

**MPD 1840.2
REVISION A**

**EFFECTIVE DATE: September 27, 2004
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MARSHALL POLICY DIRECTIVE

AD01

MSFC HEARING CONSERVATION PROGRAM

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		1/7/00	History Log added with this revision; previous history contained in Directives Manager's Reference File. Document rewritten from MMI 1820.1A to an MPD.
Revision	A	9/27/2004	Reformatted to Times New Roman; replaced "must" and "will" with "shall" throughout document; replaced Management Operations Office with Integrated Customer Support; 8b deleted roll of HCP officer throughout document; section 3, deleted "Noise Control Act of 1972, as amended (42 U.S.C. 4901 et seq.)", "29 CFR Part 1960, as revised October 21, 1980, "Basic Program Elements for Federal Employee Occupational Safety and Health Program" and "Office of Management and Budget (OMB) Circular A-72" and added NPR 1820.1, "Hearing Conservation"; deleted added "MPD 1840.1, "MSFC Environmental Health Program" to section 5; section 8 (b) 25 replaced 200 with 300; 8 (c) replaced "Director, Customer and Employee Relations Directorate" with "Human Capital Office"; changed 9b to read "The following records are maintained and dispositioned by OMEHS in accordance with 29 CFR 1910.1020 and not less than 30 years following last day of employment at MSFC."

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1. PURPOSE

The purpose of this Directive is to establish procedures and responsibilities for the effective control of occupational noise and for hearing conservation.

2. APPLICABILITY

This Directive is applicable to all Marshall Space Flight Center (MSFC) employees, contractor personnel, and operations located at MSFC.

3. AUTHORITY

- a. 29 CFR 1910.95, "Occupational Noise Exposure"
- b. NPR 1820.1, "Hearing Conservation"
- c. Executive Order 12196, dated February 26, 1980, "Occupational Safety and Health Program for Federal Employees"

4. APPLICABLE DOCUMENTS

None

5. REFERENCES

MPD 1840.1, "MSFC Environmental Health Program"

6. DEFINITIONS

- a. Action Level. An exposure to an 8-hour Time Weighted Average (TWA) of 80 decibels measured with a dosimeter or sound level meter on the A-scale, slow response. The TWA computation should be made using a 5 dB exchange rate.
- b. Administrative Control. Any procedure that limits daily exposure to noise by control of the work schedule.
- c. Audiogram. An audiogram is a record of the threshold of audibility as a function of frequency obtained for each ear during an audiometric examination. An audiogram can be a chart, graph, or table resulting from an audiometric test. An audiogram shows an individual's hearing threshold level as a function of frequency.
- d. Audiologist. A professional specializing in the study and rehabilitation of hearing, who is certified by the American Speech, Hearing, and Language Association, or licensed by a state

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board of examiners.

e. Audiometer. An electronic instrument that conforms to the requirements and specifications of ANSI Standard S3.6-1969 (R 1973) used for measuring hearing threshold levels.

f. Decibel (dB). A unit of measurement of sound pressure level.

g. Decibels - A-weighted (dBA). A unit of measurement of sound level corrected to the A-weighted scale as defined in ANSI S1.4-1971. The A scale discriminates against very low frequencies as does the human ear; therefore, it is better for measuring general sound levels.

h. Engineering Control. Any design procedure that reduces the sound level either at the source of the noise or within the hearing zone of individuals.

i. Hazardous Noise: A noise hazard exists wherever any operation, process, or procedure generates noise of sufficient duration and intensity to be capable of producing a permanent loss of hearing to an unprotected person:

(1) Steady State Noise. (Continuous/Intermittent Noise) Noise equivalent to 85dB TWA or greater.

(2) Impulse or Impact Noise. Variations in noise levels that involve peaks of intensity that occur at intervals of greater than 1 second. If the noise peaks occur at intervals of 1 second or less, the noise is considered continuous. Noise equivalent to 140dB or greater peak sound pressure level (dBP) is considered to be hazardous.

j. Hearing Threshold Level (HTL). The amount, in decibels, by which the threshold of audibility for an ear differs from the standard audiometric reference level.

k. Hertz (Hz). The international symbol for cycles per second and is the unit of measurement for the frequency of tones.

l. Revised Baseline - The most recent audiogram that has established a standard threshold shift. It will be used as the basis of comparison for future audiograms.

m. Standard Threshold Shift (STS). An average hearing threshold shift of 10 dB or more at 2000, 3000, and 4000 Hz in either ear. A STS that is demonstrated on a retest audiogram is determined to be a permanent or persistent STS.

n. Time Weighted Average (TWA) Sound Level. That sound level, which if constant over an 8-hour exposure, would result in the same noise dose as is measured.

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7. POLICY

It is MSFC policy to conduct operations in such a manner as to minimize unprotected exposure to noise levels above 85 dBA and to proactively support the Hearing Conservation Program's primary goal of preventing noise-induced hearing loss among employees, contractors, and visitors.

Noise-induced hearing loss is a serious threat to people exposed to hazardous noise levels at work or at home. Loss of hearing can occur from exposure to impulse or impact noise as well as from exposure to steady-state (continuous/intermittent) noise. The hearing loss may be temporary or may become permanent through repeated unprotected exposure to intense noise. Initial deterioration of hearing may not be apparent to the individual. By the time there is subjective awareness of the loss, the impairment may be substantial and irreversible. Hearing loss caused by noise exposure is almost entirely preventable. Therefore, concerted preventive efforts are warranted to ensure the hearing of employees is conserved.

8. RESPONSIBILITIES

a. Integrated Customer Support Department, Center Operations, shall be responsible for implementing and administering the MSFC Hearing Conservation Program.

b. MSFC Occupational Medicine & Environmental Health Services (OMEHS) shall be responsible for:

- (1) Maintaining a registry of all personnel enrolled in the MSFC HCP, scheduling those persons for audiometric examinations, and notifying employees of the need to avoid exposure to high noise levels preceding audiometric tests.
- (2) Providing medical evaluations, obtaining an occupational history of participants in the Medical Monitoring Program, supervising on-site audiometric testing, and evaluating test results.
- (3) Notifying employees of significant hearing loss or other medical pathology of the ear, and explaining the need and plans for further testing and/or referrals.
- (4) Notifying the employee (in writing), and the employee's supervisor within 21 days if further testing establishes that a permanent STS has occurred.
- (5) Recommending to the supervisor the reassignment of employees to work in low noise areas when such is necessary to prevent further significant hearing loss or the aggravation of other medical conditions. Any reassignments shall be in accordance with applicable personnel management requirements.
- (6) Referring employees to an audiologist or physician specialist, as appropriate.

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- (7) Ensuring that the physicians who conduct or supervise the audiometric testing of employees have reviewed the requirements of this chapter and had hearing conservation training.
- (8) Ensuring that personnel performing audiometry are certified by the Council on Accreditation for Occupational Hearing Conservation and responsible to a physician or an audiologist.
- (9) Ensuring that audiometric test equipment is properly calibrated and that ambient noise levels in audiometric test rooms meet the requirements specified in the NASA Headquarters Health Standard on Hearing Conservation.
- (10) Maintaining audiometric test records and other records as required by the NASA Headquarters Health Standard on Hearing Conservation.
- (11) Providing employee access to medical records in accordance with the requirements of the NASA Headquarters Health Standard on Hearing Conservation.
- (12) Conducting baseline surveys of each new operation, job, and/or procedure having the potential of creating noise levels above 80 dBA. These surveys shall be pre-operational, where possible.
- (13) Conducting annual walk-through surveys of all work-sites to evaluate the potential for excess noise exposures and to develop sampling strategies as appropriate.
- (14) Monitoring and evaluating noise hazard areas or operations through noise surveys and personal noise dosimetry.
- (15) Recommending appropriate means of controlling noise exposures.
- (16) Designating noise hazard areas and notifying appropriate managers/supervisors of such areas.
- (17) Maintaining a current inventory of all noise hazard areas and noise levels recorded in these areas.
- (18) Providing employee access to noise survey/dosimetry records.
- (19) Notifying supervisors of affected employees of the requirements for employees to participate in the HCP. Participation is required when noise-monitoring data shows that noise exposures exceed the action level of 80 dBA TWA as specified in this Directive.
- (20) Notifying supervisors of affected employees of the requirements for employees to wear appropriate hearing protection.

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(21) Reviewing facility and operational plans to assess the adequacy of precautions planned/taken to control noise exposures.

(22) Recommending the selection of hearing protection devices and specifying performance (attenuation) requirements.

(23) Providing guidance in the development of training programs for personnel enrolled in the HCP and their immediate managers, and ensuring that the training provided is adequate and meets regulatory requirements.

(24) Assist in determining if the cause of a permanent STS is work-related.

(25) Notifying the Safety and Mission Assurance Directorate of any employees who have demonstrated a persistent STS of 25 dB or greater so that the appropriate information may be entered on the OSHA 300 Log.

c. Director, Human Capital Office shall be responsible for supporting the MSFC HCP by announcing training courses, providing classroom space and equipment, and recording training, as appropriate, in official records.

d. Manager, Facilities Engineering Department, shall be responsible for:

(1) Giving necessary consideration to acoustics in the design and modifications of facilities by using facility configuration and selection of building materials to limit sound to permissible levels.

(2) Conducting acoustic studies of effectiveness versus cost to provide the basis for sound management judgment as to the best means for protecting personnel from excessive sound levels.

(3) Selecting building equipment with low noise emissions. Ensuring that vendors certify maximum noise levels that can be expected from their products.

(4) Achieving an A-weighted sound pressure level of less than 85 dB at all locations in which personnel may be present during normal operations.

(5) Designing and installing acoustical treatment that will provide permissible sound levels.

(6) Notifying the Procurement Office when the provisions of the Hearing Conservation Program shall be included in any contract under which contractor employees will be assigned to on-site MSFC hazardous or potentially hazardous noise areas.

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e. Director, Safety and Mission Assurance Directorate, shall be responsible for entering the appropriate information on the OSHA 300 Log when notified by OMEHS that an employee has demonstrated a persistent STS of 25 dB or greater.

f. Director, Procurement Office, shall be responsible for preparing and including the necessary provisions of the Hearing Conservation Program in any contract under which contractor employees will be assigned to on-site MSFC hazardous or potentially hazardous noise areas.

g. Directors/Managers/Team Leads shall be responsible for ensuring that consideration is given to noise exposure reductions in the design and development, or selection and purchase, of aeronautical and space hardware, tools and support equipment. Assuring power tools and machines that produce noise levels above 85 dBA are appropriately labeled. Where noise levels are expected to exceed maximum allowable limits, program or office directors/managers/team leads shall notify OMEHS.

h. Supervisors shall be responsible for:

- (1) Reporting suspected hazardous noise in all of their areas of jurisdiction to the OMEHS.
- (2) Maintaining a roster (name and job title) of personnel working in designated high-noise areas (or otherwise exposed to hazardous noise) and informing OMEHS of changes (new employees, employees transferred, employees terminated, etc.).
- (3) Referring personnel who complain of hearing loss or other hearing or ear problems to OMEHS for examination.
- (4) Enforcing the wearing of hearing protection devices and ensuring that administrative controls are followed where required.
- (5) Notifying OMEHS of any changes in operations requiring noise determinations or evaluations.
- (6) Ensuring that hearing protective devices that have been approved by OMEHS are available for use by employees.
- (7) Ensuring that employees who are enrolled in the HCP receive annual (calendar year basis) training.
- (8) Ensuring that employees who are enrolled in the HCP participate in annual (calendar year basis) audiometric testing.
- (9) Attending Hearing Conservation Training as required for supervisors.

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(10) Ensuring that caution signs are posted in designated noise hazard areas and that appropriate labels, decals, or placards are placed on tools and equipment as specified by OMEHS

(11) Notifying each affected employee of the results of noise monitoring when the employee's noise exposure meets or exceeds the action level of 80 dBA TWA.

i. Individual employees shall be responsible for:

(1) Participating in annual Hearing Conservation Training (on a calendar year basis), if enrolled in the HCP.

(2) Receiving an annual (calendar year basis) audiometric test, if enrolled in the HCP.

(3) Utilizing control procedures established for maintaining effective noise exposure control, including wearing and maintaining hearing protective devices furnished for their protection.

(4) Observing posted hearing protection signs, decals, and labels and complying with the requirements at all times.

(5) Cooperating with supervisors and OMEHS personnel, in activities/actions undertaken to evaluate hazardous noise and to prevent hearing loss caused by excessive exposure to workplace noise.

(6) Notifying supervisors, and/or OMEHS of areas, operations, or equipment which may produce hazardous noise.

9. RECORDS

a. Audiometric test data, noise exposure records, and instrument calibration records shall be established and maintained by OMEHS in accordance with the OSHA Standard on Occupational Noise Exposure..

b. The following records are maintained and dispositioned by OMEHS in accordance with 29 CFR 1910.1020 and retained not less than 30 years following the last day of employment at MSFC:

MSFC Form 4045, "MSFC Medical Center Hearing History and Audiogram"

MSFC Form 2805, "MSFC Work History Questionnaire"

Environmental Health Services Noise Sampling Data

10. MEASUREMENT

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None

11. CANCELLATION

MPD 1840.2 dated January 7, 2000

Original signed by
Robin N. Henderson for

David A. King
Director

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Appendix A

MSFC Hearing Conservation Program Criteria

A.1 Default Maximum Noise Exposure Limits (With Hearing Protection)

A.1.1 Where highest-rated personal hearing protective devices (plugs plus muffs) are insufficient to attenuate employee noise exposure to a level of 85 dBA or below, administrative controls shall be implemented to ensure that the employee's exposure does not exceed the default exposure limit of 85 TWA shown in Table 1 below, computed using a 5 dB exchange rate. This default exposure limit also applies to cases where the requirement for personal hearing protection with a specific Noise Reduction Rating (NRR) has been waived by OMEHS for operational or safety reasons.

Table 1

85 dBA TWA Default
Maximum Permissible
Noise Exposure Limits*

Noise Duration (Hours)	Sound Level* (dBA)
16	80
8	85
4	90
2	95
1	100
.5	105
.25	110
.125 or less	115

*These limits apply to noise exposure with (after accounting for) hearing protection and are applicable only when highest-rated hearing protector(s) (plugs plus muffs) are insufficient to attenuate noise exposure to 85 dBA. Exposure (after accounting for hearing protection) to sound levels above 115 shall not be permitted, regardless of duration of exposure.

A.2 Engineering Controls

A.2.1 Where feasible, facilities and equipment shall be procured, designed, operated, or modified in such a manner as to minimize exposure to noise levels above 85 dBA. Any reduction in noise level, even if it is not reduced below 85 dBA, is beneficial. If engineering controls fail to reduce sound levels below 85 dBA, hearing protective equipment and/or administrative methods of noise exposure protection shall be used.

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A.3 Personal Hearing Protection

A.3.1 Personal protective equipment shall be used only temporarily or where engineering controls are not feasible or practical. Earmuffs and/or plugs shall be provided to employees assigned to work in areas where they will be exposed to continuous, intermittent, or impact noise (without regard to duration of exposure) in excess of 80 dBA. Disposable earplugs shall be available for employee use where noise exposures are less than 80 dBA (for protection against nuisance noise), if they so desire. Earmuffs and/or earplugs shall be worn by employees exposed to continuous, intermittent, or impact noise in excess of 85 dBA, without regard for duration of exposure or character of the noise source. Earplugs and earmuffs shall be for the exclusive use of each employee and shall not be traded or shared. Use of ear protectors shall be mandatory where requirements are posted and their use shall be enforced by supervisors as specified in this Directive.

A.3.2 Hearing protectors shall attenuate noise exposure (at the ear) to a level of 85 dBA or below, based on the NRR of the protector. Estimation of the adequacy of hearing protector attenuation shall be performed according to OSHA-specified methods.

A.3.3 The adequacy of hearing protector attenuation shall be re-evaluated whenever employee noise exposures increase to the extent that the hearing protector currently in use may no longer provide adequate attenuation. More effective hearing protectors shall be provided when necessary.

A.3.4 Employees shall be able to choose either earmuffs or earplugs from a variety of styles. Any protector (or combination of protectors) that provides the required NRR, as specified by the OMEHS shall be acceptable.

A.4 Administrative Control

A.4.1 Where highest-rated hearing protective equipment (plugs plus muffs) or engineering controls are not sufficient to attenuate noise exposure to less than 85 dBA, the duration of time spent in the noise hazard area shall be limited so as not to exceed the default maximum exposure limit (with hearing protection) of 85 dBA TWA. This default limit is 80 dBA TWA for employees who have demonstrated a persistent STS.

A.5 Noise Monitoring

A.5.1 Measurement of potentially hazardous sound levels shall be conducted when any information, observation, or calculation shows that an employee could be exposed to a noise level in excess of 80 dBA. This includes, but is not limited to, times where there is a need to document representative noise exposures, where employees complain of excessive noise, or where it is difficult to understand a normal conversation when the speaker and listener face each other at a distance of two feet. Any new equipment, operation, job, or procedure with the potential for creating noise levels above 80 dBA shall be evaluated with regard to noise

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emissions prior to start-up. All continuous, intermittent, and impulsive sound levels from 80 dB to 130 dB shall be integrated into the noise measurements. Noise exposure computation is shown in Appendix A of 29 CFR 1910.95. Noise monitoring shall be repeated at least biannually or whenever any changes to facilities, equipment, work practices, procedures, or noise control measures alter potential noise exposures.

A.5.2 Noise monitoring shall be conducted in accordance with the OSHA Standard on Occupational Noise Exposure and the NASA Headquarters Health Standard on Hearing Conservation. Requirements of these standards are hereby incorporated by reference.

A.6 Employee Participation in the HCP

A.6.1 All personnel who are routinely exposed to noise (30 or more days per year) at or above the action level of 80 dBA TWA as shown in Table 2 below shall be identified and placed in the HCP. (Program enrollment is based on employee noise exposure independent of hearing protector usage or selection.) Other personnel, including those in maintenance, custodial, emergency response, safety, security, and environmental management positions who have a reasonable potential for periodic exposure to noise levels above 85 dBA shall also be enrolled in the HCP.

Table 2

80 dBA TWA Action Level for Employee Enrollment in the HCP

Noise Duration (Hours)	Sound Level* (dBA)
8	80
4	85
2	90
1	95
.5	100
.25	105
.125 or less	0 or above

*These sound levels apply to measured or estimated TWA exposures, without accounting for any reduction provided by hearing protection. They are to be used only as a threshold for Program enrollment and are not to be construed as exposure limits.

A.6.2 All employees who are enrolled in the HCP shall receive an annual audiogram (every calendar year).

A.6.3 All employees who are enrolled in the HCP shall participate in annual hearing conservation training activities (every calendar year), as specified by OMEHS.

A.7 Medical Monitoring Program

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A.7.1 Audiometric testing shall be conducted in accordance with the OSHA Standard on Occupational Noise Exposure and the NASA Headquarters Health Standard on Hearing Conservation. All medical monitoring requirements specified in these standards are hereby incorporated by reference.

A.8 Posting of Personal Hearing Protection Requirements

A.8.1 Caution signs which clearly indicate the hazard of high noise levels and state the requirements to wear hearing protection shall be posted at the entrance(s) to, or the periphery of, noise hazard areas. Decals or placards with similar statements shall be affixed to power tools and machines that produce noise levels above 85 dBA. Signs and decals shall have wording in black letters on a yellow or orange background.

A.9 Employee Training

A.9.1 Hearing conservation training shall be provided employees enrolled in the HCP on an annual (calendar year) basis and shall include, at a minimum: an overview of the MSFC HCP; a review of the effects of noise on hearing (including permanent hearing loss); noise control principles; the purpose of hearing protectors; the advantages, disadvantages, and attenuation characteristics of various types of ear protectors; instructions on selections, fitting, use, and care of hearing protectors; and explanation of the audiometric testing procedure and the purpose of audiometric testing.

A.9.2 An education program shall be provided for supervisory and managerial personnel whose employees are exposed above the action level of 80 dBA, emphasizing their responsibility in the HCP. Personnel shall be encouraged to use hearing protectors whenever they are exposed to noise levels above 80 dBA during off-duty activities (e.g., from lawn mowers, firearms, etc.).