SAND2010-5877P

Sandia National Laboratories

Operated for the U.S. Department of Energy's
National Nuclear Security Administration
by Sandia Corporation

Albuquerque, New Mexico 87185- 0734
Livermore, California 94551-

Date: August 12, 2010

To: Amy Sun, Chemical and Biological Systems, ORG06735

From: Arielle McCoy, Student Intern, ORG06735

Subject: Summary of Summer Project: Chemical Supply Chain

This note outlines only one of two projects that I supported during my summer internship at Sandia National Laboratories from May to August, 2010. It require a basic understanding of chemistry and computer programming,.

Background: Severe weather conditions have the potential to disturb a supply chain's balance should they occur where chemical facilities reside. A chemical supply chain details how groups of chemicals are related from their production to their consumption. An assessment must be done to level out chemical amounts to reinstate the balance should an event, such as a hurricane, occurs. Mass balances are necessary to accurately model the supply chain. Identifying the manufacturing processes of plants informs us how the plants produce a certain chemical as well as the amounts necessary for the reaction. The Chemical Economic Handbook (CEH) is consulted for such information.

Purpose: The purpose of this project is to assess hydrochloric acid and hydrofluoric acid supply chains and their resilience when hurricanes occur. The use of the CEH is most beneficial in the assessment as it has the most accurate and up-to-date information on hundreds of chemicals.

Process: I was tasked with authenticating data.

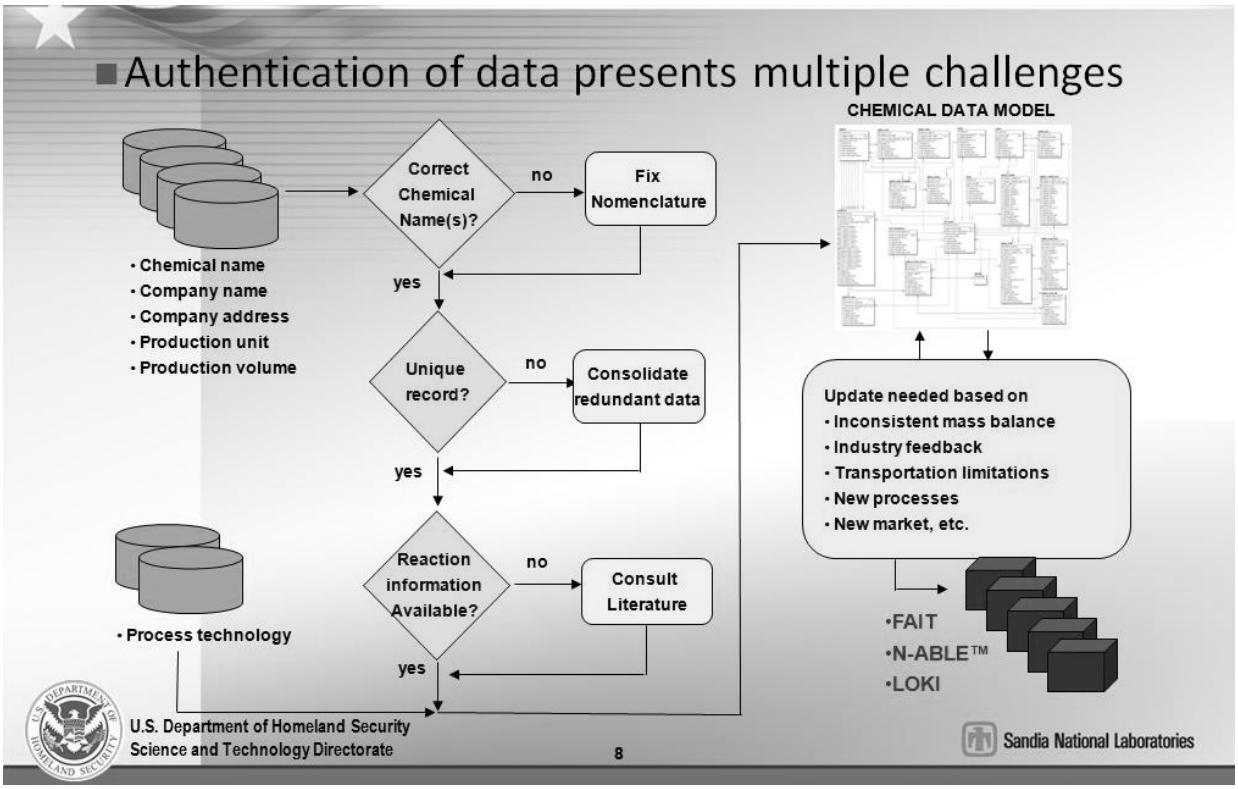
Unfortunately, there is not a standard naming convention for chemicals. Synonymous names had to be accounted for as well as the input style facilities used, such as spaces, dashes, descriptors, etc. The search within the database tool is extremely sensitive so wildcards had to be used to grasp most variations. A common chemical alias was implemented for consolidation.

In addition to queries about the chemicals, the three datasets also differed in the names of the facilities as well as the cities where they reside. The plant names may differ due to alternate names or acquirement of facilities by a different company. The cities were not always cities, but sometimes regions or counties. Referring to the CEH or the internet tends to solve this problem.

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

After consulting the CEH for manufacturing processes, the mass balance can be associated to the match. The mass balance is dictated by the stoichiometry of the reactions specified in the manufacturing process.

The process flow diagram below illustrates the steps as described above.



Summary: I had a very basic understanding of what a supply chain was before working on this project. I now realize how much more detail must be applied due to the inconsistency of naming conventions and mass balance implementations. I also learned that in order to create an efficient supply chain, other economic details should be included, like the prices for financial evaluations. Such assessments can dictate which path facilities might take to recover.

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.