Low Level and Mixed Low Level Waste Treatment Technology Identification

FIU Applied Research Center

U.S. Department of Energy Environmental Management Office of Waste Management

The mission of the U.S. Department of Energy (DOE) Office of Environmental Management (EM) is to complete the safe cleanup of the environmental legacy brought about from five decades of nuclear weapons development and government-sponsored nuclear energy research.

To support DOE-EM in its mission, the Office of Waste Management (EM-30):

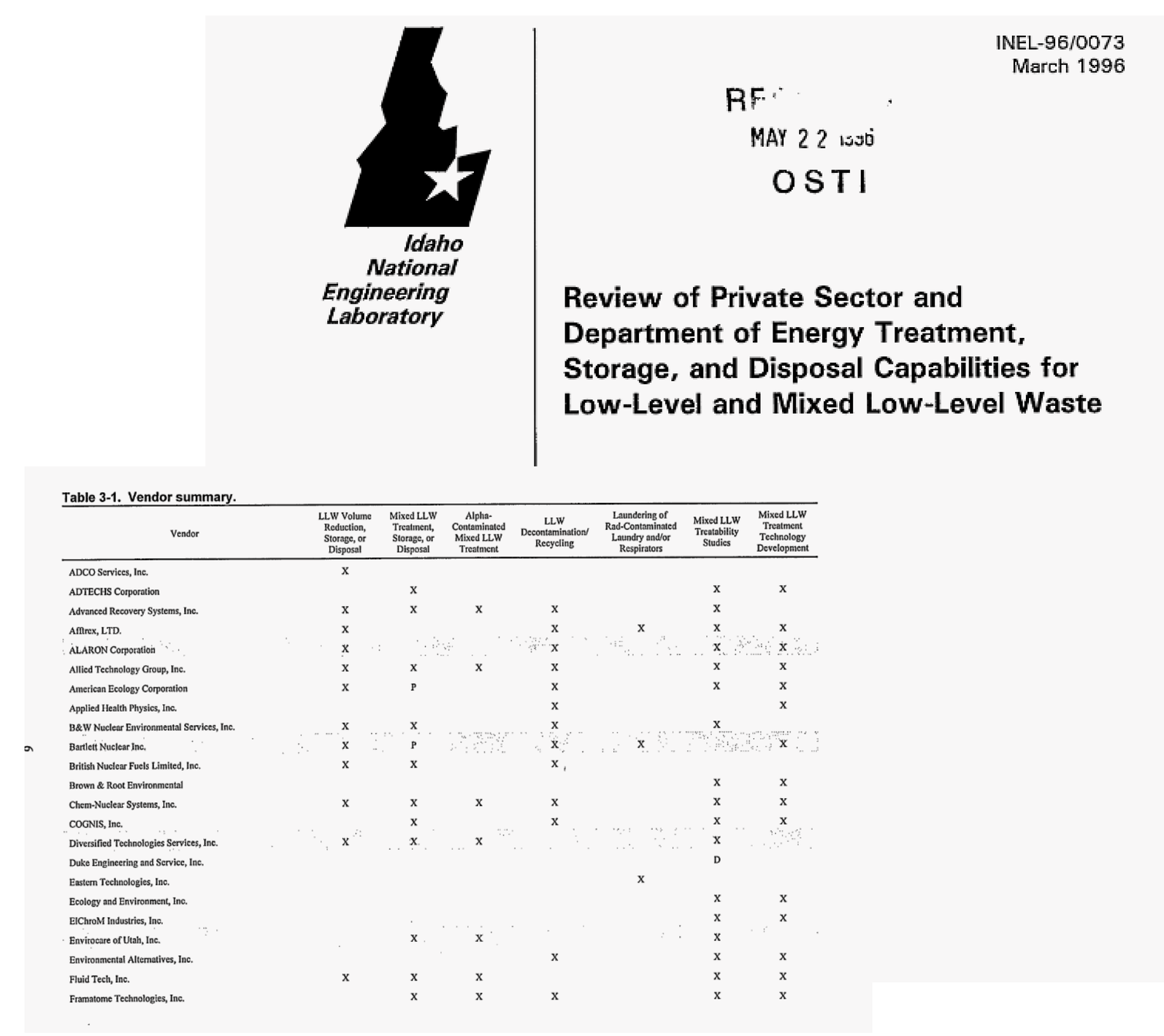
- Performs program management functions to identify and advance strategies to plan and optimize EM waste management projects and processes.
- Identifies and implements strategies and technical practices that improve the performance, costs and schedule and reduce the technical risk of EM projects.
- Supports implementation of EM waste and materials disposition activities and provides the complex-wide integration of operational disposition activities.
- Ensures safe and efficient packaging and transportation systems necessary to achieve waste and materials disposition EM-wide.

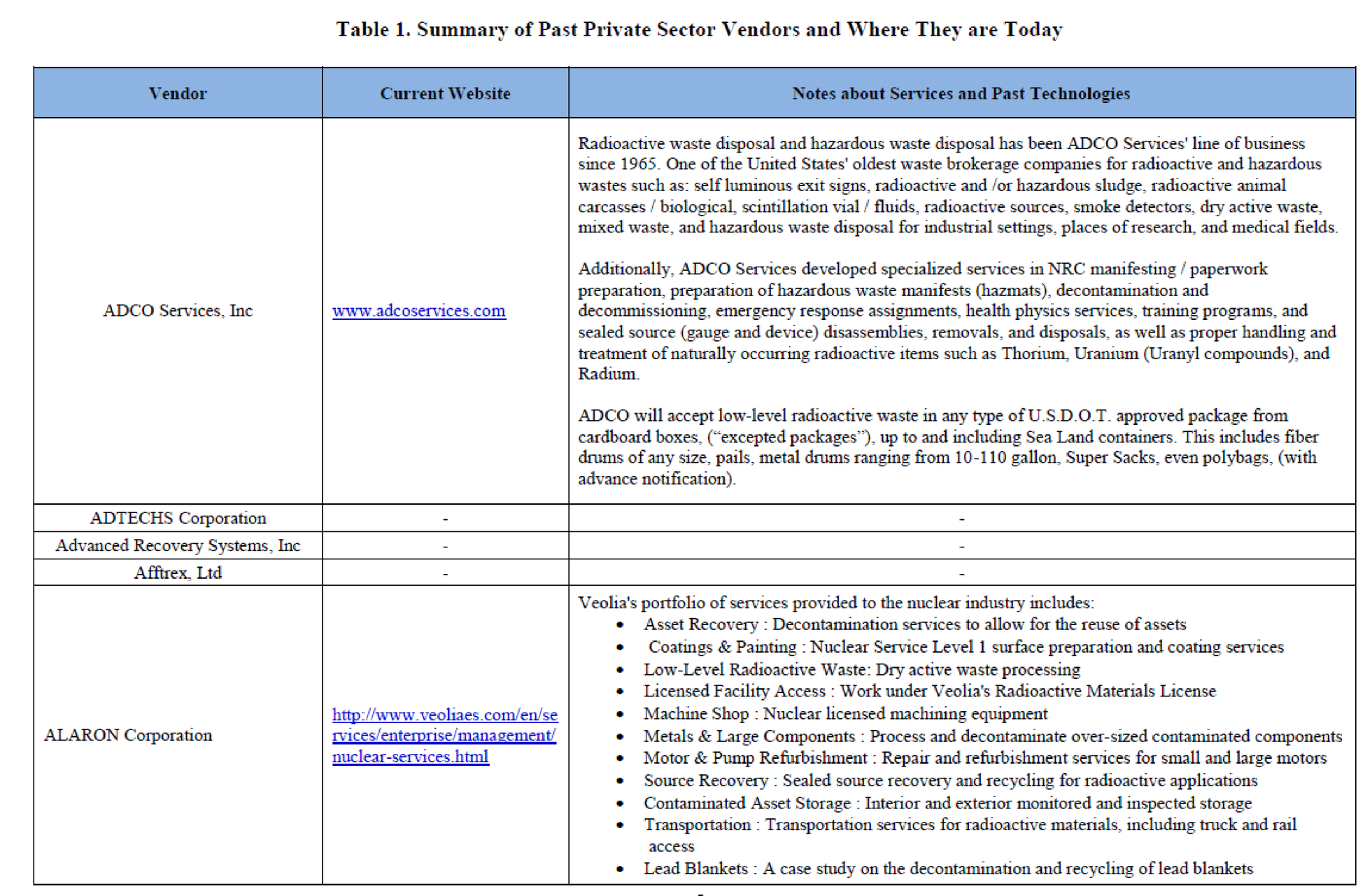
Objective

Develop concise information describing current and historical United States (U.S.) commercial low-level waste (LLW) and mixed low-level waste (MLLW) treatment capabilities to support exchanges on U.S. and international treatment capabilities, with a particular focus on technologies to address orphan (challenging) waste streams that lack a disposition path.

Historical Companies & Their Technologies

The 1996 report "Review of Private Sector and Department of Energy Treatment, Storage, and Disposal Capabilities for Low-Level and Mixed Low-Level Waste" summarized the current and near-term private sector vendor capability for the treatment, storage, and disposal of low-level and mixed low-level waste in 1996. The table shows the information currently available regarding each of those private sector vendors.



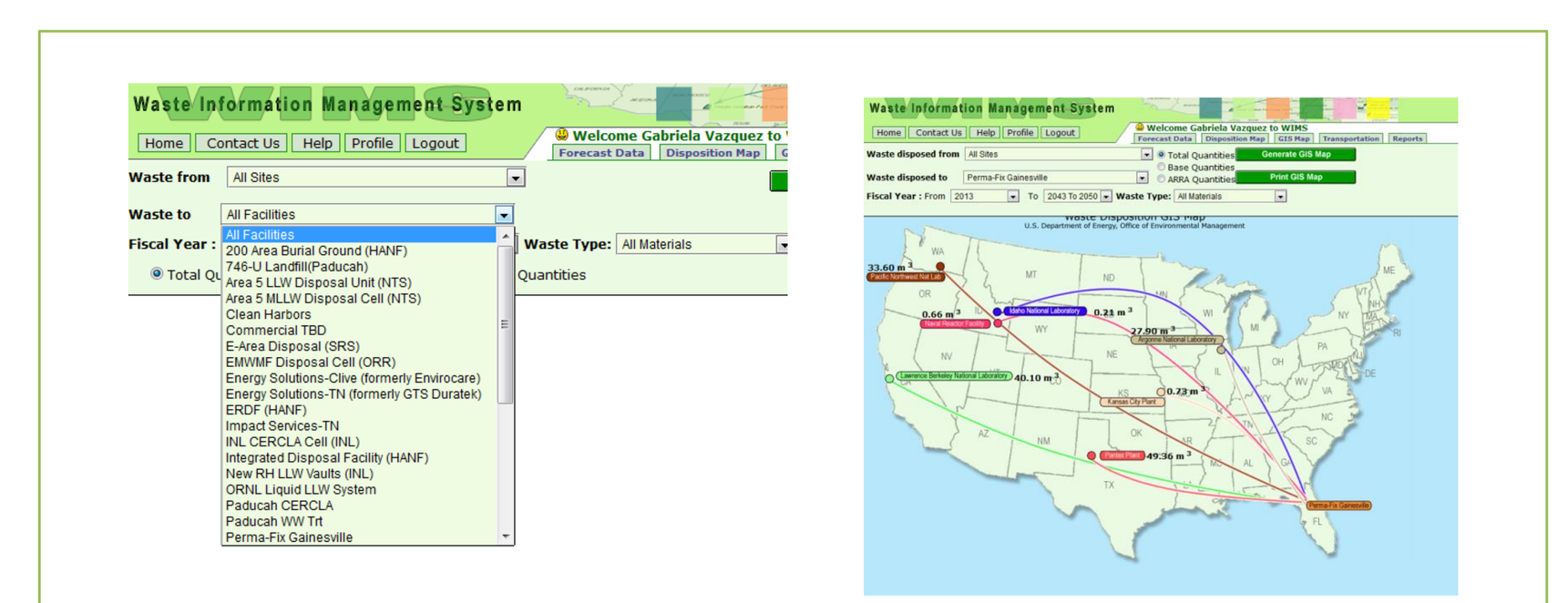


42 companies existed in 1996 to treat either LLW or MLLW

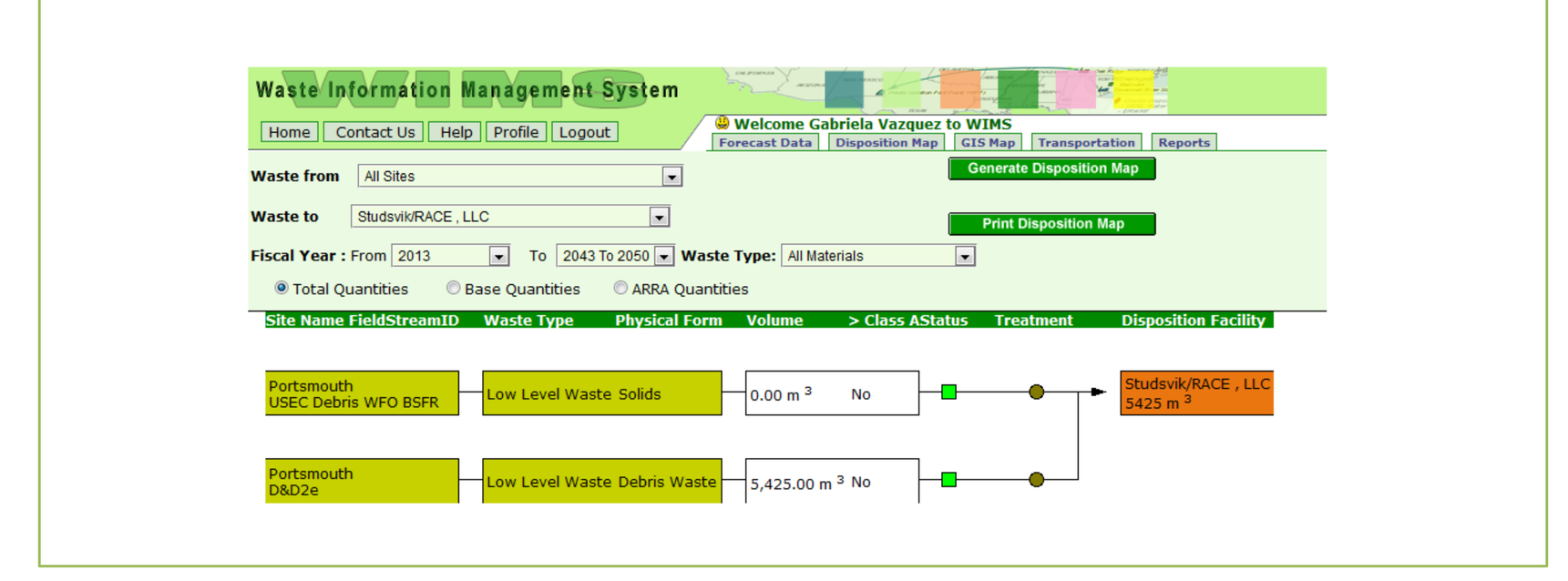
24 companies continue to exist today in 2013

11 companies have treatment capabilities on site

Waste Information Management System (WIMS) indicates DOE sites are forecasting to ship waste to **5**



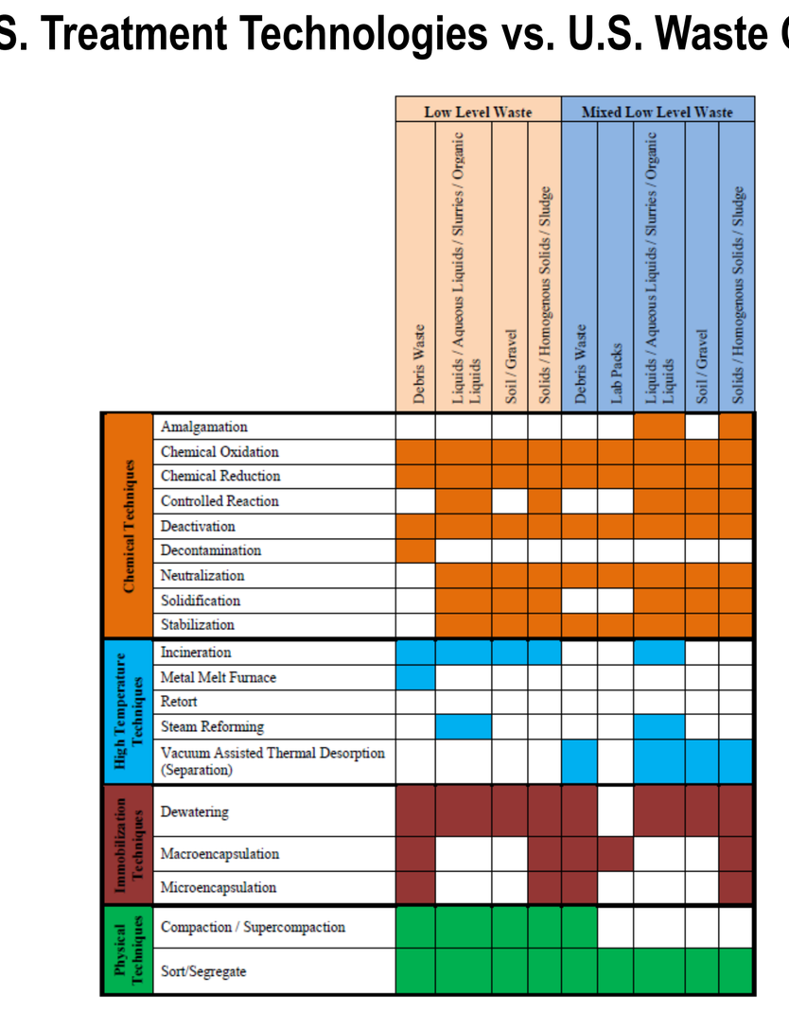
Waste Information Management System (WIMS)



Results

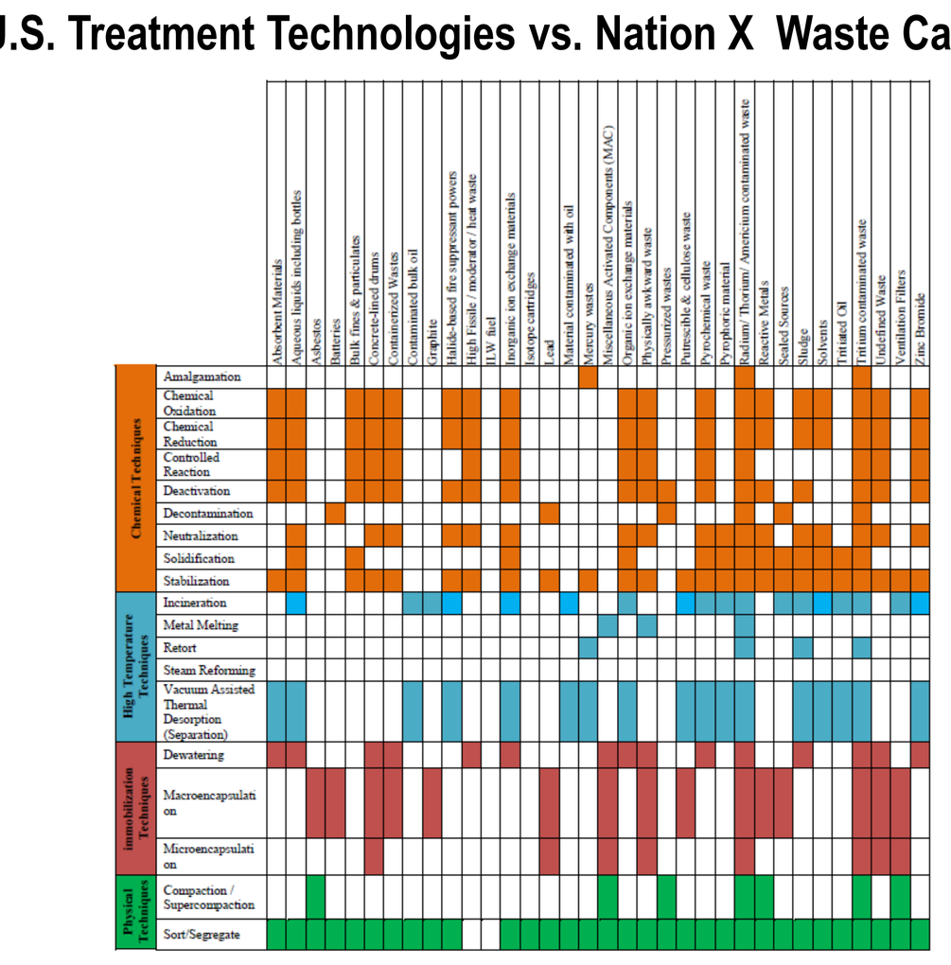
All the surveys were collected and the data was compiled onto two matrices.

U.S. Treatment Technologies vs. U.S. Waste Categories



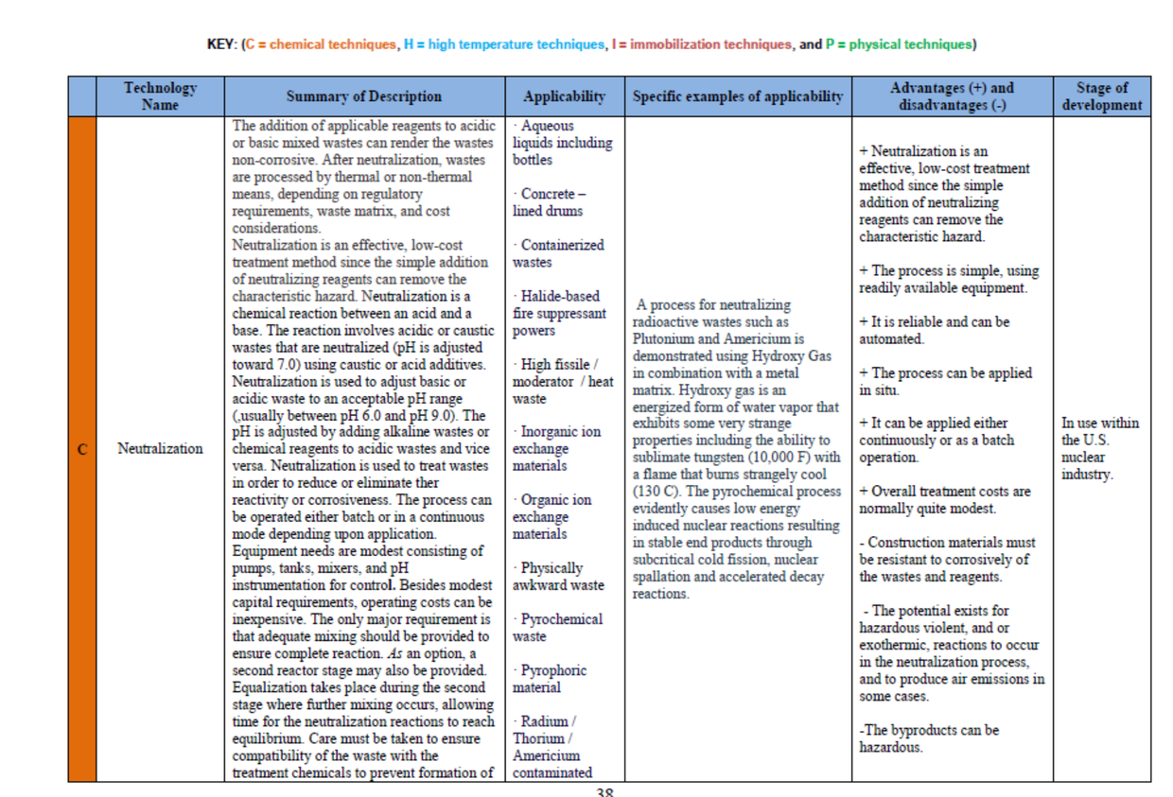
The 1st matrix correlates U.S. treatment technologies to U.S. waste streams.

U.S. Treatment Technologies vs. Nation X Waste Categories



The 2nd matrix is for the purpose of collaboration with international nations. Nations would be able to provide their waste streams and the treatment facilities can indicate what treatment technology capabilities they have. This particular matrix was completed for a specific nation.

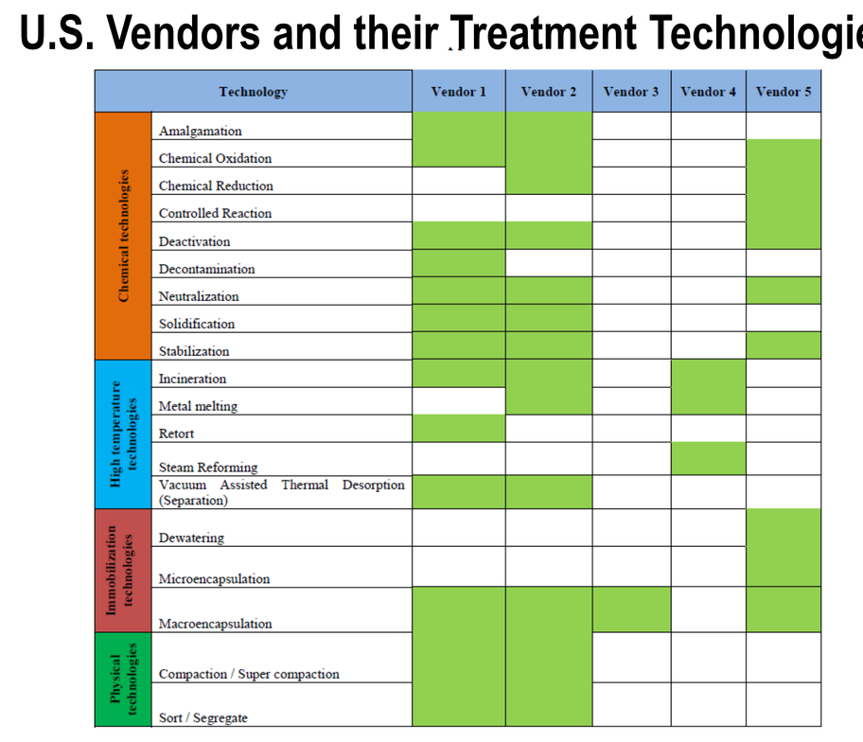
Summary of Treatment Technologies



Details of each available technology was collected

- Summary description
- Applicability
- Specific example of applicability
- Advantages
- Disadvantages
- Stage of development

U.S. Vendors and their Treatment Technologies



A table identified supplier information; it indicated which technologies were available from each vendor.

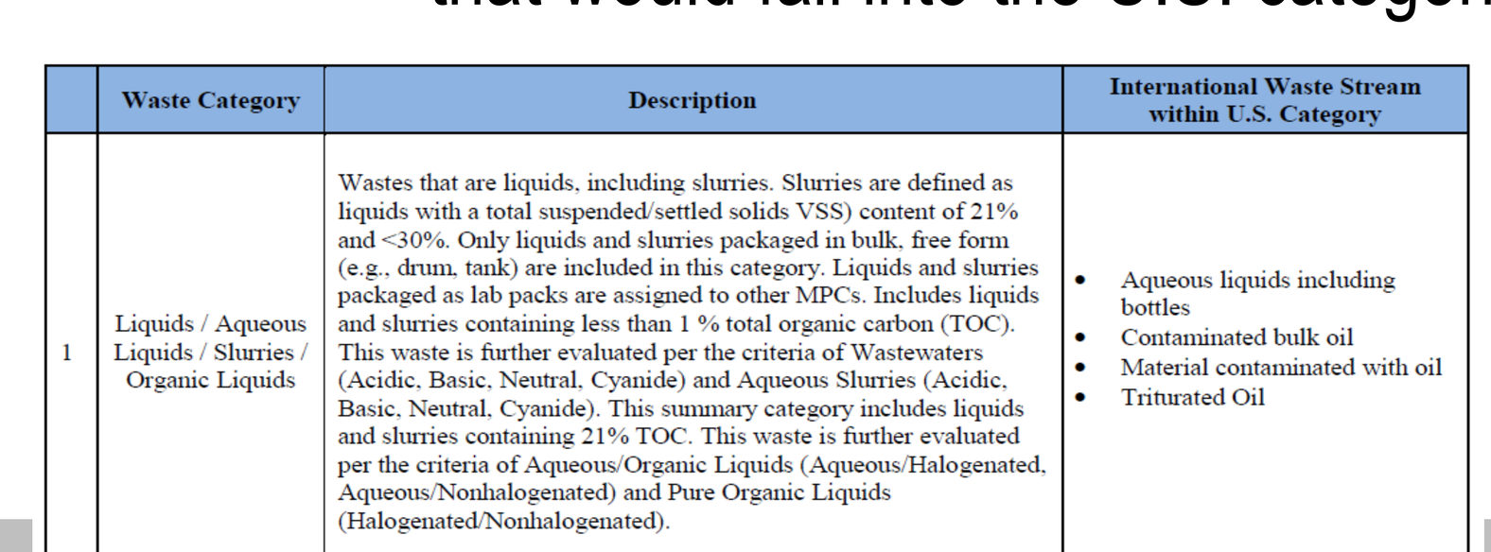
Gabriela I. Vazquez
DOE Fellow, Mechanical Engineering
Applied Research Center
Florida International University
10555 West Flagler St.,
EC 2100 C5-7
Miami, Florida 33174
Email: gvazq002@fiu.edu
http://fellows.fiu.edu/

Waste Categories

Using the DOE Waste Treatability Group Guidance report, six waste categories were identified.

1. Liquids / Slurries
2. Solids
3. Soil / Gravel
4. Debris Waste
5. Lab Packs
6. Special Waste Forms

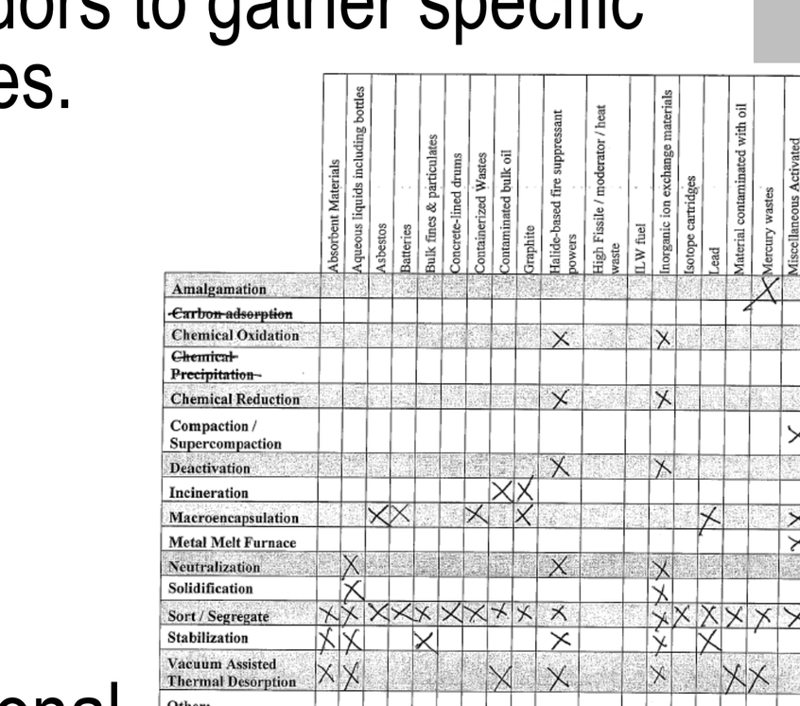
The descriptions go into further detail of what specific waste would be included in each category. Based on the descriptions provided by the international nation for their waste categories, the table also lists the international category titles that would fall into the U.S. categories.



Present Technologies

Surveys were sent out to the 5 private sector vendors to gather specific details on available technologies.

1. **Perma-Fix Environmental Services, Inc.**
2. **Energy*Solutions***
3. **Studsvik, Inc.**
4. **Waste Control Specialists LLC**
5. **Philotechnics**



A list of the U.S. waste categories and international waste categories were provided. The vendor marked off which waste categories they would have the means to treat on site.

Conclusion

- This information will be useful for future collaborations with international partners to determine common challenging untreatable waste streams and to work together to develop technologies to treat and continue disposal.
- The U.S. has been able to learn from past challenges and improve the development of new technologies. Many countries can benefit from our lessons learned.
- The five companies surveyed provide the main treatment options for the U.S. DOE waste streams. It is vital that as disposal of LLW and MLLW continues, these companies take part in the collaboration of technology development to meet U.S. DOE waste treatment and disposal demands.

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