TO: REGIONAL ENGINEERS AND BUREAU CHIEFS IN THE OFFICE OF HIGHWAYS PROJECT IMPLEMENTATION AND PRIVATE ASR TESTING LABORATORIES

SUBJECT: MINIMUM PRIVATE LABORATORY REQUIREMENTS FOR ALKALI-SILICA REACTIVITY (ASR) TESTING

1.0 SCOPE

This policy governs the minimum qualifications for Private ASR Testing Laboratories operated by Contractors, Producers and Consultants that conduct ASR tests.

Private ASR Testing Laboratories shall be approved as one of the following laboratory types:

1. ASTM C 1293
2. ASTM C 1567
3. ASTM C 1293/1567

2.0 PURPOSE

1. To ensure that Private ASR Testing Laboratories are equipped and maintained at a uniform and high level of quality
2. To establish uniform procedures for evaluating and approving Private ASR Testing Laboratories
3. To maintain a uniform standard for inspecting test equipment and test procedures

3.0 AUTHORITY AND REFERENCES

3.1 Authority. Federal regulations (23 CFR Part 637) require the Department to establish an Acceptance Program for qualifying construction testing laboratories.

3.2 References.

1. IDOT Standard Specifications for Road and Bridge Construction
2. IDOT Manual of Test Procedures for Materials
3. AASHTO, ASTM, and IDOT Test Procedures
4.0 DEFINITIONS

AASHTO - American Association of State Highway and Transportation Officials.

AASHTO R 18 - The AASHTO Standard for "Establishing and Implementing a Quality System for Construction Materials Laboratories." The principles and/or requirements of AASHTO R 18 are used by the Bureau to administer the Qualified Laboratory program for Private ASR Testing Laboratories.

ACCEPTANCE PROGRAM - All factors that comprise the Department's determination of the quality of the product as specified in the contract requirements.

ACCREDITED LAB - A laboratory that is currently accredited by the AASHTO Accreditation Program (AAP) or other accrediting body recognized by FHWA.


ASTM C 1077 - The ASTM "Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation" The principles and/or requirements of ASTM C 1077 are used by the Bureau to administer the Qualified Laboratory program for Private ASR Testing Laboratories.

BUREAU - Central Bureau of Materials (CBM), Illinois Department of Transportation.

BUREAU LABORATORY - The Department's central laboratory maintained and operated by the Bureau. The Bureau Laboratory administers the Qualified Laboratory program for Private ASR Testing Laboratories.

CCRL – Cement and Concrete Reference Laboratory.

CONSULTANT - A private firm which performs construction materials testing for the Department, Producer, or Contractor.

CONTRACTOR - The individual, firm, partnership, joint venture, or corporation contracting with the Department for performance of prescribed work.

DEPARTMENT - Illinois Department of Transportation (IDOT), including its Districts and Central Bureau offices.

FHWA - Federal Highway Administration

PRIVATE ASR TESTING LABORATORY – An ASR construction materials testing laboratory not operated by the Department or a Local Agency.

PRODUCER - An individual or business entity providing materials and/or products for performance of prescribed work.

QUALIFIED LABORATORY - A laboratory that is inspected and approved by the Department. FHWA's regulations (23 CFR 637.203) define these as Laboratories that are capable as defined by appropriate programs established by each state transportation
department. As a minimum, the qualification program shall include provisions for checking test equipment, and the laboratory shall keep records of calibration checks.

QUALIFIED PERSONNEL - Personnel with demonstrated capability to perform the applicable inspection and testing.

SPECIFICATIONS - Specifications for materials; manufactured, fabricated or constructed items; processes; products; designs; conducted test procedures, etc. which includes the Standard Specifications, supplemental specifications and recurring special provisions, highway standards, shop drawings, contract plans, project special provisions, AASHTO Specifications, ASTM Specifications, etc., as applicable.

STANDARD SPECIFICATIONS - The Department's Standard Specifications for Road and Bridge Construction.

TECHNICAL MANAGER - The individual with responsibility for the overall operations, condition, and maintenance of the Private ASR Testing Laboratory. The Technical Manager shall be identified in writing.

5.0 PRIVATE ASR TESTING LABORATORY REQUIREMENTS

5.1 Personnel Qualifications/Responsibilities.

5.1.1 All testing for Department contracts shall be performed by Qualified Personnel as determined by the Bureau.

5.2 Facilities and Equipment.

5.2.1 The Department will approve all Private ASR Testing Laboratories used on Department projects.

5.2.2 Each Private ASR Testing Laboratory shall have adequate floor space to efficiently conduct the required tests for each laboratory type it is approved for.

5.2.3 Each Private ASR Testing Laboratory shall have HVAC equipment capable of maintaining a room temperature of 68-86º F (20 to 30º C).

5.2.4 Each Private ASR Testing Laboratory shall maintain the equipment and facilities necessary to perform the tests required for each laboratory type it is approved for.

5.2.4.1 Qualified Laboratory Type: ASTM C 1293. Each Private ASR Testing Laboratory approved by the Department to perform ASTM C 1293 shall have the following, at a minimum:

1. Specified, documented, source for nonreactive coarse and fine aggregates according to ASTM C 1293
2. Specified, documented source for cement according to ASTM C 1293
3. Moist room according to ASTM C 511 (e.g., temperature and relative humidity measuring device(s), humidification device, etc.)
4. Temperature controlled storage environment capable of maintaining 100.4 ± 3.6 ºF (38.0 ± 2.0 ºC) according to ASTM C 1293
5. Length comparator according to ASTM C 490
6. Storage containers according to ASTM C 1293
7. Sodium hydroxide (NaOH) according to ASTM C 1293
8. One example of a mix design according to ASTM C 1293
9. Ability to meet mixing requirements according to ASTM C 192, ASTM C 143, ASTM C 138, and ASTM C 157

5.2.4.2 Qualified Laboratory Type: ASTM C 1567. Each Private ASR Testing Laboratory approved by the Department to perform ASTM C 1567 shall have the following, at a minimum:

1. Storage oven or water bath according to ASTM C 1567
2. Controlled environment for mixing and molding according to ASTM C 1567
3. Moist room according to ASTM C 511 (e.g., temperature and relative humidity measuring device(s), humidification device, etc.)
4. Specimen molds according to ASTM C 490
5. Gage studs according to ASTM C 490
6. Length comparator according to ASTM C 490
7. Reference bar according to ASTM C 490
8. Storage containers according to ASTM C 1567
9. Sodium hydroxide (NaOH) according to ASTM C 1567
10. Type IV reagent water according to ASTM D 1193
11. Nos. 4, 8, 16, 20, 30, 50, and 100 sieves according to ASTM E 11
12. Tamper and trowel according to ASTM C 109
13. Mixer, paddle, and bowl according to ASTM C 305
14. Flow table according to ASTM C 230

5.2.4.3 Qualified Laboratory Type: ASTM C 1293/1567. Each Private ASR Testing Laboratory approved by the Department to perform ASTM C 1293 and ASTM C 1567 shall meet the requirements of 5.2.4.1 and 5.2.4.2.

6.0 QUALITY SYSTEM CRITERIA

6.1 CCRL Inspection and Comparison Testing.

6.1.1 Qualified Laboratory Type: ASTM C 1293. Each Private ASR Testing Laboratory approved by the Department to perform ASTM C 1293 shall have been inspected by CCRL for that test, and successfully compared results with the Bureau Laboratory. CCRL inspection and successful comparison of test results with the Bureau Laboratory are a prerequisite for Departmental inspection.

6.1.2 Qualified Laboratory Type: ASTM C 1567. Each Private ASR Testing Laboratory approved by the Department to perform ASTM C 1567 shall have been inspected by CCRL for that test, and successfully compared results with the Bureau Laboratory. CCRL inspection and successful comparison of test results with the Bureau Laboratory are a prerequisite for Departmental inspection.

6.1.3 Qualified Laboratory Type: ASTM C 1293/1567. Each Private ASR Testing Laboratory approved by the Department to perform ASTM C 1293 and ASTM C 1567 shall meet the requirements of 6.1.1 and 6.1.2.
6.2 **Technical Manager.** Each Private ASR Testing Laboratory shall have a Technical Manager (however titled) who has overall responsibility for the technical operations of the Private ASR Testing Laboratory. The Technical Manager shall be responsible for equipment maintenance, calibration, standardization, verification and checks; maintaining records; and ensuring that current test procedures are utilized.

6.3 **Equipment Calibration, Standardization, Verification and Checks.** The Private ASR Testing Laboratory shall calibrate, standardize, verify or check all testing equipment associated with tests performed for each laboratory type it is approved. Calibration, standardization, verification and check intervals for each piece of testing equipment shall be according Department Policy Memorandum 6-08, AASHTO R 18, or as specified in a particular test method, as applicable.

6.4 **Department Proficiency Testing.** Private ASR Testing Laboratory qualifications may include round-robin proficiency testing conducted by the Department. Results of proficiency testing may be considered in the overall evaluation of the Private ASR Testing Laboratory to conduct ASTM C 1293 and/or ASTM C 1567.

6.5 **Records.**

6.5.1 **Test Records.** Each Private ASR Testing Laboratory shall maintain test records which contain sufficient information to permit verification of any test report.

6.5.2 **Laboratory Quality Records.** Each Private ASR Testing Laboratory shall maintain documentation of internal quality controls. At a minimum, the records shall include:

1. Documentation of assignment of personnel responsible for internal quality controls
2. Documentation of equipment calibration, standardization, verification and checks
3. All documentation shall be maintained and available for Department inspection for a period of three years

6.5.2.1 **Equipment Calibration, Standardization, Verification and Check Records.** Calibration, standardization, verification and check records shall include the minimum information listed below. AASHTO R 18 and ASTM C 1077 may provide additional guidance for recording calibration, standardization, verification and check records for testing equipment.

1. Description
2. Model & Serial Number
3. Name of person calibrating, standardizing, verifying or checking
4. Equipment used for calibration, standardization, verification or checks
5. Date calibrated, standardized, verified, or checked & next due date
6. Reference procedure used
7. Results of calibration, standardization, verification or checks

6.5.3 **Proficiency Sample Records.** Each Private ASR Testing Laboratory shall retain results of participation in any proficiency sample program, including the documentation of steps taken to determine the cause of poor results and corrective action taken.

6.6 **Publications.** Each Private ASR Testing Laboratory shall maintain current copies or electronic access to the required test procedures for each laboratory type it is approved.
Each Private ASR Laboratory shall maintain a current copy or electronic access to the Manual of Test Procedures for Materials.

7.0 LABORATORY INSPECTIONS

7.1 General. The Department will approve Private ASR Testing Laboratories by inspection and other requirements, as applicable.

7.2 Travel Reimbursement. The Private ASR Testing Laboratory shall be responsible for payment of transportation, per diem (meals), lodging, and incidental travel costs incurred by the Bureau if the trip from the Bureau to the Private ASR Testing Laboratory, the Private ASR Testing Laboratory inspection, and the return trip to the Bureau cannot be completed within one day's normal work hours of 8:00 AM to 4:30 PM. Reimbursement for travel costs shall be provided no later than 30 calendar days after receipt of costs submitted by the Department.

7.3 AASHTO Accredited Private ASR Testing Laboratories. AASHTO accreditation does not waive the right of the Department to conduct inspections and/or re-inspections.

7.4 Private ASR Testing Laboratory Inspection Scope.

1. Facilities - Physical and environmental conditions
2. Equipment - Test apparatus for specification compliance
3. Documentation - Calibration, standardization, verification and check records
4. Personnel - A review of Qualified Personnel credentials
5. Observation - The Private ASR Testing Laboratory may be required to demonstrate required tests. Some test procedures may be evaluated through discussion with laboratory personnel.
6. Split or Comparison Sample Testing - Results of split or comparison sample testing between the Private ASR Testing Laboratory and the Bureau
7. Proficiency Sample Testing - Results of proficiency sample testing programs conducted by the Bureau
8. Report - The Private ASR Testing Laboratory will be provided with a report listing those tests for which it is approved. The report will note deficiencies.

7.5 Private ASR Testing Laboratory Inspection Procedure.

7.5.1 The Private ASR Testing Laboratory shall submit a written request for an inspection to the Bureau. The request shall indicate the following:

1. The location of the Private ASR Testing Laboratory
2. The type of Private ASR Testing Laboratory, i.e., ASTM C 1293, ASTM C 1567, ASTM C 1293/1567
3. The name of the Technical Manager who will be present for the inspection
4. The date the Private ASR Testing Laboratory will be ready for inspection

7.5.2 Bureau personnel will establish a tentative date to perform the inspection.

7.5.3 Bureau personnel will perform the inspection and prepare a report. Standard inspection forms and a preliminary report, developed and maintained by the Bureau Laboratory will be used.
7.5.4 Bureau personnel will assign identification numbers to all test equipment.

7.5.5 Bureau personnel will perform a close-out with the Technical Manager. The Technical Manager will be given a copy of the preliminary report.

7.5.6 If a review of the preliminary report indicates there are no deficiencies, the Bureau will provide written notification to the Private ASR Testing Laboratory indicating the Private ASR Testing Laboratory is now approved. The notification will include an equipment list.

7.5.7 If the preliminary report indicates there are deficiencies, the Bureau will provide written notification to the Private ASR Testing Laboratory, indicating the deficiencies and that corrective action is required.

7.5.8 After correction of all cited deficiencies, the Private ASR Testing Laboratory shall notify the Bureau. The Bureau will re-inspect the Private ASR Testing Laboratory to verify the deficiencies have been corrected.

7.5.9 The Bureau will provide written notification to the Private ASR Testing Laboratory, indicating the Private ASR Testing Laboratory is now an approved lab. The notification will include an equipment list.

7.5.10 Uncorrected deficiencies will not be waived. Equivalent equipment specifications may be approved only with the written approval of the Bureau’s Engineer of Concrete, Soils, and Metals.

7.6 Re-Approval of Approved Private ASR Testing Laboratories.

7.6.1 The re-inspection of Private ASR Testing Laboratories will be conducted at intervals deemed appropriate by the Bureau. The interval between inspections will not exceed two calendar years. The Bureau’s evaluation may include the following:

1. Physical inspection of the laboratory facility and equipment
2. Review of the Private ASR Testing Laboratory’s internal quality plan and documentation in accordance with this policy and those parts of AASHTO R 18 and ASTM C 1077 incorporated by this policy
3. Observations of tests performed by Qualified Personnel
4. Results of split sample testing between the Private ASR Testing Laboratory and the Bureau
5. Results of proficiency sample testing programs conducted by the Bureau
6. Overall past performance and experience

7.6.2 The Bureau will issue a letter of re-approval to the Private ASR Testing Laboratory, or provide a written and itemized deficiency list. The Private ASR Testing Laboratory shall notify the Bureau when deficiencies are corrected and ready for re-inspection.

7.6.3 At any time, if the Bureau identifies deficiencies in the facility, equipment, or test procedures that could affect the results of any tests, the Bureau will require the Private ASR Testing Laboratory to take immediate action to correct the deficiency.
8.0 LABORATORY DATABASE AND APPROVED LIST

8.1 Laboratory Database. The Department will maintain a computer database to monitor the approval status of Private ASR Testing Laboratories. The database will include the following information:

1. Laboratory Codes (Department, Producer, etc.)
2. Type Laboratory (ASTM C 1293, ASTM C 1567, ASTM C 1293/1567)
3. Demographics (Address, etc.)
4. Date Inspected
5. Approval Status

8.2 Approved List. The Department will maintain two lists of approved Private ASR Testing Laboratories on the Internet. The lists will be entitled “Approved List of Laboratories to Perform Alkali-Silica Reactivity (ASR) ASTM C 1293” and “Approved List of Laboratories to Perform Alkali-Silica Reactivity (ASR) ASTM C 1567”, and will include the following information:

1. Laboratory Name
2. Address
3. Contact Person and Title
4. Phone No.
5. Website

The Department may remove a Private ASR Testing Laboratory from the list if deficiencies in the facility, equipment, or test procedures are indicated through inspections, proficiency testing, or other circumstances, unless the Private ASR Testing Laboratory takes immediate action and corrects the deficiency.

9.0 CLOSING NOTICE

 Archived versions of this policy memorandum may be examined by contacting the Bureau.

The current Bureau Chief of Materials has approved this policy memorandum. Signed documents are on file with the Bureau.