

**ANIMAL PROJECTS**

UNIVERSITY OF ILLINOIS, Champaign, Illinois

South Farms Relocation, Beef and Sheep Facilities, 2003

UNIVERSITY OF GEORGIA, Athens, Georgia

Animal Health Facility, 2003

Design of animal spaces, feed storage and handling, and waste handling systems in and out of containment.

AUBURN UNIVERSITY, Auburn, Alabama

Master Plan for Swine Research and Education Center, 2002

WTA BEEF MARKETING ALLIANCE, London, Kentucky

Beef Marketing Facility, 2002

Design, specifications and drawings for beef facility

USDA/NATIONAL ANIMAL DISEASE CENTER, Ames, Iowa

Building 3, Wing G, Animal Room Improvements, 2002

Pre-design, design, bid and construction phases for animal room improvements

USDA/NATIONAL ANIMAL DISEASE CENTER, Ames, Iowa

Buildings 4D, 4E and 3A, 4A Animal Rooms, 2002

Pre-design, design, bidding and construction observation for upgrade of existing HVAC monitoring systems.

USDA/NATIONAL ANIMAL DISEASE CENTER, Ames, Iowa

Barn 134 Improvements, 2001

Pre-design, design and bid phase for complete renovation including structural, HVAC, plumbing, electrical and architectural improvements

USDA/NATIONAL ANIMAL DISEASE CENTER, Ames, Iowa

Penwork Design, 2001

Pre-design and design phases for improvements to animal housing facilities and specification of animal handling equipment

WOODLAND FARMS, Mike Hermanson, Story City, Iowa

Turkey Building Foundation, 2001

Design of structural foundation for turkey buildings

UNIVERSITY OF WISCONSIN, Marshfield, Wisconsin

Heifer/cow facility, 2001

Design of housing, animal flow and manure/waste handling facilities

UNIVERSITY OF WISCONSIN, Platteville, Wisconsin

Swine Research Building, 2001

Design of farrow to finish swine research facility, including schedules and support areas, with complete manure management design.

UNIVERSITY OF WISCONSIN, Platteville, Wisconsin

Dairy Research Building, 2001

Renovation of exiting freestall facilities for better animal management flow and increased usage of freestalls.

THE MILTON HERSHEY SCHOOL, Hershey, Pennsylvania

Animal and Dairy and Food Processing Center, 2001 and continuing

Agricultural Engineering design for dairy, large animal, small animal, milk processing (goat and cow), veterinary clinic and horse stables. Includes animal flow and waste/manure treatment.

THE OHIO STATE UNIVERSITY, Columbus, Ohio

25-year long range planning for facilities in the College of Agriculture, 1999/2000 and continuing

USDA/NATIONAL ANIMAL DISEASE CENTER, Ames, Iowa.

Modernization Plan for Animal Health Facilities, 2000 and continuing

Update existing Modernization Plan, develop program of requirements and develop facility and infrastructure modernization phasing plan to combine the current USDA-ARS, NADC and USDA-APHIS, NVSL efforts into one consolidated campus over a ten-year period.

USDA - AGRICULTURAL RESEARCH SERVICES, Ames, Iowa

National Animal Disease Center, Animal Research Building (3 BC) Remodel, 1999/2000

Drawings and specifications for remodeling the animal research areas, change rooms, necropsy and laboratories, including a complete remodel of the air handling in a BL-3 level facility.

GENETIC RESOURCES INTERNATIONAL, Navasota, Texas, 2000

Building evaluation and air conditioning design for bulls used in connection with semen collection.

CENTRAL CONFINEMENT SERVICES, Columbus, Nebraska

6000-cow dairy located in Wendell, Idaho, 1999/2000.

Flush system design for parlor and holding area, freestall barns and transfer lanes. Concrete design for parlor and basement, holding area, freestall barns and transfer lanes and hospital/calf barn

UNIVERSITY OF KENTUCKY, Princeton, Kentucky

Consultation and specifications for farrow to finish swine facilities and feed mill, 2000

MIDWEST DAIRY INSTITUTE, Milbank, South Dakota

800-cow dairy teaching farm, 1998/99

800-cow free stall housing with sand bedding, double 14 milking parlor, feed center and various support buildings.

USDA - AGRICULTURAL RESEARCH SERVICES, Ames, Iowa

National Animal Disease Center, Incinerator building remodel, 1998/99

Remodeling of ventilation system and ash removal and transfer from BL-4 area.

UNIVERSITY OF MARYLAND-EASTERN SHORE, Princess Anne, Maryland

Center for Food Science and Technology, 1998/99

Provide consultation and design for live animal handling and holding; swine, sheep, goat and bovine slaughter facilities; poultry slaughter facilities; seafood processing facilities; meat processing and cold storage facilities.

USDA - AGRICULTURAL RESEARECH SERVICES, Ames, Iowa

National Soil Tilth Laboratory  
Ventilation system survey and redesign, 1997/98

UNIVERSITY OF NEBRASKA, Curtis, Nebraska  
Livestock Pavilion, 1998  
Preliminary design and specifications for design/build bidding. Show arena and animal handling areas for teaching and demonstration.

THE OHIO STATE UNIVERSITY, OARDC, Wooster, Ohio  
Equine Education Complex 1977/99  
Assisted the University in preparing drawings and specifications for housing, teaching, offices and pavilion for equine education.

USDA - AGRICULTURAL RESEARCH SERVICES, Ames, Iowa  
National Animal Disease Center, Animal Research Building (4 BC) Remodel, 1977/99  
Drawings and specifications for remodeling the animal research areas, change rooms, necropsy and laboratories, including a complete remodel of the air handling in a BL-3 level facility.

USDA - AGRICULTURAL RESEARCH SERVICES, Ames, Iowa  
National Animal Disease Center, Incinerator Building Remodel 1996  
Preliminary study and pre-design of alternate layout of necropsy, office areas and carcass handling.

UNIVERSITY OF KENTUCKY, Lexington, Kentucky  
Swine, Beef and Sheep Teaching and Research Farms, 1996/99  
Drawings and specifications for farrow to finish swine facilities, beef cow/calf market and handling facilities and sheep lambing and market facilities.

IOWA STATE UNIVERSITY, Ames, Iowa  
Animal Science Teaching Building and Livestock Infectious Disease Facility, 1995/99  
Drawings and specifications for animal manure system.

USDA – AGRICULTURAL RESEARCH SERVICES, Ames, Iowa  
National Animal Disease Center, Security Fencing, 1995/99  
Study and later drawings and specifications for security system with fences, gates and identification card entry

USDA – AGRICULTURAL RESEARCH SERVICES, Ames, Iowa  
National Animal Disease Center, Poultry Facility, 1995  
Drawings and specifications for small broiler/layer research and clean bird holding.

IOWA STATE UNIVERSITY, Ames, Iowa  
Beef Nutrition Research 1995  
Consultant to University Design Services in the preparation of construction documents for a confinement beef feeding research facility.

IOWA STATE UNIVERSITY, Madrid, Iowa.  
Bilsland Swine Breeding Farm, 1995/96.  
Drawings and specifications for a 48 sow farrowing - Nursery with a sow wash area and observation room. Approximately 8,440 square feet. Two (2) 600-head grow/finishing buildings were also designed as naturally ventilated buildings with mechanical winter ventilation. Approximately 11,700 square feet.

MICHIGAN STATE UNIVERSITY, East Lansing, Michigan.  
Swine Facility, 1993/96.

A 200-sow, farrow-to-finish Swine Facility with an individual intensive lab for farrowing and nursery. 41,800 square feet of production facilities including a solid-liquid manure separation system, compost building and load-out area.

Poultry Facility, 1993/96.

A 48-pen, 1150 Turkey Research Facility complete with work room. (8,120 square feet).

Beef Handling Facility 1993/96.

A 1,600 square foot Beef Handling Facility with a handling chute, scale, squeeze chute, outside holding pens and dual height loading chute and working corral.

Intensive Dairy Metabolism Facility 1993/96.

A 3,650 square foot Metabolism Facility complete with feed room, milk center and sample prep lab.

THE OHIO STATE UNIVERSITY, Wooster, Ohio.

Poultry Teaching/Research Facility, 1993/95.

Consultant to Prime Architect on a 20,600 square foot Poultry Facility.

SOUTH DAKOTA STATE UNIVERSITY, Brookings, South Dakota.

Swine Grower/Finishing Biostress Research Facility, 1993/94.

Drawings and specifications for a 400 head grower/finishing facility with feed storage/handling support rooms. Approximately 7,000 square feet.

USDA-AGRICULTURAL RESEARCH SERVICES, Ames, Iowa.

National Pig Research Center, 1993/94.

Preliminary design of a 600 sow farrow-to-finish swine facility. Three site production with the design of a waste management system for each site. Consultant to prime architect. Approximately 71,000 square feet of production facilities.

UNIVERSITY OF MINNESOTA, Grand Rapids, Minnesota.

Open Front Beef Facility, 1993/94.

Drawings and specifications for a 180 head open front wood post-frame beef facility, including quarters and feed bunk layout. 10,800 square feet.

AMERICAN CYANAMID, Princeton, New Jersey.

Swine Research Facility 1992/1993.

Drawings and specifications for a 40 sow farrowing-nursery facility and 200 head grower-finishing facility with animal labs, handling area, feed storage, and office. farrow/nursery facility has approximately 15,500 square feet, and the grower/finishing facility has approximately 10,800 square feet.

USDA-NATIONAL ANIMAL DISEASE CENTER, Ames, Iowa.

Animal Shelter/Feed Building, 1991/1992.

Drawings and specifications for 40 cow individual feeding barn with electronic feed gates and tubs. Project incorporated approximately 5,000 sq. ft. post-framed barn addition and pre-engineered roof system for approximately 5,800 sq. ft. existing dairy research building.

SOUTH DAKOTA STATE UNIVERSITY, Brookings, South Dakota.

Sheep Lambing Barn, 1992.

Building program refinement, drawings and specifications for 600 head sheep unit with lambing facilities, office, laboratory and feed supplies storage. 17,300 square feet.

UNIVERSITY OF MINNESOTA, Crookston Campus, Minnesota.

Agricultural Operations Management Center, 1991/1992.

Drawings and specifications of animal facilities including 24 sow swine unit, beef and sheep building, hay-shavings storage building, and manure storage bunkers and liquid slurry tank. Consultant to prime Architect. 15,680 GSF.

ALMAR FARMS, Middlebury, Indiana.

Dairy Planning and Waste Management System, 1991.

Facility planning for 200 cow dairy operation. Design of Waste Management System including manure tank and earthen storage basin.

UNIVERSITY OF MINNESOTA, St. Paul Campus, Minnesota.

Animal Physiology Research Facility, 1991.

Building program refinement, schematic design and design development of animal housing areas and equipment for prime architect on campus research laboratory. Facility to meet AALAC requirements. 14,470 GSF.

OHIO STATE UNIVERSITY, Wooster, Ohio.

Dairy Maternity and Calf Barn Facility, 1991.

Drawings and specifications for replacement maternity facility including 14 maternity pens, 32 head calf nursery, 54 head growing heifers, hay storage building and manure storage bunker. Performed in association with local Engineering firm. 17,650 square feet.

SOUTH DAKOTA STATE UNIVERSITY, Brookings, South Dakota.

Swine Research Facility, 1991.

Drawings and specifications for swine research facility including 60-head gestation housing, 24 farrowing stalls, and 28 single litter size research nursery pens. Equipment bid separately. Performed in association with local Engineering firm. 7,300 square feet.

PENNSYLVANIA STATE UNIVERSITY, University Park, Pennsylvania.

Dairy Research Unit, 1991.

Independent review of design development documents prepared by Architect. 550-head dairy facility complete with individual feeding barn, intensive research barn, milking parlor, heifer and milking cow housing.

HAWKEYE INSTITUTE OF TECHNOLOGY, Waterloo, Iowa.

Cattle Laboratory Building, 1991.

Consultant to architect and preparation of specifications for animal housing portion of cattle housing building. 8,160 square feet.

WOODLAND FARMS, Story City, Iowa.

Liquid Manure Storage Basin, 1990/1991.

Sizing and design of earthen manure storage basin for 300 cow dairy, including Iowa Department of Natural Resources permit application.

21ST CENTURY GENETICS, Shawano, Wisconsin.

Young Sires Housing, 1989/1990/1991.

Drawings, specifications, contract documents, and Master Planning for facilities to house unproven bulls. Ongoing project with 78,800 square feet of the 137,900 square feet completed.

IOWA STATE UNIVERSITY, Ames, Iowa.

Ankeny Dairy Station-Individual Feeding Barn, 1989.

Preparation of contract drawings and specifications for 48-cow freestall barn with individual electronic feed gates.

IOWA STATE UNIVERSITY, Ames, Iowa.

Swine Nutrition and Management Research Center, 1989.

Consultation to prime engineering firm on 200-sow farrow-to-finish swine operation of 25,750 square feet.

UNIVERSITY OF KENTUCKY, Lexington, Kentucky.

Animal Science Experiment Stations, 1988/89.

Evaluation of program and facility needs for next 20 years, in the areas of beef, dairy, horses, poultry, sheep, and swine, with a total of approximately 1500 mature animal units.

AMERICAN BREEDERS SERVICE, De Forest, Wisconsin.

Admittance Quarantine Facility, 1987.

Drawings, specifications, and contract documents, for a 3300 square foot unit for quarantining 40 bull calves. Project included development of roads, all utilities, veterinary treatment area, along with calf housing requirements. \$150,000.

SELECT SIRE, INC., Plain City, Ohio.

Howard C. Kellgren Production Center, 1986.

Drawings, specifications and contract documents for a 32,900 square foot unit for housing 52 mature bulls. Project included site development, feed and bedding storage, visitor center, semen collection facilities as well as the normal bull housing. The facility included six independent computer controlled environmental zones including two zones of air conditioning for bulls.

LANDMARK GENETICS INC., Watertown, Wisconsin.

International Barn, 1986.

Drawings, specifications, and contract documents for a 17,000 square foot production unit housing 41 bulls, a collection and mount area, and a complete semen processing facility. Project included development of site, all utilities, feed and bedding storage, a Veterinary treatment area and a second collection area.

ELI LILLY COMPANY, Greenfield, Indiana.

Milking Parlor and Treatment Facility, 1985.

Drawings, specifications, contract documents, and cost estimates for a 5640 square foot facility for a double-6 herringbone milking parlor and treatment area. Project included development of utilities, construction details and housing requirements.

MISSISSIPPI AGRICULTURAL & FORESTRY EXPERIMENT STATION, Mississippi State, Mississippi.

Dairy Science Farm, 1984.

Drawings, Specifications, Contract Documents, and cost estimates for a 200-cow research and teaching dairy farm. Included in the project are all facets of the dairy, including utilities, waste treatment, site development, housing requirements, and parlor needs.

MONSANTO COMPANY, St. Louis, Missouri.

Dairy Farm, 1983.

Preliminary drawings and consultation for a 200-cow research dairy. Project included development of housing requirements, parlor needs, feeding, roads, and utilities.

UTAH STATE UNIVERSITY, Logan, Utah.

Dairy Science Farm, 1983.

Consultation for a 200-cow research and teaching dairy farm. Project included development of all facets of the dairy to be located on an undeveloped site.

## **GRAIN/SEED STORAGE FACILITIES**

US Grain, New Sharon, Iowa

Design bin foundation and tower structure, 2007

US GRAIN, Vinton, Iowa

Design of 150' bin foundation, 2007

CONSOLIDATED BLENDERS, Guntersville, Alabama

Design structural repair of alfalfa pellet storage facility after fire, 2007

COOPERATIVE MUTUAL INSURANCE

Investigation of cause of explosion North Iowa Cooperative at Clarion, Iowa, 2004

FARMERS COOPERATIVE ELEVATOR, Ida Grove, Iowa

Design foundation for grain bin, 2003

FARMERS COOPERATIVE ELEVATOR, Woolstock, Iowa

Investigation of cause of major explosion and design repair of facility, 2002

FARMERS COOPERATIVE COMPANY, Ida Grove, Iowa

Design foundation for 105' grain bin, 2002

FARMERS COOPERATIVE COMPANY, Buckeye, Iowa

Evaluation of concrete elevator, 2002

UNITED COOPERATIVE, Webster City, Iowa

Evaluation of clay tile elevator, 2001

AG VALLEY COOPERATIVE, Bartley, Nebraska

Structural evaluation and repair design of wood elevator, 2001

SWISS VALLEY AG SERVICES, Monticello, Iowa

Grain bin manhole inspection, 2001

Evaluation of structural integrity of existing manholes on four concrete tanks

COOPERATIVE MUTUAL INSURANCE CO., Shelby, Iowa

Structural evaluation of overhead concrete grain bins, 2001

COOPERATIVE MUTUAL INSURANCE, Ruby, Nebraska

Structural evaluation of steel grain bins, 2001

COOPERATIVE MUTUAL INSURANCE, Bartley, Nebraska

Structural evaluation and repair design of wood elevator, 2001

HEART OF IOWA COOPERATIVE, Nevada, Iowa

Design of grain bin and conveyors, 2001

USDA - PLANT INTRODUCTION STATION, Iowa State University, Ames, Iowa  
Seed Storage Cooler, 2001

CARGILL NUTRENA, Smithton, Missouri

Footing design for overhead bins, 2001

Design footings for overhead bins and connection of girders and columns to existing wall.

FARMERS ELEVATOR COOPERATIVE, Pleasant Hill, Iowa

Rail loadout, 1999

Development of new facilities for receiving storage and 25-car rail loadout.

HEART OF IOWA COOPERATIVE, Nevada, Iowa

Grain Storage, 1996

Drawings, specifications and site observation of 100 rail car loadout with supporting grain storage and receiving.

GOWRIE ELEVATOR, Gowrie, Iowa

Grain Elevator Repair, 1994/95.

Site observation, analysis and report on concrete elevator tanks damaged in an explosion. Design and construction observation of installation of reinforced shotcrete liners.

STEWART INDUSTRIES, Florence, Illinois.

Barge Load-out, 1995.

Design of a grain handling barge load-out tower, catwalk and conveyor support from a grain elevator into river barges.

UNIVERSITY OF MINNESOTA, Becker, Minnesota.

Sand Plains Research Farm, 1992.

Drawings and specifications for a 2,400 square foot post frame seed sample preparation facility.

UNIVERSITY OF MINNESOTA, Grand Rapids, Minnesota.

North Central Experiment Station, 1992

Drawings and specifications for a 3,600 square foot field crop laboratory with lab rooms, offices, meeting room, and a machinery storage area.

UNIVERSITY OF MINNESOTA, Morris, Minnesota.

West Central Experiment Station.

Drawings and specifications for a 6,500 square foot agronomy research facility complete with labs, computer room, offices, and machinery storage area.

IOWA STATE UNIVERSITY, Ames, Iowa.

Grain Center Specifications, 1991.

Preparation of Contract Document Specifications for receipt of bids on grain drying and storage system including bins, drying and stirring equipment, bucket elevator and tower, conveyors, temperature monitoring equipment and controls. System design by ISU.

HENDRIX TOWN AND COUNTRY, La Hogue, Illinois.

Elevator Leg Tower Foundation, 1991.

Design and drawing of foundation for bucket elevator support tower.

LAWN HILL COOPERATIVE COMPANY, New Providence, Iowa.

Grain Elevator Repair, 1991.



Site observations, analysis and report on existing concrete elevator tanks. Design and construction observation of installation of reinforced shotcrete liners for two concrete grain tanks.

FARMERS COOPERATIVE COMPANY, Ledyard, Iowa.

Grain Elevator Repair, 1991.

Site observations, analysis and report on existing concrete elevator tanks. Design and construction observation of installation of reinforced shotcrete liners for two concrete grain tanks.

SCOULAR GRAIN COMPANY, Venango, Nebraska.

Grain Elevator Repairs, 1990.

Analysis on existing concrete elevator tanks. Design and construction observation of I installation of shotcrete liners for 3 concrete grain tanks.

CENTRAL IOWA COOPERATIVE, Stanhope, Iowa.

Grain Elevator Repairs, 1990.

Analysis on existing concrete elevator. Design and construction observation of installation of shotcrete liners in two concrete grain tanks and supports for overhead bins.

FARMERS COOPERATIVE AND FEED COMPANY, Cresco, Iowa.

Wood Cribbed Elevator, 1990.

Site observations, analysis, report and recommendations on structural condition of wood cribbed elevator.

GOOD SEED AND GRAIN COMPANY, Omaha, Nebraska.

Site observations and recommendations for concrete grain elevator, 1990.

Site observations, report and recommendations to insurance carrier on concrete grain elevator annex adjacent to wood crib elevator destroyed by fire.

GOLD-EAGLE COOPERATIVE, Goldfield, Iowa.

Workhouse and Receiving Revisions, 1989.

Preparation of drawings and specifications for receiving area and upgrading of grain elevator equipment, including receiving building, extension of two bucket elevators, supporting super structure on headhouse roof, grain cleaners, distributor system, and drag conveyor.

## **FEED HANDLING FACILITIES**

GOLD EAGLE COOPERATIVE, Eagle Grove, Iowa

Design of structural framework for pallet mill and cleaner, 2001

FARMERS COOPERATIVE ELEVATOR ASSOCIATION, Greenleaf, Kansas

Structural evaluation of damage due to explosion and redesign of concrete feed mill, 2001

TRIPLE "F" COOPERATIVE, Urbandale, Iowa

Site observation following fire, report on condition of equipment and estimated cost of replacing damaged equipment, 2001

SULLY COOPERATIVE EXCHANGE, Sully, Iowa

Design of foundation and millwright design for steel grain bin, 2001

HEART OF IOWA COOPERATIVE, Gilbert, Iowa

Design of foundations for truck loadout bins, 1998.  
Redesign of materials handling and new grinding area

EAGLE GROVE COOPERATIVE, Eagle Grove, Iowa  
Feed mill redesign, 1998.  
Redesign for 300 ton/hr. pelleting process and grain receiving.

THE OHIO STATE UNIVERSITY, Wooster, Ohio  
Feed mill evaluation, 1995  
Evaluation and cost estimate of remodeling vs. replacement of University feed milling system.

GEORGE A. ROLFES CO., Boone, Iowa.  
Keelung Harbor Dust Collection Piping, 1991.  
Independent design review of dust collector piping including elevator boot and head, conveyor, scale hopper, and scale garners.

IBBERSON INTERNATIONAL, Minneapolis, Minnesota.  
Feed Mill Modernization Review, Vilnius, Lithuania SSR, 1990.  
Independent review of Ibberson preliminary design and proposal for modernization of feed mill for Malyba Grain Processing Industrial Corporation.

CADCO INC., West Des Moines, Iowa.  
Premix Ingredient Tank Structural Evaluation, 1990.  
Site observation, evaluation and report on structural condition of support legs for premix feed ingredient storage bins.

IOWA STATE UNIVERSITY, Ames, Iowa.  
Structural Evaluation of Feed Mill Structure, 1990.  
Site observation, analysis and report on wall cracks on masonry-clad feed mill structure at the Ruminant Nutrition Research Station.

IOWA STATE UNIVERSITY, Ames, Iowa.  
Feed Preparation Facility, Swine Nutrition and Management Research Center. 1989.  
Preliminary and Final Drawings and Specifications for a feed preparation facility to serve a 200-sow farrow-to-finish swine research station. Features include a nominal 30x60 pre-engineered steel building, exterior bulk storage bins, custom steel support system for nine overhead bins, bulk ingredient receiving area, premix and mixing areas, secure ingredient storage area, and bagging area. Feed handling equipment includes horizontal mixers, electronic scale hopper, bucket elevator, drag conveyor, hammer-mill, feed distribution augers, and dust collection system.

KEMIN INDUSTRIES, INC., Des Moines, Iowa.  
Feed Additive Manufacturing Plant, 1986.  
Development of master plan and analysis of process equipment for handling of dry bulk solids.

MICHIGAN STATE UNIVERSITY, Kellogg Biological Station, East Lansing, Michigan.  
Feed Center. 1985.  
Design of electrical system including motor control center and controls for automation of feed processing system for dairy research center.

EASTMAN CHEMICALS DIVISION VALLEYBROOK FARM, Kingsport, Tennessee.  
Feed Mill and Feed Centers, 1985.  
Drawings and Specifications for a complete feed mill and two feed centers used to provide feed to approximately 1,000 research animals. All components of the system

were designed to be completely automated, including electronic routing from the Feed Mill. Cleanout and avoidance of any contamination were emphasized throughout the design.

MONSANTO COMPANY, St. Louis, Missouri.

Feed Handling Facility, 1984.

Drawings and Specifications for an overhead bulk feed handling facility, consisting of 12 steel overhead bins, screw feeders, electronic scales, and pneumatic filling system. Structure was designed with 32 foot clear span truck drive below the overhead bins in a Seismic II zone.

MONSANTO COMPANY, St. Louis, Missouri.

Feed Processing Facility, 1984.

Preliminary design and drawings for a feed processing facility for research feeds. Features included mixing, grinding, rolling, and pelleting of complete feeds and feed products.

### **FERTILIZER AND AG CHEMICAL FACILITIES**

GOLD EAGLE COOPERATIVE, WESLEY, IOWA

Investigation of condition of overhead bin, headhouse and hopper support, 2002

HEART OF IOWA COOPERATIVE, Nevada, Iowa

Structural evaluation of fertilizer tower, 2002

CRESTLAND COOPERATIVE, Mt. Ayr, Iowa

Secondary containment for pesticides, 2001

COOPERATIVE MUTUAL INSURANCE COMPANY, Omaha, Nebraska

Evaluation of the tank failure and the condition of the remaining liquid fertilizer storage facility at Alliance, NE, 2001

FARMERS ELEVATOR COOPERATIVE, Collins, Iowa

Secondary containment liquid fertilizer, 1998

Design of concrete pesticide containment and truck receiving and loadout.

UNITED SUPPLIERS, INC., Eldora, Iowa.

Secondary Containment: Liquid Fertilizer, 1994/95.

Design of an earthen berm with liner secondary containment for 1.25 million gallons fertilizer storage tanks complete with ingredient and finish product tank pad, loading and receiving area as well as a truck wash area.

Secondary Containment: Liquid Fertilizer, 1995.

Design of a concrete 24,000 gallon secondary containment at Aredale, IA for hopper bottom tanks.

Secondary Containment: Truck Receiving, 1995.

Design of a concrete 36,400 gallon containment for storage tanks as well as a dry fertilizer truck receiving pit and containment at Kesley, IA.

Truck/Rail Receiving Containment, 1995.

Design of a Truck/Rail Receiving Pit for dry fertilizer and conveyor system. A 40,500 gallons concrete secondary liquid fertilizer containment facility was also designed at Allison, IA.

Truck/Rail Receiving Containment, 1995.  
Design of a Truck/Rail Receiving Pit for dry fertilizer in Geneva, IA.

PRAIRIE LAND COOPERATIVE, Garden City, Iowa.  
Secondary Containment: Liquid Fertilizer, 1995.  
Design of an earthen berm with liner secondary containment of a volume of 1.38 million gallons. Complete with loading pad.

Loading Pad Containment: Union, IA, 1995.  
Design of a concrete loading pad and sump pit for loading liquid fertilizer.

FARMER'S ELEVATOR COOPERATIVE, Scranton, Iowa.  
Secondary Containment: Liquid Fertilizer, 1995.  
Design of a vinyl lined earthen berm secondary containment for 671,000 gallons. In addition, a concrete loading pad with center trench.

CENTRAL IOWA COOPERATIVE, Jewell, Iowa.  
Secondary Containment: Liquid Fertilizer, 1994.  
Design of a containment, staging area, and loading pad for a maximum 676,000 gallon tank. Containment area used an earthen berm and concrete wall to obtain required volume. Staging and loading pad were constructed of concrete.

UNIVERSITY OF MINNESOTA, Becker, Minnesota.  
Sand Plains Research Farm, 1992.  
Drawings and Specifications for a 1,200 square foot post-frame fertilizer storage facility.

GOLD-EAGLE COOPERATIVE, Livermore, Iowa.  
Liquid Fertilizer Containment System, 1992.  
Design of concrete liquid fertilizer secondary containment area with loading/unloading pad. 41,700 gallon secondary containment capacity. Designed for compliance with state regulations.

BUCKEYE COOPERATIVE, Buckeye, Iowa.  
Liquid Fertilizer Containment System, 1992.  
Design of earthen bermed liquid fertilizer storage facility for a total capacity of 643,000 gallons, and the foundation design for a loading/unloading warehouse facility. Designed for compliance with state regulations.

GOLD-EAGLE COOPERATIVE COMPANY, Eagle Grove, Iowa.  
Liquid Fertilizer Containment System, 1992.  
Design of N28 liquid fertilizer secondary containment facility and loading/unloading area. 1,232,000 gallon storage capacity. 6,600 gallon unloading area capacity.

ALDEN COOPERATIVE ELEVATOR, Alden, Iowa.  
Herbicide Containment Structure, 1991.  
Secondary containment and loading area for 90,000# dry, granular herbicide bulk tank. Designed for compliance with state regulations.

FARMERS COOPERATIVE ELEVATOR, Radcliffe, Iowa.  
Pesticide Containment Area, 1991.  
Secondary containment for multiple liquid bulk pesticides and loading area. 14,300 gallon containment volume designed for compliance with state regulations.

CENTRAL IOWA COOPERATIVE, Jewell, Iowa.  
Liquid Fertilizer/Pesticide Loading Pad, 1991.

Nominal 1,500 sq. ft. concrete rinse, loading pad for field application equipment and storm water control. Designed for compliance with state regulations.

UNITED SUPPLIERS, Eldora, Iowa.

Liquid Pesticide Containment Facility, 1991.

Secondary containment pad and curb for 1,100 cft. storage tank. Designed for compliance with state regulations.

WOODLAND FARMS, Story City, Iowa.

Liquid Fertilizer Containment System, 1991.

Designed for compliance with state regulations. Secondary containment facility for 68,900 gallon storage capacity and 14 foot by 24 foot mixing/rinse area.

W&H COOPERATIVE OIL CO. and GOLD-EAGLE COOPERATIVE, Eagle Grove, Iowa.

Above-ground Fuel Storage Containment Dike, 1991.

Renovation and concrete dike structure for 40,000 gallon fuel storage. Designed for compliance with state regulations.

UNITED SUPPLIER'S/KNUTSON CONSTRUCTION, Eldora, Iowa.

Ag Chemical Bulk Storage Facility, 1989.

Preparation of foundation drawings and design of containment for 1,600,000 gallon bulk ag-chemical warehouse.

LAND-O-LAKES, Minneapolis, Minnesota.

Fertilizer Plant Addition, 1985.

Addition to Sauk County Farmer's Union Coop, Baraboo, Wisconsin.

### **MISCELLANEOUS/OFFICE/COMMERCIAL BUILDINGS**

PORK TECHNOLOGIES, INC., Ames, Iowa

Expert witness on hog confinement structure litigation, 2002

R.E. PEDROTTI CO., Inc., Mission Kansas

Complete engineered drawings for a Tylon T600-64 tower with concrete foundation, 2002

USDA/NATIONAL ANIMAL DISEASE CENTER, Ames, Iowa

Water Tower Renovation, 2001

Development of schematic and preliminary plans and estimate for cost of construction

USDA/NATIONAL SOIL TILTH LABORATORY, Ames, Iowa

Security Access Control System, 2001

Bidding drawings and specifications for upgrade of the existing security and access control systems.

FLOUR MILL EVALUATION, Shelby, Ohio

Evaluation of potential remodeling of a flour mill into an apartment complex, 2001

USDA/PLANT INTRODUCTION FACILITY at Iowa State University, Ames, Iowa

Machine Shed Addition, 2001

Design, bid document production, bid administration and construction observation.

Seed Storage Cooler, 2001

Plans and specifications for a 20' x 50' cooler and support, including fire suppression system

NATIONAL SOIL TILTH LABORATORY, Ames, Iowa

Conference Room Expansion, 2000

Combine two (2) existing rooms into one state of the art audio/visual conference room, including interior finishes, data/voice and audio/video communications, satellite feeds, distance learning and video conferencing, sprinkler layout, electrical remodel and lighting design.

USDA-ARS, NATIONAL ANIMAL DISEASE CENTER, Ames, Iowa

Security Fencing and Telecommunications Improvements, 1999

Addition of security chain link fencing with horizontal roller gates operated by dual card readers and proximity loop. Replacement and upgrade of existing twisted pair communication system with fiber optics and category 5 twisted pair. Upgrade of existing Johnson Controls NCU's and security system.

IOWA STATE UNIVERSITY, Madrid Iowa

Bisland Swine Breeding Farm, 1995/1996

A 1,600 square foot office complex including a men's and women's shower in/out facility with a break room and conference room.

WOODLAND FARMS, Story City, Iowa

Warehouse Foundation Design, 1995

Design of a 22,500 square foot warehouse concrete foundation with a lock loadout area.

CENTRAL IOWA AGRI-SYSTEMS, Nevada, Iowa

Concrete Plan and Foundation: Office/Shop, 1995

Design of a 4,000 square foot concrete plan with columns and base pad for steel building frames.

UNIVERSITY OF MINNESOTA, Morris, Minnesota

West Central Experiment Station, 1993

Drawings and Specifications for a 6,500 square foot agronomy research facility, complete with labs, computer rooms, offices and machinery storage area.