

MEMORANDUM

Agenda Item No. 8(E)(1)

TO: Honorable Chairwoman Audrey M. Edmonson
and Members, Board of County Commissioners

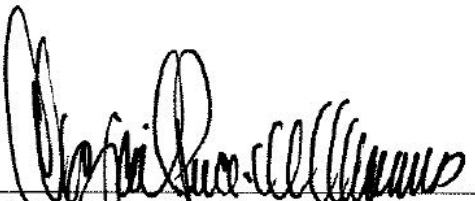
DATE: July 21, 2020

FROM: Abigail Price-Williams
County Attorney

SUBJECT: Resolution authorizing execution of the Research Collaboration Agreement with National Institute for Occupational Safety and Health, an agency of the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, and Miami-Dade County ("County") by and through the Miami-Dade Fire Rescue Department, to collaborate on a turnout gear research project; and authorizing the County Mayor to execute any necessary amendments, and to exercise the renewal, cancellation, and termination provisions contained therein

Resolution No. R-724-20

The accompanying resolution was prepared by the Fire Rescue Department and placed on the agenda at the request of Prime Sponsor Commissioner Joe A. Martinez and Co-Sponsors Commissioner Jose "Pepe" Diaz, Commissioner Sally A. Heyman and Vice Chairwoman Rebeca Sosa.



Abigail Price-Williams
County Attorney

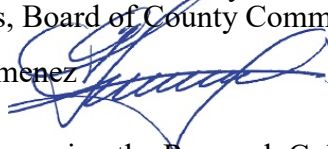
APW/uw

Memorandum



Date: July 21, 2020

To: Honorable Chairwoman Audrey M. Edmonson
and Members, Board of County Commissioners

From: Carlos A. Gimenez
Mayor 

Subject: Resolution approving the Research Collaboration Agreement between the National Institute for Occupational Safety and Health, an agency for the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services and Miami-Dade County, by and through the Miami-Dade Fire Rescue Department to collaborate on a Turnout Gear research project

Recommendation

It is recommended that the Board approve the attached Research Collaboration Agreement with the National Institute for Occupational Safety and Health (NIOSH), an agency of the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, and Miami-Dade County (County) by and through the Miami-Dade Fire Rescue Department (MDFR), to collaborate on a turnout gear research project and authorize the County Mayor or County Mayor's designee to execute any necessary amendments, and to exercise the renewal, cancellation, and termination provisions contained therein.

Scope

This Research Collaboration Agreement will support countywide services.

Fiscal Impact/Funding Source

There is no fiscal impact to the County, NIOSH will reimburse MDFR for all turnout gear used in the study.

Track Record/Monitor

This Research Collaboration Agreement will be monitored by Division Chief, Paul Estopiñan of the Miami-Dade Fire Department to ensure compliance with all requirements.

Background

Turnout gear protects more than one million U.S. fire fighters from a variety of hazards including carcinogens, flames, heat, and chemical/biological agents. Not only does turnout gear serve as a barrier to external hazards, it simultaneously must allow for the escape of metabolic heat to prevent elevated core body temperatures. To provide the necessary performance characteristics, turnout gear design is complex, consisting of three major layers that work as a composite—an outer shell, moisture barrier, and thermal liner.

A post-market study by the University of Kentucky demonstrated that turnout gear may not be protective throughout its entire age-based lifecycle of 10 years. However, there is limited information about the interactions between (1) use and exposure history (use history), (2) advanced visual inspections, (3) performance, and (4) the presence of trapped organic and inorganic compounds in the gear fabric. Understanding the interaction between these four factors

will improve the fire service's ability to ensure that turnout gear remains protective throughout its lifecycle. These evidence-based data may be used to enhance existing performance, care, and maintenance standards.

The National Personal Protective Technology Laboratory (NPPTL) will be conducting a four-year study with the objective of developing evidence-based recommendations to improve confidence that turnout gear will remain protective throughout its lifecycle.

- Specific Aim 1: Develop and execute a statistically meaningful sampling strategy at four, regionally dispersed, fire departments.
- Specific Aim 2: For all sampled turnout gear (coat and trousers only):
 1. Establish credible use history estimates across the entire lifecycle of the gear (e.g., number of fire-related calls, repair history, and laundering history).
 2. Conduct an advanced visual inspection according to NFPA 1851 and collect quantitative measures for each metric using non-destructive methods.
 3. Perform tests according to select NFPA 1971 test methods using a Garment Specimen-Retrieval' procedure that is supported by the NFPA.
 4. Determine the concentration of chemical compounds trapped within the fabric using advanced analytical chemistry analysis methods.
- Specific Aim 3: Analyze relationships between (1) use history, (2) visual inspections, (3) performance tests, and (4) concentration of organics and inorganics—resample as needed to explore relationship trends.
- Specific Aim 4: Facilitate the adoption of research findings (e.g., training materials, NFPA 1851, NFPA 1971, manufacturer material selection).

The data produced by this study will be used to improve confidence that turnout gear will remain protective throughout its lifecycle. Specifically, the findings are expected to inform (1) new test methods for NFPA 1971 (e.g., known use conditions could be used to develop simulated aging tests), (2) NFPA 1851 guidance (e.g., use-based retirement criteria), and (3) design considerations for manufacturers (e.g., layer-specific performance issues).

Collaboration between NIOSH and fire departments is necessary for Specific Aim's 1 and 2.1. In order for NIOSH to conduct the Research Project, used fire fighter gear must be collected, tested and evaluated, and the fire department must provide department run statistics and exposure tracking data (i.e., National Fire Operations Reporting System data), and laundering and repair history information to determine data trends.



Maurice L. Kemp
Deputy Mayor



MEMORANDUM (Revised)

TO: Honorable Chairwoman Audrey M. Edmonson
and Members, Board of County Commissioners

DATE: July 21, 2020

FROM: Abigail Price-Williams
County Attorney

SUBJECT: Agenda Item No. 8(E)(1)

Please note any items checked.

- ☐ "3-Day Rule" for committees applicable if raised
- ☐ 6 weeks required between first reading and public hearing
- ☐ 4 weeks notification to municipal officials required prior to public hearing
- ☐ Decreases revenues or increases expenditures without balancing budget
- ☐ Budget required
- ☐ Statement of fiscal impact required
- ☐ Statement of social equity required
- ☐ Ordinance creating a new board requires detailed County Mayor's report for public hearing
- ☐ No committee review
- ☐ Applicable legislation requires more than a majority vote (i.e., 2/3's present ____, 2/3 membership ____, 3/5's ____, unanimous ____, CDMP 7 vote requirement per 2-116.1(3)(h) or (4)(c) ____, CDMP 2/3 vote requirement per 2-116.1(3)(h) or (4)(c) ____, or CDMP 9 vote requirement per 2-116.1(4)(c)(2) ____) to approve
- ☐ Current information regarding funding source, index code and available balance, and available capacity (if debt is contemplated) required

Approved _____ Mayor
Veto _____
Override _____

Agenda Item No. 8(E)(1)
7-21-20

RESOLUTION NO. R-724-20

RESOLUTION AUTHORIZING EXECUTION OF THE RESEARCH COLLABORATION AGREEMENT WITH NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH, AN AGENCY OF THE CENTERS FOR DISEASE CONTROL AND PREVENTION, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, AND MIAMI-DADE COUNTY (“COUNTY”) BY AND THROUGH THE MIAMI-DADE FIRE RESCUE DEPARTMENT, TO COLLABORATE ON A TURNOUT GEAR RESEARCH PROJECT; AND AUTHORIZING THE COUNTY MAYOR OR DESIGNEE TO EXECUTE ANY NECESSARY AMENDMENTS, AND TO EXERCISE THE RENEWAL, CANCELLATION, AND TERMINATION PROVISIONS CONTAINED THEREIN

WHEREAS, this Board desires to accomplish the purposes outlined in the accompanying memorandum, a copy of which is incorporated herein by reference,

NOW THEREFORE BE IT REOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MIAMI-DADE COUNTY, FLORIDA, that this Board:

Section 1. Approves the attached Research Collaboration Agreement between the National Institute for Occupational Safety and Health, an agency of the Centers for Disease Control and prevention, U.S. Department of Health and Human Services, and Miami-Dade County (“County”) by and through the Miami-Dade Fire Rescue Department to collaborate on a turnout gear research project.

Section 2. Authorizes the County Mayor or County Mayor’s designee to execute the Research Collaboration Agreement between the National Institute for Occupational Safety and Health, an agency of the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, and the County by and through the Miami-Dade Fire Rescue Department and to exercise the renewal, cancellation and termination provisions contained therein.

The foregoing resolution was offered by Commissioner **Jean Monestime**, who moved its adoption. The motion was seconded by Commissioner **Dennis C. Moss** and upon being put to a vote, the vote was as follows:

Audrey M. Edmonson, Chairwoman	aye		
Rebeca Sosa, Vice Chairwoman	aye		
Esteban L. Bovo, Jr.	aye	Daniella Levine Cava	aye
Jose "Pepe" Diaz	aye	Sally A. Heyman	aye
Eileen Higgins	aye	Barbara J. Jordan	aye
Joe A. Martinez	aye	Jean Monestime	aye
Dennis C. Moss	aye	Sen. Javier D. Souto	aye
Xavier L. Suarez	absent		

The Chairperson thereupon declared the resolution duly passed and adopted this 21st day of July, 2020. This resolution shall become effective upon the earlier of (1) 10 days after the date of its adoption unless vetoed by the County Mayor, and if vetoed, shall become effective only upon an override by this Board, or (2) approval by the County Mayor of this Resolution and the filing of this approval with the Clerk of the Board.



MIAMI-DADE COUNTY, FLORIDA
BY ITS BOARD OF
COUNTY COMMISSIONERS

HARVEY RUVIN, CLERK

Melissa Adames

By: _____
Deputy Clerk

Approved by County Attorney as
to form and legal sufficiency.

GKS

Gerald K. Sanchez

RESEARCH COLLABORATION AGREEMENT

This Agreement is between the National Institute for Occupational Safety and Health (“NIOSH”), an agency of the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services (“Agreement”), having offices located at 1095 Willowdale Road, MS 2703, Morgantown, WV, 26505 and Miami-Dade County, Florida, which is a political subdivision of the State of Florida, having a principal place of business at 111 N.W. 1st Street, Miami, Florida, 33128 (“Collaborator” or “County”), (collectively, the “Parties”).

This Agreement is neither a funding agreement as defined in 35 U.S.C. § 201(b) nor a cooperative research and development agreement authorized under the Federal Technology Transfer Act of 1986, as amended, 15 U.S.C. §§ 3710a *et seq.*, and Executive Order 12591 of April 10, 1987.

BACKGROUND

1. NIOSH and Collaborator want to collaborate on a research project; and
2. NIOSH and Collaborator want to transfer between the Parties, during the term of this Agreement, proprietary research materials and/or proprietary confidential information required to conduct the research project.

TERMS AND CONDITIONS

Article 1 DEFINITIONS

- 1.1 **“Confidential Information”** includes scientific, business, or financial information pertaining to the Research Project (defined below) that is designated as confidential by Provider (defined below). Confidential Information does not include information that: (i) is in the public domain other than as a result of a disclosure by recipient (defined below) or any of Recipient’s representatives in violation of this Agreement; (ii) was in the possession of Recipient before disclosure by the Provider; (iii) is acquired by Recipient from a third party having no obligation of confidentiality to Provider (iv) is hereafter independently developed by Recipient, without reference to Confidential Information received from Provider; or (v) Provider expressly authorizes Recipient to disclose.
- 1.2 **“Invention”** means any invention or discovery that is or may be patentable or protectable under applicable laws.
- 1.3 **“Investigator”** means the principal researcher designated by a Party to direct the Research Project.
- 1.4 **“Material”** means data, prototype, vouchers for turnout gear (coats and trousers), NFORS subscription vouchers, turnout gear, department run statistics, and turnout gear records and inventory documentation provided by one of the Parties and used in the Research Project.
- 1.5 **“Provider”** means the Party that provides Material or discloses Confidential Information to the other Party under this Agreement.
- 1.6 **“Recipient”** means the Party that receives Material or Confidential Information from the other Party under this Agreement.

- 1.7 **“Research Project”** means the collaborative research described in Appendix A.

Article 2 COLLABORATIVE RESEARCH

- 2.1 NIOSH and Collaborator agree to collaborate on the Research Project. The Investigators for NIOSH will be Mr. Matthew G. Duling and Dr. Susan M. Moore, and the Investigator for Collaborator will be Division Chief Paul Estopiñan.
- 2.2 Nothing in this Agreement will be construed to limit the freedom of either Party from engaging in similar research with other parties.
- 2.3 The Parties recognize that the Research Project describes the collaborative research to be conducted under this Agreement and that the goals set forth in Appendix A are good faith guidelines. If events occur that require substantial modification of the Research Project, the Parties may amend Appendix A according to Paragraph 6.2.1 of this Agreement.
- 2.4 The Parties will exchange information regularly in writing. This exchange may be accomplished through meeting minutes, annual reports, detailed correspondence, and circulation of draft manuscripts. Interim and final reports shall be exchanged by the Parties as defined in Appendix A.

Article 3 CONFIDENTIALITY; PUBLICATIONS

3.1 Confidential Information

- 3.1.1 Either Party may disclose or receive Confidential Information under this Agreement only under the terms of this Article 3.1.
- 3.1.2 All Confidential Information exchanged between the Parties must conspicuously bear the words “Confidential Information” or “Confidential.” Confidential Information exchanged orally or through observation must be reduced to writing and marked “Confidential Information” or “Confidential” within 30 days after disclosure to be considered Confidential Information.
- 3.1.3 Recipient will maintain Confidential Information in confidence for a period of 3 years from the effective date of this Agreement and will protect Confidential Information with the same degree of care as Recipient uses to protect its own Confidential Information.
- 3.1.4 Recipient may disclose Confidential Information to its employees, consultants, or contractors to whom it is necessary to disclose this information for the purpose of the Research Project. Recipient may make these disclosures only under terms at least as restrictive as those specified in this Agreement. Recipient agrees that disclosure of Confidential Information may not be made to any party not listed herein unless Provider grants prior written approval to Recipient.
- 3.1.5 Recipient may disclose Confidential Information if required to do so by law, regulation, or court order. If Recipient, or anyone to whom it discloses Confidential Information in accordance with Article 3, becomes legally required to disclose any Confidential Information (e.g., Florida’s Public Records Law, Chapter 119, Florida Statutes), Recipient will provide timely notice to Provider and, to the extent practicable, consult with Provider prior to any disclosure.

- 3.1.6 Subject to the obligations set forth in Article 3.2, either Party may disclose the Abstract of the Research Project (in Appendix A) to the public.

3.2 Publications; Press Releases

3.2.1 Publications

- 3.2.1.1 In addition to the specific goals of the Research Project, the Parties view dissemination of research findings, both by publication and oral presentation, as essential objectives of the Research Project. Authorship will be decided according to commonly accepted conventions for scientific publications—for publications where only one Party meets the requirements for inclusion as an author, this Party agrees to acknowledge the contributions of the other Party.
- 3.2.1.2 The Parties are encouraged to make publicly available the results of the Research Project. Before either Party submits a paper or abstract for publication or otherwise intends to publicly disclose information about any Invention made in the course of the Research Project, the other Party will have 30 days to review proposed manuscripts and 3 days to review proposed abstracts to assure that its Confidential Information is protected. Either Party may request in writing that the proposed publication or other disclosure be delayed for up to 30 additional days as necessary to file a patent application.
- 3.2.1.3 NIOSH plans to publish the data obtained from this study in scientific journals, trade magazines, scientific and trade conference proceedings/presentations, and NIOSH-numbered publications. These publications may include data from the Collaborator and may also include data from other collaborators.
- 3.2.1.4 The Collaborator plans to share the NIOSH study results at scientific and trade conference proceedings/presentations.

3.2.2 Press Releases

Collaborator-issued press releases that reference or rely upon the work of NIOSH under this Agreement will be made available to NIOSH for review and comment at least 7 days prior to publication.

Article 4 DATA

- 4.1** Each Party will own the data it generates. Jointly generated data will be jointly- owned.
- 4.2** Each Party will disclose to the other Party a summary of all data generated under this Agreement. Subject to the restrictions in Article 3, both Parties will have free access to and use of any data generated under this Agreement.

Article 5 THE TRANSFER AND USE OF MATERIAL/CONFIDENTIAL INFORMATION

5.1 Mechanics of Transfer

Either Party may provide or receive Material and/or Confidential Information under this Agreement. If either Party transfers to the other Party a material not listed in Appendix A, the Parties will amend this Agreement to include the additional material.

5.2 Conditions of Use

5.2.1 Recipient's Investigator(s) will use Material and/or Confidential Information solely in connection with the Research Project.

5.2.2 Recipient will use Material in compliance with all applicable laws, regulations and policies.

Article 6 TERMINATION AND GOVERNANCE

6.1 Effective Date

The Agreement will be effective on the date of the last authorized signature below.

6.2 Term and Termination

6.2.1 The Parties agree that this Agreement will be effective for (4) years from the date of the last authorized signature below and may be extended as mutually agreed by the Parties in a written amendment to this Agreement.

6.2.2 This Agreement will terminate immediately if the Parties agree mutually, in writing, to termination.

6.2.3 This Agreement will terminate in 30 days after either Party receives written notice of the other Party's desire to terminate this Agreement.

6.3 Liability

6.3.1 No indemnification for any loss, claim, damage, or liability is intended or provided by either Party under this Agreement. Each Party will be liable for any loss, claim, damage, or liability that the Party incurs as a result of its activities under this Agreement, except that NIOSH, as an agency of the U.S. Government, assumes liability only to the extent provided under the Federal Tort Claims Act, 28 U.S.C. §§2671 *et seq.*, and the County, as a political subdivision of the State of Florida, assumes liability only to the extent provided under section 768.28, Florida Statutes.

6.3.2 MATERIAL IS BEING SUPPLIED UNDER THIS AGREEMENT WITH NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Provider makes no representations that the Material provided will not infringe any proprietary rights of third parties.

6.4 Assignment

Neither this Agreement nor any rights or obligations of either Party hereunder may be assigned or otherwise transferred by either Party without the prior written consent of the other Party. This Agreement will be binding upon the Parties and their respective successors and permitted assigns.

6.5 Non-endorsement

By entering into this Agreement, NIOSH does not directly or indirectly endorse any product or service that is or will be provided, whether directly or indirectly related to this Agreement, by Collaborator, its successors, permitted assigns, or licensees. Collaborator will not in any way state or imply that this Agreement is an endorsement of any such product or service by the U.S. Government or any of its organizational units or employees.

6.6 Survivability

Articles 3, 4, 6.3, 6.5, 6.6 and 6.8 will survive expiration or earlier termination of this Agreement.

6.7 Severability

The illegality or invalidity of any provisions of this Agreement will not impair, affect, or invalidate the other provisions of this Agreement.

6.8 Governing Law

The construction, validity, performance, and effect of this Agreement will be governed by Federal law as applied by the Federal courts in the District of Columbia. Federal law and regulations will preempt any conflicting or inconsistent provisions in this Agreement.

6.9 Entire Agreement

This Agreement, together with all appendices, constitutes the entire agreement between the Parties and supersedes any prior or contemporaneous oral or written agreements or communications between them with respect to the subject matter hereof. This Agreement may be amended only by written instrument signed by authorized representatives of NIOSH and Collaborator.

6.10 Notices

All notices pertaining to or required by this Agreement shall be in writing, shall be signed by an authorized representative and shall be delivered to the addresses indicated on the signature page for each Party.

SIGNATURES BEGIN ON THE NEXT PAGE

FOR NIOSH:

John Howard, M.D, Director.

Date

Mailing Address for Notices:
National Institute for Occupational Safety and Health
Office of Research and Technology Transfer
Attention: Kathleen Goedel
1150 Tusculum Avenue, Cincinnati, OH 45226
Telephone: (513) 533-8686

Acknowledgment by NIOSH's Investigators:

LCDR Matthew G. Duling, MS, REHS,
Industrial Hygienist

Date

Susan M. Moore, PhD, Senior Scientist

Date

FOR Collaborating Fire Department:

Carlos A. Gimenez, Mayor, Miami-Dade County

Date

Miami-Dade Fire Rescue Department
Attention: Alan R. Cominsky, Fire Chief
9300 NW 41st Street, Doral, FL 33178

Approved as to form and legal sufficiency

Gerald Sanchez, Assistant County Attorney

Date

Acknowledgment by Collaborator's Investigator:

Paul Estopiñan, Division Chief

Date

APPENDIX A
Research Project
Evidence to Inform Standards that Ensure Turnout Gear Remains Protective
Throughout Its Lifecycle

I. Abstract

Turnout gear protects more than one million U.S. fire fighters from a variety of hazards including carcinogens, flames, heat, and chemical/biological agents. Not only does turnout gear serve as a barrier to external hazards, it simultaneously must allow for the escape of metabolic heat to prevent elevated core body temperatures. To provide the necessary performance characteristics, turnout gear design is complex, consisting of three major layers that work as a composite—an outer shell, moisture barrier, and thermal liner.

Turnout gear, therefore, could be contributing to cardiovascular disease, the leading cause of fire fighter deaths (33%), and fire fighter cancer rates, which have been proven to exceed that of the general public. A post-market study by the University of Kentucky demonstrated that turnout gear may not be protective throughout its entire age-based lifecycle of 10 years. However, there is limited information about the interactions between (1) use and exposure history (use history), (2) advanced visual inspections, (3) performance, and (4) the presence of trapped organic and inorganic compounds in the gear fabric. Understanding the interaction between these four factors will improve the fire service’s ability to ensure that turnout gear remains protective throughout its lifecycle. These evidence-based data may be used to enhance existing performance, care, and maintenance standards.

Existing standards are maintained and enhanced by the National Fire Protection Association (NFPA):

- *NFPA 1971: Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*
- *NFPA 1851: Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*

The next edition of NFPA 1971 will be released in 2023 and the next edition of NFPA 1851 will be released in 2024, suggesting that practical implementation of any evidence- based recommendations must begin no later than 2022.

II. Objective/Background

The National Personal Protective Technology Laboratory (NPPTL) will be conducting a four-year study with the **objective of developing evidence-based recommendations to improve confidence that turnout gear will remain protective throughout its lifecycle.**

Specific Aim 1: Develop and execute a statistically meaningful sampling strategy at four, regionally dispersed, fire departments.

- **Specific Aim 2:** For all sampled turnout gear (coat and trousers only):
 1. Establish credible use history estimates across the entire lifecycle of the gear (e.g., number of fire-related calls, repair history, and laundering history).
 2. Conduct an advanced visual inspection according to NFPA 1851 and collect quantitative measures for each metric using non-destructive methods.
 3. Perform tests according to *select* NFPA 1971 test methods using a Garment Specimen-Retrieval' procedure that is supported by the NFPA.
 4. Determine the concentration of chemical compounds trapped within the fabric using advanced analytical chemistry analysis methods.
- **Specific Aim 3:** Analyze relationships between (1) use history, (2) visual inspections, (3) performance tests, and (4) concentration of organics and inorganics—resample as needed to explore relationship trends.
- **Specific Aim 4:** Facilitate the adoption of research findings (e.g., training materials, NFPA 1851, NFPA 1971, manufacturer material selection).

The data produced by this study will be used to improve confidence that turnout gear will remain protective throughout its lifecycle. Specifically, the findings are expected to inform (1) new test methods for NFPA 1971 (e.g., known use conditions could be used to develop simulated aging tests), (2) NFPA 1851 guidance (e.g., use-based retirement criteria), and (3) design considerations for manufacturers (e.g., layer-specific performance issues).

In order to obtain technical recommendations regarding the study design, execution, and interpretation of results prior to presenting the work to the NFPA 1971 committee and its sub-committee for NFPA 1851, NIOSH has established a NIOSH Turnout Gear Lifecycle Partnership (“Partnership”). The NFPA 1971 Chair and other stakeholders helped to establish the membership of the Partnership to ensure diversity of thought, comprehensive stakeholder perspectives, and an understanding of historical NFPA 1971 and 1851 committee/sub-committee discussions and perspectives. Coordinating with these NFPA committees and the Partnership is intended to ensure that the NFPA committees consider this study’s findings and recommendations to be adoptable through enhancements to the language in the NFPA 1971 and 1851.

Collaboration between NIOSH and fire departments is necessary for Specific Aim’s 1 and 2.1. In order for NIOSH to conduct the Research Project, used fire fighter gear must be collected, tested and evaluated, and the fire department must provide department run statistics and exposure tracking data (i.e., National Fire Operations Reporting System data), and laundering and repair history information to determine data trends.

III. Experimental/Research Plan

This Research Collaboration Agreement pertains to

- Collecting turnout gear from the fire department as outlined in Specific Aim 1, Sampling Strategy, with NIOSH providing a \$1,612.98 voucher, CDC award # 75D30119P06022, for each coat-trouser combination collected.
- Reviewing fire department documents (e.g., turnout gear records, run statistics, turnout gear cleaning and repair policies) and obtaining survey data from fire fighters as outlined in Specific Aim 2.1, Use History Estimates.

Both Specific Aims are described in more detail below.

Specific Aim 1: Sampling Strategy

Using the collaborating fire department's annual run statistics and the year that each coat and trouser was put in service, an estimated number of fire-related calls to which each article was exposed will be calculated. An example of the sampling design for the coats and trousers is provided below:

- Exposure Category 1: <150 fire-related calls
- Exposure Category 2: ≥ 150 and <300 fire-related calls
- Exposure Category 3: ≥ 300 and <450 fire-related calls
- Exposure Category 4: ≥ 450 fire-related calls

Within each Exposure Category, only coats and trousers of a certain size (e.g., trousers with a waist size of ≥ 39 " and an inseam of ≥ 31 ") will be considered for sampling. This exclusion criteria is necessary to ensure that a sufficient number of specimens may be harvested from the garment to achieve Specific Aim 2.3: Performance Testing.

For each Exposure Category, the project team will randomly select coats until an initial sample size of 15 coats is obtained, yielding a total of 60 coats for that department. The coat serial number will be used to identify the fire fighter to which the coat is assigned. The trousers that are assigned to this same fire fighter will also be sampled if they fall into the same Category. Otherwise, trousers will be randomly sampled until 15 within each Category are obtained.

In addition to sizing restrictions, a fire fighter must be the user of the coat/trouser for at least 75% of its time in service; otherwise, it is excluded from the study. Fire department turnout inventory records will be used to assess this factor.

With this initial sample of 60 coats and trousers from a single fire department, statistical analyses will be conducted on the results from Specific Aim 2.1 to 2.4. Any trends in the data that would benefit from an increased sample size will be addressed by collecting up to 40 additional coats and trousers from that fire department. The manner in which these 40 additional coats and trousers are sampled will be determined based on the findings from the initial analysis (n=60 coats and trousers) spread across the four sampling categories.

Specific Aim 2.1: Use History Estimates

Use history estimates for each coat and trouser will be obtained from two sources of data:

1) fire department records and 2) National Fire Operations Reporting System (NFORS) department-wide data and exposure tracking information completed by the fire fighters assigned to the sampled coat and trousers.

- Department Records: The project team will collaborate with fire departments that maintain detailed records regarding the launderings and repair of their turnout gear, including data maintained by the department's Independent Service Provider (ISP). However, preliminary discussions with departments indicates that these records may only be available for the past two or three years. The department's laundering and repair policies, and any changes to those policies that occurred during the period when the sampled gear was in service will be reviewed. These detailed records and policy history will be used to inform estimates related to the laundering and repair history for each coat and trouser in the study.

NFORS Department-Wide Data and Exposure Data Modules: NFORS is a system designed to improve fire fighter and civilian safety through consistent and quality data (<https://www.nfors.org/faq/>). It is currently administered by the International Public Safety Data Institute (IPSDI). The fire department shall allow IPSDI to provide NIOSH with **at least 6 months** of its Department-Wide Data from NFORS. If the department has access to more than 6 months of data, NIOSH requests that the total amount of data be provided to NIOSH to increase the robustness of the study design.

If a fire department does not currently use NFORS, NIOSH will coordinate with IPSDI to provide the department with support for the one-time NFORS implementation fee (\$5,000) voucher, CDC award # 75D30119P04294. Regardless of whether the department currently used NFORS or not, NIOSH will further coordinate with IPSDI to provide the department with support for a six- month subscription voucher, CDC award # 75D30119P04294.

Six-month subscription costs are expected to range from \$6,600 to \$13,800 based on the department sizes being targeted for this study. Therefore, depending on department size and the need for NFORS implementation, NIOSH will provide approximately \$6,600 to \$18,800 of NFORS support to obtain exposure and use history data for this study. All subscription support will be based on NFORS 2018 6-month subscription costs.

The Collaborator will notify all of its fire fighters within the department of its interest to have their participation in this study and will ask each firefighter to complete the NFORS exposure tracking module following each run/call for at least 6 months. If possible, the Collaborator will also provide IPSDI with their turnout gear coat and trouser serial numbers and assigned firefighters for IPSDI to link each firefighter to their assigned gear sets within the NFORS system—the purpose of which is to reduce the burden to the firefighter who is entering the exposure information. Firefighters will have the ability to opt out of being a part of this study within NFORS if they choose.

IPSDI will provide NIOSH with at least 6 months of NFORS data for all turnout gear coats and trousers associated with firefighters who opted to be included in this study. Using these data, NIOSH will select 100 turnout gear coats and 100 turnout gear trousers that it intends to sample—note, NIOSH will first sample 60 coats and trousers and later sample 40 coats and trousers. NIOSH will notify the Collaborator of the coats and trousers it intends to sample. The Collaborator will be given sufficient time to replace these coats and trousers prior to NIOSH collecting them.

NIOSH will not receive any personal identifiable data from IPSDI—exposure data will be provided to NIOSH based on coat/trouser serial numbers only. The NFORS data system is served exclusively over HTTPS. All NFORS data is stored with at least dual redundancy and utilizes AES-256 encryption at rest. The infrastructure runs inside data centers designed and operated by Amazon Web Services (AWS). AWS data centers feature state of the art environmental security controls to safeguard against fires, power loss, and adverse weather conditions. Physical access to these facilities is highly restricted and they are monitored by professional security personnel.

The project team will travel to each fire department to collect the sampled turnout gear and take pictures of storage conditions or otherwise document any unique exposures to hazards such as UV light. The fire department will be responsible for implementing NFORS and encouraging its fire fighters to provide exposure data after each run/call.

IV. Contributions of the Parties

The contributions of NIOSH and the Collaborator are described below in the sequence that they must occur:

- Step 1: Collaborator provides NIOSH with NFORS department-wide data and NFIRS run statistics (6-month minimum with additional data desired if available), turnout gear inventory database, Independent Service Provider data, and policies related to when turnout gear is laundered or repaired
- Step 2: NIOSH selects 60 coats and 60 trousers based on the run statistics and turnout gear inventory—this will include some newer gear

- Step 3: NIOSH confirms with IPSDI that selected coats/trousers are associated with fire fighters who have opted in to the study.
- Step 4: NIOSH provides Collaborator with 60 vouchers (\$1,612.98 per voucher, which is \$96,778.80 in vouchers) for replacement gear with Miami-Dade Fire Rescue's Bunker Gear Ensemble contracted vendor.
- Step 5: Collaborator orders replacement gear using the vouchers provided by NIOSH.
- Step 6: Collaborator has all selected coats and trousers cleaned per their procedures for safe transport and handling by NIOSH staff.
- Step 7: NIOSH travels to Collaborator to collect selected coats and trousers and to collect updated Independent Service Provider data for each coat and trouser.
- Step 8: Collaborator encourages all of its fire fighters to provide exposure data at the completion of each call/run.
- Step 9: NIOSH tests and evaluates all sampled gear and selects up to an additional 40 coats and 40 trousers for further testing (if needed based on data trends).
- Step 10: NIOSH confirms with IPSDI that selected coats/trousers are associated with fire fighters who have opted in to the study.
- Step 11: NIOSH provides Collaborator with a voucher for every additional coat/trouser (up to 40 articles; \$1,612.98 per voucher, which is \$64,519.20 in vouchers) for replacement gear with Miami-Dade Fire Rescue's Bunker Gear Ensemble contracted vendor.
- Step 12: Steps 5 thru 7 repeated and NIOSH tests and evaluates all sampled gear.
- Step 13: NIOSH provides Collaborator with a report of findings.

V. Materials Contributed by NIOSH

1. Up to 100 vouchers (\$1,612.98 per voucher for a total of \$161,298.00)—one voucher for every coat/trouser collected.
2. One-time implementation fee for NFORS—only if fire department does not already use NFORS.
3. A 6-month NFORS subscription based on the size of the fire department and the 2018 subscription costs.
4. A final report at conclusion of analyses from testing and evaluation of collected turnout gear.

VI. Materials Contributed by Collaborator

1. Department run statistics—NFORS and NFIRS data (at least 6 months of data, but additional data is desired if available).
2. Turnout gear inventory.
3. Turnout gear records—e.g., laundering and repair history, policies, and Independent Servicer Provider records.
4. Up to 100 coats and 100 trousers as selected by NIOSH.
5. Training/education to encourage fire fighters to provide exposure data at the completion of each call/run.