

CAN THE LABORATORY MEET MY DQOs?

Assessing Laboratory Capability

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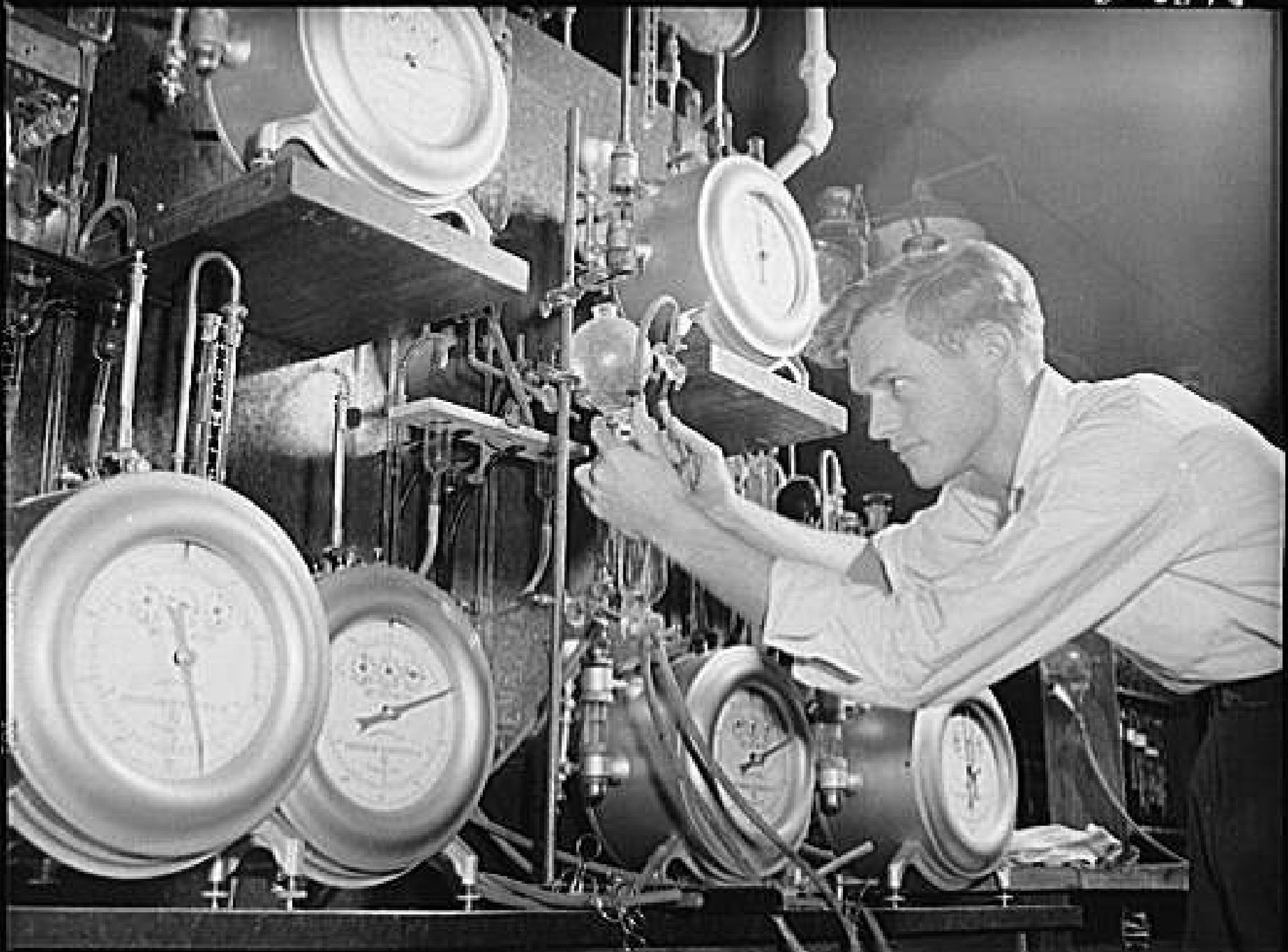
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- **THE DQOs ARE SET**
- **I KNOW WHAT TO LOOK FOR....**
- **NOW ALL I NEED TO DO IS COLLECT MY SAMPLES,**
- **HAVE THEM ANALYZED....**

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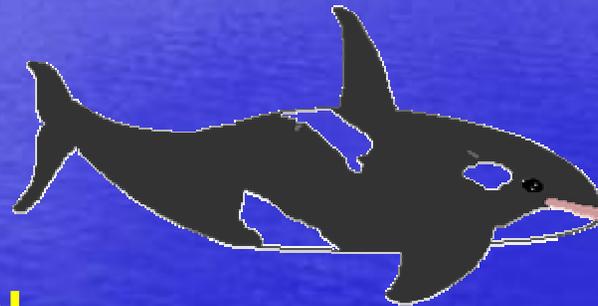
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AND I'M HOME FREE....!!!!!!



IF ONLY LIFE WERE SO EASY

UNFORTUNATELY



AND TOO OFTEN

IT'S NOT

I need MQOs too!

Some Common Problems

101: The Dreaded

High Detection Limit

PARAMETER	DQO	RESULT	DETECTION LIMIT
Phosphorus	10	8	5
Nitrogen	5	4	1
Mercury	0.02	ND	2
2,3,7,8- Tetrachloro Diabohical Destructostuff (TCDD)	0.000005	ND	0.050

SOME COMMON PROBLEMS

102:

THE FAILED MS

PARAMETER	SPIKE CONCENTRATION	RESULT	% RECOVERY	LIMIT (%)	DL
Phosphorus	10	4.8	48	80-120	5
Nitrogen	5	5.2	104	80-120	1
Mercury	5	5.0	100	75-125	2
2,3,7,8-Tetrachloro Diabolical Destructostuff (TCDD)	100	67	67	35-165	0.050

SOME COMMON PROBLEMS

103:

THE FAILED REPLICATE

PARAMETER	RESULT 1	RESULT 2	RPD	ACCEPTANCE LIMIT %
Phosphorus	10	28	94.7	<50
Nitrogen	5	7	33.3	<50
Mercury	6	7	15.3	<50
2,3,7,8-Tetrachloro Diabolical Destructostuff (TCDD)	ND	ND	0	<100

SuperDooper Analytical, Inc.

PARAMETER	DETECTION LIMIT	MATRIX SPIKE % RECOVERY	DUPLICATE RPD
PHOSPHORUS	ACCEPTABLE	96	94.7
NITROGEN	ACCEPTABLE	104	33.3
MERCURY	ACCEPTABLE	100	15.3
2,3,7,8-TETRACHLORO DIABOLICAL DESTRUCTOSTUFF (TCDD)	ACCEPTABLE	10	0

SO, HOW DO I AVOID THIS

QUAGMIRE

??????

CHARACTERISTICS OF AN INITIAL DEMONSTRATION OF CAPABILITY

(IDC)

IDC OBJECTIVES

- **DETERMINE WHETHER A LABORATORY CAN ROUTINELY ACHIEVE THE PROJECT'S DQO'S/MQOs**
- **DO THIS PRIOR TO**
 - **CONTRACTING**
 - **BEST AS AN ELEMENT OF THE RFP**
 - **SENDING THE LAB ANY PROJECT SAMPLES**

ELEMENTS OF THE IDC

- DETERMINE YOUR OBJECTIVES (DQOs/MQOs)
- DETERMINE WHICH QC SAMPLES YOU NEED
- SET DATA ACCEPTABILITY LIMITS
- DETERMINE THE FREQUENCY OF QC SAMPLES
- VERIFY ACCEPTANCE LIMITS FOR EACH QC SAMPLE OR SAMPLE GROUP

IDC ANALYTICAL ELEMENTS

- **DETECTION LIMIT DETERMINATION**
- **REPLICATE ENVIRONMENTAL SAMPLES**
- **MATRIX SPIKE**
- **CERTIFIED REFERENCE MATERIALS**
- **SURROGATE SPIKES/INTERNAL STANDARDS**
- **CALBRATION STANDARDS**

DETECTION LIMIT DETERMINATION

- **MAKES SURE THAT THE LAB CAN ROUTINELY ACHIEVE THEIR TARGET DL**
- **DL SHOULD BE $<$ THE DQO/MQO**
- **DL OFTEN DETERMINED USING THE METHOD DETECTION LIMIT (MDL) DETERMINATION
(40CFR 136 APPENDIX B REVISION 1.11)**

MDL OR OTHER DL DETERMINATION

- **IN MATRIX OF INTEREST**
- **REPLICATE SAMPLES ANALYZED TOGETHER**
- **SPIKE OR NATURAL CONCENTRATIONS**
- **STATISTICAL ANALYSIS**

MDL DETERMINATION

- AT LEAST 7 REPLICATES
- FORTIFY BETWEEN 1 – 5X THE DL
- UNSPIKED RESULT
- SPIKED LEVEL (IF FORTIFIED)
- SPIKED RESULT
- % RECOVERY
- ALL CALCULATIONS AND PARAMETERS
- CALCULATED DL OR MDL

REPLICATE SAMPLES

- **MUST BE AT RELEVANT CONCENTRATIONS (RANGE IS BEST)**
- **MINIMUM OF 3 DETERMINATIONS (MAY BE PROJECT SAMPLES, OR FROM THE DL STUDY)**
- **ANALYZE RESULTS AS RSD**

MATRIX SPIKES

- **MUST BE AT RELEVANT CONCENTRATIONS (<10 x DL)**
- **MUST BE IN THE MATRIX OF INTEREST!**
- **COULD BE FROM PREVIOUS PROJECTS**
- **MINIMUM OF 4 SAMPLES**

MATRIX SPIKES

- **UNSPIKED RESULTS**
- **SPIKE CONCENTRATION**
- **SPIKED RESULTS**
- **% RECOVERY**

CERTIFIED REFERENCE MATERIALS

- **APPROPRIATE CONCENTRATIONS (\approx 5X DL)**
- **APPROPRIATE MATRIX (e.g. DON'T USE A SEDIMENT CRM FOR A TISSUE STUDY)**
- **MAY HAVE TO BE PREPARED IN THE LAB IF THERE IS NO COMMERCIALY AVAILABLE CRM (e.g. NIST, EC, USGS)**

SURROGATE SPIKES

- **SHOULD BE FROM A PREVIOUS PROJECT**
- **RELEVANT MATRIX**
- **FOR ORGANICS, SHOULD COVER THE RANGE OF ANALYTE TYPES**
- **ISOTOPE DILUTION – ALL ANALYTES**

OTHER POTENTIAL IDC ELEMENTS

- **LAB VISIT OR AUDIT**
- **CERTIFICATION/ACCREDITATION**
 - **DRINKING WATER**
 - **NELAC**
- **EXPERIENCE REQUIRMENTS**
 - **STAFF**
 - **SIMILAR PROJECTS**

LAB VISIT/AUDIT

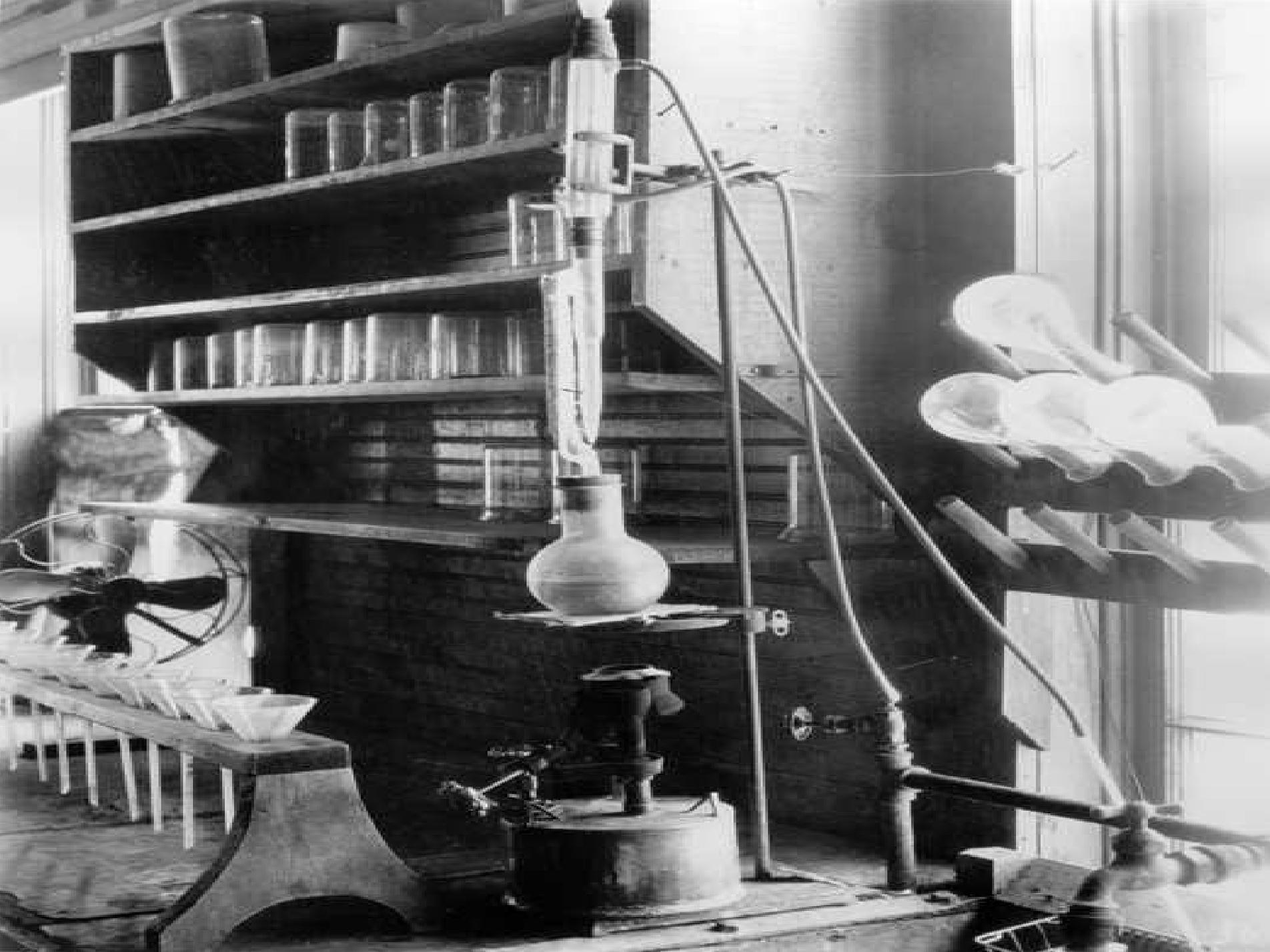
ADEQUATE SPACE

WORKMANLIKE ATMOSPHERE



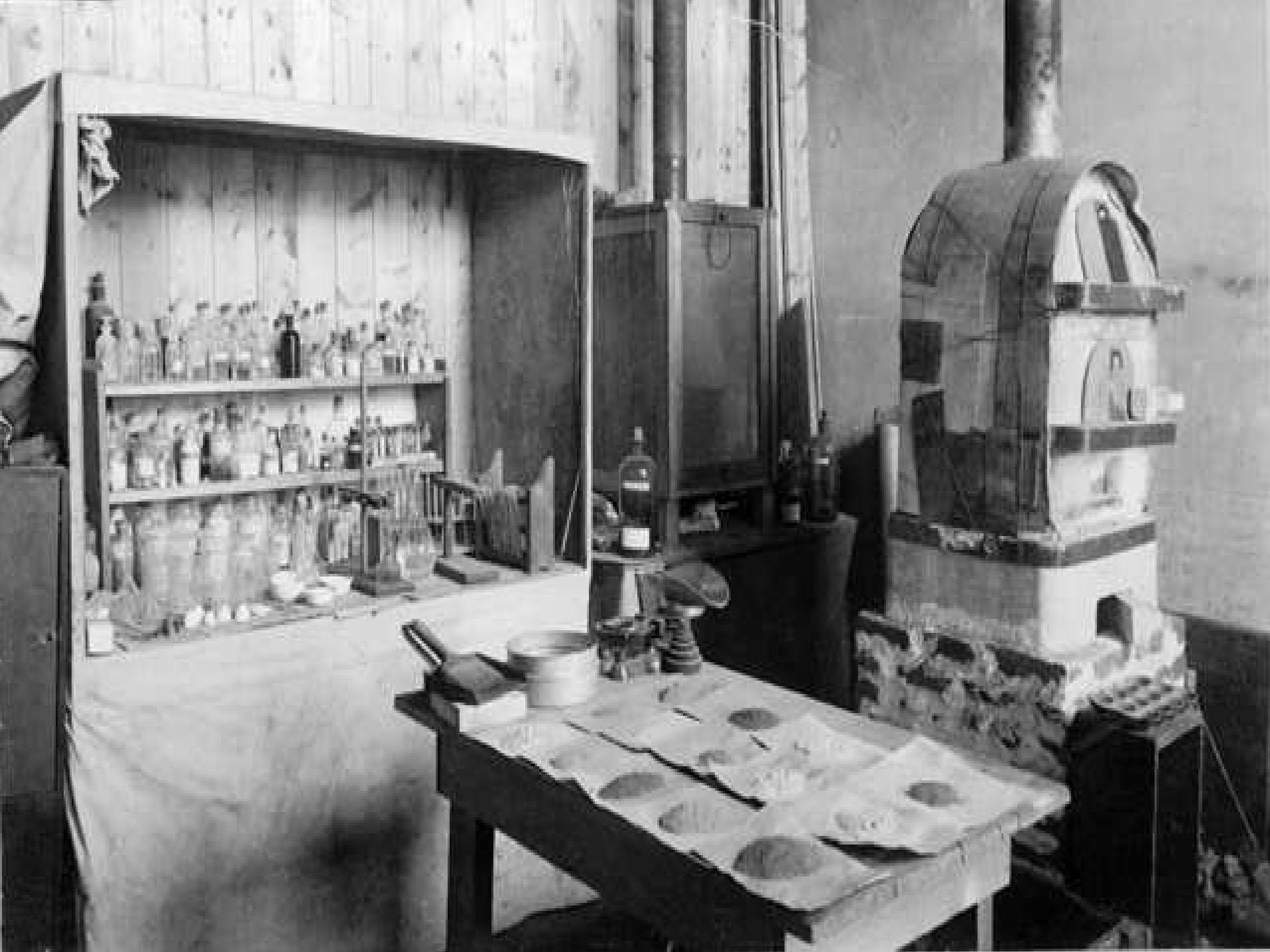
LAB VISIT/AUDIT

NECESSARY EQUIPMENT



LAB VISIT/AUDIT

**ONGOING EXPERIENCE WITH
YOUR SAMPLE TYPE**



LAB VISIT/AUDIT

ADEQUATE STAFF

**SUPERVISORY & QA/QC
OVERSIGHT**



EVIDENCE OF PROBLEM SOLVING ABILITY

- **CAN THE LAB TACKLE UNIQUE/DIFFICULT PROBLEMS?**
 - **OR DO THEY ADOPT A "COOKBOOK" APPROACH?**



GETTING YOUR RESULTS

THE LABORATORY DATA PACKAGE

- **SPECIFY THE FORMAT OF DATA SUMMARIES**
 - **EASY TO COMPREHEND**
 - **LINK TO THE ANALYTICAL BATCH**
 - **ALL RESULTS AND CALCULATIONS**
- **ENTIRE DATA PACKAGE AS A PROJECT DELIVERABLE**

PROJECT QA/QC

- **QUALIFIERS**
- **QC RESULTS – ONE EACH PER BATCH MINIMUM**
- **“BLIND” SAMPLES**
 - **REPLICATES**
 - **REFERENCE MATERIALS**
 - **QC SPIKES**
- **SHARED EXTRACTS FOR MULTILAB STUDIES**

SOME IDC BENEFITS

- HELPS YOU ASSESS LABS
- REALITY CHECK ON DQOs/MQOs
- HELPS LABS ASSESS THEMSELVES
- EFFICIENT DATA VALIDATION/REVIEW
- SUPPORTS PB(M)S APPROACH

AND IN THE END...

**EVEN THE BEST LABS SOMETIMES FAIL TO MEET QC
CRITERIA ON EVERY SAMPLE**

**ULTIMATELY – IF YOU FAILED TO INDICATE WHAT
YOU NEED TO ACHIEVE – IT'S YOUR FAULT, NOT
THE LAB'S!**

**BUT, IF YOU'VE SELECTED A LABORATORY THAT
HAS DEMONSTRATED THAT THEY CAN MEET
YOUR DQOs**

CHANCES ARE YOU'LL BE A.....

WINNER OF THE

2004

TUCKY DERBY



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DISCLAIMER 101

- **MOST LABS REALLY DO A GOOD JOB**
- **IT'S UP TO YOU TO TELL THEM WHAT YOU NEED!!!!!!!!!!!!!!**

DISCLAIMER 102:

- THE VIEWS EXPRESSED ARE SOLELY THE AUTHOR'S/PRESENTER'S AND ARE NOT NECESSARILY THOSE OF THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA)



but they might be.....

ACKNOWLEDGEMENTS

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