

PROBLEMS ENCOUNTERED DURING THE RADIOLOGICAL REMEDIATION OF OLD BUILDINGS

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ABSTRACT

With several military base closures resulting in property transfer to public use and the decommissioning of many legacy waste facilities, the opportunity for remediation of older buildings is increasing. Along with these projects, come several problems that could give the potential remediator some surprises. During the pre-construction and planning phases of the original construction activities, several generations of drawings were most likely produced for approval and permit submittal. Over the years, buildings may undergo several renovations with or without the full characterization or remediation that should be done when radioactive materials are used on a site. New walls or floors may be built over the original construction materials. Contamination in and around the building may have resulted from processes that were accepted at the time or from inadvertent activities that may have been covered up, including accidental spills. Many buildings contain hidden rooms or accesses that over time became useless and have been closed up or over, these areas may not be very obvious. When characterizing a building the effluents of the building are usually forgotten, sewer lines are important areas to investigate. All these items could cause a remediator to overlook a potentially highly contaminated area. With more of these facilities being turned over for public use, correctly characterizing these buildings will become a more common problem.

INTRODUCTION

The use of radioactive materials today is much more wide spread than it was many years ago, but the control of it is in a much better state as it was decades ago. Much of the relaxed use of radioactive material came from lack of knowledge of the materials at that time. The military or governmental labs owned many of these buildings, since much of the early work was done on these facilities. One can assume many incidents were not reported due to fear of discipline or lack of regulations. Once the building was not used for the use of radioactive materials any more, more than likely it was not properly cleaned up since the same people were using it or the mess was not visible. This continued with many buildings through the years until the government no longer needed the facility or the facility is being turned over for public use. With this transition the buildings need to be surveyed to be sure that no residual radiation is present. Due to this there are many projects of remediation of these buildings, along with these projects, come several problems that could give the potential remediator some surprises.

The buildings that are referenced in this paper were used as radium dial paint shops in the 1920s-1940s. When this activity was stopped the buildings were turned into either other manufacturing facilities or industrial facilities, with some of the buildings ending up being office space. The doses to people over the years were negligible due to most of the contamination being fixed in place or being covered. But, now with renovations being done on the buildings to get them ready for public use this contamination is being once again uncovered and needs to be dealt with. To determine where this contamination and figure out how it got there 60-80 years after deposition is quite a difficult task.

DRAWINGS

During the pre-construction and planning phases of the original construction activities, several generations of drawings were most likely produced for approval and permit submittal. Some of the drawings were approved and the work completed, but others were not accepted. The drawings that were not accepted may or may not have been destroyed. These could have been placed in a drawer but not labeled as bad. Other work that was completed may have been on approved drawing, but the drawings may have been destroyed over the years. If a remediator comes to the project 60 years later and looks for drawings, they may come across these drawing and think they are correct. These drawings may have the correct work on them or may be an unapproved or inaccurate version. We have found several versions of drawings, none of them correct, of piping that ends up going in the opposite directions or is not there at all. Some underground rooms and spaces that were in the opposite orientation as to what was shown on the drawings. Finding the latest drawing is not always the solution either, because information that was on older drawings may not be carried over to the new ones.

RENOVATIONS

Over the life time of a building there can be many renovations and remodeling. Whether or not any or all of these changes will be written down or recorded is a different matter. During remodeling there is an opportunity for old rooms, semi-permanent installations, and walls to be covered up and forgotten. In some instants there may even be a purposeful attempt to hide old structures of places that are contaminated. In our experience we have found false walls, double walls, cemented over crawl spaces, and the incorporating the covering of structures into the design of the wall as to make it look less conspicuous. Floor coverings can be added to either add to the atmosphere of the office or to try and cover low level or alpha contamination. We have found contamination below two layers of floor tile, and if the contamination had no gamma emission associated with it, it probably would have never been found.

SPILLS AND ACCIDENTS

In the usual use of material, no matter how carefully one tries, there are inevitable accidents. Most of the time they are reported and either cleaned up correctly or an attempt is made to do so. But there are cases where, usually due to fear of consequences, an accident occurs and the party involved tries to clean up or cover up the accident. So, this incident would have no record of occurring and no record of location of the accident. An example of a case where the attempt to clean up a small spill can lead to widespread contamination is; if one tried to use the company janitors' mop and bucket to clean up a spill on ones own, this would actually spread contamination the next time the janitor uses the mop to clean up a normal spill. If this was done, and the janitor did indeed use the contaminated mop in another area in the facility, this would give an explanation to a very even distribution of contamination in an area, which would not be considered impacted. Even when a spill was cleaned property, it was not always documented properly. This information could help a remediator look in places where there is a likelihood of contamination.

SANITARY SEWER

Sanitary sewers are hopefully not the usual way in which radioactive material is disposed of today, but may have been the norm many years ago. Today we have exempt quantities of radioactive material that can be introduced into the sewer system, many years ago these quantities and types of materials were quite different. Usually the fact that that sanitary sewer was used as a receptacle for waste was documented, but many times it was used as a convenience. This would not be too bad if the sewer system in a part of the building was isolated from the main system, and hence the contamination would not be spread too far. But, once the contamination makes into the larger system the problem may be spread from the building of origin all the way to the waste water treatment plant.

We have found that parts of the sanitary sewer system are connected to the storm drains of the building. There is even a case of where someone connected a sink that drained directly into a storm drain. This can become a problem because the storm drain water is not processed before it is introduced back into the environment.

CONCLUSIONS

Through the many year lifetime of buildings that once housed radioactive material handling activities, there can be many things that occur that can make locating, identifying, and remediating contamination difficult. One can not always rely on drawings or even personal interviews for what was done many decades ago.