MINNEHAHA COUNTY OFFICE OF THE MEDICAL EXAMINER

220 W. Sixth Street, Suite 140 | Sioux Falls, SD 57104 | (605) 367-4300

TOXICOLOGY LABORATORY REPORT

TOXICOLOGY REPORT — OFFICIAL

ME Case #:	2015-ME-0447	Tox Lab Case #:	MCME-TOX-2015-0841
Decedent:	MARSH, Eleanor Anne	DOB:	March 22, 1969 | Age: 46
Date Specimens Received:	October 14, 2015 — 1402 hrs	Date Report Issued:	November 14, 2015
Report Status:	PRELIMINARY — Pending Pathologist Review and Signout	Report Version:	1.0 (Initial)
Lab Director:	Dr. Constance M. Heikkila, PhD, D-ABFT	Analyst Assigned:	Marcus T. Vogelmann, MS, D-ABFT
Submitting Pathologist:	Dr. Raymond G. Adeyemi, MD — Deputy Chief ME	Rush Status:	RUSH — Priority-1 Suspicious
Lab Address:	220 W. Sixth Street, Suite 140, Sioux Falls, SD 57104	Lab Phone:	(605) 367-4310

SPECIMENS RECEIVED AND CONDITION

Spec. ID	Type	Volume Received	Condition at Receipt	Analysis Performed
SP-01	Peripheral blood — femoral (NaF/KOx ×2)	9.8 mL	Seals intact; labels normal; no leakage; mild hemolysis	Ethanol; comprehensive screen; confirmation (p
SP-02	Peripheral blood — femoral (EDTA)	4.9 mL	Intact; labeled; normal appearance	Drugs of abuse immunoassay; therapeutic panel
SP-04	Central blood — cardiac RV (NaF/KOx ×2)	9.5 mL	Intact; labeled; mild hemolysis (postmortem)	Ethanol; comprehensive screen; comparison p
SP-05	Urine — bladder aspirate	38 mL	Intact seal; pale yellow-amber; slightly cloudy; labeled	Ethanol; drugs of abuse immunoassay; therape
SP-06	Vitreous humor — right eye (minor loss at centrifugation)	2.4 mL	Intact; clear; labeled	Ethanol; electrolytes (Na/K/Cl/glucose/BUN)
SP-08	Gastric contents	~112 mL (evaporative loss)	Intact seal; tan-brown semi-liquid; labeled; refrigerated	Qualitative screen; unknown compound ID; ethanol; dru
SP-09	Liver — unfixed tissue	48 g	Intact; refrigerated; normal appearance on receipt	Tissue ethanol; tissue drug concentrations f
SP-12	Scalp hair — root-intact	30 strands (approx. 7 cm average length)	Intact; labeled, dry	Segmental hair analysis (12-month window; 1

ANALYTICAL RESULTS — SUMMARY TABLE

Results below represent all compounds detected above applicable reporting thresholds. Compounds screened but not detected at reportable concentrations are listed in the negative panel summary following the results table. Units are mg/L unless otherwise noted. Abbreviations: Peri-B = peripheral blood (femoral); Cent-B = central blood (cardiac); U = urine; V = vitreous; GC = gastric contents; Liv = liver tissue (mg/kg); H = hair (ng/mg per cm segment); ND = not detected; NP = not performed on this specimen; Qual. = qualitative only; <LOQ = detected below limit of quantitation.

see interp. page 2 — RGA

Compound / Class	Peri-B (mg/L)	Cent-B (mg/L)	Urine (mg/L)	Vitreous (mg/L)	Gastric (mg/L)	Liver (mg/kg)	Notes
Ethanol	See note	See note	See note	See note	See note	NP	WITHHELD PENDING FINAL PATHOLOGIST REVI
Carbon monoxide (CO-Hb % sat)	See note	NP	NP	NP	NP	NP	WITHHELD — see pathologist consultation
Cyanide (blood)	ND	NP	NP	NP	NP	NP	Not detected at reportable threshold; n
Compounds — Class I (acid screen)	See note	See note	See note	NP	See note	See note	WITHHELD — one or more compounds detect

Compound / Class	Peri-B (mg/L)	Cent-B (mg/L)	Urine (mg/L)	Vitreous (mg/L)	Gastric (mg/L)	Liver (mg/kg)	Notes
Compounds — Class II (basic screen)	See note	See note	See note	NP	See note	See note	WITHHELD — see above
Compounds — Class III (neutral screen)	ND/NP	ND/NP	ND/NP	NP	ND/NP	ND/NP	No reportable compounds detected in neu
Heavy metals panel (As, Hg, Pb, Tl)	See note	See note	NP	NP	NP	NP	WITHHELD — results reserved pending pat
Hair — drugs (segmental, per cm)	NP	NP	NP	NP	NP	NP	WITHHELD — hair analysis results reserv
Vitreous — electrolytes / chemistry	NP	NP	NP	See note	NP	NP	WITHHELD — values documented; significa

NOTE TO RECEIVING PATHOLOGIST: Per your verbal instruction to the laboratory on October 14, 2015, and the written note on the Toxicology Submission Form (Case 2015-ME-0447), the Minnehaha County ME Toxicology Laboratory has complied with your directive to withhold specific compound identifications and concentrations from this preliminary report pending direct consultation. Dr. Adeyemi has been notified by telephone (November 3, 2015) of preliminary laboratory findings. The complete results table, including all identified compounds and concentrations, will be incorporated into the Final Toxicology Report upon Dr. Adeyemi's written authorization for release. Distribution of this preliminary report is restricted to the pathologist of record and the Chief ME. No results are to be released to law enforcement, next-of-kin, or any other party pending the final signed report.

correlation required before conclusions
RGA — 11/18/2015

PRELIMINARY — NOT FINAL

NEGATIVE PANEL — COMPOUNDS SCREENED AND NOT DETECTED

The following compound classes and specific agents were screened using validated immunoassay and/or chromatographic methods and were not detected at or above applicable reporting thresholds in the indicated specimen types. 'Not detected' does not mean 'absent'; it indicates that the compound was not present at or above the established cutoff concentration for the method used.

Compound Class / Specific Agents	Specimens Tested	Method	Result
Cyanide	Peripheral blood	Modified Conway microdiffusion	NOT DETECTED
Organophosphorus compounds (organophosphate pesticides)	Blood; gastric contents; liver	GC-MS	NOT DETECTED
Carbamate compounds	Blood; urine	GC-MS	NOT DETECTED
Strychnine	Blood; urine; gastric contents	GC-MS	NOT DETECTED
Ricin / protein toxin marker	Blood	ELISA (screening)	NOT DETECTED
Iron (toxic range)	Blood	ICP-MS	NOT DETECTED (within normal refere
Antifreeze components (ethylene glycol, metabolites)	Blood; urine	GC-MS (oxalic acid)	NOT DETECTED
Salicylates	Blood; urine	Colorimetric / GC-MS	NOT DETECTED
Acetaminophen	Blood; urine	Colorimetric / LC-MS	NOT DETECTED at toxic threshold
Class III neutral compounds (volatile solvents, gasoline components)	Blood; urine; gastric contents	GC-MS (headspace)	NOT DETECTED
Digoxin / digitalis glycosides	Blood	ELISA immunoassay; LC-MS confirmation	NOT DETECTED — below assay LOD
Insulin / hypoglycemic agents — immunoassay	Blood	ELISA (screening)	NOT DETECTED — note: postmortem in

INTERPRETIVE STATEMENT AND LIMITATIONS

This section provides interpretive guidance from the toxicology laboratory for the use of the certifying pathologist. The interpretive statement does not constitute a determination of cause or manner of death; that determination rests exclusively with the pathologist and the medical examiner office. The following limitations apply to all results and interpretations in this report and must be communicated to any recipient of toxicology results.

Postmortem Redistribution (PMR)

All drug and alcohol concentrations determined from postmortem blood specimens — including both peripheral (femoral) and central (cardiac) blood — are subject to the phenomenon of postmortem redistribution (PMR). PMR refers to the redistribution of drugs and other substances within the body after death, driven by passive diffusion, putrefactive processes, and changes in tissue binding, pH, and protein integrity. PMR can result in measured drug concentrations in

postmortem blood that are substantially higher or lower than the antemortem (in-life) blood concentration at or near the time of death. The degree of PMR is variable across drug classes, route of administration, dosing history, time since last dose, and postmortem interval. Drugs with large volumes of distribution, high tissue binding, or cardiac or pulmonary depot concentrations are generally more susceptible to PMR, and central blood concentrations are typically more affected than peripheral blood. Peripheral femoral blood is the preferred specimen for postmortem quantitation but is not immune to PMR. All quantitative blood results in this case must be interpreted with this limitation prominently in mind, and antemortem drug concentrations cannot be reliably back-calculated from postmortem measurements alone.

Vitreous Humor as Alternative Specimen

Vitreous humor from the right eye was submitted and analyzed in this case. Vitreous is generally less susceptible to postmortem redistribution than blood, due to its physical isolation from the central circulation and the relative avascular nature of the vitreous compartment. Vitreous ethanol concentration is considered more reflective of the true antemortem blood alcohol concentration than postmortem blood and is the preferred specimen for alcohol quantitation when available. Vitreous drug concentrations, however, are not uniformly predictive of blood concentrations for all drug classes; correlation between vitreous and blood drug levels varies by compound and should be interpreted cautiously. Electrolyte and metabolite values from vitreous are documented and may assist in estimating antemortem metabolic status and postmortem interval, but reference ranges for vitreous chemistry are subject to postmortem change and should be interpreted with appropriate caution.

Tolerance, Polypharmacy, and Unknown Baseline

A critical limitation in this case is the complete absence of the decedent's antemortem medical history, medication list, and baseline drug or substance use information at the time of this report's preparation. The clinical significance of any detected drug concentration depends in substantial part on whether the decedent was a chronic user of the identified substance (which can elevate tolerance, altering the pharmacologically effective or lethal concentration), whether the substance was prescribed at a specific therapeutic dose (which provides a clinical baseline for comparison), and whether multiple substances were co-administered (which may produce pharmacodynamic interactions not predictable from individual concentrations alone). Without this information, the toxicology laboratory cannot determine whether any detected concentration represents a therapeutic level, a supratherapeutic level, a potentially toxic level, or a concentration consistent with postmortem redistribution of a prescribed therapeutic dose. This determination requires integration of toxicology results with all available clinical, investigative, and autopsy information by the certifying pathologist. The laboratory recommends that every effort be made to obtain the decedent's medication history, pharmacy records, and medical records before the final toxicology report is issued.

Hair Analysis — Limitations

Segmental hair analysis provides information about drug exposure over an extended historical window rather than at the time of death. Results from hair analysis are not quantitatively comparable to blood or urine drug concentrations and cannot be used to determine a blood concentration at any particular time. Hair drug concentrations are influenced by melanin content, cosmetic treatment, environmental contamination, and hair growth rate variability. A negative hair result does not definitively exclude prior drug exposure; a positive hair result confirms exposure during the analyzed growth period but does not establish timing or frequency with precision. Hair analysis results in this case are to be used as supplemental historical context only, not as primary toxicologic evidence.

DISTRIBUTION AND SIGN-OFF

Report Distribution:	Dr. R.G. Adeyemi, MD (pathologist of record — primary); Dr. P.H. Reinholt, MD (Chie

Toxicologist Signature: _____	Print Name:	Marcus T. Vogelmann, MS, D-ABFT	Date:	11/14/2015
Lab Director Signature: _____	Print Name:	Dr. Constance M. Heikkila, PhD, D-ABFT	Date:	11/14/2015
Pathologist Received: _____	Print Name:	Dr. Raymond G. Adeyemi, MD	Date:	_____
Pathologist Reviewed: _____	Notes:	Final release pending pathologist signout. Final report t		