TO:

ENGINEERING INSTRUCTION

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

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SUBJECT: ADDENDUM TO CONSTRUCTION SUPERVISION MANUAL SECTION 107-05 SAFETY AND HEALTH REQUIREMENTS

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APPROVED: P. T. Wells

P.T. Wells, P.E., Deputy Chief Engineer Construction Div.

The attached new section (107-05) for the Construction Supervision Manual should be inserted after page 107-25 in the existing CSM manual, and shall be in-force on May 2, 1994. .

Over the past several years, there have been a number of accidents involving contact with live electrical wires, including 5 which resulted in fatal or near-fatal injuries to the workers involved.

On December 1, 1992, NYSDOT's Employee Safety and Health Section issued Safety Bulletin 92-2 "Working Near Energized Electrical Lines and Equipment". SB 92-2 summarized the requirements of the New York State High Voltage Proximity Act (NYS HVPA), governing work in the vicinity of high voltage electrical lines, and also provided safety policy and procedures for several types of operations that are considered to pose a specific risk of electrical contact. Most of the information and requirements of SB 92-2 are contained in a shelf note that has been added to all contract proposals beginning with the letting of September 9, 1993.

The new CSM section provides guidance on the requirements of SB 92-2, the NYS HVPA and relevant OSHA regulations as they apply to Department construction contracts and operations.

Questions should be directed to the Construction Division at (518) 457-6472.

SAFETY AND HEALTH REQUIREMENTS

WORKING NEAR ELECTRICAL LINES AND EQUIPMENT

I. POLICY

A. INTRODUCTION

Compliance with Federal, State and NYSDOT requirements for working near energized electrical systems is mandatory for contractors, subcontractors, consultants and Department employees on all construction contracts and operations. There are three primary sources for these requirements:

1. Title 29 Code of Federal Regulations Part 1926 "Safety and Health Regulations for Construction". Attention is specifically directed to Subpart K on general electrical safety requirements and to 1926.550(a)(15) on specific requirements for operations involving cranes or derricks.

2. The New York State High Voltage Proximity Act (NYS HVPA) establishes statewide standards governing work in the vicinity of high voltage electrical lines (defined as greater than 600 volts).

3. NYSDOT Safety Bulletin 92-2 "Working Near Energized Electrical Lines and Equipment", provides Department policy and procedures for working near energized electrical systems. SB 92-2 also summarizes the provisions of the NYS HVPA. Contracts let after September 9, 1993 contain a proposal insert which incorporates most of the information and requirements of SB 92-2.

The extent of efforts required to comply with these requirements is commensurate with the scope of the project and of the project-specific tasks which entail a risk for electrical contact. Some projects may entail only minimal risk, while others will require a comprehensive electrical safety plan, measurement and marking of hazards, monitoring by construction inspectors, and coordination with utilities.

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B. RESPONSIBILITIES OF THE CONTRACTOR

Primary responsibility for compliance with safety requirements, including electrical safety, is assigned to the contractor by State and Federal law, as well as by Section 107-05A of the Standard Specifications. The contractor's Project Safety and Health Plan must specify how safety requirements, including electrical safety, are to be carried out, and identify a responsible person. In particular, the 5 requirements of the NYS HVPA noted in SB 92-2 must be addressed by the contractor. The contractor shall either follow the specific procedures spelled out in SB 92-2, or propose equivalent procedures.

Regardless of information shown on the plans regarding electrical utilities, the contractor is responsible for identifying and marking all electrical lines that may be affected by any operation during the course of the project. The contractor should request assistance from utility companies as needed.

For each subcontractor employed on a project, the contractor must either provide a separate Project Safety and Health Plan which covers electrical safety procedures, or certify that the subcontractor will be subject to the contractor's own Project Safety and Health Plan.

C. RESPONSIBILITIES OF THE E.I.C. AND INSPECTION STAFF

The E.I.C. and inspection staff are responsible for ensuring compliance with electrical safety requirements. The following specific steps and actions must be taken by the E.I.C. and inspection staff to ensure that electrical safety is adequately addressed throughout the project:

1. The contractor must be reminded of requirements and responsibilities, and provided a copy of the NYS HVPA at preconstruction or initial project health and safety meeting.

2. Prior to the start of work, an acceptable electrical safety plan must be received from the contractor, usually as part of the Project Safety and Health Plan. The E.I.C. should review this plan to ensure that it addresses the same elements noted under section I.B. above.

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3. The electrical safety plan for the project, and all related materials, including SB 92-2 and the NYS HVPA, should be maintained in an accessible location at the Field Office.
4. All electrical utilities must be identified and marked by the contractor prior to the start of any operations that may result in electrical contact. Documentation of these actions should be provided in the project diary.

5. All inspection staff must be familiarized with electrical safety requirements and the contractor's electrical safety plan. An initial discussion of electrical safety should be included in a tailgate safety session early in the construction season, prior to the start of any operations that may result in electrical contact. This session may be held either separately or together with the contractor, and should be documented in the project diary. If any operations are extended for more than one season, refresher instruction shall be provided at the beginning of each new season.

6. Inspectors must also be made aware of the specific electrical hazards associated with their operations. They are responsible for ensuring that the contractor follows the appropriate procedures as noted in the electrical safety plan.

7. Inspectors must routinely observe the contractor's operations for compliance, and must be provided adequate authority to alleviate any problems noted. In the case of noncritical discrepancies (i.e. warning labels missing), the contractor's responsible person shall be instructed to correct the deficiency in a timely fashion. For more serious violations or hazards (i.e. situations that present an immediate risk of electrical contact), immediate corrective action shall be required. In extreme cases, inspectors should request the E.I.C. to order work stopped on the operation until the risk can be addressed. EI 92-017 provides guidance on additional steps that can be taken to obtain contractor compliance.

8. Inspectors must report ongoing disregard of electrical safety requirements to the EIC for resolution with the contractor. This includes repeated failure by truck drivers to adhere to safety procedures, and any indications that workers have not been properly instructed by the contractor.

9. All electrical contact or near-miss incidents must be reported to the Regional Office and Central Office immediately, following procedures in SB 92-2 and Construction Division Accident Reporting Procedures.

On larger, more complicated jobs, the E.I.C. may delegate specific tasks relative to electrical safety and other safety issues to a subordinate. Nevertheless, the ultimate responsibility is still the E.I.C.'s.

II. PROCEDURE

A. PRE-CONSTRUCTION MEETING OR INITIAL PROJECT HEALTH AND SAFETY MEETING

The following actions should be taken at this meeting, and noted in the meeting records:

1. Remind the contractor of responsibility for compliance with electrical safety requirements in the contract documents, the NYS HVPA and applicable OSHA regulations. The contractor's electrical safety plan must specify how those responsibilities are to be carried out. The contractor should be reminded of the specific requirements to (a) place a warning decal on all equipment that could come within 10 feet of a high voltage electrical line and (b) ensure that all drivers and equipment operators are aware of and comply with electrical safety requirements.

2. Provide the contractor with a copy of the NYS HVPA.

3. Discuss any project-specific hazards that have been identified in the contract documents.

B. IDENTIFYING AND MARKING HAZARDS

In accordance with the requirements of SB 92-2, the contractor shall identify, reference, and clearly mark all potential electrical hazards prior to the start of any

operations which could result in electrical contact. This is best accomplished in a walk/ride through the project by the construction superintendent and/or the contractor's health and safety representative, and possibly utility representatives. The inspection shall include off-site areas such as waste areas, borrow pits, etc. The E.I.C. or a representative may also wish to participate; if not, the contractor must document all actions to the E.I.C.

OSHA 1926.416(a)(3) requires warning signs to be posted and maintained in the vicinity of energized electrical circuits. The contractor may also elect to use additional methods for marking electrical hazards, including, but not limited to, the following possibilities:

- have the appropriate utility place a high visibility marker on the hazard
- mark the pavement beneath overhead electrical lines with spray paint, survey tape, etc.

It is extremely helpful, although not specifically required, to have the actual clearance to overhead electrical lines either listed on the appropriate warning sign, or prominently displayed elsewhere in the vicinity. Contractors can measure clearances (without coming in dangerous proximity to the lines) using standard surveying equipment.

Where heavy foliage may obscure electrical hazards, pruning by a utility or other properly trained tree crew should be considered.

The following factors shall be considered when identifying potential electrical hazards:

- the type of operation
- the equipment to be used, and the maximum possible height (e.g., dump boxes raised, cranes fully extended, etc.)
- the effect of any proposed changes in grade
- the electrical voltage of the hazard

The NYS HVPA applies to lines carrying 600 volts or more. While residential electrical services are generally less than 600 volts, contact with these lines can

still result in serious injury or death. Therefore, all electrical lines must be properly identified and marked, and contact with them must be avoided.

When there is any uncertainty with regard to voltages or clearance distances, the appropriate utility shall be contacted to make an authoritative determination. When there is potential for proximity or contact, the appropriate utility shall be contacted to determine the need for de-energizing, insulating or relocating lines. In either case, the utility must be notified at least five working days in advance.

C. WORKER INSTRUCTION

Before starting any operations where there could be a risk of electrical contact, the contractor must provide electrical safety training to all of the workers involved in the operation, including contractor employees, subcontractor employees and independent truckers. Workers should be informed regarding (1) the requirements of the contract documents, the NYS HVPA, and applicable OSHA regulations; (2) the potential electrical safety risks involved in the operation; and (3) the safety procedures that must be followed. Workers should also be assigned specific individual responsibilities when appropriate (e.g. spotting). New employees who are assigned to operations already in progress must receive the same type of instruction.

If any operations are extended for more than one season, refresher instruction shall be provided at the beginning of each new season.

For operations where spotters will be used, the contractor must (1) designate and train the specific person(s) responsible for spotting, (2) make sure all drivers and operators understand they must follow the instructions of the spotter(s), and (3) review the hand signals to be used.

The contractor's electrical safety plan must include a description of any training plans.

D. REQUIREMENTS FOR SPECIFIC OPERATIONS

SB 92-2 provides specific guidelines and procedures for several types of operations that are described as "High Risk Tasks". These include: (1) paving

and associated operations, (2) aerial lifts using cranes or booms, (3) tree work, (4) traffic signal work, (5) building electrical work, and (6) excavation, pile driving and other underground operations. Work on ladders and scaffolds is another operation that poses a potential risk for electrical contact.

A checklist of requirements for each of these operations is provided below. The contractor must either follow the procedures set forth here, or suggest acceptable equivalents. As a general rule for all operations, extra precautions should be taken in the presence of rain, snow or dampness.

Note that workers touching or even standing next to equipment that comes into contact with an electrical line are at risk of fatal or serious injury, not just the equipment operator or driver.

1. PAVING AND ASSOCIATED OPERATIONS

- The NYS HVPA requires a minimum clearance of 10 feet from high voltage electrical lines, with higher clearance requirements for lines rated more than 50 kilovolts. There is an exception for vehicles in transit across or along a public roadway, provided the vehicle and its load are not more than 13 feet wide or 13 1/2 feet high. Typical paving equipment will not exceed these dimensions, but there may be exceptions (e.g. unusually high smokestacks or antennas, dump trucks with boxes raised, etc.). If there is any doubt, measurements shall be taken.

- Contractors must ensure that all haul truck drivers, whether contractor employees, subcontractor employees or independent owner-operators, are aware of and adhere to the requirements of the contract documents, the NYS HVPA and applicable OSHA regulations. Any driver who fails to comply is subject to removal from the project. Of particular importance is the requirement that trucks must not pull away from the paver or dump site until their boxes are fully lowered.

- The contractor must use spotters to direct truck movement in the vicinity of overhead wires. Spotters may have other duties (e.g. dumper), as long as they do not interfere with the employee's ability to act as a spotter.

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Drivers must receive and execute instructions only from the spotter. Hand signals should be used when clear visual contact can be maintained between the spotter and the driver/operator. When visual contact is impaired, radios or another suitable form of positive contact must be used.

- Warning decals shall be placed on any equipment that could come within 10 feet of a high voltage electrical line, including dump trucks. The contractor should maintain a supply of stickers to provide to independent haulers, if needed, when they come to a project.

- The contractor is responsible for ensuring compliance with electrical safety requirements at off-site dump and borrow areas that are not covered by inspectors. Specific details must be provided in the electrical safety plan.

2. AERIAL LIFTS USING CRANES OR BOOMS

- OSHA 1926.550(a)(15) requires a minimum clearance of 10 feet from any part of the crane or load to any electrical transmission or distribution line, even ones rated less than 600 volts. The minimum clearance is reduced to 4 feet if the equipment is in transit with no load and a lowered boom. In both cases, clearances are higher for lines rated more than 50 kilovolts.

- The contractor must use spotters when visibility is impaired such that equipment operators cannot assess clearance. Spotters may have other duties, as long as they do not interfere with the employee's ability to act as a spotter. Operators should receive and execute instructions only from the spotter. Hand signals should be used when clear visual contact can be maintained between the spotter and the driver/operator. When visual contact is impaired, radios or another suitable form of positive contact must be used.

- Warning decals shall be placed on any equipment that could come within 10 feet of a high voltage electrical line.

- The construction superintendent or a representative must review operations daily to ensure compliance with electrical safety requirements.

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3. TREE WORK

- Branches touching electrical wires shall be removed by the appropriate utility before work begins. Limbs and branches shall not be purposely dropped onto wires. If limbs or branches fall across wires accidentally, all work shall stop immediately and the appropriate utility shall be called to remove the hazard.

- Pruners working in trees should try to position themselves so that the trunk or limbs of the tree are between their body and electrical wires. Whenever possible, they should avoid working with their back toward electrical wires.

- Personal protective gear shall have appropriate dielectric characteristics.

4. TRAFFIC SIGNAL WORK

- The contractor shall request the appropriate utility to determine voltages and take whatever actions are necessary to make the work safe.

- Crews working on traffic signals shall use rubber blankets, mats, gloves and other insulative equipment and tools which are specifically approved for electrical work.

- Crews working on traffic signals shall use electrical test equipment to determine if the equipment to be worked on is energized.

5. BUILDING ELECTRICAL WORK

- Employees working on building electrical systems shall be familiar with OSHA Lock-Out/Tag-Out procedures, and shall employ these procedures when appropriate.

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6. EXCAVATION, PILE DRIVING AND OTHER UNDERGROUND OPERATIONS

- Whenever there is a possibility of contacting any utility lines or equipment, the Underground Facilities Protection Organization (UFPO) shall be called at 1-800-962-7962 to identify and mark the locations.

- The Town, City or County may also have to be contacted for information on utilities that do not belong to UFPO.

- Industrial Code Rule 53 "Construction, Excavation and Demolition Operations At or Near Underground Facilities", published by the New York State Department of Labor (NYSDOL), provides extensive additional information on requirements for coordination between excavators and utility owners/operators.

- When the exact location of utility lines is unknown, employees using jackhammers or hand tools which could contact a line shall wear insulated protective gloves.

7. WORK ON LADDERS AND SCAFFOLDS

- Before moving or erecting ladders and scaffolds, the contractor shall survey the area for electrical lines, taking appropriate consideration for the type of work to be done. When there is potential for proximity or contact, the appropriate utility shall be contacted to determine the need for de-energizing, insulating or relocating lines.

III. SUMMARY

Electrical contact accidents represent a deadly hazard on construction contracts. These accidents are 100% preventable through strict adherence to the following principles:

- Training of all workers.
- Identifying and marking all electrical lines.
- Implementation of specific procedures for avoiding contact.
- Proper attitude by all workers and inspectors to avoid risk.

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IV. REFERENCES

- OSHA 29 CFR 1926 "Safety and Health Regulations for Construction"
- The New York State High Voltage Proximity Act
- NYSDOL Industrial Code Rule 53 "Construction, Excavation and Demolition Operation At or Near Underground Facilities".
- NYSDOT Safety Bulletin 92-2 "Working Near Energized Electrical Lines and Equipment"
- EI 92-017 "Contractor Compliance with Health and Safety Requirements & Other Contract Provisions"

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