VDOT AGGREGATE DATABASE: MITS/PLAID

2020 Mid-Atlantic Quality Assurance Workshop

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WHAT IS MITS/PLAID?

MITS/PLAID is

- **A centralized online database where Central Mix Aggregate (CMA) and Hot Mix Asphalt (HMA) job mixes and sample results are submitted and approved**
- **Can be viewed by the Department and the Producer.**

MITS: Materials Information Tracking System

- **Department Side**

PLAID: Producer Lab Analysis and Information Detail

- **Producer Side**

MILESTONES

- Started in 2011
- Went through 3 development phases
  - Phase I - HMA portion (2012)
  - Phase II - CMA portion (2013)
  - Phase III – Daily Weight Summary Sheet (TL102), D2S, Control Charts, Quality Management Report, etc. (2015)
- In Maintenance phase now - Continuing upgrades (Automated Upload/Submission, VTM-1 report, etc.)

WHAT HAS CHANGED

Before	After
MS Access database	*Web-based database*
Job mix formulas are keyed to system by VDOT	*Job mix formulas are keyed to system by Producer*
VDOT verifies approved suppliers and design/spec ranges	*System verifies approved suppliers and design/spec ranges*
Acceptance test data (QC data) entered by VDOT	*Acceptance test data (QC data) entered by Producer*
Acceptance test data received when picked up by QA Technician at plant	*Acceptance test data keyed or interfaced to the web portal within 48 hours of sampling*
QA Technician must review all reports to determine if results are positive or adverse	*System notifies QA technician if results are positive or adverse*

WHAT HAS CHANGED

Before	After
QA Technician must notify Producer of price adjustments or adverse IA test results	*Producer can see price adjustments and IA test results on the web portal immediately when they are "released" by VDOT*
Producer manages their own control charts	*System creates control charts*
Each QA Technician retains manual records of investigation, findings, and corrective actions	*Investigative activities, findings, corrective actions and final resolution are recorded in the system*
QA Technicians manually provide information on flagged results for FHWA reporting at year-end	*Information on flagged results is stored in the system and automatically pulled to FHWA reports*
Daily 102 production data reports picked up by VDOT when visiting plant	*Producer keys 102 production data to web portal within 1 working day (paper copy is printed from system and sent to project site)*

OVERVIEW

- **Number of Active Accounts – CMA and HMA : 574 (as of May 2019)**
  - **406 Producer users**
  - **168 VDOT users**

- **Number of Samples tested**

	2019	2018	2017	2016	2015
Producer QC samples	4345	6191	8691	7781	7686
VDOT IA samples	1137	1496	2011	1796	1628
Total	5482	7687	10702	9577	9314

VDOT Spec – Base Aggregate

- **Design Range for Dense-Graded Aggregate**

Amounts Finer Than Each Laboratory Sieve (Square Openings[1]) (% by Weight)							
Size No.	2 in	1 in	3/8 in.	No. 10	No. 40	No. 200	ASTM D4791 Flat & Elongated 5:1
21A	100	94-100	63-72	32-41	14-24	6-12	30% max.
21B	100	85-95	50-69	20-36	9-19	4-7	30% max.
22	---	100	62-78	39-56	23-32	8-12	30% max.

- **Max allowable LL =30 and PI =6 (for Aggregate Type I)**
- **Lots of 2000 tons or 4000 tons used**
- **Determination of gradation and Atterberg limits is based on a mean of the results of tests performed on four samples taken in a stratified random manner from each lot**

VDOT Spec – Base Aggregate

- **A lot is considered acceptable for grading if the mean of the test results is within the deviation from the job-mix formula specified in Table II-10**

TABLE II-10
Process Tolerances for Each Laboratory Sieve (%)

No. Tests	Top Size	1 in	3/4 in.	3/8 in.	No. 10	No. 40	No. 200
1	0.0	±10.0	±14.0	±19.0	±14.0	±8.0	±4.0
2	0.0	±7.1	±10.0	±13.6	±10.0	±5.7	±2.9
3	0.0	±5.6	±7.8	±10.6	±7.8	±4.4	±2.2
4	0.0	±5.0	±7.0	±9.5	±7.0	±4.0	±2.0
8	0.0	±3.6	±5.0	±6.8	±5.0	±2.9	±1.4

- **If a lot of material does not conform to the acceptance requirements payment adjustment points will be determined**

VDOT Spec – Base Aggregate

- **Atterberg limits**
- **A lot is considered acceptable for Atterberg limits if the mean of the test results is less than the maximum for LL and PI in Table II-11**

Max. Liquid Limit		Max. Plasticity Index	
No. Tests	Subbase and Aggregate Base Type I and II	Subbase Sizes No. 21A, 22, and Aggregate Base Type II	Aggregate Base Type I and Subbase Size No. 19
1	25.0	6.0	3.0
2	23.9	5.4	2.4
3	23.2	5.1	2.1
4	23.0	5.0	2.0
8	22.4	4.7	1.7

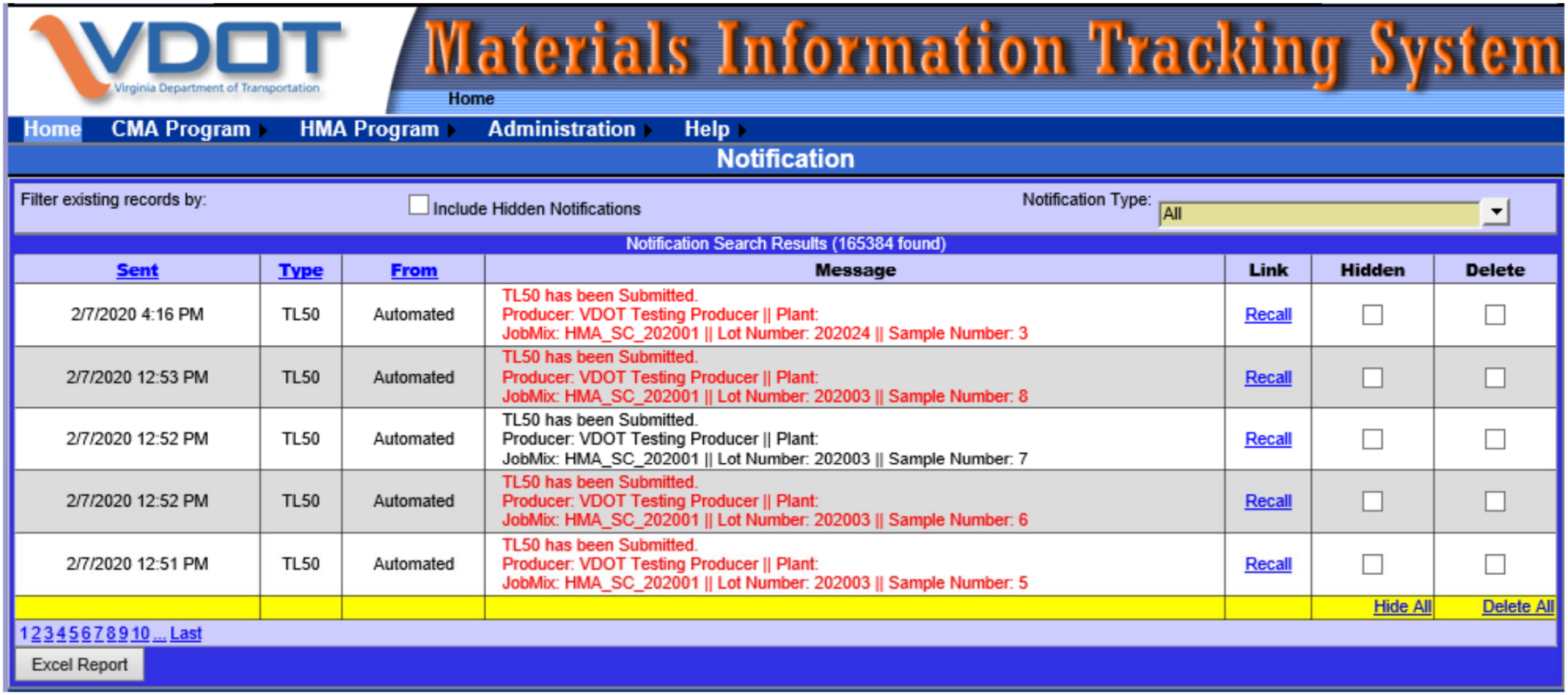
VDOT Spec – Base Aggregate

- **The variability of the total quantity furnished is determined on the basis of the standard deviation for each sieve size.**

TABLE II-12
Standard Deviation

Sieve Size	1 Adjustment Point for Each Sieve Size	2 Adjustment Points for Each Sieve Size	3 Adjustment Points for Each Sieve Size
2 in	0.6-1.5	1.6-2.5	2.6-3.5
1 in	4.6-5.5	5.6-6.5	6.6-7.5
3/4 in	5.6-6.5	6.6-7.5	7.6-8.5
3/8 in	7.1-8.0	8.1-9.0	9.1-10.0
No. 10	5.6-6.5	6.6-7.5	7.5-8.5
No. 40	3.6-4.5	4.6-5.5	5.6-6.5
No. 200	3.1-4.0	4.1-5.0	5.1-6.0

MITS/ PLAID – Home

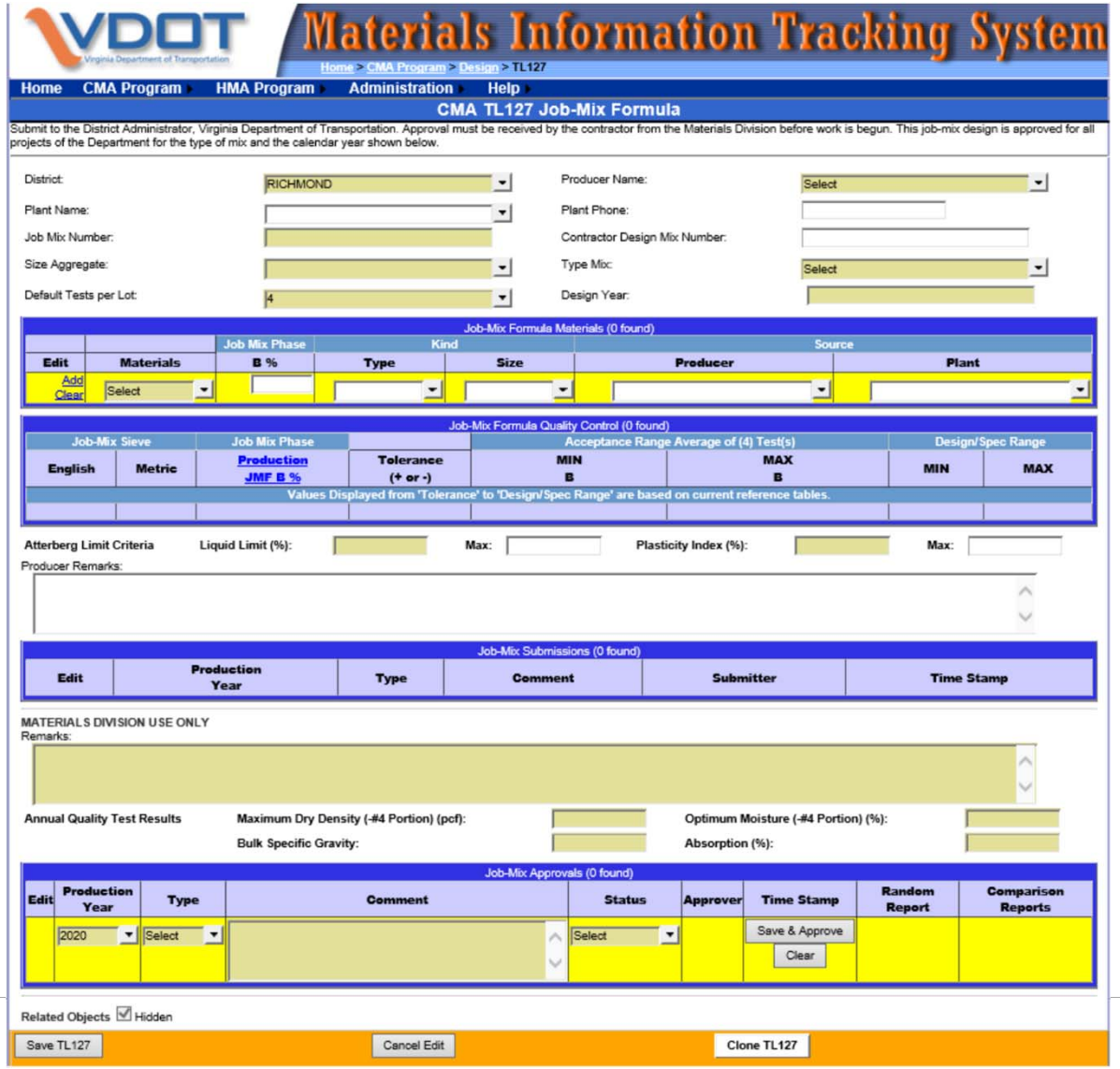


MITS MENU

1. Home
2. CMA Program
   - Design
     - TL 127
     - Recall TL127
   - Lots
     - Lot details
       - TL 52
       - Recall TL 52
       - Upload TL 52
     - Recall lot
   - Projects
     - Project details
     - Recall Project
     - TL 102 QA list
       - TL 102 QA Details
       - Upload QA TL 102
     - TL 102 MA list
       - TL 102 MA Details
   - Reports
     - Control Chart
     - Investigation Report
     - Point Adjustment
     - Variability Analysis
     - TL 127 job mix Formula
     - TL 52 Monitor
3. HMA Program
4. Administration
   - Security
     - User Management
   - Design
     - Kind Type
     - Material Type
     - Aggregate Size Management
     - Sieve Management
     - CMA Specific
     - HMA Specific
     - Source Management
   - District Management,
   - Producer Management
   - CMA Plant Management
   - HMA Plant Management
   - Communication
   - Reports
   - Security Audit
   - All projects
   - Producer
   - Plant
   - Yearly Summary
5. Help
   - Online Manual
   - Printable Manual
   - Contact

VDOT TL-127 FORM

- Job mix formula
- Material, Type, Size, Source, Design % passing, Cement Content
- The producer shall submit a job mix formula for each mixture prior to starting work



VDOT TL-127 FORM

- **Job mix formula**

Job-Mix Formula Materials (1 found)

		Job Mix Phase	Kind		Source	
Edit	Materials	B %	Type	Size	Producer	Plant
Edit	Aggregate	100 %	Limestone	#26	VDOT Testing Producer	Plant-Richmond
Add Clear	Select					

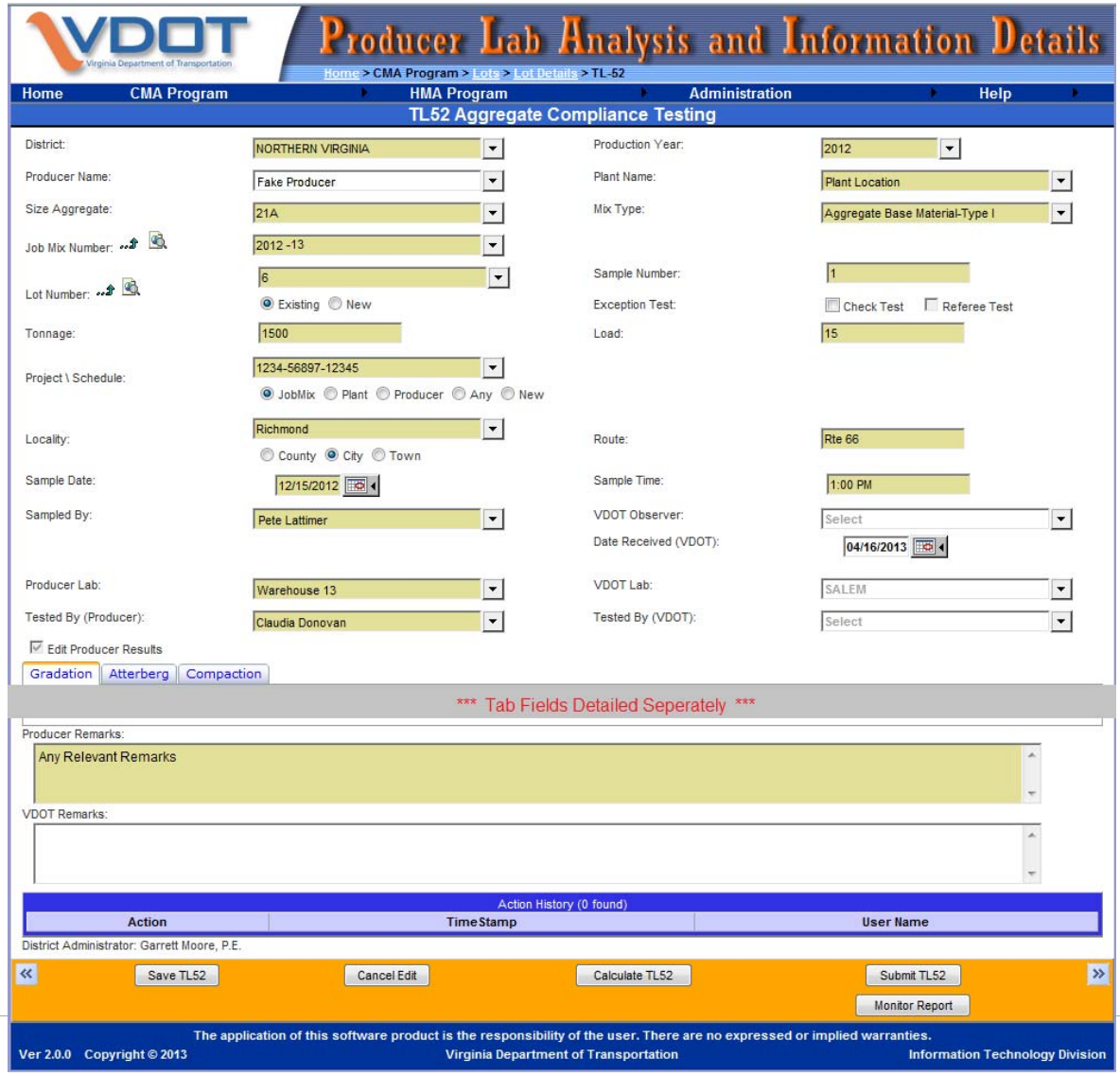
Job-Mix Formula Quality Control (6 found)

Job-Mix Sieve		Job Mix Phase		Acceptance Range Average of (4) Test(s)		Design/Spec Range	
English	Metric	Production JMF B %	Tolerance (+ or -)	MIN B	MAX B	MIN	MAX
2in	50mm	100 %	0.0 %	100.0 %	100.0 %	100 %	
1in	25mm	85 %	5.0 %	80.0 %	90.0 %	94 %	100 %
3/8in	9.5mm	65 %	9.5 %	55.5 %	74.5 %	63 %	72 %
#10	2mm	35 %	7.0 %	28.0 %	42.0 %	32 %	41 %
#40	.425mm	15 %	4.0 %	11.0 %	19.0 %	14 %	24 %
#200	0.075mm	10.0 %	2.0 %	8.0 %	12.0 %	6 %	12 %

Values Displayed from 'Tolerance' to 'Design/Spec Range' are based on current reference tables.

VDOT TL-52 FORM

- **Test report form of Individual CMA Sample**
- **Gradation, Atterberg limits, Water Content, and Cement content**
- **The prodcuer shall provide the test results within 48 hours of sampling**



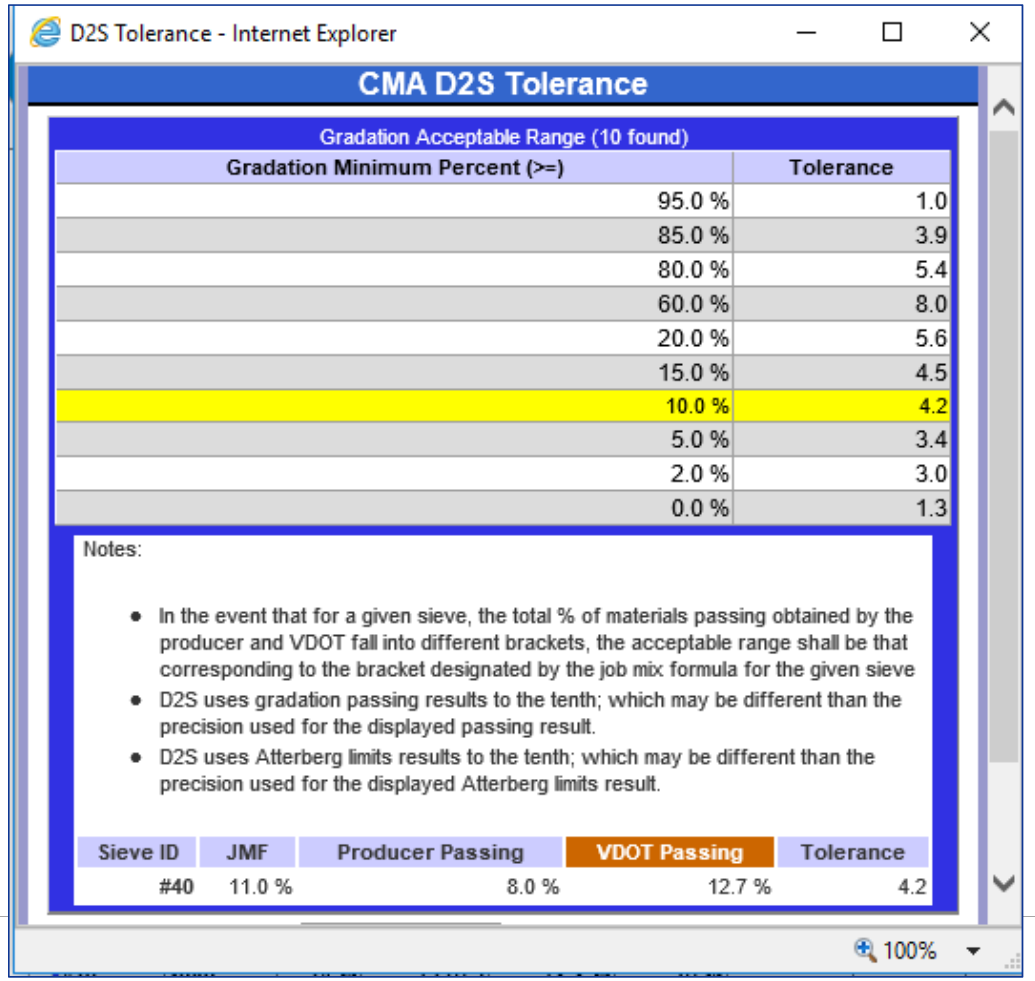
VDOT TL 52 FORM - Gradation

Job-Mix Formula Quality Control (16 found)

Sieve			Producer results					VDOT results					D2S	Previous	
English	Metric	JMF	Weight Retained (g)	Percent Retained	Percent Passing	Percent Retained (-#10)	Percent Passing (-#10)	Weight Retained (g)	Percent Retained	Percent Passing	Retained (-#10)	Percent Passing (-#10)	Percent Passing	F	T
3in	75mm		0.0	0.0 %	100 %				0.0 %	100 %			0.0 %	0.00	0.00
2 1/2in	63mm		0.0	0.0 %	100 %				0.0 %	100 %			0.0 %	0.00	0.00
2in	50mm	100 %	0.0	0.0 %	100 %				0.0 %	100 %			0.0 %	0.00	0.00
1 1/2in	37.5mm		0.0	0.0 %	100 %				0.0 %	100 %			0.0 %	0.00	0.00
1in	25mm	95 %	124.1	1.9 %	98 %			191.0	3.3 %	97 %			* 1.4 %	1.96	1.70
3/4in	19mm		268.6	4.2 %	94 %			616.0	10.5 %	86 %			7.7 %	1.32	1.50
1/2in	12.5mm		921.9	14.3 %	80 %			0.0	0.0 %	86 %			6.6 %	2.19	12.54
3/8in	9.5mm	67 %	691.7	10.7 %	69 %			1543.0	26.3 %	60 %			* 9.0 %	1.98	0.00
#4	4.75mm		1942.7	30.1 %	39 %			1035.0	17.6 %	42 %			3.5 %	2.02	0.64
#10	2mm	24 %	1210.2	18.8 %	20 %			988.0	16.8 %	26 %			5.5 %	1.54	0.91
Mechanical Analysis of -#10 Sieve															
#20	0.85mm		89.30	8.6 %	11 %	42.9 %	57 %	44.30	8.7 %	17 %	34.3 %	66 %	5.4 %	1.49	4.35
#40	.425mm	11 %	34.90	3.4 %	8 %	16.8 %	40 %	20.80	4.1 %	13 %	16.1 %	50 %	* 4.7 %	1.25	3.77
#60	0.25mm		19.40	1.9 %	6 %	9.3 %	31 %	10.30	2.0 %	11 %	8.0 %	42 %	4.6 %	1.71	3.92
#80	0.18mm		7.30	0.7 %	5 %	3.5 %	28 %	4.70	0.9 %	10 %	3.6 %	38 %	4.4 %	2.09	5.66
#100	0.15mm		3.20	0.3 %	5 %	1.5 %	26 %	2.40	0.5 %	9 %	1.9 %	36 %	4.2 %	1.40	3.23
#200	0.075mm	7.0 %	1.10	0.1 %	5.0 %	0.5 %	25.5 %	6.90	1.4 %	7.9 %	5.3 %	30.9 %	2.9 %	1.70	3.72
Totals	(+#10)		5159.2					4373.0							

D2S COMPARISON

- D2S Tolerance Popup Panel
- D2S is the Individual Test differences between 2 results obtained on test portions of the same material.
- VDOT provides the maximum Acceptable Range of Two Test results called the d2s based on AASHTO test methods, Virginia test methods and historical data
- Highlighting Current Gradation Tolerance



VDOT TL 52 FORM – Atterberg limits

Property	JMF	Pro
Cannot be Determined		
Weight of Dish (g)		1.5
Weight of Dish + Wet Soil (g)		47
Weight of Dish + Dry Soil (g)		41
No. of Blows		19
Weight of Water (g)		
Weight of Dry Soil (g)		
Percent Moisture		
Liquid Limit	23 %	

Notes :

- In the event that for a given sieve, the total % of materials passing obtained by the producer and VDOT fall into different brackets, the acceptable range shall be that corresponding to the bracket designated by the job mix formula for the given sieve
- D2S uses gradation passing results to the tenth; which may be different than the precision used for the displayed passing result.
- D2S uses Atterberg limits results to the tenth; which may be different than the precision used for the displayed Atterberg limits result.

Field	JMF	Producer	VDOT	D2S Difference	D2S Tolerance
Liquid Limit	23 %	14.9 %	13.5 %	1.4 %	1.8 %
Plastic Limit		0.0 %	0.0 %	0.0 %	0.0 %

D2S iff.	D2S Tol.	Criteria Max	Previous F	Previous T
0 %	0.0 %			
		2.0 %	0.00	0.00

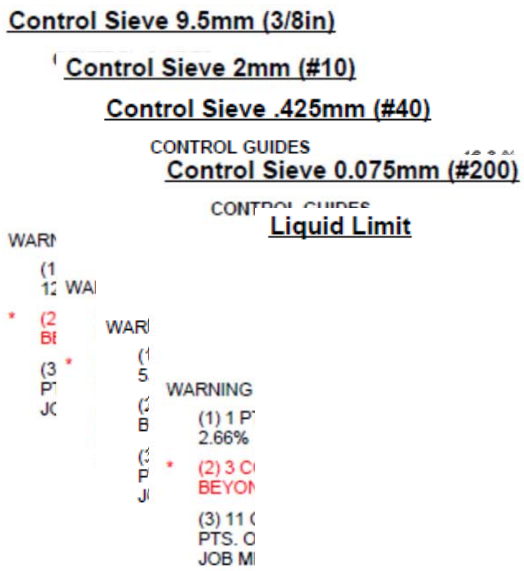
% Cement Tolerance:

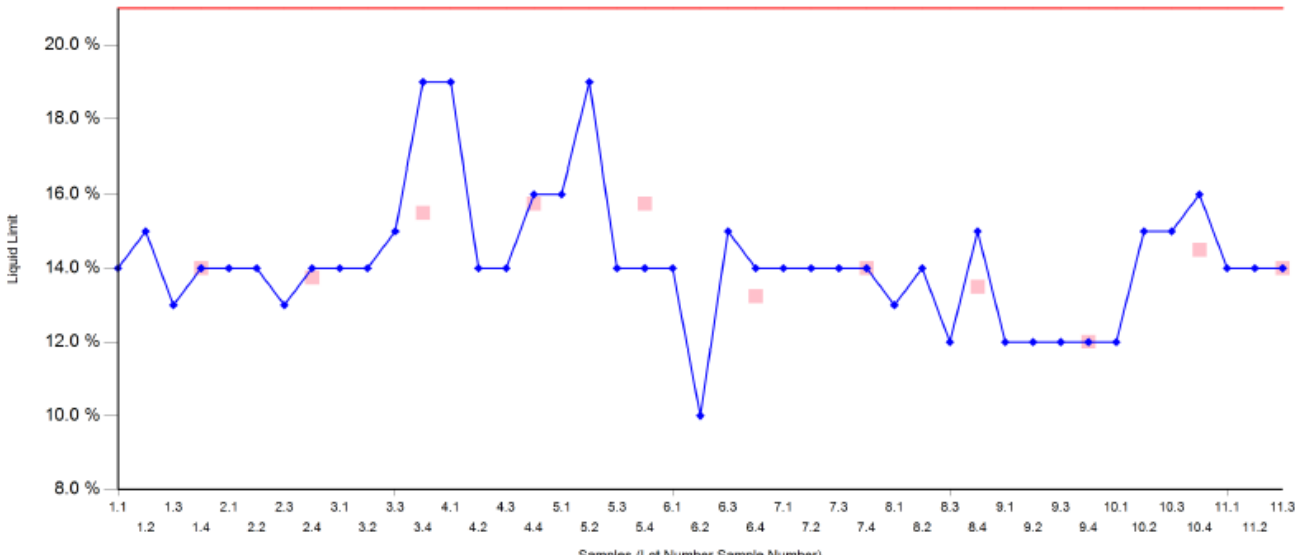
A factor to calculate Liquid Limit D2S, % of Mean: 13 %

A factor to calculate Plastic Limit D2S, % of Mean: 18 %

CONTROL CHARTS

- **Required by the Spec**
- **Created for spec sieves, LL, PI, and Cement Content (if applicable)**

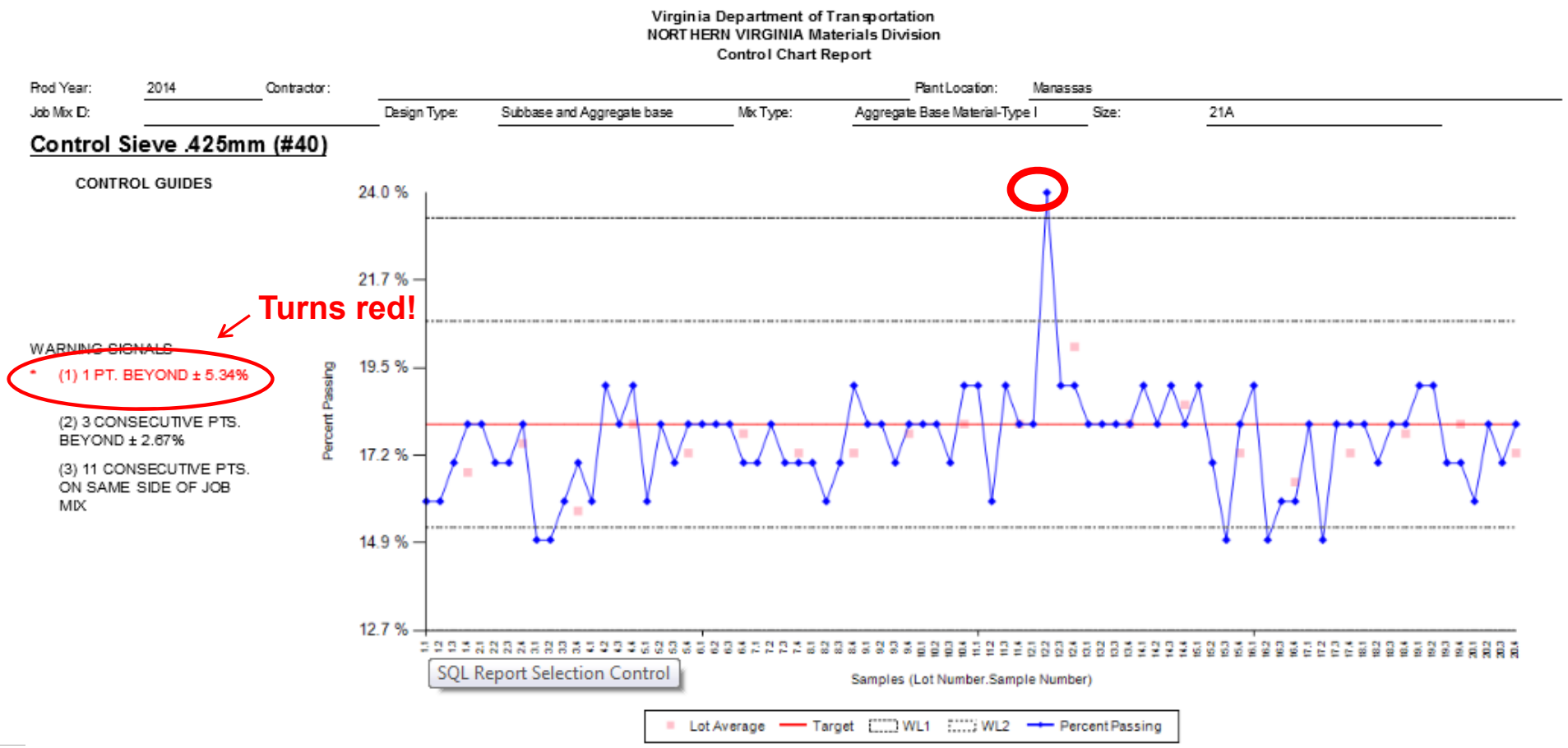




CONTROL CHARTS

- **Established the following control limits to Provides warnings**
  - **Number 1 Warning Limit: ±2 standard deviations from job mix**
    - Will show warning when one test result is outside this limit
  - **Number 2 Warning Limit: ± 1 standard deviation from job mix**
    - Will show warning when 3 consecutive test results are outside this limit
  - **Will also show Warning when 11 consecutive test results fall on the same side of the job-mix.**

CONTROL CHARTS



MATCHED AND NON-MATCHED COMPARISONS

VDOT uses contractor quality control test results for acceptance of CMA and HMA

23 CFR 637.207 (2) : Quality control sampling and testing results may be used as part of the acceptance decision provided that:

(A) The sampling and testing has been performed by qualified laboratories and qualified sampling and testing personnel. – training and certification program and system of laboratory inspection

(B) The quality of the material has been validated by the verification testing and sampling. The verification sampling shall be performed on samples that are taken independently of the quality control samples.

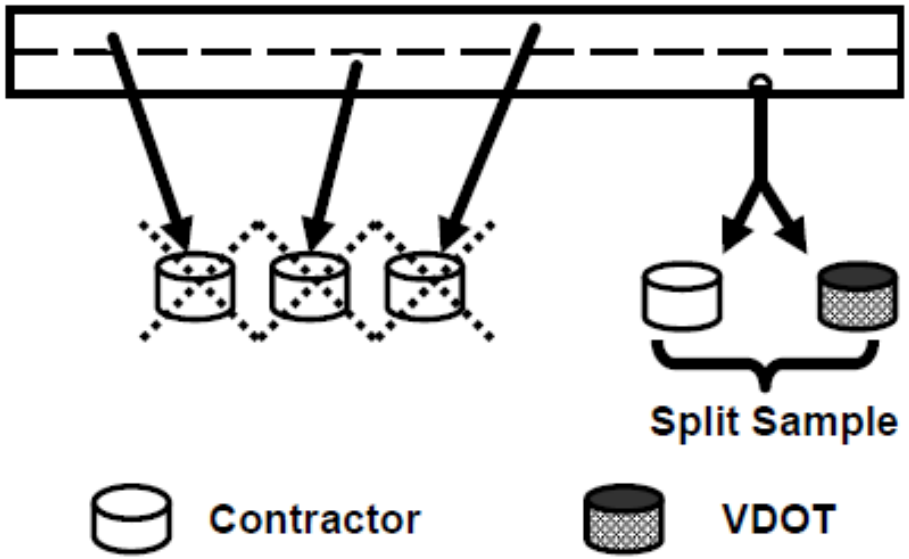
(C) The quality control sampling and testing is evaluated by an Independent Assurance (IA) program.

→ (B) and (C) are evaluated by split samples using a statistical method

→ Statistical calculations are defined in VTM-59

VTM-59 : Matched Comparison Analysis

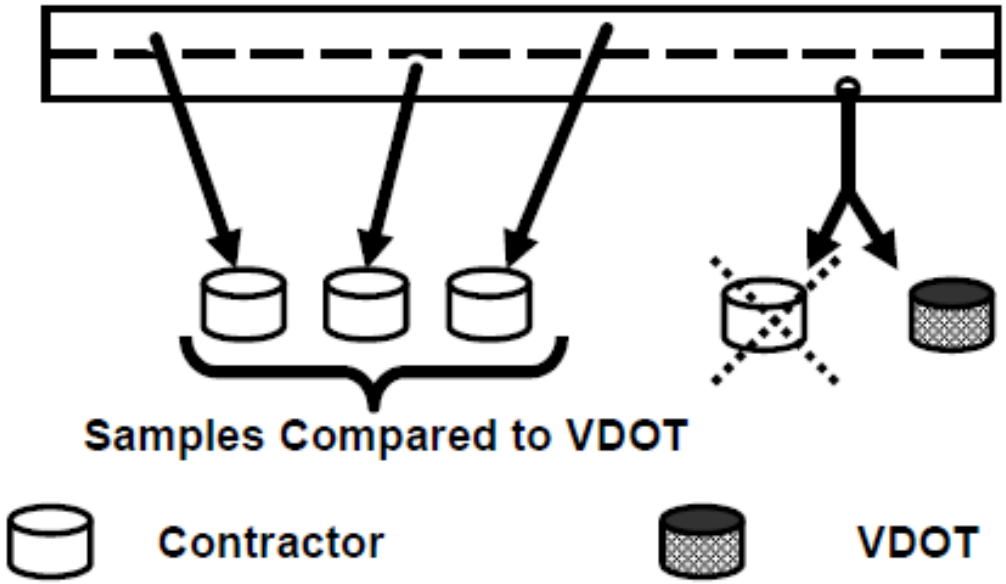
- **Comparison is made using the Split samples only**
- **Independent Assurance (IA) Testing**



- **Paired t-test: If calculated t $\geq t_{\alpha/2,n-\alpha}$ then VDOT average ≠ the contractor's average**
- **F-test : If calculated F $\geq F_{.99}$ then VDOT standard deviation ≠ the contractor's variability**

VTM-59 : Non-Matched Comparison Analysis

- VDOT split samples vs the Producer Non-split samples
- Verification (VST) Testing



- T-test: If calculated $|AM-AC| \geq \mu$, then VDOT average ≠ the contractor's average
- F-test : If calculated $F \geq F_{.99}$ then VDOT standard deviation ≠ the contractor's variability

Matched Comparison Analysis Report

Virginia Department of Transportation
Materials Division
CENTRAL-MIX AGGREGATE
Matched Comparison Analysis Report (IA)

Producer : Plant: Job Mix ID: -2014-01 Mix Type: Aggregate Base Material-Type I Size: 21A

Producer Plant Data

Lot Number	Sample Number	Sample Date	3in (75mm)	2 1/2in (63mm)	2in (50mm)	1 1/2in (37.5mm)	1in (25mm)	3/4in (19mm)	1/2in (12.5mm)	3/8in (9.5mm)	#4 (4.75mm)	#10 (2mm)	#20 (0.85mm)	#40 (.425mm)	#60 (0.25mm)	#80 (0.18mm)	#100 (0.15mm)
1	3	1/9/2019	100 %	100 %	100 %	100 %	100 %	97 %	79 %	71 %	51 %	36 %	26 %	22 %	19 %	16 %	15 %
2	4	2/8/2019	100 %	100 %	100 %	100 %	100 %	98 %	82 %	72 %	53 %	38 %	26 %	22 %	19 %	17 %	16 %
4	4	6/21/2019	100 %	100 %	100 %	100 %	100 %	98 %	80 %	69 %	50 %	37 %	29 %	24 %	20 %	18 %	16 %
5	2	7/18/2019	100 %	100 %	100 %	100 %	100 %	99 %	85 %	71 %	49 %	35 %	26 %	22 %	19 %	17 %	15 %
Current JMF					100 %		95 %			69 %		35 %		22 %			
Mean			100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	98.0 %	81.5 %	70.8 %	50.8 %	36.5 %	26.8 %	22.5 %	19.3 %	17.0 %	15.5 %
Standard Deviation			0.0	0.0	0.0	0.0	0.0	0.8	2.6	1.3	1.7	1.3	1.5	1.0	0.5	0.8	0.6

VDOT Monitor Data

Lot Number	Sample Number	Sample Date	3in (75mm)	2 1/2in (63mm)	2in (50mm)	1 1/2in (37.5mm)	1in (25mm)	3/4in (19mm)	1/2in (12.5mm)	3/8in (9.5mm)	#4 (4.75mm)	#10 (2mm)	#20 (0.85mm)	#40 (.425mm)	#60 (0.25mm)	#80 (0.18mm)	#100 (0.15mm)
1	3	1/9/2019	100 %	100 %	100 %	100 %	100 %	96 %	96 %	71 %	51 %	36 %	26 %	21 %	18 %	16 %	15 %
2	4	2/8/2019	100 %	100 %	100 %	100 %	100 %	96 %	96 %	74 %	54 %	37 %	27 %	22 %	19 %	17 %	16 %
4	4	6/21/2019	100 %	100 %	100 %	100 %	100 %	96 %	96 %	69 %	50 %	36 %	26 %	22 %	18 %	16 %	15 %
5	2	7/18/2019	100 %	100 %	100 %	100 %	100 %	97 %	97 %	69 %	47 %	32 %	23 %	19 %	17 %	15 %	14 %
Current JMF					100 %		95 %			69 %		35 %		22 %			
Mean			100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	96.2 %	96.2 %	70.7 %	50.5 %	35.3 %	25.5 %	21.0 %	18.0 %	16.0 %	15.0 %
Standard Deviation			0.0	0.0	0.0	0.0	0.0	0.5	0.5	2.4	2.9	2.2	1.7	1.4	0.8	0.8	0.8

Paired T - Differences

Lot Number	Sample Number	Sample Date	3in (75mm)	2 1/2in (63mm)	2in (50mm)	1 1/2in (37.5mm)	1in (25mm)	3/4in (19mm)	1/2in (12.5mm)	3/8in (9.5mm)	#4 (4.75mm)	#10 (2mm)	#20 (0.85mm)	#40 (.425mm)	#60 (0.25mm)	#80 (0.18mm)	#100 (0.15mm)
1	3	1/9/2019	0 %	0 %	0 %	0 %	0 %	1 %	-17 %	0 %	0 %	0 %	0 %	1 %	1 %	0 %	0 %

Non-Matched Comparison Analysis Report

Non-Matched Comparison Analysis Report (QA)

Producer: . . Plant: Job Mix ID: 2014-01 Mix Type: Aggregate Base Material-Type I Size: 21A

Producer Plant Data

Lot Number	Sample Number	Sample Date	3in (75mm)	2 1/2in (63mm)	2in (50mm)	1 1/2in (37.5mm)	1in (25mm)	3/4in (19mm)	1/2in (12.5mm)	3/8in (9.5mm)	#4 (4.75mm)	#10 (2mm)	#20 (0.85mm)	#40 (.425mm)	#60 (0.25mm)	#80 (0.18mm)	#100 (0.15mm)	#200 (0.075mm)	Liquid Limit
1	1	1/2/2019	100 %	100 %	100 %	100 %	100 %	96 %	80 %	70 %	51 %	36 %	25 %	21 %	18 %	16 %	15 %	10.3 %	0 %
	2	1/7/2019	100 %	100 %	100 %	100 %	100 %	96 %	79 %	69 %	49 %	34 %	24 %	20 %	17 %	15 %	14 %	9.4 %	0 %
	4	1/21/2019	100 %	100 %	100 %	100 %	100 %	96 %	78 %	68 %	49 %	34 %	25 %	21 %	18 %	16 %	15 %	9.8 %	0 %
2	1	1/29/2019	100 %	100 %	100 %	100 %	100 %	95 %	79 %	69 %	51 %	37 %	27 %	22 %	19 %	17 %	16 %	9.8 %	0 %
	2	2/1/2019	100 %	100 %	100 %	100 %	100 %	96 %	81 %	71 %	51 %	37 %	24 %	19 %	16 %	14 %	13 %	8.9 %	0 %
	3	2/7/2019	100 %	100 %	100 %	100 %	100 %	96 %	81 %	72 %	53 %	38 %	25 %	21 %	18 %	16 %	15 %	9.8 %	0 %
4	1	5/14/2019	100 %	100 %	100 %	100 %	100 %	95 %	81 %	71 %	52 %	38 %	29 %	23 %	20 %	18 %	16 %	10.8 %	0 %
	2	5/15/2019	100 %	100 %	100 %	100 %	100 %	97 %	84 %	75 %	55 %	40 %	30 %	25 %	22 %	19 %	18 %	11.8 %	0 %
	3	6/18/2019	100 %	100 %	100 %	100 %	100 %	99 %	82 %	73 %	55 %	40 %	28 %	23 %	19 %	17 %	16 %	11.0 %	0 %
5	1	6/21/2019	100 %	100 %	100 %	100 %	100 %	97 %	80 %	71 %	52 %	38 %	27 %	23 %	20 %	18 %	17 %	10.5 %	0 %
6	1	9/12/2019	100 %	100 %	100 %	100 %	100 %	96 %	81 %	72 %	53 %	39 %	29 %	25 %	21 %	19 %	17 %	10.8 %	0 %
	2	9/24/2019	100 %	100 %	100 %	100 %	100 %	97 %	79 %	68 %	47 %	34 %	25 %	21 %	18 %	16 %	15 %	10.1 %	0 %
	3	12/12/2019	100 %	100 %	100 %	100 %	100 %	96 %	78 %	67 %	48 %	36 %	27 %	22 %	19 %	17 %	15 %	9.9 %	0 %
	4	12/13/2019	100 %	100 %	100 %	100 %	100 %	97 %	81 %	70 %	51 %	36 %	27 %	22 %	19 %	17 %	15 %	9.9 %	0 %
Current JMF					**100 %**		**95 %**			**69 %**		**35 %**		**22 %**				**10.0 %**	**23 %**
Mean			100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	96.4 %	80.3 %	70.4 %	51.2 %	36.9 %	26.6 %	22.0 %	18.9 %	16.8 %	15.5 %	10.2 %	0.0 %
Standard Deviation			0.0	0.0	0.0	0.0	0.0	1.0	1.6	2.2	2.4	2.1	2.0	1.7	1.6	1.4	1.3	0.7	0.0

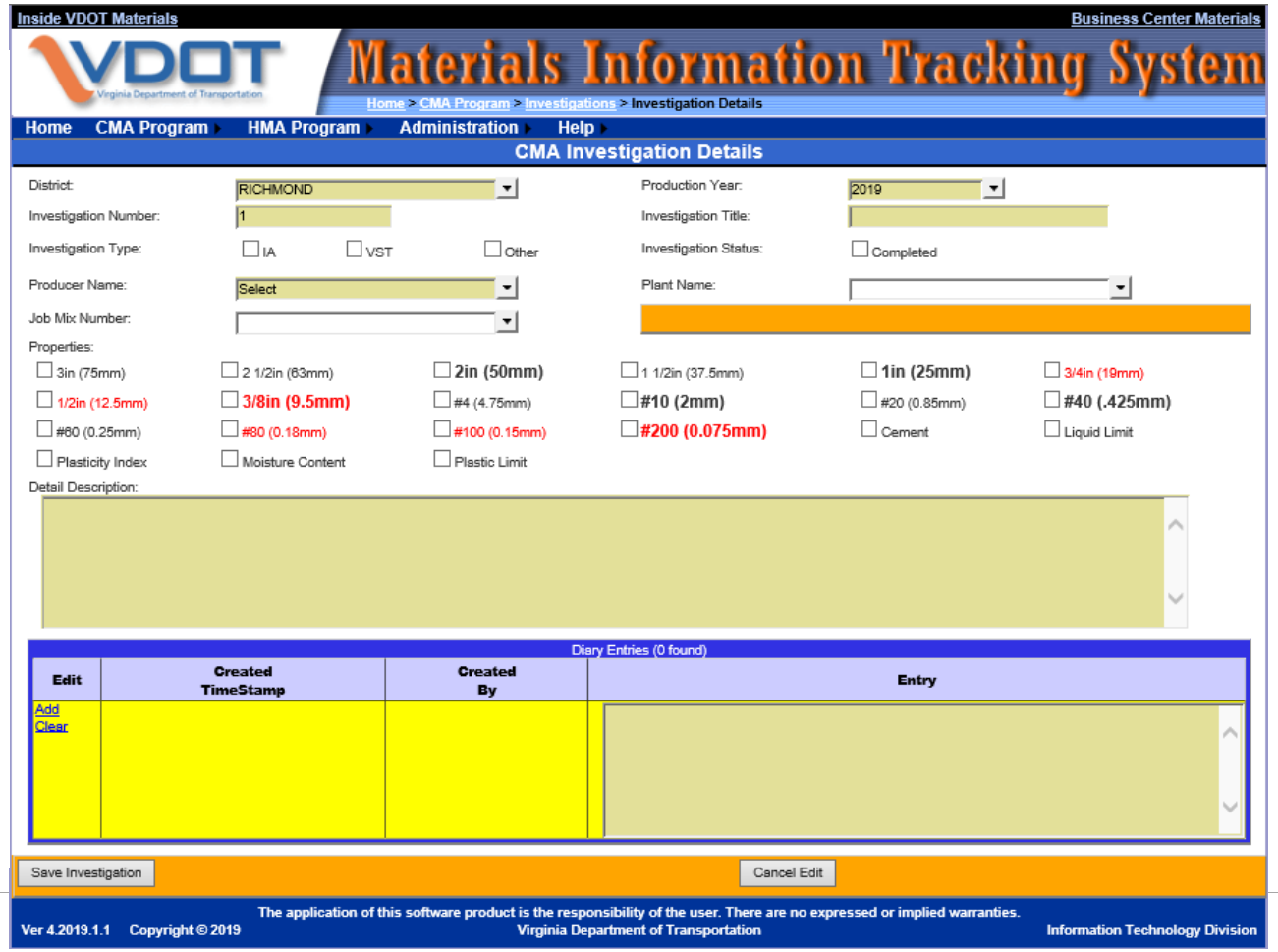
VDOT Monitor Data

- **If there is a statistical significant difference between the two sets of results, an investigation will be made to determine the reason for the difference.**

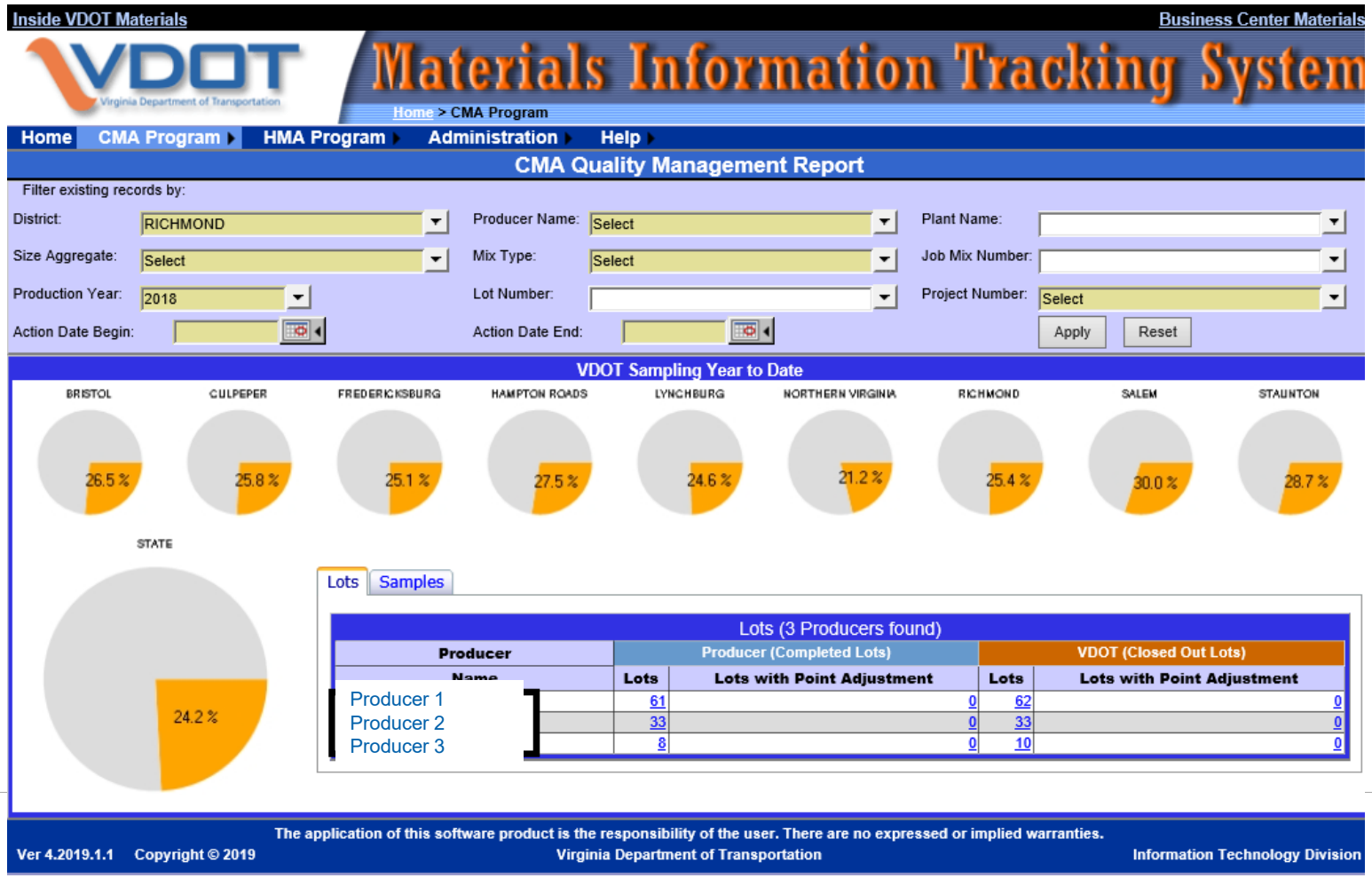
5	2	7/18/2019	100 %	100 %	100 %	100 %	100 %	97 %	97 %	69 %	47 %	32 %	23 %	19 %	17 %	15 %	14 %	10.0 %	0 %
Current JMF					**100 %**		**95 %**			**69 %**		**35 %**		**22 %**				**10.0 %**	**23 %**

INVESTIGATION FORM

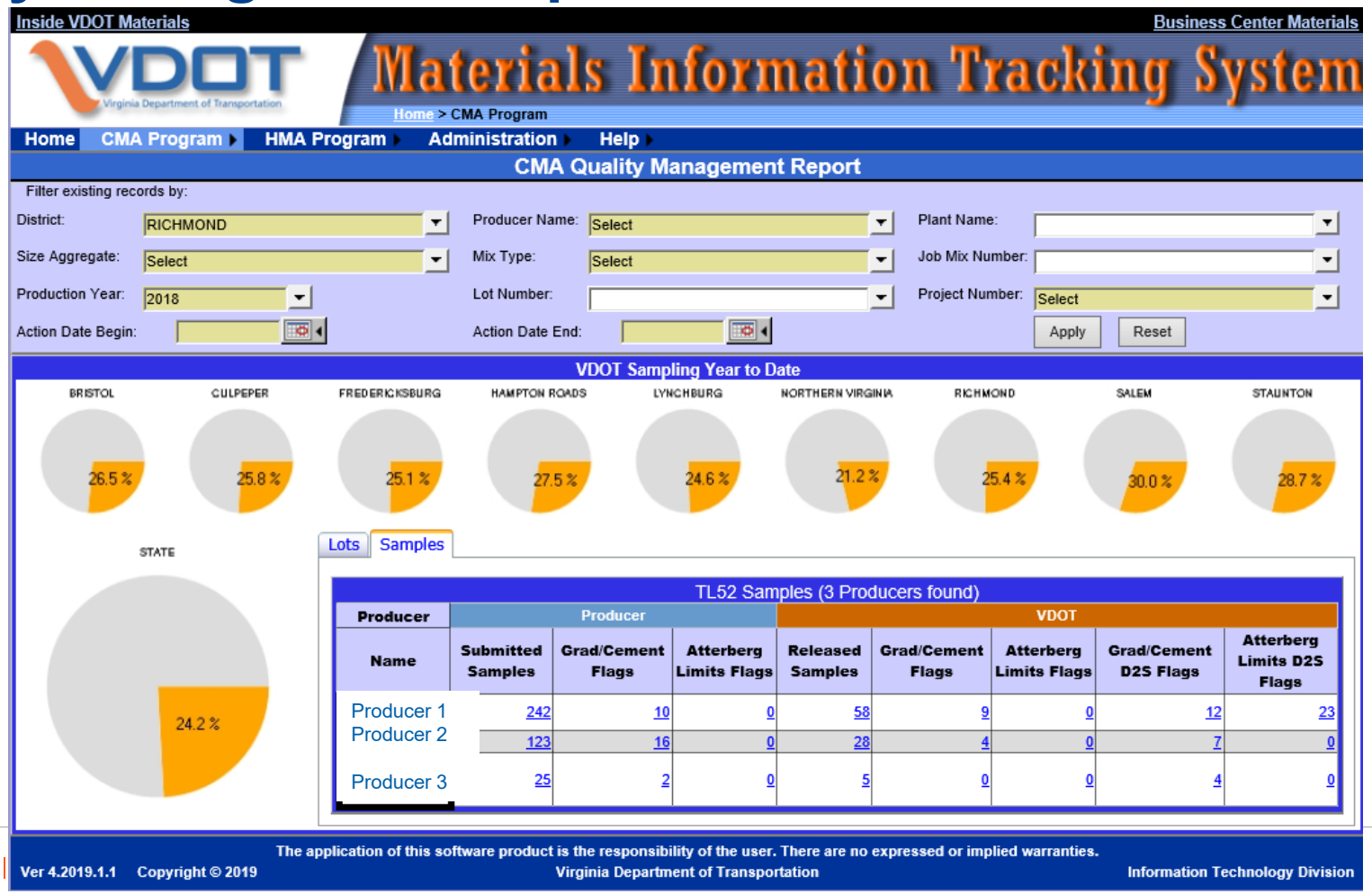
- **Investigative activities, findings, corrective actions, and final resolution**



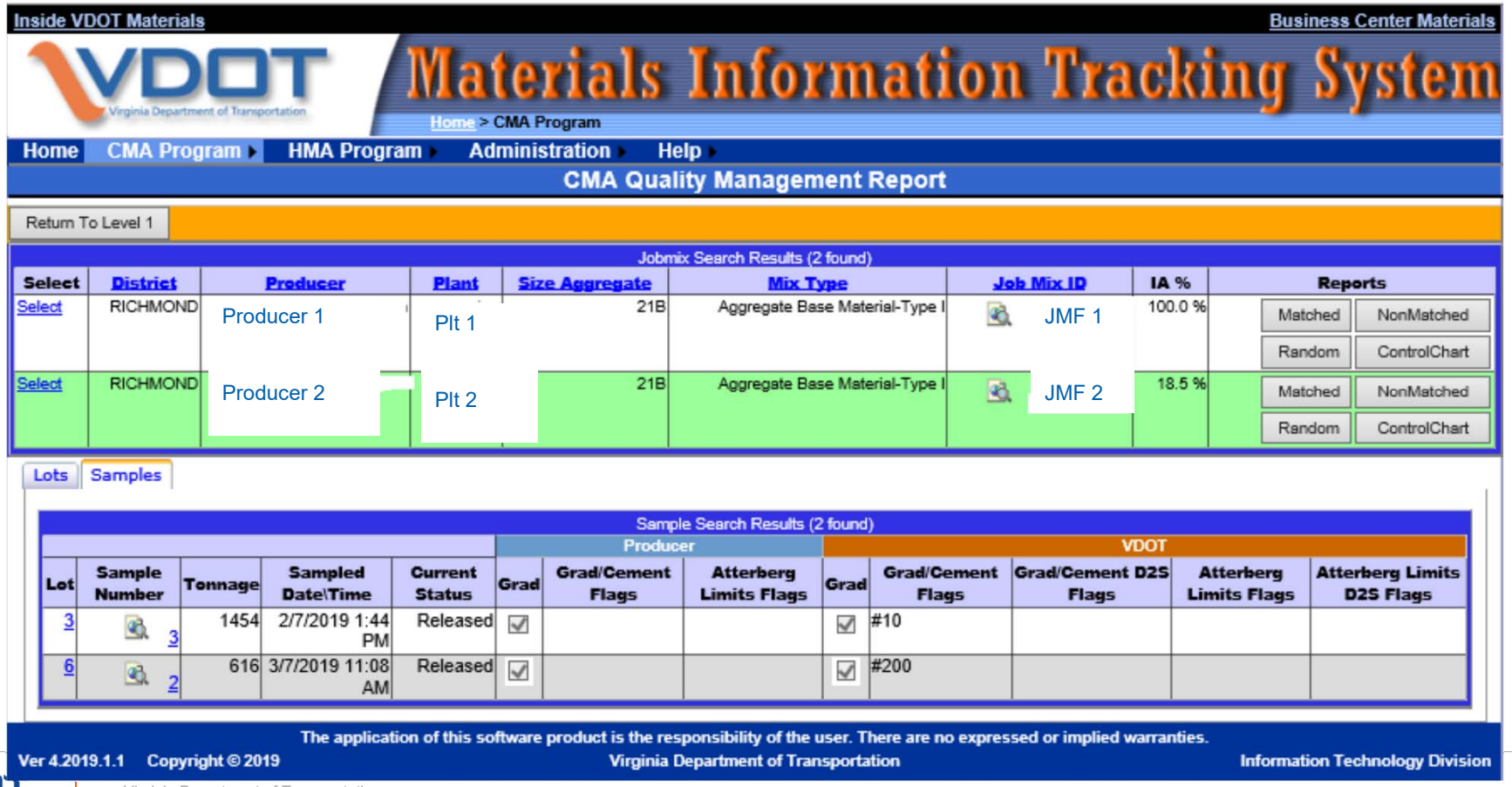
Quality Management Report – Level 1



Quality Management Report – Level 1



Quality Management Report – Level 2



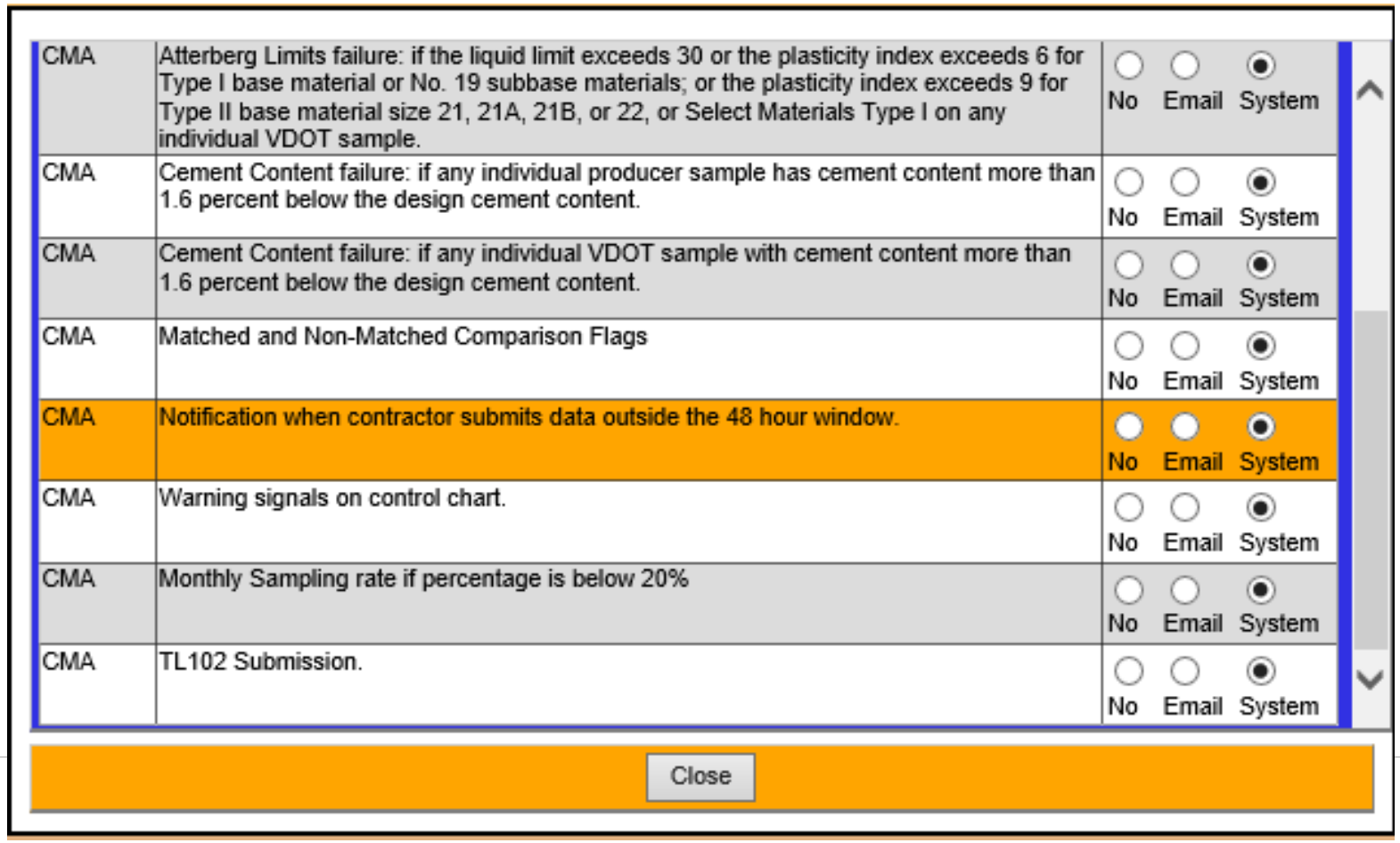
AUTOMATIC NOTIFICATIONS

Options for automatic Notifications:

- **3 consecutive flags on the results of gradation (the same sieve) and Atterberg limits for the producer samples**
- **2 consecutive D2S flags on the gradation (the same sieve) and Atterberg limits**
- **Atterberg Limits failure**
- **Cement Content failure**
- **Matched and Non- Matched Comparisons – on the first flag**
- **Notification when contractor submits data outside the 48 hour window**
- **Warning signals on control chart**
- **Monthly Sampling rate if percentage is below 20%**

NOTIFICATIONS

- **Can select the option of receiving notification (No / Email or System)**

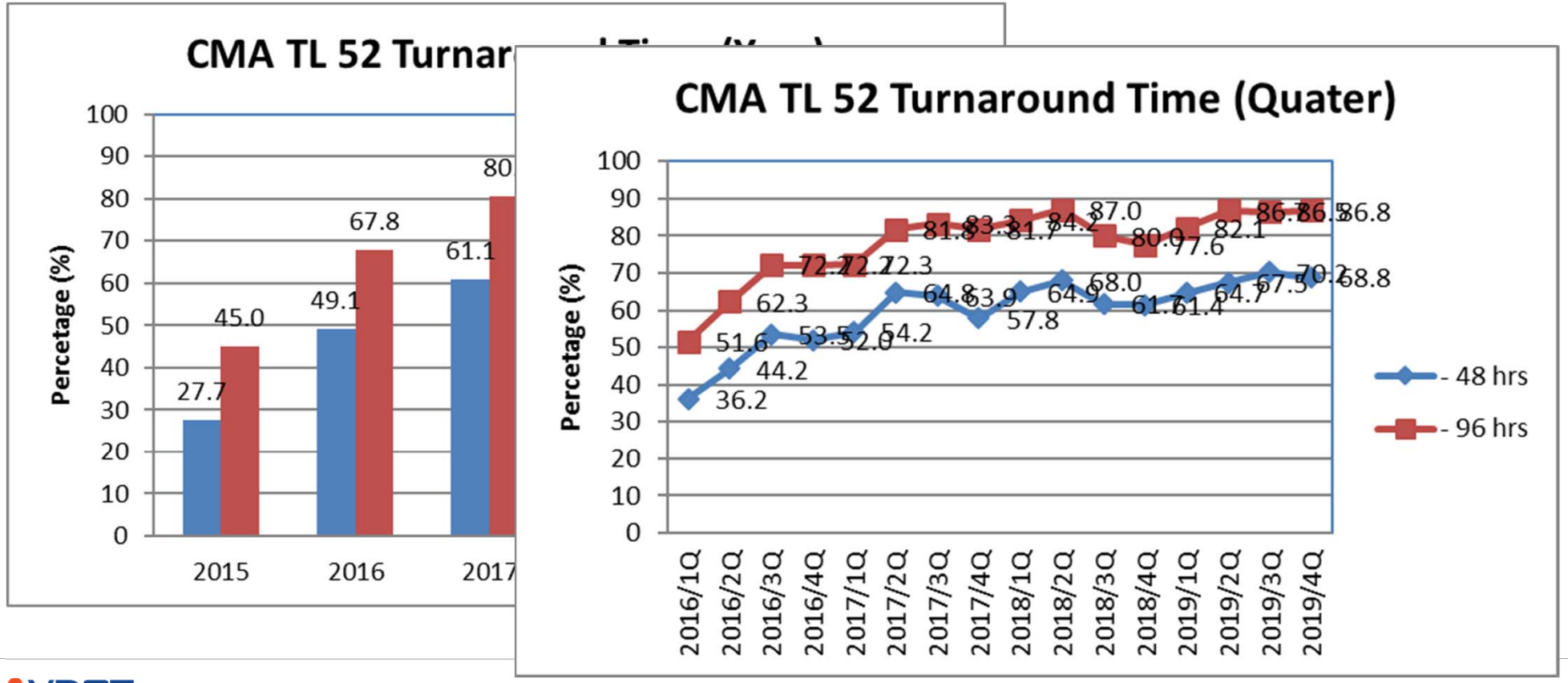


CMA	Atterberg Limits failure: if the liquid limit exceeds 30 or the plasticity index exceeds 6 for Type I base material or No. 19 subbase materials; or the plasticity index exceeds 9 for Type II base material size 21, 21A, 21B, or 22, or Select Materials Type I on any individual VDOT sample.	○ No ○ Email ◉ System
CMA	Cement Content failure: if any individual producer sample has cement content more than 1.6 percent below the design cement content.	○ No ○ Email ◉ System
CMA	Cement Content failure: if any individual VDOT sample with cement content more than 1.6 percent below the design cement content.	○ No ○ Email ◉ System
CMA	Matched and Non-Matched Comparison Flags	○ No ○ Email ◉ System
CMA	Notification when contractor submits data outside the 48 hour window.	○ No ○ Email ◉ System
CMA	Warning signals on control chart.	○ No ○ Email ◉ System
CMA	Monthly Sampling rate if percentage is below 20%	○ No ○ Email ◉ System
CMA	TL102 Submission.	○ No ○ Email ◉ System

Close

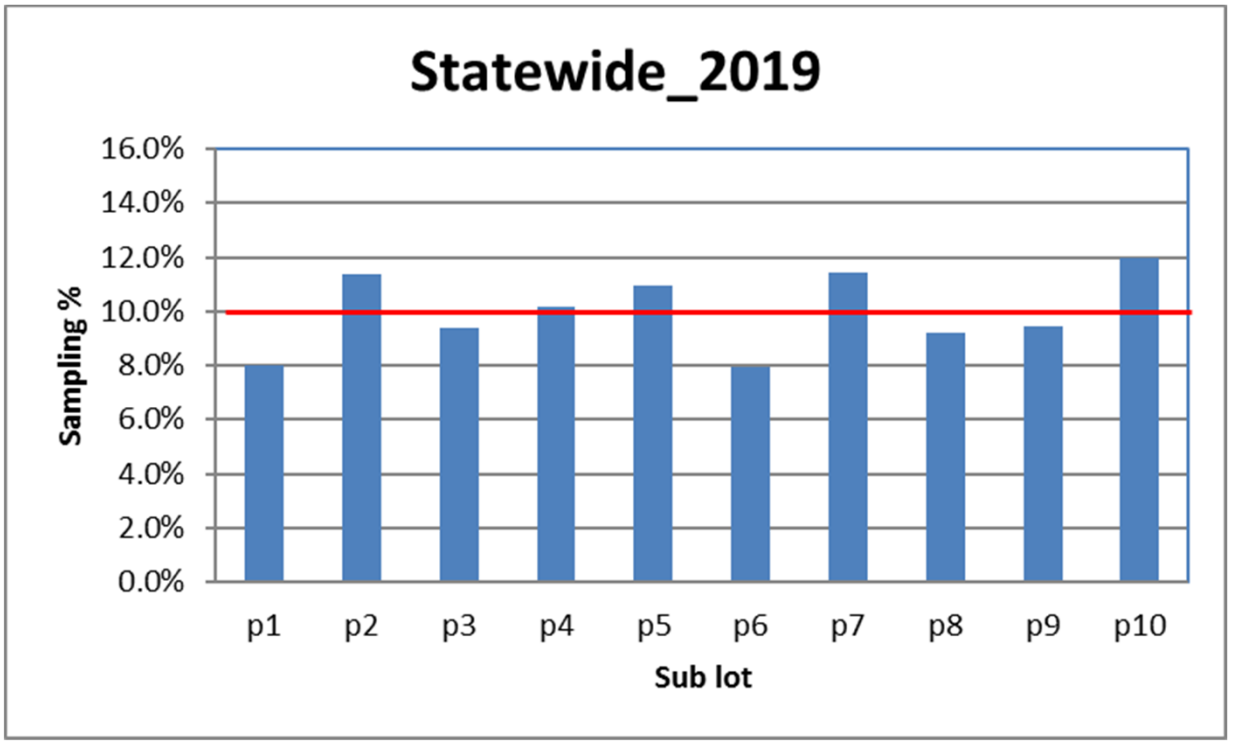
DATA ANALYSIS

- **Sample Turnaround time**

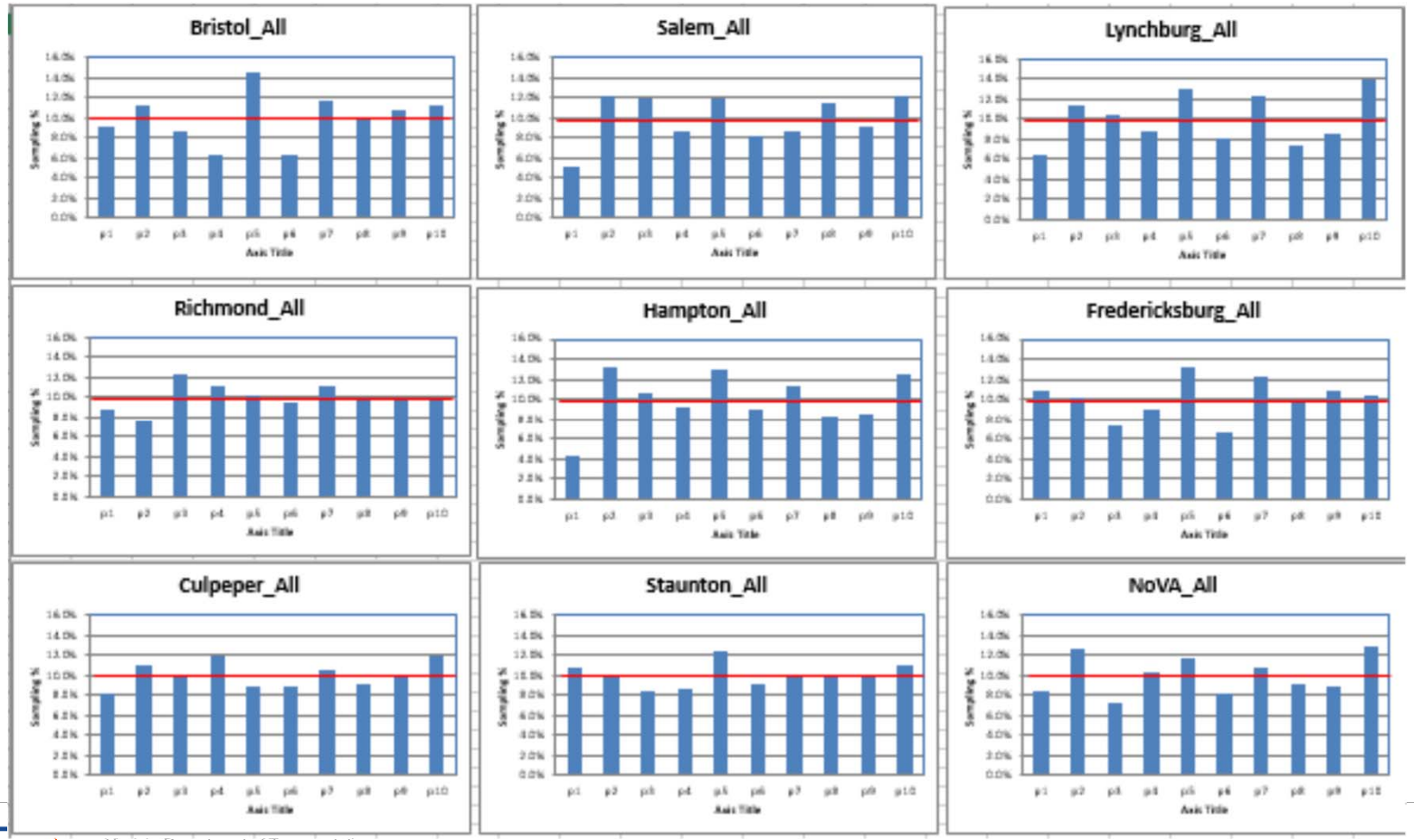


DATA ANALYSIS

- Random Sampling %
  - Sampling % for each sub-lot should be close to 10% if randomly sampled
  - The lower standard deviation is, the more likely samples were taken randomly



Random Sampling Percentage



Thank you!