

**QUALITY ASSURANCE
LABORATORY ACCREDITATION
PROGRAM GUIDE**

EXHIBITS

Developed by

WACEL

**7508 Wisconsin Avenue, 4th Floor
Bethesda, Maryland 20814
301-652-7925**

Seventh Edition

DRAFT 2016

EXHIBIT 1: Minimum Capabilities to be a WACEL Accredited Laboratory

A testing laboratory that seeks accreditation for concrete testing shall be capable of performing the required ASTM test methods or practices listed below:

1. Sampling, Method C172
2. Slump, Test Method C143
3. Unit Weight, Yield, and Air Content C138
4. Air Content, C173 (volumetric method) and C231 (pressure method)
5. Making and Curing Test Specimens, C31
6. Compressive Strength, C39
7. Capping Cylindrical Concrete Specimens C617 or C1231
8. Temperature, C1064

A concrete testing laboratory that also performs testing on concrete aggregates shall be capable of performing the required ASTM test methods or practices listed below.

1. Organic Impurities, C40
2. Minus No. 200 Wash, C117
3. Specific Gravity, C127 and C128
4. Sieve Analysis, C136

A testing laboratory that seeks accreditation for soils testing shall be capable of performing the required ASTM test methods or practices listed below.

1. Proctors D698 (standard), D1557 (modified), VTM-1, and the equivalent test methodology required by Maryland.
2. Specific Gravity of Coarse Aggregate (oversized particles), C127
3. Specific Gravity of Soils, D854
4. Hydrometer and Sieve Analysis, D422
5. Moisture Content, D2216

6. Field Density Testing D1556 (sand cone), or D2922 (nuclear) or both
7. Atterberg Limits, D4318
8. California Bearing Ratio (CBR)* -- ASTM D1883/VTM-8

*CBR is required only of a principal laboratory in the WACEL service territory. Branch labs in the WACEL service territory need not necessarily have to have the equipment or capability in their particular office to perform CBRs. The region known as the WACEL service territory is defined annually by the Board of Directors.

EXHIBIT 2: Application Form

Accreditation Review No. _____

APPLICATION FOR ACCREDITATION

1. Firm Seeking Accreditation _____

2. Address _____

_____ ZIP _____

3. Authorized Representative _____

4. Work Phone AC _____ Ext _____ Fax No.: _____

If information about the laboratory for which accreditation is sought differs from information conveyed in responses to items 1-4, complete items 5-9. Otherwise skip to item 10.

5. Laboratory Name _____

6. Laboratory Address _____

_____ ZIP _____

7. Authorized Representative _____

8. Rep's Work Phone: _____ Ext _____ FAX: _____

9. If the individual identified in item 4 is not the same as the one in item 8, should the Materials Review and Facilities Inspection Report be sent to the person identified in item 4, item 8 or both? (Circle one) 4 8 Both

10. How many persons employed at the applicant laboratory participate in:

a. soils testing _____

b. concrete testing _____ concrete aggregate _____

11. Indicate the accreditation you seek (check one):

_____ soils only _____ concrete only _____ both soils and concrete

12. Approximately when would you like the Facilities Inspection to occur? _____

13. Are you aware that Laboratory Accreditation Team personnel serve on a voluntary basis and may be unable to comply with your preferred schedule? (Circle one) Yes
No
14. Are you aware that other organizations offer laboratory accreditation in the fields of soils and concrete and that these may be applied to if WACEL cannot handle your request promptly? (Circle one) Yes No
15. The fees associated with accreditation (which must accompany this application by check payable to WACEL) are based on the number of persons required to serve on the LAT. Inspection fees are: \$1,000 for WACEL Members; \$5,000 for nonmembers. Annual Audit fees are \$500 per members and \$2,500 for nonmembers. The total amount due at this time, and provided herewith, is \$_____.
16. I understand that the scope of the accreditation involves the following:
- an examination of materials identified in Exhibit 3;
 - a review of facilities during a Materials Review and Facilities Inspection (Exhibit 5);
 - a possible reinspection to verify that deficiencies, if any, have been addressed to the satisfaction of the Laboratory Accreditation Team within 90 dates of the date of the MRFI Report;
 - an annual audit to assure that the laboratory continues to meet the requirements of the WACEL Laboratory Accreditation Program an
 - the need to complete and return within 30 days of the first and second anniversary date of the accreditation a completed Certificate of Continued Compliance (Exhibit 4) signed by the Professional Engineer in charge of the lab and accompanies by evidence of participation in a reference sampling program for each discipline for which accreditation has been obtained (Circle

one to signify your understanding of the scope of the program) along with an annual audit fee of \$500. Yes No

17. Do you understand that additional costs are associated with the Program? (These include the cost of Laboratory Accreditation Team participants' transportation to and from various meetings and the applicant laboratory, and their cost of meals for the Materials Review, Pre-Inspection and luncheon meetings, feasibly among others.) Do you understand that the applicant laboratory also is responsible for similar expenses of whatever Novice Members and/or Outside Observers may be assigned? Do you understand that nonmembers are required to pay an additional fee and additional expenses if reinspection is required for any reason? (Circle one in response to all three questions) Yes No
18. Are you aware that WACEL may refuse to accredit the applicant laboratory but you will nonetheless be required to pay all charges associated with the accreditation program? (Circle one) Yes No
19. Have you read and become fully familiar with the WACEL document that describes the Quality Assurance Laboratory Accreditation Program? (Circle one) Yes No
20. Do you have authority to act on behalf of the firm herewith seeking accreditation? (Circle one) Yes No
21. Please read the following statement and add your initials where indicated only if you understand it and agree to bind to it the firm you represent:

I understand that this accreditation procedure is being entered into at the request of the firm I represent. I understand, also, that WACEL could feasibly face some liability exposure either from the firm I represent or from third parties who may, among many other things, claim the firm I represent was negligent and that WACEL's accreditation was accorded in a negligent manner. As to liability exposure as a result a of claim or action brought against WACEL by the firm I represent, the firm I represent herewith

agrees to take no action whatsoever against WACEL or any of its agents, voluntary or paid, for implementation of procedures associated with the accreditation process. It is understood that WACEL, for reasons it considers valid, may refuse to accredit the applicant laboratory. Even though I or another representative of that laboratory may disagree with WACEL's judgment or interpretation of facts, it is agreed WACEL's determination is final. It is understood, further, that WACEL will do its best to maintain confidentiality, but that it cannot and does not offer a guarantee that confidentiality will be maintained. And as to claims which may arise from any aspect of this accreditation procedure, when such claims are brought against WACEL by any entity or person other than the firm I represent, this firm hereby declares that it shall hold harmless, indemnify and defend WACEL and/or any of its agents from and against any and all such claims, as well as any losses or damages WACEL and/or its agents may suffer as a result of such claims, demands, costs or judgments.

Initials of Authorized Representative _____

22. By signature affixed below, I certify that I have read and understood WACEL's Quality Assurance Laboratory Accreditation Program Guide, as well as this accreditation application form, and that, by authority vested in me by the firm I represent, herewith bind my firm to all terms and conditions of the Program as made clear in the Program Guide and to all terms and conditions made clear in this application form.

Signature _____

Date _____

RETURN THIS FORM WITH YOUR CHECK AND THE MATERIALS IN EXHIBIT 3 TO:
WACEL, 7900 Wisconsin Avenue, Suite 305, Bethesda, MD 20814

EXHIBIT 3: Materials for Review Listing

Accreditation Review No. (#)

Materials List

The following list of materials must be provided with Exhibit 2, Application for Laboratory Accreditation. If you are applying for accreditation for both soils and concrete testing, provide relevant materials for each, unless the document in question is equally applicable to both soils and concrete (Note that more than one copy of a given document may be required. The number required is indicated in the space provided in the right-hand margin of the following list.) Please be certain to indicate on each copy of each document furnished exactly what the document is, unless a title or some other inherent identification in or on the document makes its identification self-evident. The documents listed are referenced in the Materials Review and Facilities Inspection Worksheet (Exhibit 5), with the Worksheet reference shown in parentheses. If you have additional materials that you believe are relevant, or which you would like the Laboratory Accreditation Team to review and comment upon, include them with other materials furnished, but be sure to describe them in a covering letter or note and explain your reasons for providing them.

ALL MANDATORY DOCUMENTS MUST BE FURNISHED WITH THE APPLICATION FOR ACCREDITATION.

1. *Photocopy of registration certificate of professional engineer in full-time responsible charge of the laboratory in jurisdiction of office location (1.4.4). _____

2. General information concerning the laboratory covered by the application, such as primary function, relationship to larger corporate entity and, if applicable, physical location of the laboratories involved _____
3. Written QA program (Quality Manual) (2.1.1). _____
4. Copies internal quality system review records (2.1.3). _____
5. Copies of management review records (2.1.4). _____
6. If accreditation in concrete testing is sought, a current C.C.R.L. laboratory inspection, Corp of Engineers inspection report or report from another WACEL-recognized program capable of objectively investigating concrete laboratory testing techniques and equipment is required. The applicant must also furnish evidence of participation in a WACEL-recognized Reference Sampling Program within the last year (2.7). _____
8. Two recent concrete test reports (if accreditation in concrete testing is sought; delete or obscure names of client and project) (2.5.2). _____
9. If accreditation in soil testing is sought, a current laboratory inspection report from A.M.R.L. or another WACEL-recognized program capable of objectively investigating soil laboratory testing techniques and equipment is required. This will include evidence of participation in a WACEL-recognized Reference Sampling Program within the last year (2.7). _____
10. Two recent soils test reports (if accreditation in soils testing is sought; delete or obscure names of client and project) (2.5.2). _____

*Failure to have this material precludes accreditation.

EXHIBIT 4: Certification of Continued Compliance

WACEL Laboratory Accreditation Program Certification of Continued Compliance

Accreditation No. _____ Date: _____
Date of Accreditation: _____
Laboratory: _____
Address: _____
Representative: _____

CERTIFICATION OF CONTINUED COMPLIANCE

This form must be completed and returned to WACEL by no later than _____. I have read and am familiar with WACEL's Quality Assurance Laboratory Accreditation Program Guide specifically relative to those factors that affect quality control and the ability of this engineering laboratory to provide accurate, reliable test data. Furthermore, I have read and am familiar with the Materials Review and Facilities Inspection Report issued subsequent to inspection of this facility by WACEL, and any subsequent reinspection. Based on my review and understanding of these materials, and based on my knowledge of developments which have occurred in this facility over the past year, I hereby certify that no major events calling for a reinspection have transpired; that the high level of quality control which permitted accreditation is being maintained, and that this laboratory is fit for continued accreditation. In addition, I recognize that the laboratory's current accreditation expires on _____, and that application for reaccreditation should be made no later than three months prior to that date.

I also understand that as a condition of maintaining accreditation, this laboratory must participate annually in a WACEL-recognized reference sample testing program for soils and/or concrete, as appropriate. Evidence documenting the laboratory's participation in soils and/or concrete reference sampling programs as appropriate for the continuation of our accreditation should be provided to WACEL with the Certificate of Compliance and verified during the annual maintenance review audit,

Signed by the registered professional engineer with full-time supervision of the laboratory:

Printed Name of Signatory: _____

THIS SIGNED FORM MUST BE RETURNED BY _____

TO
WACEL
7508 Wisconsin Avenue, 4th Floor
Bethesda, MD 20814

EXHIBIT 5: Materials Review and Facilities Inspection Worksheets

WACEL

QUALITY ASSURANCE LABORATORY ACCREDITATION PROGRAM

LABORATORY ACCREDITATION TEAM MATERIALS REVIEW AND

FACILITIES INSPECTION WORKSHEET

Instructions: Each Laboratory Accreditation Team (LAT) participant shall be furnished with a copy of this form. Each shall complete those elements of the form that pertain to areas of concern assigned by the LAT Captain. Particularly for Materials Review, most of which should be performed prior to Facilities Inspection, more than one LAT participant may be assigned to review a given item. In most of Section 2.0, a simple "YES" or "NO" is used as a response. If the response is "NO" – record exactly why the area is weak and resulting as a deficiency. Use either the blank space on the worksheet or record your findings on a separate sheet of paper and attach it to the worksheets. Additionally, the equipment calibration and verification records check should be performed on a separate sheet of paper and attached to these worksheets upon completion. Each LAT participant is encouraged to record comments and observations in full, including those relating to observations about matters deemed important even though assigned to some other member of the LAT or not identified on the worksheet.

1.0 GENERAL INFORMATION

1.1 ACCREDITATION REVIEW NO. _____

1.2 LABORATORY ACCREDITATION TEAM COMPOSITION

1.2.1 LAT Captain _____

1.2.2 LAT Member(s) _____

1.2.3 LAT Novice Member(s) _____

1.2.4 Outside Observer(s) _____

1.3 PERSON COMPLETING THIS WORKSHEET _____

1.4 APPLICANT LABORATORY

1.4.1 Name _____

1.4.2 Address _____

_____ ZIP _____

1.4.3 Telephone _____ - _____ FAX _____ - _____

1.4.4 Professional engineer in full-time responsible charge

Name _____

State(s) in which registered _____

Registration certificate no. _____

Copy of certificate provided? ____ Yes ____ No

1.4.5 Facility manager (if not P.E. in responsible charge) _____

1.5 ACCREDITATION SOUGHT ____ SOILS ____ CONCRETE

1.6 DATE OF APPLICATION _____

1.7 DATE OF MATERIALS REVIEW MEETING _____

1.8 DATE OF FACILITIES INSPECTION _____

2.0 GENERAL QUALITY ASSURANCE CONSIDERATIONS

2.1 QUALITY ASSURANCE POLICY

2.1.1 Does the applicant have a written Quality Manual? YES / NO

2.1.2 Has the laboratory identified a technical (or quality) manager and
nominated deputies to serve in their absence? YES / NO

Technical (or Quality) Manager _____

Deputy to serve in absence _____

2.1.3 Has the laboratory performed and documented an internal
quality system review within the past year? _____ YES / NO

2.1.4 Has the laboratory performed and documented a management
review within the past year? _____ YES / NO

2.1.5 Other comments and observations _____

2.2 ORGANIZATIONAL POLICIES AND GENERAL REQUIREMENTS

2.2.1 Does each page of the QM include a preparation or revision date? YES / NO

2.2.2 Does the QM include the legal name and address of the company
and that of the main office, if different? YES / NO

2.2.3 Does the QM include ownership and management structure? YES / NO

2.2.4 Does the QM include an organizational chart? YES / NO

2.2.5 Does the QM include position descriptions for each technical
operational position shown? YES / NO

2.2.6 Does the QM include resumes for technical staff (or ref. location)? YES / NO

2.2.7 Does the agency use temporary site facilities? YES / NO
If so, does the QM describe this situation? YES / NO / NA

- 2.2.8 Does the QM include a document defining its policies and objectives for commitment to good practice and quality of inspection/testing? YES / NO
- 2.2.9 Does the QM include a statement to the effect that their policies and operational procedures have been established to meet the requirements of ASTM E329? YES / NO
- 2.2.10 Does the QM include a list showing applicable dates of qualifications, accreditations, and recognition by others? YES / NO
- 2.2.11 Other comments and observations _____

2.3 STAFF TRAINING/COMPETENCY/CERTIFICATIONS

- 2.3.1 Does the QM include a document describing methods used to ensure that personnel are *properly trained* to perform the work assigned? YES / NO
- 2.3.2 Does the QM include a document describing methods used to ensure that personnel are *competent* to perform the work assigned? YES / NO
- 2.3.3 Does the laboratory conduct formal competency reviews of certified technicians annually? YES / NO
- 2.3.4 Does the QM include a blank form for recording the results of training and competency evaluations? YES / NO
- 2.3.5 Have training and competency evaluations been performed for all technicians? YES / NO
- 2.3.6 Have all technicians obtained applicable certification(s) within 120 days of hire? YES / NO

2.3.7	<u>CONCRETE</u>	<u>SOILS</u>
Supervising Lab Tech	_____	_____
Level of Certification	_____	_____

Supervising Field Tech _____

Level of Certification _____

2.3.8 Do supervising technicians have at least 5 years of relevant experience and an adequate certification level? YES / NO

2.3.9 Other comments and observations _____

2.4 EQUIPMENT

2.4.1 Does the QM include an inventory of major equipment, or reference the location? YES / NO

- Does the inventory list include the name of the equipment, manufacturer, model and serial number, date received and in service, and condition? YES / NO

2.4.2 Does the QM include a list of equipment requiring cal/ver? YES / NO

- Does the list include the required interval, a reference the procedure used, and the location of the resulting record? YES / NO

2.4.3 Does the QM include in-house cal/ver procedures, or reference the location? YES / NO

2.4.4 Does the QM include certificates or other documents that establish the traceability of in-house calibration equipment or reference standards, or reference their location? YES / NO

2.4.5 Do cal/ver records include the date that the work was performed, the next due date, the individual performing the work, an identification of any calibration equipment used, and detailed results of the work performed? YES / NO

2.4.6 Is all equipment currently calibrated or verified? YES / NO

2.4.7 Other comments and observations _____

2.5 TEST RECORDS AND REPORTS

2.5.1 Does the QM include a document describing procedures used to prepare, check, and amend test reports? YES / NO

2.5.2 Does the QM include typical reports for the work routinely performed by the laboratory? (Laboratories seeking accreditation for soils should include a few typical soils reports, likewise for laboratories seeking accreditation for concrete.) YES / NO

2.5.3 Impressions gained from review of at least two typical reports for each discipline in which accreditation is sought.

o Soils reports (if applicable) _____

o Concrete reports (if applicable) _____

2.5.4 Do corrections or additions to reports clearly reference the report being amended? YES / NO

2.6 SAMPLE MANAGEMENT

2.6.1 Does the QM include standard operating procedures for sample identification, transfer of samples from the field to the laboratory, sample storage, retention, disposal, and recording of results? YES / NO

2.7 DIAGNOSTIC AND CORRECTIVE ACTION

2.7.1 Does the QM include a document describing participation in proficiency sample and on-site inspection programs? YES / NO

- 2.7.2 Does this document include methods used to identify poor results and procedures followed when poor results or deficiencies occur? YES / NO
- 2.7.3 CCRL or Army COE Report (If the applicant seeks accreditation in concrete testing, it must have on file a report of a CCRL inspection or Army COE inspection performed within the past two years.) YES / NO
- Report No. and Date _____
 - Have deficiencies noted in the report been corrected within 30 days? YES / NO
 - Have corrective measures been adequately documented? YES / NO
- 2.7.4 AMRL or Army COE Report (If the applicant seeks accreditation in soils testing, it must have on file a report of an AMRL inspection or Army COE inspection performed within the past two years.) YES / NO
- Report No. and Date _____
 - Have deficiencies noted in the report been corrected within 30 days? YES / NO
 - Have corrective measures been adequately documented? YES / NO
- 2.7.5 Comments and observations _____

- 2.7.6 Does the QM include a procedure for handling external technical complaints? YES / NO
- 2.7.7 Does the procedure include who is responsible for handling the complaint, the review system, and the type of reply issued? YES / NO
- 2.8 INTERNAL QUALITY SYSTEM REVIEW
- 2.8.1 Does the QM include a document describing the scope of internal quality system reviews, the frequency of the reviews, identify the

individual responsible for the reviews, distribution of reports to management, and identify the location of the resulting record? YES / NO

2.9 SUBCONTRACTING AND EXTERNAL TECHNICAL SERVICES

2.8.1 Does the QM include a document describing the procedures followed relative to subcontracting and ensuring the quality of external technical services? YES / NO

2.9.2 Does the subcontracting policy describe procedures for selecting competent subcontractors and how the results obtained from a subcontractor are reported? YES / NO

2.9.3 Does the laboratory maintain records of verification of competency for external organizations used? YES / NO

2.9.4 Other comments and observations _____

2.10 TEST PROCEDURES

2.10.1 Does the laboratory maintain copies of current standards which relate to the tests performed? YES / NO

2.10.2 Have procedures which differ from recognized standards been committed to writing (exclusions)? YES / NO

2.10.3 For laboratories seeking accreditation for Soils:

- Has a “Laboratory Procedures Manual” been developed?
A “Laboratory Procedures Manual” is a manual describing the procedures for standard tests performed by the laboratory (not just the ASTM Standards). YES / NO / NA

2.11 ADDITIONAL DOCUMENTATION REQUIREMENTS

2.11.1 For laboratories seeking accreditation in Concrete:

- Has the laboratory participated in a proficiency sample testing program for C128 (Fine Agg Sp. G)? YES / NO / NA
 - If the laboratory also tests concrete aggregates: Have mechanical sieve shakers been verified for each different type of aggregate tested? YES / NO / NA
- 2.11.2 Are records maintained for at least 3 years? YES / NO
- 2.11.3 Does the laboratory have documented policies to ensure the protection of clients' confidential information and proprietary rights? YES / NO
- 2.11.4 Does the laboratory have documented procedures for the purchase, reception, and storage of consumable materials used for the technical operations of the laboratory? YES / NO
- 2.12 IN THE LABORATORY
- 2.12.1 Is all equipment (including reference materials) labeled/marked/identified to indicate its calibration status? YES / NO
- 2.12.2 Is non-functioning equipment (either out of calibration or not properly working) segregated from use, or clearly labeled as out of service? YES / NO

COMMENTS

3.0 <u>CONCRETE TESTING EQUIPMENT</u>	APPLICABLE ASTM <u>REQUIREMENT</u>	<u>STATUS</u>
3.1 COMPRESSION TESTING MACHINE	C39	
3.1.1 Make and model _____	--	_____
3.1.2 Serial number _____	--	_____
3.1.3 Capacity (lbs.) _____	--	_____
3.1.4 Dial readable to nearest _____ lbs.	0.1% Full Scale	_____
3.1.5 Zero adjustment on dial	Required	_____
3.1.6 Load Applied Continuously	Required	_____
3.1.7 Variable rate of loading	--	_____
3.1.8 Spherical seated upper block	Required	_____
3.1.9 Date of calibration _____	1 yr. max.	_____
3.1.10 Calibration agency _____	--	_____
3.1.11 Calibration method* _____	--	_____
3.1.12 Copy of calibration certificate available	Required	_____
3.1.13 Does the certification include curve data	Required	_____
3.1.14 Safety guards	--	_____
3.1.15 Other _____		

* Load Cell or Proving Ring

3.2 CONCRETE CYLINDER CAPPING

APPLICABLE
ASTM
REQUIREMENT STATUS

3.2.1 Capping with Gypsum Plaster or Sulfur Mortar

C617

- o Type of capping compound _____
- o Type of capping plate _____
- o Visual condition of plate _____
- o Suitability of alignment devices _____
- o Caps checked for proper planeness _____
- o Temperature control on melting pot _____ Required
- o Cube strength records of capping material _____
- o Safety Equipment
 - o Exhaust fans _____
 - o Fire extinguisher _____
 - o First-aid kit _____
 - o Safety glasses _____
 - o Other _____

3.2.2 Use of Unbonded Caps

C1231

- o Type of pads _____
- o Pad manufacturer _____
- o Durometer hardness _____
- o Are the number of tests on each pad recorded? _____
- o Are pads used more than 100 times? _____
- o If so, has qualification testing been performed (C1231-9.2.2) _____

STATUS

- o Are cylinder ends checked for perpendicularity prior to testing (< 0.5 degrees or 1/8 inch for 12 inch cylinders)? _____
 - o Are cylinder ends checked for depressions prior to testing (< 0.2 inches) _____
 - o How are cylinders that do not meet the perpendicularity or depression checks handled? _____
 - o Is cylinder verticality checked during load application (1/8 inch in 12 inches)? _____
 - o Are cylinders tested to complete failure (C1231 - Note 5)? _____
- 3.2.3 Are cylinder diameters measured and recorded _____
- 3.2.4 Other _____
- _____
- _____
- _____

3.3 CURING FACILITIES

APPLICABLE
ASTM
REQUIREMENT STATUS

- 3.3.1 Moist room or lime water curing (circle one) C511 _____
- 3.3.2 General description of facility and condition _____
- _____
- _____
- 3.3.3 Cylinder storage method _____ -- _____
- 3.3.4 Heating and cooling method _____ Thermostatic Control _____
- 3.3.5 Free moisture on cylinders (no running water) Required _____

3.3.6	Temperature _____	69.8 to 77.0°F	_____
3.3.7	Recording thermometer installed	Required	_____
3.3.8	Temperature records available	Required	_____
3.3.9	Humidity _____	95% min.	_____
3.3.10	Method of determining humidity _____	--	_____
3.3.11	Other _____		

		<u>APPLICABLE ASTM REQUIREMENT</u>	<u>STATUS</u>
3.4	CYLINDER COMPRESSIVE TEST REPORT FORM	C39	
3.4.0	Contains information required by ASTM C39/CCRL/ACI		_____
3.4.1	Contains information recommended by WACEL?		_____
3.4.2	Other _____		
3.5	FIELD CURING OF CYLINDERS	C31	
3.5.1	Type of cylinder molds used _____		_____
3.5.2	Field curing method reportedly used (ACI 301)		_____
3.5.3	Maximum/minimum thermometers reportedly used		_____
3.5.4	Cylinders reportedly picked up (48 hours max)	ASTM C31	_____
3.5.5	Method of transporting reported (protection from air drying/freezing) _____		

3.5.6	Condition of cylinder racks		_____
3.6	FIELD TESTING EQUIPMENT		
3.6.1	Condition of slump cones/rods	C143-5.1/5.2	_____
3.6.2	Evidence of smooth/nonabsorptive surface use	C143	_____

3.6.3	Condition of air meters _____	C-138/C-231	_____
3.6.4	Calibration of air meters _____	C-138/C-231	_____
3.6.5	Condition of unit weight buckets _____	C-29	_____
3.6.6	Evidence of unit weight bucket calibration	C-29	_____
	• Plexiglas, Glass, or Metal Plate available in the correct size?		_____
3.6.3	Condition of Concrete Beam Molds	C-31	_____

3.7 ADDITIONAL REMARKS

4.0	<u>SOIL AND AGGREGATE TESTING EQUIPMENT</u>	APPLICABLE ASTM <u>REQUIREMENT</u>	<u>STATUS</u>
4.1	MOLDS AND HAMMERS	D698, D1557, VTM-1	
4.1.1	Adequate molds on hand (4", 6") _____ Evidence of calibration of molds (both water filled and dimensional)		_____
4.1.2	Adequate hammers on hand (5.5 lb, 10 lb) _____ Evidence of calibration of hammers		_____
4.1.3	Adequate number of accessories (screens pans, trowels, spatulas, water sprinklers, balances, ovens, straight edges, extruder)		_____
4.1.4	Adequate base (200 lb min)		_____
4.1.5	Automatic Proctor hammer (optional)		_____
	o Evidence of calibration		_____
	o How was the calibration performed?		_____

4.1.6 Additional Comments

4.2 SIEVES AND SHAKERS

E11

- 4.2.1 Correct soils, concrete sieves on hand (see Appendix 1) _____
- 4.2.2 Sieves nest easily _____
- 4.2.3 No broken wires in use _____
- 4.2.4 Each sieve labeled as per ASTM E-11 _____

APPLICABLE
ASTM
STANDARDS STATUS

- 4.2.6 Mechanical sieve shaker functioning properly _____
- 4.2.7 Other _____

4.3 ATTERBERG LIMIT DEVICES

D4318

4.3.1 Liquid limit devices

- o Complete devices and accessories _____
- o Liquid limit devices in good condition
(no grooves, not worn, tight axle, limited-impact circle, etc.) _____
- o Devices properly calibrated (1cm drop) _____

4.3.2 Plastic limit equipment

- o Complete accessories _____
- o Ground glass plate meets criteria _____

4.3.3 Other _____

4.4 DRYING OVENS	<u>ASTM MANUAL OF TESTING</u>	<u>STATUS</u>
4.4.1 Adequate number, size & condition	Various	_____
4.4.2 Thermostatically controlled and accurate		_____
4.4.3 Provisions for checking temperature against calibrated thermometer	Not Req'd	_____
4.4.4 Provision to eliminate hot spots in oven _____		_____
4.4.5 Other _____		_____
_____		_____
_____		_____
_____		_____

	<u>ASTM MANUAL OF TESTING</u>	<u>STATUS</u>
4.5 THERMOMETERS	Various	
4.5.1 Adequate number and ranges		_____
4.5.2 Currently calibrated or traceable to NIST		_____
4.5.3 Other _____		_____
_____		_____
_____		_____

4.6 SAMPLE PREPARATION APPARATUS	<u>ASTM MANUAL OF TESTING</u>	<u>STATUS</u>
4.6.1 Sample splitter _____	C702	_____
o Physical condition with flat scoop, etc.		_____
4.6.2 Quartering method _____	Acceptable	_____
4.6.3 Evidence of Presoaking Proctors	D698, D1557	_____
4.6.4 Evidence of low-temperature drying of samples	D4318	_____

4.6 SAMPLE PREPARATION APPARATUS	<u>ASTM MANUAL OF TESTING</u>	<u>STATUS</u>
4.6.5 Dispersion apparatus	D422	_____
o High-speed mechanical stirrer		_____
o Proper physical dimensions of cup, baffles, and stirrer		_____
o Proper motor speed	10,000 rpm	_____
o Air jet (unlikely to see)		_____
o Proper design and dimensions		_____
4.6.6 Other _____		_____
_____		_____
_____		_____

4.7 IN-PLACE DENSITY EQUIPMENT

4.7.1 Sand cone method	ASTM D1556	_____
o Sand		_____
o Evidence of calibration (apparatus and sand)		_____
o Jar, funnel, and plate		_____
o Miscellaneous equipment		_____
o Complete set (balances, drying equipment, spoons, chisels, pans, brush, etc.)		_____
4.7.2 Nuclear method	ASTM D2922	_____
o NRC and/or state license on hand _____		_____
o NRC and/or state regulations on hand		_____
o Procedures manual available for operators		_____
o Documentation of training		_____
o Notice to employees identifying emergency contact		_____

4.7.2 Nuclear method (continued)

ASTM D2922

- o Film badge records _____
- o Shipping, transfer and survey records _____
- o Transport containers properly labeled _____
- o Sign-in/sign-out records _____
- o Evidence of bill of lading use _____
- o Field book with copy of license, charts and daily standard counts _____
- o Leak test records on hand _____
- o Calibration within 18 months _____
- o Standardization blocks (serial no. matches gauge) _____
- o Condition and workability of equipment _____
- o Evidence of standardization checks _____

4.7.3 Other _____

	APPLICABLE ASTM <u>REQUIREMENT</u>	<u>STATUS</u>
4.8 SCALES AND BALANCES	D4753	
4.8.1 All scales (field and laboratory clean and operable)		_____
4.8.2 Scale conditions		_____
4.8.3 Recent calibration traceable to NIST		_____
4.8.4 Scales used for purpose intended to proper accuracy range		_____
o Concrete weight (sufficient capacity accurate to 3.0%) C138		_____
o Sensitivity _____		_____
o Range _____		_____
o Aggregate weight (at least 100# capacity accurate to 0.1%) _____		_____
4.8.5 Proctor	D698, D1557	_____
o 20kg capacity readability to ± 1 gram _____		_____
o At least 1000 gram capacity readable to ± 0.01 gram		_____
4.8.6 Sand cone	D1556	_____
o 20 kg readable to ± 5 grams _____		_____
o 1000g readable to ± 0.1 gram _____		_____
4.8.7 Atterberg limits (balance accurate to 0.01 gram)	D4318	_____
4.8.8 Sp. gravity of coarse aggregate (5kg accurate to 0.5 gram) C127		_____
4.8.9 Sp. gravity of fine aggregate (1kg readable to 0.1 gram) C128		_____
4.8.10 Sp. gravity of soils (accurate to 0.1% of recorded mass) D854		_____
4.8.11 Moisture Content	D2216	
sample < 200 g GP1 readable to 0.01g		_____
sample > 200 g GP2 readable to 0.1g		_____
4.8.12 Other _____		_____

	<u>ASTM MANUAL OF TESTING</u>	<u>STATUS</u>
4.9 SPECIFIC GRAVITY TESTING	ASTM C127	
4.9.1 Coarse aggregate		
o Container (wire basket or bucket)		_____
o Suspension – wire of smallest practical size		_____
o Thermometer (minimum range 21 to 25°C)		_____
o Oven and suitable containers		_____
o Towels or cloths		_____
o No. 4 and 1 ½-inch sieve		_____
4.9.2 Soils	ASTM D854	_____
o Pycnometer (100ml volumetric flask or larger or 50ml stoppered bottle)		_____
o Thermometer (minimum range 10 - 40°C)		_____
o Oven and suitable containers		_____
o Vacuum or suitable heat source to expel entrapped air		_____
o Distilled water available		_____
4.10 MISCELLANEOUS		
4.10.1 Sieves (see item 4.2)		
4.10.2 Hydrometer bulb for mechanical analysis	D422	_____
4.10.3 Evidence of calibration of hydrometer bulb	D422	_____
4.10.4 Other _____		

APPENDIX 1

SIZES OF SIEVES REQUIRED

ASTM E11

A. For soils testing, ASTM D422 (Particles Size Analysis) lists the following as a complete set of sieves:

3 inch	No. 10
2 inch	No. 20
1 1/2 inch	No. 40
1 inch	No. 60
3/4 inch	No. 140
3/8 inch	No. 200
No. 4	

Optionally, the following sieves may be used:

3 inch	No. 16
1 1/2 inch	No. 30
1 inch	No. 50
3/4 inch	No. 100
No. 4	No. 200
No. 8	

Additionally, the following sieves are required:

No. 10 for ASTM D854, Specific Gravity
No. 40 for ASTM D422, Liquid Limit

B. The following would be considered an acceptable set of sieves for soils and concrete testing:

3 inch	No. 10	
2 1/2 inch		No. 16
2 inch	No. 20	
1 1/2 inch		No. 30
1 inch	No. 40	
3/4 inch	No. 50	
1/2 inch	No. 60	
3/8 inch	No. 100	
No. 4	No. 200	
No. 8		

EXHIBIT 6: MFRI Report Format and Sample Wording

(Date)

Accreditation Review No (#)

REPORT OF MATERIALS REVIEW AND FACILITIES INSPECTION

Performed in conjunction with an Accreditation Review of (name of laboratory, address)

This report has been prepared by the Laboratory Accreditation Team (LAT) Captain (name) on behalf of (name) (LAT Member), (name) (LAT Novice Member) and (name) (Outside Observer).

BACKGROUND

At the request of LAT, (name of laboratory) submitted a number of written materials relevant to engineering laboratory quality control. A list of materials submitted is appended hereto. These materials were distributed for review to the entire LAT that met on (date of Materials Review Meeting) to discuss them. Selected pages from these documents which have been commented upon by the reviewers are appended hereto. The balance of materials have been destroyed.

On (date), the LAT inspected the facilities of (name of laboratory), relying in part on WACEL-developed worksheets. The original worksheets used at that time, indicating the judgments of those who employed them, are attached to this report.

FINDINGS

Findings can be segregated into three distinct categories: strengths, tolerable weaknesses, and deficiencies.

Strengths

Strengths are defined as those activities or materials which are subject to judgmental evaluation and demonstrate excellence or which require no improvement. In the opinion of the LAT, the following activities and materials demonstrated excellence:

- 1.
- 2.
- 3.
- 4.
- 5.

The following, reported in general terms, are good and require no immediate improvement.

- 1.
- 2.
- 3.
- 4.
- 5.

Tolerable Weaknesses

A tolerable weakness comprises material or activity which in its current form is marginally acceptable. The nature of the weakness is not so serious as to degrade quality to an unacceptable level, but improvement is strongly encouraged. The items involved, and generally stated suggestions for improvement, are as follows:

- 1.

Comment

2.

Comment

3.

Comment

4.

Comment

5.

Comment

Deficiencies

A deficiency occurs when material or activity in its current form is not acceptable. A given deficiency may comprise one or several distinct items or it may comprise a number of tolerable weaknesses which, taken together, create a deficiency.

In the opinion of the LAT, tolerable weaknesses listed as items 3, 4, and 5 above are interrelated. While any one on its own is tolerable, as indicated, the interaction between the three is such that it creates a deficiency. Accordingly, improvement of tolerable weakness 3, 4, and 5 is listed as deficiency item no. 1, below, followed by other specific deficiencies.

1.

Comment

2.

Comment

3.

Comment

4.

Comment

5.

Comment

CONCLUSION

Given the deficiencies cited, the LAT cannot accredit (name of laboratory) either for soils or for concrete.

RECOMMENDATION

Deficiencies nos. 1, 2 and 3 all relate to written materials which affect both soils and concrete.

It is not necessary to reinspect the facility in order to evaluate whether or not improvements made are sufficient. Accordingly, it is suggested that these improvements be made and that, when complete (name of laboratory) forward to (name of LAT Captain) two copies of each item, one for his own review and one for review by (name of LAT Member or Senior Member). Assuming the revised materials are found acceptable, the LAT can recommend accreditation in the field of soils.

Deficiencies nos. 4 and 5 both relate to improvement of concrete testing equipment.

Reinspection is required before accreditation can be accorded. Reinspection will be performed by (name of LAT Member or Senior Member). As soon as the laboratory is ready for reinspection, (name of LAT Member or Senior Member) should be contacted: (Name of LAT Member's or Senior Member's firm, address, telephone).

NOTE: IMPROVEMENTS MUST BE MADE WITHIN THREE MONTHS FROM THE DATE OF THIS REPORT. We strongly suggest they be made well before that date. Failure to make the changes within three months, or failure to notify either (name of LAT Captain) or (name of LAT member or Senior Member) of changes within three months, results in automatic and irrevocable termination of this accreditation engagement.

COMMENT

(name of LAT Captain) will be pleased to communicate with a responsible representative of (name of laboratory) relative to findings, conclusions, and recommendations.

COPIES

Copies of this document and its attachments have been furnished to Messrs. (other LAT participants). Messrs. (LAT Novice Member) and (LAT Outside Observer) have been advised to read this document for checking purposes. If they do not concur with the findings, they are required to document their differences in writing to the LAT Captain and the WACEL PA within one week of receiving the report. If they agree with the findings, they are to maintain their copies until such time as the Accreditation Review process has been completed, and then they shall destroy their copies and other materials related to this Accreditation Review. A copy also has been furnished to the WACEL Program Administrator, who will deal with the copy as specified in the Program Guide.

Respectfully submitted,

WACEL, Inc.

(Name), Captain

Laboratory Accreditation Team No. (#)

Enclosure: Selected materials pages
Checklists

pc: (Name of LAT Member)
(Name of LAT Novice Member)
(Name of Outside Observer)
(Name of WACEL PA)

EXHIBIT 7: APPLICATION TO PARTICIPATE ON A LABORATORY ACCREDITATION TEAM

PLEASE PRINT OR TYPE

Name: _____

Company
Affiliation: _____

Address: _____
_____ ZIP _____

Phone: _____ FAX _____

E-Mail _____

Position in organization/title: _____

Licenses held: _____

Area of expertise (check all that apply) _____ Soil _____ Concrete _____ Lab Management
_____ Business Management
_____ Other _____

Are you a principal of your organization? _____ Yes _____ No

Please identify training you have received in the areas of quality assurance, assessment and calibration:

How many laboratory accreditation teams are your willing to serve on annually? _____ 1
_____ 2-3 _____ 4-5?

I hereby certify that I am familiar with the requirements of the WACEL Laboratory Accreditation Program and agree to comply with Program rules described in the WACEL Quality Assurance Laboratory Accreditation Program Guide, including those relating to

confidentiality. I also agree not to serve on an accreditation team where I have any commercial or financial or other interest that could compromise my objectivity.

Signed: _____

Complete and return **along with a copy of your resume** to: **WACEL, 7508 Wisconsin Avenue, 4th Floor, Bethesda, MD 20814; FAX: 301-907-9326; email mike@wacel.org.**