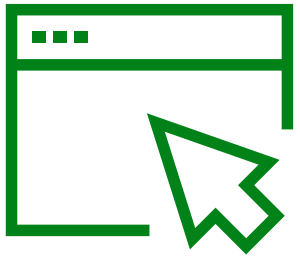
Welcome Participants

Your **lines have been muted** to ensure our presenters are not distracted by background noise



Attendees are encouraged to **participate by using the chat/Q&A** via the chat box function – select "All Panelists and Attendees" or only "All Panelists"

A link to the **recording of this session & slides** will be provided in our follow-up email sent next week

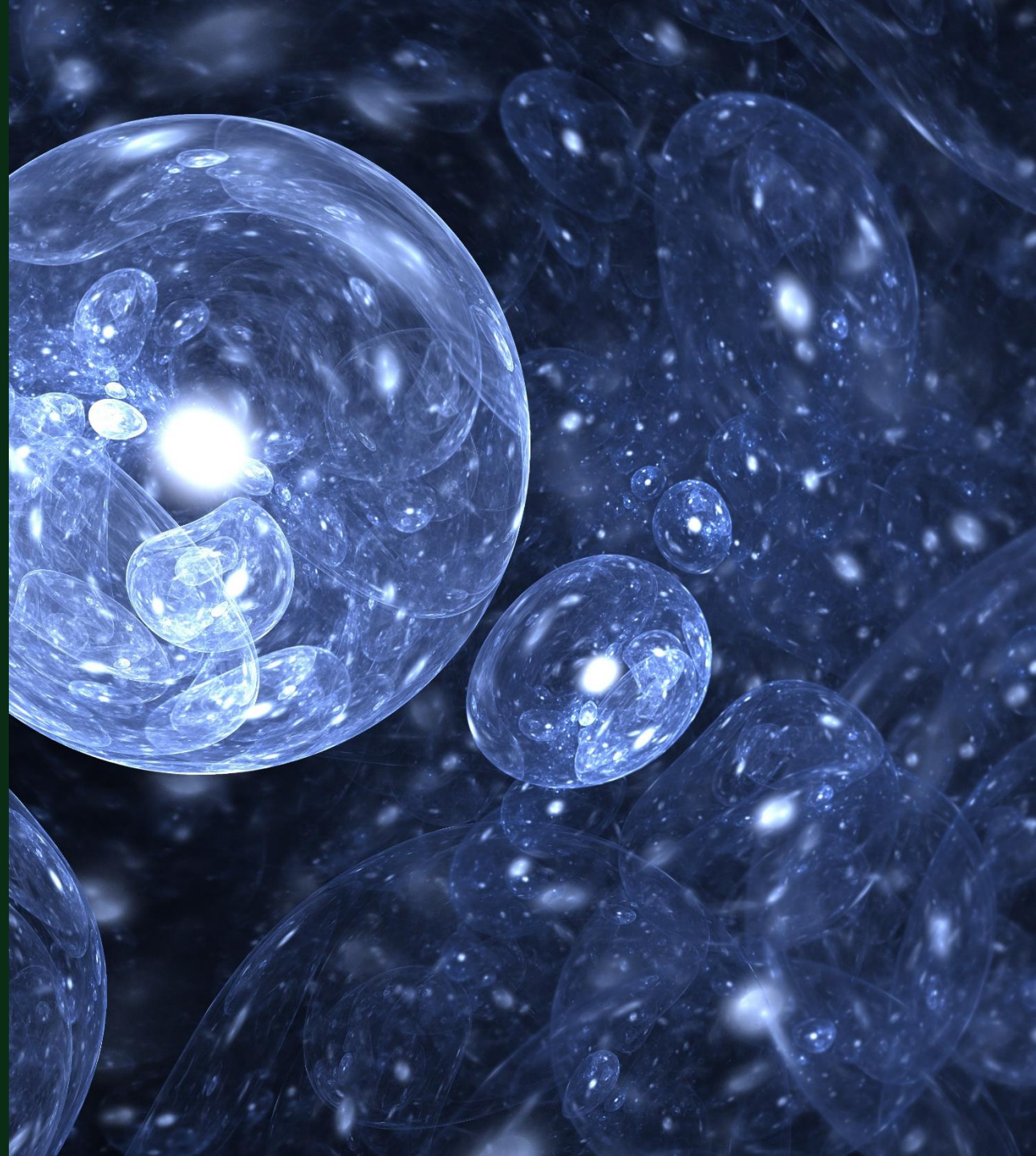
ERM

ERM WEBINAR SERIES: FAST FLUORINATED FACTS

PFAS in the News

MAY 29TH, 2024

Sustainability is our business

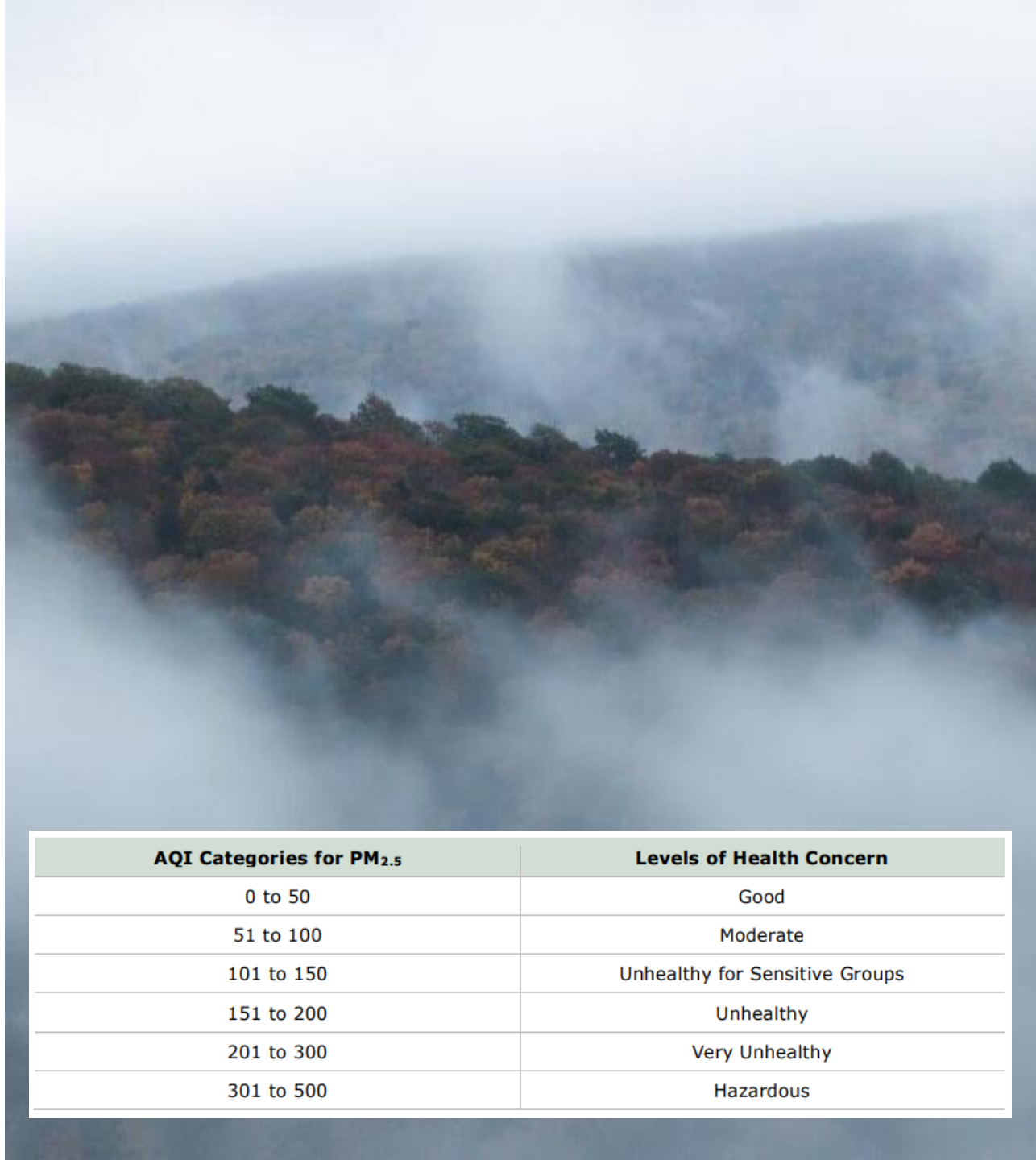


Safety Moment

Air quality impacts from wildfire smoke has already affected parts of the U.S. and Canada this spring. Air quality hazards create health hazards that impact everyone differently.

What are some ways we can minimize this health hazard?

- Monitor the Air Quality Index (AQI)
  - U.S. EPA – www.AirNow.gov
  - U.S Forest Service – https://tools.airfire.org
  - Purple Air (U.S. & Canada) – https://map.purpleair.com
- AQI less than 151
  - Adjust work schedules
  - Reduce and limit strenuous work activities
  - Provide additional rest periods
- AQI exceeds 151 and is below 500
  - Voluntary use of PPE may be appropriate (i.e., N95 filtering respirators).
- AQI equals or exceeds 301
  - Stop work and consult if continued work is safe
- AQI equals or exceeds 501
  - Respiratory protection is required for continued work



AQI Categories for $PM_{2.5}$	Levels of Health Concern
0 to 50	Good
51 to 100	Moderate
101 to 150	Unhealthy for Sensitive Groups
151 to 200	Unhealthy
201 to 300	Very Unhealthy
301 to 500	Hazardous

Agenda/ Contents

1. PROPOSED RCRA PFAS RULES
2. EPA INTERIM GUIDANCE ON THE DESTRUCTION AND DISPOSAL OF PFAS AND MATERIALS CONTAINING PFAS (2024 UPDATE)
3. FINAL PFAS NATIONAL PRIMARY DRINKING WATER REGULATIONS: MCLS FOR 6 PFAS
4. CERCLA HAZARDOUS SUBSTANCE LISTING (PFOA & PFOS)

Speakers

Margaret Averill

Partner, Account Manager High Value

Adam Piestrzeniewicz

Managing Consultant, Geologist

Ali Boroumand

Technical Consulting Director

John Hazard

Senior Partner, Engineer

PROPOSED RCRA PFAS RULES

Margaret Averill

Listing of Specific PFAS as RCRA Hazardous Constituents

40 CFR 261

Status:

- Proposed February 8, 2024 (Federal Register)
- Public Comment Closed April 8, 2024
- EPA reviewing comments

Who: RCRA Corrective Action Sites (TSDFs – permitted and interim status)

What:

- 9 PFAS (and their salts and structural isomers)
- Added as hazardous constituents in 40 CFR 261 Appendix VIII
- Additional corrective action, investigation and cleanup, at applicable sites to address releases of these PFAS

Proposed PFAS for inclusion

- PFOA
- PFOS
- PFBS
- GenX
- PFNA
- PFHxS
- PFDA
- PFHxA
- PFBA

Considerations:

- Rule would increase EPA's authority to address releases
- Concern that EPA has not established that these 9 PFAS meet the requirements for inclusion
  - toxic, carcinogenic, mutagenic or teratogenic effects on humans or other life forms
- Concerns about lack of published standards
  - action levels, waste management/disposal options
- EPA's authority to pass rule has been challenged

Expand Definition of Hazardous Waste Applicable to RCRA Corrective Action for Releases

40 CFR 260.10 and 264.101

Status:

- Proposed February 8, 2024 (Federal Register)
- Public Comment Closed March 26, 2024
- EPA reviewing comments

Who: RCRA Corrective Action Sites

What:

- Amend the definition of hazardous waste
- Authorizes EPA to require corrective actions to address releases from RCRA Solid Waste Management Units based on statutory definition of hazardous waste
- Includes 9 PFAS from first rule as well as other emerging contaminants

Considerations:

- Broad implications – EPA redefining their authority to require corrective actions
- Rule streamlines EPA's ability to regulate other hazardous materials without legal challenges
    - Provides authority to EPA/State permit writers without public participation or external scientific review
- 1,740 facilities could be subject to additional corrective action requirements

Final Thoughts on RCRA Proposed Rules

- Both rules would be effective immediately in all states on effective date in final notice
- Proposed rules are significant step toward EPA's regulation of PFAS in realm of investigation and cleanup authority
- If 9 PFAS are listed in Appendix VIII, likely next step is listing of these chemicals as RCRA hazardous waste
  - Listing as a hazardous waste, would result in “cradle-to-grave” responsibility
- EPA has identified 56 industries affected, including:
  - Waste Management
  - Chemical manufacturing
  - Petroleum and coal products manufacturing
  - Fabricated metal product manufacturing

EPA INTERIM GUIDANCE ON THE DESTRUCTION AND DISPOSAL OF PFAS AND MATERIALS CONTAINING PFAS (2024 UPDATE)

Adam Piestrzeniewicz

April 2024 Guidance Updates

EPA Interim Guidance (April 2024 Update)

- **Guidance Purpose** – "describe technologies for managing the destruction and disposal of PFAS-containing materials and to recommend practices associated with these technologies that minimize PFAS releases to the environment."
- **NOT A REGULATION DOCUMENT**

- The Guidance is an update to the December 2020 Guidance; NEW sections include:
  - An update to Section 6 (Emerging Technologies for PFAS Destruction & Disposal)
  - Guidance to conduct PFAS emissions field testing at commercial thermal destruction sources
  - A summary of Clean Harbors' test data and Chemours Thermal Oxidizer Test Data
  - A summary of Cost and Considerations

Destruction and Disposal Technologies

EPA Interim Guidance (April 2024 Update)

Destruction and Disposal Technology	Examples of PFAS-Containing Materials That Could Be Managed Using These Technologies
Solid phase: Landfill disposal Thermal treatment	• Drinking water, groundwater, and wastewater treatment residuals ° Biosolids/sewage sludge ° Spent GAC ° Ion exchange resins • Air waste stream treatment residuals ° Spent GAC ° Fly ash • Contaminated soil • End-of-life products (e.g., textiles) • Solidified liquid wastes
Liquid phase: Underground injection Thermal treatment	• Sewage sludge (liquid) • Landfill leachate • AFFF (spent or concentrate) • End-of-life products (e.g., spent cleaning solvents) • Pollution control residuals (e.g., concentrates) from PFAS production and use
Gas phase: Thermal treatment	• Landfill gas (LFG) • Emissions from manufacture, use, or destruction of PFAS

Emerging Technologies

(*neither recommending nor discouraging the use of any emerging technology for managing the Section 7361 specified PFAS materials*)

Emerging Technologies specified criteria:
PFAS destruction, production of few to no hazardous residuals or byproducts, commercial availability, and cost effectiveness

Emerging PFAS Destruction and Disposal Technologies:

- Mechanochemical Degradation (MCD)
  - *Ball milling to facilitate thermal and chemical reactions*
- Electrochemical Oxidation
  - *Electrodes to facilitate direct electron transfer at the surface of the anode*
- Gasification and Pyrolysis
  - *Thermal decomposition in an oxygen-free environment*
- Supercritical Water Oxidation
  - *Chemical and physical destruction of contaminants under supercritical conditions (>374°C and 22 MPa)*

Destruction and Disposal Technology – Risk of Release

EPA Interim Guidance (April 2024 Update)

Current D&D Technology Considerations
Interim storage with controls (short term)
Underground injection (Class I non-hazardous industrial & hazardous waste wells)
Hazardous waste landfills (RCRA Subtitle C)
Landfill disposal in all landfill types (stable polymeric PFAS)
GAC reactivation units with thermal oxidizers operating under specific conditions (>1,100°C)
Thermal treatment units (Hazardous Waste Combustors, Cement Kilns, Lightweight Aggregate Kilns, and Thermal Oxidizers) (>1,100°C, well mixed, adequate residence times)
Landfill disposal in Municipal Solid Waste Landfills with composite liners and leachate & gas collection & treatment systems
Thermal treatment at lower temperatures (Municipal Waste Combustors, Sewage Sludge Incinerators) (850°C to 1,000°C)
Construction and Demolition landfills (Disposal of volatile, water soluble, or oxidizable PFAS)

FINAL PFAS NATIONAL PRIMARY DRINKING WATER REGULATIONS: MCLS FOR 6 PFAS

Ali Boroumand

PFAS - National Primary Drinking Water Regulation

- EPA is setting enforceable Maximum Contaminant Levels (MCLs) and non-enforceable health-based Maximum Contaminant Level Goals (MCLGs) for six PFAS.
- The rule applies to any water system, public or private, that has at least 15 connections or regularly serves at least 25 people.
- Hazard Index (HI) of 1 for a mixture containing two or more of PFNA, PFHxS, PFBS, and HFPO-DA as EPA believes these chemicals cause similar health effects.
- EPA lists the following as Best Available Technologies (BATs) for meeting MCL requirements: granular activated carbon (GAC), anion exchange resins (AIX), reverse osmosis (RO), and nanofiltration (NF).

Status

- Published in Federal Register– April 26, 2024
- Effective Date June 25, 2024

Action	MCL	MCLG
PFOA PFOS	4 ppt	0 ppt
PFHxS PFNA HFPO-DA (GenX chemicals)	10 ppt	10 ppt
Mixtures of two or more of PFHxS, PFNA, HFPO-DA, and PFBS	HI = 1.0	HI = 1.0

HI can be calculated as:

$$HI\ MCL = \frac{[GenX_{water}]}{10\ ppt} + \frac{[PFBS_{water}]}{2{,}000\ ppt} + \frac{[PFNA_{water}]}{10\ ppt} + \frac{[PFHxS_{water}]}{10\ ppt}$$

PFAS - National Primary Drinking Water Regulation

Requirements:

- *Initial Monitoring* to be completed and *Compliance Monitoring* to begin by April 26, 2027.
  - Initial Monitoring: 2 or 4 quarterly samples depending on the size of the system and water source
  - Compliance Monitoring: quarterly, annual, or triennial (one sample every 3 years) schedule may apply, depending on the initial and prior compliance monitoring results.
  - Compliance to be evaluated based on running annual average
- Capital improvements to comply with MCLs to be completed by April 26, 2029.
- Analytical Methods 533 or 537.1 for PFAS analysis.
- Specific reporting requirements for waters systems.

Implications for Industry:

- MCLs to be used as groundwater screening level/clean-up goal.
  - An alternative approach could be to establish risk-based criteria using previously established Health Advisory limits, which might result in even lower values.
- Public water supplies are likely to look for upstream sources for source control or cost recovery.
- The analytical methods inevitably will generate data for unregulated FPAS, which could have additional implications for potential sources.

CERCLA HAZARDOUS SUBSTANCE LISTING (PFOA & PFOS)

John Hazard

CERCLA Hazardous Substance Listing – PFOA & PFOS

Status:

- Final - May 8, 2024 (in Federal Register)
- In effect - 60 days from publication
- 90 days to file legal challenges

Who: Superfund Sites; PFOA/PFOS users; Due Diligence

What:

- PFOA & PFOS hazardous substances
- Report release above RQ (1 lb)
- EPA discretion for response actions & cost recovery
- In-scope for ASTM Phase I's

Potential Implications:

- Investigation at new, existing & closed sites (reopener) including through 5-yr reviews
- Changes to existing remediation & waste disposal
- Natural Resources Damages (NRD) claims
- M&A - reduced valuations, future liability concerns
- New litigation from passive receivers
- Delays/modifications? - legal challenges to the rule from industry
- Influence on state programs
- Increased costs

EPA's CERCLA Enforcement Discretion & Settlement Policy

Issued April 19, 2024*

- **Where will EPA Focus:**
  - Significant contributors to release of PFAS
  - Manufacturers & users of PFAS, federal facilities, and industrial parties (PRPs)
  - **not** farmers (biosolids), municipal landfills, water utilities, municipal airports, and local fire departments
- **Environmental Justice (EJ)** - Pursue major PRPs to protect communities from PFOA/PFOS exposures
- **3rd Party Lawsuit Concerns** –
  - Require settling parties to waive rights to sue non-settling parties that satisfy the equitable factors (e.g., passive receivers)
  - Directly settle with parties that satisfy the equitable factors

Equitable Factors & Enforcement Considerations

1. State, local, or Tribal government
2. Performs a public service role in:
   - Providing safe drinking water;
   - Handling of municipal solid waste;
   - Treating or managing stormwater or wastewater;
   - Disposing of, arranging for the disposal of, or reactivating pollution control residuals (e.g., activated carbon filters);
   - Ensuring beneficial application of wastewater treatment products as a fertilizer or soil conditioner; or
   - Performing emergency fire suppression services
3. Manufactured PFAS or used PFAS as part of an industrial process
4. Whether, and to what degree, actively involved in the use, storage, treatment, transport, or disposal of PFAS

*PFAS Enforcement Discretion and Settlement Policy Under CERCLA (epa.gov)

Thank you

If further information is required, please contact Nadine Weinberg at nadine.weinberg@erm.com