

Use of Contractor's Test Results for Acceptance ...



Presented by Matthew Corrigan

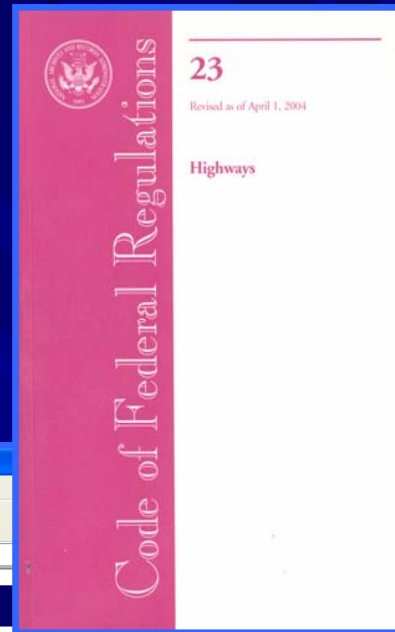
NESMEA -2007

October 16, 2007
Groton, CT



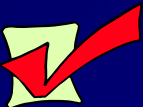
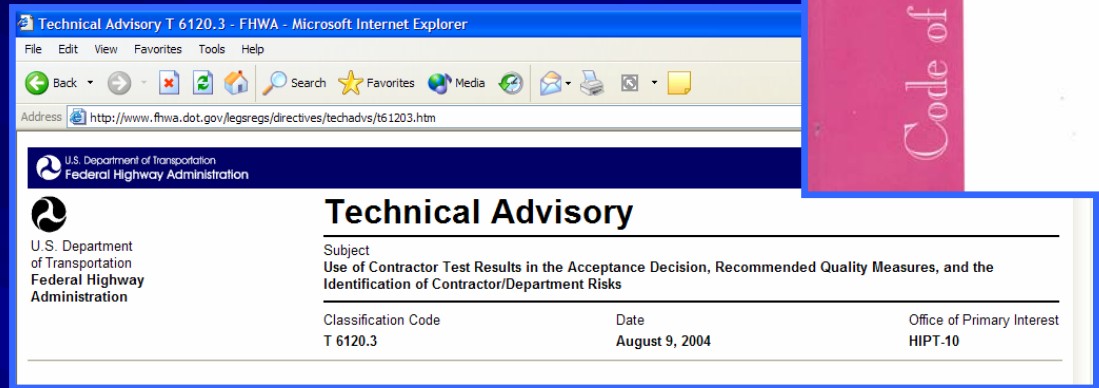
Long-Life Asphalt Pavements for the 21st Century

Use of Contractor's Test Results



Title 23 Code of Federal Regulations, Part 637 (23 CFR 637)

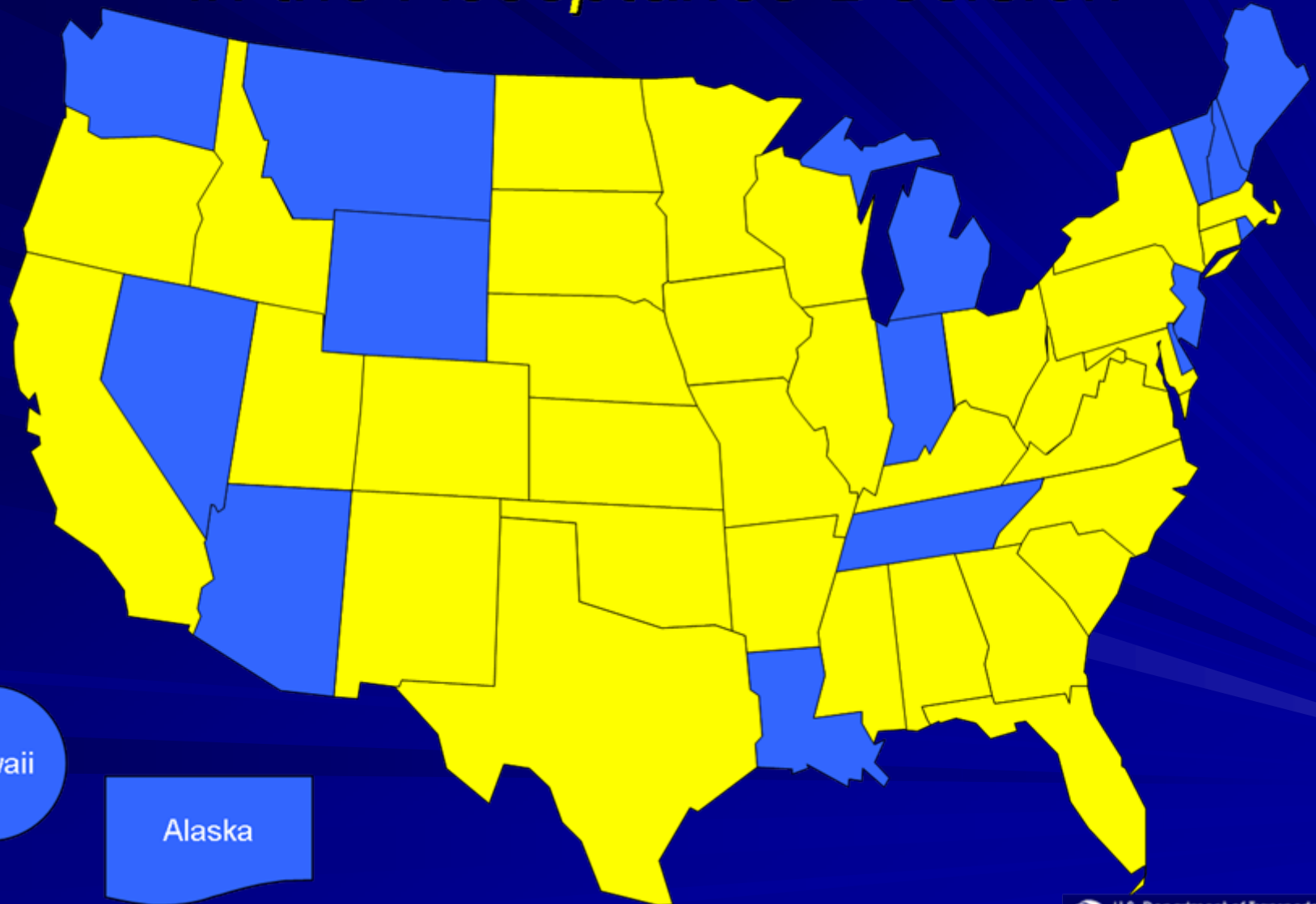
June 29, 1995



Technical Advisory T 6120.3 Use of Contractor Test Results in the Acceptance Decision, ...

August 9, 2004

33 States using Contractor Test Results in the Acceptance Decision



Hawaii

Alaska

Use of Contractor's Test Results ...

Is there a Concern?

- Survey of FHWA Division Administrators
 - 60% of the Divisions that have done State reviews have a concern with the results obtained from the contractor
 - Seven Divisions reported concerns without doing a State review

Use of Contractor's Test Results ...

 You know there is a concern when...

- One third of the States represented at the AASHTO SOC indicated they had individuals under active investigation internally or by the OIG for fraud or other contracting abuses
- FHWA Division Offices are requesting reviews

Use of Contractor's Test Results ...

✓ You **REALLY** know there is a concern when ...



The State Agency's
are proactively
requesting FHWA
reviews

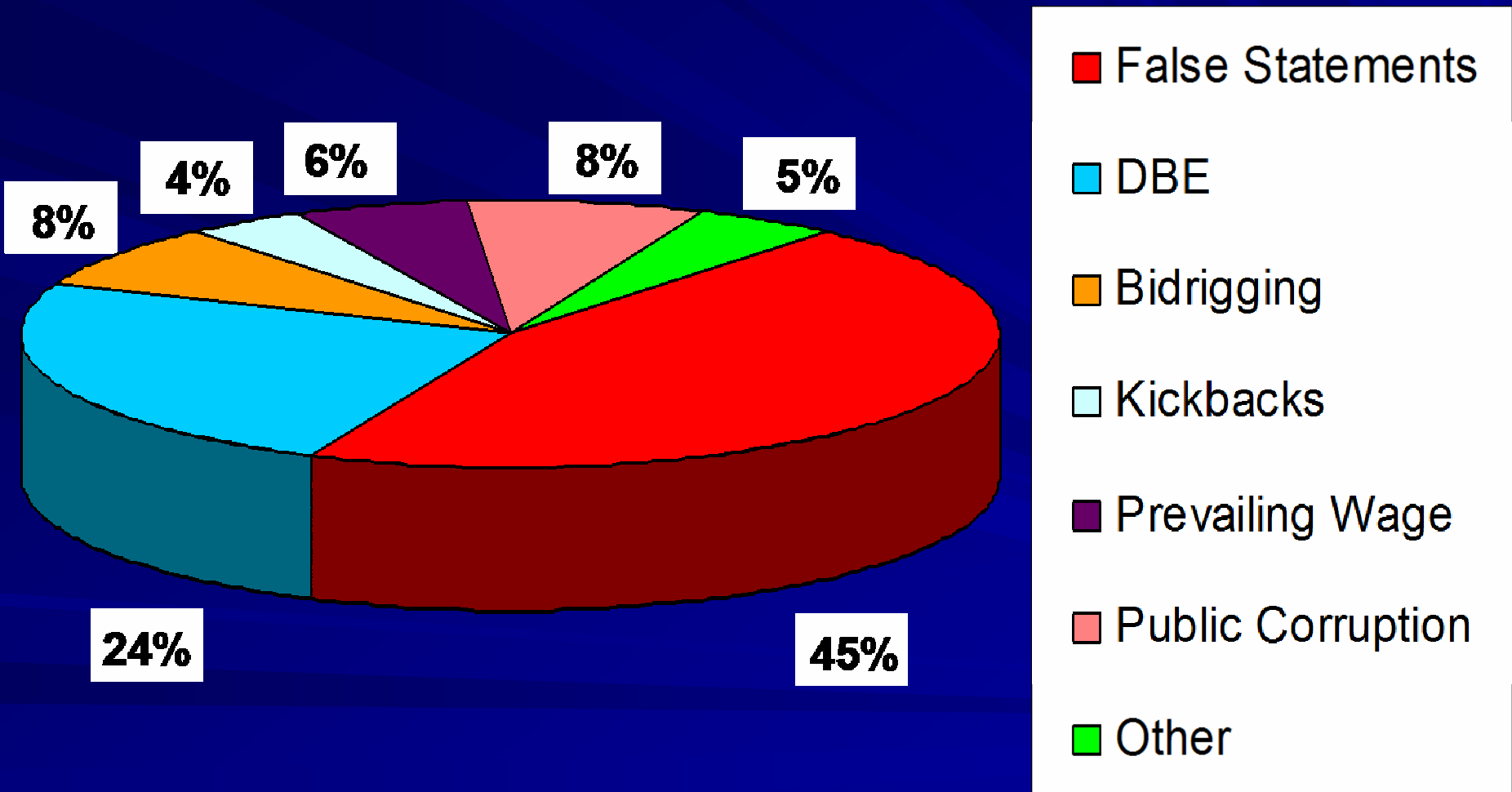
Use of Contractor's Test Results ...

The Office of Inspector General

- “Contract Fraud Initiative Is Our Number One Priority” - OIG
- Statistics Since FY 2000 thru Present
 - 180 Indictments
 - 139 Convictions
 - \$98 Million in Fines & Restitution, etc.
 - 600 Years in Jail, Probation, etc.

Use of Contractor's Test Results ...

✓ Percentage of Contract Fraud by Type

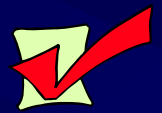


Use of Contractor's Test Results ...

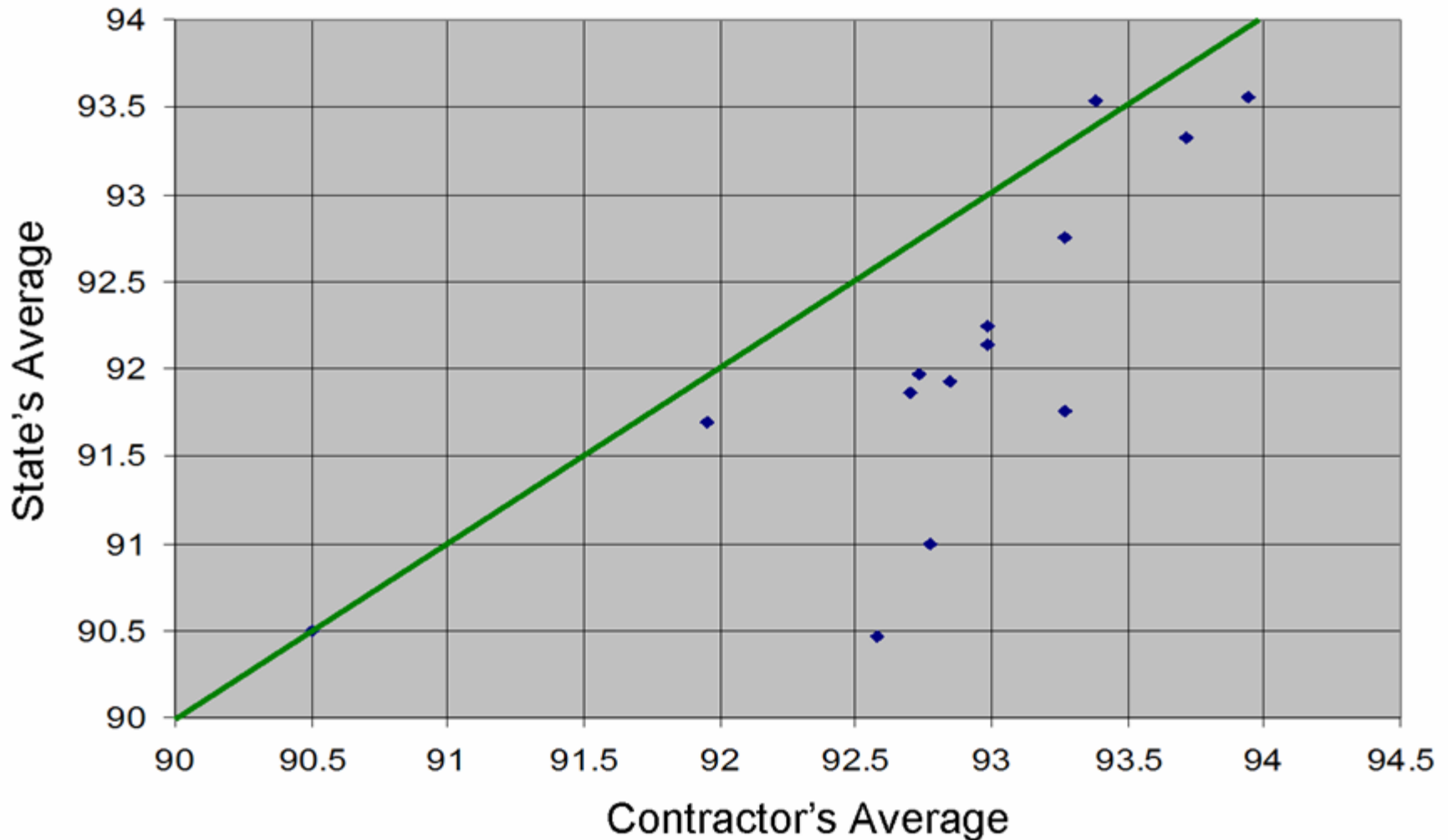
What is being found ...

- Manipulation of test data (both parties)
- Raw weights modified
- Incorrect calibrations
- Manipulation of production
- Substitution and manipulation of cores
- Gyratory compactor mold wear
- Discharging from different silos

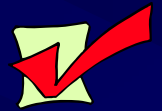
Use of Contractor's Test Results ...



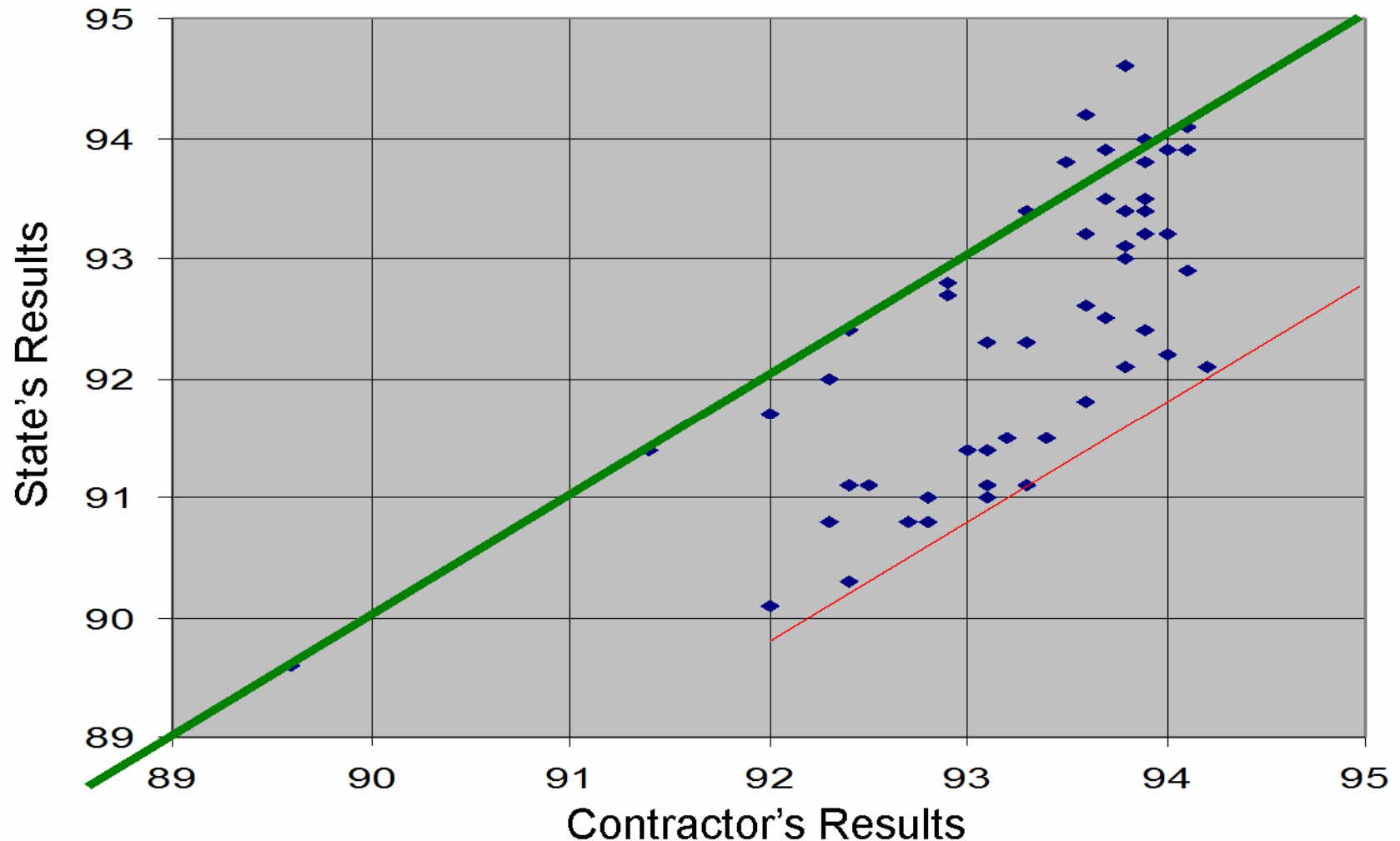
What is being found ...



Use of Contractor's Test Results ...

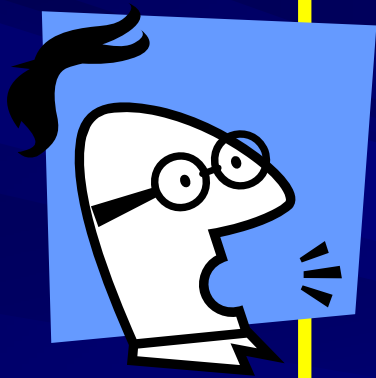


What is being found ...



Use of Contractor's Test Results ...

 Is it Real?



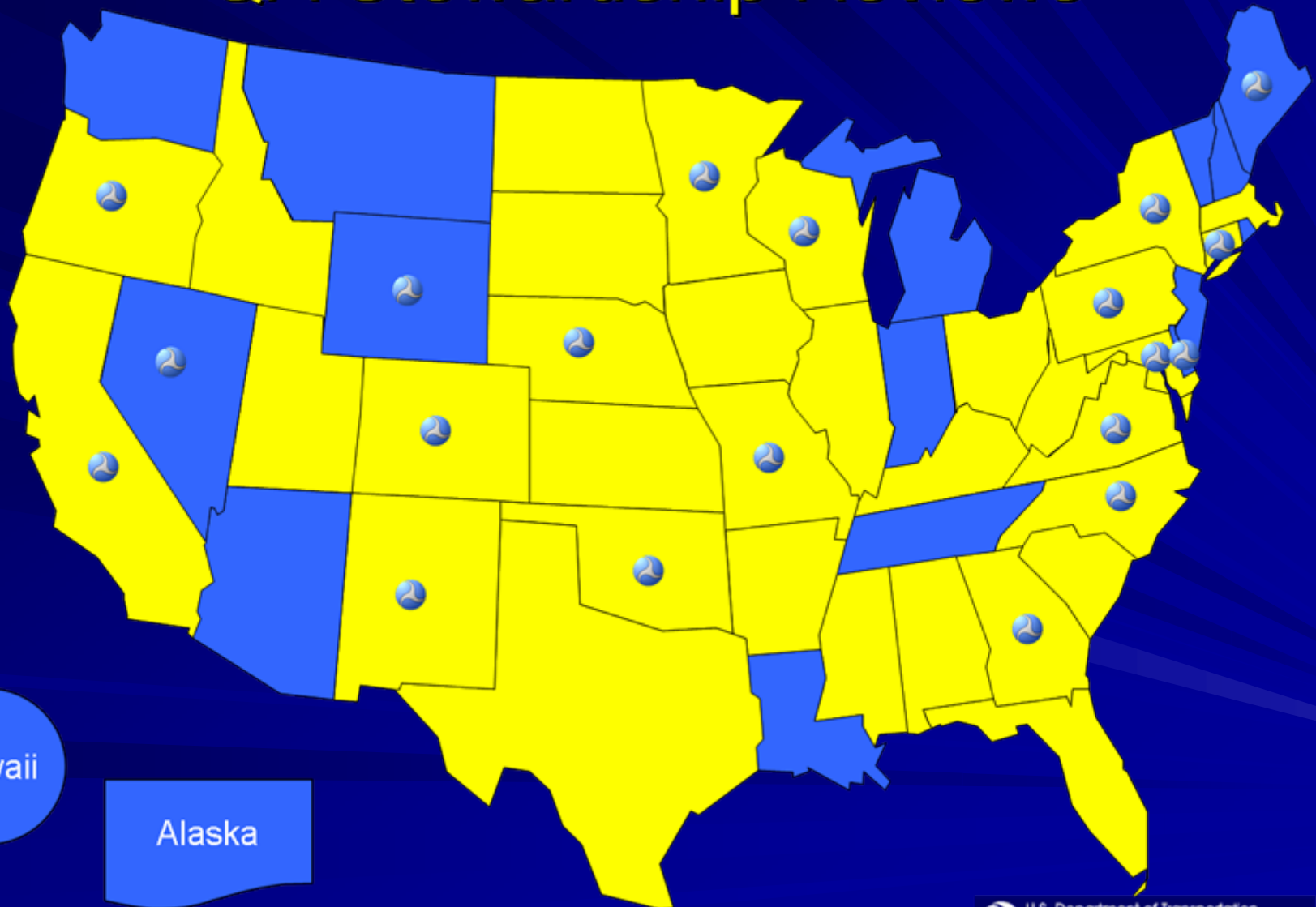
Several State DOTs have
gone back to doing the
acceptance testing in house

Use of Contractor's Test Results ...

Where we are now ...

- Not enough State Verification Testing
- Not enough State personnel
- Reluctance to spend money on construction engineering – not even for consultants
- Ineffective validation procedures
- Increasing volume of projects/workload

20 States Reviewed as part of QA Stewardship Reviews



Hawaii

Alaska

Use of Contractor's Test Results ...

Needed Improvements

Sampling and testing provisions need to be stronger and require more emphasis.

**Largest Area of Concern
Identified during the
QA Stewardship Reviews**

Use of Contractor's Test Results ...

Needed Improvements

Need to strengthen the validation procedures of Contractor's results used for acceptance

- no independent samples

**Highest Frequency of
Regulatory Non-Compliance
Identified during the
QA Stewardship Reviews**

Use of Contractor's Test Results ...



Independent Samples



23CFR637B Sec. 637.207 QA Program

Contractor sampling and test results can be used as part of the acceptance decision provided:

(a)(1)(ii)(B) ... they are **validated** by verification sampling and testing ... verification testing shall be performed on samples taken independently of the contractor samples

Use of Contractor's Test Results ...

Needed Improvements

Need to strengthen the validation procedures of Contractor's results used for acceptance

- No independent samples
- Verification testing by Contractors

Use of Contractor's Test Results ...

Independent Samples



23CFR637B Sec. 637.205 Policy

(d) The **verification sampling and testing** are to be performed by qualified testing personnel employed by the State or its designated agent, excluding the contractor and vendor.

Use of Contractor's Test Results ...

Independent Samples

When is it possible to allow some limited contractor involvement in taking independent verification samples for the State?

- Labor Regulations
- Hazardous Conditions
- Liability Issues



Use of Contractor's Test Results ...

Independent Samples

When is it possible to allow some limited contractor involvement in taking independent verification samples for the State?

- Labor Regulations
- Hazardous Conditions
- Liability Issues

**EXCEPTION NOT
THE RULE**



Use of Contractor's Test Results ...

Independent Samples

The State can use the services of the contractor's personnel to assist in obtaining independent verification samples when the following requirements are adhered to:



Use of Contractor's Test Results ...

Independent Samples




- ✓ The verification sample location or time is randomly selected by the State and is only given to the contractor immediately prior to sampling.
- ✓ The contractor's personnel are used only to provide labor to assist in physically obtaining the verification sample of the material.
- ✓ The State is present to witness the taking of the verification sample.



Use of Contractor's Test Results ...



Independent Samples

-  Both the State witness and contractor labor are qualified sampling personnel.
-  The State witness controls the sampling process by choosing the location or timing and directing the taking of the verification sample.
-  The State witness immediately takes possession of the verification sample.



Use of Contractor's Test Results ...

Needed Improvements

Need to strengthen the validation procedures of Contractor's results used for acceptance

- no independent samples
- Verification testing by Contractors
- no statistical comparison
 - number of samples for comparison

Use of Contractor's Test Results ...

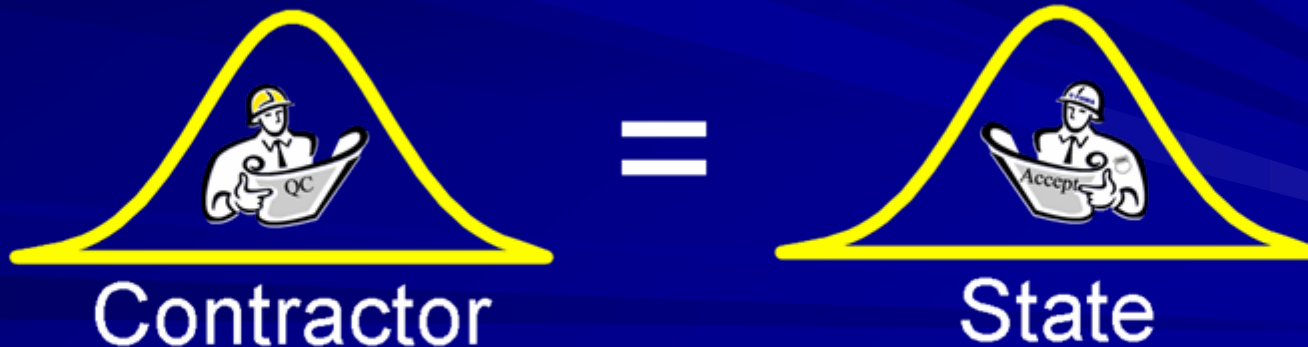
✓ Independent Sample Validation

F-test

H_o : variances are equal, $s^2_{\text{contractor}} = s^2_{\text{state}}$



t-test (independent)

H_o : means are equal, $\bar{X}_{\text{contractor}} = \bar{X}_{\text{state}}$





Use of Contractor's Test Results ...

Power of the F -test

Ratio of Standard Deviations	Number of Contractor  Tests	Number of Agency  Tests	Probability of Detecting a Difference
2	3	3	0.10
	5	5	0.21
	20	5	0.49
	⋮	⋮	⋮
	40	10	0.77
	50	15	0.90



Use of Contractor's Test Results ...

Power of the (independent) t -test

Difference in Means	Number of Contractor Tests 	Number of Agency Tests 	Probability of Detecting a Difference
3	5	1	0.34
	6	1	0.42
	7	1	0.46
	8	1	0.53
	9	1	0.54
	10	1	0.58

Use of Contractor's Test Results ...

Power of the (paired) t -test

Difference in Means	Number of Contractor  Tests	Number of Agency  Tests	Probability of Detecting a Difference
2	2	2	0.17
	3	3	0.47
	4	4	0.73
	⋮	⋮	⋮
	7	7	0.98
	10	10	1.00

Use of Contractor's Test Results ...

Needed Improvements

Need to strengthen the validation procedures of Contractor's results used for acceptance

- no independent samples
- Verification testing by Contractors
- no statistical comparison
 - number of samples for comparison
 - increase frequency (non-comparison)
- no defined time frame for comparison

Use of Contractor's Test Results ...

Needed Improvements

- Control of Contractor supplied data
 - source documentation
- Control of random sampling locations
- Multiple sample locations and tests
- Retest provisions
- Dispute resolution

Use of Contractor's Test Results ...

Needed Improvements

- Independent Assurance
 - tolerances
 - not using split samples
 - used for "Specification Compliance"
 - incomplete program
 - include all technicians and tests

Use of Contractor's Test Results ..

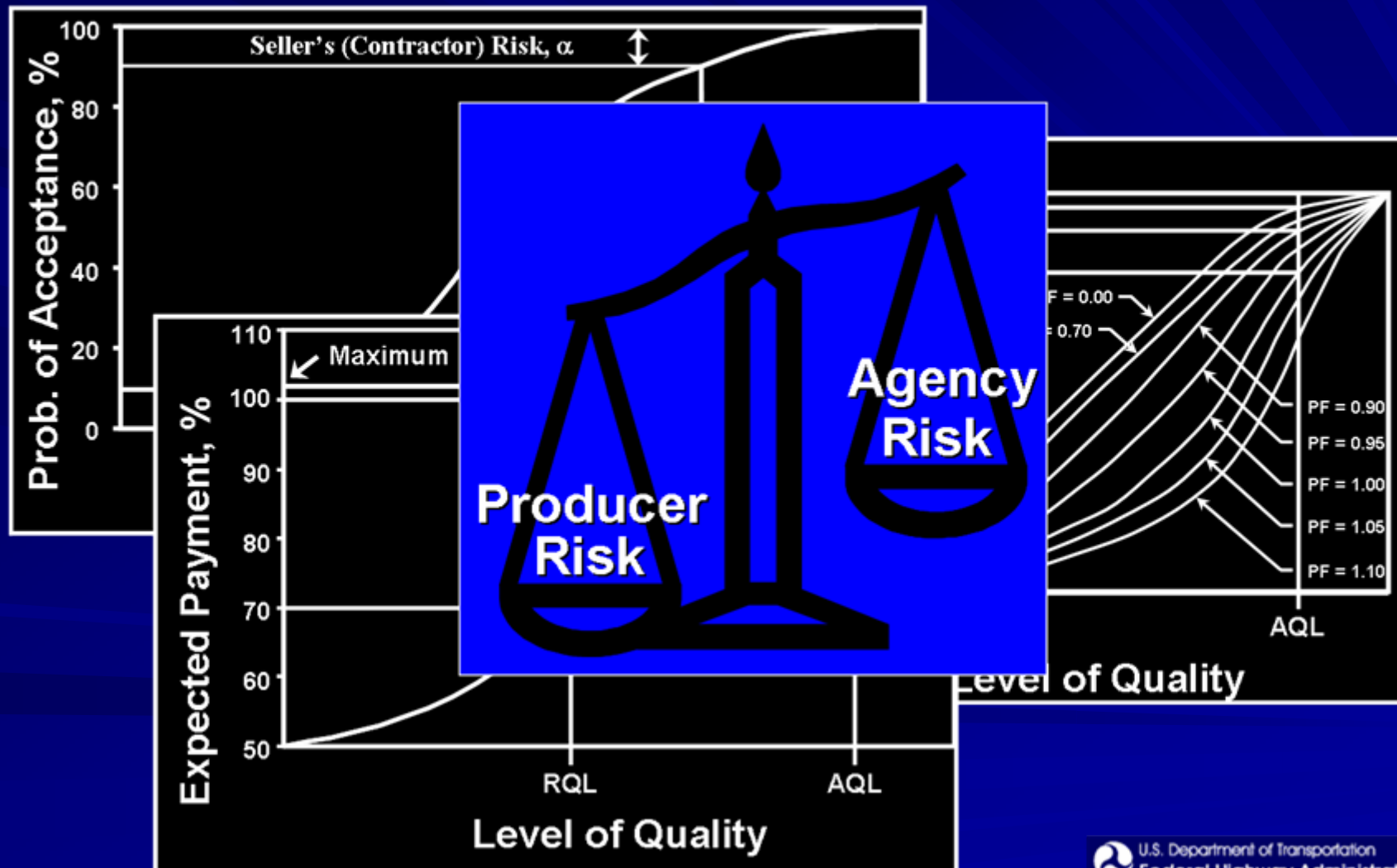


Risks

- Considered in properly developed QA plans
- Dependent on selected AQL and RQL
- Lowered with larger sample quantities
- Developed using computer simulation
 - Programs: NONCENTT, Demo89, **SpecRisk Analysis Software (2007)**
 - Operating Characteristic (OC) Curves
 - Expected Pay (EP) Curves

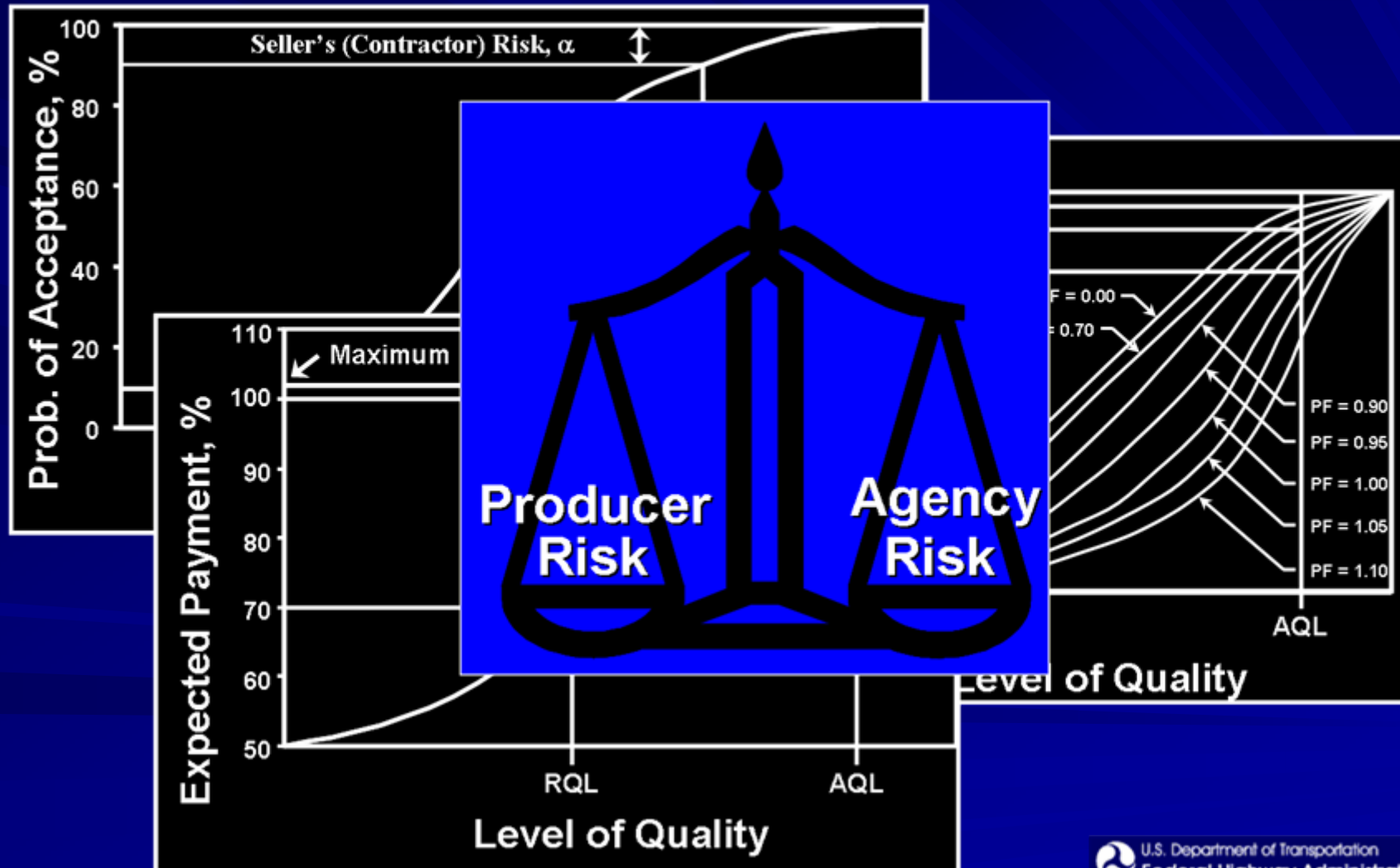
Use of Contractor's Test Results ...

Risks



Use of Contractor's Test Results ...

Risks

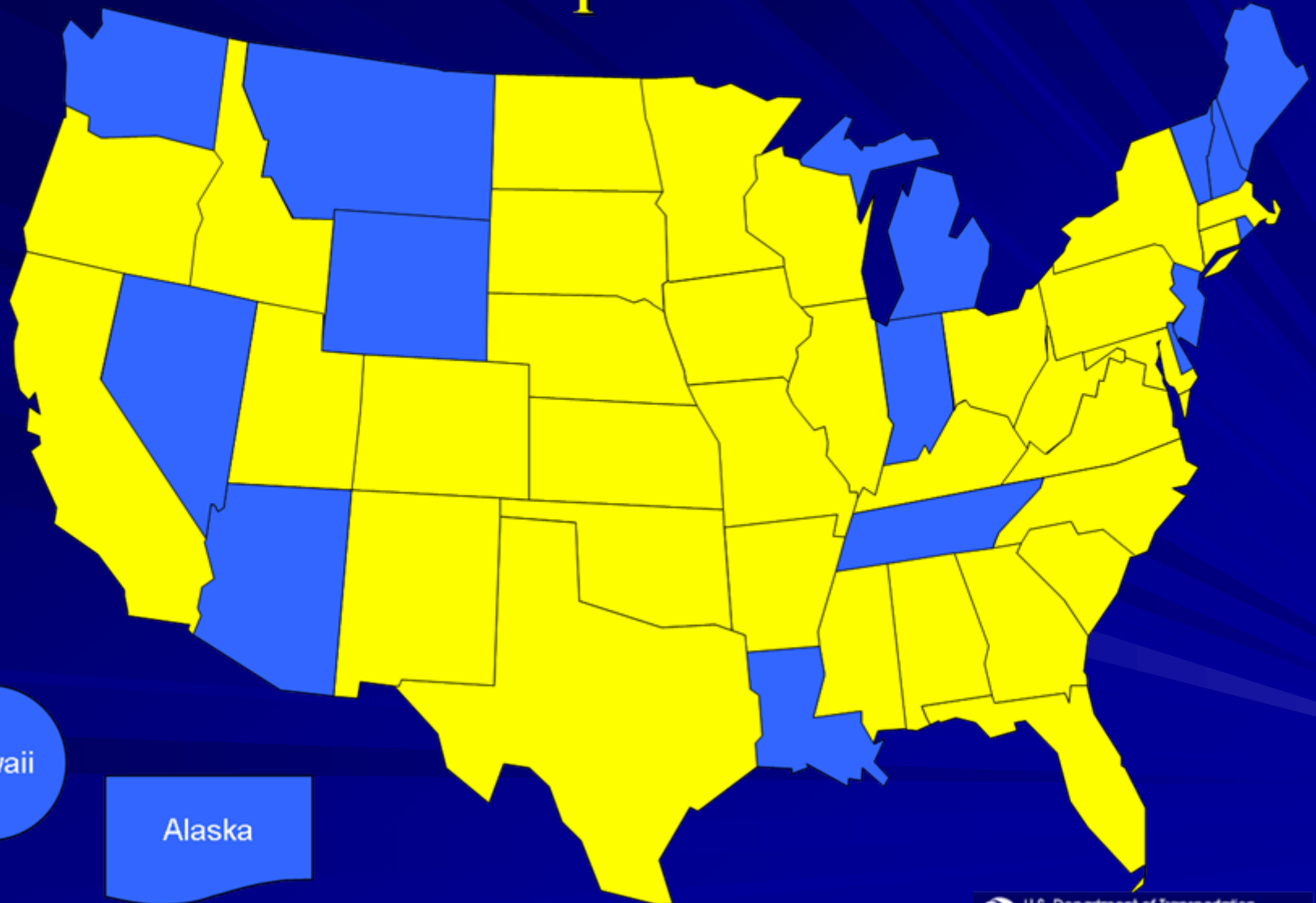


Use of Contractor's Test Results ...

 Needed to continue the journey:

- Appropriate Check's and Balances
- Strong Sampling and Testing Provisions
- Strong Technician Qualification Programs
 - Demonstrated Proficiency
 - Qualification Revocation Process
- Strong Validation Procedures
 - Increased Number of State Tests
- Strong Independent Assurance Program
- Strong Quality Assessment Procedures

33 States using Contractor Test Results in the Acceptance Decision



All States using Contractor Test Results in the Acceptance Decision?




No States using Contractor Test Results in the Acceptance Decision?



www.fhwa.dot.gov/pavement/qa/index.cfm

www.fhwa.dot.gov/pavement/materials/stewardreview2007.cfm

U.S. Department of Transportation
Federal Highway Administration

Search | Feedback

Pavements

DesignConstructionPreservationMaintenanceManagementRehabilitation

Technical Guidance | Research | Technology Transfer (T²)

FHWA > Engineering > Pavements > Quality Assurance Stewardship Reviews

Pavement Design and Analysis

Materials and Construction Technology

Pavement Management and Preservation

Pavement Surface Characteristics

Construction Quality Assurance

Environmental Stewardship

Quality Assurance Stewardship Reviews

The Materials Engineering program within the FHWA's Office of Pavement Technology supports State highway agencies in assuring the highest standards of quality for the materials and construction practices used on Federally funded highway infrastructure. Quality Assurance focuses on the following activities:

- [Laboratory Qualification](#)
- [Laboratory Accreditation](#)
- [Materials Technician Qualification](#)

Current Projects and Activities

- [Memorandum on Technical Advisory T 6120.3 Use of Contractor Test Results in the Acceptance Decision, Recommended Quality Measures, and the Identification of Contractor/Department Risks](#)
- [Optimal Procedures for Quality Assurance Specifications](#)
- [Quality Assurance Stewardship Activities](#)
 - [Quality Assurance Stewardship Review Summary Report for Fiscal Years 2003 through 2006](#) **NEW!**
- [Questions and Answers on the Quality Assurance Regulation \(23 CFR 637\)](#)
- [Non-Regulatory Supplement 23 CFR Part 637](#)

Publications

Events

- [View all Upcoming Pavements Events](#)

More Information

- [Pavement Materials](#)

Contact

Matthew Corrigan
[Office of Pavement Technology](#)
202-366-1549
[E-mail Matthew](#)

Matthew Corrigan, P.E.
Mobile Asphalt Laboratory Program Manager
Warm Mix Asphalt Program Manager

ASPHALT

Office of Pavement Technology
HIPT-10, Room 3118
400 Seventh Street S.W.
Washington, DC 20590

matthew.corrigan@dot.gov
www.fhwa.dot.gov/pavement

