North Carolina Department of Labor
Occupational Safety and Health Division

Raleigh, NC

Field Information System Operational Procedure Notice 147A

Subject: Logging Operations, Inspection Procedures and Interpretive Guidance

A. **Purpose**.

This Operational Procedure Notice (OPN) establishes NCDOL Occupational Safety and Health (OSH) Division policies and provides clarification to ensure uniform enforcement of the Logging Operations standard—29 CFR 1910.266.

B. **Action**.

Bureau chiefs and supervisors will ensure that the general inspection procedures and clarifications in this instruction are followed, that compliance officers are properly trained and knowledgeable to recognize logging industry hazards, not only to protect themselves while performing their duties, but so they can also conduct effective inspections of logging operations and investigations of logging related fatalities and or accidents.

C. **Scope and Application**.

The standard applies state-wide to all logging operations where trees are harvested regardless of the end use of the product. Logging operations include, but are not limited to, the operations of marking (i.e., marking danger trees in areas being harvested and marking felled trees to be cut to length), debarking, yarding, chipping, felling, limbing, bucking, loading and unloading equipment and personnel to, from and between logging sites, and other operations associated with felling trees and moving logs from the stump to the point of delivery. The standard does not cover the construction or use of cable yarding systems or the construction of roads or trails to logging sites.

D. **Background**.

CPL 02-01-019 (2-1.19): Logging Operations, Inspection Procedures and Interpretive Guidance and CPL 02-01-22 (2-1.22): Logging Operations, Inspection Procedures and Interpretive Guidance Including Twelve Previously Stayed Provisions were issued by OSHA and adopted verbatim by the OSH Division in 1995 and 1996, respectively. Selected guidance from the directives was incorporated along with text from the Logging Operations standard into Standards Notice (SN) 62: Logging Operations.

This OPN incorporates all guidance from CPL 02-01-019 and CPL 02-01-22 in its entirety and replaces SN 62. Where applicable, outdated references have been updated.

E. **Discussion**.

The Logging Operations standard provides protection for all logging employees, regardless of the end use of the forest product that they are harvesting (e.g., saw logs, veneer bolts, pulpwood, or chips).

1. The standard includes various requirements for the provision, inspection and maintenance of equipment (e.g., personal protective equipment, tools, vehicle requirements and machines) used in performing logging operations. The standard incorporates performance requirements that provide flexibility to employers in developing safety and health

programs to suit logging operations in all regions of the country. The standard also requires employers to provide training for each employee who has not been trained previously.

2. The employer is responsible for ensuring that employees can properly and safely perform the work tasks and properly and safely operate the tools, equipment, machines and vehicles used in their jobs.

3. The standard requires employers to maintain certification of training which indicate the date of the training completion or, in the case of previously trained employees, the date on which the employer determined that prior training was adequate. In addition, the standard requires each logging employee to have current first aid and cardio pulmonary resuscitation (CPR) training (e.g., certificate).

4. The standard addresses hazards unique to logging operations in addition to hazards covered by other 29 CFR 1910 General Industry standards. It strengthened and clarified the requirements of the previous standard. Compliance with this standard will significantly decrease the number of injuries and fatalities resulting from logging operations.

5. Many of the requirements included in the standard have been directed at the most hazardous logging operations: felling, limbing, bucking and yarding. Bureau chiefs and supervisors will ensure that inspections focus on these high hazard operations, giving particular attention to observing whether safe work practices are being followed in these operations.

F. **Definitions**.

1. **Logging Operations**. "Marking" covered by the standard includes only marking that is done by the attendant to trees and at the same time as felling, cutting and moving trees in a particular logging work site. Some marking operations include marking danger trees and sizing and marking felled trees to be cut to length. (Reference the definition for "Logging Operations" in the Logging Operations standard.) These particular marking operations inform loggers working in the area or on the tract whether and how to cut trees.

   a. Marking activities which take place in advance of and separate from the tree harvesting are not covered by the standard. Incidental marking of danger trees or wildlife trees at the same time tracts of land are being marked also is not covered by the standard because no tree harvesting is undertaken in the area at this time. These preparatory activities do not involve the hazards associated with logging operations.

   b. Logging operations cover the transportation of machines, equipment and personnel between as well as to and from logging sites.

2. **Vehicles**. Vehicles include only those cars, buses, trucks, trailers, or semi-trailers owned, leased or rented by the employer and used for transportation of employees or movement of materials. (Reference the definition for "Vehicles" in the Logging Operations standard.)

G. **Inspection Guidance**.

1. **Paragraph (d)(1)—Personal Protective Equipment (PPE)**. The employer is required to provide, at no cost to the employee, appropriate eye, face, head, hand, and leg protection. The employer is not required to provide logging boots for employees. The cost of logging boots may be borne by employees. The compliance safety and health officer (CSHO) will determine through employer/employee interviews whether, except for foot protection, the

employer is providing, at no cost to the employee, personal protective equipment which meets the requirements of this Section.

2. **Paragraph (d)(1)(ii—PPE Inspection**. The employer is required to assure that all PPE, including any PPE provided by an employee, is maintained in a "serviceable condition" and is inspected before initial use during a workshift. **If personal protective equipment is not used during a workshift, it does not need to be inspected**. The employer may delegate the tasks of maintenance and inspection to the employee who uses the personal protective equipment, but ultimately the employer remains responsible. There are different ways in which employers can fulfill their obligation of assuring that personal protective equipment is maintained and inspected. For example, one method an employer can use is informing employees of the maintenance and inspection procedures during training, reinforcing the requirements during regular safety and health meetings, and conducting spot checks of employees who use personal protective equipment. The standard does not require a written record of inspections.

   Protective material may be damaged or destroyed in the course of work (e.g., while stopping a chain saw). When only the outer covers of the protective equipment have been penetrated, it does not necessarily mean that the equipment is no longer serviceable. However, where there are also cuts or tears in the protective material of the logging boot or leg protection, such equipment is no longer in serviceable condition. Such cuts and tears in the protective material compromise the ability of the PPE to provide the level of protection which is necessary. In situations where footwear and leg protection cannot be repaired it must be replaced with PPE which is serviceable.

3. **Paragraph (d)(1)(iii)—Gloves**.

   Employees handling wire rope may wear any type of gloves or hand protection provided that it provides adequate protection against puncture wounds, cuts and lacerations. Employers may provide employees with cotton, leather or rubber gloves if such gloves provide the type of protection required.

4. **Paragraph (d)(1)(iv)—Leg Protection**.

   a. The CSHO will determine whether the employer has provided, at no cost to employees operating chain saws, leg protection specified in (d)(1)(iv).

   b. Employees must use leg protection constructed of cut-resistant material any time they operate a chain saw. Chain saw kickback and sudden cut-through, which are major causes of chain saw injuries, are not dependent on whether the chain saw is used frequently or regularly by the operator. A feller, who operates a chain saw as a regular part of the job, and a logging truck operator, who may operate a chain saw occasionally or incidentally to operating a vehicle, both face a significant risk of injury when using a chain saw. As such, leg and foot protection are required whenever an employee is operating a chain saw.

   c. The CSHO will ascertain whether employees who are working as climbers are wearing leg protection or whether the employer has demonstrated that a greater hazard is posed by wearing such equipment in the particular situation.

   d. The leg protection requirement does not apply to employees operating a chain saw from a vehicular mounted elevating and rotating work platform.

5. **Paragraph (d)(1)(v)—Cut-resistant Foot Protection**. Employers will assure that foot protection worn by each employee who operates a chain saw, including rubber, caulk-soled and other slip-resistant boots, is chain saw cut-resistant.

   a. Material is deemed to be "chain saw cut-resistant" if it either provides enough resistance to give the employee time to react before the chain saw cuts through the boot material or jams the flywheel and chains, thereby causing the saw to stop.

   b. The chain saw cut-resistant foot protection requirement applies to all employees who operate a chain saw as a regular part of the employee's job as well as incidental to the job. Based upon the hazards to employees when they use a chain saw, OSH requires that all employees who use a chain saw be protected against foot injury, regardless of the frequency of chain saw usage.

   c. A specific type of construction of protective footwear, such as steel-toed logging boots, is not required. Steel-toed boots meeting the foot protection requirements of ANSI Z 41-1991, "American National Standard for Personal Protection-Protective Footwear," provide adequate protection for the toe. (Note: compliance officers may reference 29 CFR 1910.136(b)—Criteria for Protective Footwear for currently recognized consensus standards.) However, if the logging boots do not have material to protect the rest of the foot from the chain saw cuts they do not comply with the final rule. Logging boots for chain saw operators must provide cut-resistant protection for the foot, not just the toe. Employees are free to use foot protection constructed with other cut-resistant material to protect against chain saw cuts.

6. **Paragraph (d)(1)(vii)—Eye and Face Protection**. The employer must assure that each employee who is at risk of eye and face injury wear protection meeting the requirements of Subpart I—Personal protective Equipment of Part 1910. For example, some employees (e.g., machine maintenance employees), may only need eye protection to guard against injury.

   a. In other logging operations such as, but not limited to, chipper operations, and cutting limbs, branches and spring poles, face protection must be worn because there is a potential for facial injury (e.g., flying wood, needles, and splinters; cutting limbs and springpoles; moving through dense underbrush). For operations such as chipping, face protection must meet the requirements of Subpart I.

   b. For chain saw operations, logger-type mesh face screens may be worn even though most logger-type mesh face screens do not meet the requirements of Subpart I. They do not comply with the referenced ANSI standards, ANSI Z87.1-1989 or ANSI Z87.1-1968 (note: compliance officers may reference 29 CFR 1910.133(b)—Criteria for Protective Eye and Face Protection for currently recognized consensus standards) because they are not able to pass the impact and penetration resistance tests required by the ANSI standard. In chain saw operations however, there is not the same hazard of objects hitting the face screen at a high speed or penetrating through the mesh openings. Mesh screens provide adequate protection to keep small limbs, branches, and saplings from poking the employee's eye or cutting the employee's face when the employee is moving through the woods, yet do not restrict vision in wet weather or fog up. Face protection comprised of mesh screens is readily available in the industry.

   c. Where both eye and face protection is necessary, and the employee is provided with face PPE that protects the eyes and face, the employee is not also required to wear separate eye protection.

7. **Paragraph (d)(2)(i)—Location of First-aid Kits**. First-aid kits must be located at each active landing, and on each employee transport vehicle. First-aid kits also must be readily accessible to each work site where felling, limbing and bucking are being done.

    a. First-aid kits at landings and on vehicles will suffice for the requirement that first-aid kits be at each worksite, provided that the worksite (including all employees involved with that worksite) is located no more than one-half mile from the first-aid kit at the landing or on the vehicle. (For enforcement purposes, first-aid kits which are within one-half mile of a worksite and all the employees at that worksite will normally be considered to be "reasonably accessible" to an injured employee, especially if audio communication is maintained with the landing.)

    b. Where one of these cutting worksites is located more than one-half mile, under optimal conditions, from another worksite, landing or employee transport vehicle, a first-aid kit must also be provided at that worksite. This is necessary because as worksites and employees are more remote from landings and vehicles it will take more time to get first-aid assistance to an injured employee, especially where the terrain is steep or wet. In these situations, the first-aid kits which are at the landing, on the vehicle, or at other worksites are too distant to be considered immediately accessible.

    c. Where conditions are not optimal, such as steep or mountainous terrain, very muddy terrain, heavy brush, or snowy and icy conditions, first-aid kits cannot be as far as one-half mile from a cutting area and still be considered immediately accessible. Where such conditions exist or are reasonably anticipated, the employer will have to evaluate their severity in determining whether cutting operations need first-aid kits to be located closer to the worksite.

8. **Paragraph (d)(2)(iii)—Review of First-aid Kits**. Annual review and approval of first-aid kits by a health care provider is permitted but not required by the standard. Each first-aid kit must contain at least the items listed in Appendix A—First-aid Kit Contents (Mandatory) of the Logging Operations standard. (Reference Paragraph (i)(7)(i)—First-aid Training for training requirements.)

9. **1910.266 Appendix A—First-aid Kit Contents (Mandatory)**. The standard specifies the minimum contents of first-aid kits that employers must provide. The minimum content list was developed in conjunction with OSHA's offices of occupational medicine and occupational health nursing. Each kit must, at a minimum, contain at least one blanket. Each first-aid kit must also contain a splint. Examples of acceptable splints include wire, inflatable and air splints.

10. **Paragraph (d)(3)—Seat Belts**. The CSHO will determine whether each vehicle or machine equipped with Rollover Protective Structure/Falling Object Protective Structure (ROPS/FOPS) or overhead guards, including employee-owned vehicles and machines, has seat belts provided for the operator meeting the requirements of the revised standard. The employer will assure that each employee uses the available seat belt while the vehicle or machine is being operated. There are different ways in which an employer can meet this obligation. One method is informing employees of this requirement during training, reinforcing the requirement during regular safety and health meetings, and by conducting spot checks of employees while they are operating vehicles and machines. The CSHO will determine through employer/employee interviews whether employees are using seat belts whenever they operate a machine or vehicle.

11. **Paragraph (d)(4)—Fire Extinguishers**. The CSHO will determine whether the employer provides and maintains portable fire extinguishers on each machine and vehicle involved in logging operations, during both operation and refueling.

12. **Paragraph (d)(5)—Environmental Conditions**.

    a. Work must terminate and employees must move to a place of safety when environmental conditions create a hazard for an employee. Hazardous environmental conditions include strong winds which may adversely affect the fall of a tree.

    b. Fire is also identified as a hazardous environmental condition. However employees are not required to leave the area any time a fire starts. If a fire started in an area where there is no fire extinguisher or other equipment or supplies which allow the employee to safely suppress it, the employer would be responsible for assuring that employees are moved out of the danger area. Likewise, where a fire, because of its size, intensity or the conditions of the area, creates a hazard for an employee who remains in the area, either to work or to attempt to suppress the fire, the employer must also assure that employees are removed from the area of danger instead of trying to extinguish the fire. The standards on Fire Protection in Subpart L of Part 1910 and not the Logging Operations standard govern the fighting and suppression of fires at logging worksites.

13. **Paragraph (d)(6)(i and ii)—Work Areas**. Through observation and employer/employee interviews, the CSHO will determine whether adjacent **occupied** work areas are spaced at least two tree lengths apart and whether the duties of each employee are organized so the actions of one employee will not cause any other employee to be potentially exposed to logging hazards. The CSHO will determine whether a distance of greater than two tree lengths is being maintained between adjacent **occupied** work areas on slopes.

14. **Paragraph (d)(6)(iii)—Working within Visual or Audible Contact**. This applies to each employee working at a logging worksite, including watchmen and other employees performing logging operations at remote logging worksites. This requirement does not apply to vehicle operators who are not at the logging site, but only to vehicle operators while they are at a logging worksite. The CSHO will determine whether each employee involved in logging operations works in a position or location that is within visual or audible contact with another employee. Engine noise, such as from chain saws, is not an acceptable means to "maintain contact".

15. **Paragraph (d)(6)(iv—Accounting for Employees**. The employer must account for each employee at the end of each workshift. The employer need not personally conduct the actual end of shift accounting of each employee, but may delegate this task. The employer remains ultimately responsible under the standard for assuring that employees are not inadvertently left in the woods. The CSHO will determine through employer/ employee interviews whether the employer accounts for each employee at the end of each workshift.

    Employees are not prohibited from remaining at the work site after the end of the work shift to engage in personal activities, such as hunting, camping, or cutting fire wood for personal use. However, no employee, particularly an injured employee, should be inadvertently left in the woods without assistance. After the workshift has ended and the employer has ascertained that the employee is done with work, including overtime work, and is safely accounted for, the employer may allow employees to remain in the area for personal reasons.

16. **Paragraph (d)(7)(i)—Signaling and Signal Equipment**. The CSHO will determine whether hand signals or audible contacts, such as, but not limited to, whistles, horns, or radios, are utilized whenever noise, distance, or other factors prevent clear understanding of normal voice communications between logging operation employees.

17. **Paragraph (d)(7)(ii)—Signaling**. Engine noise, such as from chain saws, is not an acceptable means to "maintain contact" or as a signal.

18. **Paragraph (d)(7)(iii)—Signaling—Designated Employee**. The CSHO will determine whether signals are given only by a designated employee, except in an emergency. A "designated person" is defined by this standard as an employee who has the requisite knowledge, training and experience to perform the specified duties.

19. **Paragraph (d)(8)—Overhead Electric Lines**. The CSHO will determine whether logging operations near overhead electric lines are in compliance with the requirements of 29 CFR 1910.333(c)(3)—Electrical—Selection and Use of Work Practices. This standard applies during line clearing tree trimming operations, where any of the activities within the scope of this standard such as felling etc., are conducted. The Telecommunications standard, 29 CFR 1910.268, and the Electric Power Generation and Transmission standard, 29 CFR 1910.269, may apply to logging operations involving tree-trimming, but not the felling of trees.

20. **Paragraph (d)(9)(i)—Storage and Handling of Flammable and Combustible Liquids**. Flammable and combustible materials must be stored, handled and transported in accordance with the requirements of 29 CFR 1910, Subpart H—Hazardous Materials. Subpart H permits Category 2 or 3, which includes chain saw fuels, to be carried in approved safety cans. Safety cans which are permitted under Subpart H are further defined as containers approved by a nationally recognized testing laboratory (NRTL), which do not hold more than 5 gallons capacity, have a spring-closing lid and spout, and are designed to safely relieve internal pressure when subjected to fire exposure. This definition is broad enough to include plastic safety cans, provided that such containers are approved by a NRTL as meeting the other requirements of the definition. SN 18: Approved Containers to Store Flammable Liquids in General Industry provides further information on approval specifications.

21. **Paragraph (d)(9)(iii)—Machine Fueling**. Diesel-powered machines and vehicles may be fueled while idling, provided that continued operation is intended and that the employer follows safe fueling and operating procedures. The OSH Division permits this exception because the hazard which this provision seeks to address, sudden flash fires, is typically not present during fueling of diesel-powered engines because diesel fuel has a higher flash point than that of gasoline, and unlike gasoline its vapors do not evolve as suddenly. Therefore, it is unlikely that a fire will erupt during fueling of diesel-powered engines. At the same time, safe-fueling and operating procedures must be followed during fueling of diesel-powered machines. Employers must train employees in safe practices during fueling. These include vapor containment, spill prevention, and procedures the operator must follow before leaving the machine cab to fuel the engine.

22. **Paragraph (d)(9)(iv)—Starting Fires**. Flammable and combustible liquids, such as chain saw and diesel fuel, may be used in certain conditions to start a fire. This flexibility will allow piles of wood or slash to be burned when permitted by forestry officials.

    a. However, this provision does not permit flammable and combustible liquids to be used whenever a fire is needed. This provision only permits such liquids to be used where the employer assures that their use does not create a hazard for an employee.

b. Employers must train employees to know under what conditions it is safe to start a fire with chain saw fuel and in what situations using fuel may create a hazard for an employee. For example, using chain saw fuel to start a fire in an enclosure is not safe and is not permitted. There are other ways to start fires where chain saw fuel may create a hazard, for example, light-weight fire starters made of sawdust and wax.

23. P**aragraph (e)—Hand and Portable Powered Tools**. The employer must assure that each hand and portable powered tool, including each tool provided by an employee, is maintained in serviceable condition and is inspected before initial use during a workshift. **If a tool is not used during a workshift it does not need to be inspected**. The employer may delegate the tasks of maintenance and inspection to the employee who uses the tools, but ultimately the employer remains responsible. There are different ways in which employers can accomplish their obligation of assuring that tools are maintained and inspected. For example, one method employers can use is informing employees of the maintenance and inspection procedures during training, reinforcing the requirements during regular safety and health meetings, and by conducting spot checks of employees who use tools. A written record of the inspections is not required.

24. **Paragraph (e)(2)(i)—Chain Saw Brakes and Kickback Devices**. Each chain saw placed into initial service after February 9, 1995 must be equipped with a chain brake. In addition, each chain saw will meet the chain saw brake and other performance and safety requirements of the ANSI B175.1 - 1991 "Safety Requirements for Gasoline - Powered Chain Saws." Compliance with the ANSI standard can be verified by the presence of the manufacturer's label and the Underwriters Laboratory (UL) label on the chain saw. No chain saw kick back device will be removed or otherwise disabled. The CSHO will determine whether chain saws placed into service **before the effective date** are equipped with a kickback device, such as a chain brake, bar tip guard, reduced-kickback guide bar, or reduced-kickback saw chain. The CSHO will determine whether the kickback device is in serviceable condition and has not been removed or disabled. Note: When chain saw sound levels specified in 29 CFR 1910.95—Hearing Conservation exceed the requirements of 29 CFR 1910.95, the employer will provide and the employee will wear ear protection in accordance with the requirements of 29 CFR 1910.95. The OSHA standard 1910.95 governs chain saw sound levels, not ANSI B175.1-1991 which provides for higher noise level).

25. **Paragraph (e)(2)(iv)—Refueling Chain Saws**. The standard requires that chain saws be fueled and started at least 10 feet from any open flame or source of ignition and fueling area. A 10-foot distance provides adequate ventilation in both situations because outdoors, where constant air movement dissipates vapors, it is unlikely there could be a concentration of flammable vapors beyond 10 feet.

26. **Paragraph (e)(2)(vi)—Starting Chain Saws**. Chain saws must be started on the ground or where otherwise firmly supported. Drop starting chain saws is prohibited. The employee is not prohibited from standing upright when starting a chain saw, provided that the employee has firmly supported or secured the chain saw. For example, a chain saw operator would be in compliance if he or she rested the chain saw firmly on a log or other stationary item and started the chain saw while standing upright.

27. **Paragraph (e)(2)(xii)—Carrying Chain Saws**. Chain saws must be carried in a manner that will prevent employee contact with the cutting chain and muffler. There are devices currently available and used in the logging industry to prevent cuts and burns while carrying a chain saw, including leather and felt shoulder pads. These devices are not required by the Standard.

28. P**aragraph (e)(2)(xiii)—Retreating with Chain Saws**. The chain saw must be shut off or the throttle released before the feller begins his retreat. The feller is not required to remain next to the tree waiting for the chain saw to idle down before retreating a safe distance from the falling tree. Rather, as soon as the feller releases the throttle, placing the machine into idle, he should immediately move on the retreat path a safe distance from the falling tree.

29. **Paragraph (f)(1)—Machines—General Requirements**.

    a. The employer will assure that each machine, including each machine provided by an employee, is maintained in a serviceable condition and is inspected before initial use during a workshift. If a machine is not used during a workshift it does not need to be inspected. The employer may delegate the tasks of maintenance and inspection to the employee who uses the machine, but ultimately the employer remains responsible. There are different ways in which employers can accomplish their obligation of assuring that machines are maintained and inspected. For example, one method employers can use is informing employees of the maintenance and inspection procedures during training, by reinforcing the requirements during regular safety and health meetings, and conducting spot checks of employees who use machines.

    b. A written record of inspections is not required.

    c. The CSHO will determine whether a machine operator manual or set of instructions is maintained within the area where the machine is being operated, and whether each operator and maintenance person is following the manual or instructions. Failure to follow instructions may indicate lack of training or lack of supervision.

30. **Paragraph (f)(2)(iv)—Machine Stability**. To maintain stability, the employer must assure that each machine is operated within the limitations imposed by the manufacture as described in the operating and maintenance instructions for the machine. There are many ways in which an employer can accomplish this obligation. Manufacturers' operating instructions can be incorporated into operator training programs. Compliance with these operating instructions can be reinforced during regular safety and health meetings, and through spot checks on employees' operating performance.

31. **Paragraphs (f)(2)(x) and (xi)—Machine Shutdown Procedures**. Paragraph (f)(2)(xi) requires that the hydraulic and pneumatic energy storage devices that can move elements of a logging machine even after the machine has been shut down must be discharged as specified by the manufacturer. Paragraph (f)(2)(x) requires that any time the operator leaves the machine cab brakes must be applied, the moving elements must be grounded or secured, and the transmission must be placed in the manufacturer's specified park position.

32. **Paragraph (f)(3)—Protective Structures**. The employer must assure that any machine used for logging operations is in compliance with the other provisions of paragraph (f)(3). For example, all machines used in logging operations must have two means of egress. To the extent that any machine in service does not have a second means of egress, the machine must be retrofitted (e.g., replacing the stationary window shield with a hinged window to allow egress) or removed from service.

33. **Paragraph (f)(3)(i)—Protective Structures for Logging Machines**. Logging machines placed into initial service after February 9, 1995 must have falling object protective structure (FOPS) and/or rollover protection structures (ROPS): tractors, skidders, swing yarders, log stackers, log loaders and mechanical felling devices, such as tree shears or feller bunchers.

34. **Paragraph (f)(3)(ii)—ROPS Specifications**. Logging machines, manufactured after August 1, 1996, must be equipped with ROPS that are tested, installed and maintained in accordance with the Society of Automotive Engineers (SAE) J1040, April 1988, Performance Criteria for ROPS for Construction Earthmoving, Forestry and Mining Machines.

ROPS and FOPS, which are required on logging machines placed into initial service after February 9, 1995, must meet the requirements of SAE J397, April 1988, "Deflection Limiting Volume - ROPS/FOPS Laboratory Evaluation." The 1988 Standard updated a 1979 SAE Standard on deflection limiting volume. There is no significant functional difference between the criteria of the 1988 and 1979 SAE Standards. Therefore, ROPS and FOPS certified to meet the requirements of either the 1988 or 1979 SAE Standards will be deemed to be in compliance with the final logging standard.

35. **Paragraph (f)(3)(vii) and (viii)—Machine Cab Enclosures**. Logging machines manufactured after August 1, 1996, will have cabs which are completely enclosed, including entrances (paragraph (f)(3)(viii). The machine cab may be enclosed either with mesh material (with openings no greater than 2 inches (5.08 cm) at its least dimension) or with other material(s), provided the employer demonstrates that the alternative provides visibility and protection from penetrating objects which is equivalent to mesh material.

a. For those logging machines manufactured on or before August 1, 1996, paragraph (f)(3)(viii) provides that such machines may either comply with paragraph (f)(3)(vii) or be equipped with a protective canopy for the operator which meets the following requirements:

i. The protective canopy will be constructed to protect the operator from injury due to falling trees, limbs, saplings or branches which might enter the compartment side areas and from snapping winch lines or other subjects;

ii. The lower portion of the cab will be fully enclosed with solid material, except at entrances, to prevent the operator from being injured from obstacles entering the lab;

iii. The upper rear portion of the cab will be fully enclosed with open mesh material with openings of such size as to reject the entrance of an object larger than 2 inches in diameter. It will provide maximum rearward visibility; and

iv. Open mesh will be extended forward as far as possible from the rear corners of the cab sides so as to give the maximum protection against obstacles, branches, etc., entering the cab area.

b. If the cab enclosure or any other item is attached to a ROPS, the attachment will not affect the function or performance of the ROPS.

c. Materials that satisfy the performance criteria of the Society of Automotive Engineers SAE J1084, April 1980, "Operator Protective Structure Performance Criteria for Certain Forestry Equipment" are deemed to comply with the Logging Operations standard. NOTE: The term "cab" includes any machine operator station, even if it is not a total enclosure providing weather and other protection.

d. The employer must assure that any machine used for logging operations is in compliance with the other provisions of paragraph (f)(3)—Protective Structures. For example, all machines used in logging operations must have two means of egress. To the extent that any machine in service does not have a second means

of egress, the machine must be retrofitted (e.g., replacing the stationary window shield with a hinged window to allow egress) or removed from service.

36. **Paragraph (f)(3)(xv)—Machine Roofs/Sheds**. The CSHO will determine whether machines operated near cable yarding operations are equipped with roofs or sheds that provide sufficient protection from breaking cable lines.

37. **Paragraph (f)(4)—Overhead Guards**. Each forklift must be equipped with an overhead guard which meets the requirements of the American Society of Mechanical Engineers, ASME B56.6-1992 (with addenda), "Safety Standard for Rough Terrain Forklift Trucks." (The preamble of the standard mistakenly references the 1987 ASME standard. This reference should be disregarded.) This Section does **not** provide an exception for forklifts placed into service before the effective date of the Standard.

38. **Paragraph (f)(5)—Machine Access**. The CSHO will determine whether the following requirements are met:

    a. Each machine cab has a second means of egress.

    b. Walking and working surfaces of each machine and machine work station have a slip resistant surface to assure safe footing.

    c. The walking and working surface of each machine are kept free of waste, debris and any other material that could cause fire, slipping, or falling.

    d. The exhaust pipes of machines are equipped with spark arresters. Engines equipped with turbochargers are not required to have spark arresters.

39. **Paragraph (f)(7)—Service Brakes**. The primary **service brakes** must be sufficient to stop and hold the machine or vehicle and its rated load on the slope on which it is being operated.

40. **Paragraph (f)(7)(ii)—Machine Brakes**.

    a. Logging machines placed into initial service after September 8, 1995, must be equipped with three braking systems - service brakes, secondary brakes that are sufficient to stop the machine in the event the service brakes fail, and parking brakes.

    b. Some older machines were manufactured with primary brakes, but without secondary or parking brakes. These older machines may remain in use, provided that the employer assures the primary brakes are inspected and maintained at their designated level of effectiveness (i.e., are sufficient to stop and hold the machine and its rated capacity on the slopes over which it is being operated).

    c. Logging machines with braking systems meeting the following Society of Automotive Engineers (SAE) or International Standards Organization (ISO) standards are deemed to be in compliance with the final rule, provided that the employer assures that such braking systems are maintained in a serviceable condition: SAE J1026, April 1990, "Brake Performance - Crawler Tractors And Crawler Loaders" SAE J1178, June 1987, "Braking Performance - Rubber Tired Skidders" SAE J1473, October 1990, "Brake Performance - Rubber Tired Earthmoving Machines" SAE J1178/ISO 11169, December 1994, "Machinery for Forestry - Wheeled Special Machines - Vocabulary, Performance Testing, and Criteria for Brake Systems" ISO 11512, March 1995, "Machinery for forestry - Tracked Special machines - Performance criteria for brake systems" ISO 3450, November 1985, "Earth moving machinery - Wheeled machines - Performance requirements and test procedures for braking systems"

41. **Paragraph (f)(8)—Guarding**. The CSHO will determine whether effective guarding meeting the requirements of Subpart O—Machinery and Machine Guarding of Part 1910 is installed on each machine and is in place while the machine is in operation in order to protect employees from moving parts.

42. **Paragraph (g)(1) and (g)(2)—Vehicles**. The employer will ensure that each vehicle is maintained in a serviceable condition and is inspected before initial use during a workshift. If a vehicle is not used during a workshift it does not need to be inspected. Employers may assign to others, including employees using the items, performance of the required inspection and maintenance procedures for equipment, but ultimately the employer remains responsible for safe equipment at the workplace. There are different ways in which employers can accomplish their obligation of assuring that vehicles are maintained and inspected. For example, one method employers can use is informing employees of the maintenance and inspection procedures during training, reinforcing the requirements during regular safety and health meetings, and conducting spot checks of employees who use vehicles. The standard does not require a written record of inspections. The standard covers only those vehicles owned, rented, or leased by the employer. Therefore, vehicle inspection and maintenance requirements do not apply to employee-owned vehicles. However, the employer has the duty to provide safe access to the worksite.

43. **Paragraph (g)(3)—Vehicle Maintenance Instructions**. The CSHO will determine whether operating and maintenance instructions are available in each vehicle and whether each vehicle operator and maintenance employee is complying with the instructions.

44. P**aragraph (h)(1)(ii)—Tree Harvesting—Unfamiliar or Unusually Hazardous Conditions**. Employees are required to contact their immediate supervisor for approval when unfamiliar or unusually hazardous conditions are encountered before cutting is commenced.

    a. Certain situations are clearly covered by this paragraph, including worsening weather conditions which begin to impair the logger's vision; deepening snow or mud which begins to affect a logger's mobility; felling very large or very tall trees; cutting trees whose lean, structure, or location make it difficult to fell in the desired or safest direction; and using a driver tree to fell a danger tree.

    b. It is also important that employers train their employees that when they encounter situations with which they have not dealt with before, they need to work with the supervisor to handle the situation. This concept should also be reinforced in regular safety and health meetings.

45. **Paragraph (h)(1)(iii)—Felling Distances**. While manual felling is in progress, yarding machines will not be operated within two tree lengths of trees being manually felled. This requirement does not apply to tree pulling operations where tree pulling and other team operations are used. The CSHO will determine whether the following requirements are met:

    a. No yarding machine is operated within two tree lengths of any tree which is in the process of being manually felled.

    b. No employee approaches manual or mechanical felling operations closer than two tree lengths until the feller or operator, respectively, acknowledges it is safe to do so.

    c. Undercuts are made in each tree being felled unless the employer demonstrates that felling the particular tree without an undercut will not create a hazard for an employee.

d. Backcuts are made in each tree being felled.

e. Backcuts are made above the horizontal cut of the undercut when the "conventional" cutting method is used. This requirement does not apply in tree pulling operations. This requirement also does not apply to "**open face felling**" since there is no horizontal undercut in that cutting method. The requirement that backcuts be above the horizontal cut of the undercut when the "Humboldt" cutting method is being used has been stayed.

f. Bucking and limbing are done from the uphill side unless the employer demonstrates that it is not feasible. When bucking or limbing is done from the downhill side, the tree must be secured with chocks to prevent it from moving.

46. **Paragraph (h)(1)(vi)—Removal of Danger Trees**.

a. The CSHO will determine whether employees are following safe practices in the removal of danger trees. Safe practices include checking for signs of loose bark, broken branches or limbs, and checking for damage before the danger trees are felled or removed.

b. Danger trees, including lodged trees, must be felled or removed before other work is commenced in the area of the danger tree. Danger trees may be marked and avoided instead of being felled or removed, provided that no other work is commenced in the area of the danger tree.

c. Mechanical felling of danger trees is recommended. When other means are used, they must minimize employee exposure. We understand this to mean that felling can be done by such means as having a single, designated, properly trained employee fell the tree.

d. Removal of a danger tree by felling another one into it is not prohibited.

47. **Paragraph (h)(1)(ix)—Domino Felling**. The CSHO will determine whether any employee is practicing the unsafe and prohibited act of harvesting trees by means of domino felling. Domino felling is defined as "[the partial cutting of **multiple** trees which are left standing and then **pushed over with a pusher**."

a. The definition of domino felling does not include the felling of a **single** tree with another tree. The domino felling that is prohibited in the final rule is the felling of **multiple** trees with another tree.

b. The practice of felling a danger tree by felling another one into it, while not prohibited in general, is not automatically permitted to be used whenever a danger tree is felled. Paragraph (h)(1)(vii) of the standard also requires that where a danger tree is felled or removed, the feller must use a technique that "minimize[s]" employee exposure to the hazard. In some cases, felling a danger tree by felling another tree into it will not minimize employee exposure to the hazards, but rather may increase a risk the feller faces in removing the danger tree. In such circumstances, safer method to remove a danger tree is to pull the tree down with a skidder or mechanical feller.

c. A danger tree may be felled in this manner only where a careful examination of mechanical techniques is made first and where it is also determined that the hazards of felling the danger tree in this manner can be sufficiently minimized.

48. **Paragraph (h)(2)(i)—Retreat Paths**. Before a feller begins cutting a tree a retreat path must be planned and cleared. Once the back-cut has been completed the feller must immediately move to a safe distance away from the tree on the retreat path.

49. **Paragraph (h)(2)(iv)—Spring Poles**. When a spring pole or other tree under stress (hereafter collectively referred to as spring poles) is cut, no employee other than the feller will be closer than two tree lengths when the stress is relieved.

    a. Spring poles are danger trees and the requirements of paragraphs (h)(1)(vi) and (vii) must be followed to minimize exposure to hazards when felling danger trees. These requirements include felling danger trees by using mechanical means or other methods that minimize employee exposure to the hazards associated with the danger tree. Any employee cutting spring poles must have his body and chain saw in the clear when the stress in the spring pole is released.

    b. Because of the inherent dangers of spring poles, only trained workers are allowed to fell spring poles (paragraph (i)). This training includes recognition of the hazard associated with spring poles (i.e., extreme stress on the entire tree), as well as the methods for dealing with spring poles. Employee training should stress that the preferred method to deal with spring poles is to avoid them (i.e., mark them and not work within two tree lengths of them), rather than felling or removing them. However, if employees cannot avoid them, training should emphasize that the safest way to remove spring poles is by machine.

    c. Where employees are trained in safe felling techniques for spring poles and where the employer provides the necessary reinforcement of safe work practices through regular safety and health meetings and spot checks, the potential for death and injury in felling spring poles will be greatly reduced.

50. **Paragraph (h)(2)(vii)—Backcuts**.

    a. **Open Face Felling**. The requirements that backcuts be placed above the level of the horizontal face cut does not apply to open face felling since there is no horizontal face cut where this method is being used.

    b. In open face felling two facecuts are made diagonally into the stem producing a notch that is very open (i.e., 70 to 90 degrees). The openness of this notch allows the tree either to fall completely to the ground, or to fall a much greater distance than in conventional cutting before the notch closes and the hinge breaks.

    c. Where the tree is able to fall a greater distance before pressure is placed on the hinge, the tree is more likely to fall in the intended direction and is less likely to kick back off the stump when the notch does close.

    d. **Humboldt Cutting**. The requirement that the backcut be placed above the level of the horizontal facecut does apply when the Humboldt cutting method is used. In the Humboldt cutting method, a horizontal cut is made into the face of the tree and a notch is cut into the stump below the horizontal cut at an angle. By contrast, in conventional felling, the notch is cut at a diagonal above the horizontal facecut.

    e. In logging operations where the Humboldt method is most heavily used, fellers most often only cut a notch no greater than 45 degrees, making this method similar to that of conventional felling. Fellers do this to keep the stumps as short as possible and thereby reduce the loss of wood. At 45 degrees, however, the face notch alone does not fully address both the hazards of misdirected falling and kickback.

    f. Proper back-cuts that provide sufficient hinge wood are critical. Sufficient hinge wood helps to hold the tree to the stump during most of its fall and thereby allows the hinge to steer the falling tree in the right direction. If the hinge is inadequate or if the pressure is placed on the hinge, it will break too soon and the

tree will be left without a steering mechanism. Without the hinge wood, the tree may twist and bend, and fall in the wrong direction.

g. Placing the back-cut above the horizontal face cut is also necessary to provide a platform to block the tree from kicking back once the hinge does break. Where there is potential that the face notch will close before the tree hits the ground, which is the case with most cutting using the conventional and Humboldt methods, this platform is necessary to prevent kickback. Where the backcut is at the same level as the horizontal cut, there is no platform to block the backward movement of the tree should kickback occur.

h. The standard does not specify how far above the face cut the back- cut must be placed; however, a back-cut placed at least one inch above the face cut creates an adequate platform to prevent kickback and to allow the hinge to direct the falling of the tree. A one-inch platform provides an adequate margin of safety for the feller while still providing the contractor with a fairly square-end log. NOTE: The decision to require that back-cuts in Humboldt cutting be above the horizontal face is based in part on the fact that most loggers currently using this method are making the notch the same size as in conventional felling-45 degrees. A 45-degree notch is generally not open enough to control for both misdirected falling and kickback hazards. However, where a notch of 70 degrees or greater is cut, the notch in Humboldt cutting acts as it does in open face felling. As discussed above, in open face felling, because of the 70-to-90 degree notch, it is unlikely that the tree will fall in the wrong direction or kickback, due to the openness of the notch rather than the type of cutting method being employed. Where the notch is at least 70 degrees, it is not as critical that the backcut be above the horizontal face cut or the notch of the face cut, regardless of whether the open face or Humboldt method is being used.

51. **Paragraph (h)(3)(i)—Bucking and Limbing**.

a. Whenever rolling or sliding of the tree is reasonably foreseeable, bucking and limbing must be done from the uphill side of the tree. Bucking and limbing may not be done from the downhill side. Where a tree cannot be limbed or bucked from the uphill side, the tree must be moved to a stable position where there is no potential for the tree to roll or slide.

b. Because of the hazards associated with bucking and limbing and the high injury rate in these operations, employees must be trained to evaluate the following five potential hazards associated with limbing and bucking:

i. Overhead hazards;

ii. Spring poles;

iii. Forward butt movement, to assess back pressure on limbs;

iv. Butt twist, to assess sideways pressure on limbs; and

v. Position of the butt of the tree in relation to the ground, to assess tension in the tree stem.

52. **Paragraph (h)(4)—Chipping**. The CSHO will determine whether the following requirements are met: a) Chipper access covers or doors are not to be opened until the drum or disc is at a complete stop. b) The chipper is shut down and locked out in accordance with the requirements of 29 CFR 1910.147—The Control of Hazardous Energy when an employee performs servicing or maintenance. 1910.147(c)(4)(i) requires the use of a documented lockout procedure and 1910.147(c)(7)(i) requires the training of employees. Unlike 1910.147, however, this standard does not allow the use of tags. c)

Detached trailer chippers are chocked during usage on any slope where rolling and sliding of the chipper is reasonably foreseeable.

53. **Paragraph (h)(5)(v)—Yarding**. Yarding lines may not be moved unless the yarding machine operator has clearly received and understood the signal. When in doubt, the machine operator must repeat the signal and wait for a confirming signal before moving the line. This applies to all yarding machines, not just yarders.

54. **Paragraph (h)(5)(viii)—Hazardous Obstructions in Yarding**. Yarding machines and their loads must be operated in a manner that prevents contact with obstructions which could create a hazard for an employee. The types of obstructions which are known to be hazardous include, but are not limited to, boulders, danger trees, stumps, log piles, power lines, and cable rigging.

55. **Paragraph (h)(6)(ii)—Loading.** Only the machine operator and other essential personnel may be allowed in the work area during loading and unloading. The work area covered by this provision is the immediate loading work area as opposed to the entire logging work area (e.g., landing.)

56. **Paragraph (h)(6)(iii)—Loading/Unloading of Trees**. The loading of trees at the logging work site and loading/unloading of trees at trans-shipment points such as satellite wood yards are covered by the standard.

    a. With regard to unloading logs at pulp, paper and paperboard mills (hereafter pulp mills) and sawmills, other standards address some of the hazards associated with such unloading (See, Pulp, Paper and Paperboard Mills, 29 CFR 1910.261, and Sawmills, 29 CFR 1910.265). To the extent that certain hazards associated with unloading trees are addressed by these other standards, they apply instead of the final logging rule. For example, both the pulp mills and sawmills standards include provisions specifying how binders and stakes must be released from the load of logs. As such, the similar provision contained in the logging final rule does not apply.

    b. To the extent that the standard addresses hazards not covered by other standards, the logging rule applies. For example, neither the pulp nor the sawmills standards addresses the hazards faced by log truck operators who remain in their cabs during unloading. Thus, paragraph (h)(6)(iii) applies to loading and unloading of trees at pulp mills and sawmills as well as at logging sites and satellite log yards.

57. **Paragraph (i)—Training**.

    a. The CSHO will determine whether each logging employee is adequately trained, using the following guidelines:

    b. All training must be conducted by a "designated person" (refer to the standard for definition).

    c. The employer must certify the training of employees involved in logging operations.

    d. The content of training provided to employees must meet the requirements specified in paragraph (i)(3).

    e. Safety and health meetings must be held at least each month. The standard allows the safety and health meetings to be conducted individually, in crew meetings, in larger groups, or as part of other staff meetings.

    f. Each employee must have received training in first aid and CPR. The employer is not required to provide the training but rather to ensure that the employee's first-aid and CPR training and/or certificate of training remain current.

g. Training materials used must be appropriate in content and vocabulary to the educational level, literacy, and language skills of the employees being trained. For example, that could include the availability of training material and instructions in the native language of the non-English speaking employee.

h. The standard provides exceptions from the training requirements for current and new employees who have previously received training meeting the requirements of this standard. Where the employer elects to rely on the previous training rather than retraining an employee, the employer must certify the date on which the employer determined that the previous training was adequate. New employees must work under the close supervision of a designated person until the employee demonstrates the ability to safely perform their duties independently. The date of the demonstration will suffice for the date on which the employer determined prior training was adequate.

i. The CSHO will determine through employer/employee interviews whether new employees and newly-trained employees work under the close supervision of a "designated person" until the employee has demonstrated that ability to safely perform the job independently. A "designated person" is defined by this standard as an employee who has the requisite knowledge, training and experience to perform the specified duties.

58. **Paragraph (i)(7)(i)—First-aid Training**. The employer must assure that every employee performing logging operations has current first-aid and CPR training. Employers are not required to provide the training. Employers may require new employees have or obtain first-aid and CPR training as a condition of employment.

59. **Paragraph (i)(7)(ii)—Frequency of First-aid Training**. Employers must assure that each employee's first-aid and CPR training remains current.

Compliance officers should reference the refresher training schedule outlined by the entity providing training (examples include the American Red Cross, the American Heart Association, and the American Medical Association).

H. **Effective Date**.

OPN 147 is canceled. This OPN is effective on the date of signature. It will remain in effect until revised or canceled by the director.

Gary Thorpe
Logging & Arboriculture
SEP Team Co-Leader

Kevin Beauregard
OSH Director

8/10/18
Date of Signature