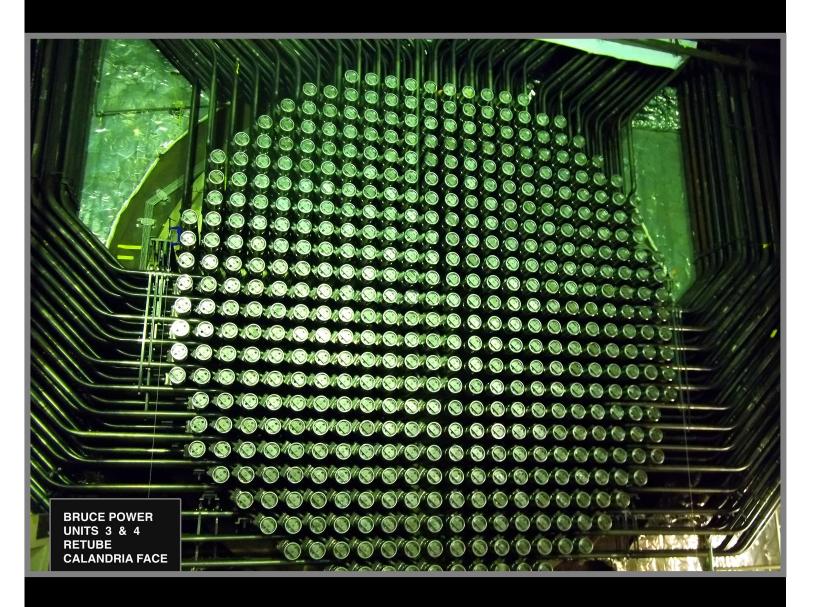
# E.S. Fox Limited

# **Nuclear Services**



# **COMPANY CONTACT**

E.S. Fox Limited — Nuclear www.esfox.com 905-354-3700

## **HEAD OFFICE**

P.O. Box 1010 9127 Montrose Road

Niagara Falls, Ontario L2E 7J9 TELEPHONE: 905-354-3700 WEBSITE: www.esfox.com





# **SERVICES**

- ENGINEERING
- FABRICATION
- CONSTRUCTION
- NUCLEAR
- STRUCTURAL STEEL
- BRIDGES
- TECHNICAL SERVICES



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# E.S. Fox Limited

### **CORPORATE OVERVIEW**

Since 1934, E.S. Fox Limited (ESFL) has set the standard for safety and quality in the fabrication and construction industry. ESFL is a privately owned, Canadian, multi-trade company, providing a single source for Industrial, Institutional, Commercial, and Energy projects. With over 3.5 million direct -hire person-hours last year, we self-perform Structural Steel Fabrication and Erection, Mechanical, Electrical, Sheet Metal, HVAC, Refrigeration, Millwright / Rigging, and Boiler Making.

The strength of our company stems from the vast experience of its people, the integration of a variety of skilled trades, and dedication to total control of construction through computerized planning and monitoring techniques.

ESFL has established a reputation for high quality workmanship, operational flexibility, efficiency, and timely project completion.

### **CONSTRUCTION CAPABILITIES**

As a fully integrated, multi-trade construction firm, E.S. Fox Limited provides clients with a single source solution for their detail engineering, fabrication, construction, and maintenance needs. We are a solutions based provider that delivers a superior level of service from "cradle-to-grave," as we offer multi-trade, service oriented solutions for all your ICI and Energy projects.

### **FABRICATION CAPABILITIES**

E.S. Fox Limited is proud to operate three state-of-the-art fabrication facilities across Ontario. At our main fabrication facility in Port Robinson, we offer over 83,000 square feet of production space. We work to the highest standards to produce Pipe Spools, Modules, Cryogenic Cold Boxes, and Pressure Vessels. With over 800 weld procedures and 40 quality certifications including nuclear, E.S. Fox Limited continues to be a leader and a symbol of Canadian strength and tradition in the supply of Quality Fabrication Services for the Industrial, Commercial, Institutional, and Energy markets for over eight decades.



# E.S. Fox Limited Environmental Health and Safety

#### SAFETY CULTURE

At ESFL, employee safety, protection of the environment, and work quality are the main focus of our safety culture. Both management and employees work together in an effort to further advance knowledge of safety and incident prevention. Together we work to ensure a safe work environment for all. Our employees believe in the fundamental principle that safety is everyone's responsibility.

One of our core values is to "Prevent the Event." Incident prevention is the integral part of every job with the safety and well-being of each individual the <u>number one priority.</u>

#### SAFETY PROGRAM KEY ELEMENTS

- Corporate Safety Manual
- Site Specific Safety Plans
- Orientation and Training
- Incident Investigation
- Lessons Learned Bulletins
- Job Safety Analysis
- Workplace Inspections
- Senior Management Review

- Safety First Attitude
- Trending and Analysis
- Setting Objectives and Targets
- Safety Workshops
- Mentoring Program
- J.H.S.C.
- Strong Communication
- Accountable Supervision
- Safety Meetings







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# E.S. Fox Limited Quality Assurance



# E.S. Fox Limited - Safety and Quality Assurance Certifications

#### ISO

- ISO 9001:2015
- ISO 14001
- ISO 45001



#### **CWB**

- Structural Steel CWB W47.1 Div. 1
- Structural Aluminum CWB W47.2 Div. 1



# CSA

- CSA N285.0 Nuclear Class 1, 2, 3, & 4
   Parts, Components & Support
- CSA N285.0 Nuclear Material Supply Ferrous and Non-Ferrous (3 Locations)
- CSA N286-12 Nuclear
- CSA N299.1 2016
- CSA B51 Boiler, Pressure Vessels & Pressure Piping & Repairs
- CSA B51 Category A, B, C, E & H
   Type Welded Non-Welded Fittings
- CSA B51 Hot Tap & Line Stopping
- CSA B52 Mechanical Refrigeration Code
- CSA Z7396. 1-17 Medical Gas Pipeline Systems Part 1

#### **ASME**

- ASME Section III, Division 1: N, NPT, NA, NS
- ASME Section VIII, Division 1 & 2 Pressure Vessels
- ASME U, U2, S, & PP Stamps
- ASME B31.1 Power Piping
- ASME B31.3 Process Piping
- ASME B31.5 Refrigeration Piping
- National Board Registration for ASME Section I, III, VIII



#### COR

 COR and Infrastructure Health and Safety Association Certification





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# E.S. Fox Limited Locations & Facilities

# Head Office: Niagara Falls, ON —250,000 square feet

Branch Location	Capabilities		Square Footage
Darlington, ON	Construction		
Hamilton, ON	Construction	Fabrication	10,000 sq. ft.
Kingston, ON	Construction	Fabrication	17,000 sq. ft.
Port Robinson, ON		Fabrication	83,000 sq. ft.
Thunder Bay, ON	Construction	Fabrication	5,000 sq. ft.
Tiverton (Kincardine), ON	Construction		
Vaughan (Toronto), ON	Construction		
Oshawa, ON	Construction		
Sarnia, ON	Construction		
		Total Fabrication	115,000 sq. ft.



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## **ENGINEERING CAPABILITIES**

E.S. Fox Limited has extensive engineering experience relating to quality programs such as ISO 9001, CSA N299/Z299, and CSA M285.0/MCA-4000; ranging from conventional piping to Class 1 Nuclear components. Our Engineering team's commitment and goal is not just to complete the project on time, but also to add value to your project in the most efficient manner possible.

E.S. Fox Limited Engineering provides the following services but not limited to:

- Design Engineering
- Virtual Construction
- Total Station Services
- CAD Services
- Welding, Manufacturing, and Metallurgical Engineering



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## **FABRICATION SERVICES**

At our main fabrication facility in Port Robinson, Ontario, we offer over 83,000 square feet of production space. We work to the highest standards required to produce Cryogenic Cold Boxes, Pipe Spools, Modules, and Pressure Vessels. With more than 800 weld procedures, we fabricate:

#### **Modules and Vessels**

- Process Modules and Equipment Skids
- Cryogenic Air Distillation Columns for: Oxygen, Nitrogen, and Argon
- Air Liquefaction / Separation
- Hydrogen Purification
- Catalyst Reclamation
- Oil / Water Purification

# **Pipe Fabrication**

- Stand alone contracts & support of field projects and other fabrication projects
- Area of expertise is high alloy materials: Stainless Steel, Aluminum, Titanium, Chrome-Moly
- Carbon Steel up to 84" Diameter
- Victaulic—Roll Grooved Piping up to 48" Dia.
- Jacketed Pipe



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# **CONSTRUCTION SERVICES**

As a fully integrated, multi-trade construction firm, E.S. Fox Limited provide clients with a single source solution for their detail engineering, fabrication, construction, and maintenance needs. We are a solutions-based provider that delivers a superior level of service from "cradle-to-grave," as we offer multi-trade, service-oriented solutions for all your ICI and Energy projects.

We provide the following Construction Services:

- Construction Management
- Piping
- Electrical
- Structural Steel
- Ironworking
- Millwrighting
- Boiler Making

- Sheet Metal
- HVAC
- Instrumentation & Controls
- Operating Engineering
- Insulation
- Carpentry
- Refrigeration



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# **NUCLEAR SERVICES**

E.S. Fox Limited is a people-first, environmentally conscious, socially responsible EPC provider in the Nuclear sector with every aspect of its development. E.S. Fox Limited's Nuclear Services contributed millions of hours in support of Ontario's safe and reliable Nuclear power industry. We provide our clients with a streamlined solution for their detailed engineering, fabrication, construction, and maintenance needs. As the Nuclear power generation sector evolves from large Nuclear reactors to Small Modular Reactors, we are primed to support the transition.

We provide the following Nuclear Services:

- Safety & Quality Control
- Nuclear Fabrication
- Project Management
- Engineering, Procurement, & Construction (EPC)
- Indigenous Relations



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# STRUCTURAL STEEL AND BRIDGE DIVISION

E.S. Fox Limited's Structural Steel & Bridge Division operates as a fabrication and erection service provider throughout Canada. With our highly skilled team of erectors and supervision, E.S. Fox Limited has distinguished itself through our dedication to quality and excellence in all phases of Structural Steel construction. From Commercial and Industrial projects to Bridges and Roller Coasters, E.S. Fox Limited continues to be an industry leader focused on organizational excellence through principles such as Safety, Quality, and Service.

We provide the following Structural Steel and Bridge Services:

- Architecturally Exposed Structural Steel
- Commercial and Industrial Steel
- Institutional Steel
- Bridges
- Themed Entertainment



# **HEAD OFFICE**

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## **TECHNICAL SERVICES AND MAINTENANCE**

ESFL's highly-qualified factory-trained technicians provide services on all types and brands of equipment encountered across all Industrial, Commercial, Institutional, and Energy markets. They are certified for specialized critical environments such as oil & gas (onshore, offshore, oil sands), nuclear, biopharmaceutical research, healthcare, data centres, museums, and art galleries.

ESFL offers maintenance agreements tailored to meet the specific needs of different systems and owner priorities.



# WE OFFER SERVICES FOR:

- Installations
- Heating, Ventilation, & Air Conditioning
- Mechanical Repairs & Maintenance
- Refrigeration
- Technical Services Building Analysis
- Energy Retrofit Projects
- Savings & Incentives

From HVAC and Controls to Design-Build systems, ESFL offers a wide range of technical services.



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# <u> OPG — NWMD — Resin Liner Repackaging Project</u>

### Client

#### Ontario Power Generation

## Scope

- The engineered equipment and systems, operating procedures, management team, project crew, and project implementation experience resulted in a successful and on-schedule retrieval of 400 liners over two phases of the project
- Project completed without compromise to safety of the project or site personnel, environmental, and financial objectives

#### **Trades**

**Production Workers** 

## **HEAD OFFICE**

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# **Bruce Power Unit 1 and 2 Turbine Control Upgrades**

## Client

#### Siemens

# Scope

- Installation of fiber-optic cables from turbine floor to control room
- Installation of conduit and tray for new cable
- Fiber-optic terminations and testing
- Replacement of control cabinets
- CDF Rack cross ties

#### **Trades**

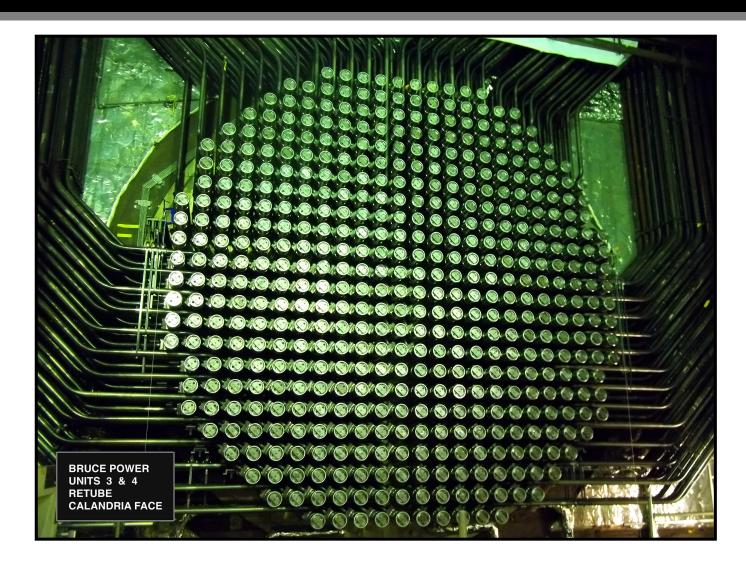
Electrical | Controls

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# Feeder Tubes — Bruce Retube Project

Client

**Bruce Power** 

Scope

- Fabricate and install 1,920 replacement Feeder Tube Sections (Bruce 1&2)
- Original specification called for welded fittings on compound bends
- Specification changed to utilize all bent feeders (welded elbows eliminated)

**Trades** 

Production Workers | Pipefitters

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# **Bruce Power Unit 2 Turbine Generator Upgrades**

Client

**Bruce Power** 

Scope

- LP Spindle Replacements
- Condenser modifications
- Stator cooling water piping replacements
- Stator core replacement
- Rotor replacement

# **HEAD OFFICE**

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# **Bruce A — Standby Generators Fuel Skid Fabrication**

## Client

# Scope

Kinetrics Inc.

- Fabrication of Fuel Skid structural frame, ladders, & walking platforms to CSA W59-13
- Component Machining
- Pressure Boundary welding of stainless steel piping to ASME B31.1
- Assembly, mounting, & connecting of pumps, instrumentation, meters, and various specialty devices
- On-skid electrical power & instrumentation wiring
- Painting & finishing
- Materials supply & procurement to N299.4 standard
- Quality Assurance & inspections to N299.3 standard
- NDE inspections

### **Trades**

Production Workers | Vessel Workers

### **HEAD OFFICE**

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# OPG Western Waste Management—Incinerator Upgrades Project

Client

Ontario Power Generation

Scope

The purpose of this project was to increase the incinerator availability. This was achieved by upgrading the support system which included 14 modifications. The upgrades led to improving the existing design, replacing obsolete equipment with state-of-the-art technology, and adding redundant backup systems. The result led to the incinerator availability being increased by 72%.

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# **Emergency Power Generator 3 — Ontario Power Generation**

# Client

### **Ontario Power Generation**

# Scope

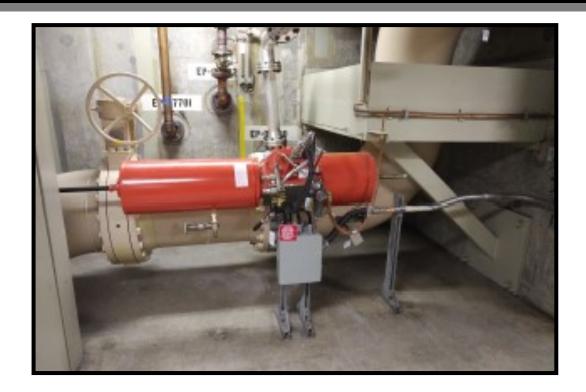
- Installation of new double wall buried fuel lines
- 8 MW fuel turbine generator
- Diesel generator start motor
- 25 ton overhead crane
- 125 VDC Battery System
- Compressed Air System
- Generator fuel lines
- Lube oil system
- 600 VAC distribution auxiliary power system
- Automatic Transfer Switch
- Fire Alarm, PA/LAN/Phone
- Heating & Ventilation Unity and systems

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# **Darlington VVRS Projects — Ontario Power Generation**

# Client

**Ontario Power Generation** 

Scope

The purpose of the reactor Vault Vapor Recovery System (VVRS) is to recover D2O vapors for economic reasons and to maintain low tritium contamination levels in the containment areas in order to minimize internal dose to personnel. The system is a vital component of the Contain portion of the reactor safety 3Cs. It is classified as a System Important to Safety as part of the Negative Pressure Containment system which maintains containment at negative pressure compared to atmosphere to prevent uncontrolled releases. The VVRS project consists of upgrading aging equipment, installing new redundant containment boundary valves, installing a connection for moderator vacuum drying equipment and installing temporary bypass fans to keep the vault at negative pressure during the phase where airlock doors remain open. Keeping the doors open is crucial: it allows for efficient passage of equipment and workers during the removal and subsequent construction phases of refurbishment. ESFL worked on the VVRS projects for all 4 units, completing units 1, 3 and 4 on schedule and under budget.

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# Retube & Feeder Replacement Island Support Annex

#### Client

Ontario Power Generation

#### Scope

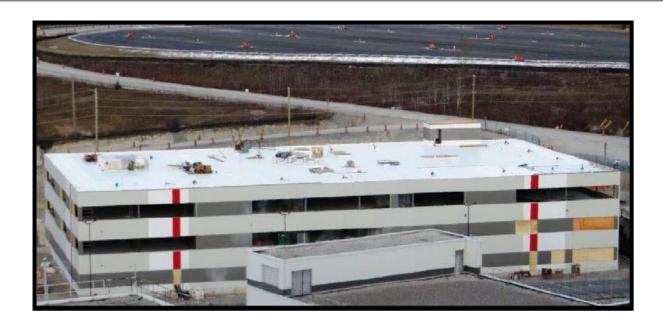
E.S. Fox Limited was the EPC contractor for construction of the Retube & Feeder Replacement Island Support Annex (RFRISA) facility. The new building consists of 37,500 ft2 of floor space, of which 12,000 ft2 is set aside for the workshop. The RFRISA meets the needs of the Nuclear Refurbishment Project for the duration of all Refurbishment activities. The RFRISA facility provides the following:

- Demolition of the existing Reactor Maintenance Building (Building 29) and associated trailers T27 and T30 (if applicable) currently located within the RFRISA footprint; relocation of existing site services
- A minimum of 200 offices and workspaces; one 90 person pre-job brief area and one 40 person conference room.
- Shop facilities, including bridge crane, to meet the needs of Nuclear Refurbishment
- Associated Building Services and Station System tie-ins

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# Refurbishment Project Office — Ontario Power Generation

### Client

Ontario Power Generation

## Scope

E.S Fox Limited was the EPC contractor for construction of a new 97,000 ft2 Refurbishment Project Office (RPO) to meet the needs of the Nuclear Refurbishment Project for the duration of Refurbishment activities. The RPO is a stand-alone building located in the southwest corner of the DNGS site and provides OPG with the following amenities:

- A secure access point to the DNGS Protected Area for the Nuclear Refurbishment workforce
- A minimum of three hundred offices and supporting features for OPG and Contractor Project Management staff
- A lunchroom including a food storage area for up to 1,100 lunches, with a minimum throughput of 400 people per half hour on staggered lunches
- A secure locker and change room providing work crews with storage for street clothing when working in radiation protection clothing. The change room incorporates a separate storage area for radiological and conventional PPE
- A secure Project Work Site Surveillance Room
- Associated Building Services and Station System tie-ins including Security tie-ins
- Design and construction of project including site grading, parking lot, road and pathway modifications, all associated lighting, and a PPE free pathway from RPO to RFRISA

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# **OPG DNGS — U2 Fire Protection**

## Client

Ontario Power Generation

## Scope

This project was an EPC contract awarded as a part of the DNGS Refurbishment Program. The purpose of the project was to perform a number of different modifications to address performance gaps in the fire protection systems across Unit 0 and Unit 2. of DNGS. The project was divided into multiple scopes including:

- Modifications to Fire Separation via the installation of new Fire Dampers within Unit 0 HVAC system and the enhancement of Unit 0 change room doors and laundry shoots to improve fire rating between elevations
- Addition of emergency lighting within the U0 transfer chamber including tie-ins to existing class II power
- Installation of new addressable detectors and EST3 control panel within U2 and U0. This involved the replacement of all existing analog detectors, pyrotronics control panel, and the implementation of new software controls
- Installation of new Fault Isolator modules within the south stairwells in U2. This involved modification of existing alarm system including the software upgrades

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Waste Products / Containers for OPG

# <u>Low Level Waste</u> <u>Containers</u>



# **Basket Stacking Frames**



Spent Fuel Modules



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