

INDEPENDENT ASSURANCE SAMPLING AND TESTING PROGRAM

DOTD Designation: S 701-05

I. Subject

A procedure to describe the Independent Assurance (IA) Sampling and Testing Program mandated by the Federal Highway Administration (FHWA) and conducted by District Laboratories for projects constructed on the National Highway System (NHS). The Louisiana NHS may be viewed at <http://www.fhwa.dotd.gov/labiv/nhs.htm>.

II. Purpose

To establish the administration of this program, including lines of responsibility, uniform reporting procedures, and the minimum number of samples and tests required. Samples and test results from this program are to be used to independently analyze the reliability of acceptance sampling and testing procedures and results. This information is not used for direct determination of the quality and acceptability of materials or workmanship.

III. General

TABLE 1, *Schedule of Independent Assurance Sampling and Testing*, takes into consideration the following independent DOTD sampling and testing programs:

- Utilization of project acceptance thickness and width measurements (DOTD TR 602)
- Materials and Testing Section quality assurance functions
- Verification sampling and testing
- DOTD training program

The frequencies listed in the schedule are the minimum and are to be used as a general guide. They may be increased by the District Laboratory Engineer as construction procedures and/or conditions warrant.

Personnel designated to conduct IA sampling and testing are not to be directly involved in acceptance sampling and testing for that phase of construction. Independent assurance test samples are not to be tested with the same equipment as acceptance samples, except when approved by the Materials Engineer Administrator.

IV. Responsibility of the District Laboratory

A. Memorandum of Anticipated Independent Assurance Sampling & Testing

The District Laboratory Engineer is responsible for the implementation and administration of the Independent Assurance Sampling and Testing Program in each district. At the beginning of construction on each NHS Project, the District Laboratory Engineer will use Table 1 to establish the minimum required IA sampling and testing for the project. The District Laboratory Engineer will notify the Project Engineer of the anticipated IA sampling and testing by a Memorandum of Anticipated Independent Assurance Sampling and Testing (Figure 1). This memorandum will list each phase of construction for which sampling and testing is anticipated and the number and types of samples required for each phase.

B. Review of Acceptance Sampling & Testing Procedures

When split samples are obtained for the independent assurance program, laboratory personnel will observe the procedures used in acceptance sampling and testing and compare them to the Department's standard procedures. When IA samples are obtained at the same time as the acceptance samples, the sampling and testing procedures will be observed and reviewed in the same manner as split samples.

C. Review of Test Results

The District Laboratory Engineer will provide the Project Engineer and District Construction Engineer with reports of IA test results as soon as they are completed. District laboratory personnel will compare the IA test results with the acceptance test results for the independent or split sample. The *Schedule of Allowable Deviation Values Between Acceptance and Independent Assurance Test Results* (Table 2) will be used to identify discrepancies. Any discrepancies in procedures or test results will be reconciled with the Project Engineer at the time these discrepancies are identified and the explanations included on the test report for the IA test.

D. Adjustments in Sampling & Testing Schedule

At any time during the construction of any course, district laboratory personnel may take additional IA tests or samples to resolve concerns about the reliability of acceptance sampling and testing results. Any discrepancies will be resolved prior to the signing of the Independent Assurance Certification referenced in VIII. D.

V. Responsibility of Project Engineer

The Project Engineer will notify the District Laboratory Engineer when construction activities requiring IA sampling and testing in accordance with the Memorandum of Anticipated Independent Assurance Sampling and Testing will be in progress. This notification is imperative due to the number of IA samples that require split sampling. It will be the responsibility of the Project Engineer to provide a written explanation of why any required IA sampling was not accomplished due to the lack of notification. The Project Engineer will notify the District Laboratory Engineer of plan changes which will affect anticipated IA sampling and testing.

The Project Engineer will assist the District Laboratory Engineer in resolving discrepancies between IA sampling and testing and acceptance sampling and testing. This assistance will include co-investigation, taking additional samples, performing additional tests, checking equipment, checking procedures, checking the qualifications of personnel performing sampling and testing, and other cooperative activities necessary to resolve any discrepancies in procedures or results.

VI. Responsibility of Materials and Testing Section

The Materials and Testing Section will monitor and review the IA program statewide to ensure standardization. Additionally, the Materials and Testing Section will implement modifications or updates to the program, as needed. The Materials and Testing Section is responsible for direct IA testing of reinforcing steel and identifying discrepancies between IA and acceptance results. The District Laboratory Engineer will be notified of these results.

VII. Sampling and Testing

A. Sampling

1. Independent Sample

Sampling is to be performed by district laboratory personnel. Samples are to be taken from the same location as, or in close proximity to, acceptance samples. When practical, the IA sample will be taken at the same time as the acceptance sample.

2. Split Sample

Sampling is to be performed by project personnel. The sample will be split or quartered by project personnel in accordance with DOTD TR 108 and one portion randomly selected as the IA sample. The splitting or quartering of the sample will be observed by district laboratory personnel.

B. Testing

The testing of IA samples is to be performed at the District Laboratory or at the project site, except for reinforcing steel which most District Laboratories are not equipped to test. These samples will be submitted to the

Materials and Testing Section for testing.

For the following materials, the equipment listed below will not be the same as that used for acceptance testing.

1. AGGREGATE and SOILS - balances, shakers, sieves, hydrometers, thermometers, liquid limit devices, grooving tools, and nuclear density-moisture devices.
2. ASPHALTIC CONCRETE - balances, shakers, sieves, reflux extractors, stability machines, breaking mold, and hammer for automatic compaction equipment.
3. PORTLAND CEMENT CONCRETE - slump cones, air meters, and cylinder molds.

NOTE: *For testing steel and concrete cylinders, different testing equipment is not available; however, to ensure reliability, the compression machines for testing concrete cylinders and the tensile machines for testing reinforcing steel will be calibrated twice each year.*

VIII. Reporting

A. Documentation

Documentation will be maintained in the Department's Material Test (MATT) reporting system when possible. Exception reports or copies of screens showing test results (Purpose Code 8, Spec Code 3) are to be used for reporting purposes. Also, results entered into the MATT System are to be accumulated under one item number, Item No. IA-__. (Example: The Item No. for all District 04 IA test results would be IA-04.)

B. Test Reports

The review of the IA sampling and testing procedures and the test results will be documented on an IA test report as illustrated in Submittal 1. The report is to indicate the type of sample (independent or split) and will include all explanations of discrepancies and corrective actions taken. If there are no discrepancies, the word "Verifies" is to be entered into *Remarks*. If there are discrepancies, the words "Does not verify" are to be entered into *Remarks*. Each person who reviews any portion of the report or makes comments will sign the reviewed section or comment.

The identification number (laboratory number, lot number, zone and test number, log number, etc.) of the acceptance test report will be referenced on the IA report. A copy of this acceptance report will be attached to the IA report. These documents will be placed in the District Laboratory IA file for the project, but will not be included in the certification or otherwise distributed. When discrepancies occur, the information from this review will be included with the Supplement to the Certification at the completion of a phase of construction.

C. Supplement to the Certification

At the completion of the IA sampling and testing of a phase of construction, all data is to be compiled and checked for accuracy and completeness. When discrepancies occur, the data is to be reported by a memorandum to the Materials Engineer Administrator. A Supplement to the Certification which will include explanations of discrepancies between IA and acceptance test results (Submittal 1) will be attached to this memorandum. If there are no discrepancies, a memorandum and Supplement to the Certification will not be required for this phase of construction, but the data will be included with memoranda for other phases of construction.

D. Independent Assurance Certification

After IA sampling and testing has been completed for a project, an Independent Assurance Certification (with a listing of all memoranda reporting completed phases of construction) will be completed and forwarded by memorandum to the Materials Engineer Administrator (Submittal 2). Any Supplement to the Certification and all memoranda will be attached to the Independent Assurance Certification.

When the Memorandum of Anticipated Sampling and Testing indicates

there are no samples to be taken on a project, the Independent Assurance Certification will not be required.

E. Distribution

The distribution for the test reports and memoranda mentioned in this step and in step IV. shall be as outlined below.

1. Memorandum of Anticipated Independent Assurance Sampling and Testing
Directed to: Project Engineer
Copies to: District Engineer Administrator
Materials Engineer Administrator
FHWA
2. Independent Assurance Test Reports
 - a. With Test Results
Directed to: Project Engineer
Copies to: District Construction Engineer
 - b. With Review and Comments
Placed in District Laboratory IA file with no distribution.
3. Supplement to the Certification
Directed to: Materials Engineer Administrator
Copies to: District Engineer Administrator
Project Engineer
FHWA
4. Independent Assurance Certification
Directed to: Materials Engineer Administrator
Copies to: District Engineer Administrator
Project Engineer
FHWA

TABLE 1
SCHEDULE OF INDEPENDENT ASSURANCE SAMPLING AND TESTING

| TYPE OF CONSTRUCTION | MATERIAL | TEST | FREQUENCY | REMARKS | |
|--|---|---------------------------------|---|--|-----------------------|
| EMBANKMENT ¹ | Non-Plastic Embankment ² | Gradation, PI, Foreign Matter | 1/10,000 lin ft/rdwy/lift | | |
| | All Embankments | Density | ½ weeks of construction activity | | |
| BASE OR SUBBASE ¹ | Soil, Aggregate or Granular Material ² | Classification and/or Gradation | 1/10,000 lin ft/rdwy 1/20,000 lin ft/shoulder | Check % cement for stabilization or treatment if required. | |
| | | Density | 1/10,000 lin ft/rdwy | | |
| ASPHALTIC CONCRETE WEARING AND BINDER COURSES ³ | 501 MARSHALL | Mixture ² | G _{mm} , Gradation, % Crushed, A.C. Content, | 1/15,000 tons | |
| | | Briquette | | | Voids, VMA, Stability |
| | | Cores | | | Density |
| | 502 SUPERPAVE | Mixture ² | G _{mm} | 1/15,000 tons | |
| | | Briquette | Voids, VMA | 1/15,000 tons | |
| | | Cores | Density | | |
| | 508 SMA | Mixture ² | G _{mm} , Gradation | 1/15,000 tons | |
| | | Briquette | Voids, VMA | 1/15,000 tons | |
| | | Cores | Density | 1/10,000 tons | |
| STRUCTURAL PORTLAND CEMENT CONCRETE ⁴ | Fresh Concrete | Compressive Strength | 1 set of 3/2000 yd ³ | | |
| | | Air (when used) and Slump | 1/2000 yd ³ | | |
| | Aggregate: Fine and Coarse ³ | Gradation | 1/2000 yd ³ of concrete | | |

¹ Does not apply when embankment, base or subbase contract quantity is less than 5000 linear feet.

² Split samples of acceptance samples will be taken at random and used for Independent Assurance testing.

³ Does not apply when contract quantity is less than 5000 tons.

⁴ Does not apply when contract quantity is less than 500 cubic yards.

TABLE 2
SCHEDULE OF ALLOWABLE DEVIATION VALUES BETWEEN ACCEPTANCE AND INDEPENDENT ASSURANCE TEST RESULTS

| TYPE OF CONSTRUCTION | MATERIAL | TEST | TEST VARIATION |
|---|--------------------------------|--|---|
| EMBANKMENT | Non-Plastic Embankment | Gradation PI Foreign Matter | No. 4 $\pm 5\%$; No. 200 $\pm 2\%$ passing +2 $\pm 2\%$ |
| | All Embankments | Density | ± 3 lb/ft ³ |
| BASE OR SUBBASE | Soil | Classification Gradation PI Density | Subgroup ± 1 No. 4 & larger $\pm 5\%$; No. 10 $\pm 4\%$; No. 40 $\pm 4\%$; No. 200 $\pm 3\%$ passing ± 3 ± 3 lb/ft ³ |
| | Aggregate or Granular Material | Gradation PI Density | No. 4 & larger $\pm 5\%$; No. 10 $\pm 4\%$; No. 40 $\pm 4\%$; No. 200 $\pm 2\%$ passing ± 3 ± 3 lb/ft ³ |
| ASPHALTIC CONCRETE WEARING, BINDER & BASE COURSES | Mixture | G _{mm} ^{1,2,3} Gradation ^{1,3} % Crushed ^{1,3} A. C. Content ^{1,3} | $\pm 0.015\%$ No. 4 & larger $\pm 5\%$; smaller than No. 4 $\pm 2\%$ passing $\pm 7\%$ $\pm 0.4\%$ |
| | Briquette | Air Voids ^{1,2,3} VMA ^{1,2,3} Stability ¹ | $\pm 1.0\%$ $\pm 0.5\%$ ± 500 lb |
| | Core | Density (Pavement) ^{1,2,3} | $\pm 0.7\%$ of individual core |
| STRUCTURAL PORTLAND CEMENT CONCRETE | Fresh Concrete | Compressive Strength, 28 days Slump Air | $\pm 7\%$ of average of set ± 0.5 in. $\pm 0.5\%$ |
| | Aggregates Fine Coarse | Gradation Gradation | No.4 & larger $\pm 5\%$; No.16 $\pm 4\%$; No.50 $\pm 4\%$; No.100 $\pm 3\%$; No.200 $\pm 1\%$ passing No.4 & larger $\pm 5\%$; No.8 $\pm 4\%$ passing |

¹Applies to Marshall.
²Applies to Superpave .
³Applies to SMA.

FIGURE 1

July 1, 1991

STATE PROJECT NO. 024-05-0031
F.A.P. NO. F-01-02(031)
LA 26 DERIDDER HIGHWAY - (SEC 2)
ROUTE LA-US 171
BEAUREGARD PARISH

MEMORANDUM TO:

NAME
PROJECT ENGINEER

This is to advise you of the anticipated independent assurance sampling and testing schedule for the above captioned project. Independent assurance samples will be taken and tests performed representing the following phases of construction:

EMBANKMENT:

- A. One density test will be taken per two weeks of construction activity. (Please advise the District Laboratory Engineer at commencement of construction activity.)

SUBBASE (6" LIME OR CEMENT TREATED SUBGRADE LAYER):

- A. Two density tests; one per roadway.

ASPHALTIC CONCRETE BASE COURSE (ROADWAY):

- A. One loose mix sample for gradation and AC content.
- B. One loose mix sample for stability test.
- C. Two cores for density; one per roadway.

ASPHALTIC CONCRETE WEARING OR BINDER COURSE (ROADWAY):

- A. One loose mix sample for gradation and AC content.
- B. One loose mix sample for stability test.
- C. Two cores for density; one per roadway.

STRUCTURAL PORTLAND CEMENT CONCRETE:

- A. One set of concrete cylinders.
- B. One slump test.
- C. One fine aggregate sample for gradation.
- D. One coarse aggregate sample for gradation.
- E. One reinforcing steel sample.

Advise this office of any plan changes or work orders affecting quantities or material requirements. Note that this anticipated independent assurance sampling and testing schedule is only the minimum Independent Assurance tests required.

If additional information is needed, please advise this office.

NAME
DISTRICT ENGINEER ADMINISTRATOR

NAME - SIGNATURE
DISTRICT LABORATORY ENGINEER

cc: District Engineer Administrator
Materials Engineer Administrator
FHWA

SUBMITTAL 1

July 21, 1991

STATE PROJECT NO. 024-05-0031
F.A.P. NO. F-01-02(031)
LA 26 DERIDDER HIGHWAY - (SEC 2)
ROUTE LA-US 171
BEAUREGARD PARISH

MEMORANDUM TO:

NAME
MATERIALS ENGINEER ADMINISTRATOR

This is to report results of Independent Assurance Sampling and Testing performed on the project referenced above.

EMBANKMENT:

A. One density test, zone and test number 07-801.

SUBBASE (6" LIME OR CEMENT TREATED SUBGRADE LAYER):

A. Two density tests, zone and test numbers 07-802 and 07-803.

ASPHALTIC CONCRETE BASE COURSE (ROADWAY):

- A. One test of loose mix for gradation and asphalt content, Lab. No. 07-341051.
- B. One test of briquette for stability, Lab. No. 07-341052.
- C. Two tests of cores for density, Lab. Nos. 07-341071 and 07-341072.

All IA test results verify except asphaltic concrete base course gradation test Lab. No. 07-341051. See attached "Supplement to Certification" for explanation of nonverifying test.

This is the initial report. Additional reports will be submitted as phases of construction are completed.

NAME
DISTRICT ENGINEER ADMINISTRATOR

NAME - SIGNATURE
DISTRICT LABORATORY ENGINEER

cc: District Engineer Administrator
Project Engineer
FHWA

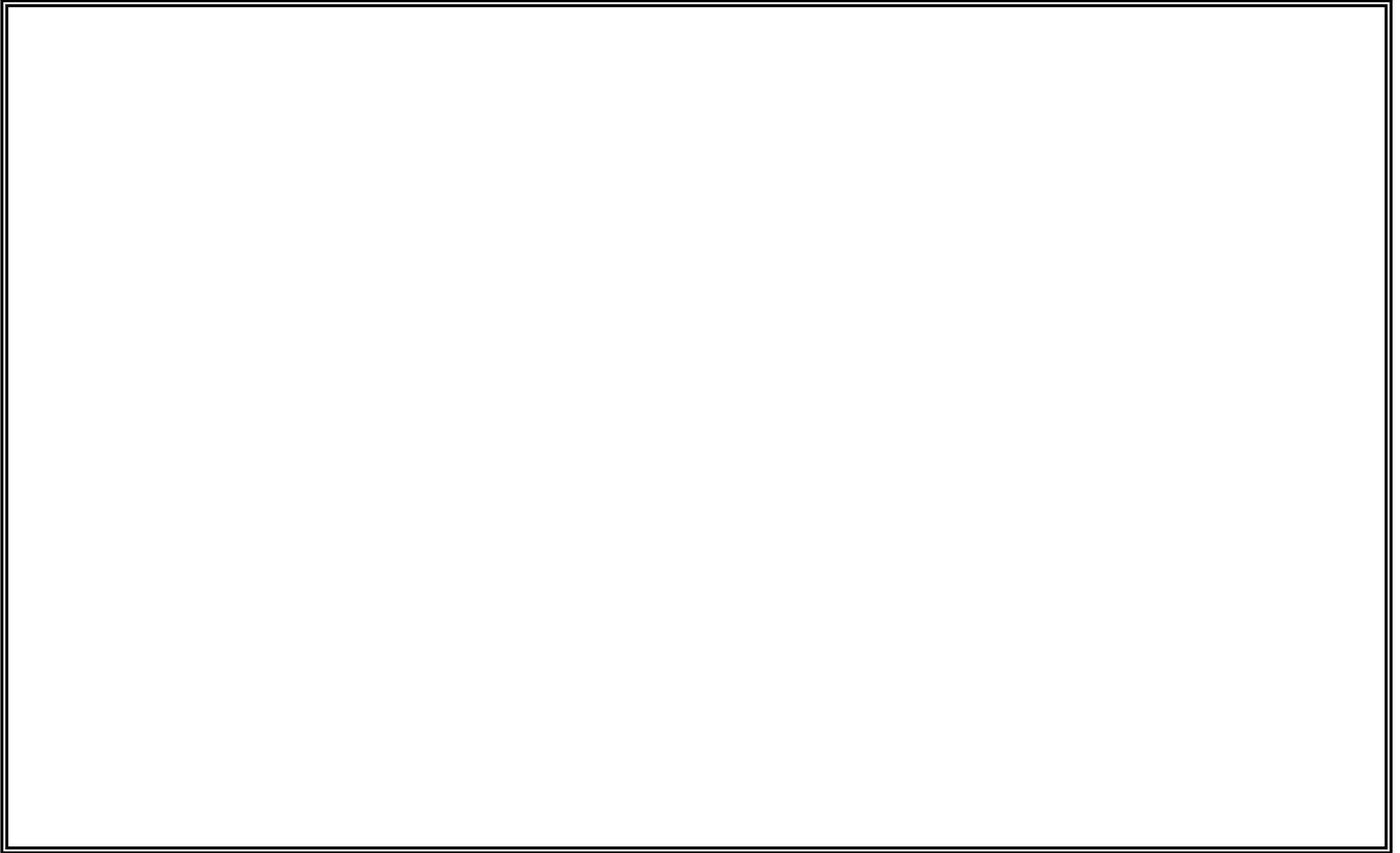
SUBMITTAL 1

STATE PROJECT NO. 024-05-0031
F.A.P. NO. F-01-02(031)

SUPPLEMENT TO THE CERTIFICATION

The Independent Assurance loose mix sample (Lab. No. 07-341051) test does not verify the acceptance sample (Lab. No. 07-341021). The amount of material passing the No. 10 sieve for the independent assurance sample is 7% less than that for the acceptance sample. The allowable deviation is $\pm 5\%$. To determine cause of this deviation, testing equipment and procedures used were checked. Procedures used were acceptable; however, the No. 10 sieve of the acceptance sample was found to be badly worn. The No. 10 sieve of the IA sample was found to be acceptable. The acceptance sample was retested using a new No. 10 sieve. The amount of material passing the No. 10 sieve was 51%. Thus, independent assurance sample test results verified acceptance test results.

SUBMITTAL 1



Gradation - 07-341051
Marshall Test - 07-341052

NAME - SIGNATURE
DISTRICT LABORATORY

ENGINEER

These test results do not verify acceptance test results, Lab. No. 07-341021. On the acceptance sample, the material passing the No. 10 was 54%. The allowable deviation value is $\pm 5\%$.

COMMENT: Procedures used in sampling, splitting and sieving the acceptance and IA samples were done correctly. Both No. 10 sieves were checked. The No. 10 sieve of the acceptance sample was found to be badly worn. The No. 10 sieve of the IA sample was found to be OK. The acceptance sample was retested using a new No. 10 sieve checked by me. The amount of material passing the No. 10 sieve was 51%.

IA sample test results verified acceptance test results.

NAME - SIGNATURE
ENGINEERING TECHNICIAN

SUBMITTAL 2

September 1, 1991

STATE PROJECT NO. 024-05-0031
F.A.P. NO. F-01-02(031)
LA 26 DERIDDER HIGHWAY - (SEC 2)
ROUTE LA-US 171
BEAUREGARD PARISH _____

MEMORANDUM TO:

NAME
MATERIALS ENGINEER ADMINISTRATOR

This is to report results of Independent Assurance Sampling and Testing performed on the project referenced above.

ASPHALTIC CONCRETE WEARING OR BINDER COURSE (ROADWAY):

- A. One test of loose mix for gradation, % crushed and asphalt content, Lab. No. 07-341115.
- B. One test of briquette for stability, Lab. No. 07-341116.
- C. Two tests of cores for density, Lab. Nos. 07-341125 and 07-341126.

STRUCTURAL PORTLAND CEMENT CONCRETE:

- A. Tests on one set of concrete cylinders, Lab. Nos. 07-341480, 07-341481 and 07-341482.
- B. One slump test (See above referenced reports).
- C. One test of fine aggregate for gradation, Lab. No. 07-341381.
- D. One test of coarse aggregate for gradation, Lab. No. 07-341382.
- E. One test of reinforcing steel, Lab. No. 22-512400.

The above Independent Assurance tests verify with the corresponding acceptance tests.

This is the final report to be submitted by this office, unless additional information is requested.

An Independent Assurance report was previously sent by memorandum, dated July 21, 1991, as follows:

EMBANKMENT
SUBBASE (6" LIME OR CEMENT TREATED SUBGRADE LAYER)
ASPHALTIC CONCRETE BASE COURSE (ROADWAY)

NAME
DISTRICT ENGINEER ADMINISTRATOR

NAME - SIGNATURE
DISTRICT LABORATORY ENGINEER

cc: District Engineer Administrator
Project Engineer
FHWA

SUBMITTAL 2

DOTD 03-22-1033
Rev. 1/92

State of Louisiana
Department of Transportation and Development

INDEPENDENT ASSURANCE CERTIFICATION

DISTRICT 07

DATE Sept.1, 1991

STATE PROJECT NO. 024-05-0031

FEDERAL AID PROJECT NO. F-01-02(031)

PROJECT NAME LA 26-DeRidder Highway

ROUTE LA-US 171

PARISH Beauregard

CERTIFICATION

All independent assurance samples and test are tithin tolerance limits to the samples and tests that are used in the acceptance program, except as noted as supplement to this certification.

Independent assurance reports sent by memoranda listed below, are attached:

| | |
|-------------------|--|
| July 21, 1991 | Embankment Subbase Asphaltic Concrete Base Course |
| September 1, 1991 | Asphaltic Concrete Wearing or Binder Course Structural Portland Cement Concrete |

DISTRICT ENGINEER ADMINISTRATOR

BY: _____
DISTRICT LABORATORY ENGINEER

REMARKS See attached supplement to this certification in memo dated July 21, 1991.

copies to:

- District Engineer Administrator
- Materials Engineer Administrator
- Project Engineer
- FHWA