

PART 1 - GENERAL

<u>1.1 SECTION INCLUDES</u>	.1	Title and description of Work.
	.2	Contract Method.
	.3	Contractor use of premises.
	.4	Owner occupancy.
<u>1.2 REFERENCES</u>	.1	American Conference of Governmental Industrial Hygienists (ACGIH), Bioaerosols Assessment and Control 1999.
	.2	Health Canada/Workplace Hazardous Materials Information System (WHMIS).
	.1	Material Safety Data Sheets (MSDS).
	.3	Canadian Standards Association (CSA International).
	.1	CAN/CSA-Z94.4-02 Selection, Use and Care of Respirators.
	.4	Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario RSO 1990, Chapter O.1 as amended, O. Reg. 278/05.
	.5	Canada Labour Code 1985 Canada Occupational Safety and Health Regulations.
<u>1.3 OUTLINE OF WORK</u>	.6	Environmental Protection Act RRO 1990, O. Reg. 347 as amended.
	.7	Environmental Abatement Contractors of Ontario (EACO) Mould Abatement Guidelines, 2004, Appendix B - Procedures for Clean Up of Bird and Bat Droppings.
	.1	Work of this Contract comprises of removal of bird and animal guano on the two towers of the Burlington Lift Bridge in Burlington, Ontario.
	.2	The work will be conducted in the open space, below the machine rooms on both towers, extended to below the high voltage wire raceway and the catwalk but will also include the vertical surfaces of the side walls protecting this area and any surfaces within this described area.

1.3 OUTLINE OF WORK (Cont'd)	.3	There are nesting Falcons on the North Tower Bridge and considerations for the protection of these birds and for the protection of the workers from these birds will be included.
	.4	Cleanup surfaces and decontaminate.
	.5	Remove and dispose of existing insulation materials.
	.6	Removal of guano shall follow the Type 3 asbestos removal process in accordance with Ontario Regulation 278/05 under the Occupational Health and Safety Act as modified in this Section.
	.7	Cable inspections by a qualified electrician must be conducted after dry removal of guano and prior to wet cleaning of cables to ensure integrity of cables.
	.8	Removal, disposal and cleanup must proceed slowly and carefully in a systematic manner.
1.4 EXISTING CONDITIONS	.1	Reports and information pertaining to Guano to be handled, removed, or otherwise disturbed and disposed of during this project are bound into this specification. Refer to Appendix A.
1.5 MEASUREMENT PROCEDURES	.1	Work will not be measured separately for payment.
1.6 DEFINITIONS	.1	Airlock: a system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways at least 6-1/2 feet (2 m) apart.
	.2	Amended water: water with a non-ionic surfactant wetting agent added to reduce water tension to allow thorough wetting of guano.
	.3	Authorized visitor: the Departmental Representative or designated representative, Clerk-of-Works, and persons representing regulatory agencies.
	.4	Competent person: individuals who can demonstrate that remediation training has been

1.6 DEFINITIONS
(Cont'd)

- .4 Competent person:(Cont'd)
obtained, is capable of identifying existing microbial hazards in workplace and selecting appropriate control strategy for microbial exposure.
- .5 Contaminated Work Area (CWA): specific area or location where actual work is being performed or such other area of facility which it has been determined may be hazardous to public health as result of remediation.
- .6 Contractor: remediation contractor providing demolition and removal services as defined in specifications.
- .7 Critical barrier or enclosure: minimum of two separate layers of 6 mil (0.15 mm) fibre reinforced polyethylene sheeting (FRPS) taped securely and separately over openings between work area and uncontaminated areas outside of work area.
- .8 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another. Typically constructed as follows: Place two overlapping sheets (minimum overlap of 1 metre or width of doorway) of FRPS over existing or temporarily framed doorway, securing each along top of doorway, securing vertical edge of one sheet along one vertical side of doorway and securing vertical edge of other sheet along opposite vertical side of doorway. Reinforce free edges of FRPS with fibre reinforced adhesive tape and weight bottom edge to ensure proper closing. Space curtained doorways minimum of 6-1/2 feet (2 metres) apart.
- .9 Decontamination Room: enclosure located between Contaminated Work Area and uncontaminated area for decontamination of equipment and workers, typically consisting of two curtained doorways at least 6-1/2 feet (2 metres) apart).
- .10 DOP Test: a testing method used to determine the integrity of the Negative Pressure unit using dioctyl phthalate (DOP) HEPA-filter leak test.
- .11 Disinfectant solution: Wide spectrum disinfectant solution.
- .12 Fibre Reinforced Polyethylene Sheet (FRPS): rip proof polyethylene sheeting with fibre reinforced adhesive tape added along edges.

1.6 DEFINITIONS
(Cont'd)

- .13 HEPA vacuum: a high efficiency particulate air filtered vacuum equipment with filter system capable of collecting and retaining particles greater than 0.3 microns at 99.97 percent efficiency.
- .14 Negative pressure: maintain decontamination area at negative pressure relative to surrounding space to prevent contaminants from leaving contaminated area. Use exhaust fan with HEPA filter to maintain at lower pressure than surrounding areas.
- .15 Polyethylene sheeting: polyethylene sheeting with tape seals along all edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of spores through sheeting into clean areas.
- .16 Occupied Area: areas of building or work site that are outside Contaminated Work Area.
- .17 PPE: Personnel Protective Equipment.
- .18 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray; with minimum of six litres capacity for work.

1.7 REGULATORY
AGENCIES

- .1 Comply with Federal, Provincial, and local requirements, provided that in any case of conflict among those requirements or with these specifications the more stringent requirement shall apply.

1.8 SUBMITTALS

- .1 Before commencing work:
 - .1 Obtain from the appropriate agency and submit to Departmental Representative all necessary permits for transporting and disposal of waste. Ensure that dump operator is fully aware of hazardous nature of material being dumped, and proper methods of disposal. Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to receive and properly dispose of waste. In Ontario, this means that the wastes shall be handled and disposed of under the requirements of Ontario Regulation 347.

1.8 SUBMITTALS
(Cont'd)

- .1 (Cont'd)
 - .2 Submit proof satisfactory to Departmental Representative that all employees have had instruction on the hazards of the work, respirator use, dress, use of showers, entry and exit from work areas, and all aspects of work procedures and protective measures. The Contractor's Superintendent shall have attended an asbestos abatement course, of not less than two days duration, approved by the Departmental Representative. Submit proof of attendance in the form of a certificate.
 - .3 Submit layout of proposed enclosures and decontamination facilities to Departmental Representative for review.
- .2 Work must be carried out by an experienced removal company that is familiar with the hazard controls required for such an operation. Submit an outline of experience.

1.9 WORKER
PROTECTION

- .1 Instructions: Before commencing work instruct workers in use of respirators, dress, showers, entry and exit from work areas, and all aspects of work procedures and protective measures.
- .2 Respirators: Provide workers with personally issued and marked respiratory equipment. Equipment must be powered air purifying positive pressure dust respirators with HEPA filters. This equipment must be worn at all times. Filters must be replaced daily. All respiratory protective devices shall be acceptable to the Occupational Health Branch of Ministry of Labour. No supervisor, worker or authorized visitor shall wear facial hair which affects seal between respirator and face.
- .3 Protective Clothing: Provide workers with full body coveralls including head covers. Once coveralls are worn in the work area, they must be treated as contaminated waste and disposed of. Provide safety shoes and other protective apparel required by Ministry of Labour construction regulations.
- .4 Each worker shall:
 - .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters that have been tested as satisfactory, and clean coveralls before entering Equipment and Access Rooms or work area. If reusable protective clothing is used

1.9 WORKER
PROTECTION
(Cont'd)

- .4 Each worker shall:(Cont'd)
- .1 (Cont'd)
each worker shall don respirator only before entering Equipment and Access Rooms where clothing is stored. All street clothes, uncontaminated footwear, towels, and similar uncontaminated articles shall be stored in clean change room.
- .2 Remove gross contamination from clothing before leaving work area then proceed to Sheave Room and remove all clothing except respirators. Place contaminated worksuits in receptacles for disposal with other contaminated materials. Leave reusable items except respirator in Equipment and Access trailer. Still wearing the respirator, don clean coveralls and footwear, proceed to shower located in Bldg C-4 as indicated on the drawings. Clean outside of respirator with soap and water while showering; remove respirator; remove filters and wet them and dispose of filters in the container provided for the purpose; and wash and rinse the inside of the respirator. When not in use in the work area, store work footwear in Equipment and Access Room. Upon completion of work, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from work area or from Equipment and Access Room.
- .3 Following showering and drying off, proceed to clean change room and dress in street clothes at the end of each day's work, or in clean coveralls before eating, smoking, or drinking. If re-entering work area, follow procedures outlined in 5.4.1 above.
- .4 Enter the unloading room from outside dressed in clean coveralls to remove waste containers and equipment from the Holding Room of the Container and Equipment Decontamination Enclosure system. No worker shall use this system as a means to leave or enter the work area.
- .5 Workers shall not eat, drink, smoke or chew gum or tobacco at the work site except in established clean room.
- .5 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in 1.9 of this section.

1.10 VISITOR
PROTECTION

- .1 Provide protective clothing and approved respirators to authorized visitors to Contaminated Work Area.
- .2 Instruct authorized visitors in proper use of protective clothing, respirators and procedures.
- .3 Instruct authorized visitors proper procedures to be followed in entering into and exiting from Contaminated Work Area.

1.11 NOTIFICATION

- .1 Not later than ten (10) days before commencing work on this project notify the following in writing:
 - .1 The appropriate Regional or Zone Director of Medical Services Branch, Health and Welfare Canada.
 - .2 Regional Office of Labour Canada.
 - .3 Provincial Department of Labour.
 - .4 Disposal Authority.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Drop Sheets: fibre reinforced polyethylene 6 mil (0.15 mm), thick woven fibre reinforced fabric bonded both sides with polyethylene.
- .2 Fibre reinforced adhesive tape: used in sealing joints of fibre reinforced polyethylene sheets and for attachment of fibre reinforced polyethylene sheet to finished and unfinished surfaces. Fibre reinforced adhesive tape must be capable of adhering under both dry and wet conditions.
- .3 Provide materials such as polyethylene sheeting, lumber, nails and other hardware necessary to construct and dismantle decontamination enclosures and barriers that isolate Work Area as appropriate for work.
- .4 Disposal bags: dust-tight 6 mil (0.15 mm) clear polyethylene waste bags.
- .5 Disinfectant Solution: for misting guano material.
- .6 Receptors: Receptors for the disposal of waste materials contaminated with guano shall comply with Section 14 of Ministry of Environment

2.1 MATERIALS
(Cont'd)

- .6 Receptors: (Cont'd)
Regulation 309. Use a "double bagging" system with the first container consisting of minimum 6 mil (0.15 mm) thick sealable polyethylene bag; second container to be rigid sealable metal or fibre drum with tightly fitting cover and 6 mil (0.15 mm) thickness sealable, polyethylene liner or a rigid, sealable, impermeable cardboard box. Containers must be acceptable to disposal site selected and Ministry of the Environment. Labelling shall refer to "Pigeon Guano" rather than "Asbestos".
- .7 Sprayer: garden reservoir type, low velocity, capable of producing mist or fine spray.

2.2 TOOLS AND
EQUIPMENT

- .1 Tools and equipment: suitable for use with microbial contamination and must be able to withstand de-contamination.
- .2 Personnel protective equipment (protective clothing, personal respiratory filter cartridges, HEPA air filters, etc.) provide in sufficient quantities for duration of project.
- .3 Vacuum cleaners: HEPA filters.
- .4 Ladders and/or scaffolds: adequate length, strength and sufficient quantity to support work schedule.
- .5 Safety Harnesses and associated equipment for working at heights.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Contaminated Working Area (CWA) and areas adjacent and around: unoccupied. Vacating is required for persons having undergone recent surgery, immune suppressed people or people with chronic inflammatory lung diseases.
- .2 One supervisor for every ten trained remediation workers is required.
- .3 Approved supervisor must remain within CWA during disturbance, removal, or other handling of contaminated materials.

3.1 PREPARATION
(Cont'd)

- .4 Prior to work in the vicinity of the high voltage wires, electricity to these wires may have to be locked out or isolated by the Contractor. The Contractor shall not proceed with any work in such areas until the completion of the isolation has been verified by a qualified electrician.
- .5 If power to the cables is locked out cables will be inspected by a qualified electrician for any damage caused by the remediation prior to being reenergized.
- .6 Power lockouts will affect bridge operation, traffic lights, navigation lights, bridge span lights, elevators and power to the Towers. Locking out of power, if required, should be limited to agreed upon conditions with the Bridge Operator. Any power outages must not impede shipping and the Contractor must be prepared to re-energize all electrical systems in short order (15 minutes notice) as to not delay shipping traffic.
- .7 If during the remediation activities, the bridge is required to be operational, any equipment (including drop cloths) that would interfere with the operation of the bridge, shall be removed. No remediation personnel will be present below the Machine House in the remediation area during the operation of the bridge.
- .8 Suspend and secure a safety canopy below and/or around the work area, as necessary, in order to prevent tools, guano, contaminated water and/or any other material disturbed during the remediation work from falling to the ground or otherwise escaping from the CWA into the surrounding environment. Canopy must be lined with FRP sheeting that can be disposed of as contaminated waste at the end of the job.
- .9 All tools will be double secured to prevent the tools from falling.
- .10 Do not use compressed air to clean up or remove residue from surfaces.
- .11 Build worker Decontamination Room at exits from work areas, within the Machine House.
- .12 Put negative pressure system in operation in the decontamination area and operate continuously from time first fibre reinforced

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| 3.1 PREPARATION
(Cont'd) | .12 | (Cont'd)
polyethylene is installed to seal openings until final completion of work including final clean-up. |
| | .13 | Before beginning remediation work, at each access to Contaminated Work Area, install warning signs in both official languages in upper case 'Helvetica Medium' letters reading as follows, where number in parentheses indicates font size to be used: 'CAUTION BIOHAZARD AREA (1 inch)(25 mm) / NO UNAUTHORIZED ENTRY (1 inch)(25 mm) / WEAR ASSIGNED PROTECTIVE EQUIPMENT (3/4 inch)(19 mm) / BREATHING GUANO OR MOULD DUST MAY CAUSE SERIOUS BODILY HARM (1/4 inch)(6 mm). |
| 3.2 PREPARATION OF
WORKER
DECONTAMINATION
ENCLOSURE SYSTEM | .1 | Establish worker decontamination enclosure system between Contaminated Work Area and uncontaminated area in Machine House. Access to Contaminated work area through this enclosure. |
| | .2 | Access to Decontamination Room through double flap curtained openings. |
| | .3 | Decontamination Room: build Decontamination Room between Contaminated Work Area, with two curtained doorways, one to Contaminated Work Area and one to uncontaminated area. Install waste receptor and storage facilities for workers' shoes and protective clothing to be reworn in Decontamination Room. Decontamination Room: large enough to accommodate specified facilities, equipment needed, and at least one worker allowing sufficient space to change clothes comfortably. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly. |
| | .4 | No personnel permitted to leave Decontamination Room unless first decontaminated by changing, wet cleaning or HEPA vacuuming to remove dust or other residue. No contaminated materials or persons to enter uncontaminated area. |
| 3.3 MAINTENANCE OF
ENCLOSURE | .1 | Maintain enclosures in tidy condition. |
| | .2 | Ensure that barriers and fibre reinforced polyethylene linings are effectively sealed with duct tape at beginning of each working period. |
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3.3 MAINTENANCE OF .2
ENCLOSURE
(Cont'd)

(Cont'd)
Repair damaged barriers and remedy defects immediately upon discovery.

3.4 MICROBIAL .1
REMEDIATION WORK
AREAS

Commence guano remediation work when:
.1 Contaminated Work Area and decontamination enclosure are effectively segregated from parts of building required to remain in use. Enclosures are to be inspected by Departmental Representative.
.2 Tools, equipment and materials waste containers are on site.
.3 Warning signs as specified are displayed where access to contaminated areas is possible.
.4 Notifications have been completed and preparatory steps have been taken.
.5 Authorized supervisor employed by contractor and qualified in microbial contamination remediation to be on job site to ensure establishment and maintenance of negative pressure enclosure and proper work practices throughout project.
.6 Do not begin remediation work until authorized by Departmental Representative.
.7 Perform an initial shoveling to remove as much of the guano residue as possible.
.8 Dry HEPA vacuum all surfaces (vertical, horizontal and angled) to remove as much of the residue as possible.
.9 Prior to disinfectant application, a full cable inspection by a qualified electrician will be undertaken to ensure there is no damage to the cable jackets prior to spraying the disinfectant solution.
.10 After HEPA vacuuming, apply disinfectant solution to all surfaces (vertical, horizontal, angled). Apply with garden sprayer set for droplet (versus mist) spraying. Lightly brush to ensure uniform wetting and contact through to the underlying surface. Apply additional disinfectant as necessary to maintain the area wet for the contact time specified by the manufacturer.
.11 Clean the areas of residue with suitable tools and HEPA vacuum. Lightly mist with water to reduce dust formation.
.12 After surfaces have been cleaned of all residue, apply a second application of disinfectant, maintaining contact for the period recommended by the manufacturer.

3.5 REPAIR AND
CLEAN-UP

- .1 During remediation and immediately after completion of remediation, clean work area starting at the top and working down. Clean both work area and Decontamination Room using HEPA vacuum and/or by damp mopping with cleaning solution.
- .2 HEPA vacuum inside layer of polyethylene sheeting within work area and on safety canopy and damp wipe prior to removal and disposal. Removal of this layer to occur after removal and decontamination activities are completed and work area inspected by Departmental Representative.
- .3 Remove inside layer of fibre reinforced polyethylene sheeting by rolling it away from walls to centre of work area. Vacuum visible debris during cleanup, immediately, using HEPA vacuum.
- .4 Include Decontamination Room in similar clean-up.
- .5 Remove non-essential fibre reinforced polyethylene sheetings and visible accumulations of material and debris.
- .6 Dispose of used fibre reinforced polyethylene sheets, used fibre reinforced adhesive tape, cleaning material, clothing, and contaminated waste.
- .7 Include sealed waste containers and equipment used in Contaminated Work Area in cleanup and removed from work area via Decontamination Room.
- .8 Carry out final visual inspection check to ensure that no guano residue remains on surfaces as result of dismantling operations.
- .9 Remove remaining critical barriers including final safety canopy at the end of the work.

3.6 WASTE DISPOSAL

- .1 Place debris and microbial infected waste in doubled-bagged dust-tight 6 mil (0.15 mm) clear polyethylene waste bags. Treat drop sheets and disposable protective clothing as waste; fold these items to contain dust, and place in plastic bags. Securely seal bags and place in waste containers for transport.

- 3.6 WASTE DISPOSAL (Cont'd)
- .2 Clean outside of bags and/or waste containers with damp cloth and cleaning solution or HEPA vacuumed prior to their transport to uncontaminated areas of building.
- .3 Remove waste bags and/or containers from site and dispose. There are no special requirements for disposal of guano material; as such they can be disposed of in MOE certified landfill in accordance with O.Reg. 347 and Section 01 74 20.
- 3.7 RE-ESTABLISHMENT OF SYSTEMS
- .1 Advise Bridge Operator to re-establish electrical systems to proper working condition.