ITEM 0020765A GUANO ABATEMENT

Description:

Work under this item shall include the abatement of accumulations of pigeon, bat, bird or other rodent/animal guano and associated work by persons who are knowledgeable, qualified, and trained in the abatement of guano and the subsequent cleaning of the affected environment.

These Specifications govern all work activities that disturb guano. All activities shall be performed in accordance with, but not limited to, the current revision of the OSHA General Duty Clause 29 CFR 1910 Section 5(a)(1), OSHA Respiratory Protection Standard 29 CFR 1910.134, OSHA Construction Standards 29 CFR 1926 and applicable Industry Standards and Guidelines on Guano/Microbial Remediation, such as; ACGIH *Bioaerosols: Assessment and Control*, OSHA SHIB 03-10-10 *A Brief Guide to Mold in the Work Place*, and NIOSH Publication 97-146 *Histoplasmosis: Protecting Workers at Risk.*

The guano abatement work shall include the removal and disposal of all guano accumulations as identified on the Contract Plans and Specifications or as directed by the Engineer.

Deviations from these Specifications require the written approval of the Engineer.

**Materials:**

All materials shall be delivered to the job site in the original packages, containers, or bundles bearing the name of the manufacturer, the brand name and product technical description.

No damaged or deteriorating materials shall be used. If material becomes contaminated with guano, the material shall be decontaminated or disposed of as guano waste material. The cost to decontaminate and dispose of this material shall be at the expense of the Contractor.

Fire retardant polyethylene sheet shall be in roll size to minimize the frequency of joints, with factory label indicating four (4) or six (6) mil thickness.

Six (6) mil polyethylene disposable bags.

Tape (or equivalent) capable of sealing joints in adjacent polyethylene sheets and for the attachment of polyethylene sheets to finished or unfinished surfaces must be capable of adhering under both dry and wet conditions.

Cleaning detergents, both non-toxic and biodegradable.

Spray equipment must be capable of mixing necessary chemical agents with water, generating sufficient pressure and volume; and equipped with adequate hose length to access all necessary work areas.

Sanders, grinders, wire brushes and needle-gun type removal equipment shall be equipped with a High Efficiency Particulate Air (HEPA) filtered vacuum dust collection system.

Containers for storage, transportation and disposal of guano waste material shall be impermeable and both air and watertight.

Any planking, bracing, shoring, barricades and/or temporary sheet piling, necessary to appropriately perform work activities shall conform to all applicable federal, state and local regulations.

Air filtration devices and vacuum units shall be equipped with HEPA filters.

**Construction Methods:**

**(1) Pre-Abatement Submittals and Notices**

1. Fifteen (15) working days prior to the commencement of guano abatement work, the Contractor shall submit to the Engineer for review and acceptance and/or acknowledgment of the following:
	1. Documentation dated within the previous twelve (12) months, certifying that all employees have received hazard communication training and understand the use and limits of respiratory equipment to be used; on an initial and annual basis.
	2. Documentation dated within the previous twelve (12) months, from a physician certifying that all employees who may be exposed to airborne guano and mold spores in excess of background level have been provided with an opportunity to be medically monitored to determine whether they are physically capable of working while wearing the respirator required without suffering adverse health affects. Employees shall also be informed of the specific types of respirators they shall be required to wear and the work he/she will be required to perform as well as special workplace conditions such as high temperature, high humidity and chemical contaminants to which he/she may be exposed.
	3. Documentation dated within the previous twelve (12) months, of respiratory fit testing for all employees who must don a tight-fitting face piece respirator in order to perform guano abatement activities. This fit testing shall be in accordance with qualitative procedures as detailed in 29 CFR 1910.134.

4. Project time schedule for each phase of work.

5. Name and qualifications of the OSHA Competent Person for the guano abatement activities, shall have a minimum of three years working experience as an environmental abatement site supervisor, shall be capable of identifying existing guano hazards and shall have the authority to implement corrective measures to eliminate such hazards. The OSHA Competent Person shall be on-site at all times guano abatement is occurring, shall comply with applicable Federal, State and Local regulations which mandate work practices, and shall be capable of performing the work of this contract.

1. No abatement shall commence until a copy of all required submittals have been received and found acceptable to the Engineer. Those employees added to the Contractor's original list will be allowed to perform work only upon submittal to, and receipt of, all required paperwork by the Engineer.

**(2) Guano Abatement Provisions:**

1. General Requirements

The Abatement Contractor/Subcontractor shall have an OSHA Competent Person on site and in control on the job site at all times during abatement work.

All labor, materials, tools, equipment, services, testing, insurance (with specific coverage for work on guano/spores), and incidentals which are necessary or required to perform the work in accordance with applicable governmental regulations, industry standards and codes, and these Specifications shall be provided by the Contractor. The Contractor shall be prepared to work all shifts and weekends throughout the course of this project as directed by the Engineer.

Prior to beginning work, the Contractor shall perform a visual survey of each work area and review conditions at the site for safety reasons. In addition, the Contractor shall instruct all workers in all aspects of personnel protection, work procedures, emergency evacuation procedures and use of equipment including procedures unique to this project.

The Contractor shall:

Shutdown and isolate heating, cooling, and ventilating air systems to prevent contamination and spore dispersal to the other areas of the building.

Shut down and lock out/tag out electrical power, including all receptacles and light fixtures, when feasible. The use or isolation of electrical power will be coordinated with all other ongoing uses of electrical power at the site.

 Coordinate all power and fire alarm isolation with the appropriate representatives.

When necessary, provide temporary power and adequate lighting and ensure safe installation of electrical equipment, including ground fault protection and power cables, in compliance with applicable electrical codes and OSHA requirements. The Contractor is responsible for proper connection and installation of electrical wiring.

If sufficient electrical service is unavailable, the Contractor may need to supply electrical power to the site by fuel operated generator(s). Electrical power supply shall be sufficient for all equipment required for this project in operation throughout the duration of the project.

In each interior work area, negative pressure must be continuously maintained until the area achieves satisfactory reoccupancy criteria and is approved by the Project Monitor to be deregulated. If interior work phases cannot be subdivided into manageable work areas that can be completed within one shift, negative air pressure must be maintained twenty-four (24) hours per day and the Contractor shall establish temporary electrical service to the site, rather than utilize generators.

Water service may not be available at the site. Contractor shall supply sufficient water for each shift to operate the decontamination shower units as well as to maintain the work areas adequately wet.

Ladders and/or scaffolds shall be in compliance with OSHA requirements, and of adequate length, strength and sufficient quantity to support the scope of work. Use of ladders/scaffolds shall be in conformance with OSHA 29 CFR 1926 Subpart L and X requirements.

Work performed at heights exceeding six feet (6’) shall be performed in accordance with the OSHA Fall Protection Standard 29 CFR 1926 Subpart M including the use of fall arrest systems as applicable.

Any data provided to the Contractor regarding guano accumulations identified throughout the structure(s) is for informational purposes only. Under no circumstances shall this information be the sole means used by the Contractor for determining the presence and location of all guano accumulations. Prior to commencement of work, the **Contractor shall verify all field conditions and quantities affecting performance/completion of the work** as described in these Specifications in accordance with OSHA, USEPA, USDOT, DEP standards. Compliance with the applicable requirements is solely the responsibility of the Contractor.

The Engineer will provide a Project Monitor to oversee the activities of the Contractor. No abatement work shall be performed until the Project Monitor is on-site. Environmental sampling may be conducted as deemed necessary by the Project Monitor.

Warning signs shall be posted at each entrance to the work area which clearly indicates the area has been regulated as a MICROBIAL REMEDIATION WORK AREA – AUTHORIZED PERSONNEL ONLY.

(b) Worker Decontamination Enclosure System

The Contractor shall establish contiguous to the Regulated Work Area, a Worker Decontamination Enclosure System consisting of Equipment Room and Clean Room in series, as detailed below. Access to the Regulated Area shall only be through this enclosure.

Access between rooms in the Worker Decontamination Enclosure System shall be through airlocks. Other effective designs are permissible. The Clean Room and Equipment Room located within the Worker Decontamination Enclosure, shall be contiguously connected with taped airtight edges, thus ensuring the sole source of airflow originates from outside the regulated areas, once a negative pressure differential within Interior Regulated Areas is established.

The Clean Room shall be adequately sized to accommodate workers and shall be equipped with a suitable number of hooks, lockers, shelves, etc., for workers to store personal articles and clothing. Changing areas of the Clean Room shall be suitably screened from areas occupied by the public.

The Equipment Room shall be of sufficient capacity to accommodate the number of workers. The Equipment Room shall be utilized by personnel to remove protective clothing, decontaminate through the use of HEPA vacuums and a wash facility, and clean off sealed waste containers ready for removal from the work area. No worker or other person shall leave a Regulated Area without decontaminating.

(c) Containment of Interior Work Areas

Pre-clean the work areas using HEPA filtered equipment (vacuum) and/or wet methods as appropriate, collecting and properly containing all dust and debris as guano contaminated waste. Vacuum units, of suitable size and capabilities for the project, shall have HEPA filters capable of trapping and retaining at least 99.97 percent of all monodispersed particles of three micrometers in diameter or larger. Do not use methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters.

After pre-cleaning, movable objects not designated for relocation by others shall be removed from the work areas with the utmost care to prevent damage of any kind and relocated to a temporary storage location coordinated with the Engineer. The Contractor is responsible for protecting all fixed objects that are permanent fixtures or are too large to remove and remain inside the Regulated Area. Fixed objects shall be enclosed with one layer of six (6) mil polyethylene sheeting sealed with tape.

Engineering controls must be implemented to ensure that debris is not dispersed outside of the work area during cleaning/removal process. Such controls involve source containment, limited critical barriers, full poly containment enclosures and/or negative pressure enclosures, based on the size and magnitude of contamination, as directed by the Engineer, and in accordance with Industry Standards and Guidelines.

Critical barriers consisting of a minimum of one (1) layer of six (6) mil polyethylene sheeting, secured at the edges with duct tape, shall be installed to seal off all windows, doorways, skylights, ducts, grilles, diffusers, vents, light fixtures, suspended ceiling tile systems and any other openings between the Regulated Work Areas and the surrounding uncontaminated areas, including the outside of the building. Complete isolation of the work area from adjacent areas using a minimum of one (1) layer of six (6) mil polyethylene sheeting to create an enclosure and seal with duct tape. HVAC systems within the work area cannot be operating.

HEPA filtered negative air filtration units will be used with the intake in the general work area and exhaust outdoors during removal/cleaning of large or extensive contamination areas, and/or as directed by the Engineer, so as to provide local exhaust ventilation and create a negative pressure enclosure work area. Negative pressure must be maintained continuously in each work area until the area achieves satisfactory verification criteria and is approved by the Engineer for deregulation. A sufficient number of negative air filtration units shall be utilized in each work area to create a negative pressure differential in the range of 0.02 to 0.04 inches of water column between the Regulated Area and surrounding areas, and allow a sufficient flow of air through the area to provide four (4) air changes per hour. Negative air filtration units shall be equipped with four stages of filtration, with the final stage being High Efficiency Particulate Air (HEPA) filtration, and incorporate an automatic warning system to indicate pressure drop or unit failure. Negative pressure shall be measured in each work area by a recording manometer, during the entire project.

Following construction of the containment work area, the containment shall pass a pre-abatement visual inspection by the Competent Person and the Project Monitor prior to commencement of abatement work.

**(d) Alternate work area containment requirements for exterior abatement procedures**

In lieu of the establishment of a negative pressure enclosure (NPE) system as described above, guano accumulations will be removed from exterior work areas within an outdoor Regulated Area(s). The regulated work areas will be established by the use of appropriately labeled barrier tape and postings, as well as source containment, poly drop cloths and local HEPA exhaust ventilation. A remote personnel decontamination unit will also be required.

(e) Personnel Protection

The Contractor shall utilize all appropriate engineering controls and safety and protective equipment while performing the work in accordance with applicable standards and guidelines.

Abatement workers should have received hazard communication awareness training on safe work practices associated with guano/microbial abatement, and health effects of guano/microbial spore exposure, be medically approved to perform such work and have received fit testing for respirator use.

## Abatement workers conducting the cleaning/removal and all personnel entering the work areas will be required to wear personal protective equipment including the following minimum. The Contractors Competent Person shall ultimately make the exposure/hazard assessment judgement on whether upgraded PPE is required.

 1. Negative Pressure Respirators equipped with N-95 filter cartridges

 2. Disposable coveralls with a hood

 3. Eye protection

 4. Appropriate gloves

Respiratory protection shall be provided and shall meet the requirements of OSHA as required in 29 CFR 1910.134. A formal respiratory protection program must be implemented in accordance with 29 CFR 1910.134. The Contractor shall provide respirators from among those approved as being acceptable for protection by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part ll.

All other necessary personnel protective equipment (i.e. hardhat, work boots, safety glasses, hearing protection, etc.) required to perform the abatement work activities, as deemed necessary by the Competent Person, shall conform to all applicable federal, state and local regulations.

All other qualified and authorized persons entering into a Regulated Area (i.e. Project Monitor, Regulatory Agency Representative) shall adhere to the requirements of personnel protection as stated in this section.

Contractor shall ensure that all workers and authorized persons who enter and leave the work area use a personnel decontamination system.

Contractor shall ensure HEPA filtered local exhaust ventilation is provided in all areas where extensive guano accumulations are to be cleaned/removed to reduce the potential for airborne exposure to spores.

Non-abatement workers shall be kept out of the immediate areas where abatement is ongoing.

(f) Removal and Cleaning Methods

The general cleaning/removal procedures specified herein are to be used as a guideline throughout the project. Deviations from specified methods of removal/cleaning must be approved in writing by the Engineer prior to their implementation.

The following details the extent of each phase of operation designated for this project. Phase areas may be combined or divided at the direction of the Engineer. Proceed through the sequencing of the work phases under the direction of the Engineer.

**[INSERT PROJECT SPECIFIC INFORMATION PERTAINING TO GUANO ACCUMULATIONS ON STRUCTURES ASSOCIATED WITH PROJECT. SPECIFICS SUCH AS BRIDGE NUMBERS & LOCATIONS SHOULD BE INCLUDED HERE]**

**Using trained and appropriately protected staff, remove and dispose of all accumulations of mice droppings, guano, feathers, carcasses, etc. as directed by the Engineer. Clean the areas where removal occurs using biodegradable/non-toxic detergent solutions and HEPA vacuuming. Regulated area(s) shall be established at the perimeter of the work area(s), and access shall be controlled by the Contractor. Utilize dust suppression methods such as misting (not soaking) materials prior to abatement. Poly drop cloths should be used as appropriate to protect objects in direct proximity to the work areas from contamination, and prevent the release of contamination/debris to outside areas. After cleaning the area(s) should be left dry and visibly free from contamination and debris. Utilize damp wiping and HEPA filtered vacuuming techniques for final area cleanup. A remote personnel decontamination unit shall also be utilized.** **Waste generated from the cleaning process should be removed from the work space in sealed plastic bags to prevent dispersal of spores to non-affected building/work spaces and disposed of as general bulky C&D waste debris.** **Removal shall be undertaken in accordance with Industry Guidelines. Care should be exercised during guano removal/cleaning to not disturb or release any underlying lead paint which may be present. *Contractor shall be responsible for the erection and safe maintenance of any and all necessary apparatus/equipment to gain access to the work areas and perform the required abatement.***

Contractor shall wet mist all materials/accumulations/surfaces scheduled for removal/cleaning prior to commencing work to minimize airborne dust/spore generation and use damp methods throughout the removal/cleanup process.

Contaminated materials, accumulations and debris that are to be removed must be removed with as little disturbance as possible.

The Contractor shall promptly place the removed material in disposal containers (six (6) mil polyethylene bags, fiber drums, etc.) as it is removed. Large components removed intact may be wrapped in two (2) layers of six (6) mil polyethylene sheeting secured with tape. As the disposal containers are filled, the Contractor shall promptly seal the containers and clean the containers before removal from the work area. Bags shall be securely sealed to prevent accidental opening and leakage by taping in gooseneck fashion. Materials with sharp-edged components (e.g. nails, screws, metal lath, tin sheeting) which could tear polyethylene bags and sheeting shall be placed in clean drums and sealed with locking ring tops. All waste containers shall be leak-tight, (typically consisting of two layers of 6 mil poly (or bags)). Containers shall be decontaminated by wet cleaning and HEPA vacuuming within the decontamination area prior to exiting the regulated area. On site storage of waste containers shall be as dictated and allowed by the Engineer within the extent of construction operations. On site storage of waste containers in public areas, outside of construction containment areas shall not be allowed.

Following material/accumulation removal, Contractor shall thoroughly clean the work area. Cleaning of surfaces and content items, shall utilize wet/damp wiping coupled with a non-toxic, biodegradable detergent wash. Following cleaning, the areas shall be dried and HEPA vacuumed to remove all associated dirt and debris.

The use of biocides, including chlorine bleach, is not recommended during guano/microbial abatement. Biocides are toxic to humans and may cause damage to underlying building substrates. Any use of biocides, fungicides, disinfectants or encapsulants can be done only with the written approval of the Engineer.

After cleaning, the Competent Person and Project Monitor shall perform a post remediation visual inspection of each work area to ensure remediation is complete, that no dust or debris remains on surfaces in the work areas as the result of removal/cleaning operations and the areas have been dried. All surfaces within the Regulated Work Areas, including but not limited to ledges, beams, and hidden locations shall be inspected for visible residue. Evidence of guano/microbial accumulations/contamination and/or debris identified during this inspection will necessitate further cleaning as heretofore specified. The area shall be re-cleaned at the Contractor's expense, until the standard of cleaning is achieved.

If at any time, the Project Monitor should suspect contamination of areas outside the Regulated Area, the Contractor shall immediately stop all abatement work and take steps to decontaminate these areas and eliminate causes of such contamination.

(g) Quality Assurance/Verification

At a minimum, the affected areas shall be free of visible guano accumulations and debris, free of moldy odors and be left dry.

Surface and airborne types and levels of microbial spores may be tested by the Project Monitor upon completion of the cleaning and sanitizing to assure that the affected areas have been returned to a level equivalent to non-affected/ambient areas. Where samples are collected, acceptable results shall be considered levels less than background (interior non-affected and/or ambient) areas for all microbial genera with similar microbial types and rank order and which do not indicate amplification. Any samples collected shall be analyzed at a laboratory accredited by the AIHA EMPAT program. When sampling is performed, it shall be conducted no less than 1 hour after abatement cleanup work has been completed.

The Engineers on-site Project Monitor will verify compliance with these specifications, conduct post-abatement work area inspections and/or collect post abatement samples, photographs, and/or videos of the cleaned surfaces/work areas as deemed necessary.

If any areas fail inspection/testing, the failed area shall be recleaned by the Contractor and retested at no cost to the Engineer.

(h) Post Abatement Work Area Deregulation

The Contractor shall remove all remaining polyethylene, including critical barriers, and Decontamination Enclosure Systems leaving negative air filtration devices in operation as long as feasible. HEPA vacuum and/or wet wipe any visible residue which is uncovered during this process. All waste generated during this disassembly process shall be discarded as abatement waste.

A final visual inspection of the work area shall be conducted by the Competent Person and the Project Monitor to ensure that all visible accumulations of suspect materials have been removed and that no equipment or materials associated with the abatement project remain.

The Contractor shall restore all work areas and auxiliary areas utilized during work to conditions equal to or better than original. Any damage caused during the performance of the work activity shall be repaired by the Contractor at no additional expense to the Engineer.

(i) Waste Disposal

Waste generated from the removal of guano, while an environmental heath hazard, is not classified as a biological waste or hazardous waste. All waste materials generated during abatement shall be disposed of as bulky C&D waste in accordance with CTDEP Solid Waste Management requirements. Contractor shall supply to the Engineer completed shipping papers for each load of waste transported for disposal, indicating the solid waste landfill name and location and quantity of waste disposed of.

**(3) Project Closeout Data:**

The Contractors site supervisor shall keep a logbook to document daily site activity. The log book shall document the preparation tasks, schedule, engineering controls utilized, abatement work conducted, daily lists of employees on site, exposure/hazard assessment judgements, negative pressure manometric measurement readings, PPE utilized, waste shipping papers, etc.

The Contractor will submit the original log book and any other related documentation to the Engineer within 30 days of completion of work.

Final payment to the Contractor shall not be approved without submission of the reporting materials.

**Method of Measurement:**

The quantity of guano abatement shall be the actual number of cubic feet removed for disposal, completed and accepted, within the lines of the work area as shown on the plans or as ordered by the Engineer.

**Basis of Payment:**

The work will be paid for at the contract unit price per cubic foot for “Guano Abatement”, completed, which price shall include the specialty services of the Guano Removal Contractor including: labor, materials, equipment, insurance, submittals, personal protective equipment, temporary enclosures, apparatus/equipment necessary for work area access, utility costs, incidentals, fees and labor incidental to the removal, transport and disposal of guano, including close out documentation.

Final payment for guano abatement will not be made until all the project closeout data submittals have been completed and provided to the Engineer. Once the completed package has been received in its entirety, the Engineer will make the final payment to the Contractor.

Pay Item Pay Unit

 Guano Abatement Cubic Foot