

DUDLEY SERVICES INC

Vermiculite Abatement Process

Bulk Extraction System Technology

Two teal arrows point from the underlined letters 'B' and 'T' in the text above towards the word 'BEST'.

BEST

Problems & Solutions

Asbestos contaminated Vermiculite attic insulation has been installed in **millions** of homes throughout the United States, Canada & most continents (over 4 million tons shipped).

To meet current / future energy efficiency standards & long-term goals of lower carbon emissions, millions of homes will need weatherization **which includes updating attic insulation**. Updating this insulation **will require** vermiculite attic insulation removal as the first step in the process.

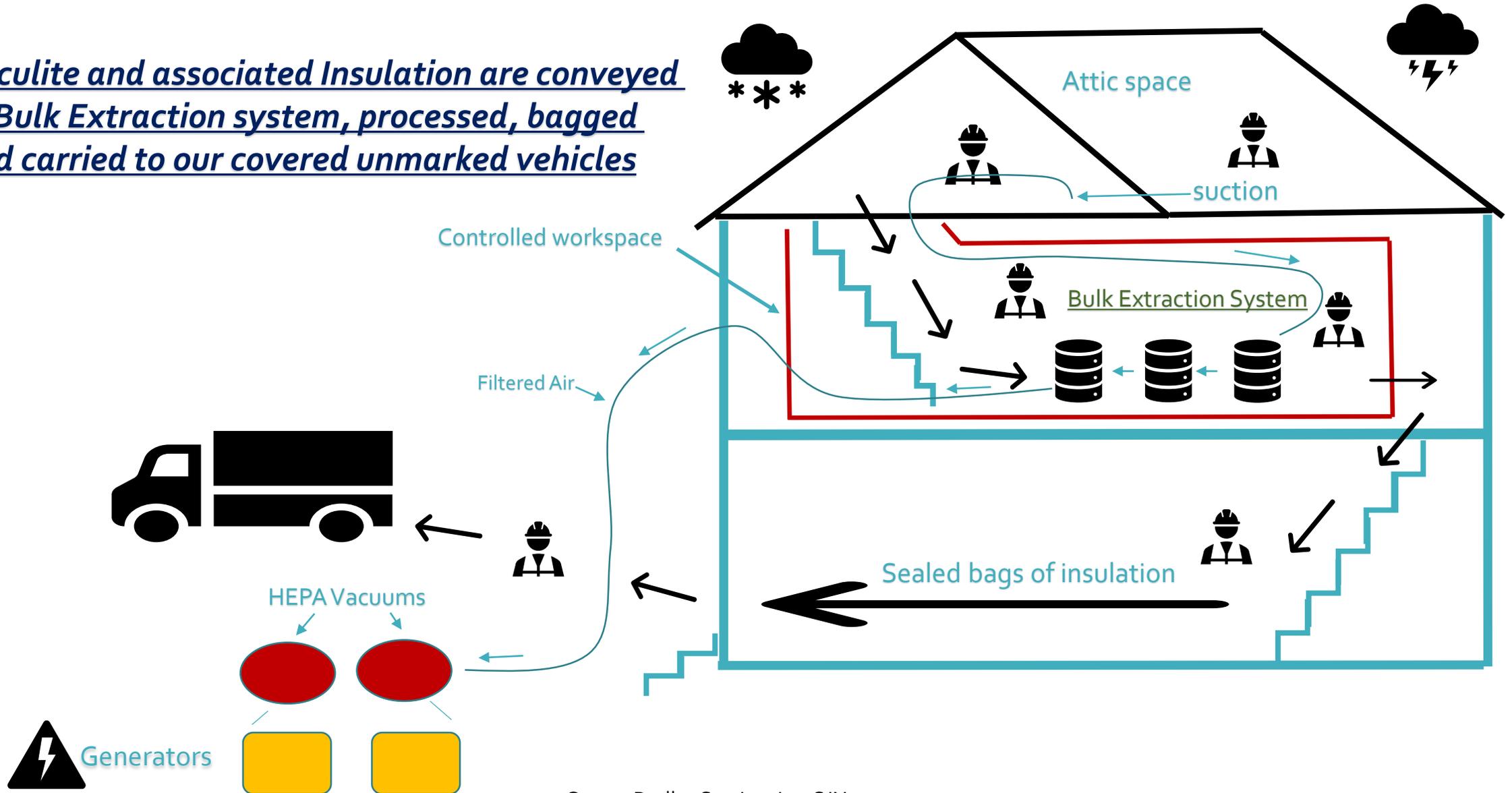
The diversity of styles, shapes & sizes of homes built in the US during the last 400 years makes removing this vermiculite very challenging.

Dudley Services Inc accepted this challenge and has innovated a proprietary **Bulk Extraction System Technology** for all types of attic insulation. This document outlines the innovative Bulk Extraction System which “evolved” through remediating thousands of different attics in the Greater Boston Area.



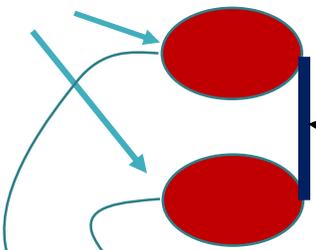
Bulk Extraction Process Overview

Vermiculite and associated Insulation are conveyed To Bulk Extraction system, processed, bagged and carried to our covered unmarked vehicles



Bulk Extraction System in Detail

HEPA Vacuums



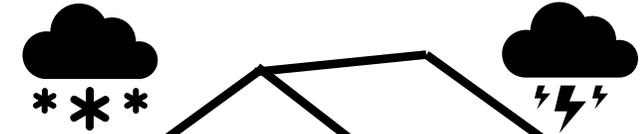
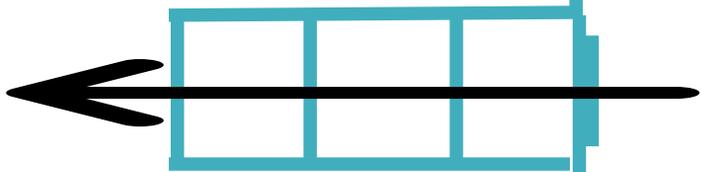
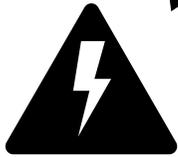
High powered HEPA filtered vacuums situated outside the dwelling

3" vacuum hose outside of dwelling receives filtered air only

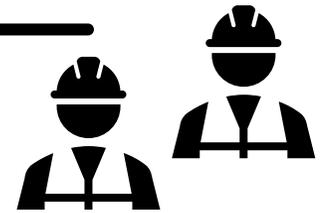


Generators

High suction requires high power sources



Attic insulation Material is conveyed from the attic space to the Bulk Extraction System with incredible suction



Bulk Extraction System



3" vacuum hose

plastic sheeting containment

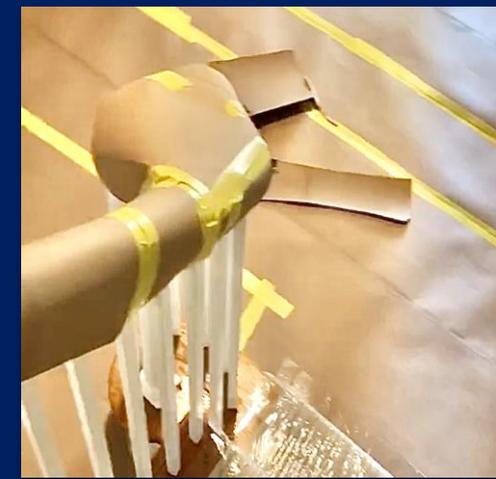
- Workers process & double bag insulation safely & efficiently in work area
- Bulk Extraction System** prevents hose leading to vacuums from clogging
- Work area in dwelling controlled under a negative air pressure and out of the elements

After bulk is collected, double bagged and taped shut it passes through air locks to the covered truck outside of the dwelling

Prepare Containment Area

In a predetermined location within the dwelling which allows direct physical entry to the attic entrance, we install a very effective temporary cardboard recycled product known as “Ramboard”.

We cover flooring, bannisters & large fragile objects in and near the work area to protect from inadvertent bumps, scratches, or breakage and securely tape the seams



Use Care on Special Surfaces

Stairs and carpets in the work areas are covered with the appropriate adhesive film coating.

Pathways to the containment area are covered as well

HVAC vent registers leading to attic / workspace are sealed off with non-stick tape.

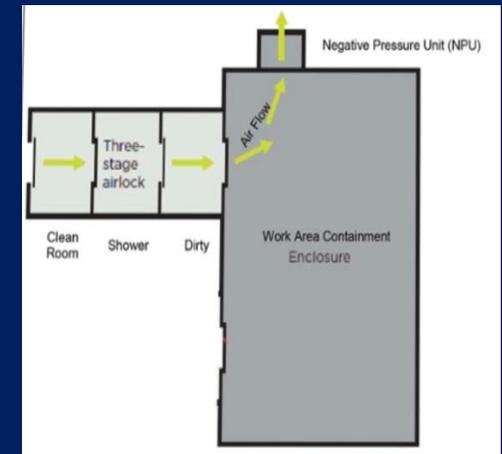
HVAC systems in the work area are switched off for the duration of the project



Make Workspace “Air-Tight”

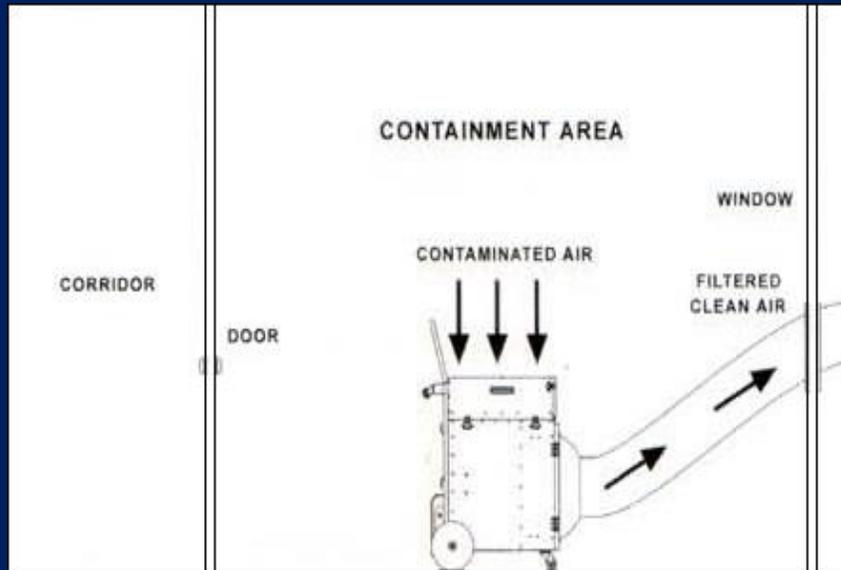
Create airtight “full containment” system beneath the attic entrance using “ZIPWALL” dust barrier system & heavy-duty plastic sheeting.

All seams are completely sealed with yellow duct tape. Having temporary cardboard flooring enables the plastic sheeting to be securely taped to the floor **without damaging finishes**. After the plastic walls are in place a plastic ceiling is then installed along with a three-chamber airlock & decontamination room at the workspace entrance



Filter Containment Area

We install a HEPA Filtered Negative Air Pressure Machine within the Containment Area. This machine is designed to **filter microscopic particles** up to .003 microns.



HEPA Filter located inside Negative Air Machine

Install Bulk Extraction System

After the work area is established and the seams are securely taped, our proprietary extraction system is easily carried into the sealed containment.

This dustless system saturates the insulation material, enables the operator to control the vacuum flow and prevents clogging of the main 3” hose leading outside to the HEPA vacuums.

Our innovative design eliminates worker downtime and **prevents the serious safety hazard of having a clogged hose outside the sealed work area.**

All insulation conveyed to this system can be quickly “double bagged” and then safely carried through the airlocks and outside to the covered vehicle.

This **Bulk Extraction System** complies with all EPA & DEP mandates requiring HEPA filtered bulk extraction processes with no visible emissions to the surrounding areas.



Prepare Attic For Extraction

Once the negative air containment work area is completely set up beneath the attic entrance workers then proceed to prepare the attic area for extraction. Floorboards are lifted, vacuumed and stacked/removed to allow access to all insulation.

Fiberglass batting and any “junk” items that may clog the extraction hose are bagged and removed from the area.

Flexible HVAC ducting is disconnected and disposed of while metal ducting can be sealed off with yellow tape.



Power Up High Powered Vacuums

We situate two High Powered HEPA Filtered Electric Vacuums outside of the dwelling and connect them to the Bulk Extraction System with a heavy duty 3" hose. Combining these vacuums with our [Bulk Extraction System](#) consistently & easily delivers an incredible **500cfm** of suction at the point of extraction. This amount of suction is necessary to thoroughly clean vermiculite insulation from crevices. We provide the generators to power the system and monitor their safe operation throughout the process.



Extraction Process

Attics can be extremely challenging workspaces with temperatures commonly reaching over 110 degrees. The continuous suction our system provides shortens the time & exertion workers need to spend in this hot & physically challenging environment.

Having incredibly high suction enables the complete removal of all loose dust & debris.

After the bulk material is removed, detailed final cleaning takes place. Vermiculite trapped in inaccessible cavities is capped and marked with bright coloring for follow on insulators/tradesman to notice



Project Completion with Inspection and Air Monitoring

The cleaned workspace is inspected by an independent third party to verify air quality and cleanliness.

Once the workspace fulfills all State and Federal requirements the area is now safe to occupy. The containment structure is disassembled and the project is completed

