**(Model SOP)**

**United States Army**

**Name of the Clinic**

**Occupational Health**

**(OFFICE SYMBOL) SOP No.\_\_\_\_\_\_**

**Effective Date\_\_\_\_\_**

**Date Removed from Service\_\_\_\_\_**

**WASTE ANESTHETIC GAS (WAG)**

**1. PURPOSE**

1. To define and provide guidance to the employees of (name of clinic / facility) regarding exposure to Waste Anesthetic Gas (WAG) at (name of installation).
2. To provide guidelines for appropriately assessing personnel with accidental, acute, or chronic exposure to WAG.

**2. AUTHORITY AND REGULATORY COMPLIANCE**

No Federal standard for WAG exposure exists. The National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA) recommend controlling WAG according to published guidelines. The most recent Occupational Exposure Limits (OEL) published as of 2012 are by the National Institute of Health (NIH) Department of Occupational Health Services (DOHS). The American Conference of Governmental Industrial Hygienists (ACGIH) also has established Threshold Limit Values (TLV) for nitrous oxide and halothane. Exposure limits for U.S. Army personnel are provided in TB MED 510.

**3. REFERENCES**.

1. AR 40-5, Preventive Medicine, 25 May 2007.
2. AR 40-66, Medical Record Administration and Healthcare Documentation,

17 June, 2008 (RAR: 04 January 2010).

1. US Army Technical Bulletin - Medical (TB MED) 510: Guidelines for the Recognition, Evaluation, and Control of Occupational Exposure to Waste Anesthetic Gases, August 2004.
2. OSHA: Anesthetic Gases: Guidelines for Workplace Exposures. 18 May 2000.
3. National Institute for Occupational Safety and Health (NIOSH). NIOSH Criteria Document 77-140. *Criteria for a Recommended Standard of Exposure to Waste Anesthetic Gases and Vapors.*
4. NIOSH. Waste Anesthetic Gases - Occupational Hazards in Hospitals. September 2007.
5. NIH Division of Occupational Health and Safety (DOHS). *Updating the NIH Occupational Exposure Limit (OEL) for Isoflurane.* January 2012.

**4. ABBREVIATIONS / TERMS**

ACGIH - American Conference of Governmental Industrial Hygienists

CEMR - Civilian Employee Medical Records

NIH - National Institute of Health

NIOSH - National Institute for Occupational Safety and Health

IH- Industrial Hygiene

OEL - Occupational Exposure Limit

OIC - Officer in Charge

OSHA- Occupational Safety and Health Administration

OHC- Occupational Health Clinic

OHN-Occupational Health Nurse

OHP-Occupational Healthcare Provider

PPM - Parts Per Million

REL - Recommended Exposure Limit

SOP - Standard Operating Procedure

TLV - Threshold Limit Values

TWA - Time Weighted Average

WAG - Waste Anesthetic Gas

**5. PROCEDURES**

1. Determination of Need for WAG Exposure Control and Medical Surveillance Program

The clinic chief, OIC, or supervisor will determine the need for a WAG Exposure Control and Medical Surveillance Program. This decision is to be made in partnership and with information provided by the installation Industrial Hygienist, Safety personnel, or other designated installation personnel responsible for occupational exposure control. Supervisors will initiate referral to occupational health at (OHC name) for all employees who are likely to have an occupational exposure to WAG.

1. Medical Surveillance Guidelines for WAG
2. In all locations where anesthesia is administered, engineering controls such as a scavenging system to remove waste anesthetic gases and adequate room ventilation should be utilized. Medical surveillance of personnel working in scavenged operating rooms is intended primarily to establish a baseline. **Routine annual follow-up is primarily educational and at minimum, should consist of a health questionnaire**. Examinations and laboratory testing should be available for conditions suspected of being related to occupational exposure. A sample program should include:
3. A preplacement medical questionnaire that includes a detailed work history (including past exposures to waste anesthetic gases); a medical history with emphasis on: hepatic (liver), renal (kidney), neurological (nervous system), cardiovascular (heart and circulation), and reproductive functions. Pertinent positive response(s) to the questionnaire should be followed by an appropriate medical evaluation (i.e., in-depth history and physical examination where appropriate) and, where relevant, suitable laboratory tests, such as liver function tests at the discretion of the occupational healthcare provider.
4. An annual questionnaire emphasizing the issues mentioned above. Again, the need for physical examination or laboratory work should be based on questionnaire responses.
5. A final medical review upon job transfer or termination. This should be in the form of a questionnaire that includes any acute or significant exposures as well as a review of symptoms and signs detected during employment, along with a medical evaluation when appropriate.
6. A reporting system for employees experiencing health problems which may possibly be associated with anesthetic exposure should be established (see Appendix C). An acute exposure (i.e., a sudden, high-level exposure) should be documented. Any subsequent health effects should trigger a medical history and a physical examination (where appropriate).
7. During each medical surveillance encounter outlined above, every worker should review an established worker education and counseling form (see Appendix A for an example). This counseling should serve as training regarding the known and potential adverse health effects, including reproductive effects, of waste anesthetic gases as required by the OSHA Hazard Communication Standard. This counseling also should be part of the employer’s reproductive hazards policy.
8. Civilian Employee Medical Records (CEMR) developed for employees who may be exposed to hazardous chemicals (including Nitrous Oxide and halogenated anesthetic agents) must be retained, made available, and transferred in accordance with OSHA Standard for Access to Employee Exposure and Medical Records (29 CFR 1910.1020). The occurrence of injury or illness related to occupational exposure must be recorded in accordance with OSHA recordkeeping regulations (29 CFR 1904). AR 40-66 also addresses compliance and use of the CEMR.
9. For female employees who are or become pregnant, it is their decision to accept the risks of working in a position with potential exposure to WAG or not. The options are to continue to work as normal and accept the risk (albeit low) of potential exposure to WAG or obtaining a temporary reassignment to a position that would not expose them to WAG during their pregnancy. The employee should consult with their personal healthcare provider, obstetrician, or an occupational healthcare provider at their installation.
10. Recordkeeping

1. Medical records of employees participating in the WAG medical surveillance program should be kept for the period of employment plus 30 years.

**6. APPENDICES**

**Appendix A: Example Worker Education and Counseling Form Overprint**

**Appendix B: Example WAG Medical Surveillance Questionnaire Overprint**

**Appendix C: Example Algorithm for WAG Reporting System**

**Appendix D: Anesthetic Gas Recommended Exposure Limits**

**Appendix A: Example Worker Education and Counseling Form Overprint**

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| **HEALTH RECORD** | | **PERIODIC WORKER COUNSELING FOR POSITIONS INVOLVING EXPOSURE TO**  **WASTE ANESTHETIC GASES (WAG)** | | | | | | |
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|  | Although there is no conclusive evidence, epidemiologic surveys have indicated that pregnant women who have been exposed to excessive levels of waste anesthetic gases (WAG, including nitrous oxide, halothane, isoflurane, enflurane, desflurane, and sevoflurane), experienced an increased risk of bearing children with birth defects and an increased number of spontaneous abortions. The main conclusion from all the reviews of pertinent studies is that adverse health effects caused by exposure to trace levels of waste anesthetic gases in the operating suite is not proven and the risk likely low.  While there is no definitive "safe" exposure level to WAG which would insure against adverse health effects, all measures are being made to reduce WAG exposure in the working environment in the form of engineering controls. Two common engineering control examples suggested by OSHA are vapor scavenging equipment and venting i.e. HVAC systems. There are published Recommended Exposure Limits (REL) and Occupational Exposure Limits (OEL), but these values are not regulated by OSHA.  Until this safe exposure level can be Identified, all pregnant women should have the option of continuing to work, accepting the risk (albeit low) of potential exposure to WAG or obtaining a temporary reassignment to a position that would not expose them to WAG during their pregnancy.  Should you become pregnant, the decision to accept the risks of working in a position with potential exposure to WAG is yours. If you have any questions or concerns, you are urged to consult your personal healthcare provider, obstetrician, or an occupational healthcare provider your installation.  Acute Symptoms of WAG Exposure  Workers exposed to high levels of WAG experience the symptoms typical for an anesthetized patient.  Anesthetic gases however cannot be detected by their odor until concentrations are very high. Symptoms include drowsiness, headache, nausea, fatigue, judgment and coordination issues, irritability, and depression. If these symptoms occur, you are to immediately advise your supervisor.  ACKNOWLEDGEMENT:  I have read and I understand the above statement pertaining to the employment in positions involving potential exposure to waste anesthetic gases (WAG).  EMPLOYEE SIGNATURE AND DATE OF COUNSELING:  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | | |
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| PATIENT’S IDENTIFICATION *(Use this space for Mechanical Imprint)* | | | **RECORDS MAINTAINED AT:** |  |  | | | |
|  | | | PATIENT’S NAME *(Last, First, Middle Initial)* | | | | | SEX |
|  | | | RELATIONSHIP TO SPONSOR | | | STATUS | | RANK/GRADE |
|  | | | SPONSOR’S NAME | | | | ORGANIZATION | |
|  | | | **CHRONOLOGICAL RECORD OF MEDICAL CARE** | | | | **STANDARD FORM 600** (REV. 5-84)  Prescribed by GSA and ICMR  FIRMR (41 CFR) 201-45.505 | |

**Appendix B: Example WAG Medical Surveillance Questionnaire Overprint**

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| **HEALTH RECORD** | | **CHRONOLOGICAL RECORD OF MEDICAL CARE** | | | | | | |
| DATE | **WAG Medical Surveillance Questionnaire** | | | | | | | |
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|  | | | SPONSOR’S NAME | | | | ORGANIZATION | |
|  | | | **CHRONOLOGICAL RECORD OF MEDICAL CARE** | | | | **STANDARD FORM 600** (REV. 5-84)  Prescribed by GSA and ICMR  FIRMR (41 CFR) 201-45.505 | |
| **HEALTH RECORD** | | **CHRONOLOGICAL RECORD OF MEDICAL CARE** | | | | | | |
| DATE | **WAG Medical Surveillance Questionnaire** | | | | | | | |
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| PATIENT’S IDENTIFICATION *(Use this space for Mechanical Imprint)* | | | **RECORDS MAINTAINED AT:** |  |  | | | |
|  | | | PATIENT’S NAME *(Last, First, Middle Initial)* | | | | | SEX |
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|  | | | SPONSOR’S NAME | | | | ORGANIZATION | |
|  | | | **CHRONOLOGICAL RECORD OF MEDICAL CARE** | | | | **STANDARD FORM 600** (REV. 5-84)  Prescribed by GSA and ICMR  FIRMR (41 CFR) 201-45.505 | |

**Appendix C: Example Algorithm for WAG Reporting System**

Worker has a possible exposure to WAG

Worker notifies their supervisor

Supervisor makes available the Hazardous Materials Communication information sheet(s) (Safety Data Sheet) regarding all anesthetic gases used in the facility available to the worker

-Supervisor takes any appropriate first aid action, if necessary, and directs any medical response.

-If non-emergent, supervisor refers worker to installation occupational health clinic (if appropriate)

Worker evaluated by occupational health provider

-Medical evaluation and treatment completed

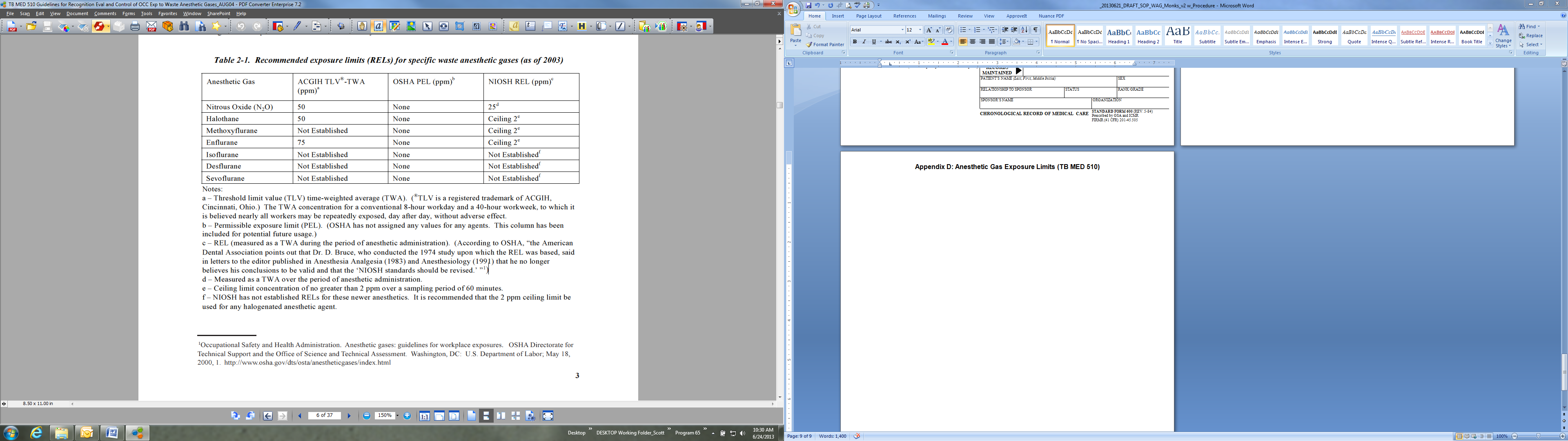
-Appropriate follow-up care planned (if needed)

-Work-related restrictions (if any) communicated to worker’s employer.

**Appendix D: Anesthetic Gas Recommended Exposure Limits**

TB MED 510 (August 2004)

Recommended Exposure Levels (RELs) for Specific WAGs (as of 2003)



National Institute of Health (NIH) Department of Occupational Health Services (DOHS)

WAG Medical Surveillance Program: Occupational Exposure Limits (OEL) (published as of 2012)

OELs listed as 8-hour time weighted averages (TWA)

