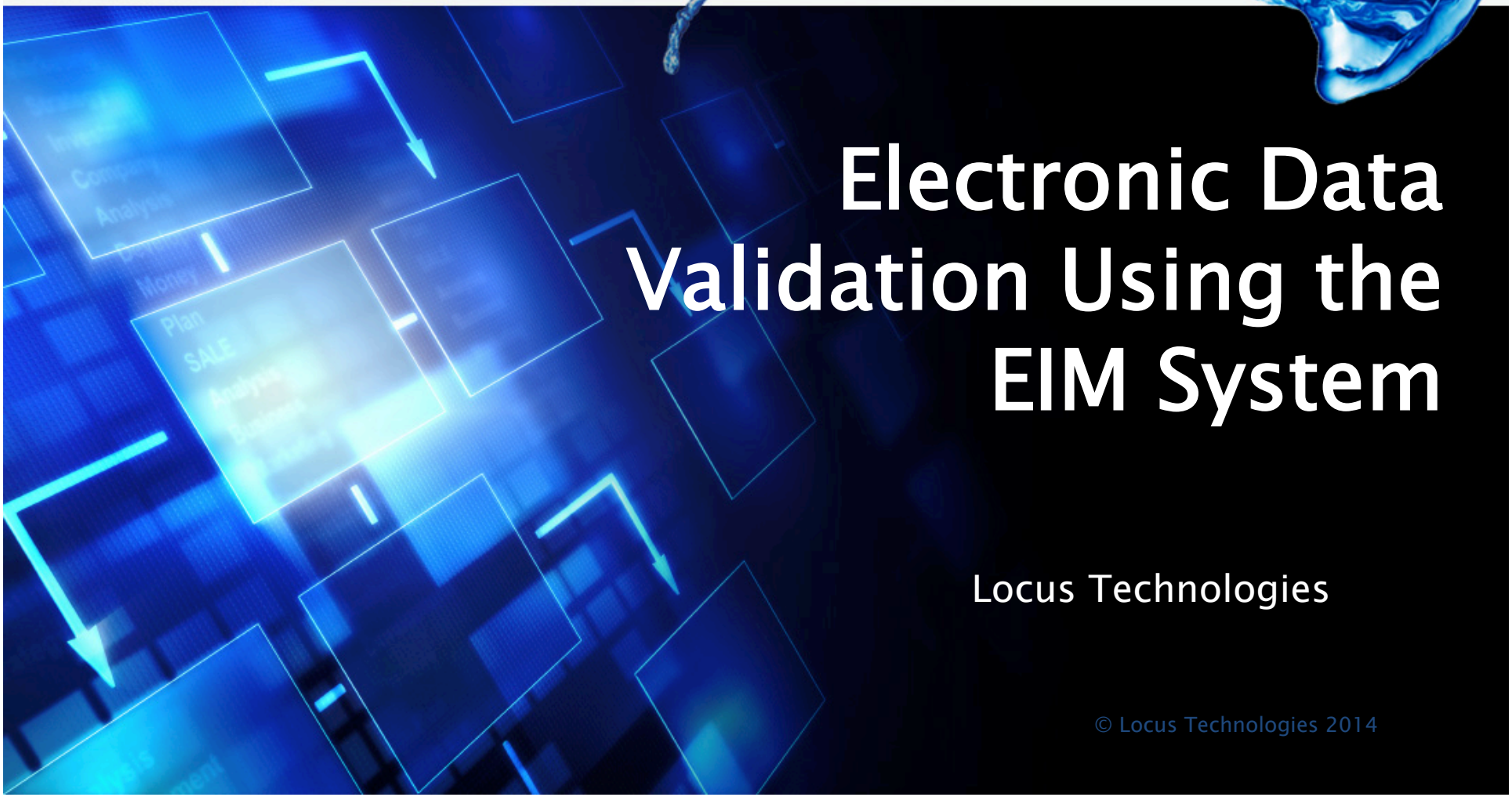


Electronic Data Validation Using the EIM System

Locus Technologies

Agenda

Introduction

- Environmental Information Management System (EIM).
- Data validation module (DVM).

DVM Setup

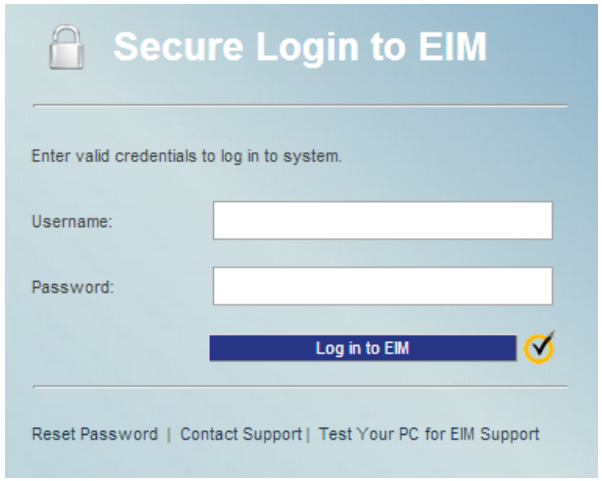
- Configure validation plan and settings.

Validation

- Perform automated validation.
- Review/update findings.
- Produce report outputs.

What is EIM?

- Cloud based environmental data management software.
- Data uploaded by labs, consultants, and data owners.
- Login via web browser and run data tools.
- Features include validation, sample planning, regulatory exports (e.g. ERPIMS), and visualization tools.



EIM DVM

Configure Validation Upfront.

Automated Validation Run and Findings Applied.

Validator Reviews and Finalizes Dataset.

Reporting of Validation Findings.

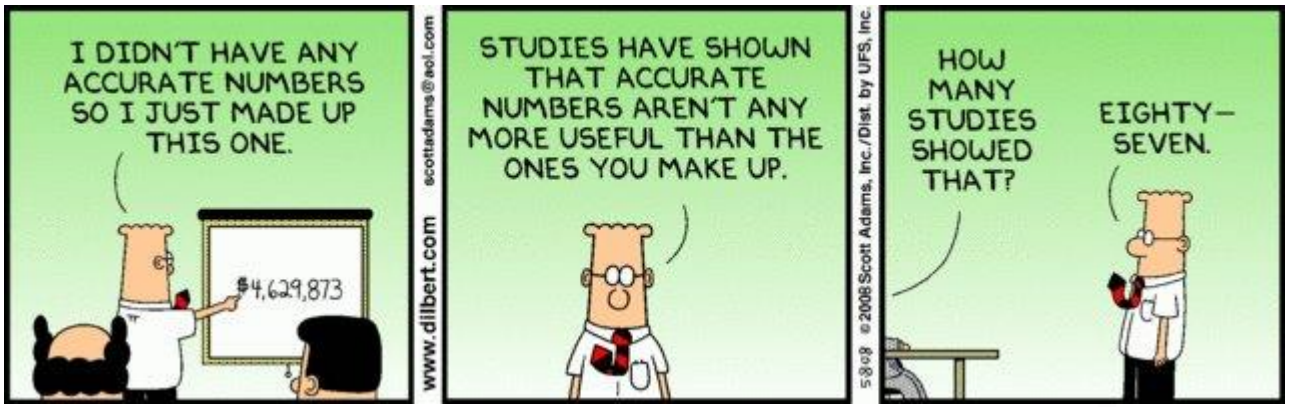
Automated DVM Checks

- Holding Times
- Blank Detects
- Spike Control Limits
- Duplicate RPDs
- Total vs Dissolved Metals RPDs
- Required QC Components
- Sensitivity of Reporting Limits
- Missing QC criteria
- Sample Condition

Typical Level II Components.

Why Use Validation in EIM?

- Improve quality by standardizing validation approach.
- Reduce costs by automating time-intensive processes that are prone to error when performed manually.
- Focus skilled resources on critical data issues.
- Fast to generate initial validation findings.



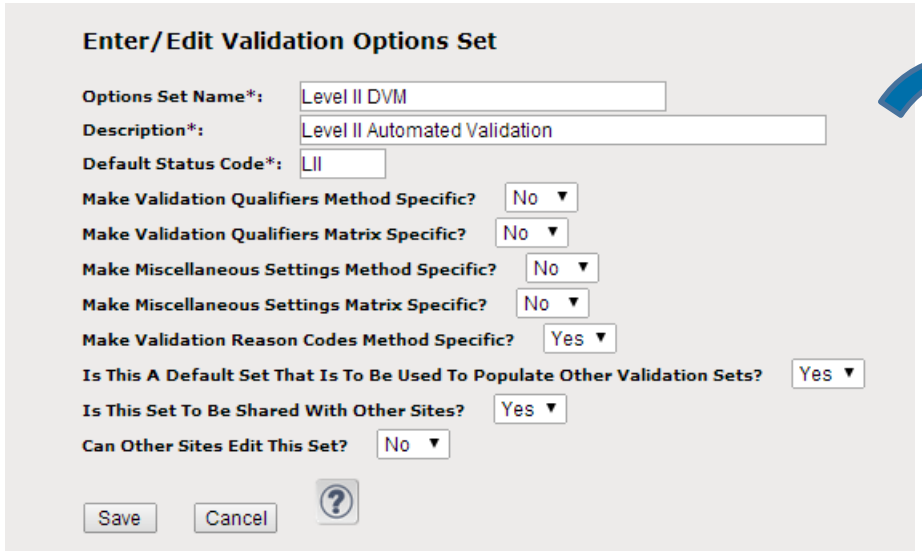
Configure Validation

The Basics

- Locus works with chemist/ validator on setup.
- Establish validation plan and set criteria to QAPP.
- Customize validation qualifiers/reason codes.
- Configure validation controls.

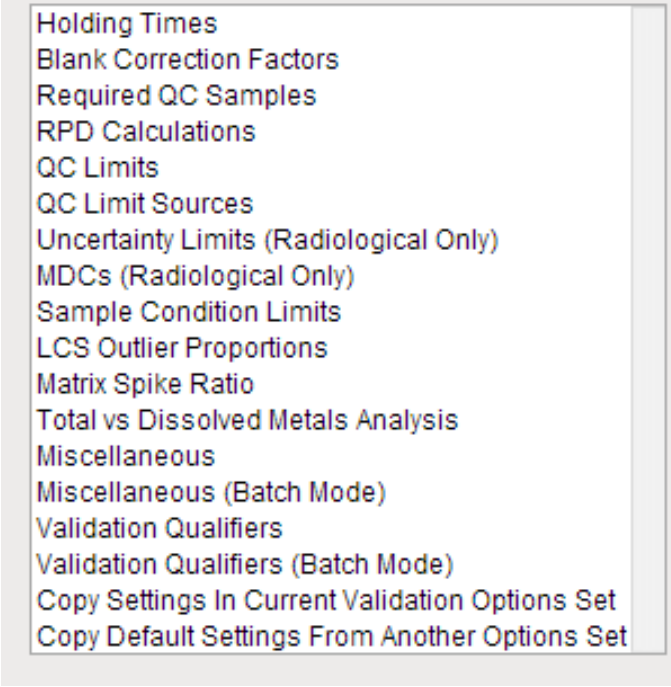
Creating Validation Plan and Criteria

Establish Validation Plan "Option Set"



DVM settings are business rules based on the logic of the validation approach.

Apply Validation Criteria to Plan



Applying Validation Criteria

Create Holding Times

Analytical Method Holding Times

Method Synonym	Parameter	Matrix Category	Preserved Flag	Extraction Hold Time (Max)	Extraction Hold Time (Reject)	Extraction Hold Time Units	Analysis Hold Time (Max)	Analysis Hold Time (Reject)	Analysis Hold Time Units
E300.0	Nitrate (as N)	Aqueous Sample	Y				2	4	Days
E300.0	Nitrite (as N)	Aqueous Sample	Y				2	4	Days
E300.0	Not Specified	Aqueous Sample	Y				28	56	Days

Set Required QC Samples

Required QC Samples

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Method Synonym	Matrix Category	Parameter	QC Sample Type/ Analysis	Edit
NS	Aqueous Sample	Not Specified	LCS/BS	Edit
NS	Aqueous Sample	Not Specified	METHOD BLANK	Edit
SW8260B	Aqueous Sample	Not Specified	SURROGATE	Edit
SW8260B	Aqueous Sample	Not Specified	TRIP BLANK	Edit

Build Qualifiers to Apply

EIM has reason codes for QC scenarios checked during validation.

EIM Validation Reason Code	EIM Validation Reason Desc
SC1	Analysis holding time exceeded.
SC2	Analysis holding time grossly exceeded.
SC3	Extraction holding time exceeded.
SC4	Extraction holding time grossly exceeded.
SC5	pH in sample too high.

Input validation qualifier (if any) DVM should apply for QC scenario.

Specify Validation Qualifiers For QA/QC Problems: Pag

Save Edits	Val Qual	Matrix Category	Detect Status	Problem
☑	J	A	Y	Analysis holding time exceeded.
☑	R	A	Y	Analysis holding time grossly exceeded.
☑	J	A	Y	Extraction holding time exceeded.
☑	R	A	Y	Extraction holding time grossly exceeded.

Save Return

Custom Setup Options

Apply optional special handling of certain QC situations by DVM.

Enter/Edit Miscellaneous Validation Options

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Matrix Category	Validation Option	Option Value
A	Blank Correction When Result Less Then Reporting Limit	Set result equal to detection limit when parameter found in any blank.
A	Diluted Surrogate Results	Do not flag any diluted surrogate analysis with a recovery of 0.

Use the fields below to enter new records or replace or delete existing ones.

Matrix Category*: Aqueous Sample

Select A Setting*:

- Blank Correction When Result Less Then Reporting Limit
- Diluted Matrix Spikes
- Diluted Surrogate Results
- Lab Duplicate Qualification Scope
- Matrix Spike Qualification Scope
- Processing Of Surrogate Exceedances
- Reporting Of Blank Spike Sample Results
- Reporting Of Laboratory Control Sample Results
- Results of Laboratory Control Samples and Duplicates Evaluated Together
- Results of Matrix and Analytical/Post-Digestion Spikes

Select A Value For This Setting

- No Selection
- Results of Matrix Spike Used To Qualify All Samples In Batch
- Results of Matrix Spike Used To Qualify Spiked Sample Only

Save | Batch Delete Mode | Return

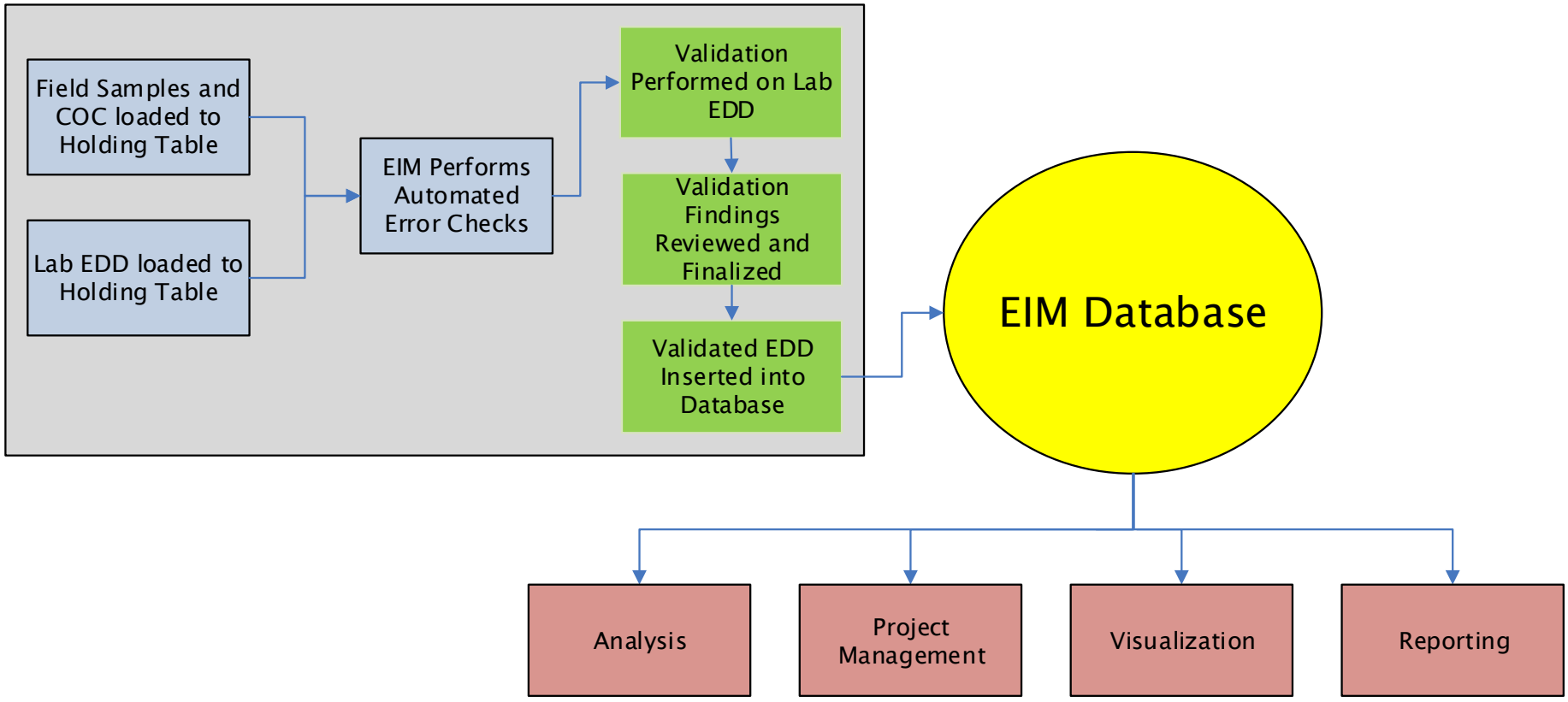
Running Validation

- Run validation checks.
- Review data outliers.
- Review auto-applied validation findings.
- Add validation findings from offline (manual) components.
- Download data reports on findings/QC issues.

The DVM steps up to support the validation process…

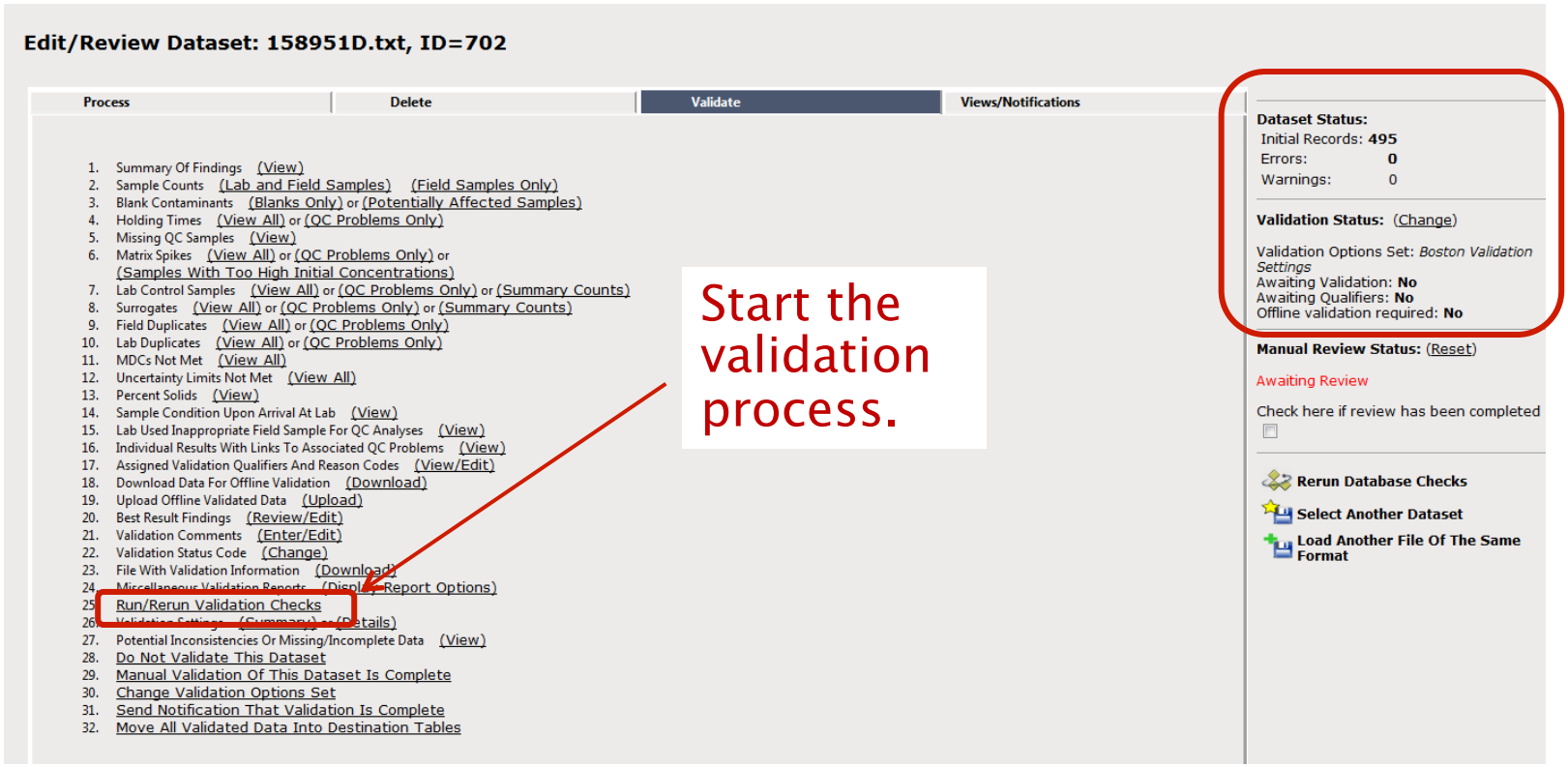
Where Does DVM Fit in EIM?

EIM's Holding Table ("Quarantine Zone")



Starting Validation

Support staff can prep EDD and start validation checks, then hand off to validator.



Snapshot of Validation Outcome

Field Results With One Or More Reason Codes

- Field Results With One Or More Reason Codes
- Blank Contaminants (Affected Samples)
- Holding Times
- Missing QC Samples
- MS/MSD Recoveries
- MS/MSD Samples With Too High Initial Concentrations
- LCS/LCSD Recoveries
- Surrogate Recoveries
- Field Duplicates
- Lab Duplicates

Fixed reports show different groupings of validation findings and QC outcomes.

Select A Category: Field Results With One Or More Reason Codes

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Lab Sample ID	Field Sample ID	Analytical Method	Analy Type Code	Dil Factor	Parameter	Parameter Code	Lab Result	Lab Detection Limit	Units	Lab Qualifier	Val Qualifier	Val Reason Codes	Detect Flag	Use Flag
4272039	SJ-0018	SW-846 8260B	INIT	1	1,1,1-Trichloroethane	71-55-6	5	5	ug/l	U	UJ	MS1	N	Y
4272039	SJ-0018	SW-846 8260B	INIT	1	Trichloroethene	79-01-6	5	5	ug/l	U	UJ	MS1	N	Y
4272040	SJ-0019	CALUFT-DRO/SW-846 8015B mod.	INIT	100	TPH - DRO CA LUFT (Waters)	PHCD	66000	10000	ug/l			SU2	Y	Y
4272040	SJ-0019	SW-846 8260B	INIT	25	1,1,1-Trichloroethane	71-55-6	130	130	ug/l	U	UJ	MS1	N	Y
4272040	SJ-0019	SW-846 8260B	INIT	25	Trichloroethene	79-01-6	130	130	ug/l	U	UJ	MS1	N	Y
4272040	SJ-0019	SW-846 8270C	INIT	5	7,12-Dimethylbenz[a]anthracene	57-97-6	53	53	ug/l	U	U	LC2	N	Y
4272041	SJ-0019	SW-846 6010B	INIT	10	Zinc	7440-66-6	0.0642	0.2	mg/l	J	J	BL4	Y	Y
4272042	SJ-0020	CALUFT-DRO/SW-846 8015B mod.	INIT	10	TPH - DRO CA LUFT (Waters)	PHCD	6800	980	ug/l		J	SU2	Y	Y
4272042	SJ-0020	SW-846 8260B	INIT	1	1,1,1-Trichloroethane	71-55-6	5	5	ug/l	U	UJ	MS1	N	Y
4272042	SJ-0020	SW-846 8260B	INIT	1	Trichloroethene	79-01-6	5	5	ug/l	U	UJ	MS1	N	Y
4272042	SJ-0020	SW-846 8270C	INIT	1	1-Methylnaphthalene	90-12-0	11	11	ug/l	U	R	SC4	N	N
4272042	SJ-0020	SW-846 8270C	INIT	1	2,4-Dimethylphenol	105-67-9	11	11	ug/l	U	R	SC4	N	N
4272042	SJ-0020	SW-846 8270C	INIT	1	2-Methylnaphthalene	91-57-6	11	11	ug/l	U	R	SC4	N	N
4272042	SJ-0020	SW-846 8270C	INIT	1	2-Methylphenol	95-48-7	11	11	ug/l	U	R	SC4	N	N
4272042	SJ-0020	SW-846 8270C	INIT	1	4-Methylphenol	106-44-5	11	11	ug/l	U	R	SC4	N	N
4272042	SJ-0020	SW-846 8270C	INIT	1	7,12-Dimethylbenz[a]anthracene	57-97-6	11	11	ug/l	U	R	SC4	N	N
4272042	SJ-0020	SW-846 8270C	INIT	1	Acetophenone	98-86-2	11	11	ug/l	U	R	SC4	N	N
4272042	SJ-0020	SW-846 8270C	INIT	1	bis(2-Ethylhexyl)phthalate	117-81-7	11	11	ug/l	U	R	SC4	N	N
4272042	SJ-0020	SW-846 8270C	INIT	1	Butylbenzylphthalate	85-68-7	11	11	ug/l	U	R	SC4	N	N
4272042	SJ-0020	SW-846 8270C	INIT	1	Di-n-butylphthalate	84-74-2	11	11	ug/l	U	R	SC4	N	N

Reason Code	Description
BL4	Parameter in blank below CRQL.
LC2	LCS/LCSD recovery below lower acceptance limit.
MS1	MS/MSD recovery below lower limit.
SC4	Extraction holding time grossly exceeded.
SU2	Surrogate recovery below lower acceptance limit.

Locus TECHNOLOGIES

Surrogate Recovery Reports

Select A Category: Surrogate Recoveries

Field Sample ID	Lab Sample ID	CALUFT-DRO/SW-846 8015B mod.	CALUFT/SW-846 8015B modified	SW-846 8260B	SW-846 8270C	SW-846 8310
	134WALCS				0/6	
	134WALCSD				0/6	
	134WCLCS					0/2
	134WCLCSD					0/2
	134WFLCS				0/6	
	134WFLCSD				0/6	
SJ-0015	4271232		0/1	0/4		
SJ-0016	4271233	0/2	0/1	0/4	0/12	0/2
SJ-0017	4271235	0/2	0/1	0/4	5/12	0/2
	4271878			0/4		
	BLK5550B		0/1			
	LCDW11			0/4		

Quick overviews of surrogate counts and outliers with hyperlinks to outlier records.

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Field Sample ID	Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Dilution Factor	Spike Recovery	Upper QC Limit	Lower QC Limit	Recvry Rejection Limit	Surrogate Recvry Flag
SJ-0017	4271235	SW-846 8270C	2,4,6-Tribromophenol	04134WAF026	05-14-2004	1	6	142	45		OUT
SJ-0017	4271235	SW-846 8270C	2,4,6-Tribromophenol	04134WAA026	05-20-2004	1	6	142	45		OUT
SJ-0017	4271235	SW-846 8270C	2-Fluorophenol	04134WAF026	05-14-2004	1	3	94	23		OUT
SJ-0017	4271235	SW-846 8270C	2-Fluorophenol	04134WAA026	05-20-2004	1	2	94	23		OUT
SJ-0017	4271235	SW-846 8270C	Phenol-d6	04134WAA026	05-20-2004	1	2	80	10		OUT

Field Duplicates and Required QC

Field duplicate pair RPDs.

Field Duplicates

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Field Sample ID	Field DuplicateID	Analytical Method	Parameter Name	Sample Matrix	Lab Result	FD Result	Lab Detection Limit	FD Lab Detection Limit	Lab Units	Detect Flag	FD Detect Flag	RPD	RPD Limit	RPD Flag	Detection Limit Multiple	Alt. Control Limit
SJ-0006	SJ-0009	CALUFT-DRO/SW-846 8015B mod.	TPH - DRO CA LUFT (Waters)	WATER	51000	33	9300	94	ug/l	Y	Y	199.741			1	1
SJ-0006	SJ-0009	CALUFT-DRO/SW-846 8015B mod.	TPH-DRO CALUFT(Water) w/Si Gel	WATER	43000	94	9300	94	ug/l	Y	N	199.127			1	1
SJ-0006	SJ-0009	CALUFT/SW-846 8015B modified	TPH-GRO (CA LUFT)	WATER	2.6	0.05	0.05	0.05	mg/l	Y	N	192.453			1	1
SJ-0006	SJ-0009	EPA 376.2 modified	Sulfide	WATER	0.1	0.1	0.1	0.1	mg/l	N	N				1	1
SJ-0006	SJ-0009	SW-846 6010B	Arsenic	WATER	0.0201	0.0055	0.01	0.01	mg/l	Y	Y	114.062			1	1
SJ-0006	SJ-0009	SW-846 6010B	Barium	WATER	0.844	0.184	0.005	0.005	mg/l	Y	Y	128.405			1	1
SJ-0006	SJ-0009	SW-846 6010B	Cadmium	WATER	0.005	0.005	0.005	0.005	mg/l	N	N				1	1
SJ-0006	SJ-0009	SW-846 6010B	Chromium	WATER	0.009	0.005	0.005	0.005	mg/l	Y	N	57.1429			1	1
SJ-0006	SJ-0009	SW-846 6010B	Cobalt	WATER	0.0019	0.0213	0.005	0.005	mg/l	Y	Y	167.241			1	1
SJ-0006	SJ-0009	SW-846 6010B	Copper	WATER	0.01	0.01	0.01	0.01	mg/l	N	N				1	1
SJ-0006	SJ-0009	SW-846 6010B	Selenium	WATER	0.01	0.01	0.01	0.01	mg/l	N	N				1	1
SJ-0006	SJ-0009	SW-846 6010B	Silver	WATER	0.005	0.005	0.005	0.005	mg/l	N	N				1	1
SJ-0006	SJ-0009	SW-846 6010B	Vanadium	WATER	0.0362	0.005	0.005	0.005	mg/l	Y	N	151.456			1	1

VOC results missing a trip blank sample.

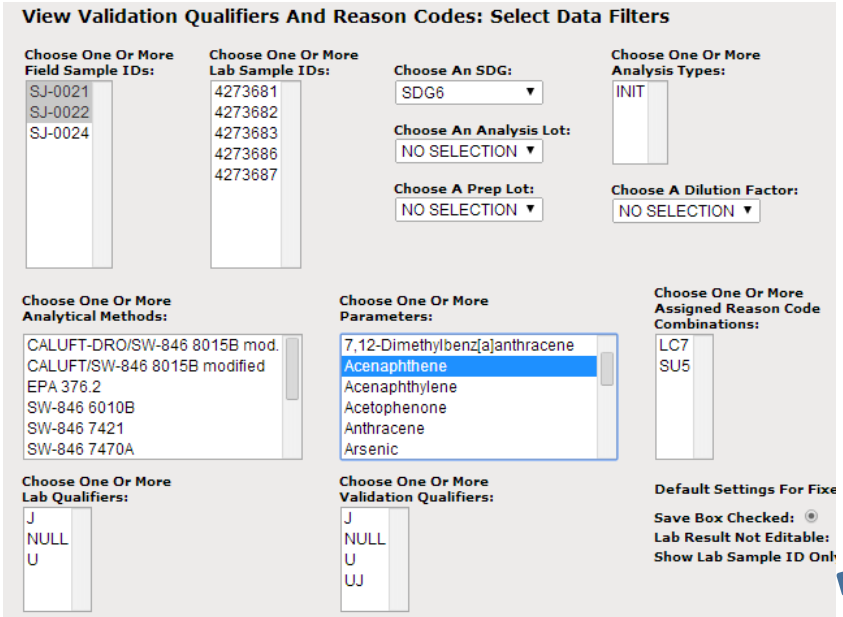
Data For Selected Option:

Page 1 of 1 Rows 5 HTML

Lab Sample ID	Field Sample ID	Missing QC Sample	Analytical Method	Parameter Name	Lab Result	Lab Qualifier	Units	Val Qlfr	Val Reason Codes
X96584	SJ-151	TRIP BLANK	SW-846 8260B	cis-1,2-dichloroethene	7.1		ug/l		MQ1
X96584	SJ-151	TRIP BLANK	SW-846 8260B	trichloroethene	29		ug/l		MQ1
X96585	SJ-152	TRIP BLANK	SW-846 8260B	trichloroethene	8.8		ug/l		MQ1
X96586	SJ-153	TRIP BLANK	SW-846 8260B	cis-1,2-dichloroethene	1.3		ug/l		MQ1
X96586	SJ-153	TRIP BLANK	SW-846 8260B	trichloroethene	1.6		ug/l		MQ1

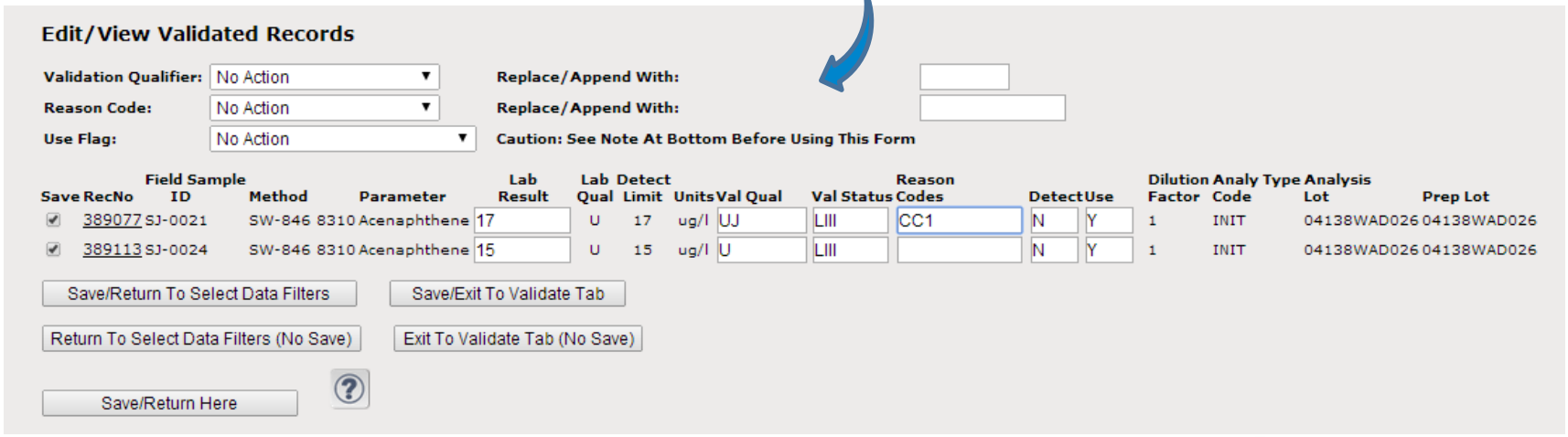
Locus TECHNOLOGIES

Review, Edit, or Add Findings



Review automated validation finding using filter criteria to narrow down dataset.

Change auto-applied findings or add in qualifiers from offline validation inputs like calibration or raw data review.



Document Entire Review Process

Handy to add supporting documentation, including verification (e.g., Form 1 review) and Level III/IV offline review or professional judgment applied to findings.

Internal Standard Area/Retention Time Comments:	
Tuning/Mass Calibration Comments:	BFB Tune check met frequency and mass abundance criteria for each 12 hour period of sample analysis.
Initial Calibration Comments:	ICAL review performed for GCMS1 (Run 80741 11/8/11 8:30), GCMS2 (Run 11894 11/7/11 17:14). RSD < 15% or linear calibration with r2 > 0.9990.
Continuing Calibration Comments:	GCMS2 11/8/11 CCV bromomethane 35% - J/UJ qualified associated bromomethane results. GCMS1 CCV met acceptance criteria.

Data Quality Report Tables

Quickly produce downloadable tables to communicate/report validation outcome.

Include	Report Name	Description
☑	Holding Table Data Dump With Validation Fields	Print all fields in EDD plus the following: Use Flag, Validation Reason Codes, Validation Qualifier, Validated By, and Validated Date.
☑	Print All Detects	Print data for detected analytes only.
☑	Print All Detects and Nondetects With QC Issues	Print data for all detects and any analysis with a validation issue.
☐	Print All Detects and Nondetects With QC Issues: Useable Results Only	Same as Print All Detects and Nondetects With QC Issues except limited to results with a Use Flag of Y.
☑	Print All Flagged Results	Print data for any analysis with a validation issue.
☑	Print All Rejected Results	Print data for all rejected analyses.
☑	Print Analyses With Both Filtered and Unfiltered Results	Print data side-by-side for those analyses which have both a filtered and an unfiltered result.
☑	Print Field Duplicate Results	Print data side-by-side for those analyses which have an analysis for both a regular and a field duplicate sample.
☑	Print Field Samples, Methods, and Their Associated Field QC Samples	Show the Sample IDs of the Trip Blanks, Field Blanks, Equipment Blanks, and Field Duplicates associated with each regular sample. Include the SDG, analytical method, Location ID, and sample date in each record.

Example percent completeness report.

Selected Validation Report:

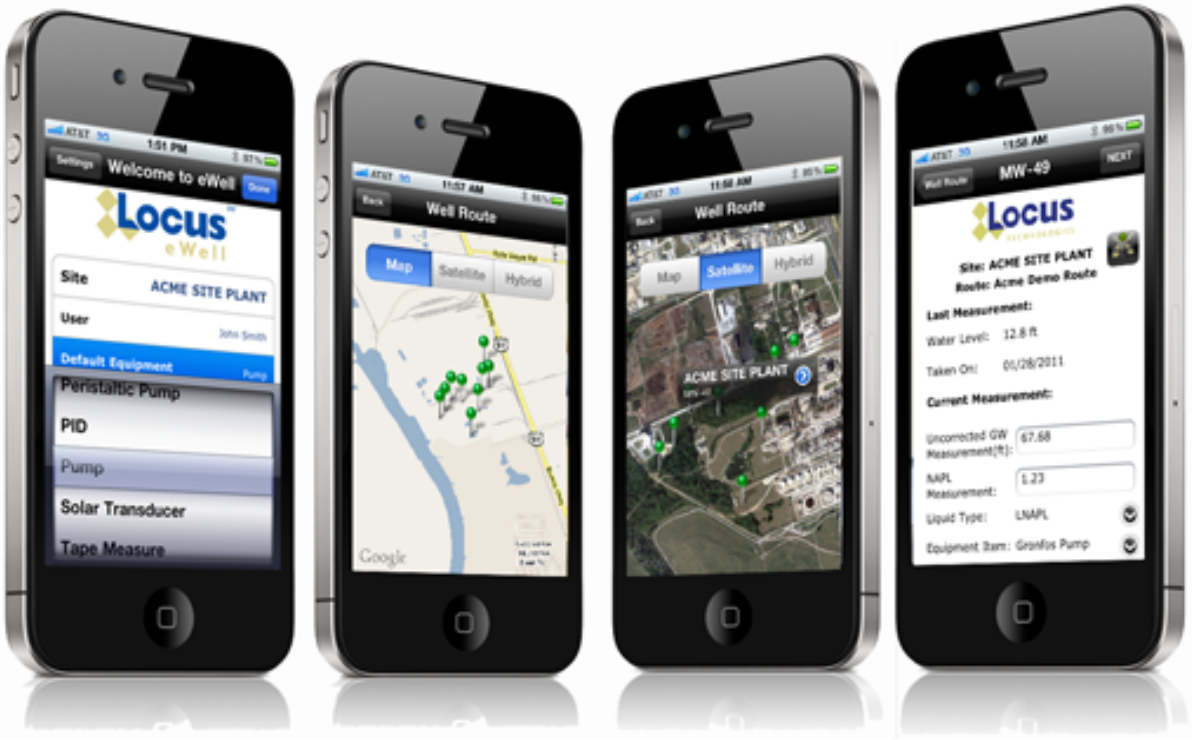
Lab Matrix	Parameter Class	Analytical Method	Leached Method	Total Unique Results	Fully Rejected Results	Difference	Percent Complete
WATER		CALUFT-DRO/SW-846 8015B mod.		24	0	24	100.00
WATER		CALUFT/SW-846 8015B modified		14	0	14	100.00
WATER		EPA 376.2		7	0	7	100.00
WATER		SW-846 6010B		70	0	70	100.00
WATER		SW-846 7421		7	0	7	100.00
WATER		SW-846 7470A		7	0	7	100.00
WATER		SW-846 7521		7	0	7	100.00
WATER		SW-846 8260B		91	0	91	100.00

Locus TECHNOLOGIES

Takeaways….

- EIM automates what can be automated.
- Once configured, DVM is fast!
- Reduces costs of the overall process.
- Catch errors earlier in process before data are finalized.
- Validator focus on critical quality elements.

EIM customer estimated $1.7 million cost savings from EIM DVM: 3,948 EDDs from 2/1/2012 to 01/01/2014.



If you are interested in learning further about EIM please contact us at:

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