

CH2M HILL Hanford Group, Inc.	Manual	ESHQ
FALL PROTECTION	Document	TFC-ESHQ-S_IS-C-04, REV A-3
	Page	1 of 14
	Issue Date	October 18, 2005
	Effective Date	October 18, 2005
FUNCTIONAL AREA MANAGER:		R. D. Cantwell
DOCUMENT OWNER:		D. C. Mobley

TABLE OF CONTENTS

1.0 PURPOSE AND SCOPE 2

2.0 IMPLEMENTATION 2

3.0 RESPONSIBILITIES..... 2

 3.1 Operations/Construction Industrial Safety Staff..... 2

 3.2 Area Managers 2

 3.3 Employees/Workers..... 3

4.0 PROCEDURE 3

 4.1 Fall Hazard Analysis and Mitigation 4

5.0 DEFINITIONS 5

6.0 RECORDS 6

7.0 SOURCES..... 6

 7.1 Requirements 6

 7.2 References..... 6

TABLE OF FIGURES

Figure 1. Fall Hazard Mitigation Process. 8

TABLE OF ATTACHMENTS

ATTACHMENT A – PERSONAL FALL ARREST EQUIPMENT INSPECTION 9

ATTACHMENT B – FALL HAZARD MITIGATION CONTROLS 11

ATTACHMENT C – FALL PROTECTION PLAN 14

1.0 PURPOSE AND SCOPE

This procedure establishes the process for identifying, prescribing, and maintaining fall protection for Tank Farm Contractor and subcontractor employees exposed to a fall hazard.

This procedure applies to work activities taking place within six horizontal feet of a fall hazard that is six feet above another work surface or when working over any operating machinery, open spaces, or hazardous substances.

The requirements for the use of personal fall arrest systems (PFASs) in this procedure do not apply to the following:

- Normal use of portable ladders or stairs
- Accessing tanker trucks and servicing large mobile equipment.

This procedure is used in combination with the safety inspection, work control, job hazard analysis, and pre-job briefing processes, which are governed by their own procedures (listed in Section 7.2).

2.0 IMPLEMENTATION

This procedure is effective on the date shown in the header.

3.0 RESPONSIBILITIES

3.1 Operations/Construction Industrial Safety Staff

Perform periodic surveillances during the erection, use, and dismantling of fall protection systems for operations and maintenance work activities.

3.2 Area Managers

1. Provide positive means of fall protection for employees in accordance with the applicable sections of 29 CFR 1910, Subpart D, and 29 CFR 1926.501(a), (b), and (c).
2. Ensure floor and wall openings and holes in the work area are guarded in accordance with 29 CFR 1910, Subpart D.
3. Ensure work area's walking/working surfaces are structurally sound and able to support expected work activities.
4. Ensure temporary covers for holes in floors, roofs, and other falling object protection for walking/working surfaces in the work area are in accordance with 29 CFR 1926.501(c).
5. Ensure elevated work requiring the use of fall protection is stopped whenever inclement weather conditions are present (such as snow, ice, thunderstorms, and winds greater than 30 miles per hour).

3.3 Employees/Workers

Use conventional fall protection systems (guardrail systems, personal fall arrest systems, or safety nets systems), as directed.

4.0 PROCEDURE

(7.1.2)

An approved procedure, work plan, or job hazard analysis is required to identify the fall hazards and the controls used to minimize the risk of injury from those hazards. One of these documents shall be completed for employees using personal fall arrest systems while working on walking/working surfaces from heights six feet or more above a lower work surface where guardrail systems do not exist.

The approved document shall address the following and include the appropriate controls:

- Identify all fall hazards in the work area (including hazards of falling or materials falling onto employees)
- Describe the method to be used for fall arrest or fall restraint
- Describe the method for the assembly, maintenance, inspection, and disassembly of the fall protection systems
- Describe the method for the handling, storage, and securing of tools and materials
- Describe the method of providing falling object protection for workers who may be in, or pass through, the area below the work site
- Protection from falling objects. When an employee is exposed to falling objects, the employee shall wear a hard hat and use at least one of the following measures:
 - 1) toeboards, screens, or guardrail system;
 - 2) canopy structure and distance from edge of the higher level;
 - 3) barricade the area in which objects could fall, prohibit employees from entering barricaded area, and keep objects that may fall away from the edge.
- Describe the method for prompt, safe removal of injured workers
- If applicable, identify acceptable anchorage points (i.e., approved by a qualified person)
- If conventional systems of guardrails, safety nets, or personal fall arrest systems are not used, document the justification for selecting an alternate fall protection system (control access zone and safety monitors).

4.1 Fall Hazard Analysis and Mitigation

See [Figure 1](#) for procedure flowchart.

Planner/Field Work Supervisor

1. Identify governing requirements for fall protection for operations or construction work activities. (7.1.1, 7.1.2) Refer to the following procedures for specific requirements or exclusions to the basic requirements in this procedure:

- [TFC-ESHQ-S_IS-C-01](#)
- [TFC-ESHQ-S_IS-C-03](#)
- [TFC-ESHQ-S-STD-05](#)
- [TFC-ESHQ-S-STD-10](#)
- [TFC-ESHQ-S-STD-12](#).

2. Obtain Operations/Construction industrial safety assistance in identifying fall hazards and their mitigation controls.

Planner/Field Work Supervisor/Industrial Safety/Workers

3. Develop work plan, or job hazard analysis in accordance with [TFC-OPS-MAINT-C-01](#) and [TFC-ESHQ-S_SAF-C-02](#).
4. Select appropriate controls for the identified fall hazards.

NOTE 1: The priority of controls for protecting workers from fall hazards is: (1) guardrail system, (2) powered man-lifts, (3) scaffolds or other access means, and (4) alternative fall protection systems.

NOTE 2: Risk must be balanced in application of this procedure. For example, if it is a higher risk to install a guardrail system or erect a scaffold, and the job is a short duration job where a ladder can be used safely, then a ladder may be an acceptable control. Otherwise, more stringent controls are necessary.

NOTE 3: See [Attachment A](#) for the requirements for the selection and use of fall protection systems, e.g., Personal Fall Arrest System, Fall Protection Plan.

Industrial Safety

5. Verify the fall hazards and protection from falling objects and their controls have been appropriately incorporated into the work steps of the work document.

Field Work Supervisor

6. Before beginning the work activity requiring fall protection, ensure assigned workers have successfully completed the applicable courses:
 - Non-PFAS Users - “Fall Hazard Recognition and Prevention,” number 020147 (or equivalent course)

- PFAS Users - “Fall Protection PFAS Users Course,” number 020146 (or equivalent course).

NOTE: On-the-job training for a Personal Fall Arrest System user for a specific fall hazard situation, or using a new style or different brand of equipment with an adequate level of experience, can be recorded on a daily log, job hazard analysis, or other recognized means.

Field Work
Supervisor/Workers

7. Verify the fall hazard and protection from falling object controls are in place.

NOTE: Required walk downs and pre-job briefings are conducted in accordance with [TFC-OPS-MAINT-C-01](#) and [TFC-OPS-MAINT-C-02](#).

Workers

8. Perform required pre use inspections on fall protection equipment.

NOTE: Refer to [Attachment A](#) for Personal Fall Arrest System inspection criteria.

9. Perform scheduled work activities.

5.0 DEFINITIONS

Approved. Tested and certified by the manufacturer or any recognized testing laboratory to possess the strength and performance requirements specified in this section.

Competent person. An individual who is capable of identifying existing and potential fall hazards, has the authority to take prompt corrective action to eliminate potential fall hazards, and knows about fall protection equipment, including the following:

- Manufacturers’ recommendations and instructions for the proper use, inspection, and maintenance.
- Rules contained in this section about erection, use, inspection, and maintenance of fall protection equipment and devices used on the job.

Control access zone. An area in which certain work, like overhand brick laying, may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems, and access to the zone is controlled.

Equivalent. Alternatives to the designs, materials, or methods specified in this section that can be shown to give equal or greater protection to employees against a hazard.

Fall arrest. Action to limit the distance of a fall.

Fall restraint. Action taken to limit access to a fall hazard so that if the person falls, they fall to the same surface.

ESHQ	Document	TFC-ESHQ-S_IS-C-04, REV A-3
	Page	6 of 14
FALL PROTECTION	Effective Date	October 18, 2005

Floor hole. An opening measuring less than twelve inches but more than 1 inch in its least dimension in any floor, platform, pavement, or yard through which materials but not persons may fall.

Floor opening. An opening measuring twelve inches or more in its least dimension in any floor, platform, pavement, or yard through which persons may fall, such as hatchway, stair or ladder opening, pit, or large manhole.

Not feasible. Where it is impossible to perform the work using conventional fall protection system (e.g., guardrail system or Personal Fall Arrest System) or where it is technologically impossible to use any of these systems to provide fall protection.

Personal Fall Arrest System. A system to stop a fall (anchorage, connectors, a full body harness, and may include a lanyard, deceleration device, life line, or a combination of these components).

Qualified person. An individual who has successfully demonstrated their ability to solve or resolve problems relating to fall protection. Documented experience in the specific application of fall protection expertise (e.g., strength of materials, Personal Fall Arrest System design, construction and erection of guardrail systems) is required. Examples of a qualified person include structural engineers and scaffold erectors.

Wall opening. An opening at least 30 inches high and eighteen inches wide in any wall or partition through which persons may fall.

6.0 RECORDS

The following records may be generated during the performance of this procedure:

- Fall Protection Work Plans.

If generated, the requesting area manager will maintain the record as part of the work package and is responsible for record retention and retirement in accordance with [TFC-BSM-IRM_DC-C-02](#).

7.0 SOURCES

7.1 Requirements

1. [29 CFR 1910](#), "Occupational Safety and Health Standards," Subpart D, "Walking-Working Surfaces," 1910.23, "Guarding floor and wall openings and holes."
2. [29 CFR 1926.501\(a\), \(b\), and \(c\)](#), "Safety and Health Regulations for Construction." (S/RID)

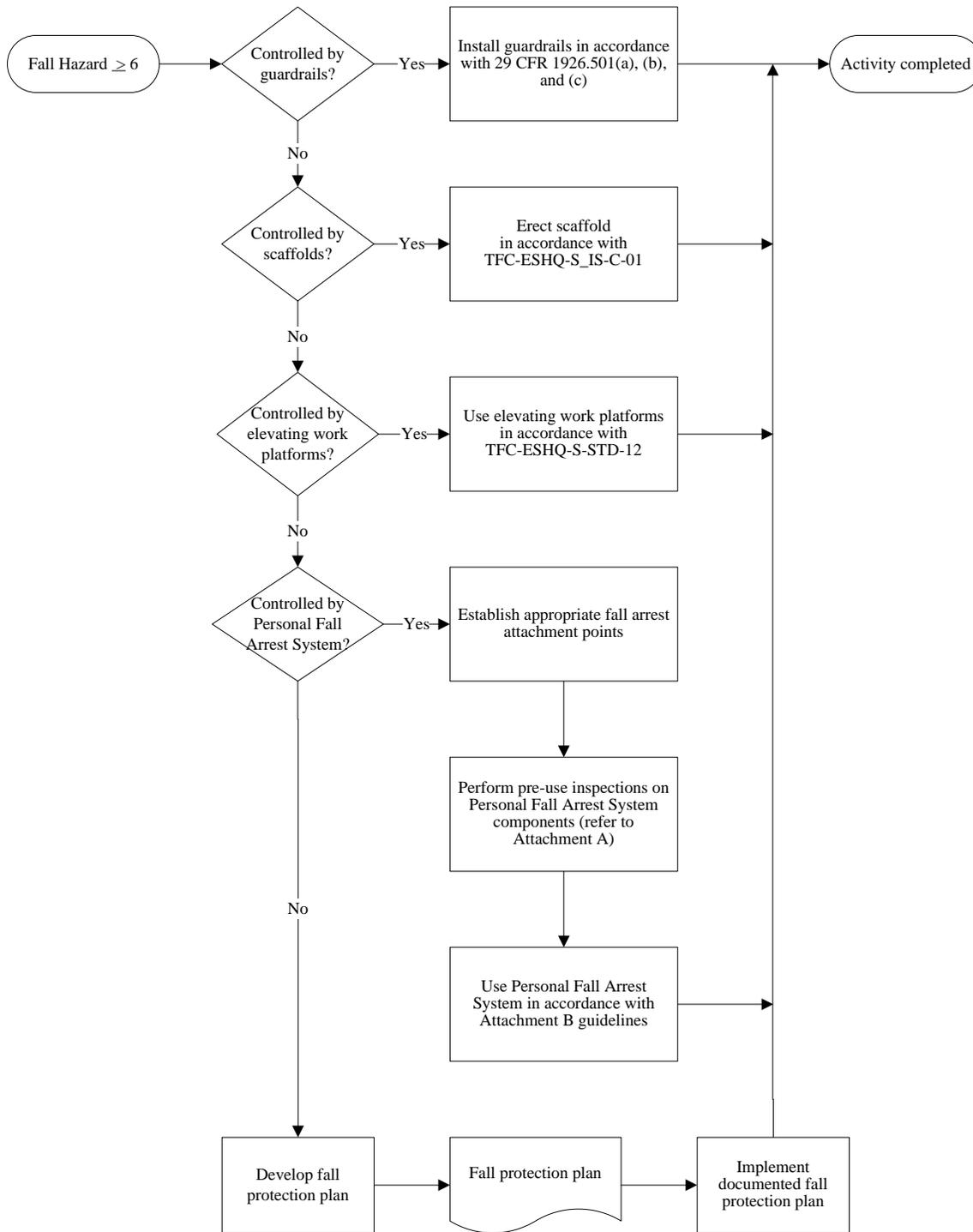
7.2 References

1. [TFC-BSM-IRM_DC-C-02](#), "Records Management."
2. [TFC-ESHQ-S_IS-C-01](#), "Scaffolding."
3. [TFC-ESHQ-S_IS-C-03](#), "Excavating, Trenching, and Shoring."

ESHQ	Document	TFC-ESHQ-S_IS-C-04, REV A-3
	Page	7 of 14
FALL PROTECTION	Effective Date	October 18, 2005

4. [TFC-ESHQ-S_SAF-C-02](#), "Job Hazard Analysis."
5. [TFC-ESHQ-S-STD-05](#), "Walking and Working Surfaces."
6. [TFC-ESHQ-S-STD-08](#), "Safety Inspections."
7. [TFC-ESHQ-S-STD-10](#), "Erecting Steel Structures."
8. [TFC-ESHQ-S-STD-12](#), "Elevating Work Platforms."
9. [TFC-OPS-MAINT-C-01](#), "Tank Farm Contractor Work Control."
10. [TFC-OPS-MAINT-C-02](#), "Pre-Job Briefing."

Figure 1. Fall Hazard Mitigation Process.



ATTACHMENT A – PERSONAL FALL ARREST EQUIPMENT INSPECTION

1. Inspect fall arrest equipment before each use and on a regular basis in accordance with the manufacturer's recommendations.
2. Use the following examples to help identify potential defects in fall protection equipment:
 - The hole in the D-ring is not round or the D-ring has been twisted
 - A buckle is stretched so the tongue does not reach the buckle
 - Threads are coming loose in any part of the webbing or lanyard
 - The snap hook keeper does not close against the hook
 - Snap hooks are not double-locking (a double-lock snap hook requires the user to push a button or pull on a latch or trigger before the gate can be opened or the lock operated)
 - Harness or lanyard webbing is stained or stiff compared to the rest of the harness
 - Harness or lanyard webbing shows evidence of burns or extreme heat
 - The manufacturer's label is missing
 - Equipment shows signs of being stretched
 - Stitching around the connectors such as buckles, D-rings, etc., show wear or damage
 - Any part of the system shows evidence of being cut off
 - The webbing has stains or other unexplained discolorations
 - Connectors have sharp edges or nicks that could damage other parts of the system
 - Holes are elongated; for example, in the webbing used to adjust length of straps that go around the thigh
 - The cable in a self-retracting life line does not retract smoothly or the braking system does not activate when the line is pulled on quickly
 - The retracting lifeline shows evidence of damage such as cuts, twists, or worn or broken strands
 - The self-retracting lifeline makes funny noises such as grinding or rubbing sounds, or feels like there is grit inside the system
 - A user reports any concern with the equipment.

ATTACHMENT A – PERSONAL FALL ARREST EQUIPMENT INSPECTION (cont.)

3. If the equipment has a potential defect, withdraw it from use immediately.
4. To ensure good working condition of the Personal Fall Arrest System, keep the equipment stored in an area that is dry, free from moisture, chemicals, and direct sunlight.

NOTE: Personal fall arrest systems need to be removed from service after six months in a radiation zone.

ATTACHMENT B – FALL HAZARD MITIGATION CONTROLS

Guardrail Systems

- Area Manager
1. Provide guardrail systems consisting of top rails, mid rails, and toeboards, or screens/mesh in accordance with [29 CFR 1926.501\(a\), \(b\), and \(c\)](#).
 2. Ensure that guardrail systems will block access to the fall hazard except at ladders and stairs. Place a swing gate across a ladder opening unless the opening is barricaded or the opening offset.

Scaffold Systems

- Area Manager
1. Erect scaffold in accordance with [TFC-ESHQ-S_IS-C-01](#).
- Field Work
Supervisor/Workers
2. Use erected scaffold in accordance with [TFC-ESHQ-S_IS-C-01](#).

Elevating Work Platforms

- Field Work
Supervisor/Workers
1. Use elevating work platforms in accordance with [TFC-ESHQ-S-STD-12](#).

Personal Fall Arrest Systems

- Field Work
Supervisor
1. Identify the fall arrest systems' anchorage points.

NOTE: Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds per employee attached, or shall be designed and installed as part of a complete Personal Fall Arrest System which maintains a safety factor of at least two (i.e., twice the potential impact load of an employee's fall), and used under the supervision of a qualified person.

A structural engineer shall be consulted to recommend appropriate fall arrest anchorage locations.

NOTE: Special consideration must be paid to locating the anchorage directly at or above the mid-shoulder D-ring so that in the event of a fall, the fall arrest begins immediately, resulting in minimal shock loading to the anchorage.
 2. Obtain structural engineer's approval of proposed fall arrest anchorages.

ATTACHMENT B – FALL HAZARD MITIGATION CONTROLS (cont.)

- | | |
|---------------------|--|
| Structural Engineer | 3. Identify or design acceptable anchorages for fall restraint in accordance with 29 CFR 1926.501(a), (b), and (c) . |
| Worker | 4. Use and select the components of a Personal Fall Arrest System for fall arrest or fall restraint according to the minimum requirements given below: <ul style="list-style-type: none">• Use Personal Fall Arrest System in accordance with the manufacturer’s recommendations.• Do not use body belts for fall arrest or fall restraint.• Before use, inspect the Personal Fall Arrest System for wear, damage, deterioration, and defective components. If any defects are found, remove the Personal Fall Arrest System from service immediately. See Attachment A for further guidance.• Attach a snap hook only to another connector that is part of the Personal Fall Arrest System. Do not hook it back onto itself unless the lanyard is approved for that application.• Do not use single-locking snap hooks (use double-locking snap hooks only).• Attach a lanyard or self-retracting lifeline to the D-ring on back of the worker between the shoulder blades.• Use Personal Fall Arrest System components only for personal protection and not for hoisting materials unless approved by the manufacturer for that purpose.• Remove Personal Fall Arrest System components that have been subject to a fall from service and destroy them. |

Alternatives to Fall Protection Systems

When conventional fall protection systems are not feasible or create a greater hazard, use alternate fall protection systems (safety monitors, control access zones, and safety monitoring systems).

NOTE: These alternative systems do not offer a positive means of fall protection. However, they do minimize risk by reducing the number of employees exposed to the fall hazard. The following examples may be considered to help determine when to use alternative fall protection systems:

ATTACHMENT B – FALL HAZARD MITIGATION CONTROLS (cont.)

- On roofs less than 50 feet wide when guardrail systems or personal fall arrest systems are not feasible (where anchorages do not exist).
- Leading edge work where the work will proceed in such a fashion that the construction of guardrails or safety nets is not feasible or puts others at risk to install these systems.
- Pre-cast concrete erection where the placement of beams would create additional hazards to the workers by being struck by the beams, getting tangled in lifelines, etc.
- Overhand bricklaying where the mason is not reaching more than 10 inches below the work surface.

Planner/ Field Work
Supervisor/ Industrial
Safety/Workers

1. Develop alternative fall protection plans such as the safety monitoring system.

Industrial Safety

2. Document alternative fall protection plans in accordance with in [Attachment C](#).

ESHQ	Document	TFC-ESHQ-S_IS-C-04, REV A-3
	Page	14 of 14
FALL PROTECTION	Effective Date	October 18, 2005

ATTACHMENT C – FALL PROTECTION PLAN

The fall protection plan is only available to employers or organizations that can demonstrate that it is not feasible or creates a greater hazard to use conventional fall protection equipment. The fall protection plan is basically a site-specific safety program.

Limitations and conditions for the use of the fall protection plan:

1. It must be a greater hazard to use guardrail systems and personal fall arrest systems.
2. A qualified person must prepare the fall protection plan and approve any changes.
3. The fall protection plan must be implemented by a competent person who is on site.
4. The fall protection plan must document the reasons why the use of conventional systems is not possible or would create a greater hazard.
5. The fall protection plan shall include a written discussion of other means used to minimize the risk of falling for employees who cannot be provided with protection from a conventional system (the use of ladders, scaffolds, vehicle-mounted work platforms).
6. Specific locations shall be identified and classified as control access zones where the risk is minimized by limiting the number of people exposed to a fall hazard and the methods for falling object protection are identified.
7. Where no other means have been implemented, a safety monitoring system shall be in place. All participants shall be named and identified by their clothing. The safety monitor will wear different designation apparel than the workers and keep people other than workers out of the controlled area.
8. Work will be stopped if an employee falls or if there is a near miss until an investigation is completed, the identified deficiencies are adequately corrected, and the fall protection plan is updated, as necessary.