

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 33 00 - Submittal Procedures
- .2        Section 01 35 33 - Health and Safety Requirements
- .3        Section 01 35 43 - Environmental Procedures
- .4        Section 01 74 11 - Cleaning
- .5        Section 01 74 21 - Construction Demolition Waste Mgt and Disposal
- .6        Section 02 41 13 - Selective Site Demolition
- .7        Section 02 82 00.01 - Asbestos Abatement Minimum Precautions
- .8        Section 02 83 10 - Lead-Based Paint Abatement – Minimum Precautions

**1.2                REFERENCES**

- .1        Canadian Environmental Protection Act, 1999 (CEPA 1999)
  - .1        Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
- .2        Department of Justice Canada (Jus)
  - .1        Transportation of Dangerous Goods Act, 1992 (TDG Act) - current to November 24, 2015.
  - .2        Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286) - current to November 24, 2015.
- .3        Health Canada / Workplace Hazardous Materials Information System (WHMIS).
  - .1        Material Safety Data Sheets (MSDS).
- .4        National Research Council Canada Institute for Research in Construction (NRC-IRC)
  - .1        National Fire Code of Canada-2010.
- .5        Human Resources and Social Development Canada (HRSDC).
  - .1        Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
- .6        Recommendations to Fisheries and Oceans Canada on Acceptable Levels of Mercury in Lighthouses and other Buildings - February 2003.
- .7        Occupational Health and Safety Act, S.N.S. 1996, c. 7, Province of Nova Scotia, last updated in 2013, c.41.
- .8        Workplace Health and Safety Regulations, N.S. Reg. 143/2014, Province of Nova Scotia.

- .9 Stantec Consulting Limited
  - .1 Limited Hazardous Building Materials Assessment, Sambro Island Lighthouse, Halifax County, Nova Scotia, DFRP #02835, LL #507, RPIS #MC 00504. Dated March 30, 2016 (Appendix 1).
- .10 References in Appendices obtained from previous reports on this site.

### 1.3 DEFINITIONS:

- .1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .4 Mercury Abatement: primary work involving the containment, control removal, treatment of mercury, or mercury-containing materials.
- .5 Mercury Vapor Analyzer: Unit to measure mercury vapour measurements with a detection range of 0.0005 mg/m<sup>3</sup> to 0.999 mg/m<sup>3</sup> (e.g., Jerome® J405 Mercury Vapor Analyzer).
- .6 Mercury recovery vacuum: Dry recovery vacuum with a polyethylene tank that includes activated carbon for the adsorption of mercury vapor, and contains a true HEPA filter and a mercury separator.
- .7 Authorized Visitors: Public Works and Government Services Canada (PWGSC), Fisheries and Oceans Canada, Environmental Consultant, representatives of regulatory agencies and any visitor approved by PWGSC and/or Fisheries and Oceans Canada.
- .8 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects over cuts and tears, and elsewhere as required to provide protection and isolation. For protection of underlying surfaces from damage and to prevent contamination entering in clean areas.
- .9 Fast-dry lacquer with grit: A clear or coloured wood finish that dries by solvent evaporation or a curing process that produces a hard, durable finish and is used to seal residual mercury to the surfaces.
- .10 Exposure limit for mercury: exposure, without regard to use of respirators, to airborne concentrations of mercury of 0.025 mg/m<sup>3</sup> calculated as 8 hour time weighted average (TWA).
- .11 Competent person: individuals capable of identifying existing lead hazards in workplace taking corrective measures to eliminate them.

#### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit proof satisfactory to the Departmental Representative that suitable arrangements have been made to dispose of hazardous waste in accordance with requirements of authority having jurisdiction.
- .3 Provide proof of Contractor's General Environmental Liability Insurance.
- .4 Quality Control:
  - .1 Provide Departmental Representative necessary permits for transportation and disposal of hazardous waste and proof that hazardous waste has been received and properly disposed at approved facilities.
  - .2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of hazardous waste exposure, respirator use, dress, and aspects of work procedures and protective measures.
- .5 Submit Workers' Compensation Board of Nova Scotia status and transcription of insurance.

#### **1.5 QUALITY ASSURANCE**

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to mercury abatement, provided that in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
  - .2 Safety Requirements: worker and visitor protection.
    - .1 Protective equipment and clothing to be worn by workers and visitors in work Area include:
      - .1 Use of a half face respirator equipped with mercury vapor cartridges, nitrile gloves, rubber boots, and chemical protective overalls sealed at the wrists and ankles, all approved and in accordance with all Health and Safety requirements of the authorities having jurisdiction.
      - .2 Eating, drinking, chewing, and smoking are not permitted in work area.
      - .3 Ensure workers wash hands and face when leaving work area.
      - .4 Visitor Protection:
        - .1 Signage to appear on the exterior of the lightstation warning of mercury present during abatement activities.
        - .2 Provide approved respirators to Authorized Visitors to work areas.
        - .3 Instruct Authorized Visitors procedures to be followed in entering and exiting work area.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .4 Storage and Handling Requirements:
  - .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
  - .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
  - .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.
  - .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
    - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
    - .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
  - .5 Transfer of flammable and combustible liquids is prohibited within the building.
  - .6 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
  - .7 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.
  - .8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
  - .9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
  - .10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
    - .1 Store hazardous materials and wastes in closed and sealed containers.
    - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
    - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
    - .4 Segregate incompatible materials and wastes.
    - .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.

- .6 Store hazardous materials and wastes in secure storage area with controlled access.
- .7 Maintain clear egress from storage area.
- .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
- .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
- .10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .11 When hazardous waste is generated on site:
  - .1 Co-ordinate transportation and disposal with Departmental Representative.
  - .2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
  - .3 Use licensed carrier authorized by provincial authorities to accept subject material.
  - .4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility that will accept material and it is licensed to accept this material.
  - .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
  - .6 Only trained personnel handle, offer for transport, or transport dangerous goods.
  - .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
  - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.
  - .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.
- .12 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .13 Report spills or accidents immediately to Departmental Representative and all applicable authorities. Submit a written spill report to Departmental Representative within 24 hours of incident.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Description:
  - .1 Bring on site only quantities of hazardous material required to perform Work.
  - .2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.
- .2 Products and equipment:

- .1 Mercury recovery vacuum.
- .2 Approved mercury decontaminant and mercury vapor suppressant, in accordance with all applicable Health and Safety requirements of the authorities having jurisdiction.
- .3 Fast-dry lacquer (with grit). MPI 84 or equivalent.

### **Part 3 Execution**

#### **3.1 HAZARDOUS MATERIALS ABATEMENT**

- .1 Scope of Mercury Abatement Activities
  - .1 Mercury abatement shall be conducted to remove mercury in droplet form and contain/suppress mercury vapours as identified in the Assessment Report (Appendix 1) on all floors, in accordance with applicable regulations, guidelines, standards and/or best practices for such work.
  - .2 Waste transportation to be conducted in accordance with the Federal Transportation of Dangerous Goods Regulation.
  - .3 Dispose of waste at a licensed facility.
- .2 Supervision
  - .1 One Supervisor for every ten workers is required.
  - .2 Supervisor must remain within work area during mercury abatement activities.
- .3 Preparation
  - .1 Remove and store items to be salvaged or reused.
    - .1 Protect and wrap items and transport and store in area specified by Departmental Representative.
  - .2 Do not start work until:
    - .1 Arrangements have been made for disposal of waste and the Departmental Representative has been notified.
    - .2 Tools, equipment, and material waste containers are on site.
    - .3 Arrangements have been made for building security.
    - .4 Notifications have been completed and preparatory steps have been taken.
  - .3 Work Area:
    - .1 Isolate areas of high impact to prevent mercury contamination of areas of low concentration as identified in the Assessment Report (Appendix 1) by sealing off openings with polyethylene sheeting and seal with tape.
    - .2 Maintain emergency fire exits or establish alternatives satisfactory to Authority having jurisdiction.
    - .3 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical cables and equipment.
- .4 Mercury Abatement

- .1 Vacuum all walls, floors, ceilings and other surfaces (e.g. stairs, windowsills, etc.) with a mercury recovery vacuum system to adsorb mercury vapours; starting on top floor and working down to bottom floor. It is anticipated that material collected from the walls, floors and other surfaces during the mercury abatement will concurrently collect loose, flaking and peeling paint from many of the interior surfaces. The paint is also a lead leachate toxic material. For the purposes of the specification interior loose, flaking and peeling paint is to be considered lead leachate toxic as it is expected to be removed during the mercury abatement.
  - .1 Collect residual mercury and leachate toxic paint and place in appropriately labelled waste container.
- .2 Wet wipe all surfaces using an approved mercury decontaminant and mercury vapor suppressant, in accordance with all Health and Safety requirements of the authorities having jurisdiction.
  - .1 Wet wipes to be collected and treated as mercury waste, and placed in appropriately labelled waste containers.
- .3 Complete lead-based paint abatement procedures on remaining paint that will be disturbed during renovation activities and interior painting.
- .4 Apply a fast-dry lacquer (with grit) to the walls, ceilings and floors of the interior of the lightstation to seal residual mercury to the surfaces.
- .5 Inspection
  - .1 Post remediation mercury monitoring to be coordinated by Departmental Representative (e.g. independent party). Mercury vapour levels following successful abatement must be less than  $0.003 \text{ mg/m}^3$ .
  - .2 Departmental Representative will confirm work for:
    - .1 Adherence to specific procedures and materials.
    - .2 Final cleanliness and completion.
    - .3 If mercury vapour levels exceed  $0.003 \text{ mg/m}^3$ , contractor to redo mercury abatement activities until desired readings are obtained.
    - .4 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level to meet target of  $0.003 \text{ mg/m}^3$ .
- .6 Cleaning
  - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Leave Work area clean at end of each day.
    - .2 Waste Management: separate waste materials for reuse, recycling or disposal.
    - .3 Collect hazardous waste materials (e.g. vacuumed mercury droplets, wet wipes, disposable clothing, etc.) in accordance with applicable federal and provincial acts, regulations, and guidelines in appropriate, labeled containers.

### 3.2 FINAL CLEANUP

- .1 Following Departmental Representative approval, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area.

- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport as mercury waste.
- .4 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.
- .5 Dispose of hazardous waste materials (e.g. vacuumed mercury droplets, wet wipes, disposable clothing, etc.) in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .6 Recycle hazardous wastes for which there is approved, cost effective recycling process available.
- .7 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
- .8 Provide waste manifests and proof of disposal to Departmental Representative.
- .9 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .10 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .11 Dispose of hazardous wastes in timely fashion in accordance with applicable federal and provincial regulations.
- .12 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

**END OF SECTION**