

Findings from the Building Evaluation and Implications for Health



Guidance • Support • Prevention • Protection

Presented to the Employees of the Bennington
State Office Building – December 6, 2007

Background

- **June 2006 VDH initiated an investigation**
- **Primary health concern was sarcoidosis**

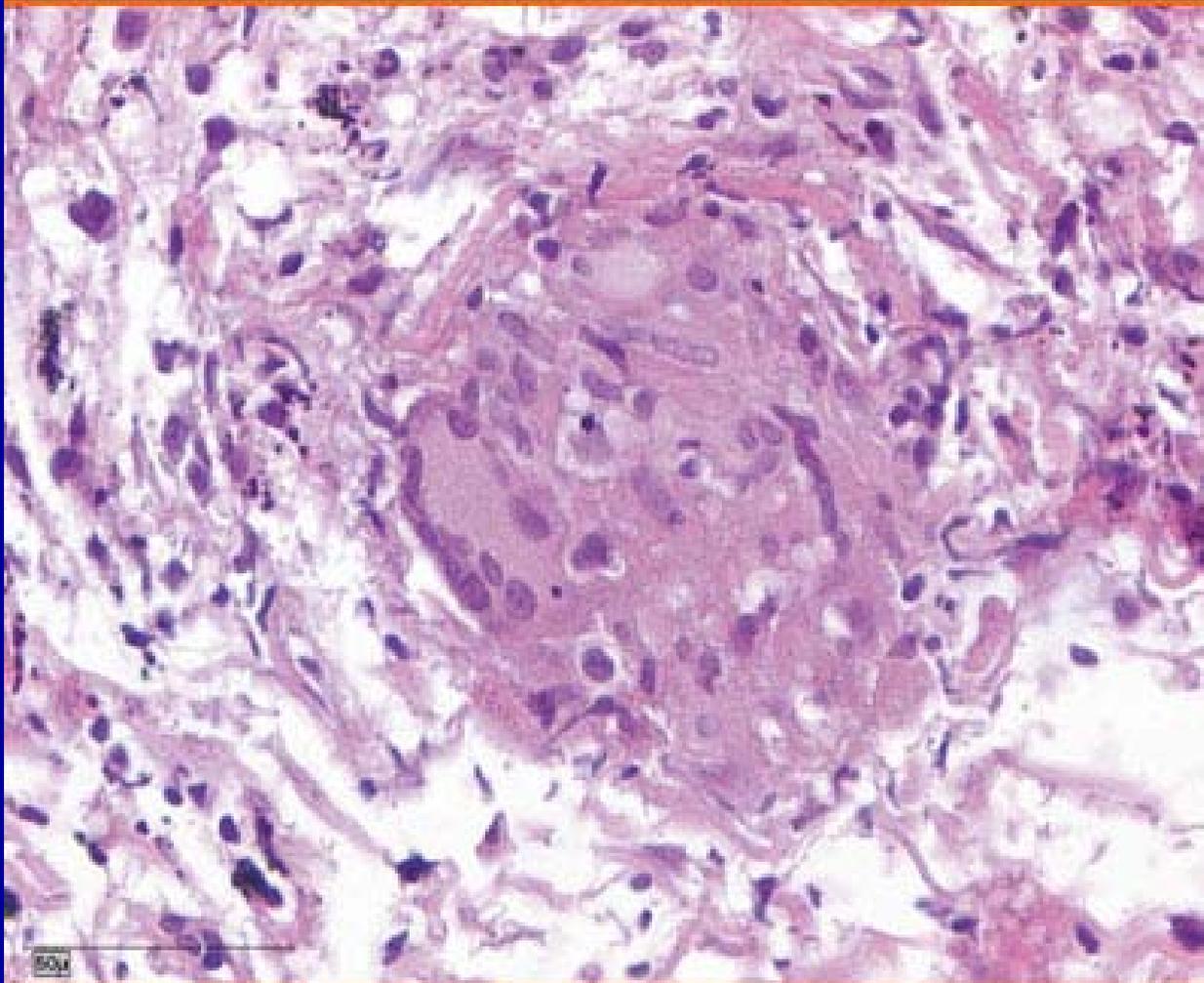
Sarcoidosis

- Relatively common
- Can be serious
- Diagnosis of exclusion
- Unknown cause, though may be response to something in environment
- Characterized by noncaseating granulomas
- Many known causes of noncaseating granulomas

Noncaseating Granuloma

Medscape®

www.medscape.com



Source: Infect Med © 2003 Cliggott Publishing, Division of SCP Communications

Background

- Investigation found higher than expected rates of sarcoidosis, asthma, and asthma-like symptoms
- October 2006 VDH recommended employee relocation during building diagnostic evaluation and remediation

Building Diagnostic Evaluation

- **Turner Building Science and Design, LLC, contracted to conduct the diagnostic evaluation**
- **Evaluation found:**
 - **“ . . . there are only two main observations that we believe make this building stand out as different from many others, that could be related to the elevated disease that has been reported.”**

Two Main Observations

- **Presence of combustion material (soot) throughout the building from oil fired boiler**
- **Hidden microbial reservoir within the condensate drainage system**

Combustion Material (Soot)

- **Direct impact – Pressure differences allowed direct flow of combustion material to adjacent areas**
- **Indirect impact – Re-entry of combustion material through roof top air intake units**

Direct Impact - Oil Fired Boiler



Indirect Impact – Roof Top Exhaust



Hidden microbial reservoir

- **Presence of hidden reservoirs of microbial growth in the condensate drainage system**
- **Mechanisms for aerosolization and distribution of microbial material throughout the building**

Hidden microbial reservoir



NIOSH Evaluation

- **Collected samples from condensate lines**
- **Collected vacuum samples from carpet**
- **Analyzed for microbes**

Laboratory Analysis

- **Three microbes found:**
 - **Mycobacteria**
 - **Paecilomyces**
 - **Thermophilic actinomycetes**
- **All not commonly found in office type work environment**

Findings with Health Implications

- **Combustion by-products from boiler on surfaces throughout the building**
- **Hidden reservoir of microbial growth that can be aerosolized and distributed throughout building**
- **High levels of microbes within carpet**

Asthma and asthma-like illness

- **Combustion by-products and microbes associated with asthma and asthma-like illness in some individuals**
- **Compelling explanation for the higher than expected rate of asthma and asthma-like illness**

Sarcoidosis

- **The three microbes found cause formation of noncaseating granulomas**
- **Noncaseating granulomas a characteristic of sarcoidosis**
- **Compelling explanation for the higher than expected rate of sarcoidosis**

Scientific Limitations

- **There may be additional explanations as to why some or all individuals developed illness**
- **There is no way to confirm with certainty that these findings caused any one individual's illness**
- **There is still much to be learned about indoor environments and their impact on illness**

Recommendations

- **Building should undergo remediation prior to re-occupancy.**
- **Remediation should include all 13 recommendations made by the Turner Group:**
 - **Includes installation of a geothermal system and Leadership in Energy and Environmental Design (LEED) certification**
- **Work with BGS to ensure building is safe for re-occupancy**