

Project Name:	Terra
Project Location:	Sioux City, Iowa
Project Completion Date:	September 1994
Project Duration:	10 Month
Project Value:	\$16,000,000
Client Name:	Terra Nitrogen
Client Contact:	Mr. Kip Landwehr
Client Phone Number:	(972) 462-8656
Technology Utilized:	Demolition

Project Description

SEMS personnel were asked to respond to an explosion at Terra Nitrogen's Sioux City Ammonium Nitrate Fertilizer plant. The explosion was catastrophic: taking the lives of several plant personnel; causing injuries to additional plant personnel; leveling several buildings and process units; damaging storage tanks, process vessels, control rooms, pipelines, and holding ponds; and create a huge crater at ground zero.

Activities completed during the emergency and subsequent remediation phases at the site included:

- Collection of thousands of gallons of liquid ammonia released through holes in 6,000,000 gallon storage tanks caused by shrapnel impacting the tank shells;
- Emptying and relocating remaining liquid ammonia from the damaged tanks;
- Construction of a 6 acre waste water treatment pond to accommodate increased volume resulting from the cleanup operations and provide capacity for the contents of one of the existing ponds. Shrapnel from the explosion compromised the HDPE liner in that pond. Once the liquids were removed from that pond, a new subsurface and liner system were installed;
- Demolition and removal from the site of buildings damaged during the explosion. Warehouse buildings were razed to the ground and the structures sent offsite for recycling. As access to materials stored in the warehouse became possible, evaluation of material conditions were made and products and supplies were relocated for storage, sent for repackaging, or disposed of offsite. Toppled process vessels, day tanks, piping, and piping supports were decontaminated and sent offsite for recycling;
- Asbestos insulation was used extensively around the facility. As a result of the explosion, asbestos was found in elevated concentrations in all areas of the facility. An asbestos abatement contractor was brought in to decontaminate areas and surfaces. SEMS personnel were responsible for removing the asbestos contamination from the bottom of two storm water retention ponds within the blast area. This was carried out by draining each pond and excavating the asbestos containing sediments. The excavated material was transported offsite to a permitted landfill.
- The facility's rail loading operation was in the blast zone and received significant damage. After review by plant process engineers, it was determined that it would have to be rebuilt. New track was installed to allow for the relocation of rail cars. Several rail cars were re-railed after being blown off the tracks by the explosion. Once the cars were relocated, the tracks were taken up and the loading racks and piping were cleaned and demolished,
- Construction of access roads around the site. Existing roadways throughout the plant were either impassable due to debris, damage to the road surfaces themselves, or too restrictive in

terms of available height and or width for the construction equipment.

- Land application of soils impacted by high levels of ammonia. Surrounding farmland owned by Terra was made available for beneficial use of the fertilized soils.
- SEMS personnel were responsible for the cleanup of mercury from damaged mercury switches around the facility.
- SEMS personnel provided confined space entry supervision and specialists for other trades involved in the rebuild of the plant.
- SEMS personnel established perimeter site security, exclusion zone entry procedures, decontamination stations throughout the plant for both equipment and personnel, and provided hot meals cooked at the site for all personnel involved in the emergency, remediation, and early rebuild operations.

The initial explosion occurred and the majority of the work conducted during the winter of 1995. Ice, snow, frigid temperatures, unstable structures, razor sharp debris, and round the clock operations tested the limits of everyone involved.