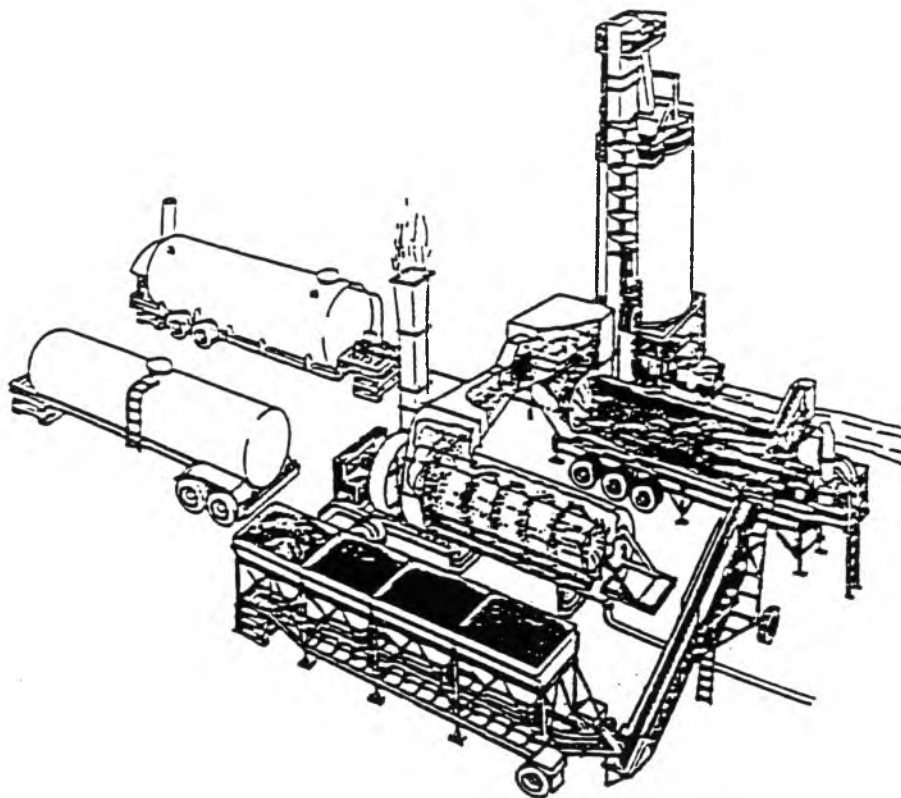


INDIANA

DEPARTMENT OF TRANSPORTATION



CERTIFIED

HOT MIX ASPHALT

PRODUCER PROGRAM

SEPTEMBER 1997

**INDIANA DEPARTMENT OF TRANSPORTATION
MATERIALS AND TESTS DIVISION**

**CERTIFIED
HOT MIX ASPHALT
PRODUCER PROGRAM**

INDIANA TEST METHOD NO. 582-97M

1.0 SCOPE

- 1.1 The Indiana Certified Hot Mix Asphalt Producer Program is a program whereby the Producer takes responsibility for all aspects of the production of quality Hot Mix Asphalt (HMA) in accordance with contract requirements, and the Department monitors the Producers production, sampling, and testing procedures.

2.0 DEFINITIONS

- 2.1 **CERTIFIED PLANT.** Any Hot Mix Plant continuing to meet the requirements of the Program, continues to be under the same ownership, and is approved by the Department.
- 2.2 **DEPARTMENT.** The Indiana Department of Transportation.
- 2.3 **DISTRICT.** The Department District Office responsible for administrating the materials and tests function in a local area of the state.
- 2.4 **DIVISION.** The Materials and Tests Division of the Indiana Department of Transportation, located at 120 S. Shortridge Rd. in Indianapolis, Indiana 46219-0389.
- 2.5 **MIXTURE.** HMA produced in accordance with the Certified Hot Mix Asphalt Producer Program for Department use.
- 2.6 **PRODUCER.** A company or owner who shall assume responsibility for a Certified Plant in compliance with the Program.
- 2.7 **PROGRAM.** The Department Certified Hot Mix Asphalt Producer Program.

3.0 PRODUCER PERSONNEL

- 3.1 The Producer personnel shall include a Management Representative and a Certified Asphalt Technician.

3.1.1 MANAGEMENT REPRESENTATIVE. The Management Representative shall be responsible for all aspects of production and control required by the Program at a Certified Plant.

3.1.2 CERTIFIED ASPHALT TECHNICIAN. A Certified Asphalt Technician is a Producer or Consultant employee who has been certified by the Department.

The Certified Asphalt Technician shall compact and analyze the HMA specimens, and perform the maximum specific gravity test. The technician shall supervise all other sampling and testing of materials, the maintenance of control charts, and the maintenance of the daily diary. All tests results for the Mixtures shall be certified by the technician.

4.0 DOCUMENTS

4.1 A Certified Plant laboratory shall have the following current documents on file:

1. Indiana Department of Transportation Certified Hot Mix Asphalt Producer Program (ITM 582).
2. Indiana Department of Transportation Standard Specifications Including Supplemental Specifications.
3. Pertinent contract Special Provisions.
4. Indiana Hot Mix Asphalt Quality Assurance Certified Technician Program Manual.
5. All applicable INDOT, AASHTO, and ASTM Test Methods.
6. Testing equipment calibrations or verifications.
7. Mix design, design mix formula (DMF), and job mix formula (JMF) for each Mixture.
8. The absorption period data for the HMA specimens and Maximum Specific Gravity sample, if applicable.
9. Test data of the production and load-out samples from the Certified Aggregate Producer on a weekly basis when material is shipped to the Certified Plant.
10. Fines correction data for each DMF.
11. Quality control test results.
12. Control charts.

4.2 A Certified Plant shall have the following current documents on file:

1. The Quality Control Plan (QCP) for the Certified Plant.
2. Binder certifications from an Approved Supplier Certification producer or a Type A certification for each binder shipment received.
3. Instructions from the manufacturer concerning storage and handling of the binder.
4. Plant calibrations for each DMF.
5. Calibration graph for return of the baghouse fines, if applicable.
6. Temperature recordation charts of the aggregate or Mixture.
7. Daily diary.

5.0 LABORATORY

- 5.1 Quality control testing shall be performed at the Certified Plant or as permitted in 5.2. The Producer shall provide and maintain a laboratory for quality control testing. The laboratory shall have the necessary space, equipment, and supplies for the tests to be performed. The laboratory testing equipment shall meet the requirements of the test methods identified for the required sampling and testing, except that an electronic balance shall be provided. The electronic balance shall be readable to 0.1 g and accurate to 0.1 g or 0.1 percent of the test load, whichever is greater, at any point within the range of use. The gyratory compactor shall be approved by the Division.
- 5.2 Performance of process control tests at laboratory facilities other than at the Certified Plant will be permitted provided that all test procedure criteria are satisfied, and the test results are furnished in writing to the Certified Plant within 24 h of sampling. If the laboratory is used for compaction of the HMA specimens and the maximum specific gravity test, the Producer shall designate the procedure for transportation of the Mixture to the laboratory. The procedure shall include the method to protect the Mixtures from the loss of temperature and/or binder aging, from the time of sampling at the Certified Plant to the time of testing at the laboratory.
- 5.3 The Engineer shall be permitted access to inspect any laboratory used for quality control testing, and witness quality control activities during production of Mixtures.

6.0 TEST EQUIPMENT CALIBRATION

6.1 The test equipment furnished by the Producer shall be properly calibrated or verified and maintained within the limits described in the applicable test method.

6.2 The Producer shall calibrate or verify equipment at the frequency indicated.

Equipment	Requirement	Minimum Frequency	Procedure
Balances	Verification	12 mo.	ITM 910
Gyratory Compactor	Verification	1 mo.	ITM 908
Ignition Furnace	Calibrate	Each Mix	AASHTO TP 53 Method A
Mechanical Shakers	Check Sieving Thoroughness	12 mo.	ITM 906
Nuclear Asphalt Content Gauge	Calibrate	Each Mix	ASTM D4125
Ovens	Verify Temperature Settings	6 mo.	ITM 903
Sieves	Check Physical Condition	6 mo.	ITM 902
Thermometers	Verification	6 mo.	ITM 909
Vacuum Pump	Check Pressure	12 mo.	ITM 905
Volumetric Flask	Calibrate	1 mo.	AASHTO T 209

6.3 The equipment calibration or verification documentation shall include:

1. A description of the equipment calibrated or verified including Model and Serial Number.
2. Name of the person performing the calibration or verification.
3. Identification of the calibration equipment used, if any (namely, standard weights, proving rings, thermometers, etc.).
4. Last date calibration or verification was performed and next due date.
5. A reference to the procedure used.
6. Detailed records showing the results of the calibration or verification performed.

7.0 DIARY

- 7.1 The Producer shall maintain a daily diary at the Certified Plant. The diary shall be a bound open format book with at least one page devoted to each day Mixture is produced.
- 7.2 The Producer shall keep the diary on file for a minimum period of three years.
- 7.3 Daily entries in the diary shall as a minimum include:
1. The quantity of Mixture produced, JMF number, and the contract or purchase order number for each Mixture.
 2. The time the sample was obtained and the time the test was completed.
 3. Non-conforming tests and the resulting corrective action taken.
 4. The temperature(s) of the Mixture in the truck at the plant.
 5. The moisture content(s) of the Mixture at the plant.
 6. Any significant events or problems.
- 7.4 The daily entry is to be routinely signed by the Certified Asphalt Technician. On occasion it may be signed by another person; however, it must then be counter-signed by the Certified Asphalt Technician. The name shall be entered in both signature and printed form.

8.0 MATERIALS SAMPLING AND TESTING

- 8.1 The Producer shall designate the sampling and sample reduction procedures, sampling location, and size of samples necessary for testing. Sampling shall be performed on uniform tonnage increments on a random basis and testing of the samples shall be completed within 24 h of the time the sample was taken. The Producer shall keep the test results on file for a minimum period of three years. The test methods and minimum frequencies of the process control tests for each mix design shall be as designated herein.

8.2 BLENDED AGGREGATE. A minimum of one sample shall be obtained and tested for gradation in accordance with AASHTO T 27 from each 2000 Mg of base or intermediate Mixtures and each 1200 Mg of surface Mixture. When the sample for a drum mix plant is obtained from the cold feed belt or the belt discharge, the total moisture content of the sample shall be determined in accordance with AASHTO T 255. The sample locations shall be as follows or as modified in the QCP:

1. Batch plants -- the hot bins.
2. Drum plants -- the cold feed belt or the belt discharge.

8.3 HOT MIX ASPHALT

8.3.1 Samples shall be obtained at the Plant to determine the voids and VMA of the Mixture. HMA specimens shall be compacted, and the maximum specific gravity determined in accordance with the requirements for each volumetric mix design except that an additional short term aging period will not be allowed. The minimum frequency of sampling shall be:

1. The first 1000 Mg and each subsequent 2000 Mg for base or intermediate Mixtures.
2. The first 600 Mg and each subsequent 1200 Mg for surface Mixtures.

The Producer may request in writing that an absorption period prior to compaction of the HMA specimens and the maximum specific gravity test be allowed if test results indicate that this period is warranted. The test results shall verify that the difference between the bulk specific gravity and maximum specific gravity for mixture without and with an absorption period is greater than .02 respectively. The maximum absorption period shall be 2 h. The request shall be forwarded to the District Materials and Tests Engineer (DMTE), and shall include the test results, the time of the absorption period, and the procedure for maintaining the HMA at compaction temperature while preventing additional binder aging and minimizing loss of moisture.

All HMA specimens and uncompacted Mixture for the maximum specific gravity test shall be given to the DMTE.

8.3.2 One sample shall be obtained at the Plant and tested for coarse aggregate angularity for Mixtures containing gravel, binder content, and moisture content. The minimum frequency of sampling shall be one sample for each 2000 Mg of base or intermediate Mixtures and each 1200 Mg of surface Mixtures. The samples shall be tested in accordance with one of the following procedures or other procedures as stated in the QCP:

1. Binder Content.
 - a. Extraction (ITM 571). The procedure for the fines correction shall be designated.
 - b. Nuclear Asphalt Content Gauge (AASHTO T 287).
 - c. Ignition Method (AASHTO TP 53 - Method A).
2. Moisture Content (ITM 572).
3. Coarse Aggregate Angularity (ASTM D 5821)

8.4 RECYCLED MATERIALS. A minimum of one sample shall be obtained in accordance with ITM 207 for each 1000 Mg of recycled materials or another frequency approved in the QCP. The samples shall be tested for coarse aggregate angularity for Reclaimed Asphalt Pavement (RAP) containing gravel, binder content, gradation, and moisture content in accordance with the following procedures or other procedures as stated in the QCP:

1. Binder Content.
 - a. Extraction (ITM 571). The procedure for the fines correction shall be designated.
 - b. Nuclear Asphalt Content Gauge (AASHTO T 287).
 - c. Ignition Method (AASHTO TP 53 - Method A).
2. Gradation (ITM 571).
3. Moisture Content (ITM 572).
4. RAP Coarse Aggregate Angularity (ASTM D 5821)

8.5 BINDER. All sampling will be witnessed by the Department. A sample identification form will be signed by the Producer and the Department, signifying the acceptability of the sample. The Department will take control of the sample.

The sample shall be obtained from either the Certified Plant binder tank or an injection line in accordance with AASHTO T 40 and the applicable exceptions to AASHTO T 40 in the Standard Specifications. The Department will determine the times during a production day when sampling will be performed.

If Certified Plant operations are suspended for more than 48 h, the next binder sample shall not be taken randomly. Instead, the binder sample shall be taken at the resumption of operations. The Producer shall notify the DMTE 24 h prior to resumption of operations.

8.6 TEMPERATURES.

1. A continuous record of the temperature of the aggregate or Mixture at the point of discharge from the mixing plant drier shall be recorded each day of production.
2. The temperature of the Mixture shall be obtained at the mixing plant a minimum of once for each 2 h of production.

8.7 MIXTURE CALIBRATION. A plant calibration shall be made for each DMF to be produced in accordance with the following methods:

1. Batch Plants -- the percentage of the total aggregate to be obtained from each hot bin and the recycled material belts.
2. Drum Plants -- the percentage of the total aggregate to be obtained from each cold bin and the recycled material bins.

9.0 ADJUSTMENT PERIOD

9.1 The Producer will be allowed an adjustment period for each design mix formula (DMF) in which changes can be made. The adjustment period shall be from the beginning of production and extending until 4000 Mg of base or intermediate mixtures or 2400 Mg of surface mixture has been produced. The production shall be for one contract. A reduced adjustment period may be allowed.

- 9.2 The amount passing the 2.36 mm, 600 μm , or 75 μm sieves on the JMF may be adjusted provided the gradation limits of 401.05 are not exceeded and the dust/calculated effective binder ratio is 0.6 to 1.2.
- 9.3 If an adjustment is necessary, a job mix formula (JMF) shall be submitted in writing for approval to the DMTE upon completion of the production of 6000 Mg of base or intermediate Mixture, 3600 Mg of surface Mixture, or a reduced adjustment period.
- 9.4 Only one adjustment period will be allowed for each DMF within a construction season. If production extends into the next construction season, the JMF will be allowed another adjustment period.

10.0 CONTROL CHARTS

- 10.1 Control charts shall be maintained by the Producer at the Certified Plant laboratory for each DMF. All test results shall be recorded on the control charts the same day the tests are conducted. As a minimum the charts shall be maintained until 30 test data points have been plotted. Subsequent to that time at least 30 test data points shall be continuously displayed.
- 10.2 All charts shall be retained by the Producer for the Certified Plant for a period of three years.
- 10.3 Control charts shall be required for:
1. 25.0 mm, 19.0 mm, 12.5 mm, 2.36 mm, 600 μm and 75 μm sieves, if applicable, for the blended aggregate samples for each DMF;
 2. Binder content of Mixture obtained at the Certified Plant for each DMF;
 3. Binder content of the recycled material stockpiles; and
 4. Air voids and Voids in Mineral Aggregate (VMA) for each DMF.
- 10.4 The target mean value for blended aggregate samples shall be determined from the mixture calibration or aggregate blend used for the DMF. All values may be adjusted once at the completion of the adjustment period.

The target mean values for the binder content of the Mixture and the recycled material shall be determined from the DMF.

The target mean value for the air void content shall be 4.0%.

10.5 Control limits from the target mean value for individual test values shall be:

Parameter	Control Limit(s)
<u>Blended Aggregate, % Passing Sieve</u> Base and Intermediate Mixtures 25.0 mm 19.0 mm 12.5 mm 2.36 mm 600 μm 75 μm	Specification Limits Specification Limits Specification Limits ± 10.0 ± 6.0 ± 2.0
<u>Blended Aggregate, % Passing Sieve</u> Surface Mixtures 2.36 mm 600 μm 75 μm	± 8.0 ± 4.0 ± 1.0
<u>Binder Content of Mixture, Plant (%)</u>	± 0.7
<u>Binder Content of Recycled Materials, (%)</u>	± 0.7
<u>Air Voids @ Ndes (%)</u>	± 1.0
<u>Voids in Mineral Aggregate @ Ndes (Min. %)</u> Nominal Maximum Aggregate Size 9.5 mm 12.5 mm 19.0 mm 25.0 mm 37.5 mm	15.0 14.0 13.0 12.0 11.0

10.6 The control chart legend shall be:

1. The target mean value shall be the center of the chart and shall be represented by a heavy long dash followed by a short dash line.
2. Control limits shall be represented by heavy solid lines.

3. The placement of all horizontal lines on the chart shall be numerically identified in the left margin.
4. The vertical distance between upper and lower control limits shall be no less than 50 mm.
5. The plot point for the test result shall be surrounded by a small circle and each consecutive point shall be connected by a solid straight line.
6. The moving average of the most current five test values shall be plotted. The plot points shall be indicated by a small triangle symbol and connected by straight lines.
7. Test results shall be plotted left to right in chronological order and dates corresponding to each test shall be shown along the horizontal axis.
8. All values shall be plotted to the nearest 0.1 percent.
9. Test results for samples obtained from other than at the Plant may be plotted on the corresponding chart provided the points are not connected with the test results from the Plant and the test results are not included in the moving average.

Any proposed deviation from these procedures shall be identified in the QCP.

11.0 RESPONSE TO TEST RESULTS

- 11.1 CONTROL CHARTS. The Producer shall take corrective action when the control limits are exceeded. Corrective action shall include, but is not limited to, investigation for assignable cause, correction of known assignable cause, or retesting.

When two consecutive test values after the first 4000 Mg of base or intermediate Mixtures or the first 2400 Mg of surface Mixtures exceed the control limits for the blended aggregate or binder content of the Mixture, production shall be discontinued. Normal production and testing shall not be resumed without the approval of the DMTE.

- 11.2 MOISTURE CONTENT. The Producer shall take corrective action when the moisture content of the HMA sampled at the Plant exceeds 0.3 percent.

- 11.3 FIELD COMPACTED SPECIMENS. The air voids and VMA shall meet the following criteria:

MIX CRITERIA	MIN.	MAX.
VMA @ Ndes		
9.5 mm*	15.0	----
12.5 mm*	14.0	----
19.0 mm*	13.0	----
25.0 mm*	12.0	----
37.5 mm*	11.0	----
Air Voids @ Ndes	3.0	5.0

*Nominal Maximum Particle Size

If consecutive sets of specimens do not meet the requirements, production shall be discontinued. Production may be resumed, using the same JMF, if the Producer verifies that the requirements for air voids and VMA can be met, subject to approval by the DMTE. If the next required set of specimens do not meet the requirements for air voids and VMA, then production shall be discontinued and a new DMF will be required.

- 11.4 Failure to discontinue production when required shall subject all Mixture produced after the required discontinuance to be considered as failed material, and this Mixture will be referred to the Chief, Materials and Tests Division for disposition. Plants that have two such referrals within a consecutive twelve month period shall be subject to suspension from the Certified status until such time that deficiencies are corrected to the satisfaction of the Department.

12.0 QUALITY CONTROL PLAN

- 12.1 Each Producer providing Mixture under the Program shall have a written QCP which shall be plant specific and be the basis of control. The QCP shall contain, but not be limited to, the methods of sampling, testing, calibration, verification, inspection, and anticipated frequencies.
- 12.2 The QCP shall include the following information for each Certified Plant.
1. The location of the Certified Plant site, including the county and reference to the nearest identifiable points such as highways and towns.

2. The name, telephone number, duties, and employer of the Management Representative and Certified Asphalt Technician(s). The duties of all other personnel responsible for implementation of the QCP shall be included.
3. The location of the laboratory, if not located at the mixing plant, and the procedure for transporting the mixture to the laboratory. Also, a list of test equipment that is calibrated or verified, and a statement of accessibility of the laboratory to Department personnel.
4. A plant site layout diagram which shall include the location of the stockpile area, binder tanks, fuel tank, additive or modifier supply, anti-adhesive supply, field laboratory, visitor parking area, and major components of the mixing plant.
5. A plan for controls of the aggregate and recycled material stockpiles. Controls for identification of stockpiles by signing or other acceptable methods, techniques for construction of proper stockpiles, and cold bin loading procedures shall be included.
6. A plan for the use of more than one binder grade in a binder tank.
7. The procedure for the consistent uniform addition of baghouse fines when returned into the mixing plant.
8. The procedure for using an anti-adhesive agent for the truck bed, and a statement that the agent is on the list of approved anti-adhesive agents.
9. The procedure for sealing the surge bin when used for extended storage of the Mixture. The written approval of the surge bin shall be included.
10. The procedure for loading Mixture into the trucks.
11. A sampling plan that includes locations, test methods, devices, techniques, frequencies, and sample reduction procedures.
12. A testing plan that includes the types of tests, and test methods.

13. A description of any other quality control techniques that may be used beyond the minimum required by the Department. These controls may include, but are not limited to:
 - a) Different types or greater frequencies of material testing; and/or
 - b) Visual checks, and monitoring of plant production.
 14. A statement of the procedure for handling addenda to the QCP including a time schedule for submittal.
 15. A documentation plan with details on control charting, test data, and the daily diary. Copies of the forms shall be included.
- 12.3 The last page of the QCP shall contain two signature blocks. The right hand block shall be signed and dated at the time of submittal by the Producer's Management Representative and shall include the title of person making the signature. The left hand block shall be signed and dated at the time of approval by the Chief, Materials and Tests Division.
 - 12.4 Production of Mixture shall not begin before the QCP has been approved. The Producer shall submit two copies of the QCP to the Department. One copy shall be submitted to the DMTE, and the other copy to the Quality Assurance Engineer. Acceptance or rejection of the QCP will be made within 15 days of receipt of the QCP at the Division. One copy will be returned to the Producer after approval.
 - 12.5 Movement of the Certified Plant to a new location will require an addendum to the QCP.

13.0 CERTIFICATION

- 13.1 Each Producer requesting to establish a Certified Plant shall do so in writing to the Chief, Materials and Tests Division.
- 13.2 Upon receipt of the request for certification the DMTE will be notified to inspect the laboratory.
- 13.3 The plant inspection, including the correction of any deficiencies, and calibration of all meters, scales and other measuring devices, shall be completed prior to certification.
- 13.4 Each plant meeting the requirements of the Program will be certified upon the approval of the QCP.

- 13.5 In the event of a change in ownership of the Certified Plant, the certification shall expire on the date of such change. The new ownership may avoid expiration by immediately submitting a statement to the Chief, Materials and Tests Division indicating recognition of the details of the Program, the existing QCP, and a clear pronouncement of intent to operate in accordance with the requirements of both documents.

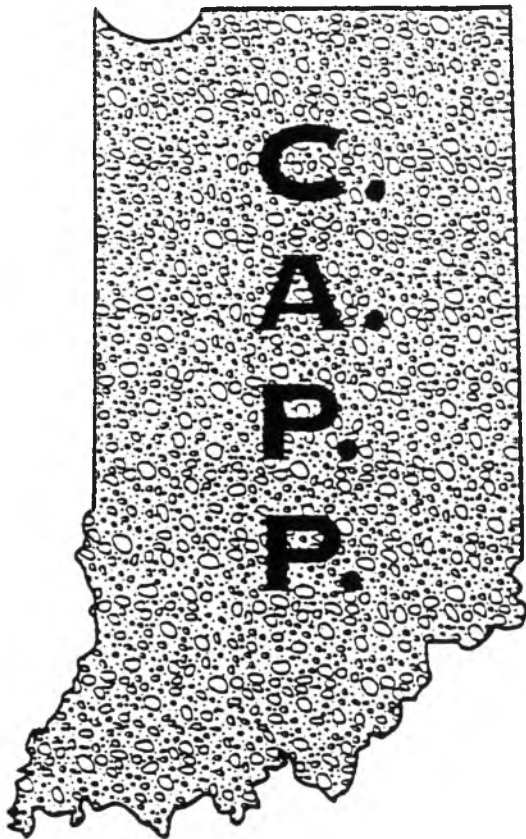
14.0 DEPARTMENT RESPONSIBILITIES

- 14.1 The Department will maintain a listing of all Certified Plants.
- 14.2 The Department will conduct audits on a random basis at each Certified Plant.
- 14.3 The Department will administer a Certified Asphalt Technician Training Program for those asphalt technicians that perform the required duties in the field. Certification of the technicians will be provided by the Department upon passing a certification test. Recertification of the technicians will be required after a period of three years.
- 14.4 Removal from approved status of a Certified Plant will be the responsibility of the Chief, Materials and Tests Division.

The Producer shall have the right to appeal the removal from Certified Plant status to the Engineer.

INDIANA

DEPARTMENT OF TRANSPORTATION



CERTIFIED AGGREGATE PRODUCER PROGRAM

SEPTEMBER 1997

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**INDIANA DEPARTMENT OF TRANSPORTATION
MATERIALS AND TESTS DIVISION**

**CERTIFIED
AGGREGATE
PRODUCER PROGRAM**

INDIANA TEST METHOD NO. 211-97M

1.0 SCOPE

- 1.1 The Indiana Certified Aggregate Producer Program (CAPP) is a program whereby a qualified mineral aggregate Producer desiring to supply material to the Indiana Department of Transportation assumes all of the Plant site controls and the Department monitors the Producers production, sampling and testing procedures.

2.0 DEFINITIONS

- 2.1 Certified Material. An aggregate product produced under the CAPP for Department use.
- 2.2 Certified Aggregate Producer. Any Plant/Redistribution Terminal continuing to meet the requirements of the Program, continues to be under the same ownership, and is approved by the Department shall be considered to be Certified.
- 2.3 Department. The Indiana Department of Transportation.
- 2.4 District. The Department District Office responsible for administering the materials and test functions in a local area of the state.
- 2.5 Division. The Materials and Tests Division of the Indiana Department of Transportation, located at 120 S. Shortridge Rd., Indianapolis, Indiana 46219-0389.
- 2.6 Non-Certified Aggregate Producer. Any Plant/Redistribution Terminal not approved under the Program. These shall include Plants/Redistribution Terminals never entering the Program, those dropping out, and those that have been removed from Certified status by the Department for failure to comply with the Program.
- 2.7 Producer. A company or owner who shall assume responsibility for each of their Certified Plants in compliance with the CAPP.
- 2.8 Program. The Department CAPP.

3.0 PARTICIPANTS

3.1 Plant. Any location at which mineral aggregate is processed into a final material shall be considered a Plant. Different processes for separate materials and stockpile yards at one location shall be considered part of the Plant.

A Producer Yard shall be the location of stockpiled aggregate materials under the control of the Producer at a point removed from the Plant. This will be considered part of the Producer's total operation.

3.2 Redistribution Terminal. Any supplier of mineral aggregate material(s) other than at a Plant shall be considered a Redistribution Terminal. Prior source documentation will be required by the Department.

4.0 PRODUCER PERSONNEL

The Producer's personnel shall include a Management Representative and a Certified Aggregate Technician.

4.1 Management Representative. The Management Representative shall be responsible for all aspects of production, handling, and control required by the CAPP at each Certified Aggregate Producer's Plant/Redistribution Terminal.

4.2 Certified Aggregate Technician. A Certified Aggregate Technician is a Producer or Consultant employee who has successfully completed the Certified Aggregate Technician Training Program and has been certified by the Department.

The Certified Aggregate Technician may be responsible for more than one Plant/Redistribution Terminal. The technician shall be at the Plant(s)/Redistribution Terminal(s) to perform the pertinent duties during critical activities and to meet the requirements of the Quality Control Plan (QCP). The technician shall supervise the sampling and testing of material, the maintenance of control charts, and the maintenance of the daily diary. All CAPP test results emanating from the Plant(s)/Redistribution Terminal(s) shall be certified by the technician.

5.0 MATERIALS

- 5.1 Material shall be produced in one of three categories; Standard Specifications, Quality Assurance, or Alternate. The intended end use of the material, and the control limits shall determine the category in which the material is classified. Material produced under these categories shall not be placed in the same stockpile unless the requirements of the Standard Specifications category are satisfied.
- 5.2 Standard Specifications. Standard Specification materials shall include all Certified Materials controlled by aggregate gradations as defined in the Department Standard Specifications and the construction contract documents.
- 5.3 Quality Assurance. Quality Assurance materials shall include all Certified Materials controlled by aggregate gradations established between the Producer and Contractor.
- 5.4 Alternate. Alternate materials shall include all materials produced which are not intended to comply with either Standard Specification or Quality Assurance material. This may include some materials produced for use by the Department as well as for commercial, local governments, or states other than Indiana.

6.0 REFERENCE DOCUMENTS

- 6.1 Each Plant/Redistribution Terminal shall have the following current documents on file at the location indicated in the QCP:
1. Indiana Department of Transportation Certified Aggregate Producer Program (ITM 211).
 2. Indiana Department of Transportation Standard Specifications. (Includes Supplemental Specifications)
 3. Indiana Department of Transportation Inspection And Sampling Procedures For Fine And Coarse Aggregates.
 4. Indiana Quality Assurance Certified Aggregate Technician Training Manual For Producer Technicians.
 5. The QCP for the Certified Plant/Redistribution Terminal.

7.0 LABORATORY

- 7.1 The Producer shall have a suitable laboratory to accomplish the requirements of the CAPP. Laboratories will be inspected by a Department representative before the Producer enters the Coordinated Testing Phase. Laboratories will also be inspected during audits and as needed to maintain the integrity of the Program.
- 7.2 The laboratory testing equipment shall meet the requirements of the test methods identified for the required sampling and testing, and as stated herein except that an electronic balance shall be provided. The electronic balance shall be readable to 0.1 g and accurate to 0.1 g or 0.1 percent of the test load, whichever is greater, at any point within the range of use.
- 7.3 The Producer shall maintain laboratory service for each Certified Plant/Redistribution Terminal. One approved laboratory may be used for more than one Plant/Redistribution Terminal provided the requirements of the Program are being maintained.

8.0 TEST EQUIPMENT CALIBRATION

- 8.1 The test equipment furnished by the Producer shall be properly calibrated or verified, and maintained within the limits described in the applicable test method.
- 8.2 The Producer shall verify the equipment at the frequency indicated:

Equipment	Requirement	Minimum Frequency	Procedure
Balances	Verification	12 mo.	ITM 910
Mechanical Shakers	Check Sieving Thoroughness	12 mo	ITM 906
Ovens	Verify Temperature Settings	6 mo.	ITM 903
Sieves	Check Physical Condition	6 mo.	ITM 902

- 8.3 The equipment verification documentation shall include:
 - 1. A description of the equipment verified including Model and Serial Number.
 - 2. Name of the person performing the verification.
 - 3. Identification of the verification equipment used, if any (namely, standard weights, thermometers etc.).

4. Last date verification was performed, and next due date.
5. A reference to the procedure used.
6. Detailed records showing the results of the verification performed.

9.0 DIARY

- 9.1 Each Certified Aggregate Producer shall maintain a daily diary. The diary shall be a bound open-format book with at least one page devoted to each day of the year.
- 9.2 The Producer shall retain the diary on file for a minimum period of three years.
- 9.3 Daily entries in the diary shall as a minimum include:
 1. General weather conditions;
 2. Area of mining operation (location and ledges, or pit area);
 3. Estimated quantity of materials produced;
 4. Time test samples were obtained and tests completed;
 5. Nonconforming gradation tests, and the resulting appropriate action taken;
 6. Changes in key personnel, if any;
 7. Significant changes in equipment, plant, screens, etc., which may affect the current statistical results of aggregate materials;
 8. Any significant event or problem; and
 9. Any out of control condition, as well as the action taken to correct the condition.
- 9.4 The daily entry is to be routinely signed by the Certified Aggregate Technician or Management Representative. On occasion it may be signed by another person; however, it must then be counter-signed by the Certified Aggregate Technician or Management Representative. The name shall be entered in both signature and printed form.

10.0 MATERIALS SAMPLING AND TESTING

- 10.1 Sampling and testing of all materials that require control for aggregate gradation, decantation, deleterious, and crushed particles shall be in conformance with the Department manual, Inspection And Sampling Procedures For Fine And Coarse Aggregates. Sampling shall be performed on uniform tonnage increments in an unbiased manner, and testing of the samples shall be accomplished in such time as to assure that process control is maintained. Testing shall be performed in accordance with the test methods as designated herein, and the applicable exceptions in the Standard Specifications.
- 10.2 The Producer shall retain the test results on file for a minimum period of three years.
- 10.3 Gradation. The gradation of the material shall be determined in accordance with AASHTO T 27. The frequency of sampling and testing shall be as follows:
1. Start of Production Frequency. Start of production material is the first 5000 Mg when producing a new material, or when producing a material after a seasonal shut down. Sampling and testing shall be performed a minimum of once every 1000 Mg, for the first 5000 Mg, but not required to exceed two per calendar day per material.
 2. Normal Production Frequency. Normal production material is material produced after the start of production. Sampling and testing shall be performed a minimum of once every 2000 Mg, but not required to exceed two per calendar day per material.
 3. Load-Out Frequency. Load-out material is the Certified Material that is shipped from the Plant/Redistribution Terminal. Sampling and testing shall be performed a minimum of once every 8000 Mg, on any Certified Material that is shipped; however, there shall be at least one sample and test per week for any Certified Material shipped that exceeds 1000 Mg.
- 10.4 Decantation. The decantation of the material shall be determined in accordance with AASHTO T 11. All load-out samples shall be washed and decanted. Unless specific problems are encountered, start of production and normal production samples need not be washed and decanted.

- 10.5 Crushed Particles. The percentage of crushed coarse aggregate particles for gravel shall be determined in accordance with ASTM D 5821. The frequency of sampling and testing shall not be less than once per week for each size of material during the start of production and normal production. No test is required if the week's production is less than 100 Mg.
- 10.6 Deleterious Materials. The percentage of deleterious materials shall be determined for coarse aggregates in accordance with AASHTO T 112, ITM 206 and the Standard Specifications. The frequency of sampling and testing shall not be less than once per week for each size of material during the start of production and normal production or as approved in the QCP. No test is required if the week's production is less than 100 Mg.

11.0 GRADATION CONTROL

- 11.1 Gradation control shall be performed for each Plant/Redistribution Terminal in accordance with the QCP and requirements herein.
- 11.2 Sieve Control. Standard Specification materials shall meet the critical sieve requirements for the materials and sieves shown below:

<u>Material</u>	<u>Critical Sieve</u>
#5	12.5 mm
#8	12.5 mm
#9	9.5 mm
#11	4.75 mm
#12	4.75 mm

All other Standard Specification materials shall not be controlled by critical sieve requirements, unless so identified in the QCP, but shall meet the specification or construction contract gradation limits for all sieves.

Quality Assurance materials shall have critical sieves and/or gradation limits as identified in the QCP.

- 11.3 Target Mean. All data that exists on a single process shall be used to establish the target mean. For a totally new process, at least 10 consecutive start of production or normal production test results shall be used. If production within a year does not result in sufficient data to establish a target mean, then a target mean shall not be determined.

The target mean on the critical sieve for Standard Specification materials, shall be no closer to either specification limit than 1.65 multiplied by the standard deviation designated in the QCP.

The target mean on the critical sieve for Quality Assurance materials shall be established between the Producer and Contractor for any sampling point.

- 11.4 Control Limits. Control limits are applicable to all critical sieve test results. They are established as plus or minus two standard deviations, but no greater than plus or minus 10%, from the target mean. When a target mean cannot be determined because of insufficient production, the Standard Specification gradation limits, or gradation for Quality Assurance material, shall be used.

Under some circumstances, when identified in the Producer's QCP, the Department may agree to designated target mean values and control limits on the critical sieve for the load-out tests that may be different from the production target mean values and control limits. To obtain such approval the Producer shall state the specific details which cause the operation to be unique in character.

- 11.5 Test Compliance. For material produced under either the Standard Specification or Quality Assurance categories, 95 percent of all gradation test results on the critical sieve shall statistically be between 10 percent below and 10 percent above the target mean at any one point of sampling. All other sieves shall be maintained within the Standard Specification or construction contract gradation requirements.

All data on the critical sieves identified for sieve control representing a process shall be included in the calculations for statistical compliance. When the control limits for load-out tests are different than the production control limits, all of the load-out tests may be used. All retest and other extraneous data shall be used for information.

- 11.6 Alternate Materials. Controls and limits as detailed in the Program herein do not apply for Alternate materials unless so stated in the QCP.

- 11.7 Nonconforming Tests. A nonconforming test shall be any test which falls outside the control limits identified in the QCP for Standard Specification or Quality Assurance materials controlled by a critical sieve. For sieves other than the critical sieve, a nonconforming test shall be any test which falls outside the control limits identified in the QCP for Quality Assurance materials, or outside the specification limits for materials controlled by Standard Specification requirements. Any nonconforming normal production or load-out test shall be followed immediately by a corrective action. Corrective actions shall include, but are not limited to, investigation for assignable cause, correction of known assignable cause, and retesting. Plants/Redistribution Terminals that continue to have repeated nonconforming normal production or load-out test results, due to lack of appropriate action, shall be subject to suspension from the Certified status by the Department.

A second consecutive nonconforming normal production test result, shall require the material to be isolated from the approved stockpile until action has been taken to eliminate the cause of the nonconformity. When a second consecutive nonconforming load-out test occurs, shipping from that stockpile shall cease until corrective action and testing has occurred that verifies the stockpile is acceptable for shipment.

12.0 CONTROL CHARTS

- 12.1 Control charts are a visual representation of the process control exercised by a Producer. Unless otherwise provided in the QCP, the control charts shall be posted on a wall at the laboratory. As a minimum, the wall posting shall be maintained until 30 production data points have been plotted. Subsequent to that time at least 30 production data points shall be continuously displayed.
- 12.2 The Producer shall retain the control charts on file for a minimum period of three years.
- 12.3 Application. As a minimum, control charts shall be required for gradation control using all start of production and normal production test results for all Standard Specification and Quality Assurance materials, or for gradation controlled Alternate materials. For materials which have a critical sieve, only the critical sieve is required to be charted. For all other charted materials, all applicable sieves shall be shown on the chart. Load-out test results shall also be plotted and may be displayed on the same chart as start up and normal production test results when the target mean remains unchanged. When the load-out target mean is designated in the QCP to be different from the production target mean, the load-out samples shall be charted separately. Other properties may also be charted as part of the Producer's overall QCP. A separate chart shall be maintained for each size of material being produced.
- 12.4 Chart Construction. The control chart legend shall be:
1. The target mean shall be the center of the chart and shall be represented by a heavy long dash followed by a short dash line.
 2. Control limits shall be represented by heavy solid lines.

3. Upper and lower specification limits shall be indicated by short dashed lines.
4. The placement of all horizontal lines on the chart shall be numerically identified in the left margin.
5. The vertical distance between upper and lower control limits shall be no less than 50 mm.
6. The plot point for the production test results shall be surrounded by a small circle, and each consecutive point shall be connected by a solid straight line.
7. The moving average of the most current five production test values shall be plotted for the critical sieve. The plot points shall be indicated by a small triangle symbol, and connected by solid straight lines.
8. When load-out test points appear on the same chart as production points, they shall be represented by a small square.
9. When load-out test points are plotted on a separate chart, they shall be represented by a small square, and connected by a straight line.
10. Test results shall be plotted left to right in chronological order, and dates corresponding to each test shall be shown along the horizontal axis.

Any proposed deviation from these procedures shall be identified in the QCP.

- 12.5 Conformance. The Producer shall apply state of the art interpretational techniques to all control charts and take corrective action when so indicated. Corrective action shall include, but is not limited to, investigation for assignable cause, correction of known assignable cause, and retesting.

13.0 QUALITY CONTROL PLAN

- 13.1 The QCP is a fundamental element in the Program, and shall be one of the first considerations in approval by the Department. Each Plant/Redistribution Terminal providing aggregate under the Program shall have a written QCP, which shall be site and plant specific, and be the basis of control. The QCP shall describe the methods of controlling all properties and quality aspects, which shall involve greater detail than the basic requirements of the Department specifications and policies. The QCP shall encompass the total process from preliminary material quality approval through the point where it leaves the Producer's control.

- 13.2 The QCP for each Plant/Redistribution Terminal shall include:
1. The location of the site, including township, range, section, etc., with reference to the nearest identifiable points such as highways and towns.
 2. Organizational structure showing the Parent Company, Management Representative, and Certified Aggregate Technician(s) at each location. Also, the duties and responsibilities of each of the people listed shall be specified.
 3. A list and description of all portions of the mineral deposit(s) indicating the different quality classes as established in the current editions of ITM 203 and ITM 210, and as indicated on the Source Category Classification Approval letter. The manner in which each quality class shall be processed, handled, and stockpiled shall be specified.
 4. An explanation for each material having marginal quality characteristics, and the plan or controls to be used for such materials.
 5. An identification of the category in which each material produced is classified.
 6. A production flow diagram, which shall be a step-by-step chart using standard symbols, showing all the points involved with mining and processing from the natural deposit to the finished material and the points of sampling. A copy of the symbol legend shall be included.
 7. A sampling plan that includes locations, devices, techniques, and frequencies throughout the entire process.
 8. A testing plan that includes the types of tests. The procedure for isolating nonconforming material shall be specified.
 9. A list of the target mean values, standard deviations, and control limits on the critical sieves for each material identified as being controlled by critical sieve requirements. Changes in the target mean are permitted by an addendum to the QCP. Control limits for Alternate materials, if applicable, shall be specified. Materials for which no control limits are appropriate shall be identified.

10. A description of any other process control techniques that will be used beyond the minimums established by Department specifications and policies. These controls may include, but are not limited to, the following:
 - a) Different types or greater frequencies of material testing.
 - b) Other midstream sampling and testing prior to material completion.
 - c) Visual checks, and monitoring.
11. A plan for downstream controls after material completion. These controls shall address such items as the identification of material stockpiles by signing or other acceptable methods, techniques for construction of proper stockpiles, material retrieval techniques and safeguards to ensure the loading and shipping of uncontaminated material.
12. A description and location of the laboratory, and a statement of laboratory capability including a list of equipment that is to be verified.
13. A documentation plan with details on control charting, test data, and the daily diary. Copies of the forms shall be included.
14. The method by which the frequency of load-out testing of the Certified Materials is verified.
15. The location of the reference documents, control charts, daily diary, test data, material shipment records, and any other pertinent information.
16. The method of control for each Producer Yard.
17. A statement of the procedure for handling addenda to include a time schedule for submittal.
18. The Annual Aggregate Source Report (Stone sources only). The report shall be included in an Appendix of the QCP. Redistribution Terminals are encouraged, but not required, to include this report for materials from another source. Information included in the report does not need to be repeated in the QCP.

19. The AP Aggregate Production Control Plan. The report shall be included in an Appendix of the QCP. Information included in the report does not need to be repeated in the QCP.
- 13.3 Authentication. The last page of the QCP shall contain two signature blocks. The right hand block shall be signed and dated at the time of submittal by the Producer's Management Representative, and shall include the title of the person making the signature. The left hand block shall be signed and dated at the time of approval by the Chief, Materials and Tests Division. The Producer shall submit two copies of the QCP to the Department for approval. One copy shall be submitted to the District Materials and Tests Engineer and the other copy to the Assistant Quality Assurance Engineer. The authentication page will be returned to the Producer after acceptance and approval.
- 13.4 Addenda. The Producer shall transmit all applicable process control changes to the Department in a timely manner for approval. This shall be done in the format of addenda to the QCP. The addenda shall include a signed and dated authentication page.
- 13.5 Certified Material Addenda. A Producer may add a Certified Material to the QCP by an addendum using the following procedure:
1. Prior to the start of production of the material, the Producer shall notify the District Materials and Tests Engineer and Assistant Quality Assurance Engineer in writing indicating the size and type of material that shall be produced. If it is anticipated that the quantity for that year shall be small, the Producer shall indicate the approximate amount of material that shall be produced.
 2. Shipment of the material may begin immediately.
 3. The control limits will be the Standard Specification gradation limits for the appropriate size of material. If the material is a Quality Assurance material then the Producer shall designate the control limits. If the material is controlled by a critical sieve, then the control limits for that sieve shall be used when the target mean is determined, and the test compliance rate of 11.5 is satisfied.

4. Materials that do not have a critical sieve requirement shall be sampled and tested in accordance with 10.3.

Materials that have a critical sieve requirement shall be sampled and tested a minimum of once every 1000 Mg for start of production and normal production, but not required to exceed two per calendar day. Load-out frequency shall be in accordance with 10.3. When the target mean is determined, and the test compliance rate is satisfied, the frequency of sampling and testing for normal production shall be in accordance with 10.3.

5. Split samples shall be obtained by the Producer for each sample, and provided to the Department. The sample splitting procedure and test results agreement shall be the same as the guidelines used during the Coordinated Testing Phase. Split samples shall be obtained until the Department is satisfied with the performance and testing results from the Producer.
6. The Producer shall submit an addendum for the Certified Material to the Assistant Quality Assurance Engineer. If the material is controlled by a critical sieve, the addendum shall include the test data used to determine the target mean, the actual and selected standard deviations, and the control limits, if applicable.

14.0 COORDINATED TESTING PHASE

- 14.1 The Coordinated Testing Phase is the initial phase for Certification. The purpose of this phase is to build mutual confidence in production capability, capacity, uniformity, and quality. Sampling and testing procedures, and test results will be reviewed in a coordinated and shared manner between the Department and the Producer. While operating in this phase, the Producer shall develop the details of the QCP, and demonstrate the ability to produce to the required test compliance rate. Mean test values and standard deviations are developed during this process for the critical sieves. Each Plant/Redistribution Terminal shall be under the Coordinated Testing Phase for at least three months of production, or a period as determined by the Department.
- 14.2 Each Plant/Redistribution Terminal requesting to enter the Coordinated Testing Phase shall do so in writing to the Chief, Materials and Tests Division. The request shall include all of the materials to be supplied at the source regardless of whether the materials are for Department or other uses.
- 14.3 Aggregate Sizes. While operating in the Coordinated Testing Phase, Producers are encouraged to limit the Coordinated Testing procedures to aggregate sizes 5, 8, 9, 11, 12, 53, 23, and 24.

14.4 Control Charts. Test results shall be charted in accordance with requirements for Certified Material, except that the corrective action need not apply. The Producer will be expected to use the charts as basic indicators of variation, and to become aware of limitations needed on any process. During this phase charts shall be maintained for all sieves.

14.5 Sampling and Testing. The frequency and types of tests for the Producer's sampling and testing shall be the same as the minimum requirements of the start of production and normal production for Certified Material, except that decantation will be required.

The use of a random sampling method is encouraged; however, if a random sampling method is not used, and if more than one sample per day is required, the samples shall be spread throughout the day's expected production. Department aggregate technicians will conduct coordinated/side-by-side testing on as many of these samples as possible. In any event, Department testing will be conducted on not less than every other test conducted by the Producer, or until the Department is satisfied with the performance and testing results from the Producer.

The coordinated tests shall utilize a split sample for all tests except non-durable, total chert, which shall use the same sample. The procedure for splitting samples shall be in accordance with the Inspection and Sampling Procedures for Fine and Coarse Aggregates. Both split halves on the final split shall weigh within 10 percent of each other after splitting. If not, both halves shall be recombined and split until this requirement is met.

14.6 Producer Records. During the Coordinated Testing Phase the Plant/Redistribution Terminal shall maintain the same references, charts, reports, diary, and Source Category Classification Approval letter as required for the Certified Aggregate Producer.

14.7 Test Results Agreement. The Coordinated Testing Phase guidelines for test agreement are:

Sieve Analysis

<u>Sieve Size</u>	<u>Maximum % Difference</u>
37.5 mm thru 9.5 mm	5
4.75 mm & 2.36 mm	3
Minus 75 μ m (decant -- all aggregates other than #53)	0.5
Minus 75 μ m (decant #53)	1.0

Crushed particles. The difference should not exceed 5 percent.

Non-Durable, Total chert. The difference should not exceed 40 percent of the lowest results or 1 percent, whichever is greater.

Test result differences will be resolved on-site between the Producer's technicians and the Department's technician, if feasible. If such differences are not readily resolved, the Area Supervisor and/or the District Materials and Tests Engineer will resolve the difference. The resolution will be recorded in the respective diaries of both technicians.

- 14.8 Data Reporting. Within the first week of each month copies of the test results, control charts, and the daily diary shall be forwarded to:

Materials and Test Division
Attn: Asst. Quality Assurance Engineer
120 S. Shortridge Rd.
Indianapolis, IN 46219-0389

15.0 TRIAL PHASE

- 15.1 The Trial Phase is the second phase for obtaining Certification. This phase is started when the Producer has successfully completed the Coordinated Testing Phase and the QCP has been approved. During this phase the Producer shall demonstrate the ability to follow the QCP. Monthly submissions of test results, control charts, and daily diaries shall be continued. Changes in the QCP by addenda may be made.

16.0 CERTIFICATION

- 16.1 Each Plant/Redistribution Terminal meeting the requirements of the CAPP shall be eligible for Certification. Each Certified Producer must comply with the Program as detailed herein. After approval, monthly submissions of test results, control charts, and daily diaries are not required.
- 16.2 Material Shipment Record. Certified Producers shall have records that show the date, type, and amount of Certified Material, and the source of Certified Material shipped to each Department contract, concrete plant, hot mix asphalt plant, or Redistribution Terminal. Certified Materials shipped to commercial or non-Department use sources may or may not be included in this report. When non-Department use materials are included in the report, they may be reported as a lump sum. When they are not included in the report, the Certified

Producer shall have records available in sufficient detail so as to enable the Department to verify the frequency of load-out testing of Certified Materials. The report shall include:

1. Date of shipment.
 2. Contract number or other facility.
 3. Total amount shipped each day.
 4. The Producer's test identification number.
 5. Approval number. (A six digit code number preceded by the letter Q.) This number will be assigned by the Department, and will be valid as long as the Producer maintains a Certified status.
 6. Aggregate size.
 7. Ledges for stone materials.
- 16.3 Weigh Tickets. The Certified Producers approval number, originating source name, source number, aggregate size, and ledges for stone materials, shall be entered on each weigh ticket representing material for Department use.
- 16.4 Change of Ownership. Once the Department has Certified a Plant/Redistribution Terminal, there is no automatic expiration date for the Certification; however, in the event of a change in ownership of the Plant/Redistribution Terminal, the certification shall expire on the date of such change. The new ownership may avoid such expiration by immediately submitting a statement to the Chief, Materials and Tests Division indicating recognition of the details of the CAPP, the existing QCP, and a clear pronouncement of intent to operate in accordance with the requirements of both documents.

17.0 DEPARTMENT RESPONSIBILITIES

- 17.1 Certified List. The Department will maintain an updated published listing of all Plants/Redistribution Terminals that are currently certified.
- 17.2 Auditing. The Department will audit the Program on a random basis at each Plant/Redistribution Terminal to verify that the Producer's production, sampling, and testing procedures are in accordance with the Program.

The audit will include random samples taken by the Producer for informational purposes as directed by the Department. A split of the audit samples shall be provided to the Department. The sample splitting procedure, and test results agreement shall be in accordance with 14.5 and 14.7.

17.3 Mineral Quality. The Department will be responsible for the pre-approval of the mineral quality at each Plant location in accordance with ITM 203 and ITM 210.

17.4 Training. The Department will administer a Certified Aggregate Technician Training Program for those aggregate technicians that perform the required duties of the Program. Certification of the technicians will be provided by the Department upon successful completion of the training. Recertification of the technicians will be required after a period of three years.

17.5 Certification Removal. Removal from the approved status of a Certified Producer will be the responsibility of the Chief, Materials and Tests Division.

The Producer shall have a right to appeal the removal from Certified Producer status to the Engineer.

17.6 District Jurisdiction. The District Materials and Tests Engineer shall have the authority to suspend shipment of a specific material or stockpile if it is found that the Producer has failed to comply with the program such that material quality and uniformity is not being met. Such action will be promptly reported to the Chief, Materials and Tests Division.

The Producer shall have the right to appeal the suspension of shipment by the District to the Chief, Materials and Tests Division.