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Georgia Department of Transportation

Office of Materials and Testing

Standard Operating Procedure (SOP) 43-A

Approval of Warm Mix Asphaltic Concrete Water Injection Foaming Systems

I. General

The Office of Materials and Testing is responsible for verifying that asphaltic concrete produced for the Department's use meets all applicable Specifications. All asphaltic concrete plants are inspected annually and each asphalt plant meeting specified minimum requirements is listed on QPL-45 "Georgia's List of Approved Hot Mix Asphaltic Concrete Plants". The purpose of this Standard Operating Procedure is to detail the prerequisites and procedures required for an asphaltic concrete plant to be approved on QPL-45 to produce Warm Mix Asphaltic Concrete (WMAC) by using a water injection foaming system. Each water injection foaming system will be approved plant specific on an asphalt plant by asphalt plant basis.

Asphalt plants that appear on this list have been evaluated by the Office of Materials and Testing and have proven their capability of meeting the appropriate Georgia Department of Transportation Specification. Any of these asphalt plants may be used without re-evaluation provided the field engineer determines the asphalt plant is currently listed on QPL-45 as approved to produce WMAC. The field engineer must ascertain that the construction item is the same material identified on the Qualified Products List and will acknowledge receipt of these items in the project diary or as required by the Construction Manual.

It shall be the responsibility of the Bituminous Branch to monitor asphalt plants covered by this SOP. The Office of Materials and Testing will update QPL-45 a minimum of once every twelve months. Representatives from the Office of Materials and Testing, at unscheduled times, may visit the producer's plant and/or construction and maintenance projects to obtain random samples of items covered by this SOP. Asphalt plants approved to produce WMAC that consistently produce test results that significantly vary from those established by prior evaluation and verified by the Office of Materials and Testing will have approval to produce WMAC removed from QPL-45. Plants that meet the current requirements of the Specifications but do not perform satisfactorily in the field will be removed from the QPL- 45. Approval removal from QPL-45 will prohibit the use WMAC produced at the plant for Department of Transportation work until the acceptability of the plant is re-established. Asphalt plants that have not been used to produce mix for Georgia Department of Transportation Construction or Maintenance work for a period of twelve months, may, at the Department's discretion be removed from QPL-45.

II. Prerequisite for Plant Approval

A. Inspection of the Equipment

The asphaltic concrete producer shall request in writing to the State Materials Engineer that the water injection foaming system at their asphalt plant be inspected for approval for use on a Warm Mix Asphaltic Concrete project. All equipment for the production and the

facilities and equipment for testing the materials shall meet the minimum requirements established in Special Provisions Sections 400, 402, 410, and 828 of the Specifications and shall be approved by the Engineer. In addition, prior to approval for any project, the water injection foaming system must meet the following requirements:

- Ensure any additive other than potable water is approved prior to use in the water injection system.
- Ensure the water injection equipment is tied into the computer in the asphalt plant control room so the metering of the injected water can be continuously monitored by the plant operator.
- Ensure the injection system is interlocked so variable water injection is automatically controlled by the plant production rate. Do not allow the water injection system to exceed 2.0% water by weight of asphalt cement for normal production rates. When approved by the Office of Materials and Testing, the water injection system may be increased to a maximum of 2.5% water by weight of asphalt cement for Warm Mix Asphaltic Concrete production rates \leq 150 tons per hour, when producing approved Warm Mix Asphaltic Concrete mixes containing $>$ 30 % RAP or as recommended by the water injection systems' manufacturer.
- Ensure the water injection rate cannot be manually overridden by the plant operator once established and approved in the plant's computer.
- Ensure the water injection system is interlocked with the plant controls to interrupt mixture when a control or equipment failure in the water injection system occurs.
- Ensure the water injects into the asphalt cement flow before the asphalt cement makes contact with the aggregate in the drum. Do not allow water to mix with the aggregate prior to the asphalt cement spray.
- Ensure the water injection equipment includes water storage and a pump control interlocked with the injection computer controls.
- Ensure the water flow alarm is installed in the plant control room to alert a shortage in the water storage tank or any other disruption in the water flow equipment.
- Provide an asphalt cement sampling valve at the water injection equipment to sample the asphalt cement prior to the spray system.

The equipment shall be maintained in a satisfactory operation condition and be capable of its intended function at all times during production.

B. Project Related Test Section

1. Prior to commencing work on a GDOT project, a 500 ton or one day's production test section will be required to evaluate the produced Warm Mix Asphaltic Concrete for compliance with all specified requirements established in Special Provisions Sections 400, 402, 410, and 828.
2. Failure to meet specified requirements during the test section will result in the work being halted and the contractor will be required to submit a written plan of action detailing what steps will be taken to meet specifications if any of these requirements are not met in the test section. If approved by the Engineer, the contractor will be permitted to construct another 500 ton test section. The contractor will not be allowed to start continual mix placement until an acceptable test section including mix design verification of the plant produced mix is obtained.
3. The Department will have ten (10) business days to complete the mix design verification of plant produced mix. Additionally, in order to evaluate the moisture

susceptibility of WMAC produced with the water injection forming device, the Department may perform the test according to AASHTO T 324, Standard Method of Test for Hamburg Wheel-track Testing of Compacted Hot-Mix Asphalt (HMA)". Once the Department's mix design verification of plant produced mix has been completed and the test section has been approved by the Engineer, placement of the warm mix asphaltic concrete may continue provided all specified requirements are maintained.

C. Minimum Number of Test Sections Required for Foaming System Approval on QPL 45

Prior to an asphalt plant being listed on QPL-45 as having an approved water injection foaming system, a minimum of three (3) test sections placed on GDOT Let projects meeting all specified requirements must be achieved.

III. QPL-45 "Georgia's List of Approved Hot Mix Asphaltic Concrete Plants".

A. Foaming (F) Designation

The Office of Materials and Testing will designate approved water injection foaming systems (F) on QPL-45. As example, a drum plant with an approved water injection system will be shown as *D/F* under Asphalt Plant type.

B. Removal of Water Injection Foaming System Approval

Failure to adhere to specification requirements established in this SOP, Special Provisions Sections 400, 402, 410, and 828 as related to Warm Mix Asphaltic Concrete criteria, may result in the removal of the approved status of this water injection foaming system.

State Materials Engineer

Director of Construction