

Volume I

Section 1.1

CONSTRUCTION AGGREGATES

1.1.1 PURPOSE

To establish procedures within the Department for monitoring Construction Aggregate sources to ensure the quality of aggregates used on Department projects.

1.1.2 AUTHORITY

Sections 334.044(2), 334.044(10)(a), 334.048(3), 20.23(3)(a),
Section 334.24, Florida Statutes

Chapter 14-103 (Construction Aggregates) Florida Administrative Code (FAC)

1.1.3 REFERENCE

Code of Federal Regulations (CFR); Federal-Aid Policy Guide (FAPG);
Subchapter G – Engineering and Traffic Operations, Part 637 –
Construction Inspection and Approval, Subpart B – Quality Assurance
Procedures for Construction.

1.1.3 SCOPE

Principal users of this document include District Materials Offices (DMO) and District Construction Offices (DCO), as well as the State Materials Office (SMO).

1.1.4 PROCEDURE

FAC Rule Chapter 14-103 establishes a standardized method of evaluation, approval, and control of construction aggregates sources through a producer Quality Control Plan (QCP) as the initial part of the Department's method of accepting aggregates. QC requires the producers and distributors of construction aggregates to be responsible for their product; to establish, maintain and employ their own process control system and certify to the Department compliance of their product with applicable quality requirements and/or specifications. This section describes the Department responsibilities and duties, authority, and standardization of monitoring methods for validating the effectiveness of the QCP and encouraging the source to

produce excellent quality material.

1.1.4.1 GENERAL ROLES AND RESPONSIBILITIES

When a source is approved, the SMO will concurrently send copies of each source's QCP to the appropriate District Materials and Research Engineer's (DMREs) Aggregate Acceptance Unit contact.

The DMRE's have administrative and supervisory responsibilities for Mine Inspectors and/or Branch Labs in their respective Districts and through them the monitoring of construction aggregate sources, i.e. Type I and IV Mines and Redistribution Terminals. The State Materials Office shall inspect Type II Mines quarterly and Type III Mines on an annual basis. Refer to **FAC Rule Chapter 14-103.004 (6)** for Mine Type definitions.

The District 2 Materials Office shall assume responsibility for monitoring material compliance from Type I sources located in Georgia and the District 3 Materials Office shall assume responsibility for monitoring material compliance from Type I sources located in Alabama. However, the DMRE for the District into which the material is transported will assume responsibility for obtaining appropriate Verification samples from the Redistribution Terminal or the point-of-use as appropriate.

1.1.4.1.1 SMO Responsibilities

The State Materials Office is specifically responsible for:

(A) Source Approval Process to include:

- (1) Initial source evaluation.
- (2) Quality Control Plan evaluation and update approval.
- (3) Source inspection as to compliance with **FAC Rule Chapter 14-103, Materials Manual Section 1.1 Volume 2**, and the source's Quality Control Program.
- (4) Material evaluation to determine aggregate properties and characteristics.
- (5) Evaluate obtained and submitted aggregate test results to determine specification compliance and reliability of results.

(B) Approval, disapproval, suspension or other actions applying to sources' Approval or disapproval of source Quality Control Programs.

- (C) Establishment and monitoring of minimum Quality Control and Quality Assurance requirements.
- (D) Technical and problem assistance.
- (E) Inspection of Type II out-of-state sources.
- (F) Overall administration and coordination of **FAC Rule Chapter 14-103** and QA operations.

1.1.4.1.2 District Responsibilities

The District Materials Offices are specifically responsible for:

- (A) Mine Inspecting to monitor and document each source's compliance with **FAC Rule Chapter 14-103**, their approved QCPs and applicable aggregate specifications.
- (B) Recommendations to the Source and the SMO when QCP needs to be updated.
- (C) Review of all District source data in system database for compliance.
- (D) Investigating breakdowns in the source's Quality Control Program, with recommendations to the Director, Office of Materials in accordance with **Section 1.1.4.6.2**.
- (E) Establishing or approving QC Certification system for mines and products.
- (F) Determination of the disposition of defective aggregates at the source.
- (G) Adding or deleting specific products from a source's approved products list.
- (H) Recommending to project engineers to reject or suspend the use of defective aggregate at the point-of-use.
- (I) Liaison with design, construction and maintenance personnel, and Project Engineers.
- (J) Providing technical solutions for construction projects.

- (K) Maintaining source data files under their supervision including input of data into the Aggregate System computer database.
- (L) Communicating and coordinating with other Department personnel regarding materials shipped across District borders.

1.1.4.2 MINE INSPECTION

The Department performs mine inspections to review the administration of the QCP, aggregate shipping controls and aggregate certification with emphasis placed on specific areas of concern. This includes processing techniques, sampling and testing procedures, personnel and equipment. Review the source's worksheets, test data, QC charts and corrective actions (if any). The relationships established, observations made, and information obtained in these inspections will assist in determining courses of action to take when:

- (1) The Source's Certification System is in question,
- (2) Technical problems arise,
- (3) Resolution issues come up, and
- (4) Material disposition investigations occur.

1.1.4.2.1 INSPECTION ACTIVITIES

As a suggested minimum, visit each approved construction aggregate source once per week (except for Type II and Type III sources). Visit sources using the Conditional Certification System more frequently than once per week; visit suspended sources once per month to determine status and progress toward problem correction pursuant to Department status change. The districts will confirm source status once per month. The DMRE may modify inspection frequencies temporarily to direct attention to problem sources or areas.

The District will designate responsibility to inspect producer's laboratories. Inspectors should have the necessary tools (e.g. thermometer, calipers, weights, and a tape measure) to check testing equipment at the aggregate source's on-site laboratory. Check all equipment used for process control and acceptance testing. If additional assistance is needed, notify the laboratory inspection section at the DMO or SMO for assistance. Review portions of the QCP at each inspection such that some aspect of each QC area is reviewed at a minimum of once per month with a complete inspection of all aspects completed within a three-month period. Direct attention toward problem areas as the inspector becomes familiar with each operation. Verification inspectors must

perform aggregate source inspections. Use the Aggregate Source Inspection Report located at <https://pdl.fdot.gov/api/form/downloadAttachment/10981049> and complete in MAC.

Initiate a dialogue with the QC personnel that encourages them to find the root causes of problems and to make long-lasting solutions. Solicit responses from QC personnel regarding your observations .

Districts may add more information than is minimally required on the ***Aggregate Source Inspection Checklists***. For a guide to these activities, see the ***Mine Inspection Flow Chart, F1*** at the end of this chapter. If in the opinion of the DMO, the issue is escalating with no clear sign of early resolution, include comments in the “Remarks” section of the checklist with the expected number of days for the source to correct any deficiency.

1.1.4.2.2 Certification

Each shipment (truck, railcar, ship, barge, etc.) of aggregate intended for use on Department projects must be certified by the producer as having been produced under their QCP and meeting all applicable specifications in accordance with ***FAC Rule Chapter 14-103.004(3)***. The mine inspector should determine:

- (A) Are certifications filled out accurately?
- (B) Are the materials being certified produced under the approved QCP?
- (C) Can QC test data be directly tied to specific materials (for example, pretested stockpiles, or for material disposition investigations)?
- (D) Are materials being handled according to the approved QCP during loading?
- (E) Are you being notified prior to shipment of aggregate materials to a Department project (for example, upon source approval, for pretested stockpiles, or after periods of non-production for FDOT)?

1.1.4.2.3 Source Records

Each source must maintain adequate records of all samples, tests and other actions to substantiate aggregate conformance to Department requirements. The mine inspector should review those records to determine the following:

- (A) Availability of test results.

- (B) The type and number of tests made.
- (C) The type and number of deficiencies found.
- (D) The quantities approved by the producer.
- (E) The nature of corrective actions taken, and quantity affected.
- (F) Accuracy and completeness.
- (G) The tracking of the sample through the sampling and testing process.

1.1.4.2.4 Sampling

Sample Methods

Sources are required to use sampling methods meeting approved Department standards which are then incorporated into the source's QCP.

1.1.4.3 VERIFICATION AND ANALYSIS ACTIVITIES

1.1.4.3.1 Sampling and Testing

During inspections take Verification samples to validate current QC data. Randomly select a product from the Source's products before you arrive at the mine. Obtain Verification samples (at a rate of one randomly chosen sample per shipment) at the point-of-use if a Type II shipment did not pass through a Terminal. For a guide and further instructions to these activities, see the ***Verification Inspection (F2)***, ***Verification Sampling (F3)***, ***Base Sampling (F4)***, ***Evaluation of Data For Base Material (F5)*** flow charts at the end of this chapter.

Select the location, timing and type of product sampled independent of any influence from QC personnel. The producer may split this sample with the Department, but may not enter the data as a QC result in the Department's database. Transport the Verification sample to the Lab for testing. As space permits, endeavor to store the remainder of the Verification sample until the QC data are validated.

Closeout Verification test results by creating and running a Comparison Package analysis in MAC. The QC is validated if the Verification result falls within the range identified by the mean plus or minus two times the standard deviation. If two consecutive Verification results fail to valid the QC, proceed to Accelerated Verification as outlined in ***Section 1.1.4.3.4***.

Collect and test additional Independent Verification samples at any time to document rejectable material.

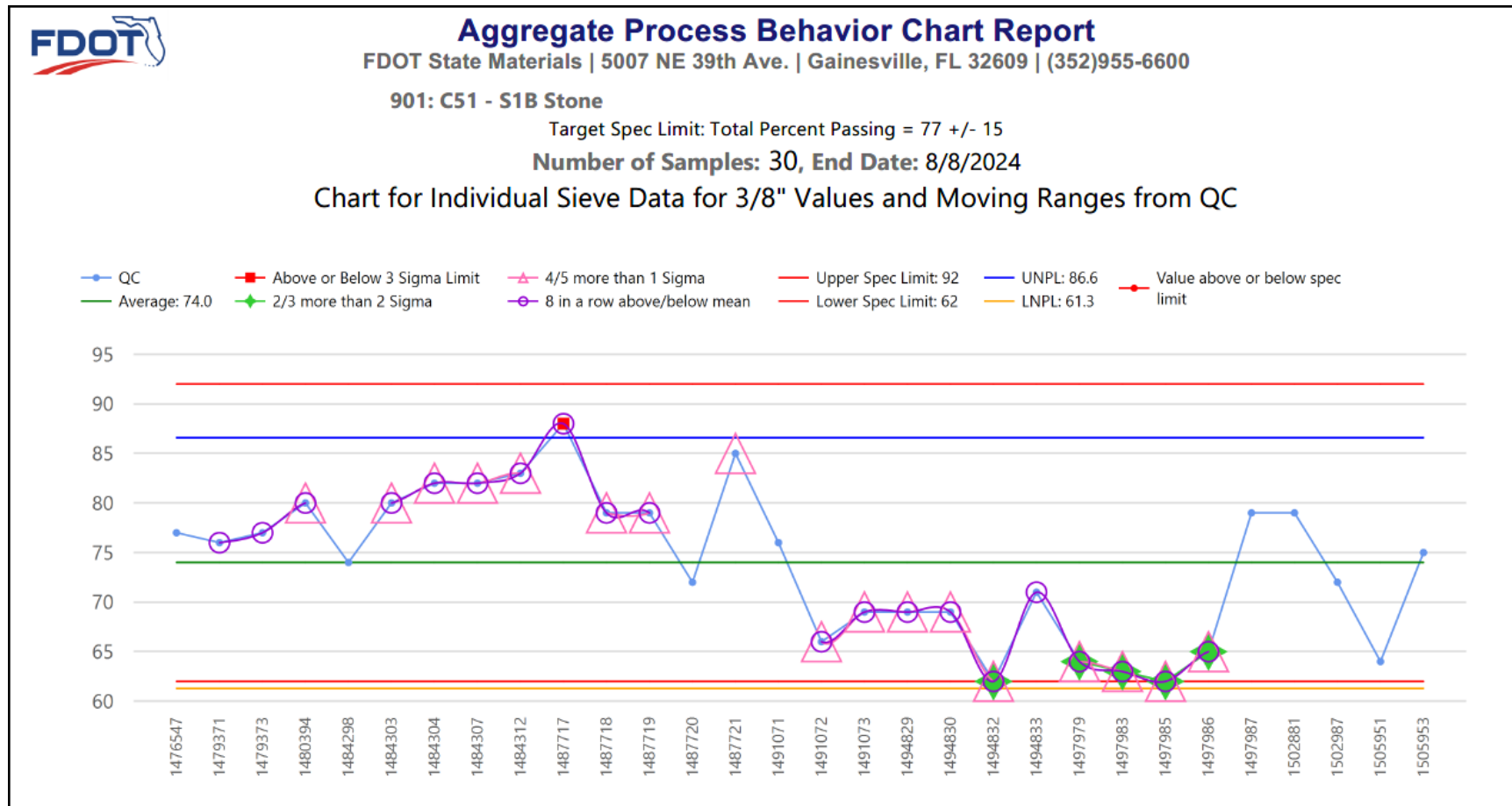
1.1.4.3.2 Control Charts

Control charts are important because they provide a simple and effective visual representation of the source's performance. Review control charts at each visit to the source and check for the following:

- (A) Availability to source and Department personnel.
- (B) Up-to-date data (**Section 1.1.4.3** of the ***Materials Manual Volume II***).
- (C) Accurate and up-to-date control charts.
- (D) Adequate coverage. As a minimum, control charts are to be kept for L. A. abrasion, gradation, -200, specific gravity, Limerock Bearing Ratio etc..., as applicable, for each grade of construction aggregate.

If any problem indicators exist, review the associated QC results with the Verification results. Review Aggregate Process Behavior Chart Report available in MAC. Discuss findings with the responsible source personnel. Document the actions the source has taken or takes to address problems, in MAC.

Figure 1. Example Control Chart



1.1.4.3.3 Data Evaluation

Evaluate the QC and Verification data to determine source's compliance and the validity of QC data. For a guide to these activities, see the ***Data Evaluation Flow Chart, F7*** at the end of this chapter. Re-initialize data for statistical compliance only when you are reasonably sure that the producer's corrective action can reasonably be expected to prevent reoccurrence of the control failure and assure continued compliance with ***Section 1.1.5.2*** of the ***Materials Manual Section 1.1 Volume 2***.

1.1.4.3.4 Accelerated Verification

Conduct Accelerated Verification when the Department is unable to validate the source's QC data. For a guide to these activities, see the ***Accelerated Verification Flow Chart, F8*** at the end of this chapter.

1.1.4.4 RESOLUTION

Conduct Resolution activities when the QC personnel dispute the accuracy of an individual Verification result from a sample split, or not split, with the Department. Use an AASHTO-accredited lab to determine whether the QC result or the Verification result stands. For a guide to these activities, see the ***Resolution Flow Chart, F9***, at the end of this chapter. Refer repeated instances of Resolution to the SMO for possible Source Approval reconsideration

1.1.4.5 INDEPENDENT ASSURANCE (IA)

IA activities for technicians are defined in ***Materials Manual Section 5.5*** and for Laboratories and Equipment in ***Materials Manual Section 5.7***.

1.1.4.6 QCP FAILURES AND ACTIONS

1.1.4.6.1 Failures

Consider the QCP to have failed when one or more of the situations listed in ***FAC Rule Chapters 14-103.0071 and 14-103.009*** occur. For example:

- (A) Out-of-date and improper records kept or test data not available to Department inspectors.
- (B) Improper sampling and testing of materials.
- (C) Improper certification of materials.
- (D) Variation from accepted QCP without prior Department approval.
- (E) Three or more control failures related to the same cause for the same product during any 365-day period. (check that this means calendar day)
- (F) Quality of products falls below 95% probability of meeting Department requirements.
- (G) Any Quality Control failure defined by a Producer's QCP.

1.1.4.6.2 Actions

In the event that any one of the above occurs, the following is a guide to minimum actions to be taken.

- (A) If the mine inspector is aware that any of the items listed in **Section 1.1.4.6.1 (A through G)** have occurred, then the following actions shall be taken:
- (1) The mine inspector shall notify available QC personnel and immediately document the Exceptions in Attachment A MAC and also notify the DMRE or their delegate. If the item does not represent a continuing deficiency in the QCP operation and does not affect material quality, specify a reasonable completion date in the report.
 - (2) If, after the specified completion date, the source has not corrected the deficiency or provided a corrective-action plan, or if the deficiency affects material quality, then unacceptable conditions exist at that source.
 - (3) Commensurate with the severity of the problem, the DMRE may allow the source time to correct the deficiency, but in no case allow longer than ten (10) working days.
 - (4) If, at the end of this period (or earlier, if the severity of the problem dictates prompt action) the deficiency has not been corrected, the DMRE shall recommend in writing further action to the State Materials Office with a copy to the producer.
 - (5) The State Materials Office shall review the situation in consultation with the DMRE and take the appropriate action(s) in accordance with **FAC Rule Chapter 14-103** and this Section.
- (B) Actions on **Subsection 1.1.4.6.1 (F)**, shall be based on statistical analysis of Quality Control and Verification data. These actions shall be taken by the State Materials Office after review of data with source, Branch Laboratory/Mine Inspector and the DMRE.

1.1.4.7 TECHNICAL ASSISTANCE

District Materials staff are expected to provide technical assistance to Aggregate Source and Project personnel. Make recommendations to Project personnel to reject or suspend the use of defective aggregate at the point-of-use. Get together with design, construction and maintenance personnel, regarding aggregate issues, e.g., availability, production and scheduling concerns.

1.1.4.8 DISTRICT MATERIALS ADMINISTRATION

Maintain data files for sources including input of data into the Aggregate System computer database and follow-up on data entry problems (e.g. generated by error logs from data uploading).

Communicate and coordinate with other Department personnel regarding materials shipped across District borders.

Maintain up-to-date logs and files on each source showing each inspection date, sample location, observations, instructions issued, problems, etc.

1.1.4.9 PROJECT ADMINISTRATION

The Project Administrator's (PA's) responsibility is to be familiar with the Department's policy of acceptance of aggregates for usage based on **FAC Rule Chapter 14-103** and this chapter, especially the certification of aggregate as a basis for acceptance. The PA also has the authority and responsibility, in accordance with **Sections 5 and 6 of the Florida Department of Transportation Standard Specifications**, for rejecting or suspending the use of obviously defective materials, regardless of the approval status or certification of those materials by the source. This should be coordinated through the DMRE.

1.1.5 TRAINING

All FDOT personnel who are involved in sampling, testing, and inspections outlined in this procedure are required to hold the applicable **Construction Training Qualification Program (CTQP) Certification**. The available Aggregate CTQP certifications are listed below:

- Qualified Sampler Technician
- Aggregate Testing Technician.
- Aggregate Base Testing Technician
- LBR Technician

These qualification ensures that these personnel have a thorough knowledge of the basics of aggregate testing.

1.1.6 FORMS

None required.

<https://pdl.fdot.gov/Forms>

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
A.1 AGGREGATE SOURCE INSPECTION REPORT

675-020-01
MATERIALS
01/06

Source: _____
Inspector: _____
Week: _____

Date: _____
Time Arrival: _____
Time Departed: _____

1. Product

A. Materials Production (List of products being produced at time of the visit, oversize material)

☐ _____

☐ **Bill of Lading/Shipping Tickets** _____

B. Stockpiling Operation (Signs, Contamination, Segregation, Equipment on Stockpiles, Stacker Position)

☐ **Signs** _____
☐ **Stockpile Condition** _____
☐ **Stockpile Location** _____

C. Loading & Shipping (Loading 90° to belt and across the entire stockpile face. Inspection of shipping units)

☐ _____

2. Testing

A. Technician (Designated by producer and available)

☐ _____

B. Test Methods Observed

☐ _____

☐ _____

☐ _____

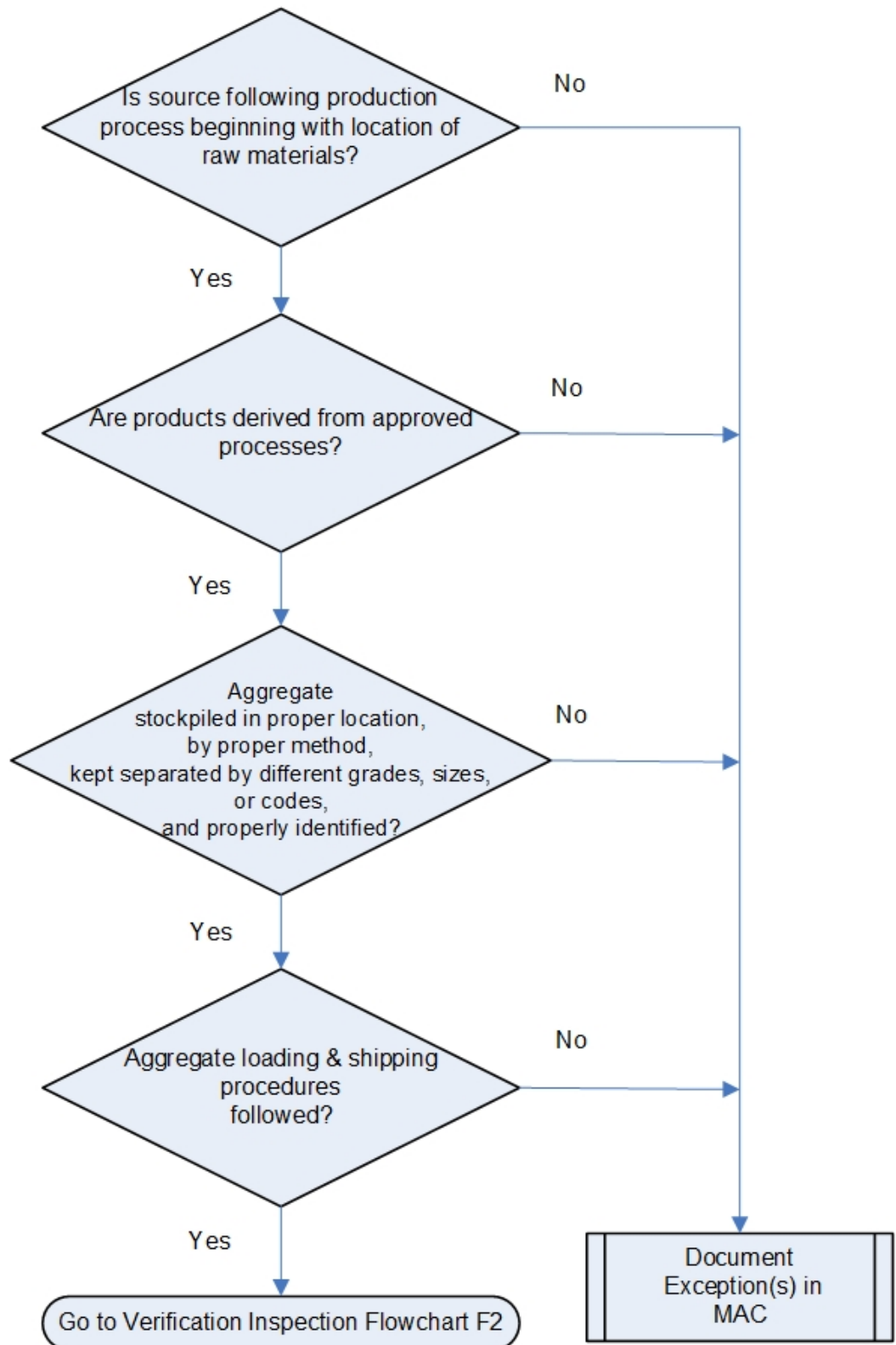
3. Data – Control Charts, Worksheets and Code Sheets (Available, Accurate, Current, (up-to-date), Corrective Actions, Received on Time)

☐ _____

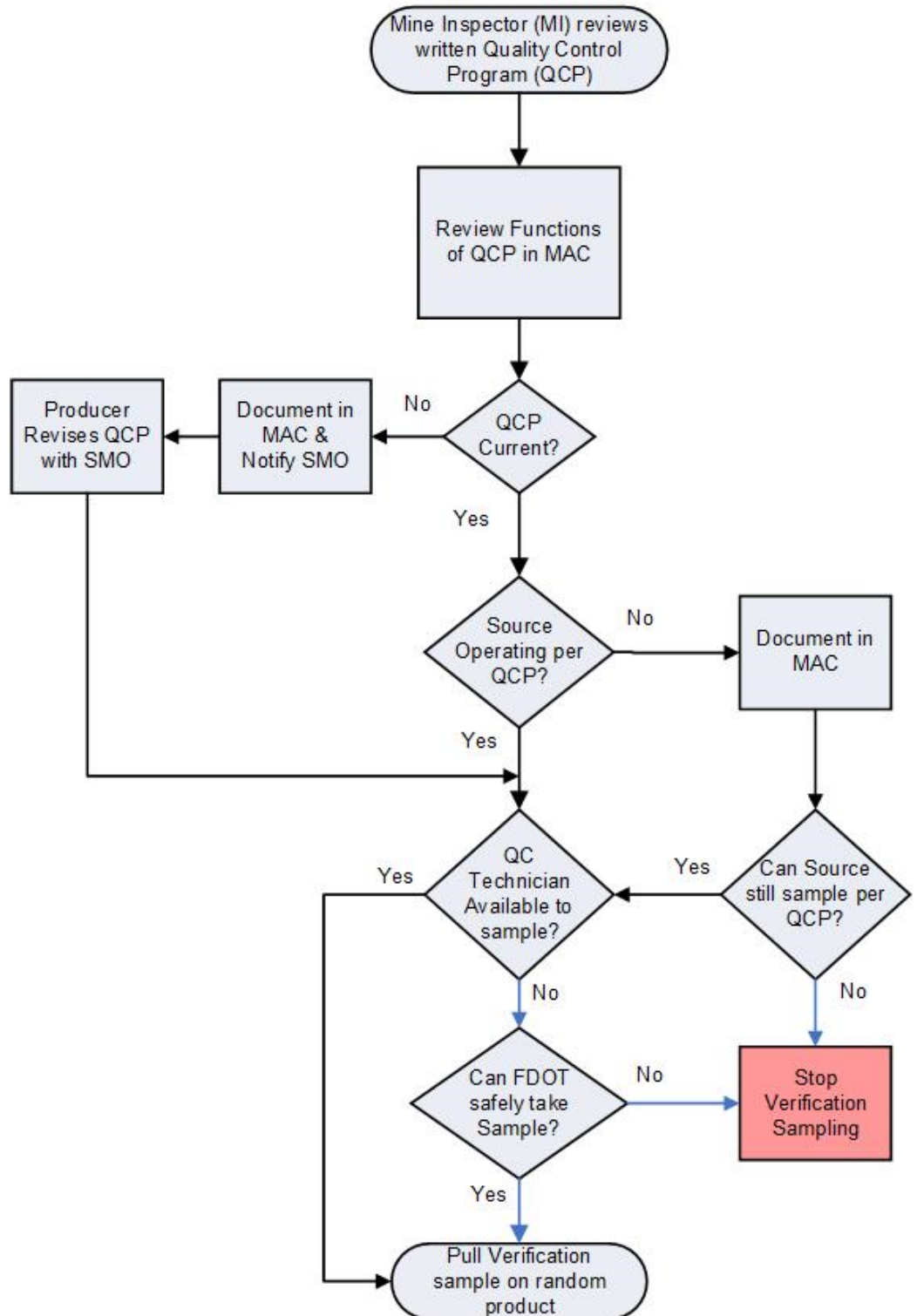
4. Material Certification (Date, Load [Tonnage], Source Number, Department Code, "Certified for FDOT" statement, Notified of Shipments)

☐ _____

F1. MINE INSPECTION FLOW CHART

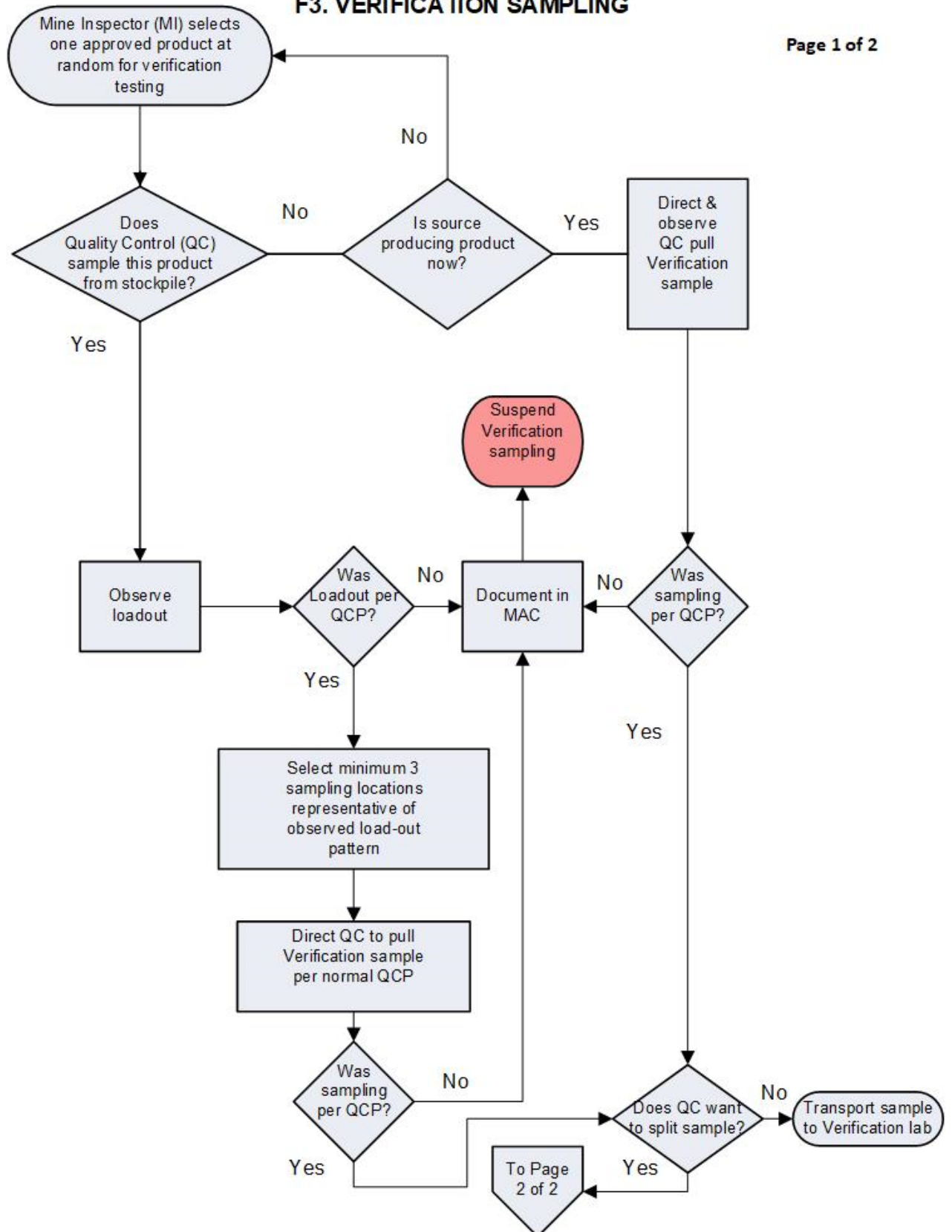


F2. VERIFICATION INSPECTION FLOW CHART



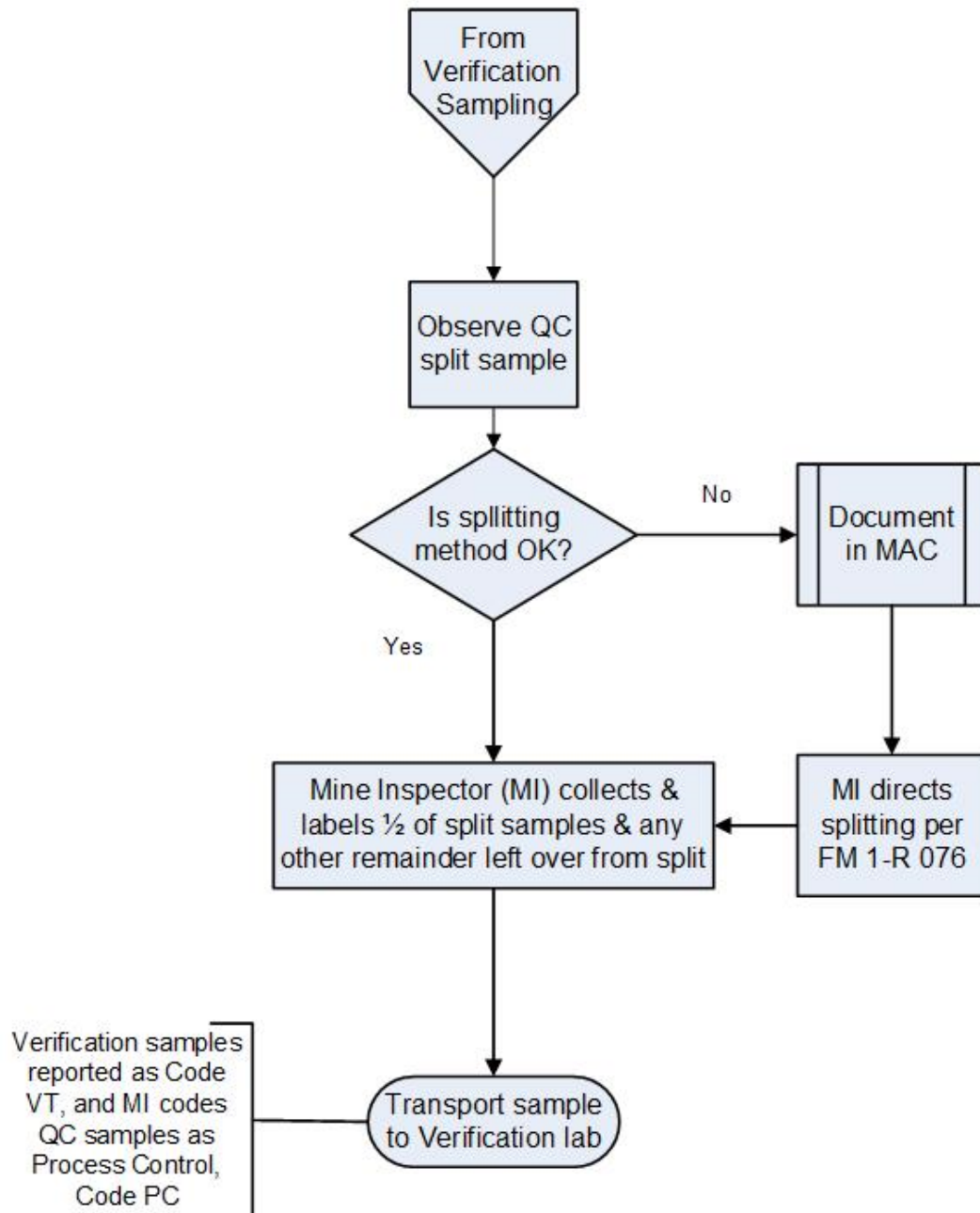
F3. VERIFICATION SAMPLING

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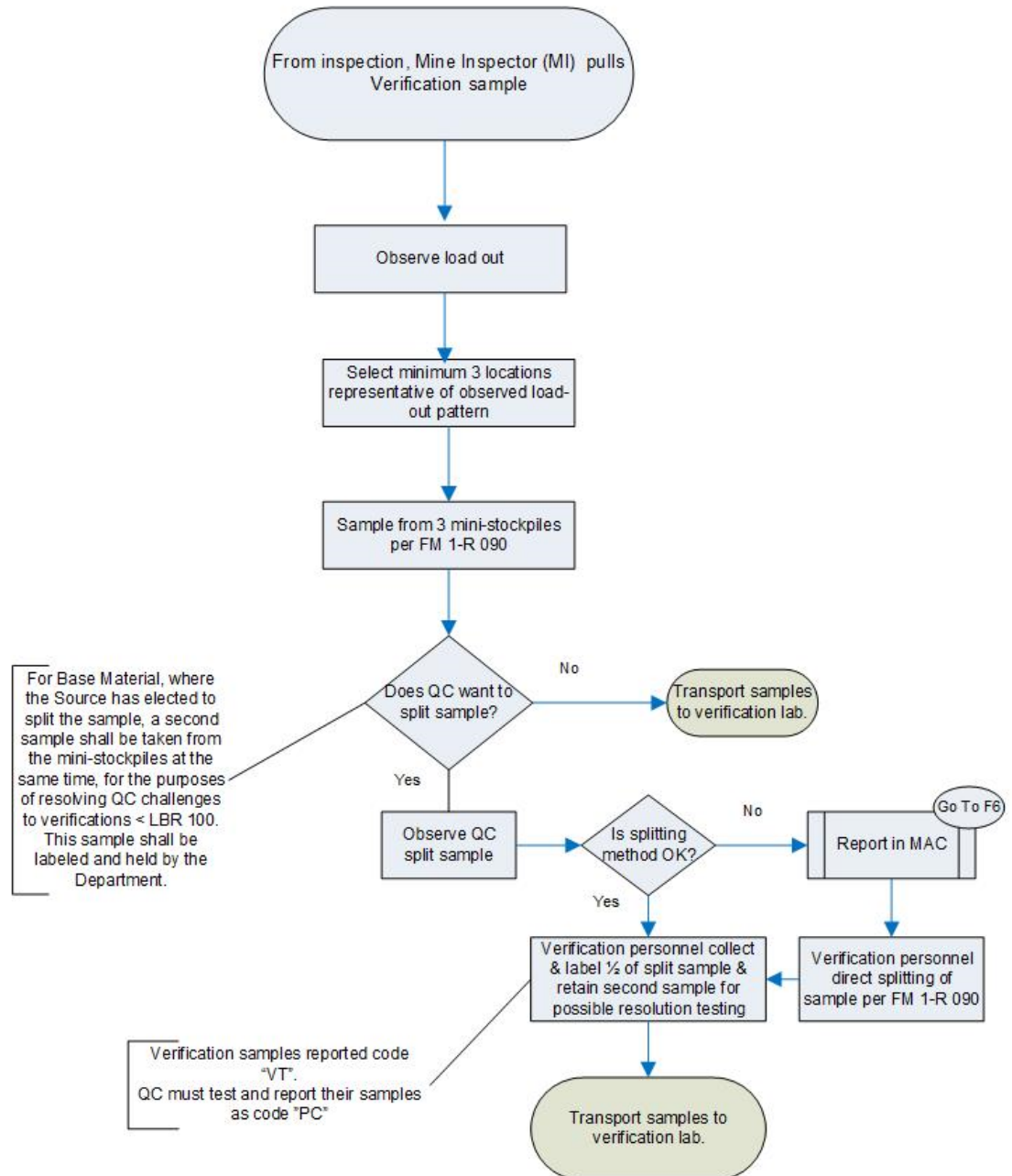


F3 VERIFICATION SAMPLING (cont.)

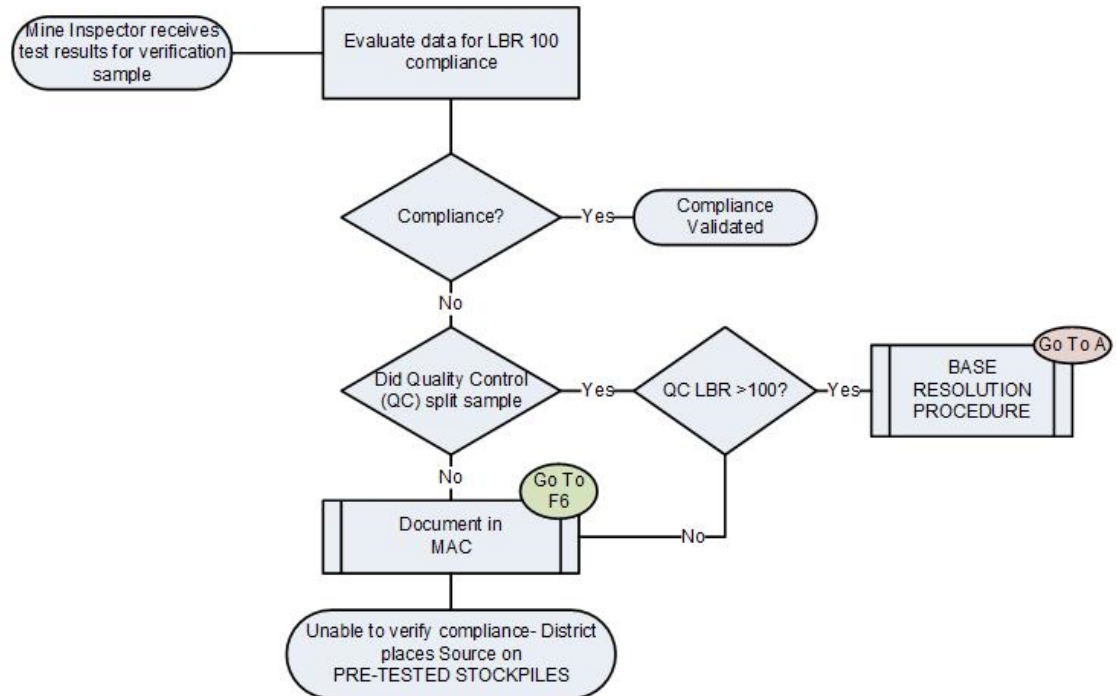
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F4. BASE SAMPLING FLOW CHART



F5. EVALUATION OF DATA FOR BASE MATERIAL FLOW CHART



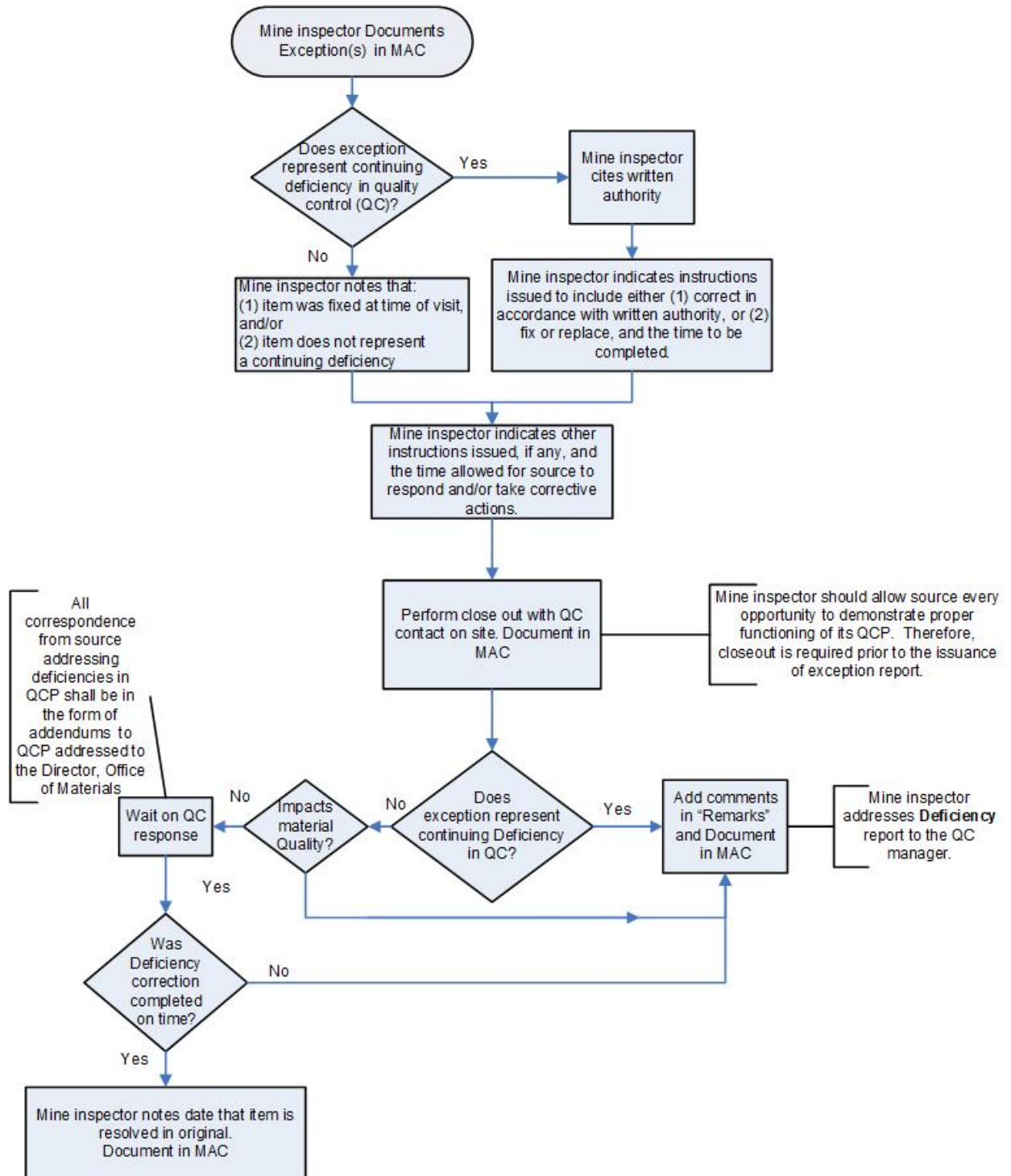
Evaluation of Base Split Samples



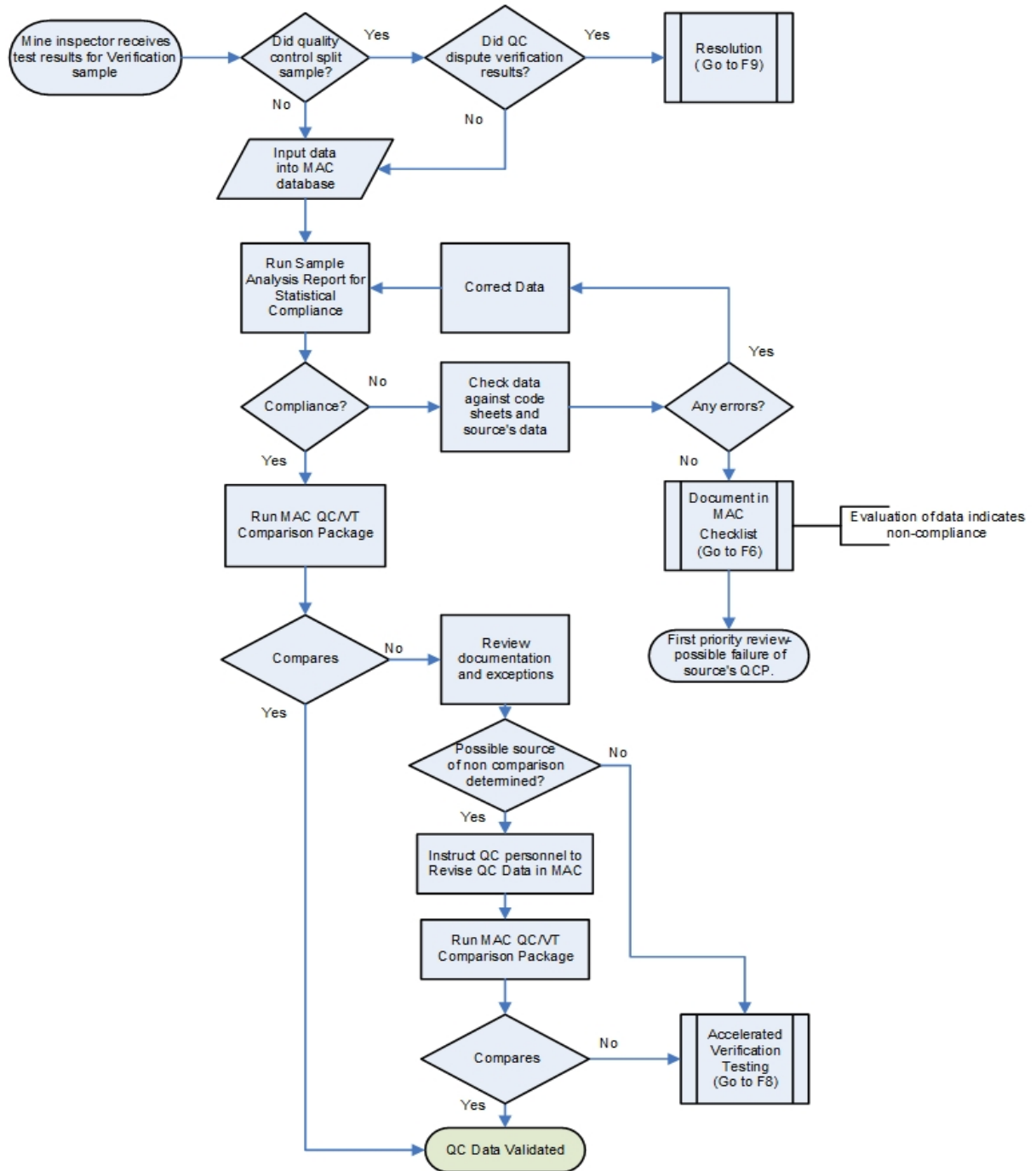
Base Resolution Procedure



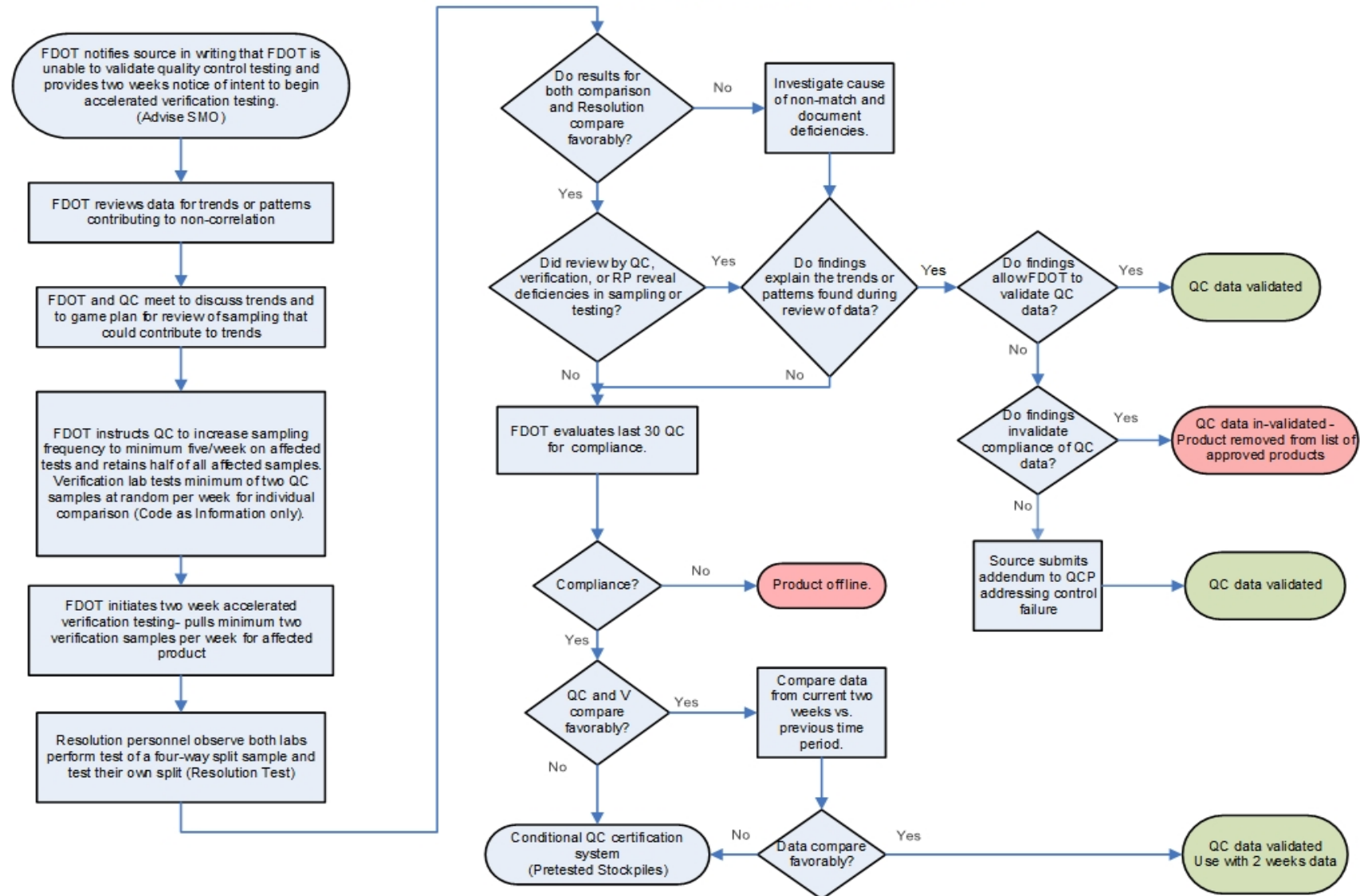
F6. EXCEPTION REPORTS AND NOTICE OF DEFICIENCY FLOW CHART



F7. EVALUATION OF DATA



F8. ACCELERATED VERIFICATION TESTING



F9. RESOLUTION

