GAI CONSULTANTS

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APPENDIX

Central Soya Company
Fort Wayne, Indiana

# SUBSURFACE INVESTIGATION OF CLINTON FEED & GRAIN, INC. CLINTON, IOWA

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117 AIRPORT NORTH OFFICE PARK
FORT WAYNE, INDIANA 46825

Project 93-557-10

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# INTRODUCTION

## Purpose and Scope

GAI Consultants, Inc. (GAI) was retained by Central Soya, Fort Wayne, Indiana, to perform a subsurface investigation of the Clinton Feed & Grain, Inc. facility in Clinton, Iowa. The objective of this investigation was to evaluate the alleged presence of the compounds alachlor and atrazine in the southwestern portion of the facility. The investigation included the installation and sampling of three monitoring wells and analysis of eight shallow soil samples from the vicinity of the former herbicide and atrazine tanks. This report provides a summary of the December 16 and December 17, 1993, field work along with laboratory results from the water and soil sampling.

## Site Location and Vicinity Characteristics

The Clinton Feed & Grain, Inc. facility is located at 1571 Main Avenue (Hwy. 136), Clinton, Iowa. The geographic coordinates are Section 35, T82N, R6E, Hampshire Township, Clinton County, Iowa. The investigation was restricted to the southwestern portion of the property on the north and west side of the southern building.

The site is situated in a relatively sparsely populated rural area located 2.7 miles northwest of downtown Clinton, Iowa, and 2.4 miles west of the Mississippi River. The site has been graded and exhibits a gently rolling topography. The site has an approximate elevation of 660 ffet with an overall slope to the northwest. A shallow ditch runs through the property and flows west-northwest for 0.2 miles to another ditch, which is part of the Mill Creek drainage system. Mill Creek flows in a southerly direction to the Missisippi River.

## Monitoring Well Installation and Sampling

The subsurface investigation at the Clinton Feed & Grain facility was initiated with the drilling of three monitoring wells on December 16, 1993. The purpose of the monitoring wells was to provide water samples for laboratory analysis to assist in assessing if the ground-water has been impacted at the facility. If necessary, the the wells can also be surveyed and their water elevations used to assess the local ground-water flow direction.

Three boreholes were advanced and three monitoring wells were installed in the boreholes. Drilling was accomplished with a truck-mounted drill rig equipped with 4 1/4" inside-diameter, continuous-flight, hollow-stem augers. Soil samples were retrieved by pushing a five-foot long, three-inch diameter, Lasky continuous sampler in advance of the lead auger. The boreholes were sampled continuously for detailed lithologic descriptions and stratigraphic information. A composite sample of the auger cuttings was retained for laboratory analyses to assist Central Soya in determining the disposition of the cuttings. The Unified Soil Classification System (USCS) was applied to each sample including texture, sorting, color, relative moisture content, consistency or density, pocket penetrometer measurements, and miscellaneous observations. The soil boring lithologic logs are provided in Appendix A and the locations of the monitoring wells are show in Figure 1.

Downhole drilling equipment was cleaned between each soil boring location with a high-temperature, high-pressure water spray wash. The cuttings generated from each boring were containerized in three 55-gallon drums. The drums were labeled and moved to a location west of the southern building. Decontamination fluids and water purged from the monitoring wells during sampling (described later) were also containerized in two 55-gallon drums. A composite water sample was obtained from these drums for laboratory analyses. The two drums of water were labeled and moved into a heated maintenance building on the northwest portion of the property. The composite soil and water samples were obtained to assist Central Soya in determining the disposition of the drummed soil cuttings and decon and purge waters.



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The monitoring wells were constructed with pre-cleaned, threaded, two-inch diameter schedule 40 PVC casing and 10-foot long PVC screens with 0.01-inch slots. Screen bases were fitted with PVC screw plugs, and the screen-length annuli were surrounded with clean-sand filter packs. The filter packs extend a minimum of one foot to a maximum of two feet above the uppermost screen slots. A minimum thickness of two feet of sodium bentonite seals was placed above the top of each filter pack. The annuli above the bentonite seals were grouted with a bentonite slurry, and each well was fitted at the surface with a flush-mounted protector and set in concrete. Well completion diagrams are found in Appendix B.

Water levels and well depths were measured on the wells installed by GAI. Water-level measurements were recorded to $\pm$0.01 foot accuracy and referenced to a permanently marked reference point on the north side of each PVC casing riser. The water-level measurements were made to determine the depth to ground water and to calculate the purge volume to be removed from each well prior to sampling.

The monitoring wells were developed on December 17, 1993. Pre-cleaned, disposable polyethylene bailers with nylon monofilament line were used to purge the wells of at least three casing volumes during development. The monitoring wells were sampled after development. Sampling was conducted using a new disposable Teflon$^{tm}$ bailer for each well. The samples were placed in containers provided by the laboratory, stored on ice while on site and during shipment to the laboratory, and shipped under chain-of-custody control to the laboratory. Prior to analysis, the samples were filtered in the laboratory using stainless steel and glass apparatus not available for field use. The filtering was performed to remove potentially contaminated suspended sediment introduced during drilling; the analyses would then be indicative of ground-water contamination rather than contamination of introduced solid matrix material. The ground-water samples were analyzed for atrazine and alachlor using EPA Method 608 (GC).

Shallow Soil Sampling

GAI obtained eight surficial soil samples (S-2 to S-9) from the depth interval of 1.0-1.5 feet. Four samples were obtained at the former herbicide tank area and four samples at the former atrazine/truck-port area (see Figure 1). The samples were obtained using a stainless steel hand auger and stainless steel probe to extract the sample from the auger. The soil samples were placed in containers provided by the laboratory, placed in a cooler with ice, and transported via express courier to the laboratory under chain-of-custody control. The samples were analyzed for alachlor and atrazine using EPA Method 608 (GC).

Prior to using the sampling tools and before each sampling event, the tools were decontaminated with an initial wash with Alconox and de-ionized water in a five-gallon bucket, followed by a de-ionized water rinse, a final Alconox and de-ionized-water wash in a stainless steel bucket, and a final de-ionized water rinse. All decon fluids were containerized in 55-gallon drums with the drilling decon/purge fluids.

## Site Geology and Hydrogeology

The surficial deposits at the Clinton Feed & Grain facility consist predominantly of clay which ranges in color from dark grey (organic) to light rusty brown or mottled grey and brown. The clay is silty and sandy (estimated 10-15% sand) with rock clasts up to 3/8" in diameter. This very poorly sorted clay is generally damp to moist, has a stiff to very stiff consistency and a low plasticity.

Underlying the clay is a clayey to silty sand unit with rock clasts up to 3/8" in diameter. This sand unit is generally fine-grained, poorly sorted and dense, has a coloration that varies from a light rusty brown to medium grey, and was saturated at depths of eight to nine feet below grade in the borings.

Pre-well development ground-water measurements obtained on December 17, 1993, and field observations of the relative elevations of the monitoring wells indicate that the shallow ground-water flow is probably to the northwest. Monitoring well MW-3 is, therefore, located in a down-gradient position from both the former herbicide and former atrazine tank locations.

## Analytical Results

The results of this investigation indicate the absence of atrazine and the presence of alachlor in soil in the southwestern portion of the property. The laboratory reports are presented in Appendix C. The results of the soil and water analyses are summarized in Table 1.

Atrazine was not detected in soil at the site; however, alachlor was identified in every soil sample analyzed, ranging in concentration from 26 to 42,000 $\mu$g/kg. The equipment rinsate blank did not contain either atrazine or alachor, thereby validating the field decontamination procedure. Samples S-2 through S-5 in the vicinity of the above-ground

tanks and concrete drive on the north-central side of the building exhibited the greatest alachlor concentrations.

The analytical data indicate that ground water in the shallow saturated zone underlying the southwestern portion of the property has not been impacted by either atrazine or alachlor.

## CONCLUSIONS

The following conclusions are derived from GAI's investigation and its findings.

1. Neither soil nor ground-water samples collected at the site contained detectable levels of atrazine.

2. Ground-water samples did not contain detectable concentrations of alachlor; however, alachlor levels in soil near the above-ground storage tanks ranges from 26 to 42,000 $\mu$g/kg. The highest alachlor levels occurred in soil samples collected near the above-ground tanks and associated concrete drive on the north-central side of the building. The areal and vertical extent of the alachlor in soil was not fully delineated by this limited investigation.

3. The maximum contaminant levels (MCLs) for alachlor and atrazine, respectively, are 2 and 3 $\mu$g/l; these MCLs were not exceeded in ground water at any monitoring well.

## LIMITATIONS

This investigation was performed for and is intended for the sole and exclusive use of Central Soya. Reliance upon the report's contents by any other party without the express written consent of GAI Consultants, Inc. (GAI) is prohibited. In performing this investigation, GAI has striven to conform to generally accepted principles and practices of other consultants conducting similar investigations in the same geographic area. The investigation is limited to the specific project, property, and dates of GAI's site visits, as described in this report, and its findings should not be relied upon to represent conditions at other properties or at later dates.

The scope of this investigation and report was mutually devised by GAI and Central Soya, and is not intended as an audit for regulatory compliance. No activity, including sampling, assessment or evaluation of any material or substance, may be assumed to be included in this investigation unless such activity is expressly considered in the scope of work and this report. Maps and drawings in this report are included only to aid the reader and should not be considered surveys or engineering studies.

The findings of the investigation are probabilities based on GAI's professional judgment of site conditions as discernible from limited, and often indirect, information provided by others and obtained or observed by GAI using the methods specified. GAI does not warrant the accuracy or completeness of information provided or developed by others and assumes no responsibility for documenting conditions detectable with methods or techniques not specified in the scope of work. GAI's opinion regarding site conditions is not a warranty that all areas within the site and beneath site structures are of the same quality or condition as those observed or sampled. If additional data concerning this site become available, such information should be provided to GAI so that our conclusions can be reviewed and modified as necessary.

Sincerely,
GAI Consultants, Inc.

James M. King

James M. King, Ph.D.
Project Manager

JMK:smm

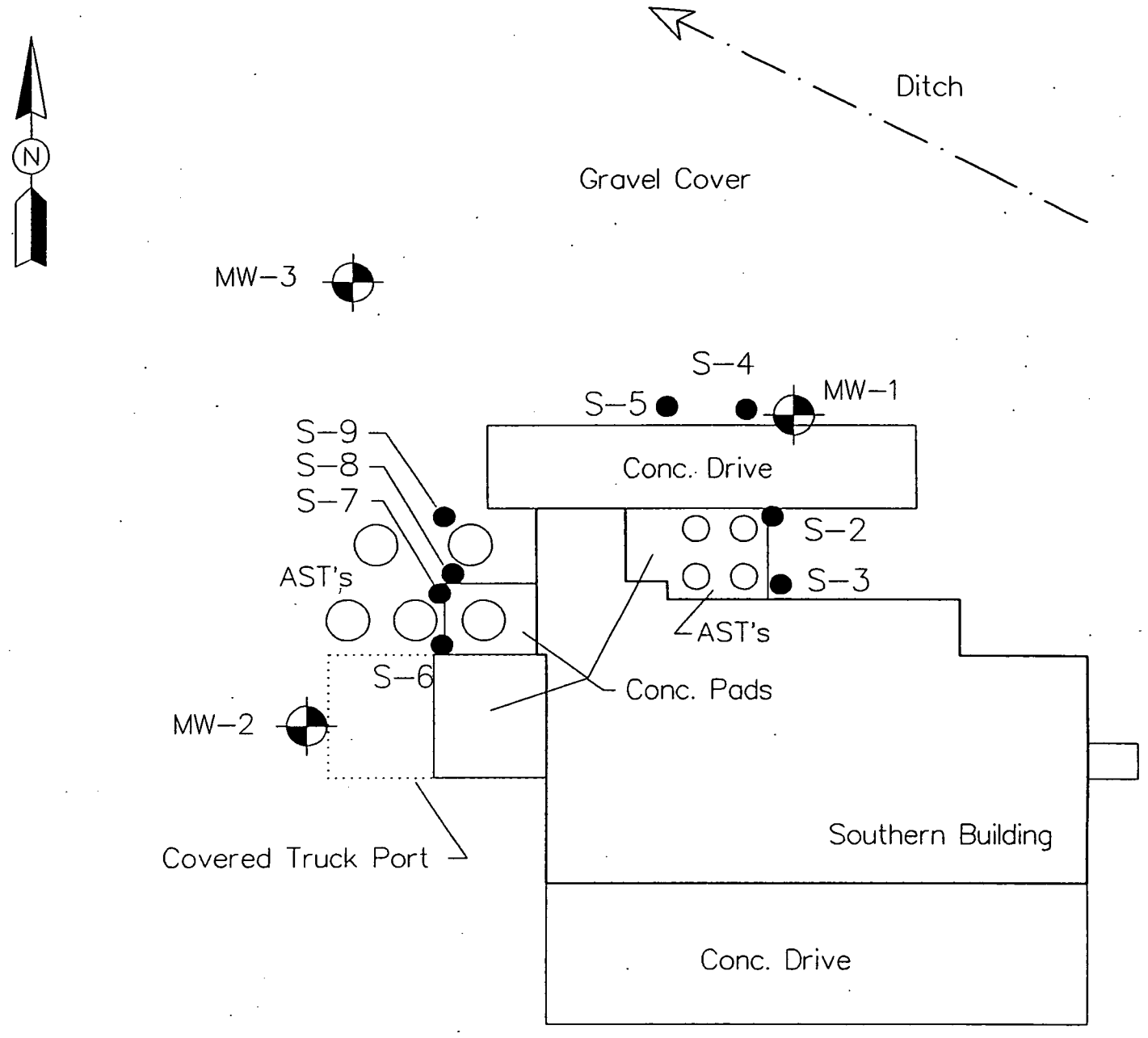



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FIGURE 1
Soil Sampling & Well Locations
Clinton Feed & Grain Site, Clinton, Iowa

CENTRAL SOYA
1946 WEST COOK ROAD
FORT WAYNE, INDIANA

DWN. NCJ DATE 1-14-94
CHKD. JMK DATE 1-14-94
APPD. JMK DATE 1-14-94
SCALE: As Noted
DRAWING NUMBER
93-557-A1
REV

Project 93-557-10

Table 1

Summary of Analytical Data
December 16-17, 1993
Clinton Feed and Grain Site
Clinton, Iowa

Soil Sampling Results (μg/kg)

| Sample ID | Atrazine | Alachlor |
|---|---|---|
| C-1 (composite) | ND | 54 |
| S-2 | ND | 42,000 |
| S-3 | ND | 5,800 |
| S-4 | ND | 890 |
| S-5 | ND | 5,100 |
| S-6 | ND | 120 |
| S-7 | ND | 140 |
| S-8 | ND | 26 |
| S-9 | ND | 410 |

Water Sampling Results (μg/l)

| Sample ID | Atrazine | Alachlor |
|---|---|---|
| W-3 | ND | ND |
| W-2 | ND | ND |
| W-1 | ND | ND |
| PW-1 (Purge/Decon) | ND | 10 |
| R-1 (Rinsate) | ND | ND |
| MCL | 3 | 2 |

ND = Parameter not detected at the minimum quantitation level.
MCL = Maximum Contaminant Level
Minimum Quantitation Level (MQL) for atrazine in water is 8 μg/l; MQL = 0.2 μg/l for alachlor.