

**BIOLOGICAL WASTE MANAGEMENT FACILITY
2004 CUHWC PRESENTATION**

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During the past 20 years, Texas A&M University (TAMU) has struggled to deal with biological waste disposal and its associated problems. Beginning in 1984, biological waste disposal problems began to be more problematic for TAMU and, especially, the Veterinary Hospital complex. Continued problems with the two incinerators and an increasing volume of waste became the major issues in these disposal problems. TAMU's biological waste can be classified as two types:

1. Pathological Waste is comprised of whole and sectionalized animal carcasses and remains that include body parts, organs, tissues, blood, and body fluids generated from Agricultural departments, Medical School, and Veterinary Medical complex. This waste includes animals of all mammalian species. Greater than 98% of the mammalian species will be dogs, cats, rodents, horses, and ruminants; up to 2% are birds, reptiles, fish, and amphibians.
2. Clinical waste is comprised of a mixture of various disposed items within the Agricultural departments, Medical School, and Veterinary Medical complex. Human organs, tissue, blood, and body fluids, as well as, other typical items, (e.g., disposable gloves, wipes, lab coats, surgical gowns, petri dishes, plastic vials, tubing, and the like), as generated through animal care, diagnostics, research, educational practices, or similar activities.

In 1990, university administrators commissioned a committee to look at the biological waste disposal needs. At the time, TAMU was utilizing two incinerators for the majority of the disposal. Non-infectious large animals were sent to rendering plants for processing. The two incinerators being used were a 500 lb./hr. placed in service in 1970 and a 750 lb./hr. placed in service in 1978. The 1970 or "grandfathered" incinerator was never permitted. The 1978 incinerator was originally permitted as pathological and hazardous waste incinerator and was only used as a hazardous waste incinerator until 1985. In early 1991, the committee presented its first recommendations. The recommendations were to increase the use of the rendering facilities and handle more clinical waste by autoclaving then sending it to the local landfill. In 1993, TAMU disposal problems were magnified during the incinerator permit renewal process. To renew the pathological permit, the state regulatory agency wanted several monitoring devices

and new efficient burners installed on the incinerator. At the time, the cost for the incinerator upgrades was about \$300,00.00. Funds could not be found so the incinerator was taken out of service. Now, there was only one incinerator to use. To complicate the issue, a major safety problem was identified with the “grandfathered” incinerator’s use, “Permitted Confined Space”. To remove the ash, someone had to climb down into the inside of the first chamber of the incinerator. In addition, the small size of the opening to the incinerator required that large animals be sectionalized before placing them into the incinerator. The sectionalizing process took place on the concrete slab next to the incinerator. For several years, this process drew very little attention until a building renovation introduced an eating facility (Cardiac Café) near the process area for the veterinary students use.

For the next several years, little was done about the biological waste disposal problems. In 1996, the committee was revitalized and new members were added. After several months, they recommended hiring a consultant to study the biological waste disposal needs. The consultant looked at the sources of waste, types, amounts, contaminants, and disposal options. Basically, the study determined that TAMU could not handle the projected waste increase utilizing the disposal methods at that time. The consultant outlined the various methods of disposal available. One of the solutions was to build a new disposal facility with updated disposal technology. However, money was not available to solve the problem. Again, in October 1999, the committee and EHSD recommended to the administration that TAMU build a new biological waste management facility. As had been the problem before, funds could not be found. To contend with the increasing amount of biological waste, TAMU departments used a wide variety of handling methods for the waste. These disposal methods included using our “grand fathered” incinerator, numerous autoclaves, landfill, rendering plants, and commercial disposal companies. Unfortunately, in 1999 a large number of the rendering plants started closing their doors. This created a new hurdle for the biological waste disposal dilemma. In addition, the state regulatory agencies began requiring disposal permits for putting certain pathological waste into landfills. Probably the one factor that got the wheels into motion for a biological waste disposal facility was the announcement by the Texas Commission on Environmental Quality (TCEQ): “All “grandfathered” emission sources would have to be

brought up to standards and permitted by September 2004 or TCEQ would need to be notified that the source would not be permitted and taken out of service by September 2005.

Finally in June 2001, TAMU's administration decided that the biological waste disposal issue must be addressed properly. An initial 5.5 million dollars was earmarked for the construction of a biological waste disposal facility project. After a short A/E (architectural and engineering) firm search, a company was selected to handle the project. During initial meetings with the A/E firm, it was decided that the original biological waste disposal study should be used. So, it was dusted off and updated. As part of this update, the A/E firm was instructed to pursue new and innovative methods of disposal. On March 19, 2002, the findings and an initial concept for the Biological Waste Management Facility (BWMF) were presented. The facility would be designed to contain at a minimum:

1. Offices
2. Laboratory areas
3. Necropsy area
4. Cold storage
5. Disposal equipment

The journey from March 2002 to present involved construction plan design, disposal method options, disposal equipment options, construction modifications, multiple regulatory agencies, regulatory compliance issues, and permitting requirements. The two issues that resulted in the most complications and delays were disposal equipment and permitting. The disposal equipment involved old technology--incineration and new technology--biodigestion. The permitting issue was originally believed to be under the Clean Air Act, a New Source Review (NSR) for construction and air operating permit . However, about a year into the NSR and air permitting, TCEQ personnel working with us asked whether we had submitted a Municipal Solid Waste (MSW)--Type V permit application. Now, let us examine how each of the issues played a major role in the facility completion.

As the building design progressed, deciding on the type of disposal equipment for the facility took on two aspects. Cost of the equipment was on one side and technology that would

effectively destroy the infectious agents and other pathogens present in the material on the other. When looking at disposal methods, the Veterinary Hospital personnel liked incineration, but wanted to look at a new rising technology--biodigestion. At the beginning of the design process, the design team felt that both technologies should be utilized in the facility to give some latitude as well as redundancy. At one point, dual technologies for disposal appeared to be financially impossible. Incineration was the tried technology that had proven to be effective for the destruction of all known agents. The cost to put in a state-of-the-art 750 lb./hr. pathological incinerator in the facility was estimated to be \$1,000,000.00. In Texas, biodigestion, a process using steam or hot water and an alkali solution that produced a digestate that would be discharged to the sanitary sewer, is basically new and unproven technology. The cost to put the digester in the facility was also estimated to be \$1,000,000.00. The project could not afford both. So, a decision had to be made on which technology would be used. To help understand this new technology, TAMU and A/E personnel consulted with others about this digestion process and made a trip to a Florida university where the digester was being used. In addition, discussions with TAMU wastewater treatment personnel and with TCEQ took place over the necessity for pretreatment of the digestate before allowing it into the sanitary sewer system. It was decided to use the new technology. To ready itself for the new technology, the Veterinary Hospital purchased a small version of the 7,000-pound capacity digester that would be placed in the facility. This digester has been utilized for about two years. Because no one wanted to give up on the possibility of the dual technology, the A/E firm was asked to continue designing for an incinerator in the facility as an "add alternate" to the construction project in the event money for the incinerator was found. At the 75% design review meeting, the A/E was notified by TAMU administrators that USDA was purchasing the digester for the BWMF. Now, both technologies could be utilized in the facility.

The permitting for the BWMF became a whole new world for me. An engineering firm had been chosen for handling the New Source Review (NSR) for construction and an air operating permit. The permitting process began on March 19, 2002. The permitting process always considered the dual technologies. The firm and I felt that it would be much easier to get them in the original permit than have to add a technology as a permit amendment. The

construction and air permit application was submitted to TCEQ on August 30, 2002. The process to a final permit involved many conference phone calls between the engineering firm, TCEQ, and myself. It also included two actual visits to TCEQ. At one point, we asked for the supervisor to review the regulatory opinion of the TCEQ engineer reviewing the permit. The final permit was issued April 29, 2003. During the air permitting process for the identified emission sources in the BWMF (gas powered boiler, pathological incinerator, biodigester), there were several major obstacles to overcome:

1. An engineering firm not located in the state of Texas and inexperienced with Texas air permitting regulations;
2. TCEQ's air permitting personnel unfamiliar with the biodigester technology;
3. Agreement with TCEQ's regulatory interpretations;
4. TCEQ's decision to regulate our pathological incinerator as a medical incinerator;
5. The final negotiated permit required limited use of the incinerator and limited the materials to be incinerated or put a continuous emissions monitoring system (CEMS) on the incinerator that would cost an additional \$150,000.00; and
6. The fact that the permitting process resulted in a three-month delay in starting construction.

Now, let us look back to an earlier comment in the paper. About a year into the air permitting, TCEQ air personnel asked about a MSW--Type V permit application. This is a permit for a municipal solid waste processing facility. In Texas, dead animals are defined in the MSW regulation as municipal solid waste and are regulated accordingly. So as required by the regulations, TAMU submitted the first MSW--Type V permit application on January 6, 2004. The revised application was due at TCEQ on June 21, 2004. Many of the same difficulties for obtaining the construction and air permit can be found with the MSW permit process:

1. An engineering firm not located in the state of Texas and inexperienced with Texas MSW permitting regulations;
2. TCEQ's MSW permitting personnel unfamiliar with the biodigester technology;
3. Agreement with TCEQ's regulatory interpretations;

4. According to the MSW regulations, the permit is supposed to have been issued before construction started.
5. TAMU should have been permitted for the past 20 years; and
6. TCEQ's first year engineer reviewing the permit application.

At the time I write this paper, we believe the BWMF will be completed and should have its first waste disposed through it during July 2004. Although the journey has been long and challenging, the ultimate benefit for TAMU is a first class biological waste management facility utilizing redundant, but alternative disposal methods. The facility uses a biodigester and incinerator to finally put the biological waste issue that has plagued TAMU to rest. As the Environmental Safety Manager for a major research and teaching institution, the following is a summary of what I have learned and the conclusions drawn:

1. Projects of this size and complexity can handicap you immensely in handling the everyday safety needs for the institution you work for.
2. For a permit that you cannot handle, use engineering firms that are very familiar with the permitting regulations and preferably, have an office in the state where the permit will be issued.
3. Early in the permit process, find other institutions that may have already had to handle these same problems.
4. Keep yourself fully involved in the permitting process from the beginning to the end. Do not get caught having to come into the permitting process at a late date.
5. Contact the regulatory agency early about all possible permits.
6. Remember, keep in contact with them during the entire permit process even though the engineering firm is handling the permit; you will probably be the one with oversight for permit compliance.