

Standard

Department:	ENVIRONMENT HEALTH AND SAFETY	Number:	LMS0057A
Subject:	FIRE RESISTANT WORKWEAR	Reference:	

1. SCOPE AND PURPOSE

This standard applies to all Suncor Energy Inc. Oil Sands employees, contractors, vendors and visitors herein referred to as personnel or worker and is part of the Oil Sands EHS management system.

The purpose of this standard is to ensure Fire Resistant Workwear (FRW) standards are established and required items are available and utilized by personnel, to minimize the severity of burn injuries from flash fires or electric arc flashes. This standard applies to all personnel who are required to wear fire resistant workwear during normal work activities, outage / shutdown activities and during non-routine or emergency operations in designated operating and support areas deemed as hazardous by Suncor Energy Inc., Oil Sands.

This standard delineates responsibilities and establishes selection criteria based on hazard assessment. The goal of this standard is to provide appropriate protection to personnel in a manner consistent with regulatory requirements and accepted professional practice. As a minimum, this standard shall be consistent with the current Alberta Occupational Health and Safety Code, Part 18 - Personal Protective Equipment unless otherwise noted.

2. STANDARD

2.1 General

Where the potential exists for a worker to be exposed to a flash fire or flashover of electrical equipment, fire resistant outerwear and associated personal protective equipment (PPE) must be utilized. See Appendix I for the list of applicable hazardous areas.

Workwear that is appropriate to wear as protection against flash fires or electric arc flashover should have the following characteristics:

All fire resistant fabrics will comply with the requirements of the following standards:

CAN/CGSB 155.20 – 2000, Workwear for Protection against Hydrocarbon Flash Fire.

CAN/CGSB 155.21-2000, Recommended Practices for the Provision and Use of Workwear for Protection against Hydrocarbon Flash Fire.

NFPA 2112 – 2007, Standard on Flame-Resistant Garments for Protection of Industrial Personnel against Flash Fire.

NFPA 70E – 2004, Standard for Electrical Safety in the Workplace.

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ASTM F 1506-02ae1, Standard Performance Specification for Flame Resistant Textile Materials for Wearing Apparel for Use by electrical Workers Exposed to Momentary Electric Arc and Related Thermal Hazards.

PROBAN is not an acceptable fabric to be used at Oil Sands and is not permitted in any area requiring Fire Resistant Workwear.

Nomex is not to be worn for welding applications unless it is used in conjunction with leathers.

2.2 HAZARD ASSESSMENT

A specific hazard assessment of the work environment shall be conducted to determine the requirement for the wearing of fire resistant garments based on the known and potential flash fire or arc flash hazards present. Prior to selecting the type of fire resistant garment or protective equipment, the following factors shall be considered during the hazard assessment, but is not limited to:

- Determination of the type of hazard or hazards present in the workplace and the potential magnitude and duration of the hazard
- Determination of the adverse effects of unprotected exposure to the hazards identified
- Determination of whether other control options (engineering, administrative, and so forth) can be used instead of flame-resistant garments
- Determination of garment performance characteristics needed for protection
- Determination of the need for garment decontamination where applicable
- Determination of ergonomic constraints of work to be performed while wearing the garment
- Comparison of risks and costs of all options
- Implementation of selected option(s)

Once in the field, flash fire &/or arc flash hazards should be reassessed using the Field Level Risk Assessment (FLRA) or equivalent prior to beginning work in the area to ensure the selection of PPE is adequate for the current conditions.

At no time shall the wearing of jewelry interfere with the effective use of personal protective equipment or shall the jewelry become a hazard in and of itself.

Conductive articles (jewelry, watch bands, key chains, and baseball caps) shall not be worn where they present an electrical contact hazard with exposed live parts.

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In addition, the following factors shall be considered, but not be limited to, during the hazard assessment, prior to selecting the type of fire resistant workwear:

- Proximity of the work to be performed to a hazard presenting a flash fire potential
- The presence of flammable materials in the environment during process operations
- The potential for the task being performed to increase the possibility of a flammable release; this could result from a mechanical failure such as a line breaking
- Operating conditions of the process — that is, potential for flammable fumes or vapors, and so forth
- The presence of engineering controls designed to reduce exposure to flammable materials present during normal operations
- Incident history
- Means and duration of egress within potential exposure zone (e.g., location and distance to exits, potential congestion, elevated or restricted areas, connections to lifelines/ fall protection, capability of workers to escape, etc.).

2.3 SPECIFICATIONS FOR GENERAL USE

- For maximum protection, fire resistant garments shall be worn as described in the manufacturer's instructions.
- Fire resistant workwear is to be worn as the outermost layer of clothing.
- Reflective striping is required on fire resistant workwear worn as the outermost layer of clothing.
- Fire resistant garment collars shall be worn closed.
- Sleeves and cuffs shall be worn down and secured.
- Protective neck, head, hand, and foot coverings shall be worn if the occupational hazard warrants their use and must be constructed of fire resistant fabric or contained by a fire resistant hood.
- Other personal protective equipment (PPE) shall be worn as determined by the review of the potential hazards to which workers are exposed.
- Workers shall not be permitted to wear non-fire resistant clothing over fire resistant garments.
- Fire resistant or non-melting undergarments (the layer closest to the skin) shall be used. An incidental amount of elastic used on non-melting fabric underwear or socks shall be permitted.

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- Only natural fibres should to be worn under fire resistant garments. Synthetic fabrics such as Nylon, Polyester and Acrylic can melt if exposed to excessive heat from a flash fire or electric arc flashover.
- Fire resistant workwear should be properly fitted - the air gaps between the FRW, the clothing worn underneath and the skin provides thermal insulation.
- FRW must be free of excessive oils and greases and should have no tears, rips, etc. that would expose the clothing or the skin underneath to direct heat and flame. Metal snaps and zippers should be covered or enclosed with the FRW fabric.
- FRW, once exposed to a flash fire, electric arc flashover or excessive heat, must be returned to the Materials Management/Area tool crib attendants for proper inspection/disposal.
- Rain gear and slickers used for chemical resistance and weather are available in **fire resistant** fabrics but are not **fire resistant** by themselves. These garments can be used safely **if a layer of FRW is worn underneath**.

2.4 SELECTION

The selection of fire resistant workwear will comply with NFPA 2113, *Standard on Selection, Care, Use and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel against Flash Fire*. The following factors will be considered, but not limited to, when selecting fire resistant workwear:

- Thermal protective characteristics of the fabric,
- Physical characteristics of the fabric,
- Garment construction and components (for example, pockets, types of closures and fasteners, etc.)
- Avoidance of static charge buildup,
- Design type of the garment,
- Type of conditions under which the garments will be worn,
- Comfort properties of the fabric and garment,
- Cleaning and maintenance considerations.

Garments shall be selected so that they cover both the upper and lower body and non-fire resistant under layers as completely as possible.

Garments shall be selected that:

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- Contain primary closure systems that function after exposure to a flash fire hazard and that avoid meltable closure systems (e.g., non–fire resistant hook-and-loop).
- Offer minimal interference and minimal hindrance to perform the work task required in the flash fire or electrical flashover hazard zone.
- Provide optimum protection so as not be tight fitting.
- Non–fire resistant emblems attached to the exterior of the garment (e.g., logos, name tags, non–flame-resistant silk-screened artwork, etc.) shall be kept to a minimum, both in surface area and number and must be attached over a minimum of 2 layers of fire resistant fabric (i.e. sewn over a pocket).

2.5 PURCHASE

Fire resistant garments to be purchased shall comply with this standard and where necessary, must comply with LMS0086A -Suncor Specifications for Manufacturing Fire Resistant Garments.

2.6 PRE-USE INSPECTION

All fire resistant garments must be used as per manufacturer's instructions and are not to be modified in any way.

FRW will be inspected before each use for damage, soiling or contamination and will consist of an examination of all components.

All personnel are expected to not use FRW that is worn, damaged, or modified beyond its manufacturers specified utilization limits. No FRW will be utilized that is not able to perform the function for which it was designed.

2.7 CLEANING, INSPECTION, MAINTENANCE, AND STORAGE

Inspection, cleaning and servicing of all types of fire resistant garments will be conducted according to manufacturer's instructions and performed by certified maintenance technicians where applicable. All fire resistant workwear should be stored in a clean, dry location free from contamination and in a functionally effective condition.

Certain cleaning agents and procedures can affect the fire resistance of some types of fire resistant garments. Fabrics must not be exposed to bleaching agents. Patching and repairs shall only be done with similar fire resistant patches and thread.

It is crucial to clean fire resistant workwear or remove the garment from service and replace with a clean garment if the fire resistant workwear is contaminated with hydrocarbons in a high risk area

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as soiling will reduce the protective qualities of the garment and increase the risk of second and third degree burns.

Contaminated fire resistant workwear and other PPE should be removed prior to entering an uncontaminated or clean area. Contaminated FRW must be segregated and disposed of according to hazardous waste procedures and protocols.

3. ROLES & RESPONSIBILITIES

The EHS Program Manager along with the industrial hygiene group is accountable for the evaluation, maintenance and revision of this standard.

Oil Sands line management is responsible for ensuring the implementation and adherence to this standard. Business Area management is responsible for providing workers with approved Fire Resistant workwear as identified in this standard.

Oil Sands Business Area management is responsible for conducting the hazard assessment to identify known and potential hazards as they relate to fire resistant workwear.

Oil Sands line management is responsible for ensuring an area is established to contain contaminated FRW when necessary and will ensure contaminated FRW is disposed of in accordance to hazardous waste procedures and protocols.

Supply Chain Management (SCM) is responsible to ensure that only approved fire resistant workwear garments are purchased and brought for use on site and that an adequate supply of fire resistant garments is maintained.

Supply Chain Management (SCM) is responsible to ensure that fire resistant garments are manufactured, cleaned and maintained in accordance with this standard and the Suncor Specifications for Manufacturing Fire Resistant Garments.

Supervisors are responsible for ensuring their personnel are aware of and comply with the Operational Controls established.

Personnel are responsible to perform their jobs in accordance with the appropriate Operational Controls and for notifying their supervisor or Suncor contact with any problems relating to those controls.

Personnel must not wear fire resistant garments that are damaged or deteriorated beyond repair.

Personnel must ensure that clothing worn beneath fire resistant workwear and against the skin is made of fire resistant fabrics or natural fibres that will not melt when exposed to heat.

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Personnel are responsible for identifying and returning their Suncor issued FRW in need of repair or beyond repair to the area Materials Management or tool crib attendant.

4. EXCEPTIONS

Any exceptions or changes to this standard must follow the Management of Change process, approved through EHS and must be accompanied by a formal hazard assessment.

Unless explicitly told that FRW is not required, FRW shall be worn during outages/ shutdowns / turnarounds.

5. IMPLEMENTATION: The Oil Sand's Areas Cross Functional Management Team is responsible for the implementation of this document.

6. INTERPRETATION AND UPDATING: The EHS Program Manager shall ensure interpretation and updating of this standard.

7. DEFINITIONS:

Aramid Fabric: A manufactured fibre in which the fibres exhibit low flammability, high strength and high modulus. These fibres maintain their integrity at high temperatures, but may shrink.

Cleaning: The removal of dirt and debris.

Chemically Treated Fabric: A chemical process or treatment is applied, where flame resistance is imparted to a material such as cotton or rayon. An untreated fabric would burn &/or melt when exposed to flame. Intense heat activates the flame-resistant chemicals which produce combustion inhibiting gases and char.

Component: Any material, part, or subassembly used in the construction of the garment necessary for meeting the requirements of this standard.

Contamination/Contaminated: The process of transferring a hazardous material from its source to people, animals, the environment, or equipment, which may act as a carrier.

Cross-Contamination: The transfer of contamination from one item to another or to the environment.

Decontamination: The physical and/or chemical process of reducing and preventing the spread of contamination from persons and equipment used in a contaminated environment.

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Emblem(s): Shields, heraldry, or printing that designates a governmental entity or a specific organization; rank, title, position, or other professional status that is painted, screened, embroidered, sewn, glued, bonded, or otherwise attached in a permanent manner.

Fabric: The one or more layers of textile material(s) used in the primary construction of protective garment(s).

Fibre: A unit of matter, either natural or manufactured, that forms the basic element of fabrics and other textile structures.

Flame Resistance: The property of a material whereby combustion is prevented, terminated, or inhibited following the application of a flaming or non-flaming source of ignition, with or without subsequent removal of the ignition source.

Flash Fire: A fire that spreads rapidly through a diffuse fuel, such as dust, gas, or the vapors of an ignitable liquid, without the production of damaging pressure.

Garments: Clothing including, but not limited to, coveralls, trousers, shirts, outerwear, and rainwear.

Heat Transfer: The thermal stability of the fibre components of a garment (weight and thickness) to provide a thermal barrier, with the requirements increasing with the intensity of the heat assault.

Hardware: Non-fabric components of the flame-resistant garment including, but not limited to, those made of metal or plastic.

Inherently Flame Resistant (IFR) fabric: Manufactured fabrics whose genetic material makes them naturally flame resistant without a chemical treatment. The molecular structure of the fibres does not support combustion.

Labeled: Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Lining: Any material that is attached and used to cover or partially cover the inside surface of a flame-resistant garment.

Melt: A response to heat by a material resulting in evidence of flowing or dripping.

PBI: Polybenzimidazole. A manufactured fibre with high chemical resistance that does not burn in air, has no melting point and does not drip when exposed to flame.

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Product Label: A label or marking affixed to a product by the manufacturer that provides general information, warnings, instructions for care and maintenance, and other information.

Reflective Striping: Material added to the exterior of the garment to enhance nighttime or daytime visibility.

Reinforcement: An additional layer of a textile material applied to a specific area of the protective garment to make that portion of the protective garment more resistant to wear.

Retirement: The process of removing protective clothing from service.

Seam: Any permanent attachment of two or more protective garment fabrics in a line formed by joining the separate material pieces.

Service Life: The period for which the protective clothing is useful before retirement.

Static Electricity: The acquisition and retention of electrical charge through induction (by means of corona discharge) or by triboelectric means (rubbing with another material).

Trouser: A garment that is designed to provide minimum protection to the lower torso and legs, excluding the ankles and feet.

Wind/Moisture Barrier: A component of a protective garment designed to inhibit wind penetration and prevent the penetration of liquid water.

Wristlet: The circular, close-fitting extension of the coat sleeve, usually made of knitted material.

REFERENCES TO RELATED DOCUMENTS

Operational Controls – LMS0062A

Personal Protective Equipment – LCS1011A

Suncor Specifications for Manufacturing Fire Resistant Garments – LMS0086A

CAN/CGSB-155.20-2001 *Workwear for protections against Hydrocarbon flash fire*

CAN/CGSB-155.1-2001 *Firefighters’ protective clothing against heat and flame*

CAN/CSGB-155.22-1997 *Fireline workwear for firefighters*

NFPA 2112 *Standard of Flame-Resistant Garments for Protection of Industrial Personnel against Flash Fire*

NFPA 2113 *Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel against Flash Fire*

NFPA 70E

CSA Z96-2002 *High Visibility Apparel*

ASTM F-1506

OSHA 1910.269



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CAPP Consumer Guideline for the Selection of Fire Resistant Workwear for Protection against Hydrocarbon Flash Fires (CAPP Publication # 1999-0005).

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APPENDIX I

AREAS/TASKS REQUIRING USE OF FIRE RESISTANT WORKWEAR

BUSINESS AREA		AREA	TASKS
Extraction	Operations	Plant 4 (including IPS #1/2) Plant 16 Plant 87	<ul style="list-style-type: none"> All hot work All Maintenance Work All work around electrical equipment where a potential for electrical arcing exists.
	Maintenance	And all tasks identified	<ul style="list-style-type: none"> All hot work All Maintenance Work All work around electrical equipment where a potential for electrical arcing exists.
Upgrading	Operations	ALL Plants and Offplot areas	<ul style="list-style-type: none"> All unless noted specifically on permit
	Maintenance		<ul style="list-style-type: none"> All unless noted specifically on permit All work around electrical equipment where a potential for electrical arcing exists
Mine	Welders Electricians		<ul style="list-style-type: none"> All welding All work around electrical equipment where a potential for electrical arcing exists
Emergency Services	Emergency Response	ALL Plants and Offplot areas	<ul style="list-style-type: none"> Emergency Response
Firebag – In Situ Operations	Operations and Maintenance Drilling and well service operations	All designated areas	<ul style="list-style-type: none"> All hands on tasks outside of an office setting. Does not include seismic , corehole construction or gravel operations



The following individuals have approved and signed this document.

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Date: Friday, 20 April 2012, 07:48 AM Mountain Time

Meaning: Approver 1 Signed

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