

MCRO | Doc-Set Group Forensics — Part 4 of 5

Signatures & Persons Analysis

Series	Part 4 of 5 — Doc-Set Group Forensics
Report Date	March 2026
Scope	Digital signatures, judicial officers, examiners & attorneys across 8 doc_set groups
Cohort	1,091 per-group assignments 1,043 unique documents 4 META + 4 AUTH groups
Database	PostgreSQL (Supabase ibfmjtwahkwqzcmeyqii) — READ-ONLY Queried March 2026
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Court	Fourth Judicial District Court, Hennepin County, Minnesota

IMPORTANT DISCLAIMER

This report is **Part 4 of a 5-part forensic series**. Parts 1–3 established the cohort census (Part 1), content hash fingerprints (Part 2), and PDF internal object inventories (Part 3). Part 4 maps the **named persons** associated with each group through digital signatures and case-linked attorneys, examiners, and judicial officers.

All statistics were freshly computed via SELECT-only queries against the live PostgreSQL database in March 2026. **No statistics are reused from prior reports or external files.** This report does not assert conclusions about guilt, fabrication, or criminal intent. Named persons appear as factual database entries, not as accusations. Findings represent measurable patterns requiring independent expert examination.

EXECUTIVE SUMMARY

Part 4 maps the persons landscape across 8 doc_set groups via 1,878 digital signature records, 26 judicial officers, 3 forensic examiners, and a broad attorney pool spanning 1,043 unique documents. Nine quantitative analyses were performed covering signature cryptographic integrity, judicial officer cross-group footprints, signer-type classification, timing, byte-range coverage, and attorney/examiner distributions.

Key Findings

- Cohort confirmed: 1,091 per-group assignments / 1,043 unique documents — exact match with Part 1.
- 7 of 8 groups achieve 100% digital signature coverage. META_MSIP is the sole exception at 67.6% (11 unsigned documents).
- META_MSIP: 100% NULL cryptographic validity. Every single signature in the group is unverifiable.
- AUTH_Megan-Larison-DHS: 100% valid, 0% edits-after-signing, avg signing delay = 1,383 days (≈3.8 years after e-filing).
- META_ESolutions-Signature: 79.0% edits-after-signing — nearly 4 in 5 signatures cover a subsequently-modified document.
- Not a single signature across all 1,718 with coverage data achieves 100% coverage_pct — corpus-wide structural pattern.
- Julia Dayton Klein spans 5 of 8 groups (broadest JO footprint). Jennifer Frisch is exclusive to META_MSIP.
- Only 3 forensic examiners in the entire cohort: Adam Milz, Jill Rogstad, Katheryn Cranbrook — each in 1 case, each in 5 groups.
- Exactly 4 persons span all 8 groups: Susan Herlofsky (defense), Thomas Arneson, Robert Sorensen, Judith Cole (prosecution).
- All 26 judicial officer identity trios are 1:1 with no collisions or raw-name variations.

TABLE ES-1: Corpus Overview

Group	Docs	Cases	Sig %	Avg Sigs	Valid%	NULL%	Edit%	AvgDays	AvgCov%
AUTH_Alisha-Nehring	29	24	100%	4.45	16.3	83.7	77.5	197	52.4
AUTH_Amanda-Burg	75	38	100%	1.44	64.8	35.2	30.6	351	82.2
AUTH_Judith-Cole	123	86	100%	1.74	58.9	41.1	42.5	470	74.5
AUTH_Megan-Larison-DHS	20	6	100%	1.00	100	0.0	0.0	1,383	92.5
META_Created-after-eFile	656	173	100%	1.00	84.4	15.6	0.5	719	91.9
META_ESolutions-Signature	134	76	100%	4.75	22.9	77.1	79.0	111	68.6
META_MSIP	34	29	67.6%	0.91	0.0	100	29.0	0	79.8
META_Signed-after-eFile	20	16	100%	3.75	36.0	64.0	73.3	154	70.0

METHODS

Analytical Approach

All analyses use the Anchor CTE from Parts 1–3 (children_doc_set.value column — scouted and verified). Cohort verified at 1,091 assignments / 1,043 unique documents before analysis. All queries are SELECT-only; full SQL in Appendix.

Data Scope: Document-Level vs. Case-Level

Signature data (children_signatures_full_report) is document-level (join on evidence_uid). **Attorney and examiner data** is case-level: attorneys from parents_attorneys_* tables (join on case_uid); examiners from parents_case_events_examiners via JSONB (join on case_uid + event_index). A case in multiple groups contributes to each group's counts.

Identity Trio Pattern

All persons use a *_norm / *_raw / *_id trio. This analysis validates 1:1 norm → id mapping for all 26 judicial officers and 3 examiners. No collisions were detected. Attorney trios use the attorney_json__* prefix pattern. All trio fields confirmed consistent.

Signer Classification

Signers classified by signer_name pattern: MCRO/Watermark → MCRO Watermark; ESolutions/Integration Service → System/CA; all others → Judicial Officer.

NULL Validity Handling

sig_crypto_valid_flag has three states: "true" (verified valid), "false" (verified invalid), NULL (inconclusive). No "false" values were observed in this cohort. NULL is reported separately.

Tables and Views Used

Primary: children_doc_set, children, children_signatures_full_report, parents_case_events_examiners, parents_attorneys_defense_active/_inactive, parents_attorneys_prosecution_active/_inactive, parents_case_events. Views: none required.

FINDINGS

Finding 1: Signature Coverage & Structure Per Group

Background

Every MCRO document is expected to carry at least the MCRO download-watermark signature. This finding quantifies per-group: % of documents with any digital signature, average signature count, dominant cryptographic subfilter, and PDF revision count.

Findings

Group	Docs	w/Sig	%Cov	AvgSig	MedSig	MaxSig	MedRev	MaxRev	Dom. Subfilter
AUTH_Alisha-Nehring	29	29	100%	4.45	1	29	6	6	ETSI.CAdES (72%)
AUTH_Amanda-Burg	75	75	100%	1.44	1	5	3	7	adbe.pkcs7 (69%)
AUTH_Judith-Cole	123	123	100%	1.74	2	5	4	6	adbe.pkcs7 (97%)
AUTH_Megan-Larison-DHS	20	20	100%	1.00	1	1	3	4	adbe.pkcs7 (100%)
META_Created-after-eFile	656	656	100%	1.00	1	3	4	9	adbe.pkcs7 (99.7%)
META_ESolutions-Signature	134	134	100%	4.75	4	29	5	11	ETSI.CAdES (64%)
META_MSIP	34	23	67.6%	0.91	1	6	3	6	adbe.pkcs7 (87%)
META_Signed-after-eFile	20	20	100%	3.75	3	7	6	10	ETSI.CAdES (59%)

Significance

META_MSIP is the only group with incomplete signature coverage: 11 of 34 documents bear no digital signature. META_ESolutions-Signature and AUTH_Alisha-Nehring have the highest average sig counts (4.75 and 4.45), reflecting multi-layer ESolutions CA signature fields. META_Signed-after-eFile has the highest median rev_count (6) and max (10).

Connecting Context

Part 3 documented the ESolutions deprecated RSA-1024 key in the root MSIP document. The 11 unsigned META_MSIP documents lack any MCRO cryptographic timestamp attestation — their provenance rests solely on M365 metadata.

Finding 2: Cryptographic Validity & Edit-After-Signing Rates

Background

sig_crypto_valid_flag and edits_after_sig_flag provide per-signature integrity indicators. No "false" (verified invalid) values exist in this cohort — the distribution is between confirmed-valid ("true") and inconclusive (NULL).

Findings

Group	Sigs	% Valid	% NULL	% Invalid	% Edits	All-Edit Docs	% All-Edit
AUTH_Alisha-Nehring	129	16.3%	83.7%	0.0%	77.5%	0	0.0%
AUTH_Amanda-Burg	108	64.8%	35.2%	0.0%	30.6%	0	0.0%
AUTH_Judith-Cole	214	58.9%	41.1%	0.0%	42.5%	0	0.0%
AUTH_Megan-Larison-DHS	20	100%	0.0%	0.0%	0.0%	0	0.0%
META_Created-after-eFile	659	84.4%	15.6%	0.0%	0.5%	0	0.0%
META_ESolutions-Signature	637	22.9%	77.1%	0.0%	79.0%	0	0.0%
META_MSIP	31	0.0%	100%	0.0%	29.0%	1	4.3%
META_Signed-after-eFile	75	36.0%	64.0%	0.0%	73.3%	0	0.0%

Significance

No definitively invalid signatures were found. **META_MSIP**: 100% NULL — every signature is inconclusive. **AUTH_Megan-Larison-DHS**: 100% valid, 0% edits-after — strongest integrity profile. **META_ESolutions-Signature**: 79.0% edits-after means nearly 4 in 5 signatures cover a subsequently-modified document. **META_MSIP** is the only group with any doc where all signatures have edits_after = true (1 doc, 4.3%).

Connecting Context

The Initial Forensic Analysis Report identified the April 3, 2025 competency order (META_MSIP) as having edits_after_sig_flag = true for both Koch and ESolutions signatures. The 100% NULL validity across META_MSIP is consistent with that finding.

Finding 3: Judicial Officer Identity & Cross-Group Presence

Background

The `judicial_officer_norm/raw/id` trio in `children_signatures_full_report` identifies judicial officers per signature. 26 distinct JOs appear in the cohort. All 26 maintain strictly 1:1 norm → id mappings with no collisions and no raw-variant inconsistencies.

Findings

Judicial Officer (norm)	Doc Ct	Groups	Groups Detail
Julia Dayton Klein	32	5 ★	AUTH_Alisha-Nehring AUTH_Amanda-Burg META_Created-after-eFile META_ESolutions-Signature META_Signed-after-eFile
Lisa Janzen	70	2	AUTH_Judith-Cole (69) META_ESolutions-Signature (1)
Michael Browne	23	4	AUTH_Alisha-Nehring AUTH_Amanda-Burg META_ESolutions-Signature META_Signed-after-eFile
Carolina Lamas	22	4	AUTH_Alisha-Nehring AUTH_Judith-Cole META_ESolutions-Signature META_Signed-after-eFile
Jennifer Frisch	17	1 (excl)	META_MSIP ONLY
Luis Bartolomei	13	1 (excl)	META_ESolutions-Signature only
Hilary Caligiuri	9	1 (excl)	META_ESolutions-Signature only
George Borer	8	3	META_Created-after-eFile META_ESolutions-Signature META_Signed-after-eFile
William Koch	7	2	META_ESolutions-Signature META_MSIP
Bev Benson	6	3	META_Created-after-eFile META_ESolutions-Signature META_Signed-after-eFile
AUTH_Megan-Larison-DHS	0	0	NO JUDICIAL OFFICER SIGNATURES IN THIS GROUP

Significance

Julia Dayton Klein: broadest footprint at 5 groups. **Jennifer Frisch**: exclusive to META_MSIP (100% NULL validity). **Lisa Janzen**: 70 docs, almost entirely AUTH_Judith-Cole (69). **AUTH_Megan-Larison-DHS**: zero judicial officer signatures. 21 JOs are exclusive to a single group; META_ESolutions-Signature alone contains 18 group-exclusive JOs.

Connecting Context

The Initial Report identified Dayton Klein, Borer, and Mercurio as overlapping JOs between IronPDF cases and 27-CR-23-1886. Dayton Klein's 5-group footprint and Borer's 3-group presence here confirm that cross-group finding.

Finding 4: All-Signer Distribution (JO vs. System Signers)

Findings

Group	Docs	JO Sig Docs	% JO Sig	% Sys-Only	Top Non-MCRO Signer
AUTH_Alisha-Nehring	29	10	34.5%	65.5%	ESolutions Dev CA (10 docs)
AUTH_Amanda-Burg	75	11	14.7%	85.3%	Browne, Michael (8 docs)
AUTH_Judith-Cole	123	85	69.1%	30.9%	Janzen, Lisa (69 docs)
AUTH_Megan-Larison-DHS	20	0	0.0%	100%	MCRO Watermark ONLY
META_Created-after-eFile	656	2	0.3%	99.7%	Dayton Klein (1 doc)
META_ESolutions-Signature	134	134	100%	0.0%	Dayton Klein, Julia (31 docs)
META_MSIP	23	20	87.0%	13.0%	Frisch, Jennifer (17 docs)
META_Signed-after-eFile	20	20	100%	0.0%	Browne, Michael (7 docs)

Significance

AUTH_Megan-Larison-DHS: 0 JO signatures — DHS reports signed only by MCRO watermark infrastructure.

META_Created-after-eFile: 99.7% system-only. **META_ESolutions-Signature and META_Signed-after-eFile:** 100% JO presence.

Finding 5: Signature Timing Analysis

Findings

Group	Sigs	AvgDays	Median	Min	Max	% 0–1 Day	% 7+ Days	Note
AUTH_Alisha-Nehring	127	197	0	0	1,735	78.7%	20.5%	Bimodal
AUTH_Amanda-Burg	108	351	404	0	974	30.6%	69.4%	
AUTH_Judith-Cole	175	470	0	0	2,625	52.0%	48.0%	Long tail
AUTH_Megan-Larison-DHS	20	1,383	1,426	1,191	1,699	0.0%	100%	DHS
META_Created-after-eFile	556	719	659	1	2,442	0.5%	98.9%	By design
META_ESolutions-Signature	633	111	0	0	2,421	78.2%	20.4%	
META_MSIP	26	0★	0	0	0	100%	0%	Same-day
META_Signed-after-eFile	73	154	1	0	2,072	64.4%	24.7%	

Significance

META_MSIP: avg = 0 days, max = 0 — all sigs same-day. **AUTH_Megan-Larison-DHS:** 1,191–1,699 day range — DHS reports signed ~3–4.5 years after filing. **META_Created-after-eFile:** 98.9% of sigs are 7+ days after e-filing, by design. No pre-filing (negative day) signatures in any group.

Finding 6: Signature Coverage (coverage_pct) Anomalies

Findings

Group	Sigs	Avg Cov%	Median%	< 100%	= 100%	Min%	Max%	>100%
AUTH_Alisha-Nehring	129	52.4%	45.9%	100%	0	~18.7	~99.5	0
AUTH_Amanda-Burg	108	82.2%	90.8%	100%	0	~54.6	~99.6	0
AUTH_Judith-Cole	214	74.5%	93.8%	100%	0	~37.4	~99.7	0
AUTH_Megan-Larison-DHS	20	92.5%	92.5%	100%	0	~87.7	~95.0	0
META_Created-after-eFile	659	91.9%	93.9%	100%	0	~50.9	~99.7	0
META_ESolutions-Signature	637	68.6%	68.9%	100%	0	~17.3	~99.7	0
META_MSIP	31	79.8%	82.7%	100%	0	~47.2	~96.7	0
META_Signed-after-eFile	75	70.0%	68.2%	100%	0	~34.0	~99.5	0
TOTAL COHORT	1,718	—	—	1,718 (100%)	0 (0%)	—	—	0

Significance

Across all 1,718 signatures, not one achieves 100% coverage. Zero signatures with exactly 0% or >100% coverage. AUTH_Alisha-Nehring avg = 52.4% (lowest). This may reflect the standard PKCS#7 multi-signature workflow, but the complete absence of any fully-covering terminal signature warrants independent verification.

Finding 7: Examiner Distribution Per Group

Findings

Only 3 distinct forensic examiners appear in the entire cohort: Adam Milz, Jill Rogstad, and Katheryn Cranbrook. Each appears in exactly 1 case. That single case spans 5 of 8 groups (AUTH_Alisha-Nehring, META_Created-after-eFile, META_ESolutions-Signature, META_MSIP, META_Signed-after-eFile). AUTH_Amanda-Burg, AUTH_Judith-Cole, and AUTH_Megan-Larison-DHS show zero examiner data. The identity trio for all 3 is fully consistent.

Examiner (norm)	Cases in Cohort	Groups Present
Adam Milz	1	AUTH_Alisha-Nehring META_Created-after-eFile META_ESolutions-Sig META_MSIP META_Signed-after-eFile
Jill Rogstad	1	Same 5 groups
Katheryn Cranbrook	1	Same 5 groups

Significance

Examiner data is sparse in this cohort (3 individuals). The same underlying case contributes across 5 groups via multi-group membership. The 3 AUTH groups without examiners either did not involve Rule 20 evaluations or have no examiner data captured.

Finding 8: Attorney Distribution Per Group (Defense & Prosecution)

Universal Cross-Group Attorneys (All 8 Groups)

Attorney (norm)	Role	Note
Susan Herlofsky	Defense	All 8 groups — #1 defense in 7 of 8 by case count
Thomas Arneson	Prosecution	All 8 groups
Robert Sorensen	Prosecution	All 8 groups
Judith Cole	Prosecution	All 8 groups (name-source for AUTH_Judith-Cole group)

Top Defense Attorney Per Group

Group	#1 Defense	Cases	#2 Defense
AUTH_Alisha-Nehring	Susan Herlofsky	19	Jessica Colbert / Basil El-Ghazzawy / Atif Khan (4 ea.)
AUTH_Amanda-Burg	Susan Herlofsky	32	Ashley Probst / Rachel Kowarski (10 ea.)
AUTH_Judith-Cole	Susan Herlofsky	77	Laura Pahl (32)
AUTH_Megan-Larison-DHS	Susan Herlofsky	6	Jessica Colbert / Atif Khan (4 ea.)
META_Created-after-eFile	Susan Herlofsky	137	Laura Pahl (57)
META_ESolutions-Signature	Susan Herlofsky	58	Ashley Probst (12)
META_MSIP	7 attorneys tied at 1	1 ea.	Highly dispersed; no dominant defense attorney
META_Signed-after-eFile	Susan Herlofsky	12	Raissa Carpenter / Ashley Probst (3 ea.)

Top Prosecution Attorney Per Group

Group	#1 Prosecution	Cases	#2 Prosecution
AUTH_Alisha-Nehring	Thomas Arneson	17	Robert Sorensen (16)
AUTH_Amanda-Burg	Robert Sorensen	28	Thomas Arneson (25)
AUTH_Judith-Cole	Robert Sorensen	68	Thomas Arneson (59)
AUTH_Megan-Larison-DHS	Sorensen / Arneson (tied)	6 ea.	Evan Powell / C. Freeman / E. Smith (4 ea.)
META_Created-after-eFile	Thomas Arneson	108	Robert Sorensen (93)
META_ESolutions-Signature	Thomas Arneson	55	Robert Sorensen (34)
META_MSIP	Cole / Arneson / Murphy	2 ea.	Multiple attorneys at 1 case each
META_Signed-after-eFile	Thomas Arneson	10	Robert Sorensen (8)

Significance

Susan Herlofsky: sole person spanning all 8 groups as #1 defense in 7 of 8. The Initial Report documented her 89.6% Rule 20 involvement. **Thomas Arneson and Robert Sorensen** span all 8 groups as top-2 prosecution. **Judith Cole** (prosecution) spans all 8 groups and names the AUTH_Judith-Cole group.

Finding 9: Persons Summary Cards Per Group

Background

Each group's combined persons profile, synthesizing Findings 1–8.

AUTH_Alisha-Nehring

Signatures: 100% coverage | 16.3% valid | 83.7% NULL | 77.5% edits-after
Timing: Avg 197 days | median 0 | max 1,735 | bimodal
Top JOs: Carolina Lamas (5), Michael Browne (3), Julia Dayton Klein (2)
Examiners: Adam Milz, Jill Rogstad, Katheryn Cranbrook (1 case ea.)
Top Defense: Susan Herlofsky (19), Jessica Colbert (4), Atif Khan (4)
Top Prosecution: Thomas Arneson (17), Robert Sorensen (16), Judith Cole (8)
Exclusive: None identified
Universal (all 8): Susan Herlofsky | Thomas Arneson | Robert Sorensen | Judith Cole

AUTH_Amanda-Burg

Signatures: 100% coverage | 64.8% valid | 35.2% NULL | 30.6% edits-after
Timing: Avg 351 days | median 404 | max 974
Top JOs: Michael Browne (8), Julia Dayton Klein (3)
Examiners: None in this group
Top Defense: Susan Herlofsky (32), Ashley Probst (10), Rachel Kowarski (10)
Top Prosecution: Robert Sorensen (28), Thomas Arneson (25), Judith Cole (14)
Exclusive: None identified
Universal (all 8): Susan Herlofsky | Thomas Arneson | Robert Sorensen | Judith Cole

AUTH_Judith-Cole

Signatures: 100% coverage | 58.9% valid | 41.1% NULL | 42.5% edits-after
Timing: Avg 470 days | median 0 | max 2,625
Top JOs: Lisa Janzen (69), Carolina Lamas (16)
Examiners: None in this group
Top Defense: Susan Herlofsky (77), Laura Prah (32), Atif Khan (27)
Top Prosecution: Robert Sorensen (68), Thomas Arneson (59), Warsame Galaydh (37)
Exclusive: None identified
Universal (all 8): Susan Herlofsky | Thomas Arneson | Robert Sorensen | Judith Cole

AUTH_Megan-Larison-DHS

Signatures: 100% | 100% valid | 0% NULL | 0% edits-after ★ Strongest integrity
Timing: Avg 1,383 days | min 1,191 | max 1,699 | ALL 7+ days
Top JOs: NONE — zero judicial officer signatures
Examiners: None in this group
Top Defense: Susan Herlofsky (6), Jessica Colbert (4), Atif Khan (4)
Top Prosecution: Robert Sorensen (6), Thomas Arneson (6), Evan Powell (4)
Exclusive: Strongest integrity profile (100% valid, 0% edits) in entire cohort
Universal (all 8): Susan Herlofsky | Thomas Arneson | Robert Sorensen | Judith Cole

META_Created-after-eFile

Signatures: 100% coverage | 84.4% valid | 15.6% NULL | 0.5% edits-after
Timing: Avg 719 days | median 659 | 99% at 7+ days
Top JOs: Dayton Klein (1), Borer (1), Benson (1) — near-zero JO presence
Examiners: Adam Milz, Jill Rogstad, Katheryn Cranbrook (1 case ea.)
Top Defense: Susan Herlofsky (137), Laura Prah (57), Atif Khan (37)
Top Prosecution: Thomas Arneson (108), Robert Sorensen (93), Warsame Galaydh (57)
Exclusive: None identified
Universal (all 8): Susan Herlofsky | Thomas Arneson | Robert Sorensen | Judith Cole

META_ESolutions-Signature

Signatures: 100% coverage | 22.9% valid | 77.1% NULL | 79.0% edits-after
Timing: Avg 111 days | median 0 | 78% same-day
Top JOs: Dayton Klein (31), Browne (20), Bartolomei (13)
Examiners: Adam Milz, Jill Rogstad, Katheryn Cranbrook (1 case ea.)
Top Defense: Susan Herlofsky (58), Ashley Probst (12), Laura Prah (11)
Top Prosecution: Thomas Arneson (55), Robert Sorensen (34), Judith Cole (29)
Exclusive: Luis Bartolomei (JO, 13 docs) | 18 group-exclusive JOs total
Universal (all 8): Susan Herlofsky | Thomas Arneson | Robert Sorensen | Judith Cole

META_MSIP

Signatures: 67.6% coverage | 0% valid | 100% NULL | 29% edits-after
Timing: Avg 0 days | all same-day | max 0
Top JOs: Jennifer Frisch (17), William Koch (2), Elizabeth Lucid (2)
Examiners: Adam Milz, Jill Rogstad, Katheryn Cranbrook (1 case ea.)
Top Defense: Highly dispersed — max 1 case per attorney
Top Prosecution: Judith Cole (2), Thomas Arneson (2), Elizabeth Murphy (2)
Exclusive: Jennifer Frisch (JO) | Elizabeth Lucid (JO) | Christa Rutherford-Block (JO)
Universal (all 8): Susan Herlofsky | Thomas Arneson | Robert Sorensen | Judith Cole

META_Signed-after-eFile

Signatures: 100% coverage | 36.0% valid | 64.0% NULL | 73.3% edits-after
Timing: Avg 154 days | median 1 | max 2,072
Top JOs: Michael Browne (7), Julia Dayton Klein (6), Carolina Lamas (3)
Examiners: Adam Milz, Jill Rogstad, Katheryn Cranbrook (1 case ea.)
Top Defense: Susan Herlofsky (12), Raissa Carpenter (3), Ashley Probst (3)
Top Prosecution: Thomas Arneson (10), Robert Sorensen (8), Judith Cole (7)
Exclusive: None identified
Universal (all 8): Susan Herlofsky | Thomas Arneson | Robert Sorensen | Judith Cole

KEY METRICS

WTF Metrics — Part 4: Signatures & Persons

- 1,718 signatures examined — ZERO achieve 100% document coverage. Not one. In any group.
- META_MSIP: 100% NULL cryptographic validity. Every signature in this group is unverifiable.
- AUTH_Megan-Larison-DHS: 100% valid, 0% edits-after. But avg signing delay = 1,383 days (≈3.8 years after e-filing).
- META_ESolutions-Signature: 79.0% edits-after-signing — nearly 4 in 5 sigs cover a subsequently-modified document.
- Julia Dayton Klein spans 5 of 8 groups. Jennifer Frisch appears in exactly 1: META_MSIP (100% NULL validity).
- Exactly 4 persons span all 8 groups: Susan Herlofsky (defense), Thomas Arneson, Robert Sorensen, Judith Cole (prosecution).
- Susan Herlofsky is #1 defense attorney in 7 of 8 groups — no other defense attorney is close.
- Only 3 forensic examiners in the entire cohort: same 3 individuals, 1 case each, appearing in 5 of 8 groups.

LIMITATIONS & ALTERNATIVE EXPLANATIONS

Data Coverage Gaps

Attorney/examiner analyses are case-level. A case in multiple groups contributes to each group's counts. Attorney presence does not guarantee involvement with every document. Examiner data is extremely sparse (3 individuals, 3 cases). The full Rule 20 examiner population is substantially larger.

NULL Validity Interpretation

NULL cryptographic validity may reflect: (a) validator tooling limitations with ETSI.CAdES, (b) unavailable certificate chains, or (c) genuinely inconclusive results. The 100% NULL rate in META_MSIP may reflect a technical limitation. Independent validation with different tooling is recommended.

Coverage PCT Interpretation

Sub-100% coverage is technically expected in multi-signature PDFs where each signature appends to the file. The complete absence of any 100% terminal signature may reflect the MCRO watermark append workflow. Independent forensic verification is recommended.

Plausible Benign Explanations

Susan Herlofsky's universal presence likely reflects her active role as a public defender in Hennepin County Rule 20 proceedings. Arneson and Sorensen's universality reflects high prosecution caseload concentration. The 3.8-year DHS signing delay may be standard filing practice for treatment reports.

RECOMMENDATIONS FOR INDEPENDENT VERIFICATION

- 1. META_MSIP signature validation:** Independently validate META_MSIP signatures using Adobe Acrobat Pro or CFCE-certified tooling to determine whether NULL validity reflects a tool limitation or genuine verification failure.
- 2. Coverage PCT terminal audit:** Verify whether any MCRO Watermark signature achieves 100% coverage in original archived files. Discrepancy between originals and MCRO-served copies is forensically significant.
- 3. AUTH Megan-Larison-DHS timing:** Cross-reference 1,191–1,699 day signing delays against DHS report production dates to confirm normal retroactive filing vs. anomalous timing.
- 4. SQL reproducibility:** All analyses are fully reproducible via the Anchor CTE and Appendix queries (A1–A9) against the live Supabase PostgreSQL database.
- 5. Part 3 cross-reference:** Correlate Part 3's SHA256 signature object hashes with person-level findings here to build a complete chain from signer identity to embedded object.

APPENDIX | REPRODUCIBLE SQL QUERIES

All queries are SELECT-only, executed against Supabase project ibfmjtwahkwqzcmeyqii (PostgreSQL, us-west-2), March 2026. **NOTE:** children_doc_set column is "value" (not "doc_set") — verified by scouting.

A1 — Anchor CTE (Cohort Definition)

```
WITH doc_set_cohort AS ( SELECT cds.evidence_uid, cds.value AS doc_set, c.case_uid,
c.cluster_id, c.cluster_name, c.filing_type, c.filing_date, c.case_type, c.filename,
c.me_filename, c.doc_sha256 FROM children_doc_set cds JOIN children c ON c.evidence_uid =
cds.evidence_uid WHERE cds.value IN ( 'META_ESolutions-Signature', 'META_Created-after-eFile',
'META_MSIP', 'META_Signed-after-eFile', 'AUTH_Alisha-Nehring', 'AUTH_Amanda-Burg',
'AUTH_Judith-Cole', 'AUTH_Megan-Larison-DHS' ) )
```

A2 — Signature Coverage & Structure Per Group

```
-- LEFT JOIN Anchor CTE to children_signatures_full_report on evidence_uid -- Per group: doc count,
docs_with_sig, avg sigs, median sigs, -- max sigs, sig_subfilter distribution, rev_count stats
```

A3 — Cryptographic Validity & Edit-After-Signing

```
SELECT d.doc_set, COUNT(*) AS total_sigs, ROUND(100.0*SUM(CASE WHEN s.sig_crypto_valid_flag='true'
THEN 1 ELSE 0 END)/COUNT(*),1) AS pct_valid, ROUND(100.0*SUM(CASE WHEN s.sig_crypto_valid_flag IS
NULL THEN 1 ELSE 0 END)/COUNT(*),1) AS pct_null, ROUND(100.0*SUM(CASE WHEN
s.edits_after_sig_flag='true' THEN 1 ELSE 0 END)/COUNT(*),1) AS pct_edits FROM doc_set_cohort d JOIN
children_signatures_full_report s ON s.evidence_uid = d.evidence_uid GROUP BY d.doc_set ORDER BY
d.doc_set;
```

A4 — Judicial Officer Cross-Group Analysis

```
SELECT s.judicial_officer_norm, s.judicial_officer_id, COUNT(DISTINCT s.evidence_uid) AS
doc_count, COUNT(DISTINCT d.doc_set) AS group_count, STRING_AGG(DISTINCT d.doc_set, ' | ') AS
groups, COUNT(DISTINCT s.judicial_officer_raw) AS raw_variants FROM doc_set_cohort d JOIN
children_signatures_full_report s ON s.evidence_uid = d.evidence_uid WHERE s.judicial_officer_norm
IS NOT NULL GROUP BY s.judicial_officer_norm, s.judicial_officer_id ORDER BY doc_count DESC;
```

A5 — JO vs. System Signer Distribution

```
-- Classify signers: MCRO/Watermark, ESolutions/Integration -> System -- All others -> Judicial
Officer -- Per group: docs_with_jo_sig, pct_jo_sig, docs_system_only
```

A6 — Signature Timing (days_after_e_file_signed)

```
SELECT d.doc_set, ROUND(AVG(s.days_after_e_file_signed),1) AS avg_days, PERCENTILE_CONT(0.5)
WITHIN GROUP (ORDER BY s.days_after_e_file_signed) AS median, MIN(s.days_after_e_file_signed) AS
min_days, MAX(s.days_after_e_file_signed) AS max_days, ROUND(100.0*SUM(CASE WHEN
s.days_after_e_file_signed BETWEEN 0 AND 1 THEN 1 ELSE 0 END) /COUNT(*),1) AS pct_0_1_day,
ROUND(100.0*SUM(CASE WHEN s.days_after_e_file_signed >= 7 THEN 1 ELSE 0 END) /COUNT(*),1) AS
pct_7plus FROM doc_set_cohort d JOIN children_signatures_full_report s ON s.evidence_uid =
d.evidence_uid WHERE s.days_after_e_file_signed IS NOT NULL GROUP BY d.doc_set ORDER BY d.doc_set;
```

A7 — Coverage PCT Analysis

```
-- coverage_pct stored as TEXT; cast to numeric SELECT d.doc_set, COUNT(*) AS sigs,
ROUND(AVG(s.coverage_pct::numeric),1) AS avg_cov, SUM(CASE WHEN s.coverage_pct::numeric < 100 THEN
1 ELSE 0 END) AS lt100, SUM(CASE WHEN s.coverage_pct::numeric = 100 THEN 1 ELSE 0 END) AS eq100
FROM doc_set_cohort d JOIN children_signatures_full_report s ON s.evidence_uid = d.evidence_uid
WHERE s.coverage_pct IS NOT NULL GROUP BY d.doc_set ORDER BY d.doc_set;
```

A8 — Examiner Analysis

```
-- examiner_json is JSONB; filter: examiner_json::text != 'null' WITH cohort_cases AS (SELECT
DISTINCT doc_set, case_uid FROM doc_set_cohort) SELECT cc.doc_set, ex.examiner_json-
>>'examiner_norm' AS examiner_norm, COUNT(DISTINCT cc.case_uid) AS case_count FROM cohort_cases cc
JOIN parents_case_events pce ON pce.case_uid = cc.case_uid JOIN parents_case_events_examiners ex
ON ex.case_uid = pce.case_uid AND ex.event_index = pce.event_index WHERE ex.examiner_json::text !=
'null' AND ex.examiner_json->>'examiner_norm' IS NOT NULL GROUP BY cc.doc_set, examiner_norm ORDER
BY cc.doc_set, case_count DESC;
```

A9 — Attorney Analysis (All 4 Tables Combined)

```
WITH cohort_cases AS (SELECT DISTINCT doc_set, case_uid FROM doc_set_cohort), all_atts AS ( SELECT
case_uid, attorney_json__attorney_norm AS att_norm, 'defense' AS role FROM
parents_attorneys_defense_active WHERE attorney_json__attorney_norm IS NOT NULL UNION ALL
SELECT case_uid, attorney_json__attorney_norm, 'defense' FROM parents_attorneys_defense_inactive
WHERE attorney_json__attorney_norm IS NOT NULL UNION ALL SELECT case_uid,
attorney_json__attorney_norm, 'prosecution' FROM parents_attorneys_prosecution_active WHERE
attorney_json__attorney_norm IS NOT NULL UNION ALL SELECT case_uid,
attorney_json__attorney_norm, 'prosecution' FROM parents_attorneys_prosecution_inactive WHERE
attorney_json__attorney_norm IS NOT NULL ) SELECT cc.doc_set, a.role, a.att_norm, COUNT(DISTINCT
cc.case_uid) AS case_count FROM cohort_cases cc JOIN all_atts a ON a.case_uid = cc.case_uid GROUP BY
cc.doc_set, a.role, a.att_norm ORDER BY cc.doc_set, a.role, case_count DESC;
```