This SOP is subject to
review and revision in 2015.

TECHNICAL SERVICES DIVISION

QUALITY ASSURANCE PROJECT PLAN

MET SOP 508

SITE SAFETY

REVISION 508.1.00 2/28/2008

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STANDARD OPERATING PROCEDURE
BAAQMD TECHNICAL SERVICES DIVISION

SAFETY PROCEDURES AT METEOROLOGICAL SITES

FEBRUARY 28, 2008

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PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to document a safety protocol to be used when servicing a BAAQMD meteorological tower site. The goal is to minimize the risk of staff injury and equipment damage during meteorological site visits.

BACKGROUND

The District operates and network of meteorological stations across the Bay Area to measure continuous ambient meteorological parameters. Each site has a 10-20 meter tower onto which various meteorological sensors are attached. Towers may either be fixed to the ground or on the roof of a building. There are two types of towers in the network – fixed and tilt-down. Fixed towers are either self-standing or guyed and need to be climbed in order to service the sensors. Tilt-down towers are guyed and hinged near the base so that the tower can be folded down.

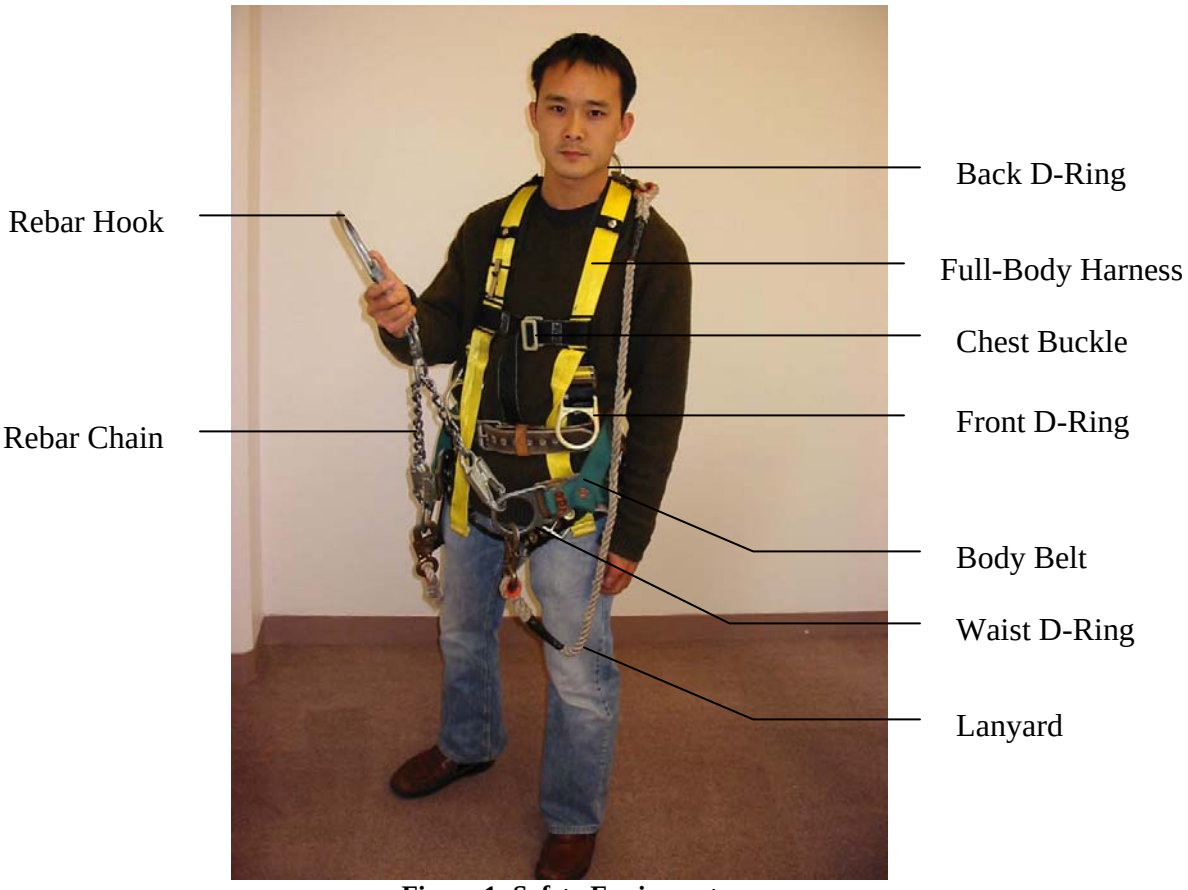

Figure 1: Safety Equipment

ON-SITE PROCEDURES

Safety Meeting

A safety meeting with all personnel present should be conducted before any work is to take place. Any safety issues pertaining to the site should be discussed at this time. To be discussed:

- Injury due to wildlife, such as poisonous spiders, snakes, and wasps. A first-aid kit and a Sawyer bite kit are stored in the met vehicle. All personnel present should know where they are located.
- Any potential hazards that may cause injury including exposed ground rods (trip hazard), steep hills, ladder use, and unusual tower configurations.

Site Inspection

Look for anything unusual that may pose a hazard around the site. This may include insect hives, litter, tower obstructions, and downed electrical wires.

Meteorological Equipment Inspection

Inspect the on-site equipment for rust, wear, and damage. This includes:

- Bent tower sections.
- Loose guy wires. They can be adjusted at the turnbuckles.
- Rusty tower hardware. In particular, rusty tower bolts may make the tower unstable.
- Damaged cables and worn wire covers.
- Loose or damaged sensors.

TILT-DOWN-TOWER LOWERING PROCEDURES

See Tilt-Down Towers SOP for procedures.

TOWER CLIMBING PROCEDURES

Climbing Limitations

Do not climb the tower if:

- The tower is wet or if wind gusts are 25 mph or higher.
- The climber feels ill, dizzy, or fatigued.
- The climber feels that conditions are unsafe for any other reason.

Safety Equipment for Climbing Towers

The use of safety equipment is required when climbers are exposed to falls exceeding 7.5 feet. See the list of safety equipment listed below. Inspect the full-body harness, body belt, and lanyards for loose stitching, broken threads, burns, or worn materials. Inspect the lanyards and rebar chain assembly for cracks, nicks, distortion, corrosion, and binding at the snaphooks.

- **Full Body Harness:** A Full-Body Harness is designed for fall arrest when used with lanyards. To wear, unbuckle the leg straps and slip the shoulder straps onto the shoulders so that the back D-ring is positioned in the middle of your back. Secure the leg straps and the chest buckle. Tighten all webbing so that the harness fits snug but allows a full range of motion. If the full-body harness has been subject to a fall, it must be replaced.
- **Body Belt:** A Body Belt provides support when leaning away from the tower. Prior to each use, check for loose or worn rivets. Buckle the belt securely around your waist with the seat below the belt.
- **Lanyards:** Two lanyards clip onto the tower legs and back D-ring of the full-body harness. Each lanyard has a snaphook on both ends. The lanyards provide fall protection while traversing the tower and when the climber is secured at a working position. Prior to climbing, clip one end of lanyards onto the back D-ring, and the other end onto the front D-ring of the full-body harness or waist D-ring of the body belt. If the lanyards have been subject to a fall, they must be replaced.

- **Rebar Chain Assembly:** The Rebar Chain Assembly consists of a chain with snaphooks on each end and a rebar hook that slides along the chain. The snaphooks clip onto the waist D-rings of the body belt. The rebar chain can be clipped onto a tower leg to secure the climber at a working position. Prior to climbing, clip the snaphooks and rebar hook of the rebar chain assembly onto the waist D-rings of the body belt.
- **Footwear:** Climbers must wear rugged boots with a protruding heel to prevent slipping on the tower.
- **Hard Hats:** Ground personnel should wear hard hats when working around the tower to protect against falling tools and equipment.
- **Tool Bucket:** The tool bucket transports tools and equipment along the tower. Prior to climbing, secure the rope to the tool bucket on one end, and tie it off to the body belt on the other end.

Working Alone

If the climber's feet will be 10 or more feet from the ground, he or she should call a co-worker prior to climbing. Upon completion of work at the site, the co-worker should be notified again that the technician is leaving the site.

Climbing the Tower

- While climbing up or down the tower, the climber should be tied off in a continuous manner with the tower using lanyards. Both lanyards should be clipped to the back D-ring on one end, and the tower legs on the other end. Warning: Only clip the lanyards to any D-ring other than the back D-ring. Doing so may cause you to flip upside-down or slip through the body belt. Do not clip the lanyard snaphook onto the tower webbing. During a fall, the webbing welds may fail, resulting in serious injury or death. If the tower leg is too large for the snaphook to clip onto, wrap the snaphook around the tower leg and clip the snaphook back onto the rope (this is called tying-back).
- Do not talk while climbing until you are properly secured to the tower or are at ground level. Most falls occur when climbers are distracted and lean back before being properly secured.
- The tool bucket should be raised and lowered by the attached rope after the climber has been secured properly to the tower. Do not attempt to climb the tower with the bucket. To avoid equipment damage, put only pertinent tools and supplies in it. Removed parts from the tower should be sent down in the bucket and removed by the ground person.

Securing Yourself to the Tower

If winds are greater than 15 mph, try to position yourself on the tower so that you are facing away from the wind. This will minimize the wind loading of the tower. There are two ways to secure yourself to the tower using the rebar chain assembly, depending on where you are along the length of the tower.

1. **Tower leg:** You may secure yourself to a tower leg anywhere along the length of the tower except at the top section. Position the rebar chain assembly so that one

snaphook is clipped to one waist D-ring on the body belt and the other snaphook is clipped to opposite waist D-ring. Clip the rebar hook to the tower leg furthest away from you at chest-level. Clip the ends of the lanyards to the tower legs.

2. **Top section:** At the very top of the tower, you must secure yourself to the vertical pipe at waist level below the crossarm. Keep the rebar hook clipped onto the waist D-ring (you will not use it). Unclip a snaphook from the rebar chain assembly, bring it behind the vertical pipe, and clip it to a waist D-ring so that both snaphooks are at opposite ends. To bring your body closer into the center of the tower, you may wrap the chain once around the vertical pipe. Clip the ends of the lanyards to the tower legs.

AUTHORS, REVISIONS, AND APPROVALS

February, 2008 (Original Version)
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   Section 8: Code of Safe Work Practices
   - Tower Procedures and Practices
   - Fall Protection

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   www.buckinghammfg.com

3. Miller Fall Protection Website
   www.millerfallprotection.com