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**THE DEPARTMENT OF DEFENSE TAKES AIM AT MILITARY CONTRACTORS; SHOULD THE MILITARY OUTGUN TECHNICAL MANUAL SUBCONTRACTORS TO TAKE THEIR COPYRIGHTS?**

DOUGLAS E. WARREN\*

INTRODUCTION

Between 1948 and 1989 the so-called “military industrial complex” was one of the largest sectors of industry in the United States. During this time, the Cold War with communist countries resulted in a Department of Defense (“DoD”) buying frenzy culminating in the procurement of virtually every type of service and product available in the United States industry from toilets to M1 Abrams tanks. In conjunction with the purchase of most of those items, the DoD also purchased technical data which was used by the military to establish a maintenance and repair system within the government for a world-wide network of repair and maintenance of military equipment procured by the DoD. Although this technical data took a wide variety of forms, technical manuals were the preferred format.

This article addresses a number of interrelated copyright questions: Are these technical manuals copyrightable under the Copyright Act of 1976? If so, who is the statutory author of the technical manuals? Were the manuals a “joint work” for the purposes of copyright authorship? Were the manuals a “work for hire” prepared by an independent contractor as a “commissioned work” of the government? What effect does § 105 of the Copyright Act have on the authorship and ownership of any copyrights that might otherwise exist in these technical manuals? Can the government contract around § 105 by requiring defense contractors in military defense contracts to assign virtually all of the contractor’s economic benefits from the technical manuals copyrights to the government? And, finally, if the government can contract around § 105, does this practice effectively defeat the statutory policy that government works not be copyrightable?

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## THE PROCESS OF GENERATING MILITARY TECHNICAL MANUALS

There are two primary types of contracts awarded by the DoD for the procurement of military equipment. The first type of contract is a “build-to-print” contract and essentially requires a defense contractor to manufacture equipment previously designed by the military. The second type of contract is a “design” contract where the defense contractor is required both to design the military equipment and then manufacture the military equipment in strict accordance with the completed design. Regardless of whether the defense contract is a “build-to-print” or a “design” contract, however, the DoD almost always requires the defense contractor to generate a complete package of reliability and maintainability (“RAM”) technical data for the military equipment being procured under the related DoD contract.<sup>1</sup> This RAM data includes information regarding the repairability of components and the estimated failure rate of each of these components. Once formulated, this RAM data becomes the primary database of information ultimately resulting in the technical manuals generated under the contract. Despite this reliance on the contractor for general expertise on the maintenance of the equipment, the military preserves its rights as the military expert in just how this maintenance information is incorporated into the military maintenance system.

The general process used to prepare a military technical manual requires the contractor to prepare the technical manuals in conformance with a host of standard military specifications. Once the particular type of technical manual is chosen (operation manual, maintenance manual, illustrated parts manual, or depot maintenance overhaul manual) the military specification related to that particular manual provides the general outline and scope of coverage for the manual. Other standard military specifications describe both the general writing style of the manual and where specific types of repair or maintenance operations should be performed within the military maintenance structure. Because the process used in the preparation of the technical manuals is important to the copyright questions examined by this article, a short description of this process follows.

*Type of Technical Manual.* Prior to award of a military procurement contract, government maintenance personnel examine the equipment to be procured and decide what type of maintenance manual should be prepared for the equipment. The type of technical manual chosen by the DoD will depend on the complexity and tools needed to perform specific maintenance actions

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1. Much of the Reliability and Maintainability (RAM) data generated by the contractor must track with another military publication, AMC-P 750-2, Maintenance of Supplies and Equipment, Guide to Reliability Centered Maintenance. Utilization of this guide by the contractor assists the contractor in coordinating the RAM data analysis for the specific equipment with the currently accepted military rationale and mission statements for the equipment depicted within the technical manual.

necessary for proper operation of the equipment. The type of manual selected defines the applicable military specification to be used in preparing the technical manual.

As a general rule, two types of technical manuals are selected for any one piece of military equipment. First, a combined “Operator and Maintenance” manual will be selected to provide military personnel with the information necessary to transport, install, operate, maintain, and repair the equipment.<sup>2</sup> A sample of a cover for an Operator and Maintenance technical manual is shown in Attachment A. Second, an accompanying “Repair Parts and Special Tools List” (“RPSTL”) manual will be selected to provide the maintenance technician with the data needed to order repair parts to keep the equipment mission-ready.<sup>3</sup> This RPSTL contains exploded technical illustrations of the equipment as well as detailed columnar parts listings which identify part nomenclature, part number, part quantities, part manufacturer, and DoD source/maintenance/recoverability (“SMR”) codes which tell the military technician which level of military maintenance level is authorized to repair or condemn the military equipment. A standard RPSTL illustration and repair parts listing is shown in Attachment B. The selection of parts included in the RPSTL is determined by the Maintenance Allocation Chart (see below) and the result of Logistic Support Analysis data.<sup>4</sup>

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2. See MIL-M-63036(TM); Manuals, Technical: Operator’s, Preparation of; See also MIL-M-63038(TM); Manuals, Technical: Unit or Aviation Unit, Direct Support or Aviation Intermediate, and General Support Maintenance, Requirements For. These documents are a multi-service set of requirements used to prepare technical manuals for all branches of the military service.

3. See MIL-STD-335(TM); Manuals, Technical: Repair Parts and Special Tools List. The RPSTL provides a detailed listing of each assembly, subassembly and component which makes up the equipment depicted in the technical manual. To assist the military maintenance technician in ordering the parts shown in the RPSTL, these parts are grouped together into a logical sequence which also tracks with the top assembly breakdown depicted within the MAC. Each of these logical groupings is then accompanied by a technical illustration showing every part of the equipment in exploded view artwork. Finally, each of these illustrations are accompanied by a detailed listings of the parts shown on each illustration. These part listings provide the technician with the proper nomenclature of the part, the number of parts used in that assembly, the part number of the part, the Contractor and Government Entity Code to identify the actual manufacturer of the part, the National Stock Number for the part, and finally, a Source, Maintenance and Recoverability code for each part which informs the military technician which military maintenance level is authorized to repair or replace that particular part, whether the part should be repaired or simply replaced, and whether the part is stocked within the military’s supply system.

4. See MIL-STD-1388-1; Logistic Support Analysis (LSA). See also MIL-STD-1388-2, Logistic Support Analysis Record (LSAR); MIL-STD-1561, Provisioning Procedures. In combination, these three documents provide a complete set of instructions for the contractor to use in analyzing the expected needs of the military in supporting the end item hardware with the necessary parts, tools and properly trained military maintenance technicians. The intent of these documents is to identify the failure rates and replacement rates expected to found under a variety

*Maintenance Allocation Chart.* After contract award to the contractor, the first technical data required of the contractor is the submission of a Maintenance Allocation Chart (“MAC”). A sample Maintenance Allocation Chart is shown in Attachment C. This MAC describes in detail exactly what type of maintenance function will be performed, the military maintenance level at which the action will be performed, the estimated time to perform each action, and the tools required to execute the maintenance action described.<sup>5</sup> Although the contractor initially provides this information, there are normally several iterative submissions wherein the contractor furnishes revised MAC’s to the military which then examines and revises the MAC as it sees fit and returns the MAC to the contractor for approval. Once approved, this MAC is the primary outline for all subsequent technical manuals and logistic support analysis data generated by the contractor.<sup>6</sup>

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of operational conditions. For example, if the end item equipment is to be used in desert operations and the equipment has a diesel engine to supply power to the equipment, a proper logistic support analysis would identify the need for more air filters and oil filters because the failure rates of these items would be high in desert conditions due to higher levels of sand contaminants. Or, if the equipment is to be used in arctic conditions, engine coolant rated for lower temperature must be identified to the military. Ultimately, proper logistic support analysis conducted under the guidelines of these three military documents is intended to provide the information the government needs to acquire the proper number of repair and replacement parts needed to keep the end item equipment mission-ready and then properly stage those parts throughout the world to support the end item equipment in any of the known mission environments.

5. DoD Data Item Description No. DI-L-7189; Maintenance Allocation Chart (MAC). This data item description is normally referenced within a DoD procurement contract and then annotated further within the contract’s “Technical Manual Statement of Work (SOW).” The standard text within this SOW as taken from DoD Invitation For Bid (IFB) DAAK01-94-B-0010 is as follows:

3.2 Maintenance Allocation Chart (MAC) . . . . The contractor shall prepare the initial MAC. Submittal shall be in hard copy in the format depicted in the following paragraph.

Following government approval, the final MAC shall also be used in the same format.

3.2.1 The MAC shall include all maintenance specific components, assemblies, subassemblies, and modules. No item will be deleted from the MAC unless the contractor is specifically authorized. If a maintenance function is a replacement function only for a repair part, the item shall not be listed in the MAC, unless listing the item would result in deletion of the Group Number.

3.2.2 The MAC shall be prepared in accordance with The Army Maintenance Management System (TAMS). The TAMS levels of maintenance are as follows: Unit Maintenance, Direct Support Maintenance, General Support Maintenance, and Depot Maintenance.

*Id.* Further information regarding criteria to be used by the defense contractor in determining military maintenance levels to select, repair versus discard criteria, and cost benefit analysis are also included in the standard DoD contract.

6. DoD Solicitation Number DAAK01-94-B-0010, Attachment 02, Technical Manual Statement of Work : “3.2.1.6.1 Maintenance Procedures. The contractor shall produce detailed

*Technical Manual Preparation.* After approval of the MAC, the contractor generates the actual technical manuals for the equipment. Although the contractor must follow military specifications in the general style and format of the technical manual, the detailed contents of each procedure are at the discretion of the contractor.<sup>7</sup> A typical military maintenance procedure is shown in Attachment D. As an example, while the MAC defines the need to replace an engine, and where in the manual the section for engine replacement is to be located, the actual step by step procedure for replacing the engine will be generated by the contractor. For instance, whether to remove the radiator in the first step or second step in the procedure is the choice of the contractor based upon the contractor's knowledge of the equipment. Additionally, the need for any technical illustrations and the placement of any technical illustrations within the text of the technical manual is generally at the discretion of the contractor.

It should be noted that while the contractor has discretion in choosing the sequencing of the steps in the maintenance procedure, the government furnishes military handbooks which contain suggested writing styles for the contractor to use in writing each step within the procedure.<sup>8</sup> Within these style handbooks, the military has shown a generic format for instructing the military technician in what tools to gather before commencing the maintenance procedure and what condition the equipment must be in before commencing with the maintenance procedure in the subject maintenance paragraph. While the government's handbooks are provided as so-called "guides," most data editors within the military system have become so accustomed to those styles that virtually all technical manual subcontractors must present their information in the style suggested by the handbook.

Once the contractor has completed a first draft of the technical manual, it is submitted to the military for review. The government will examine the technical manual for conformance to the military specifications and to the agreed upon MAC for the equipment. The military will also examine the format of the manual, including placement of text and illustrations, to determine if the technical manual is legible and understandable to the military

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maintenance procedures in the general format specified on pages 7/7 through 7/9 of MIL-HDBK-63038-1A, as authorized by the Maintenance Allocation Chart." *Id.*

7. *Id.*

8. See MIL-HDBK-63038-2 (TM), Technical Writing Style Guide and MIL-HDBK-63038-1A (TM), Technical Manual Writing Handbook. Together these two military handbooks provide general guidance for writing style, word usage, abbreviation, and suggested layout for integrating procedural text with related technical artwork and exploded illustrations. These handbooks are generally supplemented by additional formatting requirements within the individual contracts for the hardware. Those supplemental instructions include spaces to indent for each head and sidehead, numerical or alphabetical selections for primary and secondary sideheads and the maximum number of indentation levels allowable for sub-procedures and sub-sub-procedures.

maintenance technicians. Any comments by the government will be provided to the contractor for incorporation into the next draft of the technical manual. This process is usually repeated two or three times until the contractor and the military are satisfied that the technical manual accurately and completely defines any and all maintenance operations necessary to keep the related military equipment in proper operating status.

*Validation of Technical Manuals.* When a final draft of the technical manual is generated, a final process known as Technical Manual Validation occurs. In this process the government provides access to a military base where the equipment will be fielded and supported. A maintenance area is set up at the facility and the equipment is placed within this area. Military personnel who are typical of the primary maintenance technicians for the equipment are present and are given copies of the final draft of the technical manual and the tools that would normally be available to them for their maintenance actions. The military technicians are then simply told to operate the equipment and perform all maintenance procedures defined within the technical manual. If at any time a procedure is either confusing to the military technicians or is impossible to perform, the process stops while the contractor attempts to re-write the procedure to eliminate the problem. Once the problem is eliminated, the validation process is restarted and continues until another problem is discovered or the entire technical manual is completed.

*Preparation of Camera-Ready-Copy and Reproduction of the Technical Manuals.* Upon completion of the validation process, all corrections and revisions are made to the technical manual. Once these revisions have been completed, the contractor prepares a final version of the technical manual in what is known in the printing industry as Camera-Ready-Copy ("CRC"). This CRC is given to the military who then relays the CRC to the Government Printing Office ("GPO"). The GPO will then advertise for bids from printing contractors who eventually print the number of copies of the technical manuals needed by the military to support the equipment. These printed copies of the technical manual are sent back to the military by the printing contractor and the military command charged with fielding the equipment will overpack each unit of the equipment with the appropriate military technical manual. It should be noted that the standard defense contract provides that the military becomes the owner of both the CRC and all copies of the technical manual.

#### TREATMENT OF TECHNICAL RIGHTS WITHIN GOVERNMENT CONTRACTS

A standard military procurement contract is voluminous and contains a myriad of references to other provisions of the Federal Acquisition Regulations ("FAR") and the Army's supplement to the FAR known as the Defense Federal Acquisition Regulation Supplement ("DFARS"). Of primary interest to this article are those FAR and DFARS provisions that address the treatment of technical data rights within the context of government procurement

contracts.<sup>9</sup> This section will examine these provisions and how they might apply to copyright law.

*General Applicability of Copyright Laws to Government Contracts.* As a threshold comment it must be stated that copyright laws apply with full force to federal contracts. This is clear from government statutes that state any civilian data rights clauses “may not impair any right of the United States or of any contractor or subcontractor with respect to patents or copyrights or any other right in technical data otherwise established by law.”<sup>10</sup> When such technical data is developed by a contractor or subcontractor exclusively with federal funds, “the United States shall have unlimited rights to use the technical data pertaining to the item or process; or release or disclose the technical data to persons outside the government or permit the use of the technical data by such persons.”<sup>11</sup> However, despite the possible need by the government for this technical data, “a contractor or subcontractor. . . may not be required, as a condition of being responsive to a solicitation or as a condition for the award of a [government] contract to sell or otherwise relinquish to the United States any rights in technical data or to refrain from offering to use, or from using, an item or process which the contractor is entitled to restrict rights in data. . .”<sup>12</sup>

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9. In fact, there are arguments that the FAR (the general regulations which govern acquisitions by the United States Government) is incompatible with the Copyright Act. Provisions within the FAR actually prevent a contractor from even establishing his copyright in the work until such time as the government procuring officer allows the contractor to do so. In particular, 48 C.F.R. § 52.227-14(c)(1) reads in pertinent part:

Data first produced in the performance of this contract. Unless otherwise provided in paragraph (d) of this clause [which allows release only after government waives other controls over the data], the Contractor may establish, without prior approval of the Contracting Officer, claim to copyright subsisting in scientific and technical articles based on or containing data first produced in the performance of this contract and published in academic, technical or professional journals, symposia proceedings or similar works. *The prior, express written permission of the Contracting Officer is required to establish claim to copyright subsisting in all other data first produced in the performance of this contract.*

*Id.* (emphasis mine.)

These provisions are in direct contradiction to § 102 of the Copyright Act, which provides that copyright protection vests immediately upon fixation of copyrightable subject matter in a fixed medium of expression. The FAR, however, is supplemented by the DFARS (the general regulations which govern acquisitions by the Department of Defense) in military contracts and incorporates contract provisions that *do* properly recognize that an author establishes claim to copyright upon fixation of the work in a tangible medium of expression *without the need for prior government approval*. For a complete discussion of this issue see David A. Vogel, *Does the FAR Violate the Copyright Law?*, 33-SUM PROCUREMENT LAW 12 (1197).

10. 10 U.S.C. § 2320(a)(1) (2000).
11. 10 U.S.C. § 2320(a)(2)(A) (2000).
12. 10 U.S.C. § 2320(a)(2)(F) (2000).



Although the government may not require a contractor to give up any legal rights to technical data, the United States government does have the ability to acquire such rights from contractors. Under the Copyright Act of 1976 ("Copyright Act") the government may obtain copyrights transferred to it.<sup>13</sup> This issue has been addressed by case law and the United States is not precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise.<sup>14</sup> Additionally, there are provisions within the U.S. code which allow the government to provide funds for the procurement of such assignments and transfer of these rights in technical data.<sup>15</sup> Therefore, while the United States Government may not be able to obtain copyrights for any work it prepares directly, it has full authority to obtain any intellectual property rights by acquisition.<sup>16</sup>

*Applicable FAR and DFARS Provisions.* Several provisions of a military procurement contract address the rights in technical data that may be generated

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13. 17 U.S.C. § 105. Subject matter of copyright: United States Government works. Copyright protection under this title is not available for any work of the United States Government, but the United States Government is not precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise.

14. *Schnapper v. Foley*, 667 F.2d 102 (1981), *cert. den'd.* 455 U.S. 948 (1982). The author in *Schnapper* claimed that copyrights for writings he had prepared for a government funded broadcast on Public Broadcasting System (PBS) belonged to him. He argued that § 105 of the Copyright Act prohibited the government from owning copyrights. The court disagreed with the writer, however, and found that § 105 simply prohibited the government from obtaining *original* authorship in writings and did not prohibit the government from becoming the *owner* of copyrights by the assignment of those copyrights to the government by the original author.

15. 10 U.S.C. § 2386.

Copyrights, patents, designs, etc.; acquisition. Funds appropriated for military department available for making or procuring supplies may be used to acquire any of the following if the acquisition relates to supplies or processes produced or useful by or for, or useful to, that department:

- (1) Copyrights, patents, and applications for patents.
- (2) Licenses under copyrights, patents, and applications for patents.
- (3) Design and process data, technical data, and computer software.

*Id.*

16. While there is a general prohibition against the government obtaining original copyrights for government works, it should be noted that this prohibition is not all inclusive. In particular, 15 U.S.C. § 290e(a) states:

Notwithstanding the limitations contained in section 105 of Title 17, the Secretary [of Commerce] may secure copyright and renewal thereof on behalf of the United States as author or proprietor in all or any part of any standard reference data which he prepares or makes available under this chapter, and may authorize the reproduction and publication thereof by others.

*Id.* Additionally, the United States Government is authorized to obtain full copyrights in the design of all postage stamps issued by the United States Postal Service or any other work created by employees of the U.S. Postal Service. 15 U.S.C. § 290(e) (1976); H.R. Rep. No. 94-1476, at 60 (1978).

in the course of a military contract for equipment. For DoD contracts involving non-commercial items, the contract requires the contractor to grant a royalty-free license to the government in “technical data” pertaining to the equipment procured under the contract when such data is developed exclusively with government funds.<sup>17</sup> Within this context, the term “technical data” means data which may be copyrightable.<sup>18</sup> This license covers not only any technical data required for maintenance of the procured equipment, but the license also covers any computer software that may be developed in association with that equipment.<sup>19</sup> Additional provisions include a grant of a

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17. 48 C.F.R. § 252.227-7013(b) (1994):

Rights in technical data. The contractor grants or shall obtain for the government the following royalty-free, world-wide, non-exclusive, irrevocable license rights in technical data other than computer software documentation:

(1) Unlimited rights. The government shall have unlimited rights in technical data that are –

- (i) Data pertaining to an item, component, or process which has been or will be developed exclusively with government funds;
- (ii) Studies, analyses, test data, or similar data produced for this contract, when the study, analyses, test, or similar work was specified as an element of performance;
- (iii) Created exclusively with Government funds in the performance of a contract that does not require the development, manufacture, construction, or production of items, components, or where it could be offered for sale or sold on the commercial market, nor must the item, component, or process be actually reduced to practice within the meaning of Title 35 of the United States Code.

*Id.*

18. 48 C.F.R. § 227.7103-9 (1994).

(a) Copyright license.

(1) The clause at 252.227-7013, Rights in *Technical Data* —Noncommercial Items, requires a contractor to grant or obtain for the Government license rights which permit the Government to reproduce data, distribute copies of the data, publicly perform or display the data or, through the right to modify data, prepare derivative works. The extent to which the Government, and others acting on its behalf, may exercise these rights varies for each of the standard data rights licenses obtained under the clause . . . .

*Id.* (emphasis mine.)

19. 48 C.F.R. § 252.227-7018 (1994).

(1) Unlimited rights. The Government shall have unlimited rights in technical data, including computer software documentation, or computer software generated under this contract that are—

- (i) Form, fit, and function data;
- (ii) Necessary for installation, operation, maintenance, or training purposes (other than detailed manufacturing or process data);
- (iii) Corrections or changes to Government-furnished technical data or computer software;
- (iv) Otherwise publicly available or have been released or disclosed by the Contractor or a subcontractor without restrictions on further use, release or disclosure other than a release or disclosure resulting from the sale, transfer, or other assignment of interest in the technical data or computer software to another party or the sale or transfer of some or all of a business entity or its assets to another party;

license to the government for technical data *not* developed exclusively with federal funds, but which are nevertheless required to maintain the procured equipment.<sup>20</sup> Finally, in the event that the license provided for in the government contract is not sufficient for the government to meet all of its needs for technical data, there are contract provisions that allow the government procurement officer to negotiate new types of license agreements for the technical data required.<sup>21</sup> The overall impact of these standard rights to technical data provisions is to require the contractor to grant a wide-ranging license to the government for all copyrighted works and any other uncopyrightable technical data prepared by the contractor during the execution of the contract.

An important clause within these DFARS provisions defines which specific rights are to be mandatorily licensed to the government. This clause “requires a contractor to grant or obtain for the Government license rights which permit the Government to reproduce data, distribute copies of the data, publicly perform or display the data or, through the right to modify data, prepare derivative works.”<sup>22</sup> This clause is an obvious parallel to § 106 of the Copyright Act and expressly requires the contractor to grant a license to the government to exercise *all* of the exclusive rights reserved to the original owner of a copyright. Although other DFARS provisions permit the contractor to indicate restrictions on some of the government’s use of these exclusive § 106 rights,<sup>23</sup> the narrowness of these clauses and the number of instances when

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(v) Data or software in which the Government has acquired previously unlimited rights under another Government contract or through a specific license; . . .

*Id.*

20. 48 C.F.R. § 252.227-7018(2) (1994):

Limited rights. The Government shall have limited rights in technical data, that were not generated under this contract, pertain to items, components or processes developed exclusively at private expense, and are marked, in accordance with the marking instructions in paragraph (f)(1) of this clause, with the legend prescribed in paragraph (f)(2) of this clause.

*Id.*

21. 48 C.F.R. § 252.227-7018(5) (1994):

Specifically negotiated license rights. The standard license rights granted to the Government under paragraphs (b)(1) through (b)(4) of this clause may be modified by mutual agreement to provide such rights as the parties consider appropriate but shall not provide the Government lesser rights in technical data, including computer software documentation, than are enumerated in paragraph (a)(14) of this clause or lesser rights in computer software than are enumerated in paragraph (a)(17) of this clause. Any rights so negotiated shall be identified in a license agreement made part of this contract.

*Id.*

22. See *supra* note 16, for a discussion of 48 C.F.R. § 227.7103-9 (1994).

23. 48 C.F.R. § 227.7103-7 (1994):

Use and non-disclosure agreement. (a) Except as provided in paragraph (b) of this subsection, technical data or computer software delivered to the Government with

such restrictions are negated by the government still allows the government to have final approval of any attempted contractor restrictions.<sup>24</sup>

#### EXISTENCE OF COPYRIGHTS

Notwithstanding these contractual controls of any copyrights pertaining to a defense contract, there must in fact actually be a copyrightable work before these provisions are applicable. Therefore, the technical manuals must be examined to determine how they fit within the framework of the copyright laws.

*Subject Matter.* Any original work of authorship fixed in a tangible medium of expression will provide a basis for copyright protection.<sup>25</sup> This includes works which may be categorized as literary works.<sup>26</sup> In the case of the technical manuals generated for defense contracts, the extensive use of military specifications presents the question of whether there is any copyrightable expression at all in the manuals. The military specifications require specific types of fonts, heading designations, sub-heading designations, and appendices.<sup>27</sup> The overall margins of the technical manuals are also controlled by military specifications.<sup>28</sup> Any technical illustrations accompanying the text must also meet the military's specification regarding art quality and content.<sup>29</sup> There are even suggestions as to how to sequence the removal and installations steps within each maintenance procedure.<sup>30</sup>

However, despite these seemingly all-encompassing controls for the preparation of the technical manuals, there still remains enough expression within the manual to provide copyrightable subject matter. It is the contractor who makes the final determination on the actual need for any technical illustration and the actual placement of any technical illustration within the technical manual. The contents of the technical illustrations are also determined by the contractor as the contractor decides how best to depict the procedure described within the procedural text. Additionally, it is the contractor who decides exactly what procedural steps to include in the

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restrictions on use, modification, reproduction, release, performance, display, or disclosure may not be provided to third parties unless the intended recipient completes and signs the use and non-disclosure agreement at paragraph (c) of this subsection prior to release, or disclosure of the data.

*Id.*

24. 48 C.F.R. § 252.227-7025 (1994) (listings Limitations on the Use or Disclosure of Government-Furnished Information Marked with Restrictive Legends).

25. 17 U.S.C. § 102 (2000).

26. 17 U.S.C. § 102(a)(1) (2000).

27. MIL-M-63036. Manuals, Technical: Operator's, Preparation of.

28. MIL-M-38784. Manuals, Technical: General Style and Format.

29. MIL-HDBK-63038-1A(TM). Technical Manual Writing Handbook.

30. *Id.*

technical manual and where these steps will be placed. In essence, while the military specifications provide the “general” guidelines for the technical manual, it is the contractor who creates the final detailed arrangement of the information within the technical manual. Because this final arrangement of the technical manual contents is at the discretion of the contractor, the contractor contributes enough of his expression to the technical manual to warrant subject matter which will provide the contractor with copyrights.<sup>31</sup>

*Authorship.* Authorship of the technical manuals appears to present a problem. The contractor makes the final determination of the arrangement of the technical manual, but only on the first draft. After the contractor completes the first draft of the manual it is submitted to the military for review. Review comments from the military address the general outline of the technical manual, the deletion or inclusion of procedural steps, revisions to the technical illustrations, and sometimes even the actual placement of text or illustrations within the technical manual. It is worth noting that the government individuals who perform this review are given the civil service title of “Technical Writer.”

Under this scenario a strong argument could be made that the technical manual represents a “joint work” of the contractor and the government. Both parties make contributions to the technical manual with the intention that each contribution be merged into one whole work.<sup>32</sup> There is a conscious contemporaneous collaboration between the government and the contractor at the time the technical manual is created and there is intent that their individual efforts be combined into a unitary work.<sup>33</sup> The overall evidence of intent is a strong indicator that some type of joint authorship is intended.<sup>34</sup>

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31. *Feist Publications v. Rural Tel. Serv.*, 499 U.S. 340 (1991). In this case, the plaintiff accused the defendant of infringing his copyrights by copying all of the names and telephone numbers from the plaintiff’s phonebook directly into the defendant’s phonebook. The court found that the only copyrightable subject matter of the plaintiff’s phonebook was the layout used by the plaintiff in preparing his phonebook. The simple arrangement of the phone number listings in alphabetical order was not enough to sustain the plaintiff’s argument of copyrightable subject matter belonging to the plaintiff. The rule from this case is that the layout of the information within a writing may constitute copyrightable and protectable subject matter, even when the items which have been arranged in the layout are not copyrightable.

32. *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061, 1071-72 (7th Cir. 1994).

33. *Oddo v. Reis*, 743 F.2d 630 (9th Cir. 1984).

34. *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061, 1068-69 (7th Cir. 1994) (adopting *Childress v. Taylor*, 945 F.2d 500 (2d Cir. 1991) and noting that “reliance on collaboration alone . . . would be incompatible with the clear statutory mandate” that there be intent to create a joint work); *Design Options, Inc. v. BellePointe, Inc.*, 940 F. Supp. 86, 90 (S.D.N.Y.1996) (“[B]oth parties must have intended, at the time of creation, that the work be jointly owned.”); *Papa’s-June Music, Inc. v. McLean*, 921 F. Supp. 1154, 1157 (S.D.N.Y.1996) (“The requisite intent to create a joint work exists when the putative joint authors intend to regard themselves as joint authors [and][i]t is not enough that they intend to merge their contributions into one unitary work.”).

Notwithstanding this evidence, however, the contributions made by the government “technical writers” are in fact only editorial in nature. When government personnel make contributions to the technical manuals, they are normally in the form of comments regarding specific treatment of a maintenance function, failure to conform to a government specification on technical manual format, or general readability of the text. Any such deficiencies found by government personnel, especially if a rewrite is indicated, must be corrected by the contractor alone. Because such comments are “editorial” contributions, the individuals providing the comments will not be vested with “author” and can therefore not be considered as a joint author in a copyrighted work.<sup>35</sup>

Finally, the intent of the government’s technical writers and the contractor that their contributions be merged into a unitary whole is trumped by the terms of the DoD contract. These terms holds the contractor solely responsible for the preparation of the technical manuals regardless of how the manuals were prepared. Other clauses mentioned elsewhere in this article also point out the fact that the government requires the contractor to obtain the copyright in the works prepared pursuant to a DoD contract. These are strong indications by the government that it fully intends the contractor to be considered the sole author of the technical manuals.

A problem also arises with the requirement that, in a joint work, the contribution of each author must itself be copyrightable so that each has contributed something which can be protected under the law.<sup>36</sup> The Copyright Act prohibits copyright protection for government works and any contribution made by the government in the creation of the final version of the technical manual is not copyrightable.<sup>37</sup> Therefore, even if the government’s “technical writer” is somehow deemed to be an “author” who makes copyrightable

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35. *Thomson v. Larson*, 147 F.3d 195 (1998):

While the Copyright Act states only that co-authors must intend that their contributions “be merged into . . . a unitary whole,” in *Childress [v. Taylor]*, 945 F.2d 500 (2d Cir. 1991)], Judge Newman explained why a more stringent inquiry than the statutory language would seem to suggest is required:

‘[A]n inquiry so limited would extend joint author status to many persons who are not likely to have been within the contemplation of Congress. For example, a writer frequently works with an editor who makes numerous useful revisions to the first draft, some of which will consist of additions of copyrightable expression. Both intend their contributions to be merged into inseparable parts of a unitary whole, yet very few editors and even fewer writers would expect the editor to be accorded the status of joint author, enjoying an undivided half interest in the copyright in the published work.’

*Id.* (emphasis added).

36. *Erickson*, 13 F.3d at 1071-72 (attributing this test to Paul Goldstein, Copyright: Principles, Law, and Practice § 4.2.1.2 at 379 (1989)).

37. 17 U.S.C. § 105 (2000).

contributions to the technical manuals, the contractor is still the only statutorily allowable author of copyrightable expression in the technical manual. As such the contractor is the sole author and the technical manual is not a joint work.

*Work for Hire.* Because the technical manuals are prepared under the authorization of a defense procurement contract, there is the possibility that the technical manual could be construed as a “work for hire.” There are two sets of conditions wherein a work may fall into this category. First, a work for hire may simply be any “work prepared by an employee within the scope of his employment.”<sup>38</sup> Second, a work for hire may also be a “commissioned work” specially ordered or commissioned under a written agreement for use, among other things, as an instructional text.<sup>39</sup> While the contractor is obviously not a direct employee of the government, at first glance it seems there is sufficient evidence that the technical manuals are prepared under a written agreement that specially ordered or commissioned the preparation of the technical manuals. Under case law, the contractor easily qualifies as an independent contractor.<sup>40</sup> However, the technical manuals do not fall within the list of works which may be classified as works for hire.<sup>41</sup> While the technical manuals do in fact provide instructions for the maintenance of equipment, they do not meet the definition of “instructional text” because it was not “prepared for publication and with the purpose of use in systematic instructional activities.”<sup>42</sup> The technical manuals prepared by the contractor are thus not works for hire and they do not fit the statutory classification as a commissioned work.

From the above discussion two things are clear. First, there is copyrightable subject matter contained within the military technical manuals prepared by defense contractors. Second, the circumstances surrounding the preparation of the technical manuals reveal the defense contractor to be the sole author and owner of any and all copyrights for this copyrightable subject matter.

#### CONTRACTING AROUND § 105 OF THE COPYRIGHT ACT

As described above, there are a number of provisions within a standard military defense contract that attempt to address the issue of copyright protection and licensing. When the contract involves the procurement of technical data in conjunction with a piece of non-commercial military equipment, the defense contractor, through its agreement to the standard FAR and DFARS provisions within the contract, grants the government a license to

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38. 17 U.S.C. § 101 (2000).

39. *Id.*

40. *Cnty for Creative Non-Violence v. Reid*, 490 U.S. 730 (1989).

41. 17 U.S.C. § 101 (2000).

42. *Id.*

use the contractor's copyrightable matter in virtually any way the government sees fit to use it. While the license granted to the government under these contract provisions is non-exclusive, the omnipresence of the government and its world-wide distribution of the technical data prepared by the contractor effectively precludes the contractor from obtaining any economic benefit from the ownership of his copyrighted work. It is difficult for the contractor to attempt to sell a military technical manual when a letter to the government invoking the Freedom of Information Act will result in the distribution of the technical manual to anyone who wishes to take the time to write the letter and pay the government's printing costs.

*Statutory Policy for Excluding Government Works of Copyright.* When Congress enacted the Copyright Act, it considered the need to grant copyright protection to government works. Congress first prohibited copyright protection for printing of judicial opinions in 1885 and in government publications by the Printing Law of 1895.<sup>43</sup> A further enforcement of this prohibition was later included in the Copyright Act of 1909 which stated "No copyright shall subsist. . . in any publication of the United State Government, or any reprint, in whole or in part, thereof."<sup>44</sup> Any concern over the definition of the word "publication" was put to rest when in the Copyright Act of 1976 that word was replaced by the all-encompassing word "work."<sup>45</sup> Thus, this new version of § 105 now includes all official records and documents of the United States Government, non-published as well as published works.<sup>46</sup> The 1976 Act further defined a work of the United States Government as "a work prepared by an officer or employee of the United States Government as part of that person's official duties."<sup>47</sup>

The legislative history of § 105 of the Copyright Act also provides a clue as to the purpose of that section as it applies to works prepared by government contractors. The House Report clearly indicates that § 105 "deliberately avoids making any sort of outright, unqualified prohibition against copyright in works prepared under Government contract or grant."<sup>48</sup> However, that same House Report also expressed concern that allowing contractors to copyright federally commissioned works might be contrary to public interest.<sup>49</sup> The

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43. Printing Law of 1895, ch. 23 & 52, 28 Stat. 601, 608 (1895).

44. 17 U.S.C. § 8 (Supp. III 1946).

45. 17 U.S.C. § 105.

46. MELVILLE NIMMER, THE LAW OF COPYRIGHTS § 5.06 at 5-50 (1978).

47. 17 U.S.C. § 101.

48. See H.R. REP. NO. 1476, 94<sup>th</sup> Cong., 2d Sess. 60 (1976) [hereinafter 1976 House Report].

49. *Id.* at 59:

There well may be cases where it would be in the public interest to deny copyright in the writings generated by Government research contracts and the like; it can be assumed that, where a government agency commissions a work for its own use merely as an alternative



primary danger recognized in these comments is that the government will enable contractors, by exercising their copyright powers, to prevent access to federally commissioned works which might best belong in the public domain. Despite these concerns, however, Congress continues to allow contractors to copyright works prepared under authority of government contracts.

*Copyright Clause Policy.* While government contractors may be allowed to copyright works produced under government contracts, the government is still prohibited from obtaining copyrights on the works *it alone* produces. This comports with the objectives of the Copyright Clause of the Constitution which balances the incentives to produce works of artistic and intellectual value with need to provide eventual access to these works by the public. It would be contradictory to require the government to *promote* access to these works and then allow the government itself to obtain a copyright on a work which would allow the government to *restrict* such access to a work.

As a counter to this argument, the government might argue that some copyright procurements may be “proprietary” in nature rather than “governmental.” Generally, when the government is performing a function which is *required* to be performed by the government in the interest of the general public, the government acts in its “governmental” capacity. However, when the government performs functions at the *discretion* of the government, the government is operating in a “proprietary” manner and can be primarily classified as a “business” interest. Thus, if the government procures copyrights to technical manuals related to the operation of public airport equipment, federally operated hospitals, or any other area in which the government is generally competing in an area which can be classified as “business,” the government may argue that the policy requiring public access to such works should be discarded to allow the government to protect its competitive position as a “business” entity.<sup>50</sup>

This is not the case, however, in copyrighted works procured under DoD contracts. A fundamental duty of the U.S. Government is to protect and defend the people of the United States and this can only be construed as a “governmental” function. Absent an overriding national security interest, even the DoD procured copyrighted works from defense contractors should be placed within the public domain.

The § 105 prohibition against the government’s ability to copyright its works prevents the government from acting in any of these contradictory manners. To determine the DoD’s conformance to this policy, we must closely

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to having one of its own employees prepare the work, the right to secure a private copyright would be withheld.

*Id.*

50. See, e.g., Marvin J. Nodiff, *Copyrightability of Works of the Federal Government and State Governments Under the 1976 Copyright Act*, 29 ST. LOUIS U. L.J. 91(1984).

examine the government's contract provisions that appear to *require* a government defense contractor to provide what is tantamount to full benefit from the copyrights in the works commissioned by the government under defense contracts.

*Applicability of Contractual Limitations on Statutory and Constitutional Policy.* Despite both the statutory and Constitutional policies which prevent the government from obtaining copyright on its works, the defense contract provisions work to actually limit these policies. First, DFARS provisions allow the defense contractor to obtain copyrights on its works prepared under the defense contract. Second, the defense contract then *requires* that contractor to obtain copyrights on these works. Third, once these copyrights are obtained, the contractor *must* provide the government a non-exclusive, world-wide, royalty-free, irrevocable license to the government. Issuance of this mandatory license grants the government the "right to reproduce data, distribute copies of the data, publicly perform or display the data or, through the right to modify data, prepare derivative works."<sup>51</sup> While the contractor technically retains its right to exclude anyone other than the government from participating in these activities, even a cursory examination of such a license will compel even the casual observer to conclude that virtually all economic benefit of the copyright has been shifted to the government and that the contractor is left with an empty copyright. The copyright protection power left to the contractor is equivalent to having a 12 gauge shotgun without any shells; i.e., de jure power with de facto helplessness.

*Statutory Construction and the Preemptive Effect of the Copyright Clause on Federal Contract Clauses.* A final issue that must be addressed is the preemptive effect of the Copyright Clause on the United States Government's attempt to contract around the Copyright Statutes. The provisions of the Copyright Act enacted pursuant to the Copyright Clause are contained within the United States Code. The contractual clauses described in the DFARS are also taken directly from the United States Code. When taken at face value there is no direct contradiction between any of the statutes within the code for either of these subject matters. However, while a facial attack on the DFARS code may not prove sustainable, there is a strong argument that, as applied, the DFARS code is constitutionally incompatible with the Copyright Clause of the Constitution.

The DFARS section of the United States Code addresses the mechanism by which the government can obtain copyrights by assignment, transfer, or by license. These methods of obtaining copyrights by the government are in conformance with Constitution and § 105 of the Copyright Act. Properly combined, a selected set of DFARS clauses would result in the proper procurement of copyrights from the original copyright owner. If the DFARS

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51. 48 C.F.R. § 227.7103-9 (1994).

provisions were used in this manner there would be no problem. This is not the case, however. Rather than utilization of these DFARS clauses in the general procurement of copyrights for the government, the DoD selects a combination of DFARS clauses *requiring* mandatory licensing and then incorporates these clauses into *all* government defense contracts. Of equal importance is the fact that any potential government contractor who wishes to bid on such a defense contract will have their bid deemed “non-responsive” if the contractor attempts to remove or limit the DFARS clauses requiring the contractor to allow the government to exercise virtually all of the copyrights originally vested in the defense contractor as the copyright holder. This is essentially a coercion contract.

The combination of the DFARS clauses within defense contracts acts to essentially deprive the proper statutory copyright owner of virtually all the economic power given to the copyright owner pursuant to the Copyright Act. Because the paramount purpose of the Copyright Clause is to promote the Arts by providing economic incentives to potential copyright owners, compulsory licensing of these economic interests to the government is in direct contradiction to that purpose. What economic incentive is there for the potential author of a copyrightable work if he knows that upon completion of the work, all practical economic interests in the work must be given to another party? Therefore, despite the constitutionality of the individual DFARS clauses, the combination of DFARS clauses selected by the DoD, and the DoD practice of including these clauses in all DoD procurement contracts, contravenes purpose of the Copyright Clause and the legislative intent of the Copyright Act.

#### CONCLUSION

Who owns the copyrights to the technical manuals prepared by contractors under government defense contracts? The Contractors own these copyrights. However, when it comes to the question of who most benefits from these copyrights, the answer must be the United States Government.

Who *should* own the copyrights to these technical manuals? In all likelihood, nobody should own these copyrights.<sup>52</sup> Defense contractors are well paid for generating the technical manuals for the military. These contractors are also well aware from the outset that the government will reproduce and distribute these technical manuals on a world-wide basis. It would be virtually impossible to prevent others from reproducing and distributing these same technical manuals because, with few exceptions, third

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52. For a discussion regarding the need to prohibit any federally commissioned work from being copyrighted by the independent contractor who creates the work, see Andrea Simon, *A Constitutional Analysis of Copyrighting Government Commissioned Work*, 84 COLUM. L. REV. 425 (1984).

parties may freely obtain these manuals directly from the government. Due to the limited need of military technical manuals by non-governmental agencies, once these potential commercial customers obtain manuals from the government, any market left for commercial sale of these manuals disappears.

However, despite these considerations, the government should also not be the owner of any copyrights to these technical manuals.<sup>53</sup> The DoD purchases these manuals using tax dollars collected from the people of the United States and, under a doctrine of public sponsorship, should belong to U.S. citizens.<sup>54</sup> In many cases the technical data incorporated into these technical manuals is extremely useful to non-defense industry related businesses. With the exception of preventing release of technical information that poses a serious threat to our national security, this information should be made accessible to the public by placing these technical manuals into the public domain. In honor of the Copyright Clause, the very usability of the technical information depicted within military technical manuals dictates the need to allow these technical manuals to be free for any United States citizen to use.

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53. There are also additional arguments that § 105 should apply to *any* government entity, federal, state, or local and that these government entities should not be allowed to obtain copyrights in their own works, whether created by the governments themselves or through contractors to those governments. For a more complete discussion of this issue, see Nodiff, *supra* note 50.

54. This concept of public ownership gave rise to the Printing Law of 1895, ch. 23, 28 Stat. 601 (amended 1976), the first statute to prohibit copyrighting of government publications.

ATTACHMENT A

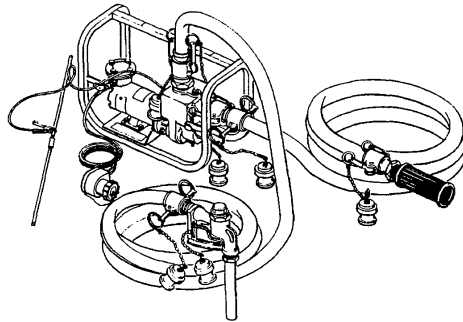
TM1 0-4320-347-1 3&P

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TECHNICAL MANUAL

OPERATOR'S, UNIT, AND DIRECT  
SUPPORT MAINTENANCE MANUAL  
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS

PUMPING UNIT, 35 GPM,  
CENTRIFUGAL, GUEL TRANSFER  
24 VDC MOTOR DRIVEN  
MODEL FB 4320-35  
NSN 4320-01-386-5913



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*Distribution statement A.* Approved for public release; distribution is unlimited.

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27 OCTOBER 1994

HEADQUARTERS, DEPARTMENT OF THE ARMY

*Typical Cover for a Military Technical Maintenance Manual*

ATTACHMENT A

TM10-4320-347-13&P

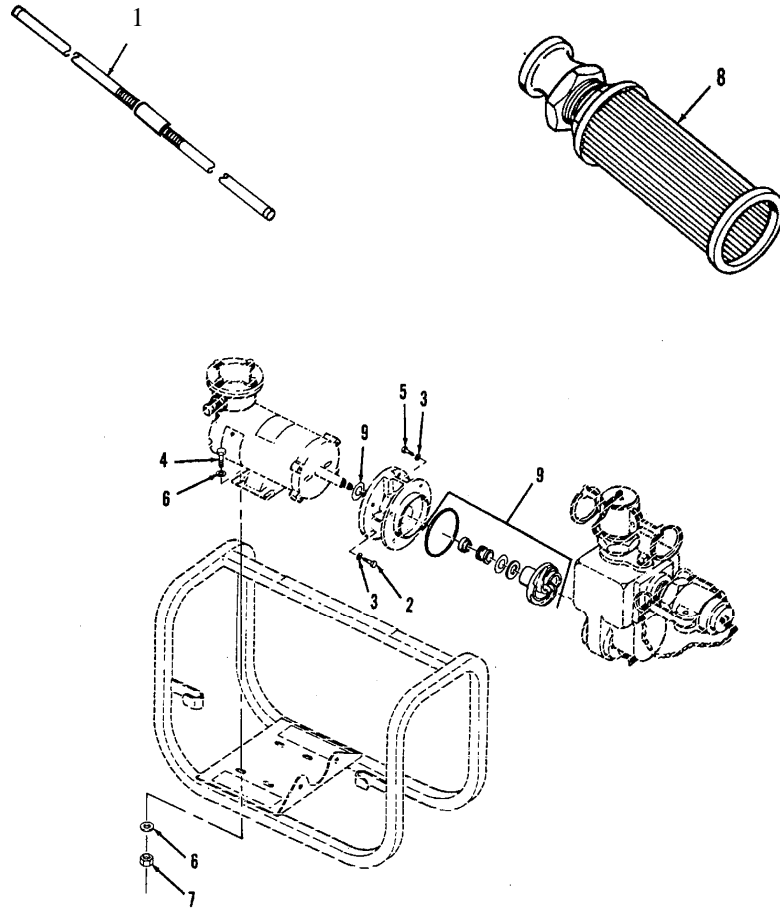


Figure C-1. Pumping Assembly.

(C-9 Blank) / C-10

*Typical Repair Parts and Special Tools List Illustration and Repair Parts Listing*

ATTACHMENT B

SECTION II

TM10-4320-347-13&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 00 PUMPING ASSEMBLY	
				FIG. C-1. PUMPING ASSEMBLY	
1	PAOZZ	40151	FB550-5	ROD, GROUND .....	1
2	PAOZZ	39428	91247A624	CAPSCREW, HEX HEAD .....	4
3	PAOZZ	96906	MS51415-7	WASHER, LOCK .....	8
4	PAOZZ	39428	91247A628	CAPSCREW, HEX HEAD .....	4
5	PAOZZ	39428	91247A581	CAPSCREW, HEX HEAD .....	4
6	PAOZZ	88044	AN960-516	WASHER, FLAT .....	8
7	PAOZZ	96906	MS17829-5C	NUT, SELF LOCKING, HEX .....	4
8	PAOZZ	40151	FBS-108	STRAINER, SUCTION .....	1
9	PDFZZ	40151	FBK-1	PUMP SEAL REPAIR KIT .....	1
				KIT CONSISTS OF:	
		P3397	10190	• PREFORMED PACKING .....	1
		62709	W105-7V	• SHAFT, SEAL, PUMP .....	1
		40151	FB3238	• SHIM SET .....	1
		10190	P3241	• SLINGER .....	1
				END OF FIGURE	

*Typical Repair Parts and Special Tools List Illustration and Repair Parts Listing*

ATTACHMENT C

TM10-4320-347-13&P

Section II. MAINTENANCE ALLOCATION CHART  
FOR  
PUMP UNIT, 35 GPM, CENTRIFUGAL

(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS & EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
00	PUMPING ASSEMBLY								
01	HOSE ASSEMBLIES SUCTION AND DISCHARGE	Inspect Replace Repair	0.1 0.1 0.1						
02	NOZZLE ASSEMBLY	Inspect Replace Repair	0.1 0.1	2.0			1	A, B	
03	GROUNDING CABLE	Inspect Replace Repair	0.1 0.1	0.2			1	B	
04	PUMP ASSEMBLY	Inspect Replace Repair	0.2		1.5 0.5		1 1	B	
05	MOTOR ASSEMBLY	Inspect Replace	0.2		1.5		1	A	
06	SLAVE CABLE	Inspect Replace Repair	0.1	0.5 0.5			1 1	B	
07	FRAME ASSEMBLY	Inspect Replace Repair	0.1	1.5	2.5			C	

*Typical Military Maintenance Allocation Chart*



ATTACHMENT C

TM10-4320-347-13&P

Section III. SPECIAL TOOLS AND TEST EQUIPMENT REQUIREMENTS

(1) REFERENCE TOOL CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL / AUTO STOCK NUMBER	(8) TOOL NUMBER
1	0	Standard tools and test equipment contained in the following kit are adequate to perform the maintenance functions listed in Section II.  Tool Kit, General Mechanic's	5180-00-177-7033	SC 5180-90-CL-N26 (19099)

Section IV. REMARKS

REFERENCE CODE	REMARKS
A	Adjust to specifications
B	Repair is limited to the replacement of components found defective during inspection.
C	Weld and straighten in accordance with TM 9-237, Operator 28 Manual, Welding Theory and Application. Rev. June 1991

*Typical Military Maintenance Allocation Chart*

## ATTACHMENT D

## TM10-4320-347-13&amp;P

5.6. PUMP ASSEMBLY REPLACEMENT AND REPAIR

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This Task Covers:

a. Removal b. Disassembly c. Clean d. Inspection e. Repair f. Assembly g. Replacement

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Initial Setup:

Tools Required

Tool Kit, General Mechanic's (Appendix B, Item 1)

Material's Required

Solvent, Dry Cleaning (Appendix E, Item 1)  
Brush, Medium Bristle (Appendix B, Item 1)  
Cloth, Lint Free (Appendix E, Item 3)  
Tape, Anti-seize (Appendix E, Item 4)  
Preformed Packing (Appendix H, Item 5)  
Seal Element (Appendix H, Item 6)  
Shim Set (Appendix H, Item 7)  
Slinger (Appendix H, Item 8)

Equipment Condition

Pump assembly shut down and cool.

## WARNING

Death or serious injury could occur if fuel is not handled carefully. Use in a well-ventilated area away from open flame, arcing equipment, ignition sources, heaters, or excessive heat. Use proper marked containers. DO NOT SMOKE.

Fuel drained from system (see para. 2.12.).  
Slave receptacle disconnected from 24 volt power source.  
Pump and motor assembly removed from frame (see paragraph 4.8.).

---

a. Removal. (Refer to Figure 5-1).

- (1) Remove four bolts (1) and four lock washers (2) from pump side housing (3).
- (2) Remove pump housing (4) from pump side housing (3).
- (3) Remove preformed packing (5) from pump side housing (3).

## NOTE

Do not damage vane tips during removal.

- (4) Loosen and remove impeller (6) by striking it along the periphery in a counter-clockwise manner and remove shims (7) and (8).
- (5) Remove two bolts (12), two lock washers (13), pump side housing (3), rotating portion of seal element (9), and non-rotating portion of seal element (10) from shaft of motor (11).
- (6) Remove slinger (14) from motor (11).

*Typical Military Style Maintenance Procedure*

(Page 1 of 2)

ATTACHMENT D

TM10-4320-347-13&P

a. Disassembly. (Refer to Figure 5-2).

- (1) Remove dust cap (1), gasket (2), and coupling half (3) from pump (4).
- (2) Remove dust plug (5), gasket (6), coupling half (7), and pipe nipple (8) from pump (4).
- (3) Remove drain cock (9) from pump (4).

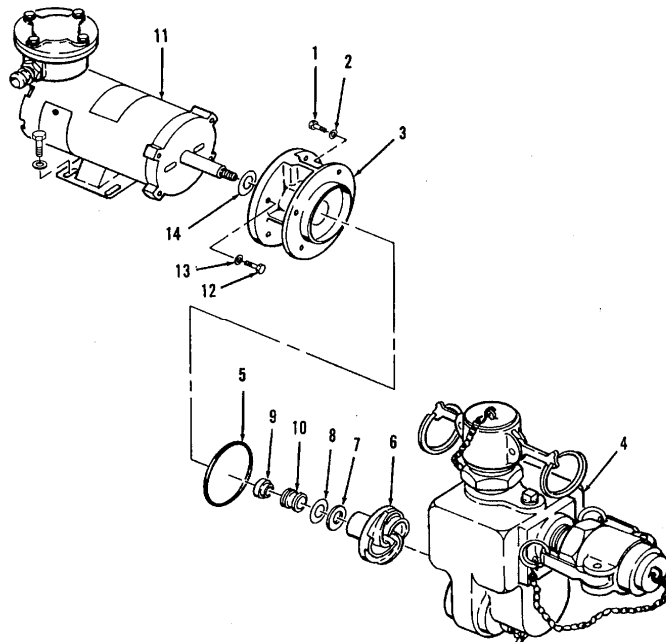


Figure 5-1. Pump Assembly Replacement.

*Typical Military Style Maintenance Procedure*

(Page 2 of 2)