measure; use the same abbreviation for both singular and plural forms (e.g., 10 bbl, not 10 bbls).

- Add the “s” when the unit is spelled out (e.g., darcy/darcies, day/days, ton/tons, and mile/miles) or when it appears without a number.

◆ *Examples:* The permeabilities of the samples varied widely.

In the experiment, the weight was measured in tons.

- 4.2b Abbreviate units of measurement in the text only when used with numerical values (unless the abbreviation replaces a very long phrase, such as “several scf/D” for “several standard cubic feet per day”).

25 ft 5×10³ ft³/D 10 dm³ 3 cm³

◆ *Note:* Always abbreviate such units in figures and tables.

- 4.2c For units of time, use the customary abbreviations “sec” (second), “min” (minute), “hr” (hour), and “yr” (year). Use the metric abbreviations “s” (second), “min” (minute), “h” (hour), “d” (day) (in metric units only; use “D” with nonmetric units), and “a” (year), **in combined units only**. Otherwise, spell out the term.

42 m/d, *but* 42 days 34 ft/D, *but* 34 days 12 cm/s, *but* 12 seconds

4.2d Use abbreviations instead of ciphers or symbols to represent customary units of measurement.

- ◆ *Examples:* lbm or lbf instead of #
in. instead of ”
ft instead of ’

4.2e Use the degree sign (°) with angles, temperatures [except for metric K (Kelvin)], and compass coordinates.

20° slope 65°F 2°W 30 °API

4.2f Use the slash (/) in place of “per” between two abbreviated units of measurement.

40 psi/ft 15 cm/s 40 lbm/ft

- ◆ *Exceptions:* shots/ft is written thus at first use, followed by (spf) to indicate its abbreviated form in further uses

BLPD, BOPD, BFPD, BWPD are other exceptions that allow the use of P for ‘per.’

4.2g Use the hyphen (-) in customary units and the product dot (·) in metric units to indicate multiplication in combined units.

md-ft md·m B/D-psi m³/d·kPa

4.2h Use “lbm” for pounds mass and “lbf” for pounds force.

4.2i Use cm³, not cc, for cubic centimeter.

4.2j Abbreviations MM for million and M for thousand should be used ONLY with cubic feet to express gas volumes. Avoid the use of MM with such expressions as barrels of oil (MMBO) or barrel of oil equivalent (MMBOE); instead, spell out “million.”

4.2k Refer to Appendix C for the abbreviations for other common oilfield units of measure. Consult the *SPE Metric Standard* for a complete listing of preferred SI units.

4.3 Organizations

The following are abbreviations for some of the organizations that may be mentioned in SPE literature. When these organization names are used often in an article, they should be spelled out at first use, followed by the abbreviation in parentheses, and abbreviated throughout the rest of the article.

American Petroleum Institute	API
American Institute of Mining, Metallurgical, and Petroleum Engineers	AIME
American Association of Petroleum Geologists	AAPG
American Chemical Society	ACS
American Gas Association	AGA
American Geophysical Union	AGU
American Society for Testing and Materials	ASTM
American Society of Civil Engineers	ASCE
American Society of Mechanical Engineers	ASME
American Institute of Chemical Engineers	AIChE
Gas Technology Institute	GTI
International Association of Drilling Contractors	IADC
National Association of Corrosion Engineers	NACE
Petrotechnical Open Software Corporation	POSC
Society of Exploration Geophysicists	SEG
Society for Mining, Metallurgy, and Exploration	SME
Society of Professional Well Log Analysts	SPWLA
The Minerals, Metals, and Materials Society	TMS
US Department of Energy	US DOE
U.S. Geological Survey	USGS

SECTION 5: PUNCTUATION

5.1 Comma

5.1a Do not use commas in dates in the day/month/year format.

◆ *Example:* The project began on 5 June 1994.

- ◆ *Note:* The combination of day, date, and time requires the use of commas, as in Thursday, 31 April 2014, at 6 p.m.

5.1b If the day of the month is not given, do not use a comma to separate the month and the year.

- ◆ *Example:* Waterflooding began in April 1975.

5.1c In a series of three or more elements, use commas between each element and before the final conjunction.

- ◆ *Examples:* ... papers by Rogers, Smith and Sloan, and Greenlee
... the effects of viscosity, flow rate, and porosity

5.1d Use commas to set off states used with locations.

- ◆ *Example:* The director arrived in Bakersfield, California, USA, last week.

5.1e Do not set off “II” and “III” or “Jr.” and “Sr.” with commas.

- ◆ *Example:* Jim Wilson Jr. has gone to Bakersfield this week.

5.1f Use a comma to separate two coordinate adjectives that modify the same noun; however, do not use the comma when the adjectives depend on what follows. The comma is needed when the adjectives are similar in meaning.

- ◆ *Examples:* a dark red dye
a dark red, commercial dye

5.1g Commas are used correctly if they logically can be replaced by “and.”

5.2 Colon

5.2a Use a colon after a complete sentence to introduce a formal list, examples, equations, or an additional statement.

- 5.2b Do not insert a colon between a verb or preposition and its object(s).
- ◆ *Incorrect:* The benefits of this practice were: timeliness and cost savings.
 - ◆ *Correct:* The data were time, volume, and depth.
- 5.2c Use a colon to introduce a long, formal quotation.
- 5.2d Use a colon to express a ratio between numbers; use a slash (/) to express a ratio with words (e.g., area/volume ratio).
- 5.2e Phrases after a colon are capitalized if they are a full sentence. However, if they are part of a list or are an incomplete thought, they are not capitalized.

5.3 Semicolon

- 5.3a Use the semicolon to separate clauses that are not linked by a conjunction and to separate long, involved coordinate clauses.
- ◆ *Example:* Drilling to such depths is rare; much of the technology is experimental and rapidly changing.
- 5.3b Use the semicolon to divide elements in a series when any of the elements contains commas. This is common in paper bylines as well as Acknowledgment sections.
- ◆ *Example:* Section officers are Jim Black, Chairperson; Susan Hall, Program Chairperson; and Bill Williams, Secretary.
- 5.3c Organize material between semicolons around common elements.
- ◆ *Examples:* Committee members are Jim Black, chairperson, and Sam Smith, secretary, Tonka Oil Company; Directors Al Jones, PDQ Drilling Company, and Max Wentworth, Sherman Associates; and Joe Johnson, vice chair, Texas Tools.
 - ◆ *Exception:* The order of authors listed on a paper is important; it reflects their level of contribution to the paper. As a result, authors should never be reordered or grouped to simplify company lists.

5.3d Use the semicolon before conjunctive adverbs such as “therefore,” “however,” “thus,” “moreover,” and “consequently.”

◆ *Example:* The first test failed; consequently, we ran another.

◆ *Exception:* “Whereas” should be preceded by a comma, never a semicolon.

5.4 Apostrophe

5.4a Apostrophes should be consistently typeset in curly form, not straight and vertical or slanted like an accent.

◆ *Exception:* For use on websites, apostrophes are used in straight form.

5.4b Use the possessive form for informal measures involving time, space, and quantity.

a day’s work a dime’s worth a yard’s length

5.4c Use the apostrophe alone to form the possessive of a plural noun ending in “s.” Use ’s to form the possessive of words not ending in “s.”

the producer’s output the wells’ total production

5.4d **DO NOT** use an apostrophe when forming the plural of figures, letters, years, abbreviations, etc.

the 1920s all As BHAs

5.4e Use ’s when forming the possessive of an abbreviated word.

◆ *Examples:* The US DOE’s latest study is a revealing one.

Total-ELF’s well in the area has enjoyed great productivity.

5.4f When forming the possessive of compounds, the last part of the compound takes the possessive form.

◆ *Example:* the equation of state’s derivation

5.4g For words showing joint possession, only the last in the succession takes the possessive.

◆ *Example:* Smith and Jones' paper

5.4h Individual possession is indicated by forming the possessive of each word in the group.

◆ *Example:* Smith's, Johnson's, and Jones' papers

5.5 Parentheses

5.5a Use parentheses to set off phrases that start with i.e. or e.g.

◆ *Example:* When identifying members of a particular discipline (e.g., reservoir management, geology, completions)...

5.5b Use brackets [] around a parenthetical phrase already containing parentheses.

◆ *Example:* The difference was small [compared with the earlier study by Adams (1976)].

5.6 Quotation Marks

5.6a Quotation marks should be consistently typeset in curly form (e.g., “like this”).

◆ *Exception:* on websites, quotations are used in straight form.

5.6b In general, use quotation marks to cite exact phraseology from another source, and to set off titles when italics are not used.

5.6c Use quotation marks at the opening of each paragraph and at the close of the final paragraph of a long quotation. If the quotation is to be set in contrasting type or to be indented from the rest of the copy, do not use the quotation marks.

5.6d Set commas and periods inside quotation marks. Other punctuation marks go inside the quotation marks only if they belong to the material quoted.

5.7 Dashes

- 5.7a There are several kinds of dashes, differing from one another according to length. The main ones are the en and em dashes. The en dash is half the length of an em dash and longer than a hyphen:

Em dash: —

En dash: –

Hyphen: -

- ◆ *Note:* In titles, colons are preferred in place of em dashes.

- 5.7b The most commonly used dash is the em dash, which is used to denote a sudden break in thought that causes an abrupt change in sentence structure; a pair of em dashes often sets such an intrusive item apart from the sentence parenthetically.

- ◆ *Examples:* Water and gas are consumed, forming a crystalline cage—resembling ice—in which gas molecules become trapped.

In several areas—especially where access to well disposal is controlled—water reuse is considered to have several advantages.

- 5.7c An em dash also is inserted in the caption of a figure after its designation.

Fig. 1—Cutaway drawing of a well. Table 1—Field Properties

- 5.7d The principal use of the en dash is to indicate continuing or inclusive numbers, such as in dates, times, or references.

1968–72

10 a.m.–5 p.m.

0900–1300

May–June 1967

pp. 38–45

0230–0500

3–5 March 2002

13 May 1965–9 June 1966

5.7e Do not mix the use of the en dash in this manner with words, such as “between/and” or “from/to,” in expressing a range.

- ◆ *Correct:* ...from 1968 to 1972...; ...1968–72...
- ◆ *Incorrect:* ...from 1968–72...; ...between 1968–72...
- ◆ *Correct:* ...between 10 a.m. and 5 p.m....; ...from 1000 to 1700....;
...10 a.m.–5 p.m....; 1300–1630
- ◆ *Incorrect:* ...from 10 a.m.–5 p.m.; ...from 1400–1800...

5.7f When the concluding date of an expression denoting a duration of time is in the unforeseeable future, the en dash is still used.

- ◆ *Example:* North Texas area wells contributing information to the ongoing study include Crumley B-213 (1979–), McConnell C-124 (1979–1992), West B-246 (1979–), and Bruce A-317 (1979–1983).

5.8 Hyphenation

5.8a Do not use hyphens to express a range of figures. Instead, use the complete idiom except with dates, page numbers, and addresses.

from 20 to 30% NOT from 20–30%

5.8b Hyphenation With Prefixes.

- Hyphens normally are not needed after ordinary prefixes.

coeducation	hydroelectric	electrochemical	interconnection
Midwestern	quasilegal	pseudosteady	multiphase
nonlinear	repressured	subsea	prestimulation
semilog	ultradeep	updip	

- Use a hyphen after a prefix when a vowel is doubled (exceptions are cooperate, coordinate, isooctane, and microorganism).

re-elect pre-eminent semi-insoluble

- Use a hyphen when the prefix precedes a proper name.

non-Newtonian post-Ordovician

- Use a hyphen after any prefix if omitting it will convey the wrong meaning or create ambiguity.

re-cover vs. recover re-treat vs. retreat

re-form vs. reform

- Hyphenate the following titles:

president-elect vice-chairman vice-consul

vice-presidential co-owner co-chair

DO NOT hyphenate vice president or president pro tempore.

- 5.8c Hyphenate compound customary units of measurement.

acre-ft md-ft

- 5.8d Hyphenate expressions such as “*n*-pentane.” However, do not hyphenate ordinary chemical combinations used as modifiers or chemical names with prefixes.

a sodium chloride solution hydroxyacetic acid

- 5.8e Do not use a hyphen between words to take the place of “and” or “or.” Instead, use a slash.

oil/water interface pressure/time plot

pressure/volume/temperature data section/chapter news

5.8f Hyphenate fractions that are spelled out.

one-half three-fourths one and three-quarters

5.8g Hyphenate numbers twenty-one through ninety-nine when written as text.

thirty-third forty-two one hundred twenty-five

5.8h Use hyphens to avoid ambiguity.

◆ *Examples:* the lower-production interval (interval producing a lower
production than other intervals)

the lower production interval (interval of production that is
physically lower than others)

5.8i Use a hyphen when two or more words in their combined sense modify a noun.

around-the-clock watch all-time record in-situ combustion

five-spot flood oil-in-place calculations gas-cap material

stock-tank oil straight-line portions restored-state cores

trial-and-error method 6-in. hole second-order equation

clay-containing fluid rule-of-thumb method steady-state flow

cross-sectional area peer-reviewed paper

5.8j When such terms follow the word modified, they do not ordinarily require hyphens.

the well is shut in

combustion occurred in situ

barrels of oil in place

fluid containing clay

5.8k When a unit of measurement comes before a noun, if it is preceded by an article, it should be hyphenated; if there is no article, there should be no hyphen.

It is a 75-lbm drill bit.

It is set at 75 ft true vertical depth.

5.8l Adjective phrases formed by an adverb and a verb are usually hyphenated

a slow-moving front

the quick-drying cement

5.8m Adverb/adjective combinations in which the adverb ends in “-ly” are not hyphenated.

regularly producing well

fully developed field

5.8n Some other combinations do not take hyphens.

relative permeability

capillary pressure

gamma ray

5.8o Use the suspended (“floating”) hyphen for relating similar qualities.

◆ *Example:* The pressure- and temperature-dependent characteristics must be established.

5.8p “Fold” is a joined suffix unless formed with a hyphenated number or numeral.

twofold

100-fold

Twenty-five-fold

5.8q Hyphenate compound directions when they are used to form one direction. Use a slash to represent “to” in a direction.

◆ *Examples:* The wind blew from the north-northwest.

The fault ran northwest/northeast.

- 5.8r Only break words and hyphenate them at the ends of the lines of right-margin-justified copy. Ragged-right-margin copy should not have word breaks.

5.9 Ampersands

- 5.9a Ampersands, which substitute for “and,” are not permitted in most instances. Exceptions include some abbreviations (such as E&P, R&D, and BS&W), as well as preservation of the ampersand where it appears in trade names and publication titles.

◆ *Examples:* *SPE Res Eval & Eng*

SPE Drilling & Completion

Health, Safety, Security, Environment & Social Responsibility
discipline area

- 5.9b Avoid using ampersands in the titles of SPE events.

5.10 Web-Related Items

- 5.10a Most uses of the prefix “e” to denote computerized or electronic form are hyphenated and lowercase, such as in e-business and e-commerce.

◆ *Exceptions:* email, ebook

- 5.10b The e-prefix is not capitalized, even in a title or at the beginning of a sentence, unless it is part of copy that is already in all capital letters.

◆ *Examples:* A Closer Look at e-Commerce

e-business is looking better all the time.

WELCOME TO THE E-ZONE!

- 5.10c The e-prefix is not hyphenated in the use of a trademarked name with this as its style.

- 5.10d Web addresses are formatted in plain typeface, with no hyperlink (i.e., no underline or special color), and followed by a period if the Web address ends the sentence.

- ◆ *Example:* You can find the site by searching for it at <http://www.webcrawler.com>.
- ◆ *Exception:* Digital object identifiers (DOIs) are formatted with the full URL according to guidelines issued by CrossRef for the use of DOIs. <http://dx.doi.org/10.2118/114172-MS>

SECTION 6: NAMES

6.1 People, Personal Titles, Degrees

- 6.1a When possible, write a person’s name as that person writes it. Particularly observe preferences in the use of initials or given name, spelling of “Mc” and “Mac,” and capitalization of prefixes such as “de,” “da,” “du,” “le,” “van,” and “von.” When personal preferences cannot be determined, use two or more initials or, if only one given name is available, spell out the first name and capitalize all prefixes except “von” and “de.”

William L. Strong

W. L. Strong

William L. (Skipper) Strong

Skipper Strong

- 6.1b Capitalization and hyphenation of elements in Arabic names vary, and so should be presented according to the preference of the author or speaker. When personal preferences cannot be determined, join the Arabic definite articles *al* and *el* with a hyphen when the name is given in full (e.g., Rasheed al-Maraj). When the full name is not used, the definite article should have an initial capital and a hyphen (e.g., Al-Maraj). Elements such as *Bin*, *Ben*, *Ibn*, and *Abu* should always be presented with an initial capital (e.g., Saleh Ibn Tariq al-Fulan).

- 6.1c Do not use the titles Mr., Mrs., Ms., Miss, Prof., or Dr. Occasionally, cultural norms will dictate the use of an honorific.

- 6.1d Do not use commas to set off “II,” “III,” “Jr.,” or “Sr.” in names.

- ◆ *Example:* Jim Wilson Jr. arrived on-site last week.

- 6.1e When an author or speaker’s nickname is used, it should be enclosed in parentheses at the first reference.

◆ *Example:* W. T. (Bud) Parker

6.1f In running text, capitalize and spell out formal titles such as president, chairman, or vice president when they precede a name and “the” or “a” is not used. All titles appearing after the person’s name should be lowercase. In program listings and headings, capitalize major words in titles, department names, etc.

◆ *Examples:* The events will be hosted by President Jane Smith.

Events are hosted by the president of Acme, Jane Smith.

Giovanni Paccaloni, who served as 2005 SPE president, is being honored with an award.

Giovanni Paccaloni, 2005 SPE President

6.1g Abbreviate academic and honorary degrees without periods or spaces. Use of the word “degree” is optional.

PhD

MA

LLB degree

6.1h Do not capitalize academic degrees when spelled out. Do not capitalize a field of study such as physics or petroleum engineering.

bachelor’s degree

BS in physics

6.1i Capitalize honorary membership titles and other SPE honors, awards, and distinctions.

SPE Distinguished Service Medal

SPE Honorary Member

6.1j In reference lists and in technical program listings of papers and authors, use the author’s initials instead of his/her given name and spell out his/her family name. Make sure spaces are used between an author’s initials.

M. B. Shelley

G. B. L. Jones

G. Elliot

J. -P. Smith (in the instance of Jean-Paul Smith)

6.1k Authors' names should be printed in bold in the author credits (byline) at first use, in regular type afterward.

6.11 Do not capitalize the names of devices, methods, theories, techniques, systems, or laws (except for proper names that are included).

Darcy's law

Cartesian coordinates

Muskat method

Laplace transform

pendant-drop method

Stokes' law

6.2 Companies, Organizations

6.2a Capitalize names of regions, sections, chapters, committees, and other units of SPE when written in full. Do not capitalize the general term when used alone or in the plural form.

Permian Basin Section

the section

SPE Board of Directors

the board meeting

6.2b Capitalize names of companies, institutes, foundations, colleges, universities, associations, etc., but do not capitalize the general term when used alone or in the plural form except in cases covered under Section 6.2.d.

Faraday Society

society goals

25-Year Club members

6.2c Capitalize the official names of departments, districts, divisions, and similar major subdivisions of companies, organizations, or universities. Do not capitalize the general term when alone or plural.

Department of Petroleum Engineering API Production Division
the Geosciences and Chemistry departments the Monograph and Books committees

6.2d Capitalize all letters in company names only if they are true acronyms, with each letter standing for a single word, or if the company name is registered/trademarked as such.

THUMS Texaco, Humble, Union, Mobil, and Standard

Aramco Saudi American Oil Company

6.2e Capitalize names of specific national and state legislative, executive, and judicial bodies.

US Supreme Court UK Parliament

6.2f Capitalize official names of organizations but not general terms.

US Navy the navy

6.2g Do not capitalize such words as national, federal, government, and state in nonspecific or incomplete references.

federal bureau government agencies state bureaus Nigerian government

6.2h If you abbreviate names of societies and government agencies, use no periods or spaces.

SPE NPF AAPG API UKOOA IATMI

6.3 Geographic

6.3a Most names of cities should be followed by the state and country or the country in which they are located. The major oil industry centers and well-known cities listed here can be used alone.

Aberdeen	Abu Dhabi	Amsterdam	Anchorage
Athens	Beijing	Berlin	Buenos Aires
Cairo	Calcutta	Calgary	Caracas
Chicago	Dallas	Denver	Doha
Dubai	Hong Kong	Houston	Jakarta
Kuala Lumpur	Lagos	London	Los Angeles
Mexico City	Moscow	Mumbai	New Orleans
New York City	Paris	Rio de Janeiro	Riyadh
Rome	San Francisco	Shanghai	Singapore
Stavanger	Sydney	The Hague	Tokyo
Tulsa	Washington, DC		

6.3b When providing locations in the US that are not listed in Section 6.3a, give the city, state (unabbreviated), USA. For locations outside the US and not listed in Section 6.3a, give the city and the country. Once a location has been established in an article or a program, the city can be referred to without the state or country.

- ◆ *Example:* The 1997 SPE Annual Technical Conference and Exhibition will be in San Antonio, Texas, USA, 5–8 October.

6.3c Capitalize such words as river, ocean, valley, etc., and geographic locations when they represent worldwide accepted usage, real properties, or legal entities.

Pacific Ocean	Gulf of Mexico	Glasscock Unit	North Sea
---------------	----------------	----------------	-----------

Middle East

Loire Valley

Platform B

- 6.3d Do not capitalize terms that refer to a compass direction or general location unless it is the name of a specific recognized region or section.

central Illinois

western Texas

midcontinent area

Central America

Northern California

Mid-Continent Section

- 6.3e Do not capitalize geologic formations, such as belt, formation, zone, field, pay, basin, pool, reservoir, delta, sand, shale, and trend when the term is being used descriptively. Do capitalize the term if the term is being used as part of a proper name or if the formation is well-known.

the Arbuckle zone

Cardium A pool

an east Texas field

the Delaware basin

Permian Basin

Overthrust Belt

Barnett Shale

Wattenberg Field

- 6.3f Capitalize geologic ages (e.g., “Mesozoic”), including leading adjectives (e.g., Upper Jurassic).

- 6.3g Always capitalize the word “the” in The Hague, but only capitalize the word “the” in The Netherlands when referring to it in relation to a city name, as in an address.

♦ *Examples:* The conference will be held in The Hague, The Netherlands.

We visited the Netherlands on our vacation.

- 6.3h Always capitalize the word “the” in official names of institutions [e.g., The Woodlands Marriott Hotel], but otherwise do not capitalize the article “the” when it does not begin a sentence and refers to an academic institution.

♦ *Correct:* The University of Texas enjoys a sizeable endowment.

♦ *Incorrect:* The author is a member of the faculty at The University of Tulsa.

6.4 Event Names

6.4a The official names of SPE events are listed in the SPE Long-Range Calendar. SPE events should be referred to by the name that appears in the events calendar. Colons are preferred in place of em dashes in official event names.

6.4b The number of the event should not be considered part of the official event name for SPE events and conferences.

- ◆ *Correct:* the 2010 SPE Annual Technical Conference and Exhibition
- ◆ *Incorrect:* the 2010 SPE 85th Annual Technical Conference and Exhibition
- ◆ *Note:* This applies only to SPE events and conferences. Other organizations may have different preferences regarding event names.

6.4c Do not abbreviate any portion of the name of an SPE event when used in a technical paper. If using the full name is awkward because of its length, rewrite the sentence or use a generic term, such as “the conference.” The Offshore Technology Conference may be referred to as OTC, and the SPE Annual Technical Conference and Exhibition may be referred to as ATCE.

6.4d Capitalization of event names and themes should follow capitalization rules for titles (see Section 8.2). Any SPE product, service, or event should be capitalized when preceded by SPE. Colons are preferred in place of em dashes in official event names.

- ◆ *Note:* “The” (not capitalized unless at the beginning of a sentence) should precede PetroBowl when PetroBowl is used as an adjective (e.g., The PetroBowlSM contest...). “The” may be eliminated when PetroBowl is used as a noun (e.g., PetroBowl XII will be hosted in Nova Scotia).

6.5 Trademarks

6.5a Avoid using third-party trademarks (whether registered or not) to describe something presented in an article, paper, or chapter. Instead, use a generic term when available (e.g., tempered-glass plate vs. Pyrex® plate). If use of a third-party trademark is unavoidable, capitalize the trademark, include the appropriate symbol (®, TM, or SM) at the end of the trademark at its first use, and acknowledge the ownership of the trademark in a reference

or as a parenthetical insertion. Repeated use of the trademark symbol in the same article, paper, or chapter is not necessary, although it should be repeated at first use in each subsequent chapter.

6.5b When using an SPE trademark, use the appropriate symbol (®, ™, or ™) at the end of the trademark at its first or most-prominent location, and then repeat use of the symbol a reasonable number of times throughout the publication, depending on the length of the publication.

◆ Note: The trademarked term “energy4me” is lowercased when used mid-sentence (e.g., The energy4me® workshop features...).

6.5c Trademarks are adjectives and should always be followed by the generic term (i.e., *Oil and Gas Facilities*® magazine). Avoid using trademarks as nouns or verbs, and do not use them in the plural or possessive.

SECTION 7: NUMBERS

7.1 General

7.1a Large, rounded numbers should be written with the words “million” and “billion” or expressed in powers of 10 notation, with the number before the × greater than 0 and less than 10. Spell out the preceding numerals if nine or less, except with sums of money or units of measurement (hours, days, months, years, and other units of time are considered units of measurement). Never use “billion,” “trillion,” etc., with SI metric units.

40 million six million consumers $8 \times 10^6 \text{ m}^3/\text{d}$ USD 4 million

7.1b Do not use commas in numbers in dates, pages, and addresses. Numbers of more than three digits used with customary (i.e., not SI metric) and nondimensional units use the comma.

456,789 bbl 2,956 ft October 1997

Page 1171 1600 Pennsylvania Ave.

- 7.1c Do not use the comma with SI metric units. Use a space instead; four-digit numbers followed by SI metric units require no space.

4 720 525 m³ 1525 m

- 7.1d Use the suspended hyphen when expressing a numerical series of dimensions.

- ◆ *Examples:* The 3-, 5-, and 7-in. wellbores ...

 A 25- to 50-lbm/bbl mud ... (Not “A 25–50-lbm/bbl mud ...”)

- 7.1e Ratios are punctuated with a colon when using numbers, with a slash when using words.

60:20 area/volume

7.2 Dates and Times

- 7.2a Use numerals, not words, to express times and dates (exceptions are noon, midnight, and names of days and months). Do not use commas in dates in the date/month/year format (see Section 5.1.1).

- ◆ *Examples:* 6 p.m. (not six p.m.)

 The startup date was 5 June 1977.

- If the day of the month is not given, do not use a comma to separate the month and the year.

- ◆ *Example:* Waterflooding began in April 1975.

- 7.2b SPE uses the 24-hour clock for its events, including all major events (ATCE, OTC, IPTC, Offshore Europe, and the Drilling Conference). When using the 24-hour clock, colons are not used (e.g., *1400 hours*). Exceptions are determined on a case-by-case basis and include regional events where the 12-hour clock is customary to the regional attendees. Include “hours” after the time in text, but not in a listing of times, such as a schedule of events.

- ◆ *Examples:* The course begins at 0800 hours.

- 7.2c Write 12-hour time with lower-case letters and periods. Provide the digits for minutes only when necessary.

10 a.m.

3:37 p.m.

- 7.2d Use “noon” and “midnight” rather than 12 p.m. or 12 a.m. Do not use “12 noon” or “12 midnight.”

- 7.2e Time ranges should include a.m. and p.m. for both ends only if an event begins in one and ends in the other. If the event is contained entirely in morning or afternoon, only the second time carries the designation of it.

from 10 a.m. to 2 p.m.

11 a.m.–6 p.m.

10–11 a.m.

from 2 to 6 p.m.

8 a.m.–noon

7.3 Phone Numbers

Use country codes with all phone numbers. The country code for the US and Canada is 1. Use periods rather than hyphens, parentheses, or slashes to separate parts of phone numbers.

1.972.952.9393

44.171.487.4250

1.800.555.1212

7.4 Units of Measure

- 7.4a Use the slash (/) in place of “per” between two abbreviated units of measurement with the exceptions BOPD, BFPD, BLPD, BWPD.

40 psi/ft

15 cm/s

40 lbm/ft

20/40-mesh sand

- 7.4b Use the degree sign (°) with angles, temperatures [except metric K (Kelvin)], and compass coordinates.

20° slope

65°F

2°W

- 7.4c Abbreviate units of measurement in the text only when used with numerical values (unless the abbreviation replaces a very long phrase, such as “several scf/D” for “several

standard cubic feet per day”). A list of preferred abbreviations for common oilfield units appears in Appendix C.

25 ft 50 million ft³/D 10 dm³ 3 cm³

7.4d Use the singular abbreviation for both singular and plural forms of measurements. If not abbreviated, use plural if appropriate.

7.4e Use only customary (i.e., English system) units or only SI units; do not mix.

◆ *Exception:* Pipe sizes always can be expressed in inches, even if the rest of the text uses metric units.

7.4f Percentages are expressed with the percent symbol (%) and are abbreviated as follows.

25% 12 mass% 21 vol% 17 mol% 13 wt%

7.5 Whole Numbers

7.5a In general, spell out “zero” and whole numbers from one through nine; use figures for 10 or more.

one two three 10 101
first second third 10th 101st

7.5b Use figures if the number expresses a unit of measurement or ratio.

1% 6 km 3 in. 6m 2:1 20°C

7.5c Use figures for dates, street addresses, currency, and times of day.

USD 3 USD 0.27 2 p.m. 55 Park Avenue

7.5d Use figures for numbers when grouping similar things if any of the numbers are greater than 10.

contains 4 to 16 pages

contains four to six pages

7.5e In general, avoid Roman numerals. Use Arabic numbers to designate tables, figures, and equations.

7.5f Spell out the first term to distinguish between two numbers that come together.

twenty-one 2-acre tracts

two 3-hour tests

7.5g Spell out numbers that begin a sentence. If the numbers are so large that the sentence becomes awkward, rewrite the sentence.

◆ *Examples:* Ten wells are producers; 13 are dry holes.

Twenty-five of these wells have been shut in.

Four-in. pipe was set.

7.5h When using the number “1” or the word “one” in text can lead to confusion, “1.0” or the term “unity” may be substituted (e.g., “for mobility ratios other than unity”).

7.5i Use a capital “X” to indicate magnification: 500X.

7.6 Fractions

7.6a Spell out common fractions when they are used alone in the text. Use figures when the fraction is combined with a whole number or when it is used with a unit of measurement. Common fractions do not exist in the SI metric system; use decimal notation instead.

2¼ pages

½-in. tubing

3.25 kg

one-half the normal time

7.6b When writing decimal fractions, place a zero before the decimal point (0.5, not .5).

7.7 Currency

7.7a When expressing currencies, select the appropriate three-letter abbreviation from the current list of ISO currency abbreviations (*ISO 4217:2008, Codes for the representation of currencies and funds*) for the first usage, and omit the currency symbol (\$, £, ¥). If

currencies alternate repeatedly (i.e., if there is more than one switch) within a paper or document, use the abbreviation at each instance of a currency. However, if a currency will be used often and/or consistently throughout a form or other document, an asterisked footnote noting the type of currency used (e.g., “Prices are in US dollars.”) is sufficient.

USD 50.25 CAD 90.50 JPY 500 GBP 50 EUR 10.50

7.7b In text, drop unnecessary zeroes from currencies. For example, write “USD 10” rather than “USD 10.00.” Retain the two decimals in a column of currencies only if one or more of the prices listed requires them.

12	USD 55.50	12.00
18	USD 50.00	13.43
11	USD 35.25	12.00

7.8 Dimensions

7.8a The designations three-dimensional, four-dimensional, etc., are generally written as 3D, 4D, etc.

7.8b When physical dimensions are written out, they are expressed in numerals, and a multiplication symbol appears between the dimensions without any additional spacing. The unit is specified afterward normally.

◆ *Example:* Each cell is 84×84×5 ft.

SECTION 8: ELEMENTS OF TECHNICAL PAPERS

8.1 Checklist of Items

All technical papers will have some, if not all, of the following elements.

- Title
- Byline
- Body
- Nomenclature
- Acknowledgments

- References
- Appendices
- SI Conversion Factors
- Author Biographies
- Figures
- Tables

8.2 Titles and Headings

8.2a In titles and headings for books, articles, lectures, etc., capitalize nouns, pronouns, adverbs, and all other words of four or more letters. Also capitalize “no,” “nor,” “off,” “out,” “so,” and “up.” Capitalize words of fewer than four letters if they are a verb or part of or closely connected to a verb.

Held Up To Inject Can Be Produced

8.2b Capitalize both parts of a compound adjective.

Two-Phase In-Situ Full-Sized

8.2c Use a colon (preferred) or an em dash, rather than a comma, to set off part of the title; capitalize the first word after the em dash or colon, and then capitalize normally as for titles generally.

- ◆ *Examples:* Corrosive Service: A Study in Economics

 Horizontal Drilling—New Horizons

8.3 Bylines

8.3a Author names on technical papers should include the name of each author, followed by his/her company affiliation. While SPE prefers the use of initials in the byline, authors can elect to use full names instead.

- ◆ *Example:* **J. B. Brown**, Consolidated Flange; **P. D. Smith**, Smith
 Consulting; and **E. L. White**, Worldwide Washers

8.3b If two or more authors in a row have the same company affiliation, it should not be repeated after each name.

◆ *Example:* **J. B. Brown**, Consolidated Flange; **P. D. Smith**, Smith Consulting; and **E. L. White** and **P. Lane**, Worldwide Washers

- Do not rearrange the names of authors in order to simplify or shorten a paper's author line. The order of authors as listed in a technical paper is important and should not be changed to simplify company references.

◆ *Example:* **J. B. Brown**, Consolidated Flange; **P. D. Smith**, Smith Consulting; **E. L. White**, Worldwide Washers; and **P. Lane**, Consolidated Flange

8.3c If an author's company affiliation changes during or after the writing of a paper, the affiliation held during the writing of the paper should be listed after the author name with the new affiliation following as a numbered footnote.

◆ *Example:* **Penny Lane**¹, Worldwide Washers
 ¹ now with Consolidated Flange

8.3d Corporate suffixes should be included in author bylines, as well as bios, if they are provided. The following is a list of common abbreviations for these suffixes.

A.B.	Aktiebolag (Finland, Sweden)
A.G.	Aktiengesellschaft (Austria, Germany, Switzerland)
A/L	Andelslag (Norway)
A/S	Aksjeselskap (Denmark, Norway)
Bpk.	Beperk (South Africa)
B.V.	Besloten Vennootschap met beperkte, Anasprakelijkheid (The Netherlands)
C.A.	Compañía Anónima (Venezuela)
Cia.	Companhia/Compañía (Brazil, Portugal, Spain, Latin America)
Cie.	Compagnie (Belgium, France, Luxembourg)
Co.	Company
Corp.	Corporation
CRL	Compañía de Responsabilidad Limitada (Spain)

C.V.	Commanditaire Vennootschap (The Netherlands)
Edms. Bpk.	Eiendoms Beperk (South Africa)
Ets.	Etablissements(s) (Belgium, France, Luxembourg)
Ges.	Gesellschaft (Austria, Germany, Switzerland)
GmbH	Gesellschaft mit Beschränkter Haftung (Austria, Germany, Switzerland)
H.B.	Handelsbolag (Sweden)
Inc.	Incorporated (US)
I/S	Interessentselskab (Denmark, Norway)
K.B.	Kommanditbolag (Sweden)
K.G.	Kommanditgesellschaft (Austria, Germany, Switzerland)
K.K.	Kabushiki Kaisha (Japan)
K/S	Kommandittselsap (Denmark, Norway)
LLC	Limited Liability Company (Middle East)
Ltd.	Limited (Ireland, Pakistan, South Africa, UK, US, Zimbabwe)
Ltda.	Limitada (Brazil, Portugal, Spain)
Ltee.	Limitee (Canada)
mbH	mit beschränkter Haftung (Austria, Germany, Switzerland)
Mij.	Maatschappij (The Netherlands)
N.L.	No Liability (Australia)
NPL	No Personal Liability (Canada)
N.V.	Naamloze Vennootschap (Belgium, The Netherlands)
Oy.	Osakeyhtiö (Finland)
plc	Public Limited Company (UK)
P.T.	Perusahaan Terbatas (Indonesia, often appears before company name)
Pte.	Private (Singapore)
Pty.	Proprietary (Australia, South Africa)
Pvt.	Private (India, Zimbabwe)
S.A.	Société Anonyme (Belgium, France, Luxembourg, Switzerland) Sociedad Anónima (Spain, Spanish Latin America)
SAI	Sociedad Anónima Inversiones (Spanish Latin America)
SAC	Sociedad Anónima Comercial (Spanish Latin America)
SARL	Sociedad Anónima de Responsabilidade Limitada (Brazil, Portugal) Société Anonyme à Responsabilité Limitée (Belgium, France, Luxembourg)

Sdn. Bhd.	Sendirian Berhad (Malaysia)
S.L.	Sociedad Limitada (Spain, Portugal, Latin America)
Soc. Cve.	Société Coopérative (Belgium)
SpA	Società per Azioni (Italy)
SRL	Società a Responsabilità Limitata (Italy)
S.V.	Samenwerkende Vennootschap (Belgium)

8.3e Bylines must be punctuated properly so as to avoid confusion of credit or affiliation. Below are examples of different byline constructions and how they ought to be punctuated.

◆ *Examples:* *2 people, 1 company: No comma before the “and.”*

J. Ford and T. Gibson, Exxon Mobil Corp.

2 people, 2 companies: Comma before the “and.”

J. Ford, Exxon Mobil Corp., and **B. Smith**, Schlumberger

3 people, 3 companies: Semicolons to separate, and semicolon before the “and.”

J. Ford, Exxon Mobil Corp.; **B. Smith**, Schlumberger; and **K. Moore**, BP

X people, 2 companies: commas to separate, and comma before the “and.”

J. Ford, **T. Gibson**, and **S. Johnson**, Exxon Mobil Corp., and **K. Moore** and **J. Foster**, BP

X people, 3+ companies: semicolons to separate, and semicolon before the “and.”

J. Ford and **T. Gibson**, Exxon Mobil Corp.; **J. Foster**, BP; **B. Smith**, Schlumberger; and **G. White**, **C. Jones**, and **S. Kennedy**, B&R Consulting.

X people, 3+ companies, with repeated companies: semicolons to separate, and semicolon before the “and.”

J. Ford and **T. Gibson**, Exxon Mobil Corp.; **J. Foster**, BP; **R. Mitchell**, Exxon Mobil Corp.; **H. Fleming**, BP; **B. Smith**, Schlumberger; **G. White**, B&R Consulting; and **F. Mills** and **S. Bowers**, Schlumberger.

8.3f When possible, write a person’s name as he/she writes it. Particularly observe the spelling of “Mc” and “Mac” and capitalization of prefixes such as “de,” “da,” “du,” “le,” “van,” and “von.” When personal preferences are not determinable, use two initials rather than the given name (or spell out the given name if you know only one), and capitalize all prefixes except “von” and “de.” Also, be aware that the order of names (family name, given name, etc.) is different in different cultures. The author’s preference should always be considered.

8.3g Do not use the titles Mr., Mrs., Ms., Miss, Prof., or Dr. Occasionally cultural norms will dictate the use of an honorific, particularly when an individual holds a higher state or political office, military rank, or religious distinction.

8.3h Do not use department names or university locations in author listings on technical papers. Use the name of the college or university only (which may include a location to differentiate it from another branch of the school).

◆ *Example:* **O. Jordan**, Texas A&M University; **J. Simpson**, University of Tulsa; and **Mahmoud Ali**, Texas A&M University-Qatar.

8.4 Body

8.4a Typeface

- **Bold** typeface is used for such things as authors’ names in bylines and on first use in author biographies; section headings in articles; and first mention of figures and tables (see Section 8.3.5).

◆ Byline

Example: **A. C. Clarke**, Monolith Communications, and **I. Asimov**, US Robotics.

◆ Author biographies

Example: **Arthur C. Clarke** is the author of *2001: A Space Odyssey* and many other books. Clarke holds a PhD in astronomy from Oxford University and is credited with inventing the concept of the communications satellite.

Isaac Asimov is the author of more than 500 books, many about robots; he is even credited with having coined the word “robotics.” He holds a PhD in biochemistry from Columbia University.

- ◆ In most situations, any punctuation accompanying a boldface citation is set in bold as well.

Example: Note trends shown in **Fig. 1**.

When a figure is cited for the first time and happens to be in parentheses, both the figure number and the parentheses should be bold, along with any punctuation that immediately follows the parentheses (**Fig. 2**). If a figure is cited for the first time and is enclosed in parentheses along with additional text, then **ONLY** the figure designation should be bold, not the parentheses or any following punctuation (see data in **Fig. 3**). Bold the first reference to a portion of a multipartite figure (**Fig. 1a**), but leave subsequent references to other parts in normal type.

- *Italic* typeface is used for such things as species names; all periodical titles; and a number of mathematical elements (see Section 8.7.1).

- ◆ *Examples:* In Europe, the pike, *Esox lucius*, is valued for food as well as sport.

SPE Journal has many fine articles, but those in the *National Enquirer* are a bit more entertaining.

- Normal typeface is used for the majority of the print in a paper. In a passage of italic type, any terms that would be set off in italics in normal type are converted to normal type for contrast.
 - ◆ *Example:* Wells, H. G. 1910. *Geological Absurdities in Journey to the Center of the Earth by Jules Verne*, 66–69. London: Gnome Press.
 - ◆ Also, certain technical terms are set in normal type, despite general rules that may apply to the contrary in some situations: M (for molar) and N (for normal), for example.

8.5 Numbering Tables, Figures, and Equations

- 8.5a Use Arabic numbers to label tables and figures; number them in order cited consecutively through the text and within appendices. Within each appendix, use Arabic numbers and the same letter designation as that of the appendix (Fig. A-1, A-2, etc.; Table B-1, B-2, etc.). Label two-part equations as Eq. 1a and Eq. 1b, or Eq. A-3a and Eq. A-3b. Do not label them as Eq. 1 and Eq. 1a, or Eq. A-3 and Eq. A-3a.
- 8.5b Designate all illustrations and nontabular material by “Fig.” Do not use the words “chart,” “exhibit,” “graph,” or “photo” when naming a specific figure. When referring to distinct parts of a single figure, use lower-case letters: Fig. 2a, Fig. 2b, Fig. 2c, etc.
- 8.5c When citing two-part figures in text, use “Figs. 2a and 2b” rather than “Figs. 2a and b.”
- 8.5d The first time a figure or table is cited in the text, put it in boldface. All subsequent citations of that figure or table should be in regular typeface.
 - ◆ *Example:* ...as shown in **Fig. 1**. Also note in Fig. 1 that the ...
- 8.5e However, if a previously mentioned figure is grouped with another being mentioned for the first time, it is set in bold again.
 - ◆ *Example:* ...as indicated in **Fig. 1**. Further development is shown in **Figs. 1 through 4**.

8.6 Enumeration of Points

8.6a Avoid numbering items in a series of brief elements.

- ◆ *Example:* The measured liquid production was a result of external expansion, liquid expansion, and rock compaction.

8.6b If the points listed have multiple parts that need to be separated by commas, semicolons should be used to separate the points.

8.6c When points enumerated are more complex, use a colon after the introductory sentence, and separate the clauses by semicolons. For consistency, if one point is a complete clause, all should be.

- ◆ *Example:* The measured liquid production was a result of several factors: expansion of the system external to the core was caused by...; expansion of the liquid contained in the pore spaces of the rock normally occurred when...; actual decrease in pore space was caused by compaction within....

8.6d When points are enumerated in a bulleted list, introduce them with a sentence followed by a colon or period, or with a phrase without a colon or period. Bulleted lists should be indented with a hanging indent, and always start with a capital letter. Whenever possible, bulleted lists should be all complete sentences ending in a period or all incomplete sentences with no period at the end of a phrase or sentence fragment.

- ◆ *Examples:* The steps you can take to protect yourself from identity theft are as follows:

- Destroy your private records and statements.
- Secure your mail.
- Safeguard your passwords.

As president of the society, Smith will emphasize

- Building support for young professionals

- Recruiting mentors from core industries
- Promoting sections to undergraduate students

8.6e Numbering points is necessary only when the point is referred to later in the article or when the list is a stepwise process.

◆ *Examples:* The method specified in Point 3 could be used.

1. Determine the model parameters.
2. Gather the necessary information.
3. Enter the data gathered using the Wickersham method into the appropriate form.

8.6f The Conclusions section of a paper commonly presents the final points as a numbered list, which should be formatted according to the above guidelines.

8.7 Equations

8.7a Equations are subject to the same rules of grammar as sentences. Maintain correct grammatical structure in sentences that contain, precede, or follow equations.

- The symbols for “equals” (=), “yields” (→), and other such signs act as verbs. A complete list of mathematical symbols can be found in Appendix D. Sentences containing these symbols must be grammatically correct.
- A complete sentence introducing an equation can end in a period or colon.

◆ *Example:* In many cases, the relationship of motion,

$$A = Bx + (c - D_2), \dots\dots\dots(3)$$

can be expressed more simply.

◆ *Note:* Take special care to avoid confusion. For example, “When $Ax = By$, C varies” is clearer when written as “When $Ax = By$, then C varies.”

8.8 Units

- 8.8f Either SI metric or customary English units should be used consistently throughout the paper. Do not mix units by using metric units to measure one thing (pressure in kPa, for example) and English units to measure something else (pipe length in feet, for example).

8.9 Symbols and Nomenclature

- 8.9a Letter symbols (including subscripts and superscripts) should be italicized in the text, equations, tables, and figures. Do not italicize numerals (including subscripts and superscripts), mathematical abbreviations (log, sin, cos, etc.), capital Greek letters, or chemical symbols. Do not italicize portions of letter symbols that are abbreviations (such as “max” for maximum) or that correspond to proper names (such as subscript Re in Reynolds number, N_{Re}). For more details, please refer to the subscript definitions list in the *SPE Letter and Computer Symbols Standard*.

p_D

k_{rw}

T_{max}

- 8.9b Each symbol used in a paper should have a unique definition (i.e., the same symbol should not be used for two different things in the same paper or book chapter).
- 8.9c Symbols should consist of a one-letter kernel. Multiple-letter symbols (e.g., WOR for water/oil ratio or NPV for net present value) are not allowed. Subscripts and/or superscripts should be used to differentiate between symbols with the same one-letter kernel.
- 8.9d At the end of the paper or book, include an alphabetical Nomenclature of all symbols used. The list should include the letter symbol, an accurate and concise definition, the dimensions in which the quantity is measured, and the units of measure used in the paper.

- ◆ *Examples:* $p = \text{pressure, m/Lt}^2, \text{psi}$
 $\mu = \text{viscosity, m/Lt, cp}$

- 8.9e Dimensions are mass (*m*), length (*L*), time (*t*), temperature (*T*), electrical charge (*q*), money (*M*), and amount (*n*). If dual units are used throughout the paper, the second set of units should appear in brackets.

L = length, L, ft [m]

ρ = density, m/L³, lbm/ft³ [kg/m³]

8.9f Common SPE standard symbols are listed below.

A	= area	P_c	= capillary pressure
B	= formation volume factor	q	= production rate
C	= concentration	r	= radius
d	= diameter	S	= saturation
D	= depth	t	= time
h	= thickness	T	= temperature
J	= productivity index	v	= velocity
k	= permeability	V	= volume
K	= coefficient	Z	= elevation
L	= length	μ	= viscosity
m	= slope	ρ	= density
N	= dimensionless number	ϕ	= porosity
p	= pressure		

8.9g Organize items in the Nomenclature as follows:

- First, list Roman alphabetical terms, each presented with lowercase versions first;
- Second, list Greek alphabetical terms, each presented with lowercase versions first. The Greek alphabet is provided in Appendix E.
- Within these sets, individual terms are alphabetized accordingly (e.g., p precedes p_c , which precedes p_{eff} , which precedes P ; likewise, Δ precedes Δp in the Greek section).

8.10 References

8.10a Citing references in the text (inline citations)

- Cite references in the text or in figure or table captions by placing the author's last name and the year of publication in parentheses. If the author's name is used in the text, include only the year of the reference in parentheses.

◆ *Examples:* The generally-accepted method (Smith 1990)....

Smith (1990) provides a detailed explanation of this method.

Fig. 2.7—Stresses acting on the borehole wall (after Aadnoy 1996)

- If the text cites more than one reference from the same author in the same year, add "a," "b," etc. to distinguish between the references. References included in the same set of parentheses should be separated by semicolons.

◆ *Examples:* Kabir et al. (2004a, 2004b) showed that...

The method is analyzed in several studies (Smith 1990; Jones and Smith 1992; Smith et al. 2004).

This practice is common across the industry (Smith 1992, 1994b; Jones 1996).

- If the referenced source is of considerable length and more than one part of it is referenced in the current paper, the in-text citation may include original figure or page numbers for clarification.

◆ *Examples:* This effect was first described several decades ago (Yousef 1956, his Fig. 4).

A different section of the same earlier work was dedicated to this phenomenon (Smith et al. 1997, 234–236).

- When citing standards in text, do not spell out the abbreviations [i.e., American Petroleum Institute (API) Recommended Practice (RP) 7G]. The abbreviated term is the actual name of the standard and should not be deconstructed.

◆ *Correct:* This process is defined in *API SPEC 2F* (1981).

The operating limits (*API RP 7G* 1989)...

◆ *Incorrect:* This process is defined in API Specification 2F (1981).

The operating limits (API 1989)...

8.10b Citing references in the reference list

- SPE style uses an author/date format for referencing, similar but not identical to Chicago style.
- Elements which should be included in a reference
 - Author(s) names – last name, first and middle initials
 - Year of publication
 - Title of work
 - For books (as applicable): edition, volume, series, chapter, pages, name and location of publisher
 - For journals or other periodicals (as applicable): name of publication, volume, issue, page numbers, publication date, paper number, DOI
 - For conference papers (as applicable): name, location and date(s) of conference, type of presentation, paper number, DOI
- No more than three author names are to be listed on a reference. If a reference has more than three authors, only the first three authors will be listed followed by et al. No comma should be used between the third author's last initial and et al.

- ◆ *Examples:* Two authors: Smith, A. and Jones, B.
 Three authors: Smith, A., Jones, B., and Kent, C.
 More than three authors: Smith, A., Jones, B., Kent, C. et al.

- For papers published by SPE, always include the SPE-assigned paper number in the reference (e.g., SPE-123456-PA).
- Always include the digital object identifier (DOI) name associated with a reference, if one is available. The DOI name should always be written as a hyperlink. DOI hyperlinks are created by adding <http://dx.doi.org/> to the front of the DOI number.

- ◆ *Example:* DOI name 10.2118/123456-PA
 would be referenced as <http://dx.doi.org/10.2118/123456-PA>

- ◆ *Note:* The DOI prefix for SPE papers is 10.2118.

- Abbreviated forms of publication and organization names are allowed in the reference list. The following are the official abbreviations for SPE publications:

<i>Journal of Canadian Petroleum Technology</i>	<i>J Can Pet Technol</i>
<i>Journal of Petroleum Technology</i>	<i>J Pet Technol</i>
<i>Oil and Gas Facilities</i> [®]	<i>Oil and Gas Fac</i>
<i>SPE Drilling & Completion</i>	<i>SPE Drill & Compl</i>
<i>SPE Drilling Engineering</i>	<i>SPE Drill Eng</i>
<i>SPE Economics & Management</i>	<i>SPE Econ & Mgmt</i>
<i>SPE Formation Evaluation</i>	<i>SPE Form Eval</i>
<i>SPE Journal</i>	<i>SPE J.</i>
<i>SPE Production & Facilities</i>	<i>SPE Prod & Fac</i>
<i>SPE Production & Operations</i>	<i>SPE Prod & Oper</i>
<i>SPE Production Engineering</i>	<i>SPE Prod Eng</i>
<i>SPE Projects, Facilities & Construction</i>	<i>SPE Proj Fac & Const</i>

SPE Reservoir Engineering

SPE Res Eng

SPE Reservoir Evaluation & Engineering

SPE Res Eval & Eng

- Omit the reference entirely if the information provided is so vague that the reader could not locate the information being referenced. Personal communications, non-specific website addresses, and unpublished results are not acceptable references. If the reference is necessary to the text, it should be cited in a footnote and not in the reference list.

8.10c Formatting for Commonly Used Reference Types

- Journal Articles

- ◆ Author, A. and Author, B. YEAR. Title of article. *Journal* **Vol** (Issue): pp-pp. Paper No. DOI.

King, M. J. and Mansfield, M. 1999. Flow Simulation of Geologic Models. *SPE Res Eval & Eng* **2** (4): 351–367. SPE-57469-PA.

<http://dx.doi.org/10.2118/57469-PA>.

- ◆ Journal article which is *in press*

Hagoort, J. *In press*. Simplified Analytical Method for Estimating the Productivity of Horizontal Wells Producing at Constant Rate or Constant Pressure. *J. Pet. Sci. Eng.* (submitted 08 January 2006).

- ◆ Journal article published online as preprint

Garmeh, G., Johns, R. T., and Lake, L. W. 2009. Pore-Scale Simulation of Dispersion in Porous Media. *SPE J.* SPE-110228-PA (in press; posted 19 February 2009).

- Conference Papers

- ◆ Author, A. and Author, B. YEAR. Title of paper. Name of conference, location, date(s) held. Paper number. DOI.

White, C. D. and Horne, R. N. 1987. Computing Absolute Transmissibility in the Presence of Fine-Scale Heterogeneity. Presented at the SPE Symposium on Reservoir Simulation, San Antonio, Texas, 1–4 February. SPE-16011-MS. <http://dx.doi.org/10.2118/16011-MS>.

- ◆ If a conference paper is included in a proceedings volume, either cite as a book chapter (see Books section below) or cite for a conference paper with the addition of Proc., before the conference name and the page numbers for the paper in the proceedings volume following the paper number:

White, C. D. and Horne, R. N. 1987. Computing Absolute Transmissibility in the Presence of Fine-Scale Heterogeneity. *Proc.*, SPE Symposium on Reservoir Simulation, San Antonio, Texas, 1–4 February, SPE-16011-MS, 365–368. <http://dx.doi.org/10.2118/16011-MS>.

- Books

- ◆ Author, A. and Author, B. YEAR. *Title of book*, edition. City, State/Province: Publisher.

Jaeger, J. C. and Cook, N. G. W. 1979. *Fundamentals of Rock Mechanics*, first edition. London: Chapman and Hall.

- ◆ To cite a chapter in a book:

Author, A. and Author, B. YEAR. Title of chapter. In *Title of book*, edition, editor(s), Chapter#, pp. City, State/Province: Publisher.

Somasundaran, P. 1975. Interfacial Chemistry of Particulate Flotation. In *Advances in Interfacial Phenomena of Particulate/Solution/Gas Systems*, ed. P. Somasundaran and R. B. Grieves, Chap. 1, 1–15. New York City: Symposium Series, AIChE.

Note: When referencing a volume, chapter, or section in a book, the term should always be abbreviated unless it is part of the title of the book, i.e. Vol. 2, Chap. 10, Sec. 6.1, but *Quadratic Equations, Volume 2: Geometric Interpretation*.

- Websites

- ◆ Author or Site Name. YEAR. Title (page or article). *Site name*, date posted, web address (accessed date).

Katz, J. 1998. Luring the Lurkers. *Slashdot*, 29 December 1998, <http://slashdot.org/story/98/12/28/1745252/Luring-the-Lurkers> (accessed 23 June 2011).

- ◆ If the title is the same as the site name:

Ambler, S. W. 2006. Enterprise Modeling Anti-Patterns, <http://www.agilemodeling.com/essays/enterpriseModelingAntiPatterns.htm> (accessed 5 March 2006).

- ◆ If the author and the site name are the same (as with Wikipedia), omit the site name the second time.

Wikipedia. 2010. Semipermeable membrane (4 October 2010 revision), http://en.wikipedia.org/w/index.php?title=Semipermeable_membrane&oldid=388646914 (accessed 20 December 2010).

Note: All wiki entries must include the specific revision date for the article being cited.

- ◆ Do not cite an entire company website (i.e., shell.com). A specific page or section must be cited, with the exact web address and title for that page.

- Thesis or Dissertation

- ◆ Author, A. YEAR. *Title*. Type of work, University, City, State (date presented).

Thomas, O. 2002. *The Data as the Model: Interpreting Permanent Downhole Gauge Data Without Knowing the Reservoir Model*. MS thesis, Stanford University, Stanford, California (June 2002).

- Recommended Practices and Standards

- ◆ *Document No.*, *Title*, edition. YEAR. City, State: Organization. DOI.

API RP 61, Recommended Practice for Evaluating Short-Term Proppant-Pack Conductivity. 1989. Washington, DC: API.

ISO 13503-1:2011, Petroleum and natural gas industries—Completion fluids and materials—Part 1, Measurement of viscous properties of completion fluids, second edition. 2011. Geneva, Switzerland: ISO.

49 CFR 178, Specifications for Packagings. 2008. Washington, DC: Pipeline and Hazardous Materials Safety Administration, US DOT.

- Patents

- ◆ Inventor, A. YEAR. Title. Country Patent No. #.

Cardenas, R. L., Carlin, J. T., and Flournoy, K. H. 1974. Surfactant Oil Recovery Process for Use in Formations Containing High Concentrations of Polyvalent Ions Such as Calcium and Magnesium. US Patent No. 3,799,264.

Moses, V. and Harris, R. E. 1994. Acidising Underground Reservoirs. International (PCT) Patent No. WO 94/25731.

- ◆ If a cited patent has more than one number, separate the numbers with semicolons.

Lund, A., Lysne, D., Larson, R. et al. 2004. Method and system for transporting a flow of fluid hydrocarbons containing water. US Patent No. 6,774,276; International (PCT) Patent No. WO/2000/025062; Norwegian Patent No. NO 311,854.

- ◆ If citing a patent application, replace the word Patent with Patent Application.

- Company or Government Report

- ◆ Author, A. YEAR. Title. Report Number, Institution, City, State/Province (Date of Release).

Shell Oil. 1975. Enhanced Recovery. Internal Report, Shell Oil Company, Houston, Texas.

Doscher, T. M. 1982. Scaled Physical Model Studies of the Steam Drive Process. Final report, Contract No. DE-AT03-77ET 12075, US DOE, Washington, DC (November 1982).

8.11 Footnotes

- 8.11a Use footnotes only if absolutely necessary. Whenever possible, incorporate such material into the text using parentheses. Very small type used for footnotes makes it particularly difficult to read equations.
- 8.11b If footnotes in body text are unavoidable, keep them as brief as possible and place them at the bottom of the page (or column for multicolumn format) in which the reference to them appears. Use an asterisk (*) for the first and a double asterisk (**) for the second. If there are more than two footnotes, use numbers instead of asterisks.

8.12 Conversion Factors

- 8.12a If dual units are provided for all units used in an article, paper, or book (including those in figures and tables), no conversion factor table is needed.
- 8.12b Use customary or SI units consistently. If only one system of units is used (customary or metric), then a conversion factor table must be included at the end of the article, paper, or book. The table should include conversion factors for all units used, including those used in figures and tables.

Sample Conversion Table:

SI Metric Conversion Factors	
bb1 × 1.589 873	E-01 = m ³
ft × 3.048*	E-01 = m
hp × 7.460 43	E-01 = kW

* Conversion factor is exact.

- ◆ *Note:* The SI Metric System of Units and SPE Metric Standard, the Society's official standard, is available on the SPE website, <http://www.spe.org>.

8.12c The following units apply in both the customary system and SI metrics and do not require conversion.

ampere	A	parts per million	ppm
capture unit	c.u.	porosity unit	p.u.
cubic centimeters	cm ³	revolutions per minute	rev/min
frequency	Hz	shots per foot	spf
gram	g	volt	V
liter	L	volume percent	vol%
micron (micrometer)	μm	watt	W
millidarcy	md	weight percent	wt%

8.13 Author Biographies

8.13a A biographical paragraph for each author is located at the end of the body of the paper. An author bio should contain the following elements, as applicable to the individual author, in the order listed here:

- Name and affiliation
 - Prior work history
 - Research interests
 - Publications/Patents
 - Academic credentials
 - SPE service
- Name and affiliation are listed with name bolded. Generalized staff duties and job titles are not capitalized, but capitalize a specific title.

◆ *Examples:* **Joe N. Johnstone** is a reservoir engineer with Depco in Houston.

Robert Jones is Director, Resource Management at OGI Company in Norman, Oklahoma.

◆ *Note:* Refer to the author by last name only in all subsequent references to the author beyond the opening line in the biographical paragraph.

- Prior work history should be listed for the last decade, at most. Use an en dash to denote year spans.
- The wording for academic credentials must be specific. Use the verb “holds” for advanced degrees. Do not capitalize areas of study or academic disciplines.

◆ *Examples:* Jones holds a __ degree in ____ from Stanford University.

Patel holds an MS degree in petroleum engineering from the University of Tulsa.

Smith holds a BS degree in physics from Hendrix College, an MSc degree in chemistry from Bristol University, and a PhD degree in geothermal engineering from Richland College.

Aziz holds MS and PhD degrees from the University of Southern South Dakota, both in petroleum engineering.

- For SPE service, provide a list of SPE volunteerism, awards, and/or committee membership.
 - ◆ *Example:* Edwards is a technical editor for *SPE Reservoir Evaluation & Engineering*. She was also the coauthor of the SPE volume *Waterflooding*.

8.14 Figures

- 8.14a Figures should be numbered with Arabic, not Roman, numerals in the order in which they are cited in the body of the paper. Related figures or figure sections may be labeled with a shared numeral and consecutive lowercase letters (e.g., Figs. 1a through 1d).
- 8.14b Figures should be high-resolution and preferably designed to occupy either a single column (3.33 in.) or the full width of the page (6.83 in.).
- 8.14c Use 8-point Arial or Helvetica in bold for axis titles and 8-point Helvetica or Arial for body copy inside figures (if any). Capitalize axis titles (see Section 8 for rules on capitalization of titles); within the figure, capitalize only the first word and any proper nouns used within phrases.
- 8.14d Axis titles indicate quantity and unit, separated by parentheses, with the unit abbreviated where appropriate.
 - ◆ *Examples:* Time (years) *NOT* Time (yr)
Depth (m) *NOT* Depth (meters)
- 8.14e Punctuate figure captions like sentences, and capitalize only the first word. If an abbreviation that has not already been defined in the text appears in a figure, it should be defined in the caption at its first use.
- 8.14f Avoid using unfamiliar abbreviations in figures.
- 8.14g For papers submitted to a journal, any figures should be grouped in order of citation at the end of the paper. See Appendix F for figure examples.

8.15 Tables

8.15a For papers submitted to a journal, any tables should be grouped in order of citation at the end of the paper.

8.15b Tables should be numbered with Arabic, not Roman, numerals in the order in which they are cited in the body of the paper.

8.15c Table captions and column headings should be as concise as possible. Punctuate table captions like sentences, and capitalize only the first word.

- Column headings sometimes indicate quantity and unit, separated by parentheses, with the unit abbreviated where appropriate.

8.15d Formatting (see also Appendix G: Sample Tables)

- Size: If possible, tables should be designed to occupy either the width of one column (3.33 in./20pi) or the full width of two columns (6.83 in./41pi).
 - ◆ Table sizes should be chosen with readability in mind. If either of the preferred one- and two-column widths would make a table look awkward or difficult to read, a width of 5 in. (30pi) may be used instead.
 - ◆ Extra-large tables, especially those meant to be viewed in landscape mode, may require special formatting on a case-by-case basis.
- Font: 8-point Arial or Helvetica for all captions, headings, and body copy. Footnotes or other notes should be in 6.5-point Arial or Helvetica.
 - ◆ Table footnotes should be listed at the bottom of the table, under the main body of the table but before the table caption. Follow footnote labeling guidelines as described in Section 8.11.2.
- Text
 - ◆ Column headings should be capitalized and center-aligned. If the column data is left-aligned, however, then the heading for that column should be left-aligned as well.

- ◆ Row headings should have only the first word and any proper nouns capitalized. Row headings may be left- or center-aligned.
- ◆ For body copy within the table, capitalize only the first word and any proper nouns used in the data. Body copy should be center aligned unless it is in paragraph format, in which case it should be left-aligned for readability.
- Caption
 - ◆ The table caption should be added below the table as for a figure.
 - ◆ Table captions should be in sentence case and left-aligned, and should not be made bold. The caption should end with a period.

APPENDIX A: OIL-INDUSTRY TERMS

Listed here are the preferred spellings of common terms in SPE literature (except as noted in Section 3.2).

A	bottomhole (adj.)	coalbed
a posteriori	bottomwater (noun, adj.)	coal gas (noun)
a priori	breakdown (noun, adj.)	coal-gas (adj.)
aboveground (adj.)	breakthrough	coastline
acknowledgment	brownfield (noun, adj.)	coauthor (noun only)
adviser	bubblepoint (noun, adj.)	cofferdam
afterflow	build up (verb)	coiled tubing (noun)
afterproduction (adj.)	buildup (noun, adj.)	coiled-tubing (adj.)
alongside	bullheading	cokriging
analog	buoyant	coreflood (noun, adj.)
anti– (joined prefix, with exceptions)	bypass	cost-effective
axisymmetric	byproduct	counter– (joined prefix, except counter-ion)
	C	crossbed
B	caprock	crossfault
backflow	carry-over (noun)	crossflow
backflush	Cartesian	crosslink (noun, verb)
backpressure (noun, adj.)	casedhole (adj.)	crossplot
backrake	casinghead (adj.)	cross section (noun)
backup (noun, adj.)	catalog	cross-sectional (adj.)
backwash	centerline	crosswell (adj.)
ballout (noun)	changeover (noun, adj.)	cutoff (noun, adj.)
bandwidth	channeling	
-based (hyphenated suffix)	chokeline (noun)	D
baseline	Christmas tree	database
bean up (verb phrase)	clean out (verb)	data set
beanup (noun)	cleanout (noun, adj.)	de-aeration
bicenter	clean up (verb)	deep water (noun)
bleedoff (noun)	cleanup (noun, adj.)	deepwater (adj.)
blowdown	cloudpoint	dewpoint (noun, adj.)
blowout (noun, adj.)	co– (joined prefix, with exceptions)	disk (disc in zoology and botany)
borehole		

dogleg
dot-com
down– (joined prefix)
drainhole
drawdown
drawworks
drill bit (noun)
drill-bit (adj.)
drill collar
drill-in fluid
drill off (verb phrase)
drilloff (noun, adj.)
drillout (noun, adj.)
drillpipe
drillship
drillsite
drillstem
drillstring
–drive (joined suffix)

E

e-business
e-commerce
edge water (noun)
edgewater (adj.)
electric line
electrical submersible
pump
electro– (joined prefix,
with exceptions)
email
endpoint
engine room
extra– (joined prefix in
most uses)

extranet

F

fail-safe
fallback (noun)
falloff
farm out (verb phrase)
farmout (adj.)
feedwater (noun)
Fiberglas (trade name)
fiberglass (generic term)
fiber-optic (adj.)
fieldwide (adj.)
fill up (verb)
fill-up (noun, adj.)
filter cake (noun)
filter-cake (adj.)
fireflood
fire tube (noun)
fire-tube (adj.)
firsthand
five-spot (noun, adj.)
flood front
floodwater
flowback (noun, adj.)
flow chart
flowline (noun, adj.)
flow loop
flowmeter
flow rate
–fold (joined suffix)
follow-up (adj., noun)
frac pack (noun)
frac-pack (adj.)
-free (hyphenated suffix)

freestanding
fresh water (noun)
freshwater (adj., adv.)

G

gamma ray log (no
hyphen)
gas cap
gas field (noun)
gasfield (adj.)
gasflood
gas lift (noun, adj.)
gauge
gray (not “grey”)
gridblock
gridpoint
groundtruthing
groundwater (noun, adj.)
guar
guidepile

H

half-length
half-life (noun, adj.)
half-width
heavyweight
hindcast
hold down (verb)
holddown (noun)
hold up (verb)
holdup (noun, adj.)
hookload (noun)
hookup (noun, adj.)
hot-water (adj.)
huff ’n’ puff

I

in situ (adv.)
 in-situ (adj.)
 infill
 injection well
 (see Section 2)
 inter– (joined prefix)
 Internet
 intranet

J

jack up (verb)
 jackup (adj.)
 judgment

K

kerosene
 keypunch
 keyseat
 kick off (verb phrase)
 kickoff (noun)
 knockout (noun, adj.)
 knowledge base

L

laboratory (not “lab”)
 leak off (verb)
 leakoff (noun, adj.)
 life cycle
 liftoff (noun)
 lightweight
 line pipe
 lock up (verb phrase)
 lockup (noun)

log-normal
 long-reach
 long-standing

M

main-bore (adj.)
 main bore (noun)
 make up (verb)
 makeup (noun, adj.)
 man-hour
 man-year
 meter (not “metre”)
 micro– (joined prefix)
 mid– (joined prefix, with exceptions)
 Mid-Continent (SPE section)
 milled-tooth bit
 mineback (noun)
 mis-tie(s)
 mixed-wet
 modeled
 modeling
 moonpool
 motherbore
 mudcake
 mud filtrate (noun)
 mudline
 mud motor
 mud-weight (adj.)
 multi– (joined prefix, with exceptions)
 multiphase flow

N

naphtha
 net-pay
 non– (joined prefix, with exceptions)

O

off-bottom
 offline (adj.)
 offset
 offshore
 off-site (adj., adv.)
 off-take (noun)
 oil field (noun)
 oilfield (adj.)
 oilflood
 oil well (noun)
 oilwell (adj.)
 oil-wet
 OnePetro
 online (adj.)
 (see Section 2)
 on-site (adj., adv.)
 on-stream (adj.)
 open flow
 open hole (noun)
 openhole (adj.)
 outcrop
 over– (joined prefix)

P

pack off (verb phrase)
 packoff (noun)
 padeye
 particle-size distribution
 pay out (verb)

payout (noun)
phase out (verb phrase)
phaseout (noun)
pick up (verb phrase)
pickup (noun, adj.)
pinchout (noun)
pinch out (verb phrase)
pipeline
plaster of Paris
Plexiglas
plugback
Poisson's ratio
poly- (joined prefix)
pore-water fluid
Portland cement
post- (hyphenated prefix)
pre- (joined prefix, with exceptions)
preventative
printout (noun)
pro- (joined prefix, with exceptions)
pseudo- (joined prefix)
pseudosteady state (noun)
pseudosteady-state (adj.)
pulse-loading
pumpdown
pumphead
pumpoff (adj.)

Q

quasi- (joined prefix, except quasi-equilibrium)

R

rate-pressure
rathole
re- (joined prefix)
read out (verb phrase)
readout (noun)
real time (noun)
real-time (adj.)
rigsite
roller-cone bit

S

salt water (noun)
saltwater (adj., adv.)
sandface
sandout
sandpack
sand screen
scaleup (noun, adj.)
screenout (noun, adj.)
seabed, seafloor
sealbore
seastate (noun, adj.)
seawater
seismic (adj.)
seismics (noun)
self- (hyphenated prefix)
semi- (joined prefix, with exceptions)
setup (noun)
shaly
shoreline
short-term
shut down (verb phrase)
shutdown (noun)
shut in (verb)

shut-in (noun, adj.)
shut off (verb)
shutoff (noun, adj.)
sidetrack
sidewall
slackoff
slickline
slickwater
slimhole
slimtube
slow down (verb phrase)
slowdown (noun)
slug catcher
space out
speed up (verb phrase)
speedup (noun)
splash plate
standalone (adj.)
standby (adj.)
stand off (verb)
standoff (noun, adj.)
standpipe
start up (verb)
startup (noun, adj.)
steady state (noun)
steady-state (adj.)
steam chest
steamdrive (noun, adj.)
steamflood
step-out (adj.)
stepout (noun)
stepwise
stick/slip
stock tank (noun)
stock-tank (adj.)

stopcock
straightedge
straightline (adj.)
streamtube
sub- (joined prefix)
sulfate
sulfide
sulfur
super- (joined prefix)
swage (not “swedge”)
sweepout (noun, adj.)

T

tail pipe
thin-section (noun in
laboratory tests)
throughput
through-tubing (adj.)
tieback (noun, adj.)
tie line (noun)
tie-line (in mathematics)
time frame (noun)
timeline
timestep (noun)
timetable
tool face
tool joint
topdrive
tophole (adj.)
towout (noun, adj.)
traveltime

tricone
trunkline
tubinghead (adj.)
twistoff
type curve (noun)
type-curve (adj.)

U

ultra- (joined prefix)
ultradeepwater
un- (joined prefix)
under- (joined prefix)
under way
up- (joined prefix)
updip
uphole/upstream

V

V-door
vendor
viscoelastic

W

wash out (verb phrase)
washout (noun)
waste water (noun)
wastewater (adj.)
water block
water blocking
water cut (noun)
water-cut (adj.)

waterdrive
waterflood
waterfrac
water-wet
web
website
well-being
wellbore
wellblock
wellhead
wellpoint
wellsite
wellstream
well test
-wide (joined suffix)
wind field (noun)
windfield (adj.)
wind speed (noun)
wireline
-wise (joined suffix)
workboat (noun)
workforce
work group
work over (verb)
workover (noun, adj.)
work string
worldwide
World Wide Web

X

X-ray

APPENDIX B: COMMON ABBREVIATIONS

The following terms are often abbreviated in SPE literature. As detailed in Section 1.3, do not abbreviate these terms if they are used only once in the article, paper, or chapter. If one or more of these terms are used repeatedly in a given work, then the term(s) should be spelled out at first use (in the text, not counting use in the title), with the abbreviation following in parentheses. The abbreviation should then be used throughout the rest of the article, paper, or chapter.

AC	alternating current
BA	bachelor of arts
BS	bachelor of science
BOE	barrel of oil equivalent
BS&W	basic sediment and water
BOP	blowout preventer
BHA	bottomhole assembly
BBS	bulletin board system
c.u.	capture unit
CRT	cathode ray tube
CPU	central processing unit
CWE	cold water equivalent
CUG	computer user group
CT	computed tomography
DC	direct current
PhD	doctor of philosophy
EOR	enhanced oil recovery
EOS	equation of state
ECD	equivalent circulating density
et al.	et al. (and others)
etc.	et cetera (and the rest)
e.g.	exempli gratia (for example)
E&P	exploration and production
FTP	file transfer protocol
FVF	formation volume factor
GC	gas chromatography
GOC	gas/oil contact

GOR	gas/oil ratio
GUI	graphical user interface
GOM	Gulf of Mexico
HSSE	health, safety, security, and environment
HP/HT	high-pressure/high-temperature
HCPV	hydrocarbon pore volume
HPAM	hydrolyzed polyacrylamide
HEC	hydroxyethyl cellulose
HPG	hydroxypropyl guar
i.e.	id est (that is)
ID	inside/inner diameter
IFT	interfacial tension
IOC	international oil company
KB	kelly bushing
LACT	lease automatic custody transfer
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LAN	local area network
MA	master of arts
MS	master of science
MD	measured depth
MDRT	measured depth from rotary table
MWD	measurement while drilling
NOC	national oil company
NPV	net present value
NMR	nuclear magnetic resonance
OIP	oil in place
OIIP	oil initially in place
OOIP	oil originally in place (or original oil in place)
OBM	oil-based mud
OS	operating system
OD	outside/outer diameter
PV	pore volume
p.u.	porosity units

ppa	pounds of proppant added
PVT	pressure/volume/temperature
PI	productivity index
QA	quality assurance
QC	quality control
ROP	rate of penetration
R&D	research and development
ROS	residual oil saturation
RMS	root mean square
SEM	scanning electron microscope
SP	self-potential
spf	shots per foot
SG	specific gravity
SS	subsea
TD	total depth
TDS	total dissolved solids
TVD	true vertical depth
UV	ultraviolet
URL	uniform resource locator
vs.	versus
WAG	water alternating gas
WOC	water/oil contact
WOR	water/oil ratio
WBM	water-based mud
WOB	weight on bit
WAN	wide area network
XRD	X-ray diffraction

APPENDIX C: COMMON OILFIELD UNITS

barrels of fluid per day	BFPD [m^3/d fluid]
barrels of liquid per day	BLPD [m^3/d liquid]
barrels of oil per day	BOPD [m^3/d oil]
barrels of water per day	BWPD [m^3/d water]
barrels per day	B/D [m^3/d]
barrels per minute	bbbl/min [m^3/s]
billion cubic feet	Bcf [10^9 m^3]
billion cubic feet per day	Bcf/D [$10^9 \text{ m}^3/\text{d}$]
cubic feet per barrel	ft^3/bbl [m^3/m^3]
cubic feet per day	ft^3/D [m^3/d]
cubic feet per minute	ft^3/min [m^3/s]
cubic feet per pound mass	ft^3/lbm [m^3/kg]
cubic feet per second	ft^3/sec [m^3/s]
cubic yard	cu yd
darcy	(spell out)
dead-weight ton	DWT [Mg]
feet per minute	ft/min [m/s]
feet per second	ft/sec [m/s]
foot-pound	lbf-ft or ft-lbf [J]
gallons per minute	gal/min [m^3/s]
gallons per day	gal/D [m^3/d]
gram	g
horsepower-hour	hp-hr [J]
inches per second	in./sec [cm/s]
kilopond (1,000 lbf)	klbf [N]
kilowatt hour	kW-hr [J]
kips per square inch	ksi [Pa]
millidarcy	md
million electron volts	MeV [MJ]
million cubic feet	MMcf
mils per year	mil/yr [m/a]
ohm	Ω
pound per cubic foot	lbm/ft^3 [kg/m^3]

pound per gallon	lbm/gal [kg/m ³]
reservoir barrel	res bbl [res m ³]
reservoir barrel per day	RB/D [res m ³ /d]
square feet	ft ² [m ²]
square mile	sq mile [km ²]
standard cubic feet per barrel	scf/bbl
standard cubic feet per day	scf/D [std m ³ /d]
standard cubic foot	scf [std m ³]
stock-tank barrel	STB [stock-tank m ³]
stock-tank barrels per day	STB/D [stock-tank m ³ /d]
stoke	St [m ² /s]
thousand cubic feet	Mcf
trillion cubic feet	Tcf [10 ¹² m ³]

APPENDIX D: MATH SIGNS AND OPERATORS

ℓ, \exp	exponential function	$+$	plus
$-$	minus	\pm	plus or minus
\times	multiplied by	\div	divided by
$=$	equal to	\neq	not equal to
\approx	nearly equal to	\cong	congruent with
\equiv	identical with	\neq	not identical with
\Leftrightarrow	equivalent to	$>$	greater than
\nlessgtr	not greater than	$<$	less than
\lessgtr	not less than	\geq	greater than or equal to
\leq	less than or equal to	\sim	distributed as; poorly approximates
$\sqrt{\quad}$	square root	$\sqrt[3]{\quad}$	cube root
$\sqrt[n]{\quad}$	n th root	erf	error function
erfc	error function, complementary	\rightarrow	vector
\therefore	therefore	\because	because
$:$	is to; divided by	\therefore	as; equals (geometrical proportion)
\propto	varies as	\doteq	approaches a limit
∞	infinity	\int	Integral
d	Differential	∂	partial differential
\sum	summation of	!	factorial product
π	pi (math constant = 3.1416)	ε	epsilon (math constant = 2.7183)
$^\circ$	degree*	'	minute; prime
"	second	\sphericalangle	Angle
∇	del (gradient operator)	Δ	delta (difference operator)
\in	set identifier		

* Do not substitute a superscript letter O or number zero for the degree symbol.

APPENDIX E: GREEK LETTERS

A	α	Alpha
B	β	Beta
Γ	γ	Gamma
Δ	δ	Delta
E	ε	Epsilon
Z	ζ	Zeta
H	η	Eta
Θ	θ	Theta
I	ι	Iota
K	κ	Kappa
Λ	λ	Lambda
M	μ	Mu
N	ν	Nu
Ξ	ξ	Xi
O	o	Omicron
Π	π	Pi
P	ρ	Rho
Σ	σ	Sigma
T	τ	Tau
Υ	υ	Upsilon
Φ	ϕ	Phi
X	χ	Chi
Ψ	ψ	Psi
Ω	ω	Omega

APPENDIX F: SAMPLE FIGURES

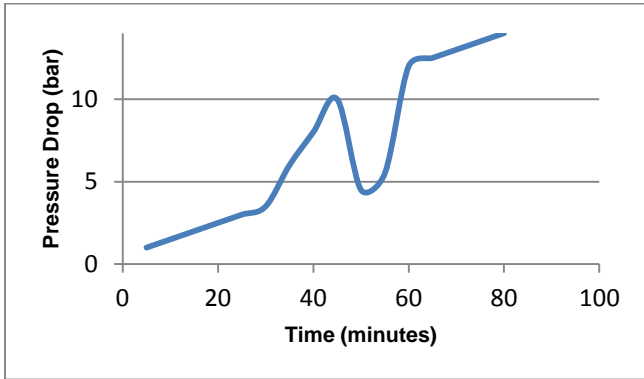


Fig. 1—Pressure drop vs. time during the injection of suspension fluid.

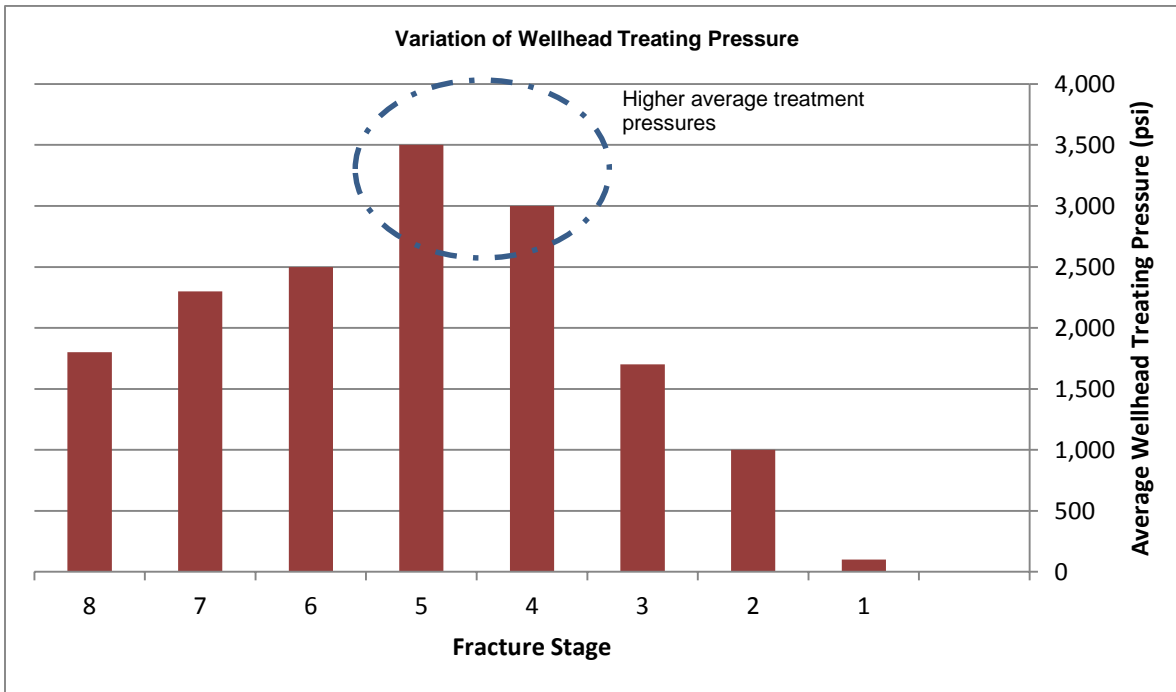


Fig. 2—Average wellhead treating pressure between fracture stages in Well 5

APPENDIX G: SAMPLE TABLES

Tables should be constructed with readability in mind. If the preferred one-column or two-column width would make a table look awkward or difficult to read, please use the 5 in. (30-pica) width instead. Extra-large tables, especially those meant to be viewed in landscape mode, may require special formatting on a case-by-case basis.

Examples: 3.33 in. (20pi) wide

Layer	Porosity	Permeability	Completion Interval
1	0.3080	725 md	2.0 m
2	0.2880	1,591 md	17.8 m
3	0.3240	3,093 md	28.6 m

Table 1—Completion layer properties for Well B.

	Porosity (%)	Permeability (D)
Grade 6 beads	42	259
Grade 9 beads	40	104
Grade 11 beads	38	10

Table 2—Porosities and permeabilities of the different bead sizes.

Cell dimensions (LxHxD)	69.8x 21.7x3.5 cm
Initial pressure	847 kPa
Initial temperature	20°C
Cell permeability	1135x10 ⁻¹² m ²
Cell porosity	0.391
Oil viscosity	10000 mPa.s at 20°C
Oil density	979 kg/m ³

Table 3—Experimental parameters.

Probabilistic Values From CDF		Parameter Sets Corresponding to t_M Values			
Value	t_M (year)	Q_∞ (Bbbl)	t_M (year)	S_L (year)	S_oS
P10	2009.1	2543.3	2009.1	19.5	1.817
P50	2013.5	2543.3	2013.5	19.9	1.829
P90	2018.3	2543.3	2018.3	20.5	1.839
Mean	2013.6	2543.3	2013.6	19.9	1.830
P10	2014.6	2900.8	2014.6	20.2	1.8199
P50	2018.8	2900.8	2018.8	20.6	1.8303
P90	2023.4	2900.8	2023.4	21.4	1.8365
Mean	2018.9	2900.8	2018.9	20.6	1.8306

Table 4—Parameter sets for $Q_\infty = 2543.3$ and $Q_\infty = 2900.8$ bbl for Hubbert model of world oil production data through 2008 ($R=8$).

Examples: 6.83 in. (41pi) wide

IFT (mN/m)	RI		IPA Concentration (%)		Water Concentration (%)		Cyclohexene Concentration (%)	
	Gas	Oil	Gas	Oil	Gas	Oil	Gas	Oil
24.20	1.44737	1.33388	0.00	0.00	0.00	100.00	100.00	0.00
6.90	1.44517	1.35204	1.04	27.04	0	72.70	82	0.27
0.60	1.41783	1.36408	33.49	43.08	2.51	53.54	64.01	3.37
0.03	1.39930	1.37200	50.06	50.07	11.51	41.59	38.43	8.34

Table 8—Concentrations by volume of isopropyl alcohol, water, and cyclohexene in the equilibrated phases used for the determination of relative permeability as a function of IFT.

Case	Oil	Gas	Temp. (°C)	Minimum Miscibility Pressure (MPa)						
				Experimental			Calculation		Deviation From VIT (%)	
				VIT	Slim Tube	Rising-Bubble	Analytical	EOS	Analytical	Slim Tube
1	RKR live oil	51 mol% C ₂₊	87	14.8 ^d	—	—	16.2 ^h	15.6 ⁱ	9.5	—
2	RKR live oil	52.5 mol% C ₂₊	87	14.0 ^d	—	—	15.2 ^h	16.4 ⁱ	8.6	—
3	RKR stock tank oil ^b	Ethane	87	18.3 ^d	11.2 ^d	—	—	—	—	—38.8
4	RKR stock tank oil ^b	Propane	87	3.9 ^d	3.0 ^d	—	—	—	—	—23.1
5	Terra Nova live oil	9.56 mol% C ₂₊	96	62.8 ^e	—	—	74.3 ^h	56.2 ⁱ	18.3	—
6	Terra Nova live oil	21.4 mol% C ₂₊	96	57.8 ^e	—	—	67.8 ^h	54.8 ⁱ	17.3	—
7	Terra Nova live oil	29.4 mol% C ₂₊	96	31.8 ^e	—	—	35.0 ^h	44.4 ⁱ	10.1	—
8	Terra Nova live oil	32.3 mol% C ₂₊	96	30.0 ^e	29.3 ^e	35.9–36.2 ^e	—	36.0 ⁱ	—	—2.3
9	Gilwood stock tank oil	Ethane	60	7.5 ^e	7.2 ^d	—	—	—	—	—4.0
10	Gilwood stock tank oil	Propane	60	2.82 ^e	3.1 ^d	—	—	—	—	9.9
11	<i>n</i> -decane	CO ₂	38	8.0 ^a	8.7 ^c	8.9 ^c	—	7.6 ^j	—	8.7
12	Live decane	CO ₂	71	12.25 ^a	11.7 ^f	—	11.7 ^g	13.4 ^j	—4.5	—4.5

^a indicates the VIT miscibilities measured in this study.

^b The relatively large deviations observed between slim tube and VIT for RKR STO is due to high asphaltenic nature of this crude oil.

^c Elsharkawy et al. 1996

^d Rao 1997

^e Rao and Lee 2003

^f Metcalfe and Yarborough 1979

^g Monroe et al. 1990; Orr et al. 1993

^h Esmailzadeh and Roshanfekar 2006

ⁱ Ayirala et al. 2003

^j Ayirala and Rao 2007

Table 9—Comparison of VIT miscibilities with other experimental techniques and calculation approaches.

Examples: 5 in. (30pi) wide, with explanations

Scenario 1:

Symbol	Value	Description
F_a	324.8	Friction parameter in annulus
h_{tvd}	9587	Total vertical depth
h_{rb}	2150	Vertical depth to seabed
r_{ri}	0.4509	Riser inner radius
r_{do}	0.127	Drillstring outer radius
c_1	10	Parameter related to drillstring velocity
c_2	25	Parameter related to drillstring acceleration
p_0	1	Atmospheric pressure (bar)
F_r	0.003	Friction parameter in the riser
$\bar{\rho}_a$	1.7705	Average density in the annulus
$\bar{\rho}_r$	1.7470	Average density in the riser

Table 5—Parameter estimates for MPC model in Eqs. 17–20 (values are based on well information and step responses).

Sizing this table at 3.33 in. (one-column width) makes the data look cramped and harder to read. This table should be sized at 5 in. (30pi) for readability.

Symbol	Value	Description
F_a	324.8	Friction parameter in annulus
h_{tvd}	9587	Total vertical depth
h_{rb}	2150	Vertical depth to seabed
r_{ri}	0.4509	Riser inner radius
r_{do}	0.127	Drillstring outer radius
c_1	10	Parameter related to drillstring velocity
c_2	25	Parameter related to drillstring acceleration
p_0	1	Atmospheric pressure (bar)
F_r	0.003	Friction parameter in the riser
$\bar{\rho}_a$	1.7705	Average density in the annulus
$\bar{\rho}_r$	1.7470	Average density in the riser

Table 5—Parameter estimates for MPC model in Eqs. 17–20 (values are based on well information and step responses).

Scenario 2:

Benefits	CLLNG	CSF	CCSL	CLPG
(a) Reduced storage requirements	Y	Y	Y	Y
(b) Improve delivery to storage	N	Y	N	N
(c) Enhanced export growth potential	Y	Y	Y	Y
(d) Efficient incremental expansion	Y	Y	Y	Y
(e) Reduced stranded costs	Y	Y	Y	Y
(f) Improved maintenance planning	Y	Y	Y	Y
(g) Enhanced response to upsets	Y	Y	Y	Y
(h) Improved capability to optimize fleets	Y	N	N	N
(i) Reduced port congestion	N	N	Y	N

Key: Y = Benefit for specific common facility; N = Little or no benefit for a specific common facility

Table 6—Summary of specific common facility benefits.

Sizing this table at 6.83 in. (two-column width) adds too much extra white space between the four narrow columns, which makes the table look awkward. This table should be sized at 5 in. (30pi) for aesthetic reasons.

Benefits	CLLNG	CSF	CCSL	CLPG
(a) Reduced storage requirements	Y	Y	Y	Y
(b) Improve delivery to storage	N	Y	N	N
(c) Enhanced export growth potential	Y	Y	Y	Y
(d) Efficient incremental expansion	Y	Y	Y	Y
(e) Reduced stranded costs	Y	Y	Y	Y
(f) Improved maintenance planning	Y	Y	Y	Y
(g) Enhanced response to upsets	Y	Y	Y	Y
(h) Improved capability to optimize fleets	Y	N	N	N
(i) Reduced port congestion	N	N	Y	N

Key: Y = Benefit for specific common facility; N = Little or no benefit for a specific common facility

Table 6—Summary of specific common facility benefits.

APPENDIX H: BOOKS STYLE

SECTION 1: FORMATTING

1.1 Textbook heading styles. For book chapters, only headings 1 and 2 should be numbered (e.g., 4.1 for Heading 1; 4.1.1 for Heading 2):

- Heading Level 1—Arial, 12 point, boldface, no run-in, no period. The first paragraph following a Heading Level 1 is flush left (no indent)
- Heading Level 2—Times New Roman, 12 point, boldface, run-in with period, flush left
- Heading Level 3—Times New Roman, 12 point, boldface, italic, run-in with period, indented
- Heading Level 4—Times New Roman, 12 point, italic, run-in with period, indented
- Heading Level 5—Times New Roman, 12 point, run-in with period, indented

1.2 Textbook example/problem styles.

H-1.2a In book chapters, examples and corresponding solutions should be bordered above the first line and below the last line in order to set them apart from the rest of the text, and should be formatted as follows:

Example 1.1—Title of Example. Times New Roman, 12 point, boldface, run-in with period, flush left.

Solution. Times New Roman, 12 point, boldface, italic, run-in with period, indented.

1.2b Problems should be numbered and introduced at the end of a chapter using a heading level 1.

Problems

- 1.1 Times New Roman, 12 point bold numbers, hanging indent, run-in with text. Text here, text here, text here. Text here, text here, text here. Text here, text here, text here. Text here, text here, text here.
- 1.2 Text here, text here, text here. Text here, text here, text here. Text here, text here, text here. Text here, text here, text here.

- 1.3 Figures and tables.** Authors should submit all figures and tables in separate documents (one for figures and one for tables), rather than embedding them in the text.
- 1.4 Front matter.** Authors are asked to provide a Foreword, or brief introduction to the book, along with any acknowledgments that should be included.
- 1.5 References.** References should be included in a single list at the end of the book; if the book has multiple contributors (i.e., a different author for each chapter), references may be included at the end of each chapter.

SECTION 2: ABBREVIATIONS AND ACRONYMS

- 2.1 Abbreviations.** Spell out abbreviations in the table of contents, chapter titles, and section headings.
- 2.2 Acronyms.**
- 2.2a Acronyms are defined when they first appear in each chapter.
- 2.2b If an acronym (e.g., WOR or ROP) is used in an equation and cannot be replaced with a one-kernel symbol, italicize the acronym in the equation but not in a subscript or the text.

SECTION 3: ATTRIBUTION

- 3.1 Attribution for modified figures and tables.**
- 3.1a When using a figure or table that belongs to another copyright holder, and when that figure or table is changed in some way from its original appearance, the caption will include a citation that uses the word “after.”
- ♦ *Examples:* Fig. 1.1—Pressurized mud balance (after Smith 1991).
Fig. 1.2—Cable-tool rig schematic. After Brantley (1940).
- 3.2 Attribution for redrawn figures and tables.**
- 3.2a When an author wants to use a figure of a nonspecific industry-understood object such as a drillstring, and they provide a drawing of a drillstring from a journal rather

than drawing one of their own, we can avoid the time-consuming effort of requesting permission and have it redrawn instead.

3.2b *Redrawn figures and tables do not use the phrase “after” in their captions; they do not need to cite a source.*

3.2c “Modified” is a word used in correspondence with another copyright owner when requesting permission to republish their figure or table with changes. *Modified is not a word used in the figure caption.*

3.3 Attribution for republished figures.

3.3a If the figure or table is produced exactly as it appears in the original source, cite the source using the author and year format.

◆ *Example:* Fig. 1.3—Steam engine (Brantley 1971).

3.3b Use “courtesy of” or “reprinted by permission from” for material that is directly provided by a company or individual.

◆ *Example:* Fig. 1.15—Typical fixed-platform structure. Courtesy of Petrobras.

3.3c If the figure is fair use or does not require permission, still cite the source (author year).

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SPE STYLE GUIDE 2015–2016

List of Revisions

Content changes from the 2014–2015 edition

SPE Style Guide 2015 Revisions List

1. Section 1.3
 - a. Reverted to the previous style for use of abbreviations, in which the term is spelled out at first use with the abbreviation following in parenthesis, then the abbreviation is used throughout the rest of the paper or chapter.
 - b. Added a stipulation that, in journal papers, the author can decide to spell the term out again when it is used as a section title, subsection title, or as a figure/table caption.
 - c. Corrected “computerized tomography” to “computed tomography.”
2. Section 3.2
 - a. The word “meetings” was changed to “events” in several instances to adhere to the update in Subsection 6.4.
3. Subsection 4.1b
 - a. Reverted to the previous style for use of abbreviations, as detailed in Section 1.3.
4. Subsection 5.8b
 - a. Updated Bullet 4 to include verbiage regarding prevention of ambiguity.
5. Subsection 5.9b updated to replace the word “meetings” with “events” to adhere to the update in Subsection 6.4.
6. Section 6.1
 - a. Added new Subsection 6.1b to discuss representation of Arabic names. (The *Chicago Manual of Style*, 16th edition, Sections 8.14 and 11.99 were researched for this topic. Additional information was provided by the JPT Middle East Editor.)
 - b. Remainder of the section was renumbered to accommodate the addition of 6.1b.
 - c. Subsection 6.1j (formerly 6.1i) updated to reflect that spaces will now be used between initials in proper names.
7. Subsection 6.2d
 - a. Updated to include capitalization of all letters in company names if the name is registered or trademarked as such.
8. Subsection 6.3b
 - a. Minor change to correct subsection reference in text from 6.3.1 to 6.3a.
9. Subsection 6.3e
 - a. Updated to reflect noncapitalization of geologic formations that are used descriptively vs. capitalization of formations used as a proper name or that are well-known.
10. Section 6.4
 - a. All instances of the words “meeting” and “meetings” changed to “event” or “events” to be more in line with current SPE terminology
 - b. Subsection 6.4d: Minor change to correct section reference in text from 8.1 to 8.2. Also updated to include capitalization of event themes and proper use of PetroBowl.
11. Section 6.5

- a. Added section to discuss use and representation of trademarked names.
12. Subsection 8.10b
- a. Updated Bullet 3 to include that no comma should be placed between the last initial of the third author's name and et al. in references with more than three authors.
13. Subsection 8.10c
- a. Added "Company or Government Report" to the list of commonly used reference types.
14. Subsection 8.13a
- a. The example in the last bullet of this subsection was updated so that the name of the journal is presented in its entirety, rather than in its abbreviated form.
15. Appendix A
- a. The term "casedhole (adj.);" was added to the list of oil-industry terms.
16. Appendix B
- a. Updated the opening paragraph to eliminate ambiguity regarding use of abbreviations.
 - b. Updated "computerized tomography" to "computed tomography."
 - c. Updated "Ppa" to "ppa."
17. Appendix C
- a. Updated stock tank barrels per day to include the standard measurement abbreviation STB/D.
18. Appendix G
- a. Minor updates made to the formatting of all example tables to bring them current with SPE guidelines.
19. Appendix H
- a. Added new appendix to cover formatting for books.