Ames Procedural Requirements

APR 8715.1
Effective Date: September 7, 2017
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COMPLIANCE IS MANDATORY

Subject: Chapter 42 – Safety Lanes, Barricades, Hazard Labeling and Posting

Responsible Office: Code QH / Occupational Safety, Health and Medical Service Division

CHANGE LOG

Status [Baseline /Revision /Cancelled]	Document Revision	Date of Change	Description
Baseline	1	9/7/2017	Added Change History and Preface to Chapter. Updated chapter to reflect changes in ANSI/NEMA 2535.2-2011 Standard.
Revision	2	9/7/2022	Revalidated with administrative changes and reformatted.
Revision	3	8/22/2023	Clerical corrections.

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PREFACE

P.1 PURPOSE

a. This directive provides procedures for safety lanes, barricades, hazard labeling and posting at Ames Research Center.

P.2 APPLICABILITY

a. This directive is applicable to ARC and associated facilities.

b. This directive applies to contractors, grant recipients, or parties to agreements only to the extent specified or referenced in the appropriate contracts, grants, or agreements.

c. In this directive, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The terms "may" or "can" denote discretionary privilege or permission, "should" denotes a good practice and is recommended, but not required, "will" denotes an expected outcome, and "are/is" denotes descriptive material.

d. In this directive, all document citations are assumed to be the latest version unless otherwise noted.

P.3 AUTHORITY

a. NPR 8715.3, NASA General Safety Program Requirements

P.4 APPLICABLE DOCUMENTS AND FORMS

a. ANSI/NEMA Z535.1, Safety Colors

b. ANSI/NEMA Z535.2, Environmental and Facility Safety Signs

c. ASME A13.1, Scheme for the Identification of Piping Systems

P.5 MEASUREMENT/VERIFICATION

a. Verification of conformance to requirements in this directive are measured through Center and Responsible Organizational management reviews, self-assessments, and subsequent analysis and reports of conformance to requirements, as well as periodic internal audits.

P.6 CANCELLATION

a. APR 8715.1 Chapter 42, Safety Lanes, Barricades, Hazard Labeling and Posting dated September 7, 2017.

Eugene Tu
Director

DISTRIBUTION STATEMENT:

Internal and external distribution.

CHAPTER 42 SAFETY LANES, BARRICADES, HAZARD LABELING AND POSTING

42.1 Responsibilities

42.1.1 **Occupational Safety, Health and Medical Service Division (Code QH)** shall:

a. Provide technical safety evaluations of the work areas at the request of the supervisor.

b. Maintain oversight of hazard assessment activities, safe work procedures, and employee training.

c. Provide specialized safety consulting on an as-requested basis.

d. Periodically review and revise this chapter as appropriate.

42.1.2 **Facilities Engineering Branch (Code JCE)** shall reflect the requirements of this chapter when planning and implementing new or modified facilities work at Ames.

42.1.3 **Plant Engineering Branch (Code JCM)** shall maintain or upgrade pipe paint colors and markings and other hazard warnings to meet the requirements of this chapter whenever maintenance work causes markings to be affected.

42.1.4 **Supervisors** shall:

a. Complete a workplace assessment to determine what hazards are present, or are likely to be present, for all operations.

b. Identify hazards that require barricading or posting as described in this chapter.

c. Ensure personnel are trained to identify hazards and recognized and honor barricades and warning signs.

d. Post hazard warnings in accordance with the requirements of this chapter.

e. Replace posted hazard warnings that are illegible.

f. Remove posted hazard warnings that are no longer applicable to the location where they are posted.

42.1.5 **Employees** shall:

a. Seek supervisor guidance on safety related questions.

b. Obey safety signs, barricades, and warnings.

42.2 Safety Lanes and Barricades

42.2.1 Safety lanes and safe-access lanes are typically floor markings that identify safe passage through or out of shops, warehouses, and similar locations. They also identify access lanes to control panels and emergency equipment, which shall be kept clear and unobstructed.

42.2.2 They shall be clearly marked with either yellow or yellow-and-black striped lines, or by plastic tape affixed to the floor.

42.2.3 Barricades are used to identify and deny access to hazardous areas including, but not limited to, the following uses:

a. Barricade excavations, breaks in roads or floors, and similar conditions to prevent injury to personnel and reduce the possibility of damage to equipment and vehicles.

b. Barricade floor-level areas under work performed at heights to protect persons at floor-level from falling objects.

c. Barricade areas where ladders, scaffolding, or staging are used to protect against falling objects.

42.2.4 The following precautions should be taken when using barricades:

d. Use barricades with appropriate flashing lights during nighttime hours and periods of reduced visibility.

e. Place barricades far enough in advance of the actual working area to prevent traffic congestion.

f. Use signs (such as "Road Closed," "Aisle Blocked," "Detour," etc.) in conjunction with barricades.

g. Use breakaway links in all chains that barricade an area in order to permit ready access by fire fighting personnel and equipment and identify such chains by the “international orange” color.

42.3 Hazard Labeling and Posting

42.3.1 General Labeling and Posting

42.3.1.1 In locations or situations where other languages are used, consideration shall be given to provide messages in those languages as appropriate.

42.3.1.2 Labels and posting are used to identify safety hazards and provide instructions. The font, color, format, and work requirements of ANSI/NEMA Z535.2-2011 shall be used to convey safety-related information on signs.

42.3.1.3 Types of safety signs are as follows (refer to ANSI/NEMA Z535.2 for more details and examples of color):

a. DANGER – indicates a hazardous situation that, if not avoided, will result in death or serious injury.

b. WARNING – indicates a hazardous situation that, if not avoided, could result in death or serious injury.

c. CAUTION – indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

d. NOTICE – indicates information considered important but not hazard-related.

e. Safety instructions or similar words – indicates a type of safety sign where specific safety-related instructions or procedures are described. The safety alert symbol is not used with this classification of sign.

f. Safety equipment location sign – identifies the direction to, or location of, safety equipment (e.g., first aid equipment, emergency eyewash, safety shower). The safety alert symbol is not used with this classification of sign.

g. Fire safety equipment location sign – identifies the direction to, or location of, fire safety equipment. The safety alert symbol is not used with this classification of sign and fire safety signs do not have a signal word.

42.3.2 Sign Placement

42.3.2.1 Place signs to alert and inform the viewer in sufficient time to take appropriate evasive actions to avoid the potential harm from the hazard.

42.3.2.2 Place safety signs so they are legible, non-distracting, and not hazardous in themselves.

42.3.2.3 Safety signs shall not be located in areas where they may be removed by the motion of the hazardous device or rendered ineffective by situational conditions of the hazard.

42.3.2.4 The alerting devices shall not be blocked by moveable panels such as doors, windows, racks, gates, etc.

42.3.3 Pipe Labeling

42.3.3.1 Because of the potential hazards associated with pipe transfer systems, piping shall be labeled accurately as to the contents and intended direction of flow and in accordance with ASME A13.1, Scheme for Identification of Piping Systems.

42.3.3.2 Table A, Piping and Utility Line Labeling Color Scheme, summarizes the Ames color scheme. Designers and facility managers shall refer to ASME A13.1 standard for additional details.

Table A, Piping and Utility Line Labeling Color Scheme

Service	Background Color	Letter Color	Sample
Fire quenching fluids	Safety Red	White	LETTERS
Toxic and corrosive fluids	Safety Orange	Black	LETTERS
Flammable fluids	Safety Yellow	Black	LETTERS
Chemically active or toxic	Safety Yellow	Black	LETTERS
Temp > 140°	Safety Yellow	Black	LETTERS
Gas pressure > 150 psig	Safety Yellow	Black	LETTERS
Liquid pressure > 500 psig	Safety Yellow	Black	LETTERS
Radioactive	Safety Yellow	Black	LETTERS
Combustible fluids	Safety Brown	White	LETTERS
Potable, cooling, boiler feed	Safety Green	White	LETTERS
Other water	Safety Green	White	LETTERS
Liquid or liquid admixture	Safety Green	White	LETTERS
Gas or gaseous admixture	Safety Blue	White	LETTERS
Compressed Air	Safety Blue	White	LETTERS
Not used at Ames	Safety Purple	White	LETTERS
Not used at Ames	Safety white	Black	LETTERS
Not used at Ames	Safety Gray	White	LETTERS
Not used at Ames	Safety Black	White	LETTERS

42.3.3.3 Directional flow arrows and other piping symbols shall utilize the color codes shown above.

42.3.3.4 Insulated piping where the outside surface is a non-ASME color shall use color-coded labels from the ANSI/NEMA Z535.1.

42.3.3.5 Labels shall be applied at appropriate intervals along the piping run in locations visible from the ground and close to valve systems.

42.3.3.6 Labeling and color-coding of vacuum systems are not required under this procedure. However, labeling is encouraged and should be performed for traceability or aesthetics at the discretion of the designer or facility manager.

42.3.3.7 Previously specified radioactive markers are acceptable and may be used if already installed or until existing supplies are depleted.

42.3.3.8 Pipe paint colors, markings and other hazard warnings to meet requirements of this chapter shall be upgraded when construction or maintenance cause new piping to be installed or existing markings to be affected.

42.3.4 Method of Identification – Legend

42.3.4.1 Legends are necessary for identification of contents. Legends shall:

42.3.4.2 Identify the contents of a piping system in full or abbreviated form.

42.3.4.3 Use arrows to indicate direction of flow (including arrows in both directions when flow can be in both directions).

42.3.4.4 Include sufficient additional details such as temperature, pressure, etc., as necessary to identify the hazard.

42.3.4.5 Be brief, informative, pointed, and simple for greatest effectiveness.

42.3.4.6 Be applied close to valves or flanges and adjacent to changes in direction, branches, and where pipes pass through walls or floors; and at intervals on straight pipe runs sufficient for identification.

42.3.4.7 Be applied by stenciling, the use of tape, or markers.

42.3.4.8 Base the number and location of identification markers on the particular piping system attributes.

APPENDIX A. ACRONYMS

ANSI	American National Standards Institute
APR	Ames Procedural Requirement
ASME	American Society of Mechanical Engineers
NEMA	National Electrical Manufacturers Association
NPR	NASA Procedural Requirement