



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240

IN REPLY REFER TO

9180 (713a)

April 14, 1966

Memorandum

To: Chief, Division of Engineering

From: Clark L. Gumm

Subject: Rewrite of Manual of Surveying Instructions

This is my answer to your memo of February 25 addressed to individual members of the Washington Cadastral Survey staff.

Instruction Memo No. 66-98, March 2, 1966, addressed to the field, subject: "Rewrite of Manual of Survey Instructions" contains one paragraph--that at the minimum--is misleading. This paragraph reads as follows:

"This rewrite was the result of the efforts of a committee composed of cadastral survey chiefs of several States and representatives of this office. The result of this joint effort was assembled, reviewed, and written in final form by D. R. W. Wager-Smith while he was assigned to this office."

On April 23, 1965, you wrote to the Washington cadastral staff members, including Mr. Wager-Smith, that:

"Wager-Smith should start at once on the task of editing the manuscripts prepared by the individual committee members. This editing task should be done with the thought of clarifying the instructions and not with any thought of introducing new elements into the manual."

Actually the manuscript produced is 100 percent the effort of Mr. Wager-Smith. As far as I can determine no portion of the work of the committee has been used by him in his "editing" assignment. His draft reflects completely his ideas on how the manual should be written, what should be in it, and what should not be in it.

Actually one cannot help but have a grudging admiration for Mr. Wager-Smith. Several years ago he determined to rewrite the manual. Since that time he has single-mindedly and ruthlessly ploughed ahead towards that objective, disregarding what everyone else thought he was supposed to do. Of great concern to me is the complete absence of the clarification and improved handling of problems which time has shown were not adequately covered in the 1947 manual. The long time experience, day-to-day knowledge, and the improvements written into the manuscripts by the other members of the committee are ignored in the Wager-Smith draft. He told me that the reason for not using the committee's efforts is that to be properly creative he needed to work directly from the 1947 manual.

I could accept the complete loss of the time and efforts of the committee over one year and a half if the result would warrant it. However, I believe Wager-Smith's draft will please no one except the author. Furthermore it could cause the Bureau embarrassment because of criticism from users who look to the manual for guidance and precept rather than a bland recital of rectangular history and survey principles. Mr. Wager-Smith's philosophy in this respect is exemplified by his statement in the last sentence of the second paragraph of Chapter III where he says: "All fundamental principles have been retained, but the detailed application of these principles to specific problems is left to the individual judgment of competent surveyors, subject to proper supervisory review."

While he omits detailed applications of survey principles and leaves specific problems to individual judgments, the manuals for over 100 years have been attempting to eliminate the "individual judgments." This has been done to secure a uniformity of handling problems so the surveys can be defended on the basis of standard procedures and precedents which have stood the test of legal inquiry and trial. This is public information having the tacit standing of regulations and should be available to the public as a published document. The manual also has been used consistently as authority in appeals before the Bureau and Department. Without an authority as to what is or what is not permissible in the execution of public land surveys both for internal use and legal justification no supervisory control can be exercised in the execution, review, and approval of such surveys.

In addition, the manual has come to have a legal standing assimilable to substantive law insofar as the interpretation of public land survey law is concerned. In suits before the courts involving surveys the manual often is cited as authority. The laws of most of the public land states require that if retracements or resurveys of the public land surveys are to be made by private surveyors they shall be made in accordance with the manual. This situation alone should make it incumbent upon us to provide a usable manual for private surveyors operating under state law.

In this connection Mr. Wager-Smith in Chapter 1, pages 13-17, has chosen to paraphrase the legal codifications of survey statutes as given in 43 USC 751, 752, and others. In some instances his paraphrases are incorrect. In other cases he has quoted court decisions without giving the citation. More to the point he has eliminated a great number of citations which are landmark cases in survey law. Reference to these cases permits of this easy identification and facilitates further research into the legal and factual elements involved.

In the summer of 1965 when the first two chapters of his drafts were available, I commented on them in a five-page memorandum. These comments are still pertinent and a copy of my memorandum is enclosed.

Mr. Wager-Smith in his private career as a surveyor and during his service with us has had more exposure to mineral surveys and surveys in Alaska than to any other public land survey element. This is manifested by the length of his chapter on mineral surveys which runs to 70 manuscript pages. (Only some 30 mineral surveys were approved in 1965.) This is the second largest chapter following the System of Rectangular Surveys which contains 114 pages, his Chapter 5 (which is former chapters 5 and 6), "Resurveys and Restoration of Corners," which two subjects are among the most important, contains only 50 manuscript pages.

One interesting innovation in Mr. Wager-Smith's chapter on mineral surveys is the inclusion of some nine pages of the sections of the Revised Statutes of 1878 having to do with mineral lands but containing nothing about mineral surveys. Actually all this material, if needed, has been covered in the United States Code which is far more easily available than text books on astronomy.

Apart from the first two chapters I have made no attempt to edit, correct, or otherwise make detailed comments on Mr. Wager-Smith's manuscripts but where there are obvious misstatements I have redlined them. There are numerous errors, misstatements and half statements which I have not noted.

I am convinced that nearly all of our surveyors will be unhappy with Wager-Smith's draft. I believe those private surveyors who use our manual will be disappointed. Persons engaged in title and survey problems such as other bureaus, title companies, and attorneys will be dissatisfied. I expect criticism from professional societies. I further believe that all of these complaints will reflect adversely on this Bureau. If the Bureau would stand to gain anything from the Wager-Smith manual that could possibly offset the disadvantages I would not object. However, other than bringing a pride of authorship to Mr. Wager-Smith I see no advantage to anyone.

I consider Mr. Wager-Smith's efforts to be completely unacceptable and recommend:

1. The Committee's manuscripts be "edited" or
2. The 1947 manual be continued in force.

*Clark F. Gumm*

Enclosures 2

1. Wager-Smith's draft
2. Memo of July 10, 1965



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D. C. 20240

9185 (713)

Memorandum

To: Chief, Division of Engineering  
From: Chief, Branch of Cadastral Engineering  
Subject: Manual now being written by Mr. Wager-Smith

The numbers listed below refer to marked paragraphs of Chapters 1 and 2 of Mr. Wager-Smith's manuscript.

## Chapter 1

we will

use 1785. 1 - A. The next year (1786).

C. K.

B. Not so. After the survey of the seven ranges, no rectangular surveying was done for nearly 10 years. During this time, Congress again considered the advisability of retaining the rectangular system.

Check

C. At first the public land surveys were under the direct control of Congress, and later, the Department of the Treasury.

Check

D. In addition, a Surveyor General of the Northwest Territory was appointed in 1797. There also were numerous other surveyors general prior to 1823.

"

E. See D above.

Check

F. I do not believe this is true. We have reason to believe that detailed instructions were issued by the Surveyors General (N. and S. of Tennessee) to their surveyors and there was a steady stream of instructions from the Secretary of the Treasury.

Check

2 - A. The Commissioner of the General Land Office did not issue these instructions but rather the Surveyor General Northwest of the Ohio River.

Check

B. In addition, in 1851 an almost identical manual had been issued by the General Land Office for use in Oregon.

Include it.

C. The Manual of 1864, although not printed until 1871, probably should be included.

I have read and I feel that the pp. should not be done. DRW intended it to sound as if it were a letter, try to use it.

With this paragraph I take violent exception. It is untrue and indicates that a little knowledge is a dangerous thing. Passing over Washington, Jefferson, and several other signers of the Declaration of Independence who were surveyors, there is Lincoln who also was a surveyor. The original surveyors of the seven ranges were gentlemen surveyors of the original States, a number of whom went on to become famous in the Northwest Territory. Coming closer to the present, the deputy surveyors during the middle of the nineteenth century were important people in their communities who were able to secure substantial bonds to ensure the performance of their job. Surveying was a highly professional occupation until recently and attracted some of the best minds of the times. I will state that the educational status of these men, together with their economic level and the general respect accorded them, would place them in the forefront of the population.

Mr. Wager-Smith's statements in this paragraph reflect a deprecatory attitude toward surveyors and begins the apologetic tone of his writing on the manual. This is not proper as the survey of the public land of the United States requires no apology--it has been a masterpiece of accomplishment. One thing that has been overlooked is that the "contracts" given the deputy surveyors were not competitive but were "negotiated contracts." I have known several "contract surveyors" who worked prior to 1910 and to my knowledge they all were graduate civil engineers. Wendell Hall's father was one.

Clarity

4 - A. Of what significance is this statement? The mails have always run and textbooks are transported by the mails.

Clarity

6 - The manual, by law--not public acceptance, is the authority on public land surveys.

Let's leave in the manual to make a control my needed in 1966. We will not discontinue publication of the Ephemeris.

7. Here we come to a matter which Mr. Wager-Smith has chosen to decide should be eliminated from the new manual--namely, Instruments and Methods. In the absence of notes of the committee on the Manual, it might not be clear what the consensus of opinion was. However, it is my belief that it was decided to leave out only the most elemental surveying discussion but to leave in the solar transit and astronomy.

Mr. Wager-Smith is attempting to introduce the principle that if it is printed elsewhere, leave it out of the Manual--the theory being that if our surveyors should have occasion to know elementary astronomy (which they do), they can purchase textbooks on astronomy. It must be pointed out that if we eliminate astronomy we also should discontinue the Ephemeris. I have no objection to discontinuing the Ephemeris if we are to eliminate astronomy. However, we cannot eliminate the need for surveyors to have access to such data. Mr. Wager-Smith has suggested that such astronomic ephemerides data as is required can be obtained from the yearly free hand-outs of the instrument companies. Although not discussed, the British Commonwealth also puts out a surveyors' ephemeris which we could buy or rather have our surveyors purchase. I am not in agreement with this

philosophy. With all the things Mr. Wager-Smith intends to leave out, our surveyors would be required to carry a library along with them. However, one thing he intends to add in the chapter on mineral surveys is that portion of the revised statutes dealing with mineral surveys and copied from the 1878 edition. Assuming for the moment that it is desirable to leave out astronomy, it appears preposterous to include laws which are far more easily available than textbooks on astronomy. In any event, the 1878 edition of the Revised Statutes has long since been modified and amended beyond easy recognition. In addition, the living law which is the case law involving decisions of the courts on meaning of the revised statutes is far more pertinent and explanatory of the "law."

8A. The manual is the "regulations." Why all the "thereons," etc. Eliminate this surplusage. *I assume this means Surplus means "H" Sec 1099.*

9 A. It has consistently been the position of the surveying division that we do not deal in "equities." Surveying basically is a matter of fact, not equities. Equities can and should be considered by the policy and legal arms of the BIM.

10. Mr. Wager-Smith has applied his own definition of "public domain" and "public lands." Insofar as public land surveys are concerned, "public lands" consist of those lands which, after inuring to the United States, have remained in public ownership, or after private acquisition have been returned to public ownership and the status of public land by law. Other federally owned land commonly called "acquired" are not public lands and are subject to administration under other than the public land laws.

10 A. Incorrect. Some of the 13 Original Colonies had no western lands.

11. Addresses and custodians are not up to date.

11 A. This should be "original public land survey records." The other public land records are on file in Washington and local record centers.

11 B. Not all the mineral survey records are in Billings.

12. Not altogether true. For example, the California enabling act does not mention public land.

13. Why list the non-public land States.

14. There is a possibility that these provisions can be considered superseded by 69 Stat. 639, 44 USC 366-380.

15 A. It is my belief that no citations should be made to the CFR since it is subject to constant changes, both in numbering and language. Actually, the manual is a book of "regulations" of probably as much force and effect as the formal regulations in 43 CFR.

*Not True for the Astron needed for 1966 Survey*

*This is true!*

*Let's be sure that our definitions are OK*

*Correct*

*Correct*

*Correct*

*Correct*

*Is it or isn't it?*

*If we do not want to cite CFR - let's not cite CFR*

*Correct* 17. Incorrect, as there was a major survey in 1950.

? 18. Why make a negative statement.

*Naughty* 19. A. Sentence with 94 words.

*Why is it?* 20. Why is it necessary to discuss the chain which has not been used by GLO since 1900 or before?

Chapter II

*Check* 1. Here again I do not believe that all of the "technical treatment" should be omitted. Again I see no reason to print several other volumes to supplement the manual and buy textbooks for the same purpose.

? 2. Overly flowery.

*if so correct* 3. The last two sentences are misrepresentations.

*132 vs 100 needs det. section* A discussion of stadia is something that should be omitted.

*It is a modern method that (if usable) deserves same attention as stadia* 5. The subtense bar does not warrant an extended discussion.

*Let's not give them methods "EXTENDED" discussion* 6. Triangulation does not warrant an extended discussion.

17. 7 A. Is this so, and if so, I was not aware of it.

*We should cover the solar transit - as it best our methods of using it.* 8. How about the solar transit?

*OK* 8 A. Rather than specify some of the agencies involved in the high order horizontal control systems we should say the national horizontal control network.

*Check* 8 B. Maybe in Alaska, although I doubt it.

? 8 C. In Alaska. Not elsewhere.

*Let's not put down your own surveyors* 9. It is not necessary to continually talk about the "Bureau's surveyors," the "Bureau's methods," or the "Bureau's surveys." This repetition strongly suggests that the Bureau's practices are inferior and the entire approach to these matters is one of apologetic diffidence.

*Good suggestion* 10. Why must we discuss these elementary items and yet leave out the real "need to know items."

*I don't care how much better* 11. Mr. Wager-Smith--on the basis of what authority, I do not know-- dismisses the tangent method as being rarely used. I have run thousands of miles and always used the tangent method. Here Mr. Wager-Smith, who to the best of my knowledge never ran a mile of public land surveys, does not have a basis for making such a statement. In addition, for latitude 40°, the tangent line departs from the rhumbline less than 20 feet at 6 miles.

*don't think has been standard for several score of years - lets keep the description*



*Clarify*

12. In practice, the solar transit can and is used up to 11:15 p.m. and started again at 12:45 a.m. This does not mean that work necessarily is stopped for an hour and a half. Actually, by means of back or fore sites, work is carried on.

*Clarify*

12 A. Out of a clear sky we talk about the P-Z-S triangle, yet we have no discussion on astronomy.

*Explain*

13. This is true only for Alaska.

*Explain + correct if necessary*

14. Not necessarily so.

*Explain + suggest*

15. Why say this?  
*Explain if necessary*

*Be sure that we cover all new methods acceptable to date.*

16. NEW SURVEYING METHODS

Everything that is said in this section could be adequately covered in four or five paragraphs. Actually, this section, as written, is not manual material but more a resume of Alaska practices which should more properly be the subject of an article on methods.

*Let's not downgrade any of our surveys*

Mr. Wager-Smith writes well, yet I am not impressed with his primer style. There are a number of sentences ending with "thereof," etc., which should be eliminated. As stated before, I detect in his style an undercurrent of disdain for our surveying practices, both past and present (except in Alaska). The constant use of "Bureau's surveyors," etc., makes this attitude apparent.

*We had a good Committee that be sure we account for what they did.*

I am more disturbed, however, about how he is going about the editing job he was assigned. He has told me that if he is to get the manual into "his words" he cannot use anything that was prepared by the committee. He consequently is working directly from the old manual, or so he has told me. With all due respect for Mr. Wager-Smith, I cannot credit him with more or better knowledge than the committee on what to eliminate or retain.

*I doubt that this statement can be supported by anything in pp 1 + 2 of the old or new manual*

Basic to the problem is that I do not believe the public, private surveyors, our surveyors, the legal profession (which uses the manual for legal purposes), and others will get what they have been used to and have been led to believe they will get from the new manual.

*Forget it!*

I therefore recommend that Mr. Wager-Smith be relieved from "editing" the manual manuscript and that the job be turned over to a private concern or possibly the Geological Survey, if they will undertake it. In the meantime the 1947 edition can be reprinted.

*The procedure has been explained - and we will never admit that we cannot do the job*

An alternate plan is to proceed with the manuscript as prepared by the committee.

*This is the job for Geom + the Committee*

Although many of the items I have called attention to are editorial in part, they do point up that a careful editorial scrutiny is required.

*ER*

*Clark L. Humm*

July 13, 1965 2185 (713)

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*Apparently this has been corrected.*  
4/4/64

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An alternate plan is to proceed with the manuscript as prepared by the committee.

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---

**NO REVISIONS  
SUBMITTED**

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Shearer





UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240

APR 15 1966

Memorandum

To: Chief, Division of Engineering

From: Norville E. Shearer

Subject: Rewrite of Manual of Survey Instructions

Pursuant to your memorandum of February 25, the following are my comments on the Wager-Smith rewrite of the Manual of Surveying Instructions:

<u>Section and Page</u>	<u>Comment</u>
1-1	Citation of "passage of laws by the Continental Congress" should be amended to read "ordinance of May 20, 1785, by the Continental Congress."
1-5	Citations of custodians of public land records are wrong as they relate to Florida, Illinois and Indiana. See the pamphlet, <u>Restoration of Lost etc.</u> , for correct custodians.
1-6	Is the Fairbanks, Alaska, district office a properly constituted "public survey office?"  Is there a public survey office at Spokane, Washington?
1-18	I am not aware of "a body of regulations governing the actual field and office procedures, etc." Where is such to be found?
1-20	For the public's information, it should be said that the cited Manual Supplements are obtainable from Superintendent of Documents, etc.
2-9	Under "current practice methods," the solar transit is still being used sufficiently to be included as one of the "methods."
2-10	The customary citation of magnetic declination is the <u>average</u> of observed declinations over all of the work, not that at the SE corner of the township.

- 2-10 That is the difference between "A table of conversions between latitude-and-longitude, etc." and "The Standard Field Tables also carry a set of "M" and "P" factors, etc."
- 2-11 Where can the "pamphlet form" for M & P factors north of 50° be obtained and for how much, etc?
- 2-11 Use of M & P factors is fully explained in the Tables.
- 2-15 What is the "P-Z-S triangle?" Any uncommon expression or abbreviation should be explained.
- 2-19 The discussion of Loxodromes is entirely unnecessary. Such are well-covered in text books and related references.
- 2-20 to 2-35 Much of this material is irrelevant and immaterial. It omits only detailed instructions on how to dig the camp latrine.
- 2-35 What "techniques of testing and using" the solar transit are "peculiar to Bureau practice?"
- 3-4 " . . . shown on maps published by the Bureau.", by what title and where available?
- 3-5 Footnote re 4th P.M., as contained in 1947 Manual should also be made in this edition.
- Why single out " . . . especially in Ohio . . .?"
- 3-14,15 "Midway" should be midpoint. There should be no interchange of these two words.
- 3-58 " . . . will be stopped against . . ." should read " . . . will be terminated at . . ."
- 3-100 "Cataclysmic." Is this a new word for "avulsively."
- 3-103 Under Meandering in General, what is meant by "lines of a higher order" and "place for the meander line."
- 3-104, 105 What is meant by "desirable land-use patterns."

- 3-105, 106, 107      There seems to be endless confusion between "monument" for "corner" and "meander line" for "ordinary high water line."
- 3-107                The part on Limits of Error is all confused with the old parts on "Rectangular Limits" and "Limits of Closure." The present version has been written from sheer ignorance.
- 3-112                What are the limits of "third order" and "second order."
- Chap. I7             The whole chapter confuses "monument" with "corner" in every other sentence. A monument is not a corner.
- 4-2                  Last paragraph is irrelevant.
- 4-4, 5                How to construct monuments is a matter for Vol. 2.
- 4-24                 The photograph is misplaced as it is not of a tree monument but rather a bearing tree and should be placed on or about 4-30.
- 4-32                 Other Accessories - Not relevant.
- 5-3                  Resurveys are authorized at the State level.
- 5-13                 The paste-up excerpt is entirely out of place-- it relates to nothing under the section for Witness Corners and Line Trees.
- 5-17                 "Lost interior corners of four sections, . . ." This statement reflects sheer ignorance.
- 5-27                 Broken Boundaries. This section should be enlarged to include the reestablishment of old resurveyed lines by broken boundary methods.
- 5-27                 Where is Fig. 68A?
- 5-32                 2nd paragraph. Retracements, etc., are not directed toward identifying alienated land. They are directed towards identification of the public lands.

- 5-33 The paste-up part is out of place. It should be in the section treating with proportionate methods.
- 5-34 3rd paragraph. The surveyor has no responsibility re recommending a course of action for an amended entry--this is a function wholly for the 1000 boys.
- 7-1 Preparation and approval of special instructions are not stated in accordance with delegated authority.
- 7-1 2nd paragraph ". . . the general instructions contained in the manual." What manual? What general instructions? The prefacing statement of this thing says ". . . published as a guide . . ."
- 7-2 4. Appropriation. It is not the responsibility of the surveyor to ". . . keep and submit an accurate account . . ." This is an accounting office responsibility.
- 7-2 5. Character of the Work. This section is never omitted. It establishes what is the nature of the surveys.
- 7-2 6. Related Surveys. This is apparently a new heading for what has been previously designated as: History of earlier surveys. The new heading is not appropriate and the explanatory statement is so poor and irrelevant that it is worthless.
- 7-4 Under no conditions should mimeographed copies of standardized statements be employed in the special instructions. Such a practice will only lead to carelessness and indifference in considering the problems of each survey. SAC's present practices are prime examples of carelessness in writing instructions by the use of "paste-up" paragraphs.
- 7-5 Last sentence. This is nice fatherly advice--of the kind that I thought the '47 Manual was supposed to be guilty of and this manual would avoid.

- 7-11 What is meant by "primary control points" and "intervisible."
- 7-12, 13 Forest III. This does not conform with ordinary procedures.
- 7- In several places. The words "parting line" are not a proper substitute for the technical words "division line" or "partition line" which the courts have employed.
- 7-16 It should not be implied that "State law" has any effect upon public land rights to beds on non-navigable waters.
- 7-19 Citation of the Department's 1909 decision is lacking.
- In the paste-up of the Lee Wilson decision, a most important part of the syllabus, previously cited, has been omitted.
- 7- Alaskan surveys. Much of this should be in Vol. 2.
- 9-8 The practice of preparing supplemental plats is dead if "very old surveys" cannot be employed.

Fillman

**SEE REVISIONS ON  
MANUSCRIPT**



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240

9185 (713a)

April 18, 1966

## Memorandum

To: Chief, Division of Engineering

From: Thomas A. Tillman

Subject: Rewrite of Manual of Surveying Instructions

In reading over the manual as written by Mr. Wager-Smith I find two major general criticisms:

(1) He has attempted to simplify the foggy sentence structure of the 1947 manual by paraphrasing the statements in it. In so doing he has deleted qualifying material to such an extent that his statements are often no longer true. These qualifications could be made in separate sentences to remove fog, but they must be retained. The narrative has been shortened at the expense of meaning.

(2) New material was carefully winnowed by the committee from numerous suggestions for inclusion in the new manual. Only matters of general--and more <sup>than</sup> occasional--use were chosen in order to avoid increasing the size of the manual. A few of these items were given token mention by Wager-Smith. Others were eliminated.

I have concentrated most of my checking on the chapter covering resurveys. I rather like Wager-Smith's approach to this chapter in that he tried to gather into one place some subjects which are scattered in the 1947 manual and still somewhat so in the committee's version. However, he has deleted so much substantive matter that the chapter is deficient even as compared to the 1930 manual. Putting this material back into Wager-Smith's edition would be tantamount to another rewriting. I believe it would be simpler--and less dangerous--to rework the committee version, at least of this chapter. That probably holds true of much of Wager-Smith's rewrite.

As an example of the omissions, consider the very first part of Wager-Smith's chapter on resurveys. Without attempting to change his approach I have added the minimum material necessary to make it factual:



"The term 'resurvey' means the reestablishment or reconstruction of the land boundaries and subdivisions that were represented in the field-note record and on the plat of a previous official survey. A required part of the resurvey is a field-note record descriptive of the work performed and a plat that represents the resurvey, subject to the approval of the directing authority. A resurvey is always related in some measure to the prior survey, if only in its outboundaries. Generally, it may be said that the extent to which its lines and monuments depend upon those of the prior survey distinguishes it as a "dependent" or an 'independent' resurvey. The term 'resurvey', standing alone without qualification, is always understood to mean a dependent resurvey.

"There is a twofold object of a resurvey: First, the adequate protection of existing rights acquired under the original survey in the matter of their location on the earth's surface, and, second, the proper marking of the boundaries of the remaining public lands."

Where the 1947 manual makes clear statements--and there are many--I do not believe paraphrasing them is an improvement. Besides making many of them less specific, there is a real danger of changing the meaning although that is not intended. This is especially true of definitions, but it also applies to some of the sections of the 1947 manual which seem ambiguous. These are often based on Departmental decisions, General Land Office decisions, or definitive findings by the courts. The earliest manuals were based on statutory law, with such material added as seemed necessary to apply it practically to surveys. As time passed, questions and protests resulted in more and more executive and judicial interpretations of the laws. The later manuals, especially those of 1930 and 1947, reflected these decisions. My belief is that their error lay in retaining the legalese and legislative language in too undiluted a form. They did not err by including it. The manual, after all, is merely a directive as to how to apply these legal principles in making a survey. Wager-Smith has apparently reached a decision to delete most citations from the new manual. I believe this will disappoint BLM, lawyers, courts, States, and local surveyors.

One of the common errors in the field notes of resurveys has been the failure to describe the condition of an original corner as it exists prior to any rehabilitation or remonumentation. This is always important, emphatically so if the resurvey ends up in court. Section 423 of the 1947 manual covers the subject. The committee version modified this only to the extent that description of the original evidence should precede the description of the new monument. The Wager-Smith version skips this entirely. He makes no mention of it in the chapter on field notes either. The purpose in having it in the chapter on resurveys is so that field surveyors will not fail to note the required information. A similar deficiency is the omission by Wager-Smith of the material in section 555 of the 1947 manual (chapter on field notes). This clarifies some important field procedures.

Wager-Smith's treatment of the restoration of a lost corner on an irregular exterior seems more involved than the exposition in the 1947 manual, sec. 375.

In summary, while Mr. Wager-Smith's edition is a good discussion of cadastral surveys, it needs extensive work before it could be a good manual.

I have marked a number of things I think should be clarified or corrected. However, I believe that a check of factual things such as history, statutes, and Bureau actions needs to be made. The flaws that trouble me are not editorial matters but matters of substance.

*Thomas A. Tillman*

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
Bureau of Land Management  
Washington, D. C. 20240

In Reply Refer To:  
9185 (713a)

March 2, 1966

Instruction Memo No. 66-98  
Expires 6-30-66

To: State Directors  
Chief, Division of Engineering - DSC and PSC

From: Assistant Director, Resource Management

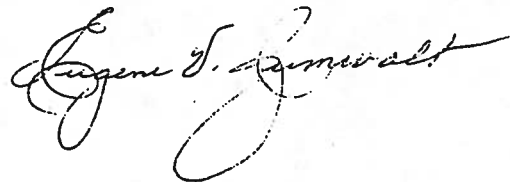
Subject: Rewrite of Manual of Survey Instructions (FD 4-4-66)

Under separate cover we are sending you three copies of the proposed rewrite of the 1947 Manual of Survey Instructions.

This rewrite was the result of the efforts of a committee composed of cadastral survey chiefs of several States and representatives of this office. The result of this joint effort was assembled, reviewed, and written in final form by D. R. W. Wager-Smith while he was assigned to this office.

We would like your chief of cadastral surveys to read this copy carefully and submit his comments. Any proposed editing or rewriting should be indicated on one of the three copies and that copy returned to this office by April 4, 1966.

Any review of the proposed rewrite will reveal that a great deal of the 1947 manual has been eliminated. There is attached to two copies of the proposal a list of the items eliminated, showing what disposition is proposed for each. We would like comments on these eliminations if you disagree with them.



Separate cover:  
Rewrite of 1947 Manual (3)

Distribution:

HE's  
IA 15  
D&FM 5  
Eng. 10

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
Bureau of Land Management  
Washington, D. C. 20240

In reply refer to:  
9185 (713a)

March 24, 1966

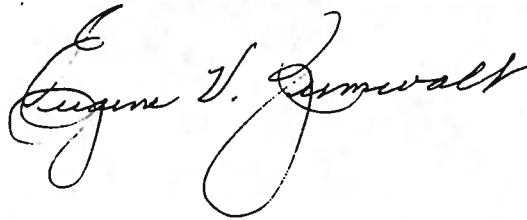
Instruction Memo No. 66-98, Change 1  
Expires 6/30/66

To: SD's  
From: Assistant Director, Resource Management  
Subject: Rewrite of Manual of Survey Instructions

Please refer to Instruction Memo No. 66-98, dated March 2, 1966.

It is requested that one of the three copies of the rewrite manuscript forwarded to your office be returned as soon as possible to the Chief, Division of Engineering, Washington, D. C.

This is not a request for the review copy, which is due in this office by April 4, 1966. We assume that your chief of cadastral survey has commenced his review of the manual rewrite and that it will be forwarded to us by the above date.



Distribution:  
SCDs, HEs  
IA-15  
D&RM-5  
Eng-10

NAME OF AGENCY  
**US DEPARTMENT OF THE INTERIOR**  
**BUREAU OF LAND MANAGEMENT**  
**WASHINGTON, D. C.**

PRECEDENCE  
 ACTION:  
 INFO:  
 TYPE OF MESSAGE  
 SINGLE  BOOK  
 MULTI-ADDRESS

SECURITY CLASSIFICATION

STANDARD FORM 14 REV. MARCH 15, 1957  
 GSA REGULATION 2-IX-203 04  
 14-303

**TELEGRAPHIC MESSAGE**  
 OFFICIAL BUSINESS  
 U. S. GOVERNMENT

THIS BLOCK FOR USE OF COMMUNICATIONS UNIT  
**I-LIM**

MESSAGE TO BE TRANSMITTED (Use double spacing and all capital letters)

THIS COL. FOR AGENCY USE

START MESSAGE ADDRESS HERE

DO NOT TYPE MESSAGE BEYOND THIS LINE

**JUN 15 AMPE**

**TO: BLM FIELD OFFICE ADDRESS LIST NO. 1**

**CHIEF, DIVISION OF ENGINEERING**  
**DENVER SERVICE CENTER**  
**BUILDING 50, DENVER FEDERAL CENTER**  
**DENVER, COLORADO**

**CHIEF, DIVISION OF ENGINEERING**  
**PORTLAND SERVICE CENTER**  
**910 N.E. UNION AVENUE**  
**PORTLAND, OREGON**

MESSAGE 66-40 EXPIRES 6-30-66 9185(713a)

RE INSTRUCTION MEMO NO. 66-98, TEN DAYS EXTENSION ON REVIEW OF PROPOSED REWRITE OF MANUAL OF SURVEY INSTRUCTIONS IS PERMISSIBLE IN ORDER THAT A MORE THOROUGH AND COMPREHENSIVE REVIEW CAN BE ACCOMPLISHED BY YOUR CADASTRAL ENGINEERS. MARKED COPY AND COMMENTS SHOULD REACH WASHINGTON NOT LATER THAN APRIL 18.

  
**C. E. REMINGTON**

**CHIEF, DIVISION OF ENGINEERING**

cc:  
 D&RM  
 DDRF 1 & 2  
 Daily  
 713a:Mcarrasco:eh 3-30-66

PAGE NO.	NO. OF PAGES
1	1

NAME AND TITLE OF ORIGINATOR (Type)  
**Michael Carrasco, General Engineer**  
*Michael Carrasco Jr.*

ORIGINATOR'S TEL. NO.  
 6941

DATE AND TIME PREPARED  
**2:15 p.m. March 30, 1966**

I certify that this message is official business, is not personal, and is in the interest of the Government.

**CE Remington, Chief, Div. of Engineering**



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240

9185 (713a)

February 25, 1966

## Memorandum

To: Clark Gumm  
Norville Shearer  
Tom Tillman  
Grover Torbert  
Walter Rother  
Roger Barron

From: Chief, Division of Engineering

Subject: Rewrite of Manual of Survey Instructions

Dick Wager-Smith's review of the committee's actions and the rewrite of the 1947 Manual of Survey Instructions are completed and the result has been duplicated.

Three copies have been forwarded to each State and Service Center for review and comment by April 4, 1966.

I would like each of you to read the proposed draft carefully and furnish your comments by the same date. Attached is a copy of the list of various items that were eliminated from the final draft, showing where they will be finally placed.

I will review a copy primarily to eliminate what I feel are some unnecessary words. I plan to leave the technical review to you and the State and Service Center experts. It is hoped that the final draft can go to the printer by early summer this year.

Attachments 2

List of Items Omitted from Vol. I  
with  
Proposals for their Inclusion Elsewhere

<u>Page</u>		
13	Omission:	List of regional and public survey offices.
	Disposition:	Considering the possibility of organizational changes, perhaps these should be completely omitted.
18-20	Omission:	Itemization of contents of <u>Standard Field Tables</u> , <u>Ephemeris</u> , and <u>Restoration of Lost Corners</u> .
	Disposition:	A general statement is made in the new manuscript concerning the contents of these supplements. Further detail may be secured from the supplements, themselves.
25-30	Omission:	Instructions in chaining and keeping notes.
	Disposition:	Chaining instructions are included in textbooks. Special instructions in Bureau methods might be included in the Bureau Manual.
30-34 } 467-8 }	Omission:	Instruction in theory and practice of stadia measurements.
	Disposition:	Stadia is taught in textbooks. Special instructions in Bureau methods might be included in the Bureau Manual.
35-40	Omission:	Instruction in triangulation.
	Disposition:	This is taught in textbooks. Special Bureau methods might be included in the Bureau Manual.
40-44 } 468-75 }	Omission:	Discussion of instruments, their use and adjustment, and the keeping of notes.
	Disposition:	A general statement appears in the new manuscript. (1) Textbooks; (2) Bureau Manuals, if special Bureau methods are required; (3) Standard adjustment might well be included briefly in <u>Standard Field Tables</u> ; (4) Manufacturers' literature.
44-88 } 97-148 } 475-7 } 493-7 }	Omission:	Instruction in practical field astronomy, with formulas, examples, and graphs.
	Disposition:	(1) Textbooks; (2) Bureau Manual, if special Bureau methods are required; (3) Condensed examples, graphs, and standard formulas might well be included in <u>Standard Field Tables</u> ; (4) A collection of "Examples of Good Practice."

Page

88-96 }  
477-93 }

Omission: Extended discussion of the solar transit, and tests and adjustments thereof.  
Disposition: (1) A brief discussion appears at the end of Chapter II in the new manuscript; (2) Bureau Manual, if required; (3) Put condensed versions of tests and adjustments in Standard Field Tables; (4) Manufacturers' literature.

149-52

Omission: practical application of geodetic theory to a surveying problem.  
Disposition: (1) Textbooks; (2) Bureau Manual if there is anything peculiar to Bureau practice; (3) Condensed version with standard formulas in Standard Field Tables; (4) publications of Coast and Geodetic Survey.

159-60 }  
497-99 }

Omission: Instruction in use of "M and P" factors.  
Disposition: (1) Standard Field Tables; (2) Bureau Manual, if desired.

163-244

Omission: Scattered interspersed instructions in techniques and the preparation of notes and plats.  
Disposition: (1) Bureau Manual; (2) A folio of specimen plats and field notes.

241-44

Omission: Exhaustively detailed itemization of objects to be noted during the survey.  
Disposition: Bureau Manual, in condensed form.

381-83 }  
519-21 }

Omission: Soil classification.  
Disposition: (1) Textbooks; (2) Bureau Manual, if desired.

385-95 }  
List on 392 }

Omission: Detailed instruction in keeping field notes.  
Disposition: (1) Bureau Manual; (2) Folio of specimen notes.

397-444 }  
List on 398-99 }  
List on 418-19 }

Omission: Detailed instruction in platting, with examples.  
Disposition: (1) Bureau Manual; (2) Folio of specimen plats.

464-66

Omission: Chain, arpent, vara.  
Disposition: Mention is made in the new manuscript. The material already appearing in the Standard Field Tables might be expanded, if desired.

525-74

Omission: Specimen Field Notes.  
Disposition: Folio of specimen field notes.



Mike

MAR 3 1966

MAR 3 1966

Memorandum

To: Chief, Division of Public Affairs  
From: Information Officer  
Subject: Review of manual

Attached is a photostat of a memorandum from Charles Remington that is quite clear. And certainly we want to help out to the fullest extent.

Will you give this to John O'Hayre with a high priority based upon the April 4 deadline? If John comes in here to review "Gobbledygook" before that date--and I'm sure we'll have the proofs before then--I suggest he bring this copy along, finished or partially unreviewed, for discussions with Engineering.

I'm sure you know that Rem has been on our side all the time on the matter of clear expression.

cc:  
~~Chief, Division of Engineering~~

/s/ Dan Saults



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240

9185 (713a)

April 23, 1965

To: Clark L. Gumm ✓  
Franklin K. Van Zandt  
David R. W. Wager-Smith  
Norville E. Shearer  
Grover B. Torbert

From: Chief, Division of Engineering

Subject: Rewriting of Manual of Survey Instructions

The committee appointed in early 1964 for the above subject, of which you are members, should by now have settled all questions of fact to be issued as a part of the 1965 manual.

Any elements that are still under discussion will be established by decision of this office, Clark Gumm acting as the arbiter.

Since the original manuscripts prepared by the committee members have now been completed, the work assignments to the extent originally contemplated are finished. Van Zandt will assemble these manuscripts and turn them over to Wager-Smith for editing.

Wager-Smith should start at once on the task of editing the manuscripts prepared by the individual committee members. This editing task should be done with the thought of clarifying the instructions and not with any thought of introducing new elements into the manual.

All work planned for the manual at this time should be in accord with the original decision that most, if not all of the portions applicable only to BIM activities will be on 8 x 10 $\frac{1}{2}$  sheets for inclusion in our regular manual system, the remainder to be printed in a bound book.

Money for printing the manual is in the FY 1966 budget and will not carry over into FY 1967. A deadline for getting all of the manuscript to the Government Printing Office is being established as Friday, October 15, 1965.

April 23, 1965

**To:** Clark L. Guzz  
Franklin K. Van Zandt  
David R. W. Hager-Smith  
Norville E. Shearer  
Grover B. Torbert

**From:** Chief, Division of Engineering

**Subject:** Rewriting of Manual of Survey Instructions

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cc: Daily  
713: CKB, Remington: eh



Form No. 4-1123  
(December 1948)

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

ROUTING AND TRANSMITTAL SLIP

To: *Director* Division or Branch \_\_\_\_\_ Date: *1/8/65*  
*attn: F. K. Van Zandt,*  
*Eng. Div.*  Necessary action

(2) \_\_\_\_\_  Approval

(3) \_\_\_\_\_  Signature

(4) \_\_\_\_\_  Prepare reply

Remarks: \_\_\_\_\_  Your comment and return

\_\_\_\_\_  Note and surname

\_\_\_\_\_  Note and return

\_\_\_\_\_  Your information

\_\_\_\_\_  See me

JAN 11 1965  
BUREAU OF LAND MANAGEMENT  
COMMUNICATIONS SECTION

JAN 11 1965

AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

GPO 885 455

*Engineering*  
(Name)

*DSC*  
(Office)

GPO 852624



11/2/65

IN REPLY REFER TO:

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

E  
9183.1

State Office  
3022 Federal Building  
Phoenix, Arizona 85025

January 8, 1965

Air Mail

Memorandum

To: D. R. W. Wager-Smith, BLM, Anchorage, Alaska

From: Chief, Division of Engineering, ASO

Subject: Manual Chapter on Mineral Surveys

Following are my belated comments of your draft of the subject chapter:

- Page 17 - Paragraph in middle of page might better read:  
"The law places definite limitations on the size of individual locations, but there are no such limitations on the number of locations in a claim. Thus, a claim may consist of any number of contiguous locations."
- Page 17 - Last paragraph: This paragraph warrants discussion regarding contiguous claims. It is not in line with current regulations and practice.
- Page 23 - Spelling of electronic, 1st line, 2nd paragraph.
- Page 24 - 1st paragraph - Shouldn't this paragraph be broadened to include optical theodolites?
- Item No. 3 under azimuth. Does this conflict the last paragraph on page 21?
- Last sentence under azimuth - Why not say, "But it is not required . . .", instead of "But it is no longer required . . ."
- Page 26 - Last sentence of paragraph in middle of page. What if stones are not available?
- Page 45 - Item No. 3 might be changed to:  
3. A durable stone, roughly 20"x6"x4", or larger, set 2/3 in the ground.

Page 46 - 2nd paragraph. Should "memorial" be defined?  
(Memorial is misspelled in next to last sentence).

On the whole I think you have done an excellent job on this chapter.  
Most of my comments could be classed as nitpicking.

*J. Wayne Forrest*

cc: F. K. Van Zandt, Eng. Div., W.O.

November 4, 1964

## Memorandum

To: D. H. W. Wager-Smith  
From: F. K. Van Zandt  
Subject: Manual of Surveying Instructions

I am sending my comments on your chapter 10. You will notice the first one relates to page 14 of your manuscript. Whether or not the material in the first dozen or so pages should be included in the new manual is a major decision, and the matter should be considered by the whole committee and those in the Bureau competent to speak on cadastral subjects.

Thanks for your memos of October 23 and 30. On the subject of limits of closure, I am collecting opinions of each member of the committee. Your factor of 2 sounds reasonable to me, and there is other opinion in support of this. We will have to keep separate our concepts of limits of closure and rectangularity (21 minutes in azimuth).

You asked if there is to be a volume 2. Probably material to go in volume 2 will come out as manual releases and be a part of the B.L.M. Manual.

The question of numeration and titles for the sections of the new publication is not settled. I have been giving considerable thought to this. If you have a copy of C. & G.S. Topographic Manual available, note their solution of the problem. It has much to recommend it. They use a decimal system entirely, and subject headings appear in the center of the page. We may have to follow the BLM directives system to the letter. Of this you may be sure, the manual number is 9185. This will not be repeated in the body of the text. The first decimal will be the chapter number (Mineral Surveys .9). The next breakdown will use the second digit, for example .58.

I have not heard specifically from the other members of the committee just what subjects should be eliminated from the present manual. (See my memo of October 5.)

You mentioned a schedule. We must do the best we can. The next step is to get in a second draft of each man's manuscript. I realize that

some of the members of the committee in the State office, have the manual work in addition to their regular duties. So far I have only Tillman's second draft. We should plan a session---perhaps in Denver---after all manuscripts have reached this office.

Your memorandum of February 14, 1963, on maximum tolerable errors in photogrammetric monumentation provides a basis for discussion. I agree with your statement in your third paragraph that limits of closure as applied to traverses are not applicable to positions determined by the stereo triangulation method.

The experience that we have had which may give us an idea on the accuracy attainable by the photogrammetric methods is limited. We did make some tests on the Sheep Mountain project, with which I am familiar, that may have a bearing on the present discussion. A dozen points were chosen at random and their positions were intersected from two triangulation stations with a T-2 Theodolite. The azimuths from the triangulation stations to the section corners selected had been previously computed. Comparison of positions showed displacements ranging from two to twelve feet, the mean displacement being six feet. As the intersected positions were not checked other than by the check afforded by the previously determined photogrammetric positions, the possibility of error in the intersection method must be considered. It is possible that the intersected positions are the better of the two, though how much better one can not say. Both positions may be out in the same direction from the theoretical.

Errors in position of points not on a closed traverse can only be stated in terms of the displacement with respect to a grid or a common origin. It would therefore seem that your figure 2 is not applicable.

The displacements recorded in the Sheep Mountain tests would not indicate that they are entirely due to random error. However, the pattern is not too regular and it is possible that random errors account for a large part of the differences. A series of four corner monuments on a two mile straight line provided a check on local error and indicated that relative displacements of the successive corner positions were considerably less than the maximum displacement of twelve feet. Errors inherent in this method will include errors of identification of photogrammetric images and errors due to taping measurements and compass orientation in the final location of the monument on the ground.

The present ABC-hoversight method provides a check on the position being sought by affording six solutions from the triangulation and tellurometer data. Thus, we can be fairly certain of the determination of the helicopter position. There is a possibility of error or blunder in the



positioning of the monument on the ground. As you know, at times the position established on the ground has to be in a clearing or at some small distance from the final location. While the chance of error or blunder is slight, it must be considered.

A check on points established by the photogrammetric method or the triangulation-trilateration method can be made only by using another method. This is obviously uneconomical for checking each point. Therefore, the only tests made upon this type of work should be spot checks which will convince the proper officials of the technical accuracy of the work. Occasionally an error in an unchecked position may go undetected. It is well established that triangulation--either with or without photogrammetry--can be made to produce a greater overall accuracy than the transit and chain. A distance and direction between two successive corner monuments may not be as accurate as if measured by a traverse. For satisfactory work, we must rely on technical competence, judgement, and integrity of the surveyor and his supervisor. The final paragraph and the last sentence in the paragraph preceding it ( in your memo of October 30) bears on this.

One thing that we should keep in mind is that the position of the monument is legally unalterable after the plat has been approved. Only due to this can we feel justified in the application of these new methods.

The first page of Lenon's letter was sent to one of the other men. As you are interested, here is a copy of page 1 for you.

We have had one of the most beautiful autumns I can remember. The foliage is still brilliant.

**Enclosures 2**

**Encl. 1-Comments**

**Encl. 2-Letter**

*Memorandum*

DATE: October 30, 1964

TO : F. K. Van Zandt  
Division of Engineering  
Washington, D.C.

FROM : D. R. W. Wager-Smith

SUBJECT: Surveying Manual - Accuracy

The following comments relate to your memorandum of October 16.

I agree that the table on page 238 should be omitted if we are to continue to regard it as an inviolable directive. But I shall miss it as the summary of an intelligent analysis of a sound approach. I once became so curious about all those figures that I broke it down. Enclosed is a copy.

Whatever changes are made in limits of closure, care should be taken that references thereto are consistent through the book. Other pages that I have noted are 177, 187, and 196; and there are doubtless others.

As for rectangular limits, I recommend simply tightening-up by a factor of 2. Thus, instead of 21' and 50 links we would have, say, 11' and 25 links as the basic tolerance, with leeway to vary it in either direction in accordance with common sense and engineering judgment. This would be the equivalent of a 1:900 closure which approaches respectability. There should be leeway to vary downward in the interests of common sense. I consider it better honestly to show 25½ links, say, than to spend public funds to re-chain a precipitous mountain; or, worse yet, to resort to "covering up" the ½ link. I agree with your thoughts on tightening up in the special instructions when circumstances warrant.

Care should be taken to permit the old limits when closing against old work, if violation of the new tolerances is caused by error in the old work. We should not set double corners, for example, if measurements in the old work cause a misalignment over 11' (but not over 21') in the new work.

In my material on special surveys in Alaska I call for 1:1000 closure, or better, on metes and bounds surveys. Frequently we do considerably better than that. I am thinking, here, of such things as homesites, small tracts, and the like. On mineral surveys it is 1:2000, with no leeway because we are dealing with employees over whom we have inadequate administrative control.

I think in terms of 1:3000 in the subdivision of little village "townsites"; and this will require at least a 1:5000 closure on the boundaries. Corresponding closures for more sophisticated townsites would be 1:5000 and 1:10,000.

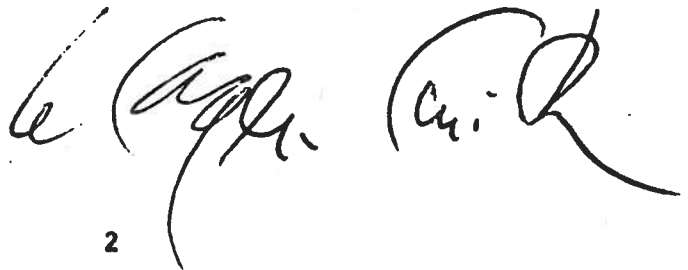
Admonitions about temperature corrections and spring balances don't belong in the hard-cover manual, of course; they belong in special instructions or in Volume 2. Is there to be a Volume 2? If we are to keep anything like the schedule you discussed at Portland, it's long past time for a decision on format and content. Are we still trying to keep that schedule; i.e. going to press in a few more months? Are all committee members to have an opportunity to read and comment upon the entire manuscript before it is irrevocably locked up? This business of catching brief insights now and then gives no basis for a considered opinion.

Have you given any consideration to setting guidelines for "limits of error in position" to be applied to points set independently of each other without any connecting lines between them? I have in mind photogrammetric, electronic, and ABC monumentation. We have been finding some serious discrepancies in points set by all three of these methods. Enclosed is a copy of a short discussion of the problem that I prepared under date of February 14, 1963 regarding photogrammetry. As far as I know, nothing ever came of it.

Is any consideration being given to a discussion of precision? It has come in for a good deal of heated debate recently, especially regarding our practices in Alaska. We are in very firm (I might almost say violent) disagreement with some of Washington's thinking. Volume 2 would be the only place in which the subject might properly be treated. I would suggest that it be treated with the simple statement that precision should be compatible with accuracy as determined by the engineer in direct charge of the work.

Throughout the preparation of the manual I hope we avoid the assumption that good surveying will result from a set of iron clad rules. This has not been the case in the past. We should encourage the exercise of judgment and integrity in the field by giving men a sense of responsibility for decisions within the bounds of sound guidelines. Generally speaking, men tend to deliver more or less what is expected of them; we cannot hope to elicit the performance of professionals by demanding the unreasoning compliance of technicians.

DRWW:dw



Handwritten signature, likely C. R. R.

UNITED STATES GOVERNMENT

# Memorandum

DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
State Office 555 Cordova  
Anchorage, Alaska 99501

9185

DATE: October 23, 1964

TO : F. K. Van Zandt, Engineering  
Washington, D.C.

FROM : D. R. W. Wager-Smith

SUBJECT: Manual of Surveying Instructions


Thanks for your memorandum of the fifth. I can well imagine that there are wide differences of opinion concerning the new Manual. I had a somewhat similar reaction toward proposals to modernize the King James version of the Holy Bible. After all, security is a thumb and a blanket.

Yet I believe that those of us charged with a public trust have not the privilege of gratifying our adoration of things past by hanging them like a millstone about the neck of changing concepts.

Nor should we fall into the trap of equating tradition with excellence. The fact that the Congress gave us certain broad powers with respect to the survey of the public lands does not give us license to rest upon these gratuitous laurels throughout all eternity. If we are to continue to merit the deference which Congress commanded the public to show us, it is high time we moved our public image up abreast of the 20th Century.

If your thought was to pique my curiosity by sending me the last 3 pages of Lenon's 4-page letter, you hit the jack-pot. Is the first page classified? Nevertheless, I am grateful to you for sending me his thoughts. In general they seem fairly sound to me, though a mite excited. I was also interested in Clark's comments. I don't think I can add much by commenting in detail.

"Special Surveys in Alaska" is presently being typed in first rough draft. It ought to reach you before long.



Postscript: Yours of the 16th on "accuracy" just received. (If you seal things in a sealed envelope they reach me sooner by avoiding internal routing at this end.) I shall reply betimes.

DRW:dw

UNITED STATES GOVERNMENT

# Memorandum

DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
State Office 218 E Street  
Anchorage, Alaska 99501

MS

DATE: July 23, 1964

TO : Franklin K. Van Zandt, Division of Engineering - Washington

FROM : D. R. W. Wager-Smith, Division of Engineering - Alaska

SUBJECT: Surveying Manual

Enclosed are the drafts of chapters 7, 8, and 9 that I brought back from Portland. I found it infeasible to list and describe suggested corrections and emendations on a separate sheet. Copy is not ordinarily revised in that way; it is too time-consuming and impractical. My notations therefore appear on the copy itself. In many instances the desirable modifications were so extensive that nothing but rewriting would serve; and there was insufficient time for that.

Following are some general comments: Until a decision is reached on the matter of the two-volume approach versus a single volume, there will be many unresolved questions of content, format, and verbiage. Completely meaningful comments, therefore, are not yet possible. Yet I assume that a rewriting job is no longer contemplated, and that the two-volume approach has been abandoned. I base this assumption on the scissors-and-paste character of most of the work I reviewed in Portland. In the three chapters returned herewith the sum-total of new writing amount to less than 5 pages in 100 pages. Yet the emendations which had been made on the paste-ups I reviewed constitute, in most cases, a marked improvement, as far as they go.

Especially commendable is the reworking of the "famous sentence" on page 359. Nevertheless, much remains to be done if a well-written volume is to ensue. The inevitable defects of a scissors-and-paste job are in evidence throughout. But I don't see how we can correct this in the time available to us. This is indeed regrettable because this book will affect the public image of the Division of Engineering for the next quarter-century.

Special Instructions: I believe an imbalance is created by treating this topic so exhaustively. In fact, the present-day purpose of formal special instructions may be seriously questioned. Formal special instructions are a carry-over from the days of contract surveying when they constituted the specifications for the job. Thus, on page 70 of the Manual of 1902 we find: "One of the most important duties to be performed by the surveyor general is to provide the deputy surveyor [ i.e. the contractor ] with Special

Instructions, in connection with the contract,.....setting forth what the deputy is to do and how the work is to be performed." (Emphasis added.) And this 1902 provision stems from provisions of the Act of May 30, 1862 which is quoted in the Manual of 1864: ".....and the special instructions of the surveyor general ..... shall be taken and deemed a part of every contract for surveying the public lands of the United States." ( The emphasized portion of this quotation appears in italics in the 1864 Manual. ) Since 1910 we have had direct administrative control over our surveyors. There is no longer the contractual relationship which demanded such formal special instructions. Might it not be reasonable to assume that they may have outlived their usefulness? Could not this whole topic be covered by a general statement that before sending men to the field we should inform them fully in writing concerning the work to be undertaken?

Townsites: I believe this still needs quite a bit of reworking. For example, Sec 475 calls for the sort of townsite design that has not been regarded with favor for many years. The specified lot and block sizes do not agree with generally accepted modern practice. And, regarding alleys, the Community Builders Handbook published by Urban Land Institute (1960) agrees with most authorities in stating: "Alleys in present-day single-family or two-family residential neighborhoods are no longer desirable nor considered necessary." Also, Sec. 479 permits the use of wooden stakes. In the light of present-day surveying costs, the use of wooden stakes for permanent points simply cannot be justified.

Maximum and Minimum Control: Somewhere in the Manual there should be clear-cut definitions of these terms. I have an intuitive concept of what they mean, but persistent inquiry discloses that there are about as many different intuitive concepts as there are BLM surveyors. If these terms have specific meanings, the meanings should be set forth in writing; if not, the terms should be discarded.

Ferry Lake Case: I do hope something can be done to make Fig. 78 more readily understandable. Over the years I have studied this figure many times, and I'm still not quite sure that I have all of the lines properly identified with the text.

Line of Mean High Tide: It would be most unfortunate if the new Manual failed to cite the Oelschlaeger-Pennington Case. There should be appropriate excerpts to point up the essential difference between the concept of a mathematical mean line, and the apparent line separating tideland from upland. And it should be pointed out that "it is not the function of this Bureau to determine lines of mean high tide, per se." The logical reasoning by which this decision escapes the confines of the Borax case is quite significant. The fact that the term "line of mean high tide" seems first to have come to the attention of the Department in 1900 (after more than 100 years of meandering by U.S. surveyors) might well be noted.

Citations: None of the citations of the United States Code agree with examples set forth in the Bureau Manual, Vol. III, Part 3 Paragraph 3.1.4D(2). The Bureau Manual requires that the appropriate edition of the Code be cited. It is possible that this requirement applies only to adjudicators: but if it affects all citations within the Bureau, then appropriate corrections should be made throughout the Survey Manual.

Soil Classification: This entire portion, together with its companion portion in the appendix, no longer serves a useful purpose in the Manual. It is true that the statutes and the regulations stemming therefrom require that the surveyor report on "the quality of the lands." And it is equally true that 100 years ago such a requirement was meaningful (as meaningful, perhaps, as that the lines be measured "with a chain of two perches.") That was in the era of land settlement and disposal when the surveyor frequently "spied out the country" ahead of settlers, and could furnish useful information on the quality of the lands. But the era of settlement has passed, and it is the policy of the Department that we are in the era of management. Who, then, are these "prospective settlers" (page 381) for whom it is proposed that the 1965 Manual furnish these soils classifications? Surely with geologists, soil scientists, agronomists, foresters, county agents, agricultural experiment stations, etc., on every hand, it cannot be seriously suggested that the 1965 cadastral surveyor's field notes are still making valuable (or even useful) contributions in this field. If we must honor the out-moded statute, let us do so with a brief requirement that the surveyor briefly give his opinion of the "quality of the lands." But better yet, let us recognize the archaic quality of this requirement, and treat it as we have treated the "chain of two perches" problem.

Field Notes: Almost all of this chapter belongs in Vol. II, if there is to be such a volume. - The improvements in the page of abbreviations are good, and I have added a few. - It seems that a disproportionate amount of space and attention is given to sample titles. - The listings on pages 392 would appear to be superfluous if we are to have a good index. - If we are to include sample field notes (which might better be in Vol. II to permit desirable periodic revisions), then we should do a complete job of it. This would embrace sample notes for electronic surveys, photogrammetric resurveys, etc.

I believe that the treatment of field notes as presently proposed tends to exaggerate the importance of form and undervalue the importance of substance. Thus, one wonders whether the rather involved rules on pages 393 and 394 may not at times preclude the exercise of judgment in clearly expressing in the notes the substance of what was accomplished in the field. Perhaps this effect could be minimized with a statement that the entire chapter is intended merely as suggested good practice to be modified when necessary to a clearer comprehension or a more succinct treatment.

Plats: Like the chapter on Field Notes, most of this chapter might better be put in Vol. II. The detailed treatment seems unnecessarily exhaustive. This is especially true in the case of topography where the last paragraph on page 415 seems to attempt to unsay most of what has been said theretofore.

Such passages as Secs. 596-598, containing such admonitions as the use of "the best black drawing ink", somehow seem to detract from the importance and the dignity of this historic volume. We should specify inks in memoranda and the like. And in this connection, are we to say anything about scribing?

The pitfalls of a scissors-and-paste job are frequently apparent in this chapter, as noted on the copy. - The lists on pages 398-99 and 418-19 are superfluous if there is a good index. - The sentences which have been added at the bottom of page 434 seems to be dealing with field procedures, rather than plats; and the same is true at several other points in this chapter.

Precision of Measurement: There are presently some differences of opinion concerning the precision with which measurements should be shown. On page 429 the dimensions of a mineral survey are shown to tenths of links. Throughout the sample field notes of mineral surveys distances are frequently shown to hundredths of feet, which is of the same order as hundredths of links. If the new Manual is to present a consistent and technically sound attitude toward both precision and accuracy, a great deal of very careful work needs to be done.

Iron Post Monuments: Should we recognize the fact that a standard two-inch wrought iron pipe is neither 2" inside diameter nor  $2\frac{1}{2}$ " outside diameter? It is 2".067 I.D. and 2".375 ( $2\frac{3}{8}$ " ) O.D. But we could avoid such quibbles if we would omit the word "diameter", and simply call it a Std. 2" WIP. But if we must use "diameter" we should qualify it as "approximate" or "nominal".

If we were to describe such a monument once in the preliminary statement of the field notes (or even in the Manual?) then we could avoid the constant repetition of the description through the notes by simply calling it a Standard Iron Post Monument, thus: Std. Mon.

Homogeneity: I don't know how, or if, we are going to cope effectively with this major problem. In my opinion, the only way in which it can be dealt with effectively is to rewrite the entire book. As it now stands we have a hodgepodge of all types of writing, some very good, some quite bad, and some even coming almost verbatim out of the quaint style of 150 years ago. We switch voices and tenses and modes of expression all on the same page without batting an eye. Either directly or by implication we contradict ourselves from passage to passage, or we come so close to contradiction that one is left with a vague wonderment as to our true intent. We are inadvertently redundant and repetitious. These are the dangers inherent in a scissors-and-paste re-hash. But we must do our very best to avoid the slap-dash character which threatens this book.



I shall send you my contributions on Mineral Surveys and Special Surveys in Alaska just as soon as I can get them written. As I explained to you in Portland, I had devoted most of my time since March to Chapter I, as I had never received word of any change in assignments until just before I went to Portland.

I am enclosing a couple of extra copies of this memorandum with the thought that you might want to discuss it with Remington and Gumm.

Enclosures

cc: Lyle F. Jones

*W. G. C. R.*



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON 25, D. C.

IN REPLY REFER TO:

9185 (713a)

July 13, 1964

Memorandum

To: C. E. Remington  
From: Franklin K. Van Zandt  
Subject: Manual of Survey Instructions

The following is to summarize the work of the committee on the re-writing of the manual during our meeting in Portland the week of July 6-10.

The first draft manuscripts of all the chapters included in the manual, with the exception of Chapter X, Mineral Surveys, were presented by the writers for review and criticism by the other members of the committee. Mr. Wager-Smith said that he would prepare his manuscript and send it to Washington for review. Each committee member discussed the content and the manner of presentation of the chapters, as rewritten, with the author, stating his objections, criticisms, and suggestions. Where these were accepted, the writer agreed to make the proper changes in his manuscript.

It was agreed that a section on protractors would be added to the material now included in the chapter on the Rectangular System.

*Van*

*CS*

9185 (713)

*Sumner*

JUN 25 1964

*W. J. Zandt*

Memorandum

To: SD, Alaska  
SD, Arizona  
SD, Colorado  
SD, Oregon

From: Assistant Director, Resource Management

Subject: Revision of Manual of Surveying Instructions

Replies to the memorandum of Chief, Division of Engineering, of June 4, on the above subject, indicate that a meeting of the Manual committee on the proposed dates is acceptable to those concerned. The committee will therefore meet in Portland, at the State Office, July 6-10. As you know, this committee includes Wager-Smith, Forrest, Teller, Tillman, Shearer, and Van Zandt (chairman). It is understood that Mr. Wager-Smith will need to leave early.

The first draft of the manuscripts of assigned chapters should be brought along.

*Eugene J. Sumwalt*

cc: DDRF 1 & 2  
BLM Perm. File  
Daily

713 PKVan Zandt:rs 6/23/64

9185 (713)

June 16, 1964

Memorandum

To: Mr. D. R. W. Wagar-Smith, BLM, Anchorage  
From: Acting Chief, Division of Engineering  
Subject: Portland Meeting - Manual of Surveying Instructions

*Van Zandt  
Brown*

As the week of July 6-10 seems to be most suitable for the other engineers working on the manual and we are anxious to move this project ahead rapidly, the proposed meeting will take place as planned. I am sorry this conflicts with the trip you have planned. I would like you to go to Portland even though you have to leave there early because of your reservations on the flight to the Pribilofs.

The following assignments are now in effect:

Chapters 1 and 3	- Toller
" 2	- Forrest (with assist from Torbert)
" 4	- Van Zandt
" 5 and 6	- Tillman
" 7, 8 " 9	- Shearer
" 10	- Wagar-Smith (plus Specials Surveys, Alaska)

In Portland, each author will be expected to review the contribution of each of the others.

I have asked Van Zandt to take general charge of the preparation of the manuscript. Gunn will be available for consultation and review.

(Sgd.) Richard E. Brown

cc:  
DDRF 1 & 2  
BLM Perm.  
Daily  
713:FKVanZandt:eh 6-16-64

Form No. 61-150  
March, 1962

UNITED STATES GOVERNMENT

# Memorandum

6/11/64  
IN REPLY REFER TO  
9185 (713)  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
State Office  
218 E Street  
Anchorage, Alaska 99501  
*Ann H. [unclear]*

DATE: June 9, 1964

TO : C. E. Remington - Washington, D.C.

FROM : D. R. W. Wager-Smith

SUBJECT: Portland Meeting - Manual

I had not known until receiving your memorandum of June 4 that there had been an agreement to have a first draft prepared by July 1. As indicated in my memorandum to you on April 15, I have been awaiting word on the proposed timing. I have hesitated to go too far in manuscript preparation pending receipt of the memorandums mentioned in the second paragraph of my communication of April 15.

It had been my thought that prior to another meeting all parties involved would have critically examined the contributions of the several authors in order that enlightened discussion might take place at such a meeting.

The July 6-10 dates for a meeting in Portland will seriously conflict with my personal plans. For about a year my wife and I have been planning a trip to the Pribilofs. Our flight leaves Anchorage at some ungodly hour on the morning of July 11. To return from Portland Friday night, unpack, repack, and depart early Saturday morning would be pretty difficult. Unfortunately the timing cannot be altered without its costing me \$300.00 since deposits are not refundable. Since this is a long weekend trip, the same difficulties would arise were the Portland meeting scheduled for the week of July 13.

Might it be possible to schedule the Portland meeting for the week of July 20? Failing this, perhaps I might leave Portland on the 9th, if the meeting is held from 6 to 10.

DRW:lt

cc: Lyle Jones

*Wager-Smith*

*Van Banting 6/11/64*



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
State Office  
710 N. E. Holladay  
Portland, Oregon 97232

IN REPLY REFER TO:

100.4b

*713a*

JUN 8 1964

Memorandum

To : Director  
From : State Director, Oregon  
Subject: Revision of Manual of  
Surveying Instructions

*EE*

The time of July 6-10 for a meeting on the revision of the Manual of Surveying Instructions is satisfactory. Upon request any hotel reservations will be made by this office.

*Russell E. Getty*  
State Director

RECEIVED  
BUREAU OF LAND MANAGEMENT  
JUN 11 11 01 AM 1964  
COMMUNICATIONS UNIT

9195 (715)

June 4, 1964

*Van Zandt*

Memorandum

To: Mr. Wayne Forrest, c/o SD, Arizona  
Mr. William Teller, c/o SD, Colorado  
Mr. T. A. Tillman, c/o SD, Oregon  
Mr. D. R. C. Wagon-Smith, c/o SD, Alaska

From: Chief, Division of Engineering

Subject: Revision of Manual of Surveying Instructions

The date agreed upon for completion of a first draft of your portion of the revised manual is July 1. We are anxious to move this work along as rapidly as possible, and would like to have a meeting as soon as possible to discuss the manuscripts of each author and the publication generally.

I have selected tentatively the week of July 6-10 for a meeting in Portland. Van Zandt and Shearer will attend. Please let me know if these dates will conflict with your regular duties. If they do, I would like for you to name an alternate time, and I will see what we can work out.

*E. Remington*

cc: DDRF 1 & 2  
BLM Perm. File  
Daily

6.05a FKVan Zandt:rs 6/4/64

Form No. 61-150  
March, 1962

**D**  
UNITED STATES GOVERNMENT

# Memorandum

4/17/64  
IN REPLY REFER TO  
9185 (6.05a)  
4.R.V.  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
State Office  
218 E Street  
Anchorage, Alaska 99501

DATE: April 15, 1964

TO : Chief, Division of Engineering - Washington, D.C.

FROM : D.R.W. Wager-Smith

SUBJECT: Rewriting Manual of Surveying Instructions

As a result of the earthquake I left Washington in some haste without benefit of final discussions of the Manual rewriting job. Please let me know whether or not you wish me to return to Washington in the immediate future to receive further instructions or to engage in further discussions.

I should appreciate receiving copies of all replies to your memorandum asking for comments on the rewriting project.

Has any conclusion been reached concerning the approximate date on which I might expect to receive the write-ups from Forrest, Teller, and Tillman?

In addition to being quaked out of the office, we were quaked out of our apartment; but things are settling down to normal routine again. I am at the point of starting on the Manual hammer-and-tongs.

*Wager-Smith*



April 7, 1964

Memorandum

To: Mr. Franklin K. Van Zandt  
From: Chief, Division of Engineering  
Subject: Survey Instruction Manual - 1965

I would like you to take on the job of "Managing Editor" for the subject manual. This title may not be sufficient to cover all of your duties on this work; but regardless of title, I think you can set up the job and follow it all the way from now until the final volumes are printed early in 1965.

As you know, your editorial staff consists of Dick Wager-Smith, Alaska; Bill Teller, Colorado; Tom Tillman, Oregon; Wayne Forrest, Arizona; and Grover Torbert and Norville Shearer, Washington office. In addition, you have Percy Andros as your assistant, and the balance of this office to furnish help, advice, and criticism as the work progresses.

Earthquakes and ulcers have depleted your crew about 50 percent during this initial six-week period but we don't want this to delay our printing objective. We had planned that by April 17, 1964, we would have the framework of the manual set up. At that time it was expected that the four field men would return to their States and write some more on their specific sections. When they had accomplished this goal, we had expected that the writing would then be reviewed by Wager-Smith and then the group might be called together in the West for some more rewriting or whatever was felt desirable. Following this writing and "in-house" review, it was felt that it might be desirable to employ an outside consultant to edit the papers to smooth out the writing, and then send the manuscript to the printer.

All of the above is now subject to your review and any changes that may be desirable. I would like you to take it over and expedite the job as much as possible. Any of our typing help will be available for the work, except Miss Hogberg. The drafting room is available for any work that they can accomplish. In short--the show is yours!

cc:

~~DDP~~ *Andros, Tillman, Torbert*  
BLM Perm. File

Daily

6.05a: CERemington:eh



D

9185 ✓

The tentative assignments for those engineers engaged in rewriting the 1947 Manual of Surveying Instructions are as follows:

Chapter 1	Mr. Wager-Smith
" 2	Mr. Forrest and Mr. Torbert
" 3	Mr. Teller and Mr. Andros
" 4	Mr. Teller
" 5 )	Probably combined. Mr. Tillman
" 6 )	
" 7	Mr. Wager-Smith
" 8 )	Combined. Mr. Forrest
" 9 )	
" 10	Mr. Wager-Smith

February 27, 1964

Memorandum

To: ED, Alaska

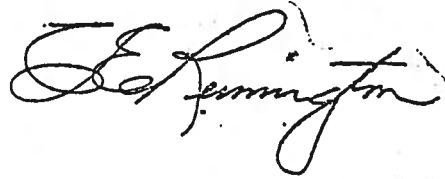
From: Chief, Division of Engineering

Subject: Rewriting Manual of Survey Instructions

Your memorandum of February 24 questioned the possibility of accomplishing a worthwhile rewriting job in six weeks.

We do not expect to complete the job in that time but do hope to have the "carcass of the critter" in shape that it will stand up. After that we hope that the participants can put on the meat, gristle, and sinews at their home stations or otherwise. Then we hope that Wager-Smith can put on the hide and help with the currying and combing. After that job is done it may be necessary to ask the Solicitor to put on the horns and hoofs, but in any case we should be able to ship the beast to the Government Printing Office late in 1964 or early 1965. We hope this schedule will put Dick at ease before his arrival here on March 7.

cc:  
DDRF 1 & 2  
BLM Perm. file  
Daily  
6.05a:CERemington:eh



Form No. 61-150  
March, 1962

UNITED STATES GOVERNMENT

# Memorandum

DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

IN REPLY REFER TO:

9185  
Your Ref.  
9185 (6.05a)

DATE: February 24, 1964

TO : Director

FROM : State Director, Alaska

SUBJECT: Rewriting Manual of Survey Instructions

Pursuant to your memorandum of February 18, Mr. Wager-Smith will report in Washington for a six weeks detail commencing March 9, 1964.

We are uncertain of the correlation between a six weeks detail and the idea of rewriting the manual in the Washington office, since we believe that there is no possibility of accomplishing a worthwhile rewriting job in six weeks. But Wager-Smith will seek clarification of these matters upon his arrival.

Wager-Smith has already written the Hotel Presidential for a single room commencing Saturday night, March 7.

*R. Dan Christman*

Acting

RECEIVED  
BUREAU OF LAND MANAGEMENT  
FEB 26 2 49 PM 1964  
COMMUNICATIONS UNIT

9185 (6.05a) -

Remington 2/13/64  
C. H. Stoddard  
P. J. [unclear]

Memorandum

FEB 18 1964

To: SD, Oregon

From: Director

Subject: Rewriting of 1947 Manual of Survey Instructions

During the past year the above subject has been discussed formally and informally by memo and at conferences and inspections. We now have learned that the Government Printing Office has less than a six-month stock on hand so the rewriting project is urgent. A team of four men from the field is being assembled to work with representatives from this office to expedite this project.

The initial work on this rewriting project will be done during the period from March 9 to April 17, 1964, in Washington, D.C. We believe the writing of the manual will be facilitated if performed in the Washington office where consultation and clearance can readily be obtained as the writing progresses. A copy of Form 52 detailing Mr. Thomas A. Tillman to this office for that period is attached.

We realize that this work comes at a time when your summer field work will be in the mobilization stage but this manual is urgently needed by the public and must be brought current with today's practices before it is reprinted. In reviewing the capabilities of the field force for this work, Tom Tillman stands out as one specifically qualified.

You should prepare the necessary travel authorization for this detail. Per diem of \$16 per day is authorized for the assignment. Travel costs will be reimbursed from Washington office funds. Tillman should arrive in time for duty at 7:45 a.m., March 9. Please indicate need for and type of accommodations desired and Engineering will make the reservations.

*Charles H. Stoddard*

Director

Enclosure

cc: Personnel  
DDRF 1 & 2  
BLM Perm. File  
Daily  
6.05a:CKRemington:eh 2-12-64

—9185 (6.05a)—

*Sumner* 2/13/64  
*W. J. ...*  
*W. J. ...*  
*W. J. ...*

Memorandum

To: SD, Colorado

FEB 18 1964

From: Director

Subject: Rewriting of 1947 Manual of Survey Instructions

During the past year the above subject has been discussed formally and informally by memo and at conferences and inspections. We have now learned that the Government Printing Office has less than a six-month stock on hand so the rewriting project is urgent. A team of four men from the field is being assembled to work with representatives from this office to expedite this project.

The initial work on this rewriting project will be done during the period from March 9 to April 17, 1964, in Washington, D.C. We believe the writing of the manual will be facilitated if performed in the Washington office where consultation and clearance can readily be obtained as the writing progresses. A copy of Form 52 detailing Mr. William H. Teller to this office for that period is attached.

We realize that this work comes at a time when your summer field work will be in the mobilization stage but this manual is urgently needed by the public and must be brought current with today's practices before it is reprinted. In reviewing the capabilities of the field force for this work, Bill Teller stands out as one specifically qualified.

You should prepare the necessary travel authorization for this detail. Per diem of \$16 per day is authorized for the assignment. Travel costs will be reimbursed from Washington office funds. Teller should arrive in time for duty at 7:45 a.m., March 9. Please indicate need for and type of accommodations desired and Engineering will make the reservations.

*Charles H. Stoddard*  
Director

Enclosure

cc: Personnel  
DDRF 1 & 2  
BLM Perm. File  
Daily  
6.05a:CER:Washington:eh 2-12-64

-9185 (6.05a)-

Remington 2/13/64  
H. R. Smith  
M. P. Petty  
Peru  
Acting Asst. Dir. BLM

FEB 13 1964

Memorandum

To: SD, Alaska

From: Director

Subject: Rewriting of 1947 Manual of Survey Instructions

During the past year the above subject has been discussed formally and informally by memo and at conferences and inspections. We now have learned that the Government Printing Office has less than a six-month stock on hand so the rewriting project is urgent. A team of four men from the field is being assembled to work with representatives from this office to expedite this project.

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We realize that this work comes at a time when your summer field work will be in the mobilization stage but this manual is urgently needed by the public and must be brought current with today's practices before it is reprinted. In reviewing the capabilities of the field force for this work, Dick Wager-Smith stands out as one specifically qualified.

You should prepare the necessary travel authorization for this detail. Per diem of \$16 per day is authorized for the assignment. Travel costs will be reimbursed from Washington office funds. Wager-Smith should arrive in time for duty at 7:45 a.m., March 9. Please indicate need for and type of accommodations desired and Engineering will make the reservations.

Charles H. Stoddard

Enclosed

Director

cc: Personnel  
DDRF 1 & 2  
BLM Perm. File  
Daily

6.05a: CERemington:eh 2-12-64

All Division of Engineering chiefs with major Cadastral surveying experience should be considered for this project. Mr. Wendell Hall, Wayne Forrest, and William Teller could all do much toward rewriting the Manual. In Alaska the best-qualified personnel would be Mr. Wager-Smith, Mr. Hazard, Mr. Means, and Mr. Jones.

We will appreciate your early advice regarding any Alaskan employee you plan to select for this project.

LFJ/bh

*Floyd K. Robinson*





UNITED STATES  
DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT  
STATE OFFICE  
U.S. Courthouse & Federal Bldg., - Room 4017  
650 Capitol Avenue  
Sacramento 14, California  
95814

IN REPLY REFER TO:

9185 (C.05)

*6.550*

NOV 10 1963

Memorandum

To: Director

From: State Director, California

Subject: Manual of Surveying Instructions, 1947

In response to your Instruction Memo No. ENG-62 of July 16, 1963 we are transmitting a copy of the memorandum from our Chief of Cadastral Engineering. Mr. Johnson has summarized our views for the need for the revision of the Manual as well as certain modifications which are necessary.

At this time we would prefer that Mr. Johnson not be assigned to the rewriting project. In addition to the persons suggested as being qualified for this position we would also like to add the names of Mr. James Hardison of Nevada and Mr. John Knowles, retired.

*John A. Hill*  
Acting

Enclosure

1963 NOV 15 AM 11 05  
COMMUNICATIONS UNIT  
U.S. DEPARTMENT OF THE INTERIOR  
WASHINGTON, D.C.



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
STATE OFFICE  
Division of Engineering  
650 Capitol Ave., Room 4017  
Sacramento, California  
95814

IN REPLY REFER TO:

9185 (C.05a)

November 12, 1963

Memorandum

To: Chief, Division of Engineering  
From: Chief, Branch of Cadastral Engineering  
Subject: Manual of Surveying Instructions, 1947

It is generally recognized by the users of the Manual of Instructions for the Survey of the Public Lands of the United States that there is a need for rewriting this publication and that it should be undertaken at an early date. The material contained in the 1947 edition of the Manual is good, and furnishes a basic guide for the cadastral surveyor. However, there is considerable criticism of the arrangement and coverage offered, and a general revision is needed to update the material and present it in a form to increase its value as a reference and guide in the field of cadastral surveying.

A preliminary factor to be considered in rewriting the manual is the extent to which it is, or will be, used by the cadastral surveying profession. The Bureau of Land Management and other land administering agencies of the Federal Government are definite users. There are many thousands of licensed land surveyors in the United States. How many of those surveyors use our manual as a guide and reference is not known.

How many states have adopted our manual as their official guide in the resurvey and subdivision of private lands? California has officially adopted it. Some states have prepared their own manuals or guides. In the public land states those guides, or controlling regulations, certainly have a basic foundation on our manual. We must not lose sight of the fact that large proportion of the members of the land surveying profession and many states and lesser governmental units, as well as colleges and universities, either directly or indirectly depend upon our manual as a guide and reference. With this realization of the important role the manual plays in the field of land surveying in our nation, its revision should be approached with this wide coverage in mind.

Due to the increased values of lands and greater emphasis being placed on accurate land boundaries, greater accuracy is being demanded in cadastral surveys. The manual should place greater emphasis on methods and practices to meet this demand.

The report of the Associate Chief, Division of Engineering, Alaska, has been generally distributed and represents a quite thorough analysis of the manual and its need for revision. His recommendations for the revision of the material are sound and I am in general agreement with them. However, I am not in agreement with his plan of publication.

I wish to offer the following recommendations:

1. The revised manual be published in a single volume.
2. The Standard Field Tables be enlarged and published as a cadastral Engineering Handbook.
3. A new publication be prepared containing those portions of the present Standard Field Tables which are in daily field use.
4. The Ephemeris be revised to give declination of the sun at either noon or midnight Greenwich Civil Time.
  - 1a. Manual revision: Without going into detail, the material contained in the manual should be rearranged, a portion transferred to the handbook and a portion into the appendix. The coverage should be retained and updated and portions expanded to give better coverage. Careful rewriting of current material could reduce the volume so that with expansion of coverage the overall size of the book should not be appreciably increased. Coverage should be given to Photogrammetry, Microwave distance measuring methods and state coordinates.
  - 2a. Cadastral Engineering Handbook: This book should contain all the material in the present Standard Field Tables plus such material now in the manual as instruments and their adjustment and methods, and new material such as that related to microwave distance equipment.
  - 3a. New book which could be titled "Cadastral Field Tables". This book should be pocket size, and contain such material from the Standard Field Tables as the Traverse tables which are used daily by the chainmen using only the traverse tables. The traverse tables should be refined to give values to tenth of links and a column added giving differences in elevation in feet. At present most Standard Field Tables are worn out by the chainmen using only the traverse tables.

- 4a. The Ephemeris should be reduced to pocket size and tabulate declination of the sun at Greenwich civil time, either noon or midnight.

Regarding recommendations for a man from the California staff of cadastral surveyors to participate on the rewriting project, I do not feel that we have anyone here qualified for this work. I, personally, have had many years experience in cadastral engineering and have a fair knowledge in this field particularly in resurveys and mineral surveys. I understand that this work would entail a detail to Washington, D.C., for a probable 90 day period. For personal reasons I would prefer not to leave Sacramento for such an assignment, but would be willing to do so if requested. In such case I would prefer not to leave here until after February 1, 1964, when Lloyd Toland will transfer to California. He could carry on my duties here.

The Division of Engineering in the various state offices has a number of men who should be qualified for this work. Also it is suggested that one or two of our retired men be contacted on the subject. Either Leo Peterson or Arthur Brown could do an excellent job here, if available.

*George W. Johnson*

In reply refer to:  
9185, 1221

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Date: October 30, 1963

SPEEDMESSAGE

To: Director

From: State Director, Nevada

Subject: Rewriting of Manual of Surveying Instructions 1947 (6.05a)

This memorandum in reply to memorandum Eng. 62 dated July 16, 1963, requests suggestions of changes in the Manual of Surveying Instructions considered to be essential by this office.

A revised Manual could be an important aid in the solution of cadastral survey problems in Nevada. The major problems are Dependent Resurveys and Protractions.

Dependent Resurveys - Boundaries between privately owned and federal lands comprise 75% to 90% of Nevada's cadastral survey problems. The 1947 Manual is adequate where the original surveys were well, faithfully and completely executed. Unfortunately, many of the record surveys in Nevada were fraudulent and fictitious. Consideration should be given to a plan of Dependent Resurvey of the boundaries between public and privately owned land, without executing a dependent resurvey of the entire township. This of course would raise the problem of record plats of surveys that have been superseded by Independent Resurveys. Independent Resurveys approved twenty or thirty years ago, even eighty years ago, have superseded adjacent surveys. However, these are still record surveys and apparently still exist insofar as status records are concerned. The approval of the Independent Resurveys is prima facie evidence of the impossibility of determining the boundaries of the areas shown on these record plats. In some cases, not all cases, the areas are suspended from entry but continue to be the basis for Oil and Gas Leasing and other administrative actions. There are reasons to believe that cancellation, at least in part, of the original plat is the only solution.

Protraction Diagrams - These diagrams should be discussed in the Manual, especially in regards to surveys or resurveys within or adjoining these areas that are executed after approval of the protraction, and status of the diagrams after all areas are surveyed within the diagram.

Protracted areas, especially protracted quarter sections shown on the record plats

INSTRUCTIONS: (1) Use in lieu of wire communications for messages requiring immediate action when sufficient speed of delivery between offices is achieved by mail. (2) Prepare in form similar to internal memorandum. (3) Give priority handling in all administrative channels. (4) Use printed form for each addressee required to take action. (5) Telegraphic or informal language may be used.

have in the past usually been ignored upon completion of the survey of the unsurveyed portion of a township. A protraction diagram, basically a plan for future survey, logically would follow the same procedure. However, we constantly run into problems with status records, solution of which seems to require cancellation, in part, of the record plat.

Consideration should be given to a system of surveys roughly similar to Alaska State Selection Surveys for administrative uses, not for passage of title, in the large unsurveyed areas in Nevada. Such a system of surveys properly tied to the boundaries of adjacent or nearby privately owned lands and to control points on the approved protraction diagrams could provide a very satisfactory substitute for most presently needed original surveys, at a greatly reduced cost, in a much shorter time.

There are also certain technical changes that should be considered:

Witness Corners - The problems inherent in witness corners are widely recognized. These problems would be eliminated if Witness Points were set on the surveyed lines on each side of the corner point. If Witness Points could not be monumented within a reasonable distance, reference monuments could be used. Solely for the clarity of field notes, a very temporary monument such as a nail in pavement, marked stone, or stake in dry wash, etc., could be placed at the corner point if accessible.

Meander Corners - A monument at the exact point for a meander corner cannot be permanent. A Witness Point on line on the landward side will serve to define the direction of the line just as well, and may be far superior to a Witness Meander corner.

Closing Corners - Because of legal significance it may not be possible to entirely eliminate closing corners. However, there are many cases when corners of minimum control could be, and have been, established simultaneously with the survey of the boundary of an adjacent township. This might become the preferred method of survey. When corners of minimum control are not feasible the use of Witness Points on the closing lines might be considered. A closing corner legally is only a point on the closing line.

Restoration of Lost Corners - This is the foundation of all dependent resurveys and therefore the basis on which the land boundaries rest. Proportionate measurements should be resorted to only after it is positively determined that the original corner is lost, not merely obliterated, and only if it is impossible to place the blunder where it occurred in the original survey. The 1947 Manual and the publication, Restoration of Lost Corners contain all the applicable rules, but nevertheless manage to convey the idea that a cursory search for the remaining corner monuments followed by a restoration by proportionate measurement actually results in the reestablishment of the original survey. Proportionate measurement is not a satisfactory method of establishment, where there are manifested blunders in the record survey between the few corners that were actually marked with rather temporary monuments. Calls of the original survey to items of topography, receive a lot of consideration by the courts in placing the manifested blunder where it occurred. This is given a once over lightly in the

1947 Manual, and should be given a better discussion in the revised Manual. Specific cases could be explained in an appendix with a reference in the Manual proper.

Photogrammetry - The use of aerial photographs instead of a preliminary retracement in the field should be explored. An appendix could show how a rough approximate photogrammetric survey in the office by one or two men could eliminate a lot of fruitless retracement and search by a full field crew.

Lands Covered by Water - Tideland surveys in Alaska - Reliction in Nevada  
The Bureau's current position of reliction, and the method of survey should be spelled out.

Metes and Bounds Surveys - Sections 434 and 472 now cover two unrelated matters. The term is used for irregular tracts such as mineral claims, forest entry claims and small tracts undescribable by aliquot parts, sec. 472. We would like to refer to surveys of lands patented in terms of the plat of the original survey. Perhaps these surveys could be designated as Dependent Resurveys in terms of the original plat even though made in the manner of the tract surveys as detailed in the 1947 Manual, for use with Independent Resurveys. If this procedure was followed, tracts would be the designation of federal lands that cannot be designated as a section, because that section has been patented in terms of the original survey.

Supplemental Plats - Severe limitations should be placed upon creation of supplemental plats that turn out to be of questionable value in identifying boundaries of parcels of lands upon the ground. On the other hand, the creation of such plats should be encouraged when the indefinable, on the ground, boundary is of no value upon use of the plat. Example - An enclave of Federal land to be conveyed to the adjoining land owner. The boundary then ceases to exist, and there is no problem.

Summary - The present Manual is lacking in arrangement and indexing. Some changes and additions to methods of survey are needed. The Manual must be a bound volume. A hand book of cases, examples, tables and information necessary for field operations, would be helpful; this should be looseleaf to allow additions or deletions of information. After necessary information is at hand for the new Manual, it should be arranged and written by a professional and not by Cadastral Surveyors, selected from various states. In the past any Manual revision has been in progress several years, which shows that it is a large job and cannot be successfully done in a hasty manner, and the results be satisfactory. We understand that the State of California has accepted the present Manual as the guide for their land surveyors; courts use this Manual and attorneys also collect data from it for court cases.

  
Acting

UNITED STATES GOVERNMENT

# Memorandum

Oct 31 10 52 AM 1963  
SURVEYING UNIT

TO : Director

DATE: October 25, 1963

FROM : State Director, Wyoming

In reply refer to:  
9185 (ENG:DHL)

SUBJECT: Manual of Surveying Instructions, 1947

Your reference:  
9185 (6.05a)  
1221

*EL*  
*CT*

Reference is made to Instruction Memo No. ENG-62.

We have little to add in the way of recommendations for the rewriting of this manual other than what was discussed at the Denver Engineering Conference in September. We think Mr. Wager-Smith's proposals as discussed at the conference are good ones. The general wordiness, length of sentences and difficulty of understanding the present manual certainly needs to be improved upon.

It would be well if the Mill Site survey rules could be altered to permit the acquisition of large areas of non-mineral land needed in present day mining operations for settling basins, waste disposal areas and dumps, instead of covering large areas with hundreds of 5-acre tracts as is now the practice.

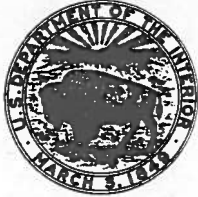
The only man in the Cadastral Section here who could participate in the rewriting of the manual would be our Cadastral Chief, Vern Lane. He is badly needed here to direct the cadastral survey activities in the State.

*Vern Lane*

ACTING

Oct 30 1963





OCT 28 11 12 AM 1963

COMMUNICATIONS UNIT  
UNITED STATES  
DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

State Office  
Post Office Box No. 777  
Salt Lake City, Utah 84110

IN REPLY REFER TO:

E:9185 (6.05a)  
1221

October 24, 1963

Memorandum

To: Director

From: State Director, Utah

Subject: Rewriting of Manual of Surveying Instructions

Submitted herewith is comment on the captioned subject requested at the recent Bureau Engineer's Conference at Denver.

We are in complete accord with the purpose and plan of the Washington office for rewriting the Manual and the excellent comments for effecting it as prepared by the Alaska State Office.

In submitting comment thereon as requested, it is suggested that the proposed staff of four to six Bureau Engineers and a consulting literary specialist be provided with consulting services of technicians from both Federal agencies and private enterprise. These consulting specialists should materially assist the staff in such fields as geodesy, mineral and land laws, ADP computing and programming, electronic measurement and their fields of endeavor related to cadastral engineering.

Comments from responsible representatives of private engineering and legal organizations as to their problems encountered in dealing with the Manual should be sought and placed in the hands of the staff.

*R. Nelson*

*[Handwritten initials]*



RECEIVED  
OCT 24 3 22 PM 1963  
IN REPLY REFER TO:  
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9185  
6.25  
UNIT

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
State Office  
3022 Federal Building  
Phoenix, Arizona 85025

October 23, 1963

Memorandum

To: Director

From: State Director, Arizona

Subject: Manual of Surveying Instructions, 1947 - Instruction Memo  
No. ENG-62

CEK

I agree that the subject manual is badly in need of rewriting.

Mr. Wager-Smith's memorandum of August 28, addressed to the Chief, Division of Engineering, Alaska, is a very complete and accurate discourse of the subject and I agree with most of his comments. However, I believe Volumes I and II as suggested by Mr. Wager-Smith could be combined. The idea of a Cadastral Surveyor's Handbook is a good one and should receive serious consideration.

Perhaps some thought should be given to publishing a booklet containing only the "Traverse Table" from the "Standard Field Tables." A great many copies of Standard Field Tables are worn out or lost each year by chainmen who use the traverse table for slope reductions and have no need for the remaining tables.

Mr. Remington's idea of having a professional writer train our technical people and also edit the writing of the manual is an excellent one.

This project is a big one and will take a lot of the time of several technical people who do not have the time to spare without endangering the Bureau's program. I believe there are three possible approaches to this problem:

1. Detail four or five qualified people to Washington; assign them to different sections of the manual and have them stay in Washington for the entire project.
2. Have the selected people report to Washington for about a two week period to be briefed on the project and to take the special writing course. Then return to the field and write their assigned portions of the manual. A second trip

to Washington by this group would probably be necessary at the conclusion of the project.


3. It might be possible to secure the services of some retired people to handle the entire project. I believe there are several such people who are qualified, such as Leo M. Petersen, Arthur W. Brown, Glenn R. Haste, John Knowler, Donald Clement, and Earl Harrington.

Some people now on the rolls who I believe are competent to help with the project are:

1. George Johnsen - Calif. - Resurveys and mineral surveys.
2. Dick Wager-Smith, Alaska - Surveys and instruments and methods.
3. George F. Tyrell, Montana - General
4. Jerry Harris, Alaska - Electronic measuring
5. Eugene Hutteball, Idaho - General
6. Tom Tillman, Oregon - General

From this office both F. Wayne Forrest and George D. Voorhees are capable of contributing to the project, however, I am opposed to having them away from Arizona for an extended period.

I assume that Mr. Gumm and Mr. Shearer of your office will take an active part in the project.

A handwritten signature in cursive script, appearing to read "Fred C. Miller". The signature is written in dark ink and is positioned in the lower right quadrant of the page.



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

E  
9185

State Office  
3022 Federal Building  
Phoenix, Arizona 85025

October 23, 1963

Memorandum

To: Director

From: State Director, Arizona

Subject: Manual of Surveying Instructions, 1947 - Instruction Memo  
No. ENG-62

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6. Tom Tillman, Oregon - General

From this office both F. Wayne Forrest and George D. Voorhees are capable of contributing to the project, however, I am opposed to having them away from Arizona for an extended period.

I assume that Mr. Gumma and Mr. Shearer of your office will take an active part in the project.

*Fred J. Weiler*

6.05a

1400-410-7

*See next page!*

October 21, 1963

**Memorandum**

**To: Assistant Director, Operating Services**

**From: Chief, Division of Engineering**

**Subject: BLM Engineering Conference and WASHO 42nd Annual Conference**

The BLM Engineering Conference was held in Denver, Colorado, on September 11, 12, and 13. From the many favorable comments received the Conference was very successful. In addition to the BLM Conference, there was a joint meeting of the BLM Engineering personnel with the Forest Service Regional Engineers and their Roads and Trails Engineer. This meeting was held on Sunday afternoon, September 15, and was presided over by C. E. Remington. The majority of the BLM Engineers remained to attend most of the Western Association of State Highway Officials 42nd Annual Conference. This meeting was held September 19-20. In connection with the WASHO Conference the BLM Engineers met with the Western States Bureau of Public Roads Regional and Division Engineers. This meeting was held on Monday afternoon, September 16, and was presided over by George M. Williams, Director of Engineering and Operations Public Roads.

The agenda of the BLM Conference was closely adhered to, with the main problem being lack of time. However, by remaining until 4:45 p.m. on the first day and meeting the following days from 8:00 a.m. to 5:00 p.m., the majority of the topics listed on the agenda were covered. The topics were of a technical nature and such valuable information was brought out by their presentation and discussion. The joint meetings with Forest Service and Bureau of Public Roads were equally successful in their discussions of technical problems common to each Bureau. In addition to clarifying joint technical problems, the public relations established between the agencies should go a long way toward fortifying BLM's future road program.

A presentation of the detailed discussions at each day's meeting would be long and tiresome. Therefore, only the topics where additional action was suggested will be presented. They are as follows:

BLM Engineering Conference - September 11, 12, 13

**Welcomes:** Colorado State Director L. M. Fickett welcomed the group and offered his wishes for a successful meeting. During the progress of the first topic Mr. Remington placed a long distance call to Washington, D. C. Through the latest electronic telephone device Associate Director Errol Hochmuth and Assistant Director of Operating Services Luther T. Hoffman

9185, 1221

welcomed ELM Engineers to the Conference. They both expressed their wishes for a successful Conference and a mutual exchange of ideas and understanding. Each praised the work accomplished by the Engineers and gave the young engineering organization a very strong verbal backing.

Responsibilities of Division of Engineering in W.O. and S.O.

In discussing the first topic other subjects crept into the discussion. This happened throughout the course of the Conference regardless of how hard we tried to adhere to the prepared schedule. It developed during the discussion that an instruction memo should be issued to establish a definite understanding of the part Engineering will play in equipment management.

Rewriting Manual of Surveying Instructions

This topic generated a lot of discussion from methods of rewriting to who should do the rewriting. Conclusion: The Manual should be rewritten, and the States should answer Instruction Memo No. ENG-62. Their answers would include recommended changes to the Manual and nomination of an Engineer to help in the rewriting. From the group nominated a committee would be selected, with assignment to Washington. The committee selected would be given a course in technical writing before beginning the task of rewriting the Manual.

Master Site Development Plans

The master site development discussion brought out the fact that many of the Chiefs, Division of Engineering, were not adequately informed by the districts on programming of construction projects. There is an urgent need for clarification from Washington to correct this situation.

Transportation Planning

During the transportation planning discussion two questions were presented that need additional clarification. They were:

1. The responsibility of securing right-of-way. Final conclusion was that it is the duty of the State Division of Engineering to make the survey, draw the property plat, and write the property description. This information then is given to the State Division of Lands and Minerals for the actual securing of the right-of-way. The State Engineers felt that instructions from Washington outlining these duties in more detail would be very helpful.
2. The number of sets of the Transportation Planning Maps that will be needed was discussed. At present two sets are made. ERM has expressed its desire to have at least two sets; this would make a total of four sets



UNITED STATES  
DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT  
STATE OFFICE  
P. O. Box 1251  
Santa Fe, New Mexico  
87501

IN REPLY REFER TO:  
500  
9185

*6.15 a*

October 14, 1963

Memorandum

To: Director

From: State Director, New Mexico

Subject: Manual of Surveying Instructions, 1947

Reference is had to Instruction Memo No. ENG-62 of July 16, 1963, on the above subject.

At this time we believe that the memorandum of the Associate Chief, Division of Engineering, Alaska, to the Chief, Division of Engineering, Alaska, covers any comments which we would care to make. This is the memorandum of August 28, 1963, which was discussed at the Engineering Conference at Denver, with copies made available by Mr. Remington. We are in substantial, if not complete, accord with the thoughts expressed in that memorandum.

We do not have a recommendation for a man from this office to participate in the rewriting.

*Charles Peely*

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OCT 16 8 58 AM 1963  
COMMUNICATIONS UNIT

*CE*





RECEIVED  
BUREAU OF LAND MANAGEMENT  
SEP 30 11 25 AM 1963  
UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
State Office  
710 N. E. Holladay  
Portland, Oregon 97232

IN REPLY REFER TO:  
100.4b

SEP 25 1963

To : Director  
From : State Director, Oregon  
Subject: Revision of Manual of  
Surveying Instructions

Your reference:  
9185 (6.05a)  
1221

Instruction Memorandum No. ENG-62, dated July 16, 1963, asks for recommendations in rewriting the Manual of Surveying Instructions. In the light of discussion at the recent engineering conference in Denver, the following general procedure is suggested for carrying out the project.

Each successive Manual has been based on those preceding it, forming an orderly procession. New material has been incorporated or added as necessary. The best method in the proposed revision would be to follow the same plan. It may be advisable to delete some material appearing in the 1947 Manual. However, careful consideration should be given to each portion so treated. For instance, much technical material dealing with solar instruments is not available elsewhere.

The Manual breaks down naturally into several main parts. The system of rectangular surveys and marking of monuments and accessories should be fully covered. The principles involved in restoration of lost corners and in resurveys are also basic. The various types of special surveys need to be included. The preparation of field notes and plats must be covered. Mineral surveys should be treated in a single section as in the 1947 Manual. These subjects all describe theory of public land surveys and the manner in which it is applied.

The section on Instruments and Methods describes the tools of the surveyor and how they properly should be used to carry out the theoretical plan. Upon review and consideration of this portion of the 1947 Manual, we believe most of the material should be retained. The purpose of the Manual has been, and remains, the presentation in one place the material needed by a public land surveyor. If we delete a portion of this subject and rely for it on other publications, cadastral surveyors will undoubtedly return to the 1947 Manual for guidance or will neglect carrying the information with them to the field.

The additional material needed to cover aerial surveys and electronic measurement might be included under instruments and methods, since these are merely new techniques used to carry out the basic plan. However, at least in the next Manual, it would be well to cover them in separate chapters because of radically different approaches.

With the addition of new material the Manual may become too bulky. This can be fixed in part by shortening and clarifying sentences in the 1947 Manual. The material in the appendix might be placed in a separate volume. Or we might have two volumes of the Manual, the first to contain portions dealing with the theory of public land surveys, their projection and restoration, together with a section on mineral surveys. The second volume would contain material on instruments and methods with whatever material is retained from the present appendix. In any case, the basic purpose of the Manual should not be overlooked. Simplicity and clarity of presentation should be stressed, but not at the cost of technical deficiency.

Mr. Thomas A. Tillman or Mr. Irving Zirpel, Jr., of this office, could be made available to participate in the rewriting if the time required is not too extended. We believe that a limited committee meeting during the coming winter, preferably after January 1, should be held to determine the format of the new Manual. Individual assignments for preparation of certain sections could be made at that time. Copies of the drafts should be circulated among the more experienced cadastral engineers for constructive criticism to be written on the drafts. A year from this coming winter the committee could hold an extended meeting for the purpose of assembling and standardizing the material. We do not believe the entire project can be carried out successfully this winter.

Another suggestion is to obtain the services of Mr. Earl Harrington or Mr. Donald Clements in an advisory capacity, each of whom was concerned in preparation of the 1947 Manual. Valuable background would be available from these men.

  
ACTING State Director

BUREAU OF LAND MANAGEMENT

UNITED STATES GOVERNMENT

# Memorandum

SEP 30 11 28 AM 1963

COMMUNICATIONS UNIT

E:WGG

9180

DATE: Sept. 25, 1963

TO : Director, Bureau of Land Management

FROM : State Director, Idaho

SUBJECT: Manual of Surveying Instructions, 1947 6.05a (9185; 1221)

We concur with your statement in Instruction Memo No. ENG-62, dated July 16, 1963, that the Manual of Instructions for the Survey of the Public Lands of the United States, 1947, is badly in need of rewriting.

The reasons for revising and rewriting the Manual were discussed at the Engineers' Conference in Denver, September 11-13. Statements in this memorandum to justify the need for rewriting it would be a repetition of those which were expressed at the conference. We are, therefore, confining our statements to a suggested procedure:

1. A qualified cadastral surveyor be assigned to prepare a format for the revised Manual. We suggest that D.R.W. Wager-Smith, Associate Chief, Division of Engineering, Alaska, be given this assignment.
2. A technical committee, composed of 3 qualified cadastral surveyors, be selected to review, rearrange, and approve the format for the Manual. We suggest that this technical committee be composed of Mr. Wager-Smith, William H. Teller, Chief, Division of Engineering, Colorado, and Norville E. Shearer, of the Washington Office. To do this job, the committee should meet in Washington, D. C.
3. Members of the committee be assigned to draft approximately 1/3 of the revised Manual contents in conformance with approved format. Each member will review the draft of the other 2 members. This will provide an equivalent of 2 technical reviews. Step 3 may be carried out while the members are at their headquarter station.
4. A professional technical writer be engaged to write the final draft.
5. Each member of the technical committee would review the final draft and submit his comments to the Chief, Division of Engineering, for review, acceptance, consolidation, and inclusion into the final draft.
6. Each committee member should have the authority to select at least one technician to assist him in revising and rewriting the manuscripts for the section assigned to him and in reviewing the sections written by the other committee members.

If we can be of further assistance in getting this job underway, please advise.

*J. T. Fallini*

UNITED STATES  
DEPARTMENT OF THE INTERIOR

5.22a-4

## BUREAU OF LAND MANAGEMENT

Colorado State Office  
Gas & Electric Building  
910 - 15th Street  
Denver, Colorado 80202SEP 23 1963 *175/6*

Memorandum

Your reference:  
9185 (6.05a)  
1221

To: Director

From: State Director

Subject: Manual of Surveying Instructions, 1947 (Instruction Memo  
No. Eng-62)

We are in accordance with the comments made in the above memorandum concerning the revision of the Manual of Surveying Instructions.

Inasmuch as this matter was rather thoroughly discussed at the Engineering Conference recently concluded, there appears to be no need for further comments. It is not believed the suggestion made by some of the engineers, concerning the employment of retired cadastral surveyors to assist in the rewriting of the Manual, would be feasible. For the most part these men are unfamiliar with the operations and maintenance of the rapidly developing electronic measuring devices. I believe there are enough people with long experience in the State Offices to provide guidance in the rewriting of the chapters concerning surveys, resurveys and special surveys.

The proposal to employ a professional writer to handle the mechanics of composition and printing appears to be very sound.

Personnel in the Division of Engineering in this office would be pleased to cooperate in the rewriting of the Manual in accordance with the schedule suggested.

*Lowell M. Kuchett*

RECEIVED  
BUREAU OF LAND MGMT.

SEP 24 1 47 PM 1963

COMMUNICATIONS UNIT

UNITED STATES GOVERNMENT

# Memorandum

DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
555 Cordova Street  
Anchorage, Alaska 99501

9185

Your reference:  
9185 (6.05a)  
1221

DATE: August 30, 1963

TO : Director

FROM : State Director - Alaska

SUBJECT: Rewriting of Manual of Surveying Instructions

C. E. Remington's Instruction Memo No. ENG-62 asks for suggestions on a Manual rewriting project, and states that this matter will be discussed at the Denver Engineering Conference in September.

Our Division of Engineering in Alaska has devoted considerable time to research and analysis of the problem. The attached memorandum from D.R.W. Wager-Smith, Associate Chief, to Lyle F. Jones, Chief, summarizes the elements of our suggested approach to a solution.

The memorandum is transmitted for Mr. Remington's review in the event that it may form the basis for discussions at Denver.

*Roger B. Robinson*

Form No. 41-150  
March, 1962

UNITED STATES GOVERNMENT

DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT*Memorandum*

DATE: August 28, 1963

TO : Chief, Division of Engineering - Alaska

FROM : Assoc. Chief, Division of Engineering - Alaska

SUBJECT: Rewriting of Manual of Surveying Instructions

The following comments relate to C. E. Remington's Instruction Memo No. ENG-62.

The need for rewriting the Manual is generally agreed, and this should be undertaken soon.

**1. THE FORMAT**

There is doubt concerning the implications of the statement that the Manual "needs to be coordinated to our Bureau manual scheme". If this statement implies mimeographed loose-leaf format, a serious question is raised concerning the propriety of such a plan. For many years cadastral surveyors, both public and private, have relied on successive editions of the Manual as a firm foundation upon which to base many professional decisions. Similarly the Courts have invoked the Manual as a legal basis for many rulings, and attorneys have cited it in arguments and briefs. Again, standard surveying texts and treatises rely heavily upon the Manual as a foundation upon which to build cadastral engineering hypotheses.

Under these circumstances the Manual serves a very important purpose, not merely as a BLM procedural guide, but as a quasi-legal document affecting the entire cadastral engineering profession and the courts.

One of the primary requisites of such a document is stability. It may not properly be published as a collection of mimeographed sheets which may be frequently or lightly replaced, changed, amended, removed, or supplemented as is the case with the Bureau manual. Should such a plan be pursued, both the engineering and legal professions, as well as the Courts, would be deprived of a reference work essential in their respective fields. At no point in time would they be able readily to determine the official position of the Bureau with respect to surveys of the public lands.

These are strong arguments in favor of retaining the Manual in the form of a printed document bound as a book. To do otherwise would subject the Bureau to criticism, and would weaken our position as the respected authority in the matter of cadastral surveys of public lands.

## 2. APPROACH TO THE REWRITING PROBLEM

Without question the specialized technical knowledge of various individuals can be employed best by having each individual set down the substance of the information for which he is to be responsible. But the "community project" idea should not be pursued too far. The finished Manual should be a cohesive volume. Its various parts should relate smoothly and logically one to another. There should be uniformity in writing style, manner of technical presentation, clarity of expression, etc. It is not to be expected that these ends could be attained by merely assembling the independent efforts of a number of writers.

A winter meeting in Washington would be an excellent means of getting the job started. But it may not be expected to produce a Manual of real consequence. And if we are adequately to maintain and to enhance the Bureau's reputation in this field, nothing short of real excellence will suffice.

In view of the foregoing, I suggest pursuance of the mid-winter conference idea to the end that agreement may be reached on major questions of purpose, form and content, and that the several specialists may produce working drafts of their contributions. At that point the conferees should disband, and one individual should be assigned the task of "putting together the pieces". When this has been accomplished, drafts of the complete volume should be sent to the committee members, allowing adequate time for their intelligent review and comment. At this point another meeting might well be called in Denver or Washington to compose divergent opinions and to reach final agreement. All of this will take time and a great deal of effort. But I am convinced that only in some such fashion as this may we expect to produce a Manual that will perpetuate the Bureau's historic position in this field, and give to the public the sort of engineering treatise that will do credit to our organization.

## 3. PURPOSE OF THE MANUAL

The initial purpose of the Manual commencing in the mid-1800's was to instruct surveyors of the public lands on two main points:

First, how to survey, i.e. the techniques, with standards of performance; and second, how to create a rectangular system by running and monumenting lines under uniform procedures designed to effectuate the statutes.

General lack of technical knowledge coupled with a loose relationship between the government and its contract surveyors, made the first purpose necessary in the early days. And lack of experience in applying the laws, coupled with a need for uniformity, dictated the second purpose. An interesting example of the latter is contained in Thomas Hutchins' letter to the President of Congress asking to be "honored with Instructions" on how to deal with the problem of convergence.

The first set of formal instructions was issued by Edward Tiffin, Surveyor General Northwest of the Ohio in 1815. And in 1855 the first bound Manual appeared. Simplicity of surveying techniques, and the limited number of procedural problems which had arisen, made it possible to embody these early-day instructions in a single small volume. And as has been noted, the sphere of interest and of influence of this volume was confined largely to a small group of contract surveyors.

As settlement and the rectangular system spread over vast areas of public domain, however, several notable developments evolved to affect the Manual, and in turn to modify its purpose. More or less standard problems arose which required standard rules for their solution - distortions, fractional townships, private land claims, resurveys, lost corners, etc., etc. And boundary disputes inevitably arose. The problems demanded a greatly expanded Manual, and the boundary questions involved a host of private surveyors and lawyers, and the Courts. Thus the Manual came to exert an important influence not merely upon contract surveyors, but upon a much larger group with important interests in the boundaries of real property and the manner of their original creation. Furthermore, despite the apparent belief of Manual authors to the contrary, the wider dissemination of technical knowledge made the teaching of elementary surveying a questionable purpose of this volume.

In view of the foregoing considerations, the present primary purposes of the Manual might properly be summarized as follows:

1. To provide both the interested public and the Bureau's employees with sufficient legal and historical background upon which to base enlightened decisions, and to give Bureau employees broad general instructions in the proper procedures to be followed in surveying the public lands.
2. To give Bureau employees detailed instructions in surveying methods and particular techniques to be used, when these methods and techniques differ from customary practice or are considered necessarily peculiar to Bureau surveys.
3. To furnish Bureau employees a concise handbook of surveying information especially applicable to Bureau surveys, with tables.



These purposes may best be accomplished through publication of the Manual in three volumes consisting of two bound volumes and one loose-leaf volume in the form of a Bureau manual.

Volume 1 (bound) should be designed to accomplish the first purpose, and Vol. 2 (loose-leaf) the second. Vol. 3 should be a bound handbook accomplishing the third purpose.

#### 4. VOL. ONE vs. VOL. TWO

A nice discrimination will be required to differentiate between the material to be placed in Vol. 1 and that more properly belonging in Vol. 2. A clear dividing line between the "broad general instructions" of Vol. 1, and the "detailed instructions" of Vol. 2 is difficult to define. In general, Vol. 1 should deal with principles and concepts established by law or quasi-legal regulations, whereas Vol. 2 should detail the technicalities of their implementation. Again, generally speaking, Vol. 1 should be comprehensible to an intelligent layman, whereas Vol. 2 should be addressed to cadastral engineers. Again, Vol. 1 should describe those aspects of the problem that tend to remain constant with the passage of time, such as the expansion of the net from the initial point; and Vol. 2 should concern itself with those aspects that may change from time to time with technological advances such as introduction of the solar transit, the optical theodolite or electronic measuring devices.

Such a two-volume approach would give to the public the sort of stable reference work upon which it has come to rely, and which the Bureau has a certain historic responsibility to furnish. And at the same time it would give to the Bureau some much-needed flexibility in instructing its cadastral surveyors pursuant to advances in technology or changes in technical policy.

This concept of separating principles and procedures from methods and techniques is further developed under topics 6 and 7 hereinbelow.

#### 5. VOLUME THREE

Our present Standard Field Tables constitutes a very valuable nucleus for Vol. 3. It should be expanded into a significant Cadastral Surveyors' Handbook. In so doing we should transfer to the Handbook much of the technical detail which presently clutters-up the Manual. And considerable additional standard surveying data should be added. But no attempt should be made to teach surveying. There are plenty of excellent texts in this field, and our men should be assumed to be familiar with them.

Among the transfers and additions should be such material as principles of stadia, elements of circular curves, adjustment of instruments, elements of astronomy, celestial observations, elements of geodesy with

formulae, basic plane and spherical trigonometric formulae, reduction to sea level, correction for curvature and refraction, basic principles of State plane coordinates with formulae, correction formulae for tape tension-temperature-sag, etc., etc. All of these matters should be treated in handbook, rather than textbook fashion. It would also be valuable to include some additional tables such as powers and roots, versines, haversines, decimals of minutes and degrees, various conversion factors, etc., etc.

Much of this material could simply be assembled from various existing publications, with permission of the publishers, giving due credit to the source.

Tables requiring explanation should be explained in the handbook, and not in a separate volume as is now the case. And there should be a carefully prepared alphabetic index.

## 6. THE 1947 MANUAL

A further development of the general plan of a two-volume approach to the instruction portion of the Manual, distinguishing between principles and their application, is here attempted against the background of the 1947 Manual. The ideas here expressed are merely exemplary, and are not intended as a detailed analysis.

Chapter I should be placed in VOL. 1. It should be updated and greatly expanded into a worthwhile treatment of the historic and legal background of the United States public land surveys. There should be adequate narrative to develop the broad picture from 1785 until the present. This would create a valuable frame of reference within which to interpret all that follows. All pertinent federal statutes should be extensively quoted, with comments. There should be generous citations and quotations from Court decisions, L.D., C.F.R., etc. Such extraneous material as the listing of the contents of the Standard Field Tables should be deleted.

With a foundation well laid in Chapter I, we may proceed with the "broad general instructions" to Bureau surveyors, laying down general rules of procedure as opposed to specific techniques and methods.

Chapter II, "Instruments and Methods": Almost all of this chapter should be transferred to Vol. 2 and Vol. 3. All passages which essay to teach elementary surveying should be discarded. There should be retained in Vol. 1 only brief informative statements of the types of instruments used.

Chapter III, "System of Rectangular Surveys", drastically rewritten, should be included in Vol. 1; but most of such material as that on Pages 237-244 dealing with specific details should be transferred to Vol. 2.

Chapters IV, V, VI dealing respectively with "Corner Monuments", "Restoration of Lost Corners" and "Resurveys" should be rewritten and included in Vol. 1. But such details as those contained in Secs. 423-25, 447-51, 460, and the like, should be omitted or placed in another volume.

Chapter VII, "Special Surveys and Instructions", should be rewritten. An improved version of portions dealing with Special Surveys should be included in Vol. 1. The part dealing with rectangular surveys might better be moved into Chapter III. The parts dealing with Townsites and with Metes-and-Bounds Surveys should be expanded, updated, and split up between Vols. 1 and 2. The part dealing with Soil Classification (both here and in Appendix VII) should be entirely deleted. Section 462 on Special Instructions is of particular interest only to Bureau employees and may be modified periodically. It should be moved to Vol. 2, leaving Sec. 461 to serve the general interest.

In Chapter VIII, "Field Notes", a rewrite of the first two pages will adequately serve the purpose of Vol. 1. The remainder of this chapter, together with Appendix VIII, "Specimen Field Notes", should be moved to Vol. 2. The detailed treatment is of little general interest outside the Bureau, and has no particular significance in a broad sense. Its presentation in loose-leaf manual form will facilitate those periodic and much-needed changes made necessary by progress, modern ideas, and new methods.

Chapter IX, "Plats", should be treated similarly to Chapter VIII, placing in Vol. 1 the basic ideas and procedures, and in Vol. 2 the detailed instructions to draftsmen.

Chapter X, "Mineral Surveys", should be updated and much expanded. Specific instructions such as plat scale, color of typewriter ribbon, etc., should be moved to Vol. 2. All mineral surveyors should be placed on the mailing list for changes in the mineral survey portion of Vol. 2.

Appendix I should be expanded and moved to Chapter I.

Appendix II: Rewrite the historic portion and put it in Chapter I. Omit instruction in elementary surveying. Place necessary instructions in Vol. 2. Place condensed versions of problems in the Vol. 3 Handbook.

Move some of Appendix III to Chapter III, and some to Vol. 2.

Move Appendix V to Chapter V.

Appendix VI might properly be included in Vol. 3, Handbook.

Appendix VII should be greatly expanded. Portions of the expanded version should be covered in Chapter I; other portions in Chapter VII; and specific instructions in Vol. 2. Very little purpose seems to be served by the section on soil studies; it should be deleted.

As previously noted, Appendix VIII should be included in Vol. 2.

The Index should be made more useful. Trying to make use of the index in its present form is a most frustrating experience.

## 7. NEW MATERIAL

Photogrammetry should be covered in Vols. 1 and 2, with some of the basic formulae and handbook data in Vol. 3. In Vol. 1 there should be a clear explanation of the general procedures employed in cadastral survey monumentation, meandering, and townsite design. Volume 2 should contain specific instructions in techniques and methods, acceptable accuracies, sample contract specifications, sample field records, etc. No attempt should be made to give a short-course in elementary photogrammetry.

Electronic Surveys should similarly be covered in Vols. 1 and 2, with appropriate handbook information in Vol. 3. The general procedures should be sufficiently discussed in Vol. 1 to convey a clear comprehension of the application of new devices. The introduction of Automatic Data Processing into the Bureau's cadastral survey program should be mentioned. Detailed instructions in techniques and methods should appear in Vol. 2, together with sample field records, acceptable accuracies, etc. No attempt should be made to give a short-course in electronic theory.

Protraction Diagrams should be discussed in Vol. 1 with a view to enlightenment on how the need for them arose, the proper uses to which they may be put, how they differ from approved plats, etc. The problem created by their frequent woeful inaccuracies should be mentioned. Plans for their updating and periodic revision should be discussed. In volume 2 there should appear the detailed instructions regarding their construction and revision.

Alaska State Selection Surveys should be discussed in general terms in Vol. 1, with detailed instructions in Vol. 2. These surveys constitute very significant departures from historically accepted practices. The concept of laying out townships from protraction diagrams and monumenting more-or-less random points on the boundaries without running the lines, should be discussed, together with the compelling reasons that brought about this new procedure.

Tideland surveys executed seaward of federal uplands should be discussed, with comments upon the determination of the low-water line for area calculations.

Offshore surveys should be treated pursuant to important recent developments in this field.

Various field activities which constitute neither original surveys nor resurveys, but which may affect established boundaries, should be discussed. An example would be the current program of Forest boundary

remonumentation. The manner of creating and filing official records of these activities should be treated.

## 8. MISCELLANEOUS COMMENTS

The verbiage and sentence structure throughout the entire Manual should be completely revised in the interests of clarity. Exceptions, of course, would have to be made in the case of the wording of statutes, decisions, and those regulations which have attained a quasi-legal status. But otherwise all obscure, ambiguous and labored passages should be reworded. As an example, one may refer to the first sentence of Section 496 on Page 359. Aside from containing the amazing total of 245 words, this sentence does not express any clear-cut idea readily to be perceived. The reader drowns in a deluge of words. And this example is fairly typical. There is much work to be done along these lines.

Typographical composition and make-up should be improved. There should be better paragraphing, and each section should be introduced by a bold-face on-line title following the section number. Wider spaces should be left between lines, and gaps between sections. These and other similar devices would promote rapid search and easy comprehension.

All mutually contradictory statements and implications should be assiduously sought out and brought into harmony. As an example, one may compare Sections 162, 234, 480 and 685 dealing with limits of closure.

Throughout the Manual there should be more and better figures. Consideration should be given to printing on slick paper and using color to clarify confusing figures. (See Ferry Lake Case, Fig. 78, P. 374). Each figure should have a sufficiently complete caption to describe clearly what it depicts, with a reference to the text where it is discussed with particularity. In many instances the figure might well be placed on one page and a fairly exhaustive discussion thereof on the facing page. This would avoid the confusing process of leafing back-and-forth between text and figure.

Photographs of transits would not be very useful in Vol. 1, but they would probably serve a good purpose in the Handbook, if they were necessary to an understanding of the text. Volume 1 might well contain informative photographs of various field operations.

There should be a more exhaustive treatment of meander lines in both Vol. 1 and Vol. 2, especially those involving the "line of mean high tide". Here again photographs, including aeriels would be very useful in illustrating conditions discussed. Considerable confusion exists in the public's mind and in the minds of Bureau employees concerning two important approaches to meanders, and an attempt should be made to clarify the Bureau's position insofar as possible within the scope of the Manual.

The first area of confusion embraces navigability, especially as it has erroneously come to be associated with "all rivers not embraced in the class denominated 'navigable', the right-angle width of which is 3 chains and upward". Not only the public, but many of our own surveyors have the idea that meandering a stream constitutes evidence of its navigability. Guidelines should be clarified concerning the practical day-to-day application of the rules and laws which determine navigability.

The second area of confusion embraces the two interpretations of the term "line of mean high tide". The 1947 Manual confines its discussion almost exclusively to bodies of fresh water, and uses the term "line of mean high water". But the definite impression is left that the line of mean high "water" or "tide" (?), is that line determinable by physical evidence on the ground. This position is supported in the Director's 1959 decision in the Oelschlaeger - Pennington case, as affirmed on June 27, 1960 in the Solicitor's opinion on Oelschlaeger's appeal.

On the other hand there is a growing tendency among Bureau employees to disregard the physical-evidence approach, and to attempt to utilize published tide tables in conjunction with leveling techniques in relating the line of mean high tide to the 18.6-year tide cycle.

The Manual should recognize these two approaches and set down guidelines concerning the circumstances under which to employ the one or the other. It should also contain fairly detailed instructions in Vol. 2 as to how the 18.6-year line is to be established. Admittedly the legal implications of such revisions will present difficulties. But there would appear to be little merit in avoiding the issue simply because it is complex.

The question of apportioning accretion should be discussed as it relates to those cases where the accretion lies seaward of adjacent public and private lands. Perhaps this might best be handled in broad general terms, with citations of more exhaustive treatment in cases, decisions, texts, etc.

Metes-and-bounds surveys should be more fully treated in both Vol. 1 and Vol. 2. There should be discussion of small-tract and homesite layouts, especially where utilization of existing rectangular net results in land-use patterns not ordinarily associated with good land management.

Careful consideration should be given to distinguishing between directives and guidelines. Regulations which stem directly from the statutes, or which are so basic to the implementation of the laws as to make their strict observance essential to the continuity of established procedures, should be set forth clearly as directives. But those portions which are included as aids to surveyors and draftsmen in exercising their individual judgment, should not be so worded as to give them the force of orders. The failure of the present Manual to make this distinction causes much confusion, and often results in substituting blind and unreasoning adherence to the "blue book" in the place of logical analysis. And, furthermore, it tends to reduce cadastral engineers to the level of technicians incapable of exercising enlightened judgment. We should not underestimate the unfortunate effect which this sort of thing has upon the initiative of our people, and upon our ability to recruit the sort of professionally oriented men who should be executing our

important surveys.

Conventional nomenclatures and techniques should be employed throughout the Manual. No good purpose is served by departing from the language and the symbols in common useage in the profession. Thus on page 46 naught but confusion results from using the symbol of inequality to indicate approximation, when there already exists a generally accepted symbol for approximation. And similarly on page 67, and elsewhere, there appears to be no justification whatever for re-defining such a standard term as "hour angle". This tendency to depart from conventional useage is deplorable in an organization such as ours. In this connection consideration might well be given to starting the ephermeris day at zero hour Greenwich Civil Time instead of noon Greenwich Apparent Time. The benefits of the latter are debatable.

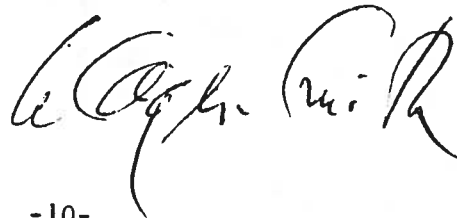
There should be discussion of the limitations to be placed on the indiscriminate creation of supplemental plats which subsequently prove to be of questionable value in accurately identifying parcels of land upon the ground.

#### 10. CONCLUSION

As has been noted previously, no attempt has here been made to analyze in detail the revisions which are required, nor to offer any easy solutions to the many problems presented. Indeed, there are no easy solutions; but the very difficulty of the task should encourage us to undertake it.

And in undertaking this important work we should not underestimate the influence that this book has in creating an image of the Bureau in the minds of the public, especially in the minds of those large segments of the cadastral engineering and the legal professions outside the Bureau. These groups are influential; they are vocal; and they are not as likely to be influenced by favorable press releases and fancy brochures as by jobs well done.

Of necessity, any discussion of a rewriting job requires a "what's wrong with it?" approach. If, therefore, this discussion appears overly critical of our present Manual, it should be recognized that such an approach is inherent in the nature of the problem. Yet in reviewing successive editions of this historic book, one cannot but pause to pay tribute to the host of able men who have devoted their time and energy and marked ability to the task of constantly enhancing its usefulness and its significance as an engineering treatise and a public document. The extent to which we prove capable of carrying forward their endeavors remains to be seen.



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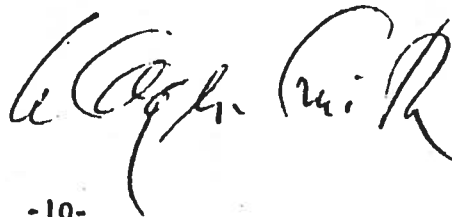
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AND SO AS WE LEAVE  
THE BUREAU IN  
OF



This man doesn't go by as a rewrite specialist with his "archaic words"





SEP 3 11 49 AM 1963

COMMUNICATIONS UNIT UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
State Office  
1245 North 29th Street  
Billings, Montana

IN REPLY REFER TO:

5: 9180  
Your reference:  
9185 (6.05a)  
1221

August 29, 1963

Memorandum

To: Director

From: State Director, Montana

Subject: Manual of Surveying Instructions, 1947

We have no one in Montana whom we feel is qualified to participate in the rewriting of the Manual of Surveying Instructions referred to in Instruction Memo No. ENG-62, dated July 16, 1963.

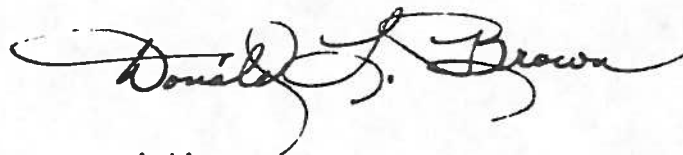
Consideration should be given to revision of the Manual under the following subjects:

Elimination of that portion of Chapter VI Resurveys, providing for independent resurveys. The dependent resurvey can be used even though recovered control may be townships apart. Independent resurveys are more costly because of the necessity to resurvey the original lines, where the lands are patented, can be recovered and are not in agreement with the independent resurvey. The results of the independent resurvey are little understood by the engineers who make them, must be explained to other personnel of our Bureau who use them, and remain to plague title records, and the understanding of property owners wherever in conflict with patents issued under the original descriptions forevermore.

Revision of Chapter X must be considered in line with proposed changes in the mining laws.

We do not feel that Chapter II, Instruments and Methods, is properly located in the same volume with instructions in surveying methods. The care, adjustment and methods in the use of surveying instruments is a technical field, apart from cadastral surveying procedure. If we continue to include information on the techniques that can be used in making cadastral surveys, our manual will be filled with instructions on the use of all modern instruments for mensuration, as well as the care and use of the Gurley solar transit, which is not fully used by our present day surveyors.

That portion of Chapter VII, Special Surveys and Instructions pertaining to riparian rights should be expanded and brought up to date with present Bureau policy.

A handwritten signature in cursive script, reading "Donald S. Brown". The signature is fluid and elegant, with a large initial "D" and a long, sweeping underline.

Acting

RECEIVED  
BUREAU OF LAND MANAGEMENT

*Therrell*

JUL 25 9 52 AM 1963



COMMUNICATIONS UNIT

UNITED STATES  
DEPARTMENT OF THE INTERIOR

IN REPLY REFER TO:  
9185  
1221

BUREAU OF LAND MANAGEMENT  
STATE OFFICE  
Post Office Box No. 777  
Salt Lake City, Utah 84110

July 23, 1963

Memorandum

To: Director  
From: State Director, Utah  
Subject: Manual of Surveying Instructions, 1947  
Instruction Memo No. ENG-62

6.05a

*CBC*  
*115*

This responds to your subject memorandum of July 16. We have two cadastral surveyor retirees, Andrew Nelson and Arthur Brown, who are presently working with us on a WAE or temporary basis. Mr. Nelson is engaged in field work at the present time. However, Mr. Brown has been assisting primarily in office operations.

Mr. Brown works only on a WAE basis, and during the past several months his health has not permitted his full participation. We have discussed this proposition with Mr. Brown concerning his interest in assisting in rewriting the survey manual. It is his feeling that he would not want a detail to Washington, D. C., but could probably assist if his contribution could be made here at the State office in Salt Lake City.

*Arthur Brown*

*Mr. L...*

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
Bureau of Land Management  
Washington 25, D. C.

In reply refer to:  
9185 (6.05a)  
1221

July 16, 1963

Instruction Memo No. ENG- 62  
Expires 12-31-63

To: All SD's

From: Chief, Division of Engineering

Subject: Manual of Surveying Instructions, 1947

FD 10-31-63

The subject manual is badly in need of rewriting. It is somewhat out of date-- needs to be coordinated to our Bureau manual scheme and needs additional chapters to cover aerial surveys and electronic measuring.

There are two primary steps that must be taken in the rewriting of the manual. First, we need your recommendations on changes you feel are essential; and secondly, we need recommendations for a man from your organization who could best participate in the rewriting. We would like these recommendations by October 31, 1963.

We would plan to rewrite the manual as a project, probably in this office. Someone would be selected as a Party Chief for the job. Others would be assigned sections, and in your recommendations we would like an indication of where your man would best qualify in the various sections. We will not take a man from each State but will limit the group to a maximum of 4-6 people.

If you have suggestions regarding this project, feel free to send them along at any time. The subject will be discussed at the Denver Engineering Conference in September.

It is hoped that we will be able to have a special writing course conducted by an expert in the field at the same time the manual writing is underway so the participants would get that training in addition to some hard work. The actual writing work would probably be a mid-winter project.



Distribution:  
FAO's, FCR's, HE's, & Insp.  
IA 15  
O&M 5  
Eng. 10

**NO REVISIONS  
SUBMITTED**

*Sumner*



Torbert



**NO REVISIONS  
SUBMITTED**

April 10, 1966  
Department of State, Country

Rother

**SEE REVISIONS ON  
MANUSCRIPT**

## Comments on the Manual

2-9

First paragraph - portion about azimuth rather preliminary. Believe this paragraph should just read:

"In Bureau practice the direction of a line is expressed in terms of its bearing.

Item 2 it should be azimuth instead of bearing

2-10

Most often the mean magnetic declination is given.

Lat. & Long.

Should say  $7\frac{1}{2}'$  or  $15'$  U.S. Geological Survey Quadrangles.

Last sentence: "A table of conversions ...." should be deleted, as this is explained below.

The M&P factors in the Standard Field Tables are to only five figures not as precise as tables by USGS (feet or US C&GS-meters)

2-27 see comments

3-6 - reference probably should be made to Chap. 7 - Special Instructions.

3-59 - More emphasis on a section not having duplication of lotting.  
Add sentence as indicated.

3-108 - Must mean sections instead of!

3-109 Delete - "For length, 25 links etc. etc." This is for sectional limits.

3-111. Add after 40 chs: "and for closure not to exceed 50 links in either latitude or departure"

5-2. I am under the impression that there is no official record of a retracement survey, there seems to be a misunderstanding between a retracement and a dependent resurvey.

5-27 Can't find Fig. 68A.

Barron

**SEE REVISIONS ON  
MANUSCRIPT**

Remington



**SEE REVISIONS ON  
MANUSCRIPT**

Revisions limited to elimination  
of excess wordage.

Alaska

**SEE REVISIONS ON  
MANUSCRIPT**

Arizona

California

**SEE REVISIONS ON  
MANUSCRIPT**



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

STATE OFFICE  
U.S. Courthouse & Federal Bldg. - Room 4017  
650 Capitol Mall  
Sacramento, California  
95814

IN REPLY REFER TO:

9185  
(0494-C.05a)

APR 19 1966

APR 19 1966

Memorandum

To: Director 713a  
From: State Director, California  
Subject: Rewrite of Manual of Survey Instructions

The Chief, Branch of Cadastral Surveys, in this office has reviewed this material, one copy of which is being returned herewith with his criticisms, suggested changes and comments.

Suggested changes are flagged with a red "X" in the right margin. Minor changes are shown in the body of the material. Paragraph rewrites are typed and attached to the tabulated list of changes enclosed, with copies inserted in the proper sequence.

In general the proposed rewrite is good, but portions appear to be too strongly Alaska oriented. Other comments offered are as follows:

More sample field notes should be included, especially of re-surveys. This would provide for more standardization in field note writing.

The use of terms "quarter section corner" and "quarter corner" as well as "one sixteenth section corner" and "one sixteenth corner" appear indiscriminately in some chapters. These should be corrected for consistency.

As the allowance of homestead entries by the Forest Service has terminated the material under that heading (7-12) should be rewritten accordingly.

RECEIVED  
BUREAU OF LAND MANAGEMENT  
COMMUNICATIONS UNIT

*Lester C. Dunn*  
Acting

APR 20 1966

Enclosures

AM  
7 8 9 10 11 12 1 2 3 4 5 6  
PM

Manual - The Laws - Rules of Survey

page 193

Hand Written Comments on copy of manual returned to Washington 5/18/66

Ch.=Chapter, Pg.=Page, L.=Line.

Ch.1, pg. 14 7th L. add "township.

bar

Ch.1, pg 15, paragraph 6th, 3rd L. from bottom of page-methods and the subtense/(add) "and triangulation"

Ch.2, pg 9. 3rd L. after 360° (add) "in a clockwise direction, measured from either the North or South point.

Ch.2, pg. 10 Paragraph Latitude and Longitude, 2nd line before 2nd sentence insert "On plats of less than a full township these values should be shown at the southeast corner of the area surveyed".

Ch.2, pg. 10. same Par. 6th L. after as "reliable" 7th line change to "topographic maps".

Ch.2, pg. 14 Omit the last 2 lines and add "Frequent reorientations along the line produces results very closely approximating the true parallel and is an acceptable and practical method of establishing a line of parallel. ( Latitudinal curve).

Ch.2, Pg. 16, L. 18 change . to , and it to "and", delete "an imaginary line drawn" using the word "the"

① Ch.2 see typewritten comments- insert after 1st paragraph page 21

Ch. 2, pg. 21, L. 1 change work expansion to "extension"

Ch. 2, pg 22, Omit 1st complete paragraph.

Ch. 2, pg 22, L. 4, paragraph 2, omit 'These data are omitted in the other States.'

Ch.2, pg. 25, L. 6 change inch to the mile series to "topographic maps".

Ch.2, pg 29, L.13 insert after the word 'distance' "from the marker".

Ch.2, pg. 40, L.6 after the work 'out' insert "at various time intervals from apparent noon"

Ch. 2, pg. 40, L.5 add (Apparent noon).

Ch.2, pg. 41, 5th L delete 'at meridian passage' and insert "for time, or by radio time signals and corrected to local meantime".

Ch. 3, "NOTE: 'Quarter corner' and 'Quarter section corner' used indiscriminately throughout this chapter. 'Quarter section corner' or "1/4 Section corner" should be consistently used. Also "one sixteenth Section Corner".

Ch.3, pg. 3, L. 7 change Fig. 40 to Fig. 8

② Ch. 3, pg 4, After word system omit balance of Line 4 and all of lines 5, 6, 7, 8, 9, 10, and 11. ADD typed insert here.

③ Ch. 3, pg 20, omit paragraphs numbered 1, 2, 3 and insert typed comments. Renumber paragraphs (one number lower four thru 8)

Ch. 3, pg. 33, line 8 change . to , and add "but only after ties are made to each corner, thereon and it's description recorded.

Ch.3, pg. 33 change illustration figures 31 and 33 to 22 and 24.

Ch. 3, ~~X~~ pg. 34, change Nos. 31 and 38 to 22 and 29

Ch. 3 pg. 76 between the words 'quarter corners' insert the word "section" on lines 2, 10, and twice on line 23.

Ch. 3, pg. 77 insert the word section between quarter corners on L. 7.

Insert the word "section" between 'quarter corner' on:

page 79 lines 3, 7, page 80 lines 3, 6, 8, page 80 lines 3, 6 and 8, page 82 line 7.

Ch. 3, pg. 82 line 3 change corners. to "section" 3rd word on line.

Insert the word "section" between 'quarter corner' on pages:

83, line 3 and 7, 84, line 8, page 85 line 5, 86 line 1, 87 lines 3 and 7.

Ch. 3 pg. 84, L. 3 change the word corners to 'section'

85, L. 3 change word corners to "section"

87, line 2 change the word corners to "section"



Ch. 3, pg. 102 L. 7, change 'by' to "be".  
Insert the word "section" between quarter and corner on pages:  
105 lines 12, 15, and 18,  
Ch. 3, pg. 106 before line 1 insert "The shore lines of" and change the word  
meandered to "traversed".  
Ch. 3, pg. 106: L. 5 after water delete the period and add " and has continued to  
do so since the date of statehood.  
L. 18 change the word streams to the words "body of water"  
L. 21 change the word stream to "body of water".  
pg. 107, line 13 after the word 'to' insert "a corner of"  
pg. 108, line 8, change section 1 to section 6  
pg. 111, after last line paragraph numbered 1, add: 4th paragraph and  
table as given on page 238 of 1947 Manual  
pg. 113, line 7 after the work hacks add "and the distance thereto  
recorded"

2

Manual - Continuation of hand written comments

page 293

Ch. 4, page 5 delete 'in constructing the' and insert "as backfill, a marked  
memorial, a supporting mound around the"  
after line 13 add sentence: "In areas of drifting sand an iron  
reinforcing rod driven in the sand, with the upper end inserted  
into the monument will increase it's stability."  
pg. 8 after line add sentence: "It is not ordinarily shown on the survey  
plat."  
In the last line after the word 'corner' insert "or at convenient  
distances and at approximately 90° apart in azimuth"  
pg. 37 Illustration should be Fig. 72.  
pg. 18 a new sentence after the 6th from the bottom of page "The distance  
should followed with the abbreviation for feet or links as appropriate."  
pg. 23 first line - delete the rest of the sentence beginning from which"  
on first line and all of second line inserting, after the word "side"  
"facing away from the corner."  
pg. 31 L. 6 after the word "stations" add "and Bench Marks"  
~~XX~~  
Ch. 5, pg 13, 5th line from bottom of page: after 'authorization to survey' add  
"or resurvey".  
2nd line from bottom: before this line add: "to perpetuate their  
positions,""  
pg. 14, L. 13, insert "improvements or other collateral evidence" after  
word notes.  
④ pg. 15, Line 19 - delete 'Existing original corners must not be distrubed.'  
and add paragraph of typed comments.  
pg. 19, 2nd paragraph after word fixed add "in longitudinal position"  
pg. 23, L. 7, insert word section between sixteenth and corners, and on  
L. 14, insert section between words sixteenth and corners.  
L. 21 delete comma and insert word "or"  
pg. 24. L. 16 and 17 insert word section between quarter corners  
pg. 25. Insert word "section" between quarter corner on lines: 2, 6, 10, 12,  
16, 18 and after end of 18, 20, and 21.  
pg. 27 Number of figure ? should be fig. 75 instead of 68A?  
pg. 31 L. 5 should read 'type of resurvey instead of 'type of survey'.  
pg. 35 Figure 69 should be Fig. 76  
pg. 37 the word 'latitudinal' on lines 16 and 20 should be changed to

- read "longitudinal", also on 3rd line of illustration
- pg. 39 insert word "usually" after the word 'are' on line 12
- pg. 47 insert word "section between quarter corner" on lines, 2, 4 and two places on line 7.
- L. 18 after 'obliterated' add "after recording their descriptions, and positions by ties to corners of the resurvey."
- pg. 48 Indented paragraph - 4th line - before A insert sentences: Older mining claims are sometimes designated by lot numbers beginning with lot no. 37. Also private land claims are often designated by tract number beginning with tract no. 37. In either case new tract numbers will not duplicate those lot or tract numbers, but begin with the next highest number.
- pg. 49, L. 19 after Survey add "topographic maps or quadrangles" and delete the word 'quad'
- pg. 50, L. 14 change word "panel" to "panelled" and add "point"
- ⑤ Ch. 7, pg. 2, add "the herein described" after word make on 1st line, deleting 'this'. Omit paragraph No. 4 and insert new paragraph No. 4
- pg. 3, L. 8 insert "data on horizontal control stations in the area," after word notes.
- L. 16 insert "triangulation stations and Bench marks of other government agencies;" at end of line.
- ⑥ pg. 13, Delete first two paragraphs and insert typed comments
- Ch. 8, pg. 1, L 12. After this line insert sentence "Current Bureau directives require that the field tablets be held two years after approval of the survey before destruction"
- pg 3. Change Title to Cadastral Surveyor
- pg. 4. Omit last three lines.
- pg 8 Add to bottom of page: "NOTE: Certificate of transcript will not be completed for original set of Field Notes."
- pg. 12 add Ts. to abbreviations for Townships.
- Ch. 9 page 2, bottom of page add: "The degree of precision of the geodetic values should be commensurate with their source."
- pg. 3, L. 20, after the word survey, ~~xxxx~~ delete period and add "showing all bearings and distances between corners."
- ⑦ pg. 4 At top of page add typed comments.
- pg. 7 after second paragraph insert definition of standard section

page 3 of 3

Manual - continuation of hand written comments (Mineral Surveys)

- After
- Ch. 10, pg. 17 L. 14 ~~between~~ Contiguity. ~~xxxxxx~~ add: "Each of the public land states containing mineral surveys maintains a separate series of Mineral Survey Numbers.
- pg. 19 L. 8 after office work insert: furnishing the necessary number of Certificates of Locations,
- pg. 19 before bottom line on page insert: The Bureau appoints Mineral Surveyors of a number deemed sufficient to execute that particular type of work. ,
- pg. 24 numbered paragraph 2 - add: if surveyed under the direct system (1910 or later).
- pg. 26 L. 12 after 'of' add "an iron post not less than 1½ ins. diam., 30 ins. long, with brass cap not less than 3 ins. diam." delete the rest of this line.
- L. 20, delete "might be, say" and insert "should be not less than"

pg. 27, 1st line, delete 'standard Bureau' and after word tablet 'described on page 4-2'. After word tablet insert "not less than 3 ins. diam., with a stem  $3\frac{1}{2}$  ins. long, firmly set in a drilled hole." After end of line 3 add "The location monument will be connected to a corner of the rectangular survey grid ~~a~~ if one is found within a distance of 2 miles."

4

L. 16, delete 'inch to the mile series' and insert "topographic maps."

pg. 29, Delete last half of line 4, all of lines 5, 6 and 7.

pg. 31, on line 9 after the word 'furnished' insert "with the application for survey. A copy of each location notice will be furnished"

pg. 33, L. 2 after first word delete balance of line.

pg. 37, L 14, delete 'He' and insert "The Mineral Surveyor"

pg. 39, last sentence on page, after improvements delete period and add: "under the heading of 'Other Improvements'.

pg. 44, Change ~~xxxxxxx~~ Standard to Corner as first word on first line. after second word on 2nd line delete balance of sentence and insert: "Metal posts, not less than 1 inch diameter, 30 ins. long, with brass cap." Delete second paragraph.

pg. 47, Line 3, change ; to a , and delete rest of sentence. Add: "Accessories will be marked for, and tied to, the true corner point". Delete last sentence on page.

pg. 49, after line, add "or lode line extended,"

pg. 53 After word "listed." Insert "However, as a general rule senior conflicts are listed first.

pg. 63 Delete paragraph 6 - lines 12 thru 16.

pg. 64 Line ~~two~~ after 'Set' add "an iron post, 2 ins. diam., 30 ins. long"

pg. 65 Line 6 change Bureau Monument to "an iron post 2 ins. diam., 30 ins. long, 24 ins. in the ground, with brass cap"

pg. 66 Line 4, change Bureau Monument to: "an iron post, 2 ins. diam., 30 ins. long,"

Line 27, change Bureau monument 24 ins. to: "an iron post, 21 ins. diam, 30 ins. long, 24 ins. in the ground, with brass cap mkd."

pg. 67 Lines 17 and 23 "an iron post, 2 ins. diam., 30 ins. long, 14 ins." replacing Bureau ~~of~~ monument and with brass cap inserted before the word mkd. on line 18 and 24.

Protraction diagrams are usually prepared on a scale of 1 inch to a mile. They are constructed to various sizes in the different states to meet filing requirements, ranging from normal township plat size covering 6 townships to those covering an area of 4 x 6 townships. Each diagram shows the areas of all unsurveyed sections. Areas are not protracted into units smaller than a section. Where boundaries of artificial bodies of water, reservation boundaries, etc., cut through a section the area may be broken down into A, B, C, etc., areas. Principle topographic features and improvements such as highways, railroads, etc., are depicted as accurately as information permits.

The theoretical extension of the rectangular net is started from existing corners of surveyed areas. Where the unsurveyed area is entirely surrounded by existing surveys whose record gives an acceptable closure, and available information indicates those surveys are within acceptable limits of measurement and alignment, those surveys will serve as control from which to extend the protractions. However where the surveyed lines bounding the unsurveyed area are known to be deficient, the extent of deficiency should be determined before the protraction diagrams are constructed in order to develop a plan of survey which will properly identify the lands and serve as a guide in the execution of subsequent surveys. Geodetic control should be shown on all diagrams.

In very large unsurveyed areas, such as in Alaska, the theoretical - - - etc., follow with par. #2.

Each tier of townships are numbered consecutively north and south of the base line. Each range of townships are numbered consecutively east and west of the Principal meridian. Townships are identified by the township number north or south of the base line and the range number east or west of the Principal Meridian, as shown in Fig. 7.

1. Surveys should proceed from south to north and from east to west wherever practical, using the south and east township boundaries as governing boundaries and placing fractional measurements against the north and west township boundaries; but either or both directions may be reversed thereby employing the opposite boundary as a governing boundary if a better survey will result.

2. Where the township boundary is defective other lines, such as sectional correction lines or sectional guide meridians, may be adopted to govern subdivisions, if a better survey will result.

INSERT, LAST PARAGRAPH, CHAPTER 5, PAGE 15

Existing original corner positions must not be changed as long as they control vested rights in the land. They may be remonumented or rehabilitated and new accessories added, but original evidence should not be unnecessarily disturbed.

4. Appropriation. The source of funds should always be cited in accordance with current administrative and fiscal procedures. If costs are reimbursable, that fact should be stated, together with the appropriation or project number to be charged. The surveyor should submit accurate information in accordance with bureau procedure which will enable the accounting section to determine the correct cost of the survey.



EXCHANGE SURVEYS

The act of March 20, 1922 (42 Stat. 465; 16 U.S.C. Sec. 485), provides for exchanges of lands within National Forests. The surveys necessary to effect such exchanges were usually made by Forest Service officials, under circumstances, and in a manner, similar to that described above for homestead entry surveys. Special Instructions were issued by the Bureau, which is responsible for the correctness of the survey.

The authority for Forest Service Officials to make Exchange Surveys has now lapsed, and such surveys for exchange purposes will henceforth be executed by the Bureau. Such surveys, when not conformed to the rectangular system of surveys are executed as tract surveys, under the provisions for "Metes and Bounds Surveys" above (7-5).

Under those special cases where the Bureau is unable to schedule such surveys to meet the operational needs of the Forest Service, authority may be granted for their execution by cadastral surveyors of that service.

INSERT BEFORE 1st PARAGRAPH, TOP OF PAGE 4, CHAPTER 9

In a regular township, with closing lines against the north and west boundaries, secs. 8 to 17, 20 to 29 and 32 to 36, are considered regular section of 640 acres each, provided that the lengths of each half mile of their north and south boundaries does not vary more than 25 links from 40.00 chains, and no boundaries vary more than 21' from cardinal directions.

Colorado

---

**NO REVISIONS  
SUBMITTED**

---



UNITED STATES  
DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT  
Colorado State Office  
14023 Federal Building  
1961 Stout Street  
Denver, Colorado 80202

IN REPLY REFER TO:

5.22a-4  
9135

April 19, 1966

AIR MAIL

Memorandum

To: Director (713a)  
From: State Director  
Subject: Rewrite of the Manual of Survey

Attached herewith are comments on the proposed rewrite of the 1947 Manual of Survey Instructions as made by Allan E. Arnold of the Division of Engineering.

Attachments

## REWRITE OF MANUAL OF SURVEY INSTRUCTIONS

A general statement should be made here in the beginning on the proposed rewrite of the Manual of Survey Instructions. Frankly I think some of the language of the 1947 manual has been too drastically changed and also too many omissions made. Admittedly some of it needed changing along with a certain amount of reorganization to make it a more usable tool. Perhaps my opinion is biased because I have become used to the present manual over a period of years. The following are brief comments by chapter.

### Chapter I

This chapter as written in the present 1947 manual is as preferable as the rewrite which only changed the wording. It is agreeable to omit the office headquarters as these do change over the years. The arrangement is in better order in the new manuscript.

### Chapter II

The point of omissions from the manual should be made here. I do not agree that disposition of these omissions should be to the Bureau Manual. In regard to instruments and methods it should either all be in the new manual or in a manual supplement. The attempt to explain only one of many ways in methods can sometimes be misleading. A case in point is the brief explanation of the adjustments of the solar attachment. It is true that the method explained is one way of doing it but it is not in my opinion the best way.

### Chapter III

Here again it becomes one's preference as to a particular style of writing or accepting what has been stated in the past. The arrangement of this chapter is better than the present manual but I do not believe that it was necessary to reword to the degree it has been. I prefer the present manual explanation for the subdivision of sections to the new manuscript.

### Chapter IV

There is no particular comment here except that the items if deleted from the manual should be in a manual supplement and not the Bureau Manual.

### Chapter V

There is no objection to combining the original Chapters V and VI. The rewording of certain sections may be objectionable as far as those that have been adopted as a part of many state laws. Although this may not directly concern the resurvey of the public lands the manual, nevertheless, has previously been a guide to many state, county and private surveyors, especially in the western states.

## Chapter VII

The references made in this chapter, especially on pages 7-32 and 7-33 to the Code of Federal Regulations may not be a good practice as these change frequently. The index numbering is already out of date.

## Chapters VIII and IX

The same general comment as given on Chapter II applies to these chapters. There is no objection in eliminating this information from the manual, but I believe if it is deleted it should be in its entirety and included in a manual supplement.

## Chapter X

My comments on this chapter are very brief. I see no need for any change from the 1947 manual. In foregoing chapters an attempt has been made towards streamlining, yet in this chapter much unnecessary detail has been added.

The instruction memo accompanying the new manuscript indicated that the copy itself was to be used for any comments. This I attempted to do in the initial review but found myself disagreeing with the rewrite to such a degree especially in Chapters I, III, V and X that general comments were resorted to. I have no objection to the deletion of the material in Chapters II, IV, VIII and IX but if it is deleted it should be included in some sort of a manual supplement and not to the Bureau Manual.

*Allen J. Smith*

Idaho



**SEE REVISIONS ON  
MANUSCRIPT**

UNITED STATES GOVERNMENT

# Memorandum

MAY 8 1966

TO : Director, Bureau of Land Management

In reply refer to:  
E:EEH 9180  
DATE: April 29, 1966

FROM : State Director, Idaho

Your reference:  
9185 (713a)  
Instr. Memo 66-98

SUBJECT: Rewrite of Manual of Survey Instructions

Attached are our Cadastral Engineer's comments pertaining to the rewrite of the Manual of Survey Instructions, together with the copy of the Manual showing his penciled notations.

If you have any questions or comments, please let us know.



Attachments

**RECEIVED**  
BUREAU OF LAND MANAGEMENT  
COMMUNICATIONS UNIT

MAY 2 1966

AM 7, 8, 9, 10, 11, 12, 1, 2, 3, 4, 5, 6 PM



*Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan*

UNITED STATES GOVERNMENT

# Memorandum

In reply refer to:

E:EEH 9180

DATE: April 29, 1966

TO : Chief, Division of Engineering, WO

FROM : Cadastral Engineer, Idaho

SUBJECT: Rewrite of Manual of Surveying Instructions

In accordance with Instruction Memo No. 66-98, dated March 2, 1966, I respectfully submit the following comments on the proposed rewriting of the Manual of Surveying Instructions.

The penciled notations on the copies of Chapters one and two are only critical and not constructive. I do not feel that I have the qualifications necessary to reconstruct them to meet the standards of previous survey manuals. They appear to have been written for grade school instruction rather than to present factual information for people in the engineering or surveying professions.

Chapters three through eight are generally in better form. However, the complete elimination of some material and the briefing of much more reduce the effectiveness of the Manual as a reference text.

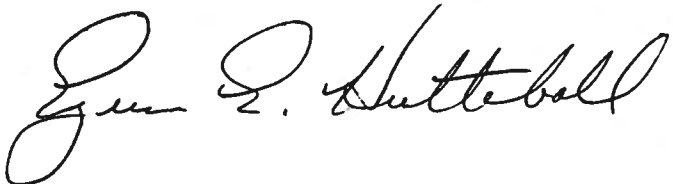
The chapter on mineral surveys attempts to present a resume of mineral law and legal decisions rather than to provide a clear and concise guide for making mineral surveys. This treatment is in direct contradiction to the rest of the text wherein material has been deliberately eliminated.

The rewrite seems to be a mixture of general history, grade school explanation of general principles, and some technical explanations. The resulting manuscript does not meet the standards of previous manuals either for quality of information or completeness of technical data. Publication in this form would certainly lose the respect that the engineering, surveying and legal professions now have for the 1947 Manual.

Several states have either referred their surveying laws directly to the 1947 Manual or have incorporated certain sections of it in their laws. The proposed rewrite does not qualify for this use--or the respect thus accorded.

A cross indexing of the 1947 Manual and the addition of concise data and information on photogrammetry and electronic measurement would serve better to uphold the standards and respect that the Bureau should maintain as the Government's Land Surveying Specialist.

Attachment  
Manual Manuscript



Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

List of Items Omitted from Vol. I  
with  
Proposals for their Inclusion Elsewhere

Page

13

*O. K.*  
Omission: List of regional and public survey offices.  
Disposition: Considering the possibility of organizational changes, perhaps these should be completely omitted.

18-20

*O. K.*  
Omission: Itemization of contents of Standard Field Tables, Ephemeris, and Restoration of Lost Corners.  
Disposition: A general statement is made in the new manuscript concerning the contents of these supplements. Further detail may be secured from the supplements themselves.

25-30

*Should remain in new manual*

Omission: Instructions in chaining and keeping notes.  
Disposition: Chaining instructions are included in textbooks. Special instructions in Bureau methods might be included in the Bureau Manual.

30-34 }  
467-8 }

*Should remain in*

Omission: Instruction in theory and practice of stadia measurements.  
Disposition: Stadia is taught in textbooks. Special instructions in Bureau methods might be included in the Bureau Manual.

35-40

*Should remain in*

Omission: Instruction in triangulation.  
Disposition: This is taught in textbooks. Special Bureau methods might be included in the Bureau Manual.

40-44 }  
468-75 }

*Should remain in*

Omission: Discussion of instruments, their use and adjustment, and the keeping of notes.  
Disposition: A general statement appears in the new manuscript. (1) Textbooks; (2) Bureau Manuals, if special Bureau methods are required; (3) Standard adjustment might well be included briefly in Standard Field Tables; (4) Manufacturers' literature.

44-88 }  
97-148 }  
475-7 }  
493-7 }

*Should remain in*

Omission: Instruction in practical field astronomy, with formulas, examples, and graphs.  
Disposition: (1) Textbooks; (2) Bureau Manual, if special Bureau methods are required; (3) Condensed examples, graphs, and standard formulas might well be included in Standard Field Tables; (4) A collection of "Examples of Good Practice."

Page

88-96 }  
477-93 }

*Should remain in manuscript.*

**Omission:** Extended discussion of the solar transit, and tests and adjustments thereof.  
**Disposition:** (1) A brief discussion appears at the end of Chapter II in the new manuscript; (2) Bureau Manual, if required; (3) Put condensed versions of tests and adjustments in Standard Field Tables; (4) Manufacturers' literature.

149-52

*Better this in survey manual than in Standard Field Tables. Now in manuscript.*

**Omission:** Practical application of geodetic theory to a surveying problem.  
**Disposition:** (1) Textbooks; (2) Bureau Manual if there is anything peculiar to Bureau practice; (3) Condensed version with standard formulas in Standard Field Tables; (4) Publications of Coast and Geodetic Survey.

159-60 }  
497-99 }

*O.K.*

**Omission:** Instruction in use of "M and P" factors.  
**Disposition:** (1) Standard Field Tables; (2) ~~Bureau Manual, if desired.~~

163-244

*Should be condensed in any manual.*

**Omission:** Scattered interspersed instructions in techniques and the preparation of notes and plats.  
**Disposition:** (1) Bureau Manual; (2) A folio of specimen plats and field notes.

241-44

*?*

**Omission:** Exhaustively detailed itemization of objects to be noted during the survey.  
**Disposition:** Bureau Manual, in condensed form.

381-83 }  
519-21 }

*Requirement of law  
Should be in Survey Manual*

**Omission:** Soil classification.  
**Disposition:** (1) Textbooks; (2) Bureau Manual, if desired.

385-95  
List on 392

*Should remain*

**Omission:** Detailed instruction in keeping field notes.  
**Disposition:** (1) Bureau Manual; (2) ~~Folio of specimen notes.~~

397-444  
List on 398-99  
List on 418-19

*Should remain*

**Omission:** Detailed instruction in platting, with examples.  
**Disposition:** (1) Bureau Manual; (2) ~~Folio of specimen plats.~~

464-66

*O.K.*

**Omission:** Chain, arpent, vara.  
**Disposition:** Mention is made in the new manuscript. The material already appearing in the Standard Field Tables might be expanded, if desired.

525-74

*O.K. if included in field in survey manual.*

**Omission:** Specimen Field Notes.  
**Disposition:** Folio of specimen field notes.

Montana



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

IN REPLY REFER TO:

5: 9185

State Office  
Federal Office Building  
316 North 26th Street  
Billings, Montana 59101

APR 21 1966

Memorandum

To: Director, Bureau of Land Management 713a

From: State Director, Montana

Subject: Rewrite of Manual of Surveying Instructions

The following comments are submitted in compliance with Instruction Memo No. 66-98 dated March 2, 1966. Extension of the FD date of 4-14-66 was obtained from Charles E. Remington in telephone conversation of April 14, 1966.

Three of our cadastral surveyors were asked to read portions of the proposed manual and make a notation of their comments or criticisms on the margin of the draft copy returned with this memorandum. Their general comment was that the quality of material contained in the proposed manual does not uphold the quality of the instructions contained in the 1947 manual.

Personal idiosyncrasies in rhetoric are found throughout the proposed manual considerably lowering its tone of authority. Near archaic usage of words and phrases are found that would cause the reader to wonder whether or not an older version of a manual had been reprinted rather than an updating of the 1947 manual.

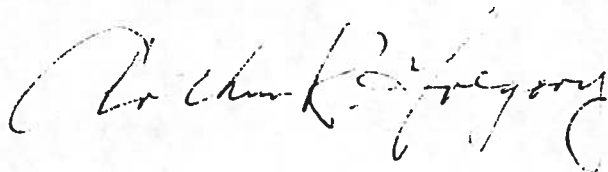
We are sorry that under these circumstances, no constructive criticism can be offered. The proposed manual is completely inadequate when compared with the 1947 version. We feel that a more acceptable manual could be obtained for use by our cadastral surveyors, private surveyors and those States making reference to the BIM Manual of Surveying Instructions in their regulatory laws on surveying practice, by limiting the revision of the 1947 manual to those sections needing corrections or additions.

RECEIVED  
BUREAU OF LAND MANAGEMENT  
COMMUNICATIONS UNIT

APR 21 1966  
AM 7, 8, 9, 10, 11, 12, 1, 2, 3, 4, 5, 6 PM

The cumbersome rhetoric of the 1947 manual may be difficult to understand, but it does convey a message. Many paragraphs of the proposed manual would be better omitted as they convey no instructions.

Sufficient time was not allowed in this review to determine if all needed procedures were included in the proposed manual.

A handwritten signature in cursive script, appearing to read "Richard K. Gregory".

1948

1 Enclosure  
Encl. 1 manual



*Nevada*

1. 11. 11.

**SEE REVISIONS ON  
MANUSCRIPT**



ATKINS NEVADA

IN REPLY REFER TO:

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Nevada State Office  
P. O. Box 1551  
Reno, Nevada 89505

713

APR 14 1966

April 12, 1966

Memorandum

To : Director

From : State Director, Nevada

Subject: Instruction Memo. No. 66-98  
Rewrite of Manual of Surveying Instructions

*CEK*

Enclosed is a copy of the proposed rewrite of the 1947 Manual of Surveying Instructions, with proposed editing or rewriting on the copy.

Enclosure:  
Survey Manual

*John F. ...*

RECEIVED  
BUREAU OF LAND MANAGEMENT  
COMMUNICATIONS UNIT  
APR 14 1966  
AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

PROPOSED REWRITE OF THE 1947 MANUAL OF  
SURVEYING INSTRUCTIONS

Throughout the chapters are proposed editing or questions relating to certain subjects.

A number of omissions have been made and a large number of these omissions are to appear in the Bureau Manual and other places. We must not forget these omissions in doing the complete job, for some of them are very important. These omissions probably are much more important to a new man than to the older hands on the job. Since we seem to be always in the process of training and working with new men, serious thought should be given in completing these omissions, and have them readily available for these people.

For the same reason, certain parts in this draft which have been treated lightly should be more fully explained, if it is not to be put in the Bureau Manual. These items have been noted on the draft.

*Nothing returned to draft - C. B. K.*

*New Mexico*

**SEE REVISIONS ON  
MANUSCRIPT**



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
STATE OFFICE  
P. O. Box 1449  
Santa Fe, New Mexico 87501

IN REPLY REFER TO:

9185 (500)

Your Reference:  
9185 (713a)

April 14, 1966

Memorandum

To: Assistant Director, Resource Management, Washington, D. C.

From: State Director, New Mexico

Subject: Rewrite of Manual of Survey Instructions  
(Instruction Memo No. 66-98 and Message 66-40)

In compliance with the above Instruction Memo, enclosed is a copy of the rewrite of the Manual of Survey Instructions.

Minor comments have been written in the margin on pages 2-9, 2-38, 3-111, 4-11, 4-14, and 4-39. Comments in the form of questions need not be answered.

We feel the rewrite is much easier to read and digest. We also think that most of the eliminations were justified. One possible exception might be the section of sample field notes.

*W. J. Anderson*

Enclosure

RECEIVED  
BUREAU OF LAND MANAGEMENT  
COMMUNICATIONS UNIT  
APR 18 1966  
AM 7, 8, 9, 10, 11, 12, 1, 2, 3, 4, 5, 6 PM  
1



Oregon

**SEE REVISIONS ON  
MANUSCRIPT**



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
State Office  
729 N. E. Oregon Street  
Portland, Oregon 97232

IN REPLY REFER TO  
9180(100.4c)

Your Reference:  
9185(713a)

APR 25 1966

Memorandum

To: Director, Washington, D. C.

From: State Director, Oregon

Subject: Comments, Rewrite of Manual of Surveying Instructions

The following comments on the rewrite of the Manual of Surveying Instruction is submitted in compliance with your memorandum of March 2, 1966.

The attached copy has been edited and annotations are in red.

The rewrite of the Manual has departed from what we believe to be the purpose of any technical manual, i.e. to combine under one cover the technical aspects and procedures of that particular field. In this instance the new manual states that the field is too broad to cover and therefore deals in generalities; it seems to apologize as to why the various techniques are not discussed and evades the highly technical procedures which are the points on which the field engineers need clarification.

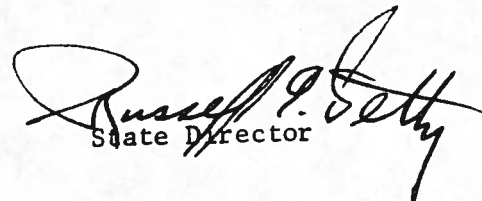
Not only has the manual become the Bureau's cadastral surveyor's "bible" but its' use, standards, and procedures have been incorporated into each state's laws for practicing licensed engineers and land surveyors.

The radical departure from a technical manual to a book of generalities, with numerous references quoted, would appear to be a great disappointment to the men in that profession. Bureau Manual supplements would not help the private engineers and surveyors as these publications are not available to them.

The Bureau's cadastral field surveyors are mobile units which at times maintain field headquarters in areas as remote as can be in our present society. These units are practically self sustaining and need a manual which deals directly with problems with which they are faced, not a book that tells them to look in another book. A technical guide is a requisite need for all engineers and surveyors and up until now the Bureau's Manual of Surveying Instructions has served as that guide.

Many techniques and methods only familiar to men in this profession have been eliminated. The old manual did not need to have those techniques and procedures eliminated, but rather they should be expanded and covered more thoroughly.

In the final analysis, the reaction to the rewrite of the manual is that it reads well, and is interesting; however, it does not give the technical information which should be in a manual of this type. It represents more of a supplement to the 1947 Manual rather than a replacement for it.

  
State Director

Enclosure

Utah

**NO REVISIONS  
SUBMITTED**



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

IN REPLY REFER TO:

713

UTAH STATE OFFICE  
Post Office Box No. 11505  
Salt Lake City, Utah 84111

April 15, 1966

MEMO 6-1865  
Memorandum

To: Director  
From: State Director, Utah  
Subject: Rewrite of Manual of Surveying Instructions

RECEIVED  
BUREAU OF LAND MANAGEMENT  
COMMUNICATIONS UNIT

APR 18 1966

AM PM  
7,8,9,10,11,12,1,2,3,4,5,6

The following is in compliance with the request for comments from cadastral engineering personnel on the new Manual in Memo No. 66-98, dated March 2, 1966.

We are highly pleased with the Rewrite of the Manual of Surveying Instructions, although there has not been time to go through this material in every detail.

The Rewrite is much easier to comprehend than the 1947 Manual. This is especially true in the case of the chapter on Mineral Surveys. It is so plainly written that any competent mineral surveyor should be able to perform his duties with a minimum of assistance from cadastral engineering sources thus eliminating a considerable amount of correspondence. The Rewrite of the Manual is compiled more like other texts on the subject of surveying. First things come first and the material on the subject at hand is not scattered throughout the manual. New methods of surveying are discussed with an eye to the future. This is important as engineers coming into the cadastral section of the Bureau from other agencies or from private practice will find the transition easier.

It is recommended that some items omitted from Volume I, requiring special instructions in Bureau methods, should be included in the Bureau Manual with explanations and examples. If it is required to obtain this material from other sources undue time could be expended.

In conclusion, I am convinced that the Rewrite of the Manual will be of value to the Land Office personnel and Bureau cadastral engineers. It is especially of value to those newly coming into the Bureau as well as private surveyors and lawyers who use the manual for advisory purposes.

Those who are responsible for bringing this Rewrite of the Manual into being should be commended.

JE Keogh

Ading



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
UTAH STATE OFFICE  
Post Office Box No. 11505  
Salt Lake City, Utah 84111

IN REPLY REFER TO:

E: 9180

MAR 30 1966

March 28, 1966

Memorandum

To: Director (713a)  
From: State Director, Utah  
Subject: Return of Rewrite Manuscript

Transmitted herewith is the rewrite manuscript as requested by  
Memo No. 66-98, dated March 2, 1966.

Attachment

*JE Keogh  
acting*

*The extra copy*

U.S.G.



Wyoming

**SEE REVISIONS ON  
MANUSCRIPT**

UNITED STATES GOVERNMENT

# Memorandum

TO : Director

DATE: April 21, 1966

FROM : State Director, Wyoming

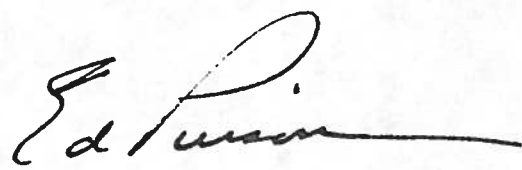
In reply refer to:  
9185 (940)

SUBJECT: Review of (draft) Manual of  
Survey Instructions

Your reference:  
9185 (713a)

Instruction Memo No. 66-98 as amended provides for the review and comments on the "Rewrite" to be completed by the Chief, Branch of Cadastral Surveys. His comments together with the marked copy are provided under separate cover.

LS



Separate cover  
Manual draft  
Comments

**RECEIVED**  
BUREAU OF LAND MANAGEMENT  
COMMUNICATIONS UNIT

APR 25 1966

AM PM  
7,8,9,10,11,12,1,2,3,4,5,6

1

4-21-66

REVIEW OF (DRAFT) MANUAL OF SURVEY INSTRUCTIONS

By

CHIEF, BRANCH OF CADASTRAL SURVEYS

It is with considerable misgivings that the review of this draft is undertaken in a few short weeks during the press of programming and regular work. Some four years were required to bring the (rewrite) to its present stage and the personnel involved with this effort are certainly more knowledgeable and experienced than myself. Nonetheless, I personally have well developed thoughts within the limits of my own incomplete knowledge on this material.

Throughout the draft the phrase "proper authority" keeps cropping up. This is confusing in that I am not sure at what level this "proper authority" appears as to decision making. It is easily recognized that the "acceptance" or approval level is vested in the Director and this is the level of final authority. In attempting to rationalize the phrase I conclude that it must exist to some extent in all levels within the Bureau's Division of Engineering, and that any technical problem that may arise in which the individual involved cannot provide the proper solution he, in turn, submits it to the "proper authority", i.e., up the ladder. If this analysis is correct it behooves the Director's engineering staff to advise all subordinate levels (State Offices and Service Centers) of the determination that is provided in answer to any complicated survey problem posed by a particular office. Sooner or later each field operations office is hit by a similar condition.

While it is very plain the Manual is that of the Bureau's, it is also much more. An excerpt from Article 10, Surveys Sections 30-001 to 30-1006, Wyoming Revised Statutes 1931, is provided, "He (surveyor) shall proceed in accordance with the surveying rules contained in a circular, 'Restoration of Lost or Obliterated Corners' and the Manual of Instructions for the Survey of Public Lands issued by the General Land Office of the United States Government."

It is reasonable to expect that both the loose leaf format and the elimination of technical material from the rewrite will meet with objections from the licensed land surveyors practicing their profession here in Wyoming. The one text most evident in the personal libraries of surveyors and engineers is found to be The Manual of Surveying Instructions rather than a text book from

some other source. I quote from page 1-3: "Its influence outside the Federal Government should be regarded as advisory only. No attempt is made to interpret State law with respect to private property". Consideration should be given to the fact that many states presently make a requirement on the licensed land surveyor that his procedures be in accordance with this Manual. It appears also that this Manual may be supplemented with additional loose leaf material in the future. It would then appear that there is responsibility upon us to provide this loose leaf material to all of those who have purchased our Manual in the years to come.

I would prefer to continue to operate within the confines of the '47 Manual, obtuse and "wordy" as it may be, rather than to operate within the generalizations and rhetoric of the rewrite.

The review conducted here is inadequate in that insufficient time is available to offer concrete suggestions or substitutions rather than negative criticism. It is difficult to realize that the rewrite is the product of the most accomplished cadastral surveyors in the Bureau.

As an example, to show the type of material that I find objectionable I refer you to 3-51, Fig. 35: The diagram shows 20 fractional sections, elsewhere, it is mentioned that the purpose of a survey is to arrive at the greatest number of regular "640 acre" sections possible in subdividing townships. All well and good.

There are several methods to subdivide the township and eliminate many of the fractional sections. One method would be to establish the corners on the north boundary referring to the sections to the south. These corners would be at 40 and 80 chain intervals counting from the northwest corner of the township. The meridional section lines would then be run south parallel to the west boundary. Nine fractional sections would be eliminated.

Another method would eliminate four of the fractional sections. The sectional correction line would be initiated on the west boundary at a latitudinal interval of 400 chains south of the northwest corner of the township. Corners on the sectional correction line would be placed at 40 and 80 chain intervals from the west boundary. Meridional section lines would be projected north and south parallel to the west boundary.

No radical departure from past approved criteria is of issue in either case. Also, the phrase "west boundary defective in position" and "North boundary defective in position" are misnomers. The use of the word "position" indicates nothing exact. It could be any direction. It is inferred that the north and west boundaries are defective because the

cast and south boundaries are defective in alignment. My reasoning is that only the south and east boundaries are defective. The north and west boundaries can effectively control the subdivision of the adjacent townships in a regular manner. The placing of a second set of corners on the north and west boundaries does not make either boundary defective. The explanation in Fig. 35 does not allow any flexibility in the approach taken to subdivide the example township.

The rewrite with marginal notes is provided with this memorandum. As previously stated this review is incomplete. Many things have been overlooked which need to be spelled out in any Bureau manual covering cadastral surveying. It is my belief that this manual should be written for the surveyor and not for the layman. Further, we have a responsibility to the practitioner of land surveying, regardless of whether his service is public or private, to provide sufficient material for his use without continual reference to other textbooks, treatises, or credences. It would be most interesting to determine the Wyoming State Board of Examiners for professional engineers and licensed land surveyors views on this manual rewrite.

ESO

**SEE REVISIONS ON  
MANUSCRIPT**





UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240

9130 (801-E)

Eastern States Office

April 25, 1966

## Memorandum

To: Director (Attention 713a)  
From: Director, Eastern States Office  
Subject: Proposed Rewrite of Manual of Survey Instructions

The Cadastral Section of this office has reviewed the above proposed manual and make the following comments:

1. OMISSIONS in the Manual rewrite

While it is true that other publications deal with the methods and procedures for the adjustment, tests and use of surveying instruments used by this Bureau; instructions dealing with chaining and the keeping of notes, in practical field astronomy, triangulation, etc., and the calculations necessary thereto, it would seem that the omission of this informational material from the Manual rewrite would place undue hardship on the Cadastral Surveyor by having the information scattered helter-skelter through a maze of other texts. The other texts have not been identified. Therefore, each surveyor would be free to choose and follow instructions more to his individual liking. Dependency on these private "libraries" would cause a general decline in respect for the Manual. With the surveyors running off in all directions according to his pet "text," conformity would be lost and there would be a problem of interpretation of one surveyor's work by others.

For reason of standardization, consistency, easy reference, and the training of new Cadastral Surveyors, singular methods as those in the old Manual should be adopted and incorporated within the Manual rewrite or perhaps in the development of a new hard bound text. The Standard Field

Tables should not be so enlarged as to make them impractical for easy use in the field operations. The inclusion of this material in the Bureau Manual would result in the easily lost or destruction of loose pages which could be vital to the completion of an assignment. We believe that the Bureau Manual should be limited to administrative matters.

The use of the solar transit in making cadastral surveys is rapidly becoming a lost art. This is due to the lack of training, confidence in the unit, and the trend of our modern day Cadastral Surveyors to develop more than the necessary precision in measurement. For this reason, material relative to the use of the transit should not be omitted from the Manual.

2. Practical Application of Geodetic Theory

The Cadastral Surveyor of today is coming more and more in contact with local or private surveys who refer only to the State Grid System. It is recommended that a practical solution to the conversion of grid north to true be developed and included in the Manual rewrite or other text.

3. Page 4-3 of the Manual rewrite

It is recommended that the diameter limit of a concrete post be reduced to 4 inches. This would facilitate the use of several commercial products for the form work; such as metal stove pipe, sewer tile, orangeburg pipe, etc. The 4 inch concrete post makes a very durable monument. If more strength is desired, a reinforcement bar could be placed at the center of the post as is.

4. Page 4-33 of the Manual rewrite

When it is necessary to mark two trees of the same size and species in the same area of description, it is recommended that the marking for one of the trees be the same (X BT) as that for smaller trees and bearing trees relative to witness corners and points, rather than an "X" alone. This is because many private land surveyors use the "X" symbol on trees to indicate a corner position and the crossing of roads and trails. This "X" symbol is also used to blaze trails in many cases.

5. Chapter VII - Special Instructions Page 7-2

It is recommended that item 4 of the format be deleted. Cost accounting is an administrative matter adequately covered in the Bureau Manual. Citing the broad "MLR" appropriation is valueless. Detailed accounting numbers applicable when instructions are written may not be applicable before the survey is completed. It would be more appropriate to include accounting instructions in the assignment instructions. Further, we do not believe that there is a need for the surveyor to "keep and submit an accurate account of all expenses that incurs in making this survey." The Bureau now has an elaborate accounting system which gives periodic print-outs to let us know how we stand fund-wise. The keeping of accurate accounting by the surveyor would amount to unnecessary duplication. Keep the surveyor surveying!

6. Chapter VII - Swamp and Overflowed Lands Page 7-25

A few states entitled to the benefits of the Swamp Act have elected to furnish their own proof of swamp character of lands. Florida is the state primarily in mind. In view of this, we question the need for the surveyor to make extensive (and expensive) examinations to determine the swamp character when this is a burden the State itself has elected to bear. A selection from such a state cannot be adjudicated on the basis of the field notes.

It is recommended that, unless there is a statutory requirement for swamp determination apart from the usual quality determination (we are unable to find it), this requirement be dropped from the Manual rewrite.

7. Omitted Lands

It is further recommended that consideration be given in the Manual rewrite for the graphic representation of lands determined to be surveyable as public land, using data from aerial photographs or other reliable source.

Time does not permit commenting on all facets of this matter. Generally we feel that:

1. The draft proposes to omit too much from the Survey Manual rewrite.

2. If these omissions must be made, they should be incorporated with other data in Volume II of a two-volume set.
3. The technical aspects of cadastral surveying should not be a part of the Bureau Manual (9180), except for changes that would be incorporated in the next revision of the surveying manual.
4. All instructions for the survey of public lands should be retained in the official BLM publication. Surveyors should not be required, or permitted, to look to "open market" text books on the subject of cadastral surveying. This Bureau should not abdicate its responsibility in this field of work.

*Julian V. Coff*

Enclosure

DSC (Teller)

**NO REVISIONS  
SUBMITTED**



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
DENVER SERVICE CENTER  
BUILDING 50  
DENVER FEDERAL CENTER  
DENVER, COLORADO 80225

April 15, 1966

Memorandum

To: Chief, Division of Engineering

From: Chief, Branch of Cadastral Surveys

Subject: Comments on Manual of Surveying Instructions - Revisions

There are being transmitted, herewith, in duplicate, copies of our comments on the proposed revision of the Manual of Surveying Instructions. The principal comments, volume wise, were prepared by me after some discussion of certain sections with other employees and with a few persons outside the Bureau of Land Management. These are very informal and in many instances have not received the study they should have. Due to the press of everyday duties, such as programming etc., the time spent on the review of the text was not as great as I would have liked.

There are comments made by O. L. Brinker, after he had reviewed the text. These are probably a little more technical in nature, and probably represent the pedagogical approach.

A third abbreviated set is the result of a review by O. N. Eggen. He spent some time reading the text out his comments are much less detailed than I had expected. There are no other cadastral surveyors in the office whose knowledge and experience would qualify them to comment. Time would not permit circulation of the draft to the field.

My comments on Chapter 7 are missing. They were not ready for transmittal at the time the major portion of the work was done. I am of the opinion the subject of special surveys and special instructions is generally of interest only to BLM employees. As such there is probably little to be said of the revision either way.

It is hoped your final review can be more deliberate and that the suggestions will be of some assistance in the final compilation of the book.

Enclosures

Chapter 1:

After reading the revision of this chapter it is impossible for me to ascertain any improvement in the content, presentation, or other material included therein. Perhaps, because of long association with previous Manuals issued by the Department through the GLO or the BLM, familiarity has created prejudices that are difficult to ignore. To me the use of technical citations, quoted from the Statutes or the court decisions that added to or confirmed existing practices, was an outstanding feature of the Manual of 1930 and 1947. To convert these to an exposition written in good "primer" style seems to be downgrading the technical character of the book. The chapter is of particular interest to those persons using the Manual for reference to the subject citations and basic laws (It has probably as little use by surveyors as any part of the publication). By virtue of this fact the language as employed in previous Manuals has been incorporated in many basic laws of the several states, often as citations. To change these, merely for the desire to change something, seems absurd.

Elimination of the table of contents of the Standard Field Tables, Ephemeris of the Sun, and the Restoration of Lost Corners, may be desirable. It does seem inconsistent to omit these pertinent details only to spend time and space in a later paragraph to give the number of pages and the size thereof. Comments from persons outside the BLM indicate there is considerable interest in the contents of these supplements.



Generally speaking, employees of the BLM accept the proposed revision with less unfavorable comment than do those persons who have read parts of the new chapter, and who use the Manual for infrequent reference. Comments made in discussion meetings with members of the ACSM and the local surveyors societies prior to the revision of the Manual were heavily in favor of leaving Chapter 1 much as it had been written for many years. These comments were even more definitely in favor of the retention of this chapter as is when they came from those persons who use the Manual as a quasi-legal reference work.

Chapter 2:

The comments re the omission of material which is available elsewhere represents a peculiar approach to the subject. If the elimination of material that can be obtained elsewhere is to be considered the ultimate goal of this manual, then it could be practically eliminated.

Each procedure provided in the cadastral surveying activity, as it is carried on by the Federal Government, is dictated by a law or a modification thereof, any or all of which are available in some published text. The cadastral surveyor could ostensibly provide himself with numerous tests covering the various phases of the work. This might well run into a substantial library; the transportation of which and the storage thereof would pose quite a problem, especially in a field headquarters consisting of locally available motel or hotel room. One of the greatest advantages of the Manual as written was the thorough coverage of instruments and methods, in sufficient detail so that the essential data were available in one volume. It is contended that if obsolete methods and equipment are dropped from consideration, substitution of descriptive material relative to newer and more acceptable methods and equipment should be added.

One of the most frequent inquiries received in this office has to do with the instruments and methods whose use was accepted during the various periods in which official cadastral surveys were made. Reference to the Manual of Instructions approved for use at the time in

question provided an easy and satisfactory method of reply to such queries. The 1947 Manual provided most of the answers to these inquiries.

All references to chains, both as units of measurement and tools, are surely superfluous. The technical data relative to the unit of measurement is clearly stated in any standard dictionary. Similar inconsistencies are to be found in this chapter.

Investigation has revealed at least four separate texts on surveying are available in the cadastral survey office. In each of these texts, all of which are considered standard works by authors such as Breed and Hosmer; Davis and Foote; Raynor, etc., the chapter on public land surveys quotes at length various chapters and sections of the Manual of Surveying Instructions. In each of these the reader is referred to said Manual as a source for more complete and detailed information concerning specific subjects. It is now proposed to remove from the source work the basic data upon which these texts are based. If the revised Manual were to be adopted it would be necessary to have a standard text book, and a copy of previous Manuals to obtain as complete coverage of the topics discussed as is now available in the Manual of 1947. The desirability of presenting a stripped down version of the Manual is questionable, especially when such denuding leaves so many questions unanswered and imposes the burden of additional research and reference to obtain what is now readily obtainable data.

No doubt additional material covering electronic measuring devices, gyro-compasses, and more modern instruments and methods should be added.

While it may not be absolutely essential to know how to use a magnetic needle for azimuth, it surely is not amiss to record that such equipment was the basic method in use in making the original surveys with which you are dealing today.

The detailed treatment of the organization of an electronic survey party is surely irrelevant. This is a matter of preference of the Chief of Party. The actual organization could be as shown, or it could require transportation by boat or crawler tractor. With increasing emphasis on foreign work it is conceivable camels could be used on this type of survey. It is not essential these details be included, especially if we are engaged in streamlining the Manual to treat only bare essentials of surveying. The use of an oil drum to mark the point, or instructions for clearing brush and timber, would be relatively unimportant to a party working in the southwestern United States but would be of extreme value to an Alaskan.

The use of the Hoversight is well described; however, inasmuch as the equipment is still in the development stage, it would appear best to mention the unit and refer the interested reader to technical bulletins in line with proposed procedures.

The descriptive matter dealing with the solar transit and its adjustments is somewhat abbreviated. To those of us familiar with the equipment it is probably sufficient. To the layman it is lacking in detail. Here again is another instance of streamlining to the point that the subject matter is either woefully incomplete or superfluous.

If the user wants to adjust a solar transit he must either refer to the older Manuals or to a manufacturer's instruction manual. He does not have enough detail to rely solely on the proposed Manual. If he must go to a manufacturer's manual why not confine the material in the revised Manual to a mere mention of the equipment and a reference where detailed adjustment instruction can be obtained. (Due to the very limited number of solar transits in use the elimination of this section would probably have less impact on the users of our Manuals than would many other sections.)

Here again there is no middle ground. Either the remarks on Instruments and Methods should be fully explained or eliminated. Partial treatment of a subject as complex and technical as this is worse than no treatment at all.

### Chapter 3:

Here again the scattering of source material through reference to other publications of the BLM, other Government agencies, or from text books defeats the purpose of the Manual. It is not believed any worthwhile savings will be noted by reducing the text of the Manual a few pages simply by referring the reader to some other work. A perfect example of this is found in the complete omission of Paragraph 134. This particular section was probably cited more times than any other in this chapter. It is the principal reference to the basic principles concerning the inviolability of original survey lines and monuments. The reasons why it should be deleted are certainly questionable.

This entire revision of Chapter 3 represents the change of text to suit the literary style of one man. It is not substantially different in content from what was included in the 1930 and 1947 editions but it is written in a "dime novel" style, omitting references and explanatory details that, while not important of themselves, were definitely beneficial to the reader in reaching desired conclusions.

It becomes evident that the revision of the 1947 Manual was made with the apparent intention of reduction of text length only. The book is a technical manual, much of the contents having become part of the rules governing surveys and resurveys in the individual states whose basic land survey and title structure rests on the public survey system. The revision does not alter any procedure established by law or regulation, and described in detail in previous editions. It only changes

the language describing these various regulations and/or procedures.

In reading the proposed revision one gets the impression the rewrite was made by a frustrated high school teacher, who intended to present the text as a basis for a classroom lecture series, while explaining all the obvious omissions and references in subsequent discussions.

The only thing that has actually been changed in the proposed revision is the literary style.

None of the basic concepts set forth in Chapter 3 are or can be changed materially. This being true, the only question is how the matter is to be presented to the users of the Manual. This appears to become a matter of choice between the old style, which describes a long-established system in language written by surveyors and interpreted by the courts and through long acceptance of the procedures, or in the new style written in an informal, oversimplified format directed to the occasional user who is familiar with the style of the scenario or the short-short story.

The revision of Chapter 3 provides little or no improvement over the 1947 presentation of the same basic material. Much worthwhile descriptive language has been deleted and in some instances the reader has been referred to other sources for the explanations which are obviously required to complete the interpretation of the subject being considered. Under the heading "Subdividing Regular Sections," reference is made to "Surveyors outside the Bureau." In several places later in the text certain procedures will be dictated by reference to "special instructions." How do these outsiders get the proper instruction?

There is nothing particularly wrong with the revision of the sections pertaining to completion of fractional secs. and special surveys.

There is nothing particularly good either. Another case of change to suit the literary style of the "revisor."

The matter of limits of closure as a test for accuracy has not been clarified. It is still evident that our method of computing error of closure merely reflects that the work of the surveyor is consistently good or bad. It is not a test of the quality of the work when referred to any standard control system. As refinements in equipment and the values of lands, etc., increases this becomes a greater problem. It is a rare case when a subdivision of a section is made, or when new surveys or resurveys are integrated with older work, that an extensive retracement of older work does not occur. It is assumed the older work met the requirements for limit of closure.

When the resurvey or retracement changes the reported values of any line the supposition arises that all or portions of those lines of the existing original survey or previous resurvey must be subject to retracement or else a substandard survey must exist. Investigation would probably disclose that the whole survey does close with itself. This would also apply to the retracement or the resurvey. With the advent of the electronic measuring device, and the improvement of azimuth determining instruments, it seems probable some one line or several lines could be established in each township upon which all surveys, retracements or resurveys would be based. Once a standard line has



been established the limit of closure might assume some semblance as a test of accuracy of the surveys.

#### Chapter 4:

The material contained in this chapter could well have been deleted from the Manual if we are to be consistent. no surveyor outside the BLM is or could be required to comply with these regulations and specifications. The specifications concerning corner monumentation could be furnished in the special instructions provided each cadastral surveyor in the Government employ. The field notes of any survey, upon which outside surveyors must rely, would then supply these individuals with corner descriptions in considerable detail. These data would be required regardless of whether or not Chapter 4 was even in existence. In line with the policy of streamlining the text we have omitted much data of far greater importance to the Manual than is found in this whole chapter.

There is nothing wrong with the revised chapter. Most of it is lifted directly from the 1947 edition. By the same token it is not evident where much improvement has been obtained in basic content or presentation.

Chapter 5:

The consensus of opinion in the BLM seems to favor the combination of Chapters 5 and 6. The material considered in these two chapters is so closely interrelated that it is simpler to integrate the procedures in one chapter.

The provisions governing resurveys and reestablishment of corners are probably of greater interest to those surveyors outside the BLM than are any other parts of the Manual. The data contained in the 1930 and 1947 Manuals has been widely incorporated in surveying regulations and basic laws in the individual states. The incorporation of these sections in State laws was done by direct reference to chapter and section of said Manual and it is presumed the language used in the text would be carried directly into State laws.

Some limited discussion of the proposed revision of these sections has been had with private surveyors, professional engineers, and lawyers who frequently are involved in survey and land title cases. It seems to be their hope that these chapters will not be substantially changed.

It is certain that the revised Manual will not make any basic changes in procedures or regulations. For this reason it is somewhat difficult to see why the format of the 1947 Manual should be changed merely to accommodate a revised style. Having used the several Manuals in the past, it is believed the proposed consolidation of Chapters 5 and 6 can be made without drastic revision in the material and the language in which it is presented. As an example, attention has been directed

to the fact that the italicized sections similar to sec. 350 et seq. are referred to verbatim in State laws in several states. To restate this would only result in confusion and might require some revision of State regulations or laws.

Time does not permit a review of these revised chapters in sufficient detail to make intelligent comment on the separate items. Before any final decision is made discussion in depth should be had concerning the proposed revisions.

The first impression is that revision has again been made for the sake of revision and that improvement in the language and presentation is subject to question.

Chapter 8:

This chapter is of interest only to the cadastral surveyors in the BLM. There is no provision for extending the specifications for notes to outside surveyors. For this reason it is probable this could be placed in a Government BLM Manual for internal use.

If this were done a much more detailed sample set of field notes should be provided. With the reorganization of the cadastral surveying activity and the inclusion of cadastral surveyors from several states in the Service Center, a great variance is noted in the final field notes as submitted. There appears to be as many ways of writing field notes as there are offices writing them. For the sake of consistency there should be some standard format.

It is probable some explanation of the field note record should be provided.

## Chapter 9:

The same qualifications apply in the case of this chapter as were outlined in Chapter 8. The construction of plats is, with the exception of Mineral Survey Plats, a strictly BLM function. There is no provision for outside surveyors in filing plats or field notes that would make this chapter particularly pertinent. As with field notes, a more detailed format for plats should be provided in a BLM Manual, or in this chapter if it is to be included, that would produce more standardization in plats. The vast difference in the conception of what constitutes plats has been brought to light with the transfer of personnel from other states to the Service Center. With work being performed for many states, detailed instructions should be given to achieve consistency in platting.

A descriptive chapter should be entered in the Manual explaining the features of the plat and its significance. This could be in narrative, nontechnical style, similar to the proposed revision of the Manual.

Chapter 10:

This chapter has been rewritten from the Mineral Surveyor's viewpoint. It does not always concern itself with the requirements of the Government.

The inclusion of nearly all of Title 32, R. S., seems to be contrary to what has been done in previous chapters. The Revised Statutes are published and are as readily available to the Mineral Surveyor as are textbooks and other works, and references have been made thereto by title only. There appears to be no more reason for including the sections of the R. S. here. There is no question but what these data are of considerable value to all users of the Manual but for the sake of consistency they should be either excluded in all chapters or universally included.

The references to the Code of Federal Regulations, and to the several circulars of the BLM are of interest as of today. These are subject to frequent and oftentimes drastic revision, occasioned by departmental rulings, the records of which are not generally distributed outside the BLM. It is believed reference to such works of a temporary nature should be omitted. The statement that current regulations govern the Mineral Surveyors activity should be sufficient.

The statements on pages 10-14 and 10-15 pertaining to the status of a Mineral Surveyor as a Federal employee might well be omitted. While the several laws pertaining to his appointment refer to the Mineral Surveyor as a Government employee, the connection is rather nebulous

and is confined to a very limited jurisdiction over his conduct and the character of his work rather than over his actual employment. Under 2, in the paragraph "Mineral Survey . . .," it is questionable, under the present organization of the BLM, whether the evaluation of improvements should be delegated to the Mineral Surveyor. He can report the value of improvements as claimed by the locator of the claim, but the evaluation of these has become a function of the minerals examiner at the time the patent application for the claim is made. It is probable the Mineral Surveyor and Claimant would discuss the value of improvements, but in case of a difference of opinion it is proper for the Claimant to place his value on all improvements. Likewise the surveyor will show as claimed improvements, only those items specified by the claimant. He may, and should, tie in all other improvements or items that could materially affect the value of the claims, listing them as other improvements, without declared value. (The evaluation of structures, excavations, roads or other improvements does require some technical knowledge. The actual cost of these is known only to the Claimant. A structure in an adjacent town is probably less expensive than the same structure built in a remote area, far removed from the source of supplies and inaccessible except by unusual means of transportation).

Much of the text in this chapter is devoted to an explanation of procedures and discussion of specific and often unusual cases, all of which could be found in publications governing such matters. The



discussions are so limited in the coverage of various phases and answers to questions which are raised in course of said discussions that they are generally of little value. Either these sections should be greatly expanded to provide full treatment of the issues, or they should be omitted entirely and the reader referred to published sources of information in which full and complete coverage of all facets of the problem can be evaluated. There are probably several hundred pages of decisions, regulations, and other pertinent data concerned with the problem of contiguity of lode claims. Mining District and State regulations or laws may materially change these instructions.

The statements concerning the supplying of regulation BLM iron posts to Mineral Surveyors is an innovation not yet approved in this office. We never have furnished our brass capped posts to Mineral Surveyors. These posts, bearing brass caps inscribed in any manner the surveyor desires, are available at a cost not much greater than ours. About all we derive from supplying our posts is the assumption of the role of storekeeper. The mineral survey is not a true BLM cadastral survey as stated on the post. It is not believed desirable to supply posts to each and every Mineral Surveyor who may apply.

Mineral Surveyors are held to be Government surveyors in a limited capacity. They are not clothed with authority to establish or reestablish corners of the public surveys. The general conception that the Mineral Surveyor is in effect a Government employee causes much confusion. He may be a part-time Government official. The only jurisdiction the

Government has is to see that his surveying activities conform to regulations and laws. This also applies to the Claimant but he is not an employee. It is thought the perfunctory discussion of this phase of the Mineral Surveying activity should be omitted. The statement "all of the information, etc. . ." is too broad. Obviously some information concerning the survey is furnished the prospective Mineral Surveyor or he would never be able to arrive at a contractual agreement with the Claimant.

The comments re "Personal Supervision" are probably desirable but if the BLM tried to enforce the listed responsibilities, they would be faced with a considerable chore. Item 1 would be required prior to entering into a contract with the Claimant. Items 2, 3, and 4 would require considerable judgment. If the paragraphs in the revision are intended to liberalize sec. 672, this has been accomplished. Probably the extent of the liberalization should be more definite and not leave so much to the judgment of some undesignated officer.

Whether or not the engineering profession has established criteria of good practice employed in the execution of metes and bounds surveys of any property is subject to question. Why not specifically require adherence to regulations of this manual or to state and local regulations governing surveys of properties of all types.

Why is it necessary to dwell at length on "taped measurements" in mineral surveys. All this was eliminated in cadastral surveys. This will also apply to all the following sections regarding various systems or methods of obtaining distances.

The paragraph re precision again is a relative thing. If the paragraph is intended to indicate what should be recorded, O. K. If it is intended to specify measurements of the accuracy indicated by reference to "hundredths of a foot" a much more detailed explanation is required to assure getting such precision. It seems angular measurements to the nearest minute would preclude taping at degree of accuracy commensurate with that discussed above.

It would seem some check should be made of the azimuth of a retraced line accepted by the BLM. It is not at all unusual to find errors in azimuth in recently resurveyed lines in excess of the allowable error in a mineral survey. In mining areas in Colorado there are as many as three (or sometimes more) record bearings for retraced lines of mining claims. These bearings will frequently include lines of other claim boundaries and/or section lines. They are all accepted surveys and the Government did not make any effort to assign priority to one line over another. Item 2 should be changed and clarified. The paragraph re traverse closures is a measure of consistency and not one of accuracy definition. If the requirement is such that one line has to be measured with a high degree of precision and all closures calculated against the values assigned to that precise line, then the 1/2000 error would have some meaning. Otherwise it is meaningless except to confirm all lines are equally good or bad.

In the paragraph relative to fixing position, why not keep the reference to the public survey system rather than the rectangular system. A

section corner is corner of the public survey and not the rectangular system. Rectangularly surveyed land could mean land bounded by four straight lines of a mining claim. That is surely a surveyed rectangle. Paragraph 2 does not mean "a monument of any other survey already approved by the General Land Office or the Bureau, if such corner is reasonably available within two miles". This would include a corner of an adjoining or conflicting mining claim previously surveyed and accepted. It might well be that the first claim was surveyed from a presently canceled or nonexistent mining claim and would be no better as a permanent reference than the corner being established in the survey under consideration. Many an approved and accepted survey has been subsequently canceled, and even the records have been taken from the official file.

A location monument should be tied to some permanent station of the horizontal control system established by the USGS or the C&GS or to a corner of the public surveys regardless of the distance. With modern equipment this is not an unreasonable regulation. There are many so-called floating mineral or location monuments in Colorado. Their use is futile. They tie nothing down at all. We have some of these that are suspected of being in at least three different sections, and there is every evidence that ties to surveys have been made from three different monuments all alleged to be the same Location Monument. It is not deemed essential to furnish mineral surveyors with monuments to establish these markers. Identical materials, not carrying the cadastral survey brass cap, can be had by the Mineral Surveyor.

Geographic Position: If a USGS Quadrangle sheet of the one inch per mile scale, which makes the survey of recent vintage, is available there will be on that sheet at least one permanently monumented control station. It would not be unreasonable to require a tie to the permanent station from which geographic coordinates could be calculated. Scaling on a paper sheet, to a corner located by reference to plotted contours or other cultural items seems a little crude when we are requiring accuracies to one-tenth of a foot. With the advent of photogrammetry and the plotting of mining claims covering large areas from control based on geographic coordinates, these values become more important. Why the concern over locally established coordinate positions for corners of the survey based on a balanced closure. Nearly all surveys are platted by use of a drafting machine and coordinates have little value. If these are to be computed and coordinate values assigned to individual corners, why not integrate them with established State Plane Coordinates and put these in the final record for use of future mineral surveyors in ascertaining where errors might occur in old surveys. The matter of what happens to the surveyors' traverse sheets seems to be a topic that could well be handled by correspondence and not given space in a manual.

In the paragraph on General Procedural Considerations, there are several inconsistencies. If "application for a mining survey must be declined where the location was not properly marked and recorded" the question naturally arises, how are the defects noted. The surveyor obviously

cannot get this information from the Claimant prior to the issuance of the survey order. Getting this information from other sources has been prohibited in previous sections of the Manual. If he does go into the field to ascertain the state of the locations and the validity of the recorded location notices without a survey order, he removes himself as a potential surveyor because he has had previous knowledge of the location. The last sentence in the paragraph at the top of page 10-30 places the mineral surveyor squarely on the horns of a dilemma. He is expected to exercise sound judgment or discretion in evaluating facts discovered on the ground while he was proscribed from obtaining such facts if he was to make the survey. This is hairsplitting both in the manual writing and the critique. Why go into all this detail when it is largely a matter of sound administrative procedure when the surveys are in progress.

Major considerations only further complicate procedural matters. No surveyor can say, with authority, whether or not the locations have been marked on the ground in the manner described until the individual has been on the ground.

The mineral surveyor has been barred from obtaining technical data relative to the discovery until he has been handed a survey order. Likewise the surveyor is presumed to get the location notices after the survey order has been handed to him.

How is the size of the location determined unless the survey has been ordered and is in progress. These are actions to be taken in order to ascertain whether the survey should be made.

The comments re "Amended Notice and Order" are much too general and superficial in character to provide any assistance in this very complicated phase of the survey. The previous copies of the Surveying Manual did not make any provision for amendment of location. Within recent years each state has tried to conform its practice to the laws in effect at the time. There are so many court decisions and hearings examiners' opinions relative to what constitutes a proper amended location that it would be practically impossible to cover the subject in this Manual. There are no clearly defined decisions or procedures covering the gray area between legitimate amended locations and relocations. The governing factor in these cases appears to be how important it is to establish the effective date of location. It is suggested that mere mention be made of the fact that amended locations have become a way of life, but that each amendment or proposed amendment of location be referred to the appropriate cadastral surveying officer for approval. Seven out of ten cases under investigation in the Colorado Office have involved amendment of location. In each of these there are extenuating circumstances. In many cases the amendment is minor but created conflicts. In other cases the amended location cases moved the claims completely away from the clearly defined point of discovery, which under any instructions we would write in this Manual, would be a flagrant violation of the letter and intent of the law or regulations and appears to have sufficient legal backing to establish validity. This type of disagreement is the rule rather than the exception.

The section re Government policy is much like a hard and fast treatise on the weather. Government policy, as regards mineral claims and the patenting thereof, is about as fluid as anything could be. (Witness the oil shale controversy). It is suggested this paragraph be omitted. It is of no intrinsic value and merely adds words to the text. It has nothing to do with the execution of a mineral survey. Surveys are technical actions, based on law or regulation, not affected by policy. The paragraph "Typical Example" is misleading and totally unnecessary. It should be stricken from the text. There is only one situation where the given example would occur. This would be in the case where a location is overlength or overwidth. If the location was underlength or underwidth the survey would fall on or within the area bounded by the location corners. If the claim is too wide the corners must then be more than the statutory distance from the discovery. To move them to obtain contiguity would amount to moving the discovery point or the declared lode line. This would result in a relocation of the claim and the requirement of a new discovery and the true position of the lode line. The futility of attempting such amended locations was clearly defined in the prominent cases of the Steen uranium claims in southeastern Utah, where the court held such attempts at amendment by the mineral surveyor, or an agent of the claimant using information provided by the mineral surveyor, were improper. It is best this subject be one of individual determination rather than by adding a paragraph such as this which can only lead to further misunderstanding and confusion.



It seems all the sections regarding amendments of location and changes in the claims as staked should be omitted. The thinking behind the inclusion of these items clearly reflects the desires of the writer based on experience as a mineral surveyor, and his suppressed desires, rather than the instructions for making surveys. Amendment of location is properly the function of the claimant and/or locator. It is not properly a function of the mineral surveyor. When instructions are issued to the mineral surveyor on the numerous and devious ways in which he can circumvent the published laws and regulations, and how the law can be twisted to represent intent rather than literal interpretation, we are straying far afield. These are instructions for survey and not a treatise on patenting procedures and practical ways in which a claimant can obtain patent either within or without the law.

There is no reason why the requirement should be deleted that any claim within any predetermined limiting distance from the survey be tied in. (This is presently 100').

It is suggested that all sections pertaining to "Improvements" be deleted. These items are more properly for evaluation by the mineral examiner at the time patent application is made. Aside from being tied in there should be no further action taken by the mineral surveyor. The statutory requirements were promulgated at the time when patent frequently was granted, based on the surveyor's returns. Today the claim is subjected to severe scrutiny by examiners from the Lands and Minerals Sections

of the agency concerned with administration of the lands involved. Often the first problem the mineral examiner has is the devaluation of the reports made by the mineral surveyor concerning the value and extent of claimed improvements. The surveyor's report is of little or no value beyond showing the proper relative position of improvements within the claim in existence at the date of survey.

The section on corner monuments contains little of value. Most of the basic data re setting of a monument has been included in foregoing chapters of the Manual and could be referred to by cross-reference. Again, the use of the standard brass cap bearing the cadastral survey inscription is questioned. The cost of the monument is an integral part of the overall expense of patenting a mining claim. Corner material meeting all the specifications of our posts can be had in nearly every large city. The mineral surveyor can obtain these without complicating BLM accounting and storeskeeping procedures. Furthermore, there is considerable question as to the superiority of the iron post in the areas where mining is in progress. A properly set, well marked stone corner is a highly satisfactory monument. Often surface changes, due to normal travel and logging or other activities, pass over a stone corner when the iron post would be dislodged.

The Controlling Precepts are the random musings of an erstwhile mineral surveyor. Everything contained in these sections can be found in much greater detail, and explained in reference to more different situations than ever could be put in these instructions. They are not instructions

as such. Most of the items covered are in the form of advice to the locator and not to the mineral surveyor who should not be concerned with them. The text covers much that has been covered before. The comments re parallelism of end lines, right angles to lode lines, etc., are basic and should not be considered instructions to the surveyor. It is not known whether the question of rights to locatable minerals found under the beds of streams or tidelands has ever been decided in such a manner that a definite statement can be made regarding them.

The paragraph re narrow strips should be deleted. From experience it has been found these strips are usually created by the attempts to provide amended location of overwidth or overlenght claims. It is not within the authority of the mineral surveyor to take corrective measures to correct these problems. The only way in which such strips can be eliminated requires a relocation of the claim or a location of an overlapping claim to cover the strip. The mineral surveyor cannot legally make claims contiguous for the sole purpose of serving the best interests of the Government. It would be nice to provide this authority to the mineral surveyor but it would require revision in the basic mineral laws.

The same comments apply to field notes and plats that were noted under the chapters applying to cadastral surveys. It is suggested new specimen field notes and plats be prepared and reproduced as a supplement to the Manual for all types of plats and field notes.

It is absolutely essential some provision be made for the ties and tabulation of other corners. This is a phase of the surveying instruction that has been overlooked. Frequently when claims are added to the connected sheets additional surveys are found in apparent conflict. These conflicts should be resolved in the field. This would eliminate the major cause for the need for amended surveys. The questions concerning millsites are complex and multitudinous. They can not be completely covered in the text of this Manual.



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

DENVER SERVICE CENTER  
BUILDING 50  
DENVER FEDERAL CENTER  
DENVER, COLORADO 80225

IN REPLY  
REFER TO: 9180

April 11, 1966

Memorandum

To: Chief, Branch of Cadastral Survey, DSC

From: Orason Brinker

Subject: Comments on Manuscript of Revised Manual of Instructions

After reading the entire manual, the revision seems much needed. The need for the current revision has been reflected in the comments of users over the past several years. The manuscript was certainly a noble effort in the direction of making the manual more useable. The following comments are meant as constructive criticism, and are, in no way, to be inferred as derogatory toward the manuscript or its authors.

I. General Comments

All apologies or explanations for the revision of the manual should be properly stated in the foreward and need not be reflected at the beginning of each chapter.

The style of the manual is a bit inconsistent, i.e. some sections talk about the facts of the subject, inferring that there exists some other publication in which the facts of the subject are clearly stated.

History of surveying practice and current practice in cadastral survey are not always contrasted cleanly. This could be confusing to a reader seeking definite information.

Few, if any, references are cited.

No bibliography is given.

Definitions of terms used need improving.

Possibly a glossary would be helpful.

Where is Chapter VI?

II. Specific Comments

- Chapter I - Page 14, line 10 - Define "parallel line".
- Page 16, line 3 Mill sites -- not "seats"
- Page 16, line 5 Topographic and cultural features are accurately shown on USGS quad sheets, if available.
- Chapter II - Page 3, line 8 How steep is steep? State a definite value for angle of elevation (vertical angle)
- Page 9, line 1 Define azimuth.
- Page 9, line 16 Is a gyro-theodolite, in its present state of development, a practical instrument for determining meridian?
- Page 13, lines 17 and 18 - Several small circles in a mercator project<sup>v</sup> appear as straight lines, e.g. parallels of latitude in a polar mercator project<sup>c</sup>.
- Page 16, line 9 When a parabola is used to approximate a circle, the amount of discrepancy between the parabola and the circle should be known.
- Page 18 When may mean latitudes be used and when not? Mean latitudes do not always give correct results.
- Page 18, line 6= If a survey is made upon the basis of a plane survey, the adjustment should be made accordingly.
- If a survey is made on the basis of a spherical surface, the traverse should be computed upon the basis of geodetic lines in the sphere.
- Page 19, lines 7 and 8 - What kind of mapping is this? What do you mean by spiral? Is this a logarithmic or Archimedean spiral? Such general statements as these do not rightfully belong in a precise manual unless they are precisely proven or references given for the statement.

Page 24, line 14 The Bureau of Land Management is not the only organization which has developed programs for converting geographic coordinates to State plane coordinates.

Page 40, line 5 Refraction in polar distance is nonsense. This should be precisely stated as the component of the refraction error in measuring the vertical angle in the direction of polar distance.

After all, the polar distance of a celestial body is in no way effected by refraction in the earth's atmosphere.

Chapter III - Page 20, Paragraph 4 - The word "Parallel" here is ambiguous. Define what is meant by parallel in this situation.

Page 21 - Better surveying criteria. Try to rewrite more clearly.

Page 31, Figure 31 - Explain how this figure is possible.

Page 32 - Definitions need rewriting.

Page 36, Last statement - If a line is not a parallel of latitude, how can it be a latitudinal curve?

Page 43, See comment, Figure 30, page 31.

Page 43, Figure 21 - See comment for Figure 30, page 31.

Page 100, line 16 - Cite references to laws dealing with riparian boundaries.

Page 108, line 8 - Section 6 --- Not Section 1.

Page 107 Limits of error. This section is historical in nature. It should be supplemented with a mathematical (statistical) development of the theory of errors and the relationship to angular and linear errors of closure as a method of prescribing the order or precision of the survey.

(By way of observation, I have yet to find a cadastral surveyor who truly understands this subject. The practice is to trust to luck to get a required "closure" and then if

successful, assert that a survey of a certain order has been attained. This type of assertion is totally absurd. Any well-trained engineer or scientist will readily detect the fallacy in such statements, which very properly should be soundly criticized to the embarrassment of the BLM Cadastral Survey. This section should appear toward the beginning of the chapter, rather than at the close. Then many of the special situations noted in the chapter would be more meaningful.

Chapter IV, Page 31

Why not include state plane coordinates as an accessory? They are more permanent than any of those mentioned and with adequate explanation of the precision of location of the monument in place with respect to their precise theoretical point on the ground represented by the coordinates -- this type of accessory would be practically indestructible.

Chapter V, page 16, lines 16 and 17 - Language used should conform to contemporary mathematical and scientific usage, i.e. just what does the expression "cardinal equivalents" mean?

- page 20            Are "fallings" adequate for modern surveys? (I believe they are poor practice.)
- page 20, line 28    "In more recent surveys" - Give date, be specific.
- General comment for pages 19 - 21 -- Too much redundancy.
- page 22, paragraphs 2 and 3 - What kind of adjustments are these? Transit rule and compass rule for adjusting traverses should not be mixed.
- page 22, line 15    What is "persuasive proof"? Either a proof is valid, or it isn't. Persuasive proof is nonsense.
- page 23, line 6     Are section corners relocated or restored?
- page 23, line 10    Are lost corners relocated or restored? The word "relocated" can be interpreted: "moved to a different place".



- Page 28, lines 1 and 2 To what figure do T and R refer?  
Figure 68a is on page 3-99.
- Page 29 The scratch work alongside Figure 74 should state that the lengths  $X_1E$  and  $X_2D$  are arbitrarily determined.  
The equations do not follow from a geometric construction.
- Page 33, line 22 "Cardinal equivalents". See comment above.
- Chapter 7, Page 15, line 3 Does the bibliography list these texts? Refer to them by footnote.
- Page 28, line 20 Same comment (Above).
- Chapter 9, Page 30, paragraphs 2 and 3 - Be specific. Give dimensions.
- Pages 6 and 7 If we are going to teach grade school arithmetic in this manual, let's do a good job of it. These pages are a mess.  
It is presumed that a Cadastral Surveyor has a BA degree, with at least six semester hours of college math. Such explanations as appear on these pages are completely superfluous, and are out of order.  
DMD's are as old as the horse and buggy. Do we not have electricity with which to operate electric calculators?  
Coordinate method (criss-cross) for calculating areas is much ~~safer~~. *faster*.
- Page 7, third line from bottom of page - Why use the word "subsisting"? The word existing will express the idea more clearly and in conformity to our contemporary diction.
- Manual Surveys - Chapter 10, page 55 - Under Amended Surveys - What circumstances indicate the need for an amended survey? This question is not answered.

Summary of Comments

By way of summary, it appears to this reader that the present manuscript, while a very noble and valiant attempt to effect a much needed revision of instructions, is far from being ready for publication.

It should be critically revised with due attention to contemporary scientific language and complete documentation, i.e. footnotes, references.

### Chapter 2

Basic meaning of the contents are very well. There are several items that should be discussed. Two of a few items wrong: Page 3, use of clinometer in slope dist., (what is steep). Page 13, circles of a globe laid out flat are straight lines. With minor changes and corrections this chapter is valuable.

### Chapter 3

The first 15 pages is very narrative, maybe that is what is needed, but it also could be too much for what a manual is intended for, and there is too much repeating. Page 18, the center of a section is not a quarter corner. The talk of "error of closure", the amount of "error" should be mentioned as to what it is and not just refer to it as "error of closure".

Various places (pages 13-99) mentions to avoid reestablishment of lost corners. The understanding is to restore these corners whenever possible, instead of have to go back over the same area for reestablishment of these corners.

Heading of Meanders: A statement as to type of meanders and also corners to be set should be noted in general instructions.

Heading of Limits of error: Why not place these limits in the various descriptive para. of Principal Meridians, Guide Meridians, Standard Parallels, Township Boundaries, and etc.

### Chapter 4

Page 6, reference to the actual corner trees (what is too small a tree?). Chapter 4 is very valuable and not enough can be stressed as to the way corners are set, referenced, and marked. I think more should be written on this.

### Chapter 5

The subject of this chapter is very vital to the surveyor. There should be a little more stress given toward the surveyor on where he stands as to disagreements on the various types of work and what he can do, not leaving the survey or up in the air.

### Chapter 7

Special Instructions: As to the contents and information given; this cannot be overlooked, as it is; as the man would get a page from the manual. All the

information is the utmost importance, also the time element that the surveyor has to read and study the work to be done. This information should be added to this chapter under Special Instructions.

As to Nonnavigable and Navigable lakes and streams, also water and tidal lands, swamp and over flowed lands, these subjects should be stressed more as these always have been a problem to the Surveyor, as to what each are and how to combat each subject.

### Chapter 8

Field notes: Page 1, the notes are not destroyed as soon as the Director has approved the notes. As long as the Chapters have a narrative on the various subjects, why not go into a little more detail on note keeping, setting up field book, etc.

In general the material in these Chapters in trying to convey its information to the practice of surveying is good. Myself did not get these chapters in time, and was not able to go step by step as should be done, so my comments do not do the subjects justice. I have tried my best in the short time of a few days.

Orville N. Eggen

P.S.C. (Forrest)

**SEE REVISIONS ON  
MANUSCRIPT**



UNITED STATES GOVERNMENT

# Memorandum

113  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
Portland Service Center  
P. O. Box 3861  
Portland, Oregon 97208

9185 (P-713a)

DATE: April 15, 1966

TO : Chief, Division of Engineering, Washington, D. C.

FROM : Chief, Branch of Cadastral Surveys, PSC

SUBJECT: Rewrite of Manual of Surveying Instructions

RECEIVED  
BUREAU OF LAND MANAGEMENT  
COMMUNICATIONS UNIT  
AM 7 18 1966  
8 1966  
PM 1, 2, 3, 4, 5, 6

Enclosed is one copy of the subject manuscript with notations by me and other members of the PSC Cadastral staff. As Chapter II was my assignment, most of my comments are directed towards that portion.

Over the years I have criticized the 1947 Manual as much as anyone. However, in my work on rewriting, I changed my mind. In general, I now think it is well written and contains the proper material. The two things that need basic changes are: (1) The organization of the material and (2) the indexing.

New surveying equipment and techniques should be recognized in the new manual; however, operational procedures should not be detailed as further developments are in progress.

This manuscript has omitted nearly all the material on practical field astronomy and the solar transit. I agree that much of this can be obtained from other sources, such as textbooks, manufacturers' literature, etc. However, it is not available from any one source, and some of it is not available in any publication. This material should be retained. It might suffice to put it only in the Bureau Manual, but I recommend that it be included in the "hard-back edition."

The draft submitted for review reads like a paper or speech for presentation. Words and phrases such as, "it is contemplated" should not be included in a finished product. Although there is merit in supplemental manuals and guides, the more material that can be consolidated into one volume the more efficient will be the field utilization of necessary information.

Enclosed is a copy of a memorandum to the Director (Attention: 732a) from the Chief, Branch of Management Analysis, PSC. Commenting on the manual manuscript, I believe his comments and recommendations are good. I believe

that, as he suggests, it would be worthwhile to contract a professional firm for editing and writing the completed product. They should be furnished the manuscripts as prepared by the several people assigned to writing the manual rather than the draft we are discussing here.

*F. Wayne Forrest*

F. Wayne Forrest

Enclosures

P-1541-1  
August 1964  
(Formerly A1-150)  
UNITED STATES GOVERNMENT

# Memorandum

DEPARTMENT OF THE INTERIOR 9185  
BUREAU OF LAND MANAGEMENT 1221 (P-732)  
Portland Service Center  
P.O. Box 3861  
Portland, Oregon 97208

DATE: MAR 30 1965

TO : Director (Attn: 732a)

FROM : Chief, Branch of Management Analysis

SUBJECT: Manual of Surveying Instructions

RECEIVED  
BUREAU OF LAND MANAGEMENT  
COMMUNICATIONS UNIT  
MAR 31 1965  
AM 7:39 PM 11/21/23/4/5/6 P.1

Several copies of the proposed revision to the Manual of Surveying Instructions were recently forwarded to the Chief, Division of Engineering, PSC, for review and comment. While in the WO, and at the beginning of the project to revise this manual several years ago, I participated in several planning discussions and was interested in what had been done to date. I have reviewed this present draft and wish to offer a few general comments.

It appears that the Manual is written for two audiences - Bureau employees and public surveyors. In so doing, it does not really serve either in a satisfactory manner. Not the Bureau employee because it is not a true internal directive. It does not clearly set forth Bureau policy and procedure because too much text book type narrative explanation is included. And it does not adequately serve the public because the writers had a dual purpose in mind and much of the material is of only internal Bureau importance. The mixture tends to water down the effectiveness for both uses.

In view of the considerable investment and the time consumed in producing this draft, I believe some additional investment should be made in completing the development of a revised Manual for public use. Of course it would be frequently referenced by Bureau employees, somewhat as a text book, but the format and predominate objective would be for public consumption.

The additional investment I suggest is contracting professional editing and writing of this draft by one of the local Washington firms, such as McGraw-Hill. These firms are thoroughly experienced in similar jobs for military and other civilian Federal agencies and I believe the quality product they could produce would be well worth the cost. The Surveying Manual is one of a kind and widely used by private and public individuals alike, and well worth our effort to make it a highly professional product.

If the public demand were met in this manner then our internal requirement for strictly Bureau policy, standards and procedures could be handled separately in the form of a BLM Manual release. The separation of text book type information from internal directives would result in material aimed directly at each audience and consequently more readily understood by each. Until a definite separation of internal and public material is achieved I am afraid that the Bureau directives system will remain the greatest loser. We have





UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON 25, D. C.

IN REPLY REFER TO:

9185 (713)

September 15, 1965

Memorandum

To: C. E. Remington  
From: D. R. W. Wager-Smith  
Subject: Finishing the new Manual

Having completed the first draft of Vol. I of the new Manual, I am seriously considering retirement. Emphysema causes me a good deal of discomfort, and it is considerably aggravated by the Washington smog. The six percent for retirement before December 1 is also an inducement.

I have finished, ahead of schedule, the primary writing job that brought me to Washington. I believe it would be in the Government's interest to continue my association with the book until it goes between covers. There is still much to be done. The draft should be reproduced and sent to the field for review. Resulting revisions may involve considerable rewriting. Paragraph numbers and headings must be prepared. The book must be set in type and proofed. I understand that a special editing office must edit it. After page-proofs are corrected, a thorough index must be prepared, set in type, proofed, and checked against the text. All revised illustrations must be checked against the text. A considerable amount of cross-referencing must be done, based on the finally-assigned paragraph numbers.-----I believe that my detailed knowledge of the entire project makes me the logical one to see it through.

Most of the work to be done will come in surges, with slack periods between. I propose that I retire in November and return to Albuquerque where the Bureau can make use of my services to finish the Manual on a consulting basis. I propose a fee of \$65 per day when actually working on the Manual, and estimate that about 100 days of my time may be required before the book is actually published. I hope that publication may take place within a year, but that will depend largely upon others. Perhaps half of my time would be expended in F.Y. 1966, and half in F.Y. 1967.

Under such an arrangement I would also be available for work on the loose-leaf portions omitted from Vol. I, and additions to the Standard Field Tables. In omitting this material from Vol. I, I developed a plan for including it elsewhere. I can work-up the material myself, or prepare an outline for the

benefit of others, or do some and leave some for others, as seems best to you. I have a particular interest in preparing some of the technical material to be placed in the Standard Field Tables.

W. G. R. (initials)



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240

November 8, 1965

Memorandum

To: C. E. Remington

From: D. R. W. Wager-Smith

Subject: Manual of Survey Instructions

Following are some miscellaneous comments that I want to get down on paper before I leave for Albuquerque.

1. My last day at the office will be November 10. I plan to drive to New Mexico, stopping for a visit in Georgia, and arriving Albuquerque about Thanksgiving. I will be on annual leave through November 29, and on sick leave for surgery beginning November 30 and probably running through December 30, on which date my retirement will become effective.
2. My new appointment will become effective on January 3. I shall submit time reports through your office at the end of each pay period in which I put in compensable time. Also, I plan to keep you informed about how my compensable time is spent.
3. The draft of the typed manuscript has been delivered to the reproduction people with a requisition for 50 copies. They say it will take a month to get the job done. When it comes back, I would like to have the original and 5 copies sent to me in Albuquerque.
4. All figures are ready for the printer with the single exception of the photograph of the men measuring a bearing tree facing page 272 in the 1947 Manual. I shall leave these figures in Washington in charge of someone whom you designate to be our contact with the GPO. The tree-measuring picture is at GPO for use in reprinting the 1947 Manual.
5. We plan to have 3 fold-in plats in the envelope in the back of the new Manual: an original survey plat, a resurvey plat, and the mineral survey plat. The first two will be typical of our present platting practice. Roger Barron is working on this. He will also select the few typical pages of field notes to match the plats. The mineral survey plat and notes (with updating of the latter) will be identical with the 1947 Manual.

6. I believe the new Manual should have 8 chapters. Chapters 5 and 6 have already been combined. I plan to combine 8 and 9 dealing with field notes and plats. As they now stand, each is too short for a chapter by itself.

7. I envision a timing something like this:

Dec. 15, 1965: You transmit copies of manuscript to field with a Feb. 1 deadline for comments.

Feb. 15, 1966: Comments transmitted to me in Albuquerque, with appropriate instructions from you to me.

Apr. 15, 1966: (Sooner, if there are only a few necessary changes.) I transmit final draft to you.

May 1, 1966: Manuscript starts its devious route to GPO.

Sept. 1, 1966: I receive proofs from printer, via your office.

Dec. 1, 1966: Corrected proofs and index returned to you.

June, 1967: The new Manual is published.

8. I believe that your letter transmitting the draft to the field should stress the point that the "textbook" and "in-house" omissions will be taken care of by other means. I find that when this point is understood, much of the resistance-to-change subsides.

W. G. P. Smith





UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240

IN REPLY REFER TO

MA 1 '955

531 Hermosa Drive, NE  
Albuquerque, New Mexico  
February 25, 1966

C. E. Remington, Chief  
Division of Engineering  
Bureau of Land Management  
Washington, D. C.

Dear Rem:

The five copies of the reproduced manuscript have arrived and they look good. Some of the pencil interlineations didn't come out very clearly but the meat of the thing is all there. I didn't get the original from which the reproductions were made; if it is available I can make good use of it here.

In order that I may stay abreast of the feel of things, and of the timing, may I have a copy of the transmittal letter which accompanied the copies to the field for review?

I have not yet received my while-actually-employed appointment. I sha'nt let this fact interfere with my work on the manual, but actually there will not be much that I can accomplish until the comments from the field are transmitted to me. The index, which will be quite a project, can't be undertaken until page proofs reach me from GPO. Nevertheless, maybe somebody ought to check into the matter of my appointment.

Has VanZandt been replaced? Are all the figures for the new manual that I left with him safe? Has Roger Barron got the notes and plates ready?

I shall eagerly await comments on the manuscript. In the meantime let it be known that I miss all of my friends there.

Sincerely,

*Dick Wager-Smith*  
D. R. W. Wager-Smith





IN REPLY REFER TO:

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON 25, D. C.

1124.3 (713a)

September <sup>17</sup> 14, 1964

Memorandum

To: Director  
Through: Assistant Director, Resource Management, *EPJ*

From: Chief, Division of Engineering

Subject: Distribution of BLM Manuals

It has been the policy of this Bureau for at least the past 25-50 years that we do not give free copies of the Manual of Instructions for the Survey of the Public Lands of the United States or its companion volume, Standard Field Tables, to the general public. We have often given copies to Congressmen or Senators for their own use, but have consistently refused to give them copies where there was any indication that the copy was to be passed on to a constituent. This refusal has been by letter, memo, or phone. We have always issued free copies to libraries and schools.

The Manual and Tables are published by GPO and are sales items at a (current) public price of \$3.75 and \$1.50, respectively. We are required to pay GPO for any of the items we may have in stock. Often we pay more than the public price.

Currently the Manual is out of print and we are rewriting it. We have available some 12 copies beyond those desk copies needed for use by the engineers in this office. The GPO has no stock.

When the Manual is reprinted in 1965 the demand will be such that free distribution to the public directly or through the Congress would cost this Bureau \$10,000 - \$15,000 per year for three to five years. This cost could be expected to decrease to \$3,000 or \$4,000 per year after that time.

*APW* *APW* I would recommend that we continue our policy of free issue to libraries and schools and refuse to give copies to the public, either through the Congress or direct. In addition, since the items are sales items through GPO, we should direct all inquiries to that agency and refuse to give free copies to Congress.

*"We cannot refuse to give a Congressman copies for his own use" - Beine  
Sept 17, 1964*

In addition, we are now publishing a map of the United States with the land survey network on it. It will be available in August 1965. The sales cost of this map will probably be in the \$5 range. We do not know at this time whether GPO will be involved in distribution of the map since there is a congressional issue of some 70,000 copies of a smaller map to be available this December. I would recommend that our policy on distribution of the larger map be the same as for the manuals.

OK  
HSP

We do have two publications--The Ephemeris and Restoration of Lost or Obliterated Corners and Subdivision of Sections--that we issue free to the public. We are the source of these same publications for other Government agencies. Distribution of the Ephemeris, a part of the Survey Manual, runs to some 1800 copies per year. These volumes are also for sale by the GPO at 40 cents and 20 cents, respectively.

do not  
issue free  
copies to  
Public

Engineering needs guidance and instructions in all of the above.

*E. G. Huntington*

Enclosures: 2

- Encl. 1 - The Ephemeris
- Encl. 2 - Restoration of Lost or Obliterated Corners & Subdivision of Sections

*Note:*  
BOB requires that Govt. receive value for services offered. Therefore, for technical manuals used by public we should charge in all cases including copies to the Congress, unless the Congress specifies otherwise. Congressional requests should be referred to GPO

HSP

