

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY MATERIEL COMMAND
5001 EISENHOWER AVENUE, ALEXANDRIA, VA 22333-0001

AMC REGULATION
No. 700-107

3 February 2003

Logistics
PREPARATION OF STANDING OPERATING PROCEDURES
(SOP) FOR AMMUNITION OPERATIONS

Supplementation of this regulation is prohibited unless prior approval obtained from
Commander, U. S. Army Materiel Command, ATTN: AMCOPS-SCL.

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*This regulation supersedes AMC-R 700-107, 8 May 1992.

1. Purpose. This regulation prescribes policies and responsibilities for preparation of standing operating procedures (SOP) for ammunition operations. The purpose of an SOP is to provide clear, concise guidance to operating personnel and to aid in the training of operators.
2. Scope. This regulation applies to all U. S. Army Materiel Command (AMC) major subordinate commands (MSC), including subordinate installations and activities that perform the ammunition operations.
3. Policy.
 - a. SOPs will be prepared for all ammunition operations.
 - b. Operations covered by this regulation include: transportation, receipt, storage, issue, maintenance, preservation and packaging, demilitarization, disposal, target and accuracy (T&A) firing testing, stockpile reliability testing, inspection, and surveillance, involving conventional ammunition and explosives, large rockets, guided missiles, toxic chemical munitions and bulk agents, and ammunition containing radioactive materials or components. Also included are Research, Development, Test & Evaluation (RDT&E) SOPs developed for ammunition operations. However for these operations (RDT&E), format and external review requirements of this regulation are not mandatory, but should have external review within their Chain of Command.
 - c. This regulation is to be followed in addition to any other broad guidance that is written in other regulations regarding SOP writing, contents, and format. Other stated requirements for SOP development do not supercede the requirement to follow this regulation as stated.
 - d. This regulation does not apply to:
 - (1) chemical demilitarization operations conducted by the Program Manager for Chemical Demilitarization (PMCD);
 - (2) laboratory operations involving research chemical agents at AMC facilities, if conducted in accordance with accepted laboratory practices."
 - e. Administrative procedures are excluded from the scope of this regulation. Ammunition related operations involving inert or non-hazardous materials are also excluded; however, the preparation of SOPs for such operations is encouraged, particularly where quality characteristics must be maintained and for personnel safety.
 - f. Routine repetitive depot type operations such as transportation or demilitarization that support research and development operations will be documented and reviewed per all provisions of this regulation.
 - g. SOPs for load-assemble-pack (LAP), manufacturing, and contractor-owned contractor-operated operations are required. It is recommended that they be prepared per the guidelines of this regulation. However, for these operations, format and external review requirements of this regulation are not mandatory.
 - h. SOPs prepared prior to the effective date of this regulation will not be rewritten solely to comply with provisions of this regulation. SOPs will be rewritten in prescribed format at the

time of the next revision.

i. SOPs will be clear, concise, and specific. SOPs will be prepared in language understandable to the personnel required to use them.

j. Specific operational, safety, and quality control requirements will be included at the step in the SOP to which they apply. General safety requirements that apply to more than one operation may be listed once at the forward portion of the SOP. Quality assurance (QA) provisions may be included in the operational SOP, or in a separate SOP. If QA provisions are provided in a separate SOP, the separate SOP will reference the operational SOP and vice versa.

k. Hazard analyses as outlined in Appendix I are required to support the development of SOPs. Hazard analyses will be performed for, and documents will be included with, all new and revised statements of work type documents, i.e., Depot Maintenance Work Requirements (DMWR), Maintenance Work Order (MWO), Letter of Instruction (LOI), and Special Surveillance Instruction (SSI). A major function of the hazard analysis is to provide the decision-makers with an assessment of the identified hazards, proposed controls, and rationale for acceptance or rejection of any residual risk. The analysis should be used as a management tool for making risk management decisions and allocating available resources for maximum benefit. The analysis will be used to develop the SOP. A copy of the hazard analysis will be filed with a copy of the SOP in the office of record of the SOP (block 5 SOP cover sheet) to assure it is available to support revisions to procedures or equipment and in development of analyses for similar items.

l. New SOPs will be validated at the installation prior to final SOP approval by use of a pilot run for conventional operations. The purpose of this validation is to verify that the instructions in the SOP are clear to the operators and that the execution of the steps in the SOP create no conditions that would constitute an unacceptable risk to the health or safety of personnel or to the environment. The introduction of these new SOPs should be divided into three phases:

Phase 1 – Conduct a pilot run using dummy/inert ammunition, if available. During this phase, the SOP should be read aloud by the operation supervisor, one step at a time, while an operator attempts to perform each step exactly as read. Any problems encountered should be noted at this time for correction before the start of the actual operation. A representative of the installation safety office as well as any other appropriate offices (e.g., ammunition planning, environmental, quality assurance, surety, operating supervisor, etc.) will observe the pilot run.

Phase 2 - Change SOP based on findings during phase 1 and obtain final local approval.

Phase 3 - Supervisors and operators of each shift will become familiar with the SOP and sign supervisor's/operator's statements when thoroughly familiar with SOP instructions. Gradually initiate live operations for each shift under close supervision at a limited production rate and build to the desired production rate.

4. Responsibilities.

- a. The commanders of each AMC MSC and installation are responsible for implementing this regulation at installations and activities under their command.
- b. Each employee and supervisor is responsible for complying with SOPs as written and approved. Deviations are not approved without formal staffing per paragraph 5.
- c. The DAC is responsible for conducting explosive safety reviews of all new or revised SOPs except those applicable to toxic chemical munitions (TCM).

5. Procedures.

- a. SOPs provide clear concise guidance for operating personnel and implement the conclusions of locally performed hazard analyses.
- b. Hazard analyses (and resulting SOPs) will address start-up, shutdown, maintenance, and emergency operations in addition to steady state operations. Preparing organization will file copies of local hazard analyses with the original SOP in the office of the organization responsible for preparation of the SOP. Any proposed operational change would require re-assessment of the hazard analysis.
- c. Installations and activities must have a uniform process for development and approval of SOPs. Offices of review include, but are not limited to: Ammunition Operations, Senior Quality Assurance Specialist (Ammunition surveillance), Safety Office, Environmental Office, Chemical Surety/Radiological Protection Offices (where appropriate), Industrial Hygiene or Medical Offices. Different organizations may have different, but equivalent structures.
- d. A pilot run, witnessed and validated by the organizational elements charged with reviewing SOPs, is a prerequisite for approval of an SOP. The pilot run is to confirm that the SOP can be safely exercised as written, that it matches the workplace, tools, and equipment, and that operators comprehend the instructions in the SOP.
- e. Operations that are highly similar may be part of a single SOP. Similarity of hazard (characteristics of materials involved, similarity of means and ease of initiation, consequences of functioning) determines which items may be combined in an SOP for an operating line or similar operation.
- f. An SOP must contain the following essential elements:
 - (1) An appropriate coversheet or title page identifying the Installation or activity, covered munitions or explosives, descriptive operation title, unique SOP number, and date of latest version. Installations will use the Standardized Numbering System in Appendix H.
 - (2) A place for supervisors and operators to sign indicates that they understand the SOP and will comply with its requirements.
 - (3) If more than five distinct operational steps or stages, an index of these steps or stages.
 - (4) A place to summarize any significant warnings, notices, or other special requirements that are either generally applicable throughout the SOP, or are of such importance

they must appear both in this special requirements section and in the appropriate steps. These special requirements may pertain to accountability, safety, quality, or any other pertinent topic.

(5) Operational procedures to complete each step in the described process. As the source of guidance to operators, SOPs should contain the specific, step-by-step guidance necessary to complete a task, including start-up, shutdown, maintenance, and emergency situations, as well as steady state operations. Photographs are often important adjuncts to clarify written instructions (particularly when operators are advised to look for a particular configuration or condition). The language throughout the SOP must reflect the needs of the operators. The key to content determination is the ability of the operators to rapidly and clearly grasp the intended information.

(6) A line layout, Appendix E, for comprehension of the flow of materials or other significant factors. Functions such as open burning may require inclusion of a site plan for clarity.

g. Active SOPs require review and revision as follows:

(1) Demilitarization/disposal SOPs require review and concurrence annually by all signatories. Toxic Chemical SOPs require an annual review by the proponent and installation safety manager.

(2) Other active SOPs require review every 2 years, by the organization performing the work and the Safety Office.

(3) Preparation of an inactive SOP for use requires the same approval process as a new SOP, unless operations fluctuate regularly (e.g. every quarter) between active and inactive.

(4) Page-for-Page changes are acceptable until approximately one-third of the SOP has been changed. At this point installations will re-write the SOP. Page changes must correspond to a change in the cover sheet that references the changes (as changed, added, deleted or re-written). Changed portions of text (short of total revision) require identification by bars in the page margin or other highlighting technique. Changes/revisions require the same approval as re-write of SOP.

h. Following final approval at the installation toxic chemical munitions (TCM) SOPs will be submitted for review to Headquarters, SBCCOM, AMSSB-OSM, if/as directed. All other SOPs (including revisions) will be submitted for review to DAC, using the Summary Sheet in Appendix G.

6. References.

- a. AR 385-64, Safety, Ammunition and Explosives Safety Standards
- b. DA PAM 385-64, Safety, Ammunition and Explosives Safety Standards
- c. AR 385-61 Safety, Toxic Chemical Agent Safety Program
- d. DA PAM 385-61, Toxic Chemical Agent Safety Standards
- e. AR 385-10, Safety, The Army Safety Program
- f. AMC-R 385-100, Safety Manual.

- g. AMC-R 755-8, Authorizing, Accomplishing, and Reporting Demilitarization of Class V Materiel.
- h. AMC Supplement 1 to AR 385-16, System Safety Engineering and Management.
- i. DOD 4145.26-M, DOD Contractors Safety Manual for Ammunition and Explosives.

The proponent of this regulation is the United States Army Materiel Command. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to the Commander, HQ AMC, ATTN: AMCOPS-SCL, 5001 Eisenhower Avenue, Alexandria, VA 22333-0001.

FOR THE COMMANDER:

OFFICIAL:

//signed by//
RICHARD A. HACK
Lieutenant General, USA
Deputy Commanding General

DENNIS A. DAVIS
Chief, Business Management
Division

DISTRIBUTION:
H, B

Sample

APPENDIX A

INSTRUCTIONS FOR PREPARATION OF SOP COVER SHEET, SUPERVISOR'S STATEMENT, AND OPERATOR'S STATEMENT

1. The SOP cover sheet is illustrated in figure A-1. Information applicable to each numbered line not listed below is considered self-explanatory.

a. 1--Installation. Insert the name of the installation.

b. 2--Item. Indicate the appropriate information as follows:

(1) Complete nomenclature. Standard Catalog Nomenclature should be used.

(2) Department of Defense Ammunition Code, (DODAC).

(3) Hazard Classification, packaged, and Fire Symbol.

(4) Hazard Classification, unpackaged, and Fire Symbol.

(5) Chemical Hazard Symbol(s).

NOTE: Complete block with "see appendix," "see index," or "not applicable," as required. For SOPs involving multiple items, it is permissible to refer to another section for information such as DODAC, nomenclature, NEW, fire symbol, etc.

c. 3--Operation. Indicate the type of activity, e.g., renovation, preservation and packaging, demilitarization, transportation, inspection, or test, as applicable. Operation should agree with SOP number code and operations listed in table H-2.

d. 4--Estimated Daily Production Rate. Enter number and units such as items, rounds, pounds, gallons, etc., if applicable.

e. 5--Organization Symbol. Insert the office symbol for the responsible organization (office of record).

f. 6--SOP No. and Date. (Date will be date of approval.) Numbering system should be consecutive, and arranged so as to avoid duplication of numbers by separate organizations of the same installation. The SOP number will be structured per appendix H .

g. 6a--Rev No. and Date.(Date will be date of approval.) Enter revision number when complete revision of the SOP is made; e.g., Rev 1.

h. 6b--Change No. and Date. (Date will be date of approval.) Insert the change number to either the basic or revised SOP, whichever is applicable.

i. 7--Authority. Indicate the appropriate technical reference, DMWR, test procedure, letter of instruction (LOI), supply bulletin (SB), technical order (TO), etc., which authorizes conduct of the operation. Date of reference, including changes, should be reflected.

j. 8-10--Prepared by, Reviewed by, Submitted by. Record name and title of individual responsible for each of these efforts, and include telephone number of preparer.

k. 11--Concurrence. Indicate office, title, name, signature, and date for those concurrences indicated in paragraph 5a. Where Government-owned, contractor-operated (GOCO) plants are concerned, it may be appropriate for members of either the contracting officer's representative (COR) staff or the contractor staff, or both to be included in concurrence and signature process.

l. 12--Approval. Names of approving officials will be prepared per paragraphs 5b and 5c. Indicate office, title, name, signature, and date.

m. 13--Annual/Biennial Review. Add date and signature blocks for concurrence offices with title indicating review for adequacy per paragraph 5g. This review will be staffed in the same manner as the original review/approval procedure. A continuation sheet may be added for successive annual/biennial signature blocks.

INSTRUCTIONS FOR PREPARATION OF SUPERVISOR'S STATEMENT

2. The SOP supervisor's statement will be placed directly beneath the cover sheet and will be in the format shown in figure A-2. Each supervisor using the SOP will be required to sign this statement.

INSTRUCTIONS FOR PREPARATION OF OPERATOR'S STATEMENT

3. The SOP operator's statement will be placed directly beneath the supervisor's statement and will be in the format shown in figure A-3. Each operator will be required to sign this statement.

NOTE: One copy of the SOP should be used for collection of all supervisor and operator signatures.

Sample

FORMAT FOR SOP COVER SHEET

1. RED CREEK ARMY DEPOT

Standing Operating Procedure For:

2. ITEM: a. Ctg. 105MM. HE. M1. 3. OPERATION: Renovation
w/o Fuze
- b. 1315-C445. 4. ESTIMATED DAILY
 PRODUCTION RATE: 800 rds
- c. Packaged (12)1.2. 5. ORGANIZATION SYMBOL: SDSRC-Y
- d. Unpackaged 1.1 6. SOP No. RC-C445-B-001 DATE _____
- e. Chemical Hazard a. Rev. No. _____ DATE _____
Symbol - None. b. Change No. 3 DATE _____
7. Authority DMWR 9-1315-C445-RI DATE _____

8. PREPARED BY _____ TITLE Equipment Specialist
JOHN A. JONES DSN./COM 555-2461/9319)565-2461

9. REVIEWED BY _____ TITLE Chief, Maintenance Branch

10. SUBMITTED BY _____ TITLE Chief, Planning Branch

11. CONCURRENCES:

OFFICE	SIGNATURE/DATE	TITLE
<u>Ammunition Operation</u>	<u>WILL R. FLATT</u>	<u>Director, Ammo Operations</u>
<u>Surveillance Division</u>	<u>JOSEPH H. GUNN</u>	<u>Chief, Ammo Surv Division</u>
<u>Environmental</u>	<u>JOHN C. BOGGS</u>	<u>Chief, Environmental Ofc</u>
<u>Safety</u>	<u>JAMES T. ROSY</u>	<u>Chief, Safety Office</u>

12. APPROVAL _____ DATE _____
JOHN O. LITTLE
COL, OD
Commanding
Figure A-1 SOP Cover sheet

FORMAT FOR SUPERVISOR'S STATEMENT

SOP NO. _____ REV. No. ____ CHANGE No. _____ DATE _____

1. The supervisor will sign this statement:

- a. When first assigned as supervisor of the operation.
- b. When an approved change is made to the SOP.
- c. At least once per quarter during continuing operations.
- d. After absence from the job in excess of 15 consecutive workdays.

2. I have personally reviewed each of the operational steps of the SOP and have no question in my mind that the operation can be performed safely, efficiently, and in compliance with environmental restrictions noted in the SOP. I have verified to my satisfaction that operators have been trained and are capable of performing their part of the operation in a safe and efficient manner and have instructed them to follow the SOP without deviation.

SUPERVISOR'S PRINTED NAME: _____

SUPERVISOR'S SIGNATURE

DATE

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

sample

Figure A-2. Format for Supervisor's statement

FORMAT FOR OPERATOR'S STATEMENT

SOP NO. _____ REV. No. ____ CHANGE No. _____ DATE _____

1. The operator will sign this statement:
 - a. When first assigned as supervisor of the operation.
 - b. When an approved change is made to the SOP.
 - c. At least once per quarter during continuing operations.
 - d. After absence from the job in excess of 15 consecutive workdays.
2. I have read, or have had read to me, and understand the general and specific safety and environmental requirements, the personnel and explosive limits, and the work description and inspection requirements necessary to accomplish my operation. I have been thoroughly trained in, and am familiar with, my part of the operation and I agree to abide by these instructions throughout my assignment to the operation.

NAME/SIGNATURE	DATE	OPERATION NUMBER
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Sample

Figure A-3. Format for Operator's statement

APPENDIX B

INSTRUCTIONS FOR PREPARATION OF INDEX OF OPERATIONS

The index of operations will be completed as illustrated in figure B-1.

- a. Column 1. Indicate the operation number.
- b. Column 2. Identify the building(s) or site(s) where the operation is being conducted.
- c. Column 3. Insert the bay/room number(s) to show the exact location of operation. Bay numbers will coincide with line layout drawings submitted. Enter not applicable (N/A) for locations without separate bays/rooms.
- d. Column 4. Indicate the total explosive limits for individual bays listed in Column 3 by number of rounds. For locations without individual bays/rooms, the operational limit will be established for the entire location. NOTE: Small caliber ammunition (hazard class/division 1.4) and chemical ammunition without bursters may be listed by number of rounds or other manner that will be meaningful to supervisors and operators. Explosive limits in a bay will include all items in transit; i.e., on conveyors, skids, or trays. Assure explosive limits comply with the approved facility site plan.
- e. Column 5. Insert a description of the operations; e. g., unpack, disassembly, etc.
- f. Column 6. Page number.
- g. Remarks. Insert a brief description of the work to be performed. List waivers, exemptions, specific authorizations, or approved deviations that apply to this operation. Insert the reason for a change or revision. If an SOP supersedes an SOP of another number, state the number of the SOP superceded. List references used to prepare the SOP and required to conduct the operation (in addition to any listed on line 7 of cover sheet). Pages/operations that are changed (excluding revisions) will be listed in the remarks.

INDEX OF OPERATIONS

<u>OPER. NO.</u>	<u>BLDG NO. OR SITE</u>	<u>BAY NO.</u>	<u>TOTAL EXPLOSIVES ALLOWED</u>	<u>DESCRIPTION OF OPERATION</u>	<u>PAGE NO.</u>
1	4650	1	425 lb.	Unpack	4
2	4650	2	200 lb.	Disassembly	5
3	4650	3	200 lb.	Cleaning	6
4	4650	4	200 lb.	Painting	7
5	4650	5	200 lb.	Reassembly	8
6	4650	6	425 lb.	Repack	9

REMARKS:

1. Operation consists of unpacking, disassembly, and performing maintenance on item and packing material as required.
2. Exemption E-16-64 is in effect as pertains to the location of Bldg. 4650 to guard shelter.
3. Operation No. 6, Change 1: To provide for receipt of boxes from Operation No. 1.
4. Operations No. 3 and 4, Change 2: To add operation to clean and point projectiles.
5. Operation No. 2, Change 3: To provide for inspection of propelling charge.
6. References: AR 385-64
 DA Pam 385-64
 AMC-R 385-100
 TM 43-0001-28
 SB 742-1
 DOD Ammo Catalogs 1-2-3
 DARCOM-P 700-3-3
 TM 9-1300-251-20
 Joint Hazard Classification System
 TM 9-1300-251-34
 AMC-R 700-107
 DOD 4145-26-M

This SOP supersedes SSMRC-23, 26 June 1964

Figure B-1. Index of Operations

APPENDIX C

EXAMPLES OF GENERAL SAFETY REQUIREMENTS

NOTE: Following listing should only be used as a guide in preparing general safety requirements. Instructions should be added or deleted/modified so as to be directly applicable to the operations covered by the SOP.

1. The applicable portion of this standing operating procedure (SOP) will be conspicuously posted in rooms or bays involved in the operation. The supervisor shall maintain a complete copy of the SOP and be responsible for the enforcement of its provisions.
2. There will be no deviation or change from the approved SOP.
3. Care will be taken to expose a minimum number of personnel, for a minimum time, to a minimum amount of hazardous materiel consistent with safe and efficient operations.
4. Specific procedures to be taken in the event of an electrical storm are outlined in
(Another locally approved SOP may contain this information.)
5. The supervisor is responsible to report all injuries and accidents occurring during his/her shift to the safety office.
6. In the event of a fire or explosion, activate all installed fire extinguishing equipment and alarm systems. The person discovering the fire/explosion will notify the Fire Department, Safety Officer, Chief of Surveillance, and Chief of Ammunition.
7. Employees will not tamper with any safety devices or protective equipment. Safety equipment will not be modified without local safety office approval.
8. Operators will have an unobstructed path of travel to the nearest available exit.
9. All hand tools will be maintained in good repair.
10. Personnel near steel banding operations will wear face shields and safety eyewear, as appropriate. Operators handling metal banding will also wear leather, or leather-palmed, gloves.
11. Worktables will be equipped with sideboards to prevent ammunition from rolling off. Metal tabletops will be grounded.
12. Paint thinners, oily rags, and other highly flammable materials will be kept in approved, marked, closed receptacles.
13. Equipment and the grounding system will be tested for electrical resistance and continuity at intervals determined per DA Pam 385-64. All exposed explosives or hazardous materials will be removed prior to making the test. Test results will be recorded.

14. Operators lifting material will use proper, safe hand holds, assume proper lifting position, avoid twisting when lifting or carrying, and avoid sharp objects.
15. Explosives-loaded ammunition, packaged ammunition, or bulk explosives will not be handled roughly, thrown about, tumbled, dropped, or walked over other explosives or ammunition. Large ammunition items packaged in DOT approved containers designed to permit dragging, rolling, or towing may be so moved when necessary during handling for storage and transportation.
16. Leather, or leather-palmed, gloves will be worn when handling wooden boxes.
17. All personnel engaged in material handling operations will wear steel-toed safety shoes.
18. a. The following protective measures will be observed when handling PENTA-treated lumber:
 - (1) Prevent inhalation, ingestion, skin and eye contact.
 - (2) Good housekeeping is essential to prevent build-up of PENTA crystals or wood dust.
 - (3) Wear gloves and coveralls. The type of gloves to be worn is dependent upon the characteristics of the wood being handled. If the wood is wet or tacky, gloves made of nitrile rubber or polyvinyl chloride (PVC) should be worn. Leather-palmed gloves offer proper skin protection when handling properly treated wood. Perspiration build-up may allow PENTA to permeate through leather gloves; therefore, only dry leather-palmed gloves should be worn, coveralls will not be taken home and will be laundered or replaced daily. When handling wood with visible crystals of PENTA or when generating wood dust, chemical goggles should be worn.
 - (4) No smoking, eating, or drinking is permitted in the work areas. Personnel should wash hands prior to eating, drinking, smoking, or using toilet facilities. All exposed areas of the body should be washed at the end of each workday.
- b. The industrial hygiene office (hygienist) will determine threshold limit value (TLV) of suspect operations, to determine protective equipment requirements.
19. Personnel handling lumber treated with Copper-9-quinolinolate (PA), zinc naphthenate (PB) and copper naphthenate (PG) will observe the following precautions:
 - a. Prevent inhalation, ingestion, and skin contact.
 - b. Personnel should wash hands before eating, drinking, smoking, and using toilet facilities. All exposed areas of the body should be washed at the end of each workday.

c. Leather-palmed gloves will be worn. If skin irritation is noted, a vinyl-coated glove can then be substituted. Coveralls may be required if irritation is noted for other areas of the body.

d. An NIOSH-approved dust mask must be worn when sawing and machining treated wood.

20. Fire symbol ___ and chemical hazard symbol ___ will be displayed on vehicles used to transport ammunition for this operation. Operational buildings will also display fire symbol ___ in the designated locations. Remove/cover fire symbols when last explosive item is removed from location or transport vehicle.

21. Each MHE/vehicle operator will have in his/her possession a valid operator's permit for the particular piece of equipment to be operated.

22. Material handling equipment and other lifting devices will have the load rating and date of next inspection marked on them. The load rating will not be exceeded and the equipment will not be used without a current inspection date.

23. Only types E, EE, ES, and EX rated battery-powered equipment will be used for this operation.

24. Any defect or unusual condition noted that is not covered by this SOP will be reported immediately to supervisory/Quality Assurance Specialist (Ammunition Surveillance) QASAS personnel.

25. Any ammunition determined to be dangerous to handle or store will be reported immediately to supervisory personnel. Operations will be suspended and if warranted, personnel will be evacuated pending further instructions.

26. Posted personnel and explosives limits must not be exceeded at any time. Transient personnel must comply with the same safety requirements as operating personnel.

27. No more than a 4-hour requirement of supplies should be kept in an operating building.

APPENDIX D

INSTRUCTIONS FOR PREPARATION OF OPERATIONS FORMAT

NOTE: The illustration of operations formats, figure D-1, is not intended to cover all situations, and the reflected information does not necessarily have complete or accurate steps. The illustration has been provided solely for the purpose of adding clarification to the written instructions below, applicable to lines A through L, figure D-1. The two-column format illustrated at figure D-1 is one example of an operations format. SOPs are not required to be prepared in this format, but must contain all the information shown. SOP Operational Formats illustrated in figures D-1, D-2, and D-3 are examples of authorized formats. Whatever format is utilized must remain consistent throughout the SOP. Numbering of all steps, complete description of operations, and specific instructions as described in paragraph f below, are required regardless of format used. Single and two-column format may not be used in the same SOP.

a. A--Standing Operating Procedures For: Indicate the operation and nomenclature of the item being worked; e.g., "Preservation and Packaging of 155-MM HE M107."

b. C--Location/Bay No.: Show site, building, bay, room, or cubicle number (as applicable).

c. G--Operation: Indicate the title of the operation; e.g., pull apart complete round, defuze, assemble cartridge case to the projectile, etc.

d. H--Explosive Limits-Indicate the number of units and pounds that have been determined to be necessary, consistent with safe and efficient operation. Where complete items are in the same bay/operation, list the quantity and explosive weight limits for each. Separate components should also be identified by quantity and total explosive weight.

e. I--Personnel Limits: When used in conjunction with establishing personnel limits, an operator is defined as any individual who is present at a work station permanently or intermittently and performs work in the bay (e.g., inspector, operator, leader). A transient does not perform work in the bay.

NOTE. Operators as listed on Personnel Limit signs bear no relationship to the total manpower requirements for the job, but are only an indication of the maximum number of personnel that are permitted to be exposed to a particular hazard.

f. J--Step No., Description of Operation, and Specific Instructions.

(1) The procedural details of work to be performed will be listed under "Description" of operation in a numbered and logical sequence. Description must be sufficient to allow the operator to accomplish the task in a safe and technically correct manner (see figure D-1).

(2) "Specific Instructions": These are intended to furnish information that applies to one specific step of the operation and which has not been included in the actual description of physical work performed. Items to be listed here include quality characteristics, specific safety equipment or clothing required, specific safety precautions to be taken, and technical instructions necessary for task accomplishment. (Refer to figure D-1 for illustrations, examples, and explanations.) All specific instructions will be identified to indicate the step referred to and the type of instruction; Safety (S); Operational (O); and Quality Checks (QC); or any combination of the above. When more than one specific instruction is listed for a step, letter the paragraphs as noted in figure D-1, step 3.

(3) Where conditions mandate special emphasis at a particular step or steps, a changed typeface or spacing is necessary to set off the special emphasis material. Typically, WARNINGS indicate the presence of a situation that can result in immediate bodily harm. CAUTIONS indicate the presence of a situation requiring special attention to serious, but not immediate, adverse consequences such as chronic health problems resulting from failure to follow good hygiene practice, a reject part. NOTES provide additional instructions in special circumstances.

g. K--Special Requirements. This space will include instructions that are required and apply to the entire operation or bay, and would not be listed in line J. Instructions may concern safety, technical aspects of the operation, defect standards, or equipment inspection requirements (see illustrations, figure D-1). Items covered under line J of the SOP need not be duplicated under line K. Surveillance/quality control inspection requirements may be listed under Special Requirements for each operation, or included as a separate operational page covering the surveillance and/or quality control inspections.

h. L--Equipment, tools, gages, and supplies. This space will include all materials, equipment (standard APE, locally fabricated equipment, and nonstandard APE), specific hand tools that are unique to operation, specific safety equipment or other items required to support operation. It is not necessary to list those tools that are commonly used in most operations, e. g., banding cutters, hammers, screwdrivers, (unless they must be spark-proof), etc. Specific nomenclature including item description, national stock number and/or specification number will be used to adequately identify listed equipment, tools, gages, and supplies.

i. Continuation sheets need only list operation number, SOP number, change, revision, and applicable date, at a minimum.

OPER NO. 3 SOP NO RC-D544-E-002 REV 1 CHG 1
 DATE _____

3d.(QC) Inspect workmanship (DS-3) and paint coverage (DS-4).

4. Projectiles will continue on monorail to Operation No. 4.

K. SPECIAL REQUIREMENTS:

1. DS-3: Projectile free of dirt, chips, grease, rust, and other foreign material. Visual-minor, AQL 0.65.

DS-4: Primer and paint coverage is complete. Visual-minor, AQL 0.65.

2. Surveillance will perform required grounding/continuity test.

3. Maintenance personnel will perform required inspection and preventive maintenance on installed equipment. (This type of statement would only be required in the special requirements for the first operation where monorail is used.)

L. EQUIPMENT, TOOLS, GAGES, AND SUPPLIES:

<u>ITEM</u>	<u>QTY RQRD</u>	<u>SPEC NO. OR DWG. NO.</u>	<u>MGMT CONTROL STOCK NUMBER OR NSN</u>
1. Paint, OD enamel	as required	TT-E-516	8010-00-297-2216
2. Paint spray equipment	1 each	APE 1045	
3. Conveyor, monorail	1 each	APE 1044	
4. Paint system, hot spray, portable	1 each	Commercial	
5. Respirator, paint spray	1 each	GGG-M-125/6A	240-01-211-3592
6. Primer, coating lacquer, rust inhibiting	as required	MIL-P-11414	8010-00-597-7854

Figure D-1 Operations format (Continued)

APPENDIX E INSTRUCTIONS FOR PREPARATION OF LINE LAYOUTS

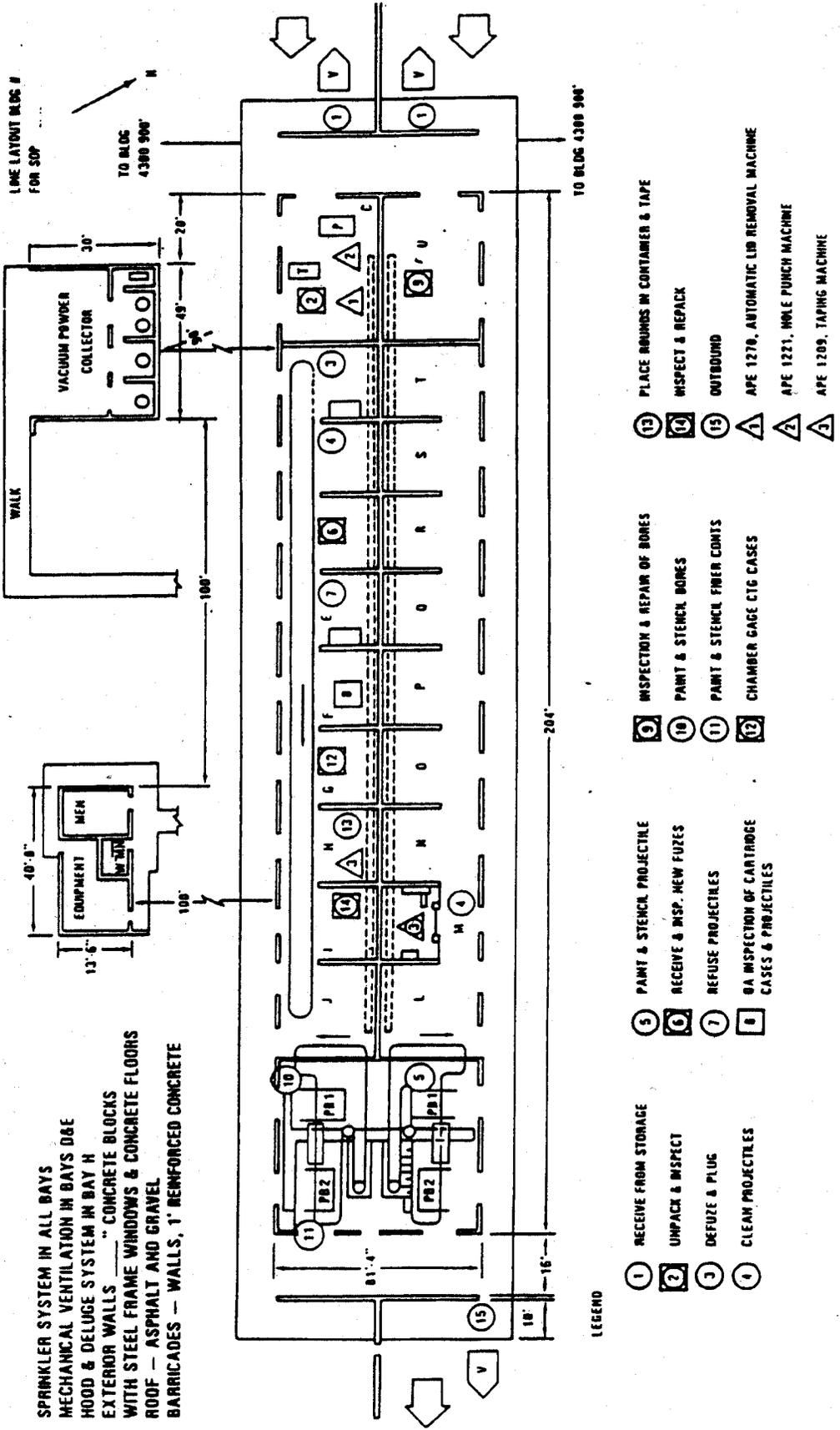
A clear legible line layout must accompany each SOP conducted inside buildings. The following instructions apply:

a. Line layouts will be prepared in the format shown in figure E-1. A layout should show the structural material of the building, fire protection, location of dividing walls, operational shields, and permanently installed equipment. Operational shields must be detailed to show the type of material used, height, and thickness. Permanently installed equipment will be listed whether or not it is used on the specific operation. Each bay or room will be identified by a numeral or letter. A directional symbol will be used to indicate true north. The building number and the applicable SOP number will also be shown.

b. The operational sequence will be depicted by the use of standardized symbols as illustrated in figure E-2. The location of pallets, tables, APE, etc., must be shown where they will be used. A legend will be used to briefly explain the operations, inspections, and location of pallets, tables, APE, etc. Assign operation numbers to agree with those in the index of operations and operations format.

#14

Appendix E — Continued



SPRINKLER SYSTEM IN ALL BAYS
 MECHANICAL VENTILATION IN BAYS D&E
 HOOD & DELUGE SYSTEM IN BAY H
 EXTERIOR WALLS — CONCRETE BLOCKS
 WITH STEEL FRAME WINDOWS & CONCRETE FLOORS
 ROOF — ASPHALT AND GRAVEL
 BARRICADES — WALLS, 1' REINFORCED CONCRETE

- LEGEND
- ① RECEIVE FROM STORAGE
 - ② UNPACK & INSPECT
 - ③ DEFUZE & PLUG
 - ④ CLEAN PROJECTILES
 - ⑤ PAINT & STENCIL PROJECTILE
 - ⑥ RECEIVE & DISP. NEW FUZES
 - ⑦ REFUSE PROJECTILES
 - ⑧ INSPECTION OF CARTRIDGE CASES & PROJECTILES
 - ⑨ INSPECTION & REPAIR OF BORES
 - ⑩ PAINT & STENCIL BORES
 - ⑪ PAINT & STENCIL FINDER CONTS
 - ⑫ CHAMBER GAGE CTG CASES
 - ⑬ PLACE BOUNDS IN CONTAINER & TAPE
 - ⑭ INSPECT & REPACK
 - ⑮ OUTBOUND
 - △ APE 1276, AUTOMATIC LID REMOVAL MACHINE
 - △ APE 1221, HOLE PUNCH MACHINE
 - △ APE 1209, TAPING MACHINE

Figure E-1

STANDARDIZED SYMBOLS

	STORAGE
	OPERATION
	INSPECTION — VERIFICATION OR ACCEPTANCE
	INSPECTION — OPERATION — IN PROCESS
	PRODUCTION EQUIPMENT
	TABLES, DOLLIES, WORK BENCHES, TRUCKS, ETC. PALLETS
	VAN
	MONORAIL
	POWER CONVEYOR
	ROLLER CONVEYOR
	PAINT BOOTH
	OPERATIONAL SHIELD

Figure E-2

APPENDIX F
PROCEDURES FOR REVIEW OF SOPS BY THE U. S. ARMY DEFENSE AMMUNITION
CENTER (DAC)

1. Installation Level.

a. The SOP will be staffed and approved within the installation (in accordance with paragraph 5a) in order to produce the most accurate and complete procedures possible. Appropriate technical data (e.g., scope of work, drawings, LOIs, work orders, waivers, exemptions) containing special instruction issued by commands, and local hazard analyses will be forwarded with the SOP. DMWRS, TMs, TOs, and SBs used to prepare the SOP need not be forwarded. The SOP will be forwarded to DAC for explosives safety review. Revisions will likewise be forwarded to DAC.

One copy to: Director
 U. S. Army Defense Ammunition Center
 ATTN: SMACC-EST
 1 C Tree Road, Bldg. 35
 McAlester, OK 74501-9053

b. Changes recommended by DAC will be incorporated into the SOP by the preparing installation where regulatory violations are cited. Comments or suggested changes will be incorporated at the discretion of the Commanding Officer.

2. Explosives Safety Review.

a. All SOPs submitted by installations will be screened and a 100 percent explosives safety review will be performed. Comments and recommendations will be forwarded to the installation commander, with copies furnished to the preparing office, local safety office, and appropriate MSC safety office.

b. A repository of approved SOPs will be maintained at DAC for two years from the date of submission. This repository will be utilized in the development of safety training and education programs and for reference use in the preparation for on-site safety evaluations.

c. SOPs submitted by installations will be reviewed primarily for compliance with Army explosives safety standards. Where noted by the reviewer, comments may also be provided addressing:

(1) Methodology and productivity.

(2) Equipment.

- (3) Quality assurance checks and Ammunition Surveillance Inspection Plans.
- (4) Storage.
- (5) Transportation.
- (6) Security.
- (7) Environmental requirements.

d. Comments and recommendations for change will be electronically transmitted by DAC to the installation commander with copies furnished to the preparing office (or routed as requested by installation) and appropriate MSC office.

e. A central source of ammunition operational expertise, criteria, and performance capabilities for the ammunition system will be established and maintained by DAC. A repository for technical data will likewise be established.

f. An immediate notification of critical explosives safety deficiencies in SOPs will be made to installations at the time the SOP is reviewed.

APPENDIX G
INSTRUCTIONS FOR PREPARATION OF THE SUMMARY SHEET

1. The format for a summary sheet for submittal of SOPs is shown in figure G-1. This information is required for each SOP, change or revision.

2. Instructions:

- a. Item 1 -Fill in as required.
- b. Items 2 through 4 -Check one block each.
- c. Item 5 -Check one block and fill in dates as applicable.
- d. Item 6 -Check/fill in as required.
- e. Item 7 -Check block or blocks as required.

STANDING OPERATING PROCEDURE
SUBMITTAL SUMMARY SHEET

1. Installation: _____
Date Submitted: _____

SOP NO. _____

2. Reason for Submittal:

_____ New
_____ Revision
_____ Change

3. Procedures Involve Material

That is:
Explosive _____ Radioactive _____
Chemical Surety Material _____
Other (Specify) _____

4. Type SOP

_____ Maintenance (Renovation, Modification)
_____ Preservation and Packaging
_____ Demilitarization
_____ Receipt, Storage, Transportation and Issue
_____ Inspection/Surveillance/Test
_____ Other

5. Operation Covered by SOP

_____ Operation is underway and will conclude _____.
_____ Operation is scheduled to start on or about _____ and conclude _____.
_____ Operation is conducted intermittently.
_____ Operation is conducted on a continuing basis.

6. Hazard Analyses

_____ Is required for critical operation number(s) _____.
_____ Is attached as an enclosure.
_____ Is not attached. Provide reason: _____.
_____ Hazard Analyses were performed by: _____ DSN _____.

7. SOP Validation

Phase 1 was Accomplished _____	Was not Accomplished _____
Phase 2 was Accomplished _____	Was not Accomplished _____
Phase 3 was Accomplished _____	Was not Accomplished _____

Validation Not Required _____

SAMPLE SUMMARY SHEET FORMAT
AMC-R 700-107

APPENDIX H STANDARDIZED SOP NUMBERING SYSTEM

In order to maintain an automated index of SOPs, a four-part numbering system has been established. The four parts are separated by hyphens, e. g., AN-G881-B-005. The use of this numbering system is required for AMC organizations. Other organizations and contractors may utilize locally approved numbering systems as long as the installation/organization and type of operation is identified.

- a. Installation code. A two-letter code identifies the installation (table H-1).
- b. Department of Defense Identification Code (DODIC). List the DODIC of the item to which the SOP applies. When multiple DODICs of the same letter are included (G880-G881, G882), the letter will be followed by three zeros (G000). When DODICs of more than one letter are included (G881, D544, H841), the operation involves ammunition or explosives in general, or a DODIC is not assigned to the item, four zeros will be entered (0000).
- c. Operation code. A one-letter operation code indicates the type of operation (appropriate section of table H-2).
- d. Sequence number. Conventional Ammunition Operations will utilize numbers 001-300 and Quality Assurance will use 301-500. Additional numbers may be used if required to meet mission needs.

INSTALLATION CODES

TABLE H-1

AC – DAC	MS -Mississippi
AN -Anniston Munitions Center	NA -Navajo
AT -Anniston Chem Actiity	NP -Newport
AP -Aberdeen	PB -Pine Bluff
AR -ARDEC	PT -Pine Bluff Chem Activity
BG -Blue Grass	PU -Pueblo
BT -Blue Grass Chem Activity	RD -Radford
BJ -Badger	RR -Red River Munitions Center
CN -Crane	RV -Ravenna
CR -CRDEC	
DP –Dugway	SI -Sierra
ED -Edgewood Chemical Activity	TA -Tank and Automotive Command
HL -Holston	TE -Tooele
HW -Hawthorne	TU -Tech Escort Unit
IN -Indiana	TY -Tobyhanna
IO -Iowa	TT - Deseret Chemical Depot
JA -Joilet	UM -Umatilla
JP -Jefferson	VL -Volunteer
KN -Kansas	
LC -Lake City	
LE -Letterkenny Munitions Center	
LH -Livorno, Italy	
LP -Louisiana	
LS -Lone Star	
LW -Longhorn	
MA -Milan	
MC -McAlester	

TYPE OPERATION CODES

TABLE H-2

<u>Ammunition Operating Element</u>	<u>Quality Assurance Element</u>
A -Administrative	Q -Administrative
B -Renovation	R -Visual Inspection and Test
C -Modification	S -Function &Trace Test
D -Conversion	T -Safety & logistics Inspections
E -Preservation & Packaging	U -Maintenance Inspection Operations
F -Nondestructive Testing	V -Demil Inspection Operations
G -Demil --Detonation	W -General
H -Demil --Burning	
I -Demil --Washout (Steamout)	
J -Demil --Disassembly	
K -Demil --Other (Including Furnace)	
L -Shipping, Receiving, Transport, and Rewarehousing	
M -General	
N -Explosive Loading/LAP/Manufacturing	
P -Research/Development Testing	

APPENDIX I

REQUIREMENTS FOR PERFORMING HAZARD ANALYSIS

1. Hazard Analysis Requirements.

a. Hazard Analyses (HA) are required for all operations involving handling and/or processing of energetic/hazardous materials.

b. Each Standing Operating Procedure (SOP) must be based upon, and supported by a HA. The HA will become a permanent part of the record copy SOP upon completion of staffing.

c. All new SOPs require a HA prior to development and staffing.

d. Hazards will be assessed in terms of exposure to risk. The hazard/exposure (risk) must be qualitatively evaluated in terms of probability and likely severity (see AR 385-10). All possible conditions and events must be considered to determine whether they could cause or contribute to an accident or injury. The Hazard Analysis Working Group shall address decisions regarding resolution of identified hazards. The RAC codes, as detailed in AR 385-10, will be developed and assigned to each hazard.

e. Development of the local hazard analysis is the responsibility of the installation commander. Personnel preparing hazard analyses will receive formal training and qualification in hazard analysis preparation. The U. S. Army Defense Ammunition Center (DAC), and the U. S. Army Safety Center (USASC), offer courses in risk management, hazard analysis, and system safety. Those personnel instructing, performing or reviewing hazard analyses should plan to attend this type of training. Under the purview of AMC-R 350-4, the installation or activity Certification Authority must evaluate training, if other than outlined above, to ensure that personnel are qualified to conduct hazard analyses. Until such time as training is completed, supervisors must ensure that only the most qualified personnel available perform, review or approve hazard analyses for ammunition operations. The installation safety office will approve each Hazard Analysis.

2. Hazard Identification and Control. The HA will identify each step of the operation in sequence. Proposed hazard controls will be evaluated for effectiveness, to either eliminate the hazard or reduce the severity to an acceptable level of risk (normally RAC 4 or 5). The RAC codes developed for the hazard analysis will identify and categorize the risk, both before and after controls have been applied." Risk Assessment Codes (RAC) will be assigned per AR 385-10, tables 3-1, 3-2, and 3-3. RAC 1 and 2 designations are unacceptable from an operational standpoint and will be reduced to the maximum extent possible, preferably to 4 or 5, prior to starting operations. RAC 3 is permitted but should be discussed with, and accepted by the commander. RAC 1 or 2 situations must be reduced to at least RAC 3 as a minimum through realistic process modification or controls, or else the task abandoned.

3. Hazard Analysis Process.

a. The organization that develops an SOP must first prepare a preliminary hazard analysis. A fairly complete list of areas to be considered may be found in MIL-STD-882B. The most common format for this analysis is the columnar approach. This format consists of several columns, describing the hazard, its cause, the resulting effects, the category of the hazard (RAC), and a description of the measures taken to control the hazard, and a final RAC for the hazard as controlled.

b. A Hazard Analysis Working Group (HAWG) will be formed at each installation to support and manage the final HA development process. Membership of the HAWG will consist of Safety (Chairperson), SOP Developer, Ammo Surveillance, Environmental, and others deemed necessary to provide adequate technical support. For toxic chemical operations the group will include at least one employee with experience and knowledge specific to the operation (an employee representative) and personnel with expertise in occupational and industrial hygiene. Employee participation in the HAWG must be documented.

c. The preliminary HA will be submitted to the HAWG for review. The HAWG will perform an evaluation and determine adequacy and suitability of the contents and make necessary changes to constitute the final HA. Depending upon the operational risks involved, the HAWG may require additional analysis efforts (data searches, testing prototyping, etc.).

d. Based upon the complexity of the operation, additional hazard analysis techniques may also be deemed appropriate by the HAWG. They will be based upon the operating and support hazard analysis techniques given in MIL-STD-882B. The HAWG will assure that ancillary functions and conditions, i. e., equipment maintenance, environmental considerations, equipment failure modes, are considered prior to approval of the HA.

e. When the HAWG approves the HA, it may then be used for development of the SOP it supports.

f. The HA will be reviewed and updated, as necessary, prior to any changes to the SOP. The HA will also be reviewed in conjunction with any SOP review/re-certification. The HA for toxic chemical operations will be reviewed during annual SOP review.