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12/82

ENVIRONMENTAL MONITORING PROGRAM

COLLIS DIVISION, CHAMBERLAIN MANUFACTURING CORPORATION

CLINTON, IOWA

PHASE I - HYDROGEOLOGICAL SITE ASSESSMENT

The objective of this phase of study is to determine a generalized site hydrogeology/geology for the Collis Division, Chamberlain Manufacturing Corporation Plant, located at 2005 South 19th Street in Clinton, Iowa. Phase I of the environmental monitoring program will permit an accurate preliminary assessment of the impact of past activities at the Clinton plant site upon the alluvial/surficial aquifer. In order to accomplish this, the geotechnical/hydrogeological investigation must fulfill several data acquisition requirements, namely:

1. Explore the site's geologic conditions, to include identification of the bedrock surface.

2. Provide suitable instrumentation to permit preliminary development of ground water profiles and evaluation of ground water flow patterns within the unconsolidated surficial aquifer.

3. Provide a means for obtaining ground water quality samples from the alluvial/surficial aquifer at the plant boundaries.

4. Assess the potential for contamination migration in the deeper bedrock aquifer.

Our proposed technical approach for implementation of this program is presented below. A proposed schedule of task completion is shown in Figure 1 attached. The design and execution of Phase I of the environmental monitoring program will be facilitated by the assembly and review of data pertaining to the plant and its subsurface conditions. Based upon information provided by the Iowa Geologic

R00312946
RCRA RECORDS CENTER

Survey, conversations and correspondence with both representatives from Collis Division, Chamberlain Manufacturing Corporation (Collis), and Environmental Protection Agency (EPA) Region VII, a preliminary framework from which to proceed with the geotechnical/hydrogeological investigation has been formulated. Based on our knowledge of the area through geotechnical investigations performed either on the plant site or in the vicinity, it should allow us to optimize data acquisition, particularly early in the investigation.

PROGRAM RATIONALE

The first four borings will be completed at the corners of the property to determine the character and distribution of the unconsolidated sand and silt alluvium overlying the limestone bedrock which is anticipated at depth - see Figure 2. Monitoring/observation wells will be installed at these locations to establish a generalized ground water table for the site from which flow direction and velocities may be determined. Additionally, a fifth monitoring well will be installed in boring #5 to obtain ground water data closer to the suspected contaminant sources. These five points may also be used for obtaining ground water samples from the surficial aquifer once the general flow directions have been determined. Data gaps in ground water level information and alluvial stratigraphy will be filled in by completion of six to seven additional borings following the installation of the five monitoring/observation wells. Upon determination of the ground water flow direction, background and downgradient, ground water monitoring wells may be identified and ground water samples collected.

A log of the boring and monitoring well installation shall be kept by the drill crew. Finished boring logs also showing physical soil test results, classifications, and well details will be provided in the report. (See attached examples.)

The initial round of sampling and testing for ground water, surface water, and sediment will be performed to determine qualitatively the presence of the parameters of interest which include a number of priority pollutants in addition to general indicators of ground water quality. A second round of ground water sampling will be performed approximately two to three weeks after the first round to ascertain that the samples are representative of the ground water.

This second round will provide the data which will be used in the Phase I analyses. In order to optimize chemical testing, once the direction of flow has been determined in the vicinity of the suspected contamination sources, i.e., the treatment lagoon system and storage facilities, additional ground water monitoring wells may be installed to intercept the probable location of contamination plumes.

SAFETY PROCEDURES

In addition to standard safety equipment, which includes the wearing of hard hats and safety shoes when working with the drilling equipment at the job site, rubber boots, gloves, and aprons or gowns will be required to prevent skin contact with drilling fluids that might contain the suspected contamination. Personnel will be required to wash exposed skin surface upon departure from the job site and before each meal.

Laboratory safety procedures will require the use of a rubber apron and glove while working with samples. Classification and testing will be performed under an exterior power-vented hood when conducted in a confined area.

The supervising geotechnical engineer will establish on-site safety procedures. All personnel will be briefed by Terracon's project safety officer before the start of the project.

GEOTECHNICAL APPROACH

Upon approval of the proposed first phase of the environmental monitoring program by EPA, the specific siting of each of the ground water monitoring wells (Numbers 1 through 4) will be performed during a site reconnaissance conducted jointly between Collis and Terracon representatives. At this time, the locations of the remaining soil borings (5 through 12) will also be determined and marked by means of construction staking and flagging. The number and location of these borings (5 through 12) may be modified slightly, depending upon data obtained from wells 1 through 4. The approximate location of the proposed borings and monitoring wells is indicated on the attached location diagram, Figure 2.

Based upon information presented by the Iowa Geological Survey, discussions with representatives of Collis, and previous soil borings obtained at the site by Terracon, we anticipate encountering limestone bedrock at depths ranging from 5 to 60 feet. Overlaying the bedrock is Pleistocene aged bedded silt and sand alluvium associated with Mississippi River activity. Ground water levels at the plant site may be as high as 2 feet from ground surface, depending upon seasonal fluctuations. Considering these conditions, we anticipate using our own drilling equipment which could include CME-55 or 45 units depending upon the drilling, access, and scheduling requirements. All drill rigs would have both auger and mud rotary drilling capabilities. Truck or track-mounted vehicles are available for use as site access conditions may dictate.

DRILLING METHODS

Each soil boring will be advanced using a dry hollow stem auger having a nominal 3 1/4-inch ID equipped with a nominal 8-inch OD drill bit assembly. Soil samples would be obtained using split/spoon or shelby tube samplers as appropriate for the soil types encountered and in accordance with ASTM Specifications D-1586 and D-1587, respectively. One-half of the soil borings will be sampled continuously. In the remainder of the borings, the samples would be obtained at maximum intervals of 5 feet or at major stratum changes, whichever occurs first. When drilling and sampling below the water table in cohesionless sands, heave within the hollow stems may occur. Should this become a significant problem, introduction of water from an approved source may become necessary to establish a positive head to minimize the heave and enable representative sample collection. Should introduction of water alone be inadequate for control of heave or cave-in upon hollow stem removal, introduction of the thinnest workable mixture of bentonite drilling mud may be necessary. No organic additives, such as Revert, shall be used.

MONITORING WELL INSTALLATION

Each soil boring will be carried a minimum of 1 foot into bedrock to confirm its presence. Upon completion of the drilling and sampling procedure performed in Phase I of this program, at anticipated depths ranging from 5 to 60 feet, auger would be removed from the bore hole and, where appropriate, the monitoring well

assembly would be inserted through the center of the hollow stem auger during removal. The well assembly would consist of a bottom-capped 2-inch ID Schedule 40 PVC screen and casing. The monitoring well screens will be situated within the saturated alluvium below the water table and just above bedrock.

We anticipate that the .01-inch slotted, manufactured Schedule 40 PVC well screen would range in length from 5 to 10 feet. The screen and casing joints would consist of non-glued, threaded joints. Upon placement of well casing and screen, a clean dry gravel pack would be placed in the boring annulus to a height at least 3 feet above the top of the well screen. The gradation and type of gravel pack material will be consistent with the well screen slot size to minimize screen clogging while preventing piping of fines into the well.

The boring annulus will be sealed to prevent vertical percolation of ground and surface water by means of a minimum 3 feet thickness of tamped bentonite clay pellets or granules over the gravel pack. Above the bentonite seal, a cement-bentonite grout, consisting of six parts cement to one part bentonite by weight, shall be placed to within 2 feet of ground surface and natural auger cuttings would be used to complete the backfill procedure.

To provide well point security and sample integrity, a 4-inch diameter ductile iron protector pipe fitted with a threaded or hinged cap which may be secured with a padlock could be provided at each well point location.

WELL DEVELOPMENT

After completion of the well installation, the well will be developed by introducing compressed air from tubing placed at a point 3 to 4 feet above the top of the screen. By the introduction of compressed air and the subsequent buoyant effect upon the water column, large volumes of water can be removed from the well in short periods of time. The subsequent dramatic lowering of water pressure at the screen is very effective in dislodging bentonite cake and reversing flow of bentonite which may migrate short distances into the adjoining alluvial aquifer. This method would only be used during the initial stage of well development with the final removal of settlement being accomplished either by bailing or submersible pump.

Well development shall be continued until the well water is clear or representative of the surrounding aquifer and sediment within the well is removed to the fullest extent practical. Development will be accomplished with a pump or bottom-discharge bailer or by means of compressed air introduction as described above. A minimum of three (3) times the standing water volume of the well (well screen and casing plus saturated annulus) shall be removed. Water samples obtained prior, during, and upon completion of well development will be tested in the field for temperature, pH, and specific conductance to determine completion of well development.

GROUND WATER SAMPLING

Terracon will collect ground water samples from each of the installed monitoring wells by means of submersible pump or bottom-discharge bailer. Immediately before sampling, the ground water surface elevation shall be determined, then the monitoring wells will be purged by pumping or bailing a volume of water equivalent to three (3) times the calculated volume of standing water in the well casing. A sufficient volume of water shall be collected from each monitoring well to allow all specified analyses to be performed. Collis representatives will be present with appropriate sample containers for the specified analyses. Should the analyses specified be beyond the analytical capability of Collis laboratory facilities, an independent chemical analytical laboratory shall be retained to perform the additional analyses required. Samples collected for analysis by an independent chemical laboratory shall be collected in containers provided by the laboratory. Care will be taken to avoid contamination of the sample by soil and windblown materials. The well pump, transfer tubing, and bailer, if used, shall be thoroughly rinsed with either soap and distilled water or high pressure, hot water from an approved source after each well point sampling to avoid cross-contamination.

Sample bottles shall be wiped dry and marked with sufficient data to uniquely identify the sampling point and any preservation and analysis information required. Sample control data notebook shall be logged at the time of collection - see Figure 7. All samples for metals analysis shall be field filtered. Samples to be analyzed for volatiles shall not be filtered. In addition, all samples will be sorted and shipped under refrigeration at 4°C to the independent analytical laboratory if required.

SURFACE WATER SAMPLING

Stream

Location of the background sampling point will be in the Manufacturers Ditch at the intersection of the extension of the east property line with the Manufacturers Ditch at the northeast corner of the property. The downstream sampling point is located approximately 600 feet downstream of the Collis effluent discharge point into the Manufacturers Ditch. These locations are indicated on the attached location diagram. Terracon shall mark the sampling points with a wooden stake painted fluorescent orange for identification and marked with a sample point code number. The stakes will be placed on the bank of the ditch where they shall not be washed away. The sample points shall each be noted as a distance and direction from the stake.

A sufficient volume of water shall be collected from two surface water stream sampling points (one of which is a background sampling point) to allow all required analysis to be performed. Sample bottles shall be prepared as appropriate for the analyses to be performed either by Collis personnel or the independent analytical laboratory. The bottles shall be rinsed with water immediately downstream from the sampling point prior to the sample collection. The sample shall be taken at approximately one-half to two-thirds of the water depth at its deepest point. The depth of water at each sampling point shall be measured after sample collection, and the stream flow conditions at the time of collection shall be noted. Care shall be taken to avoid stirring up sediments during sample collection.

Runoff Locations

Surface water samples from runoff puddles located between the main plant building and the lagoon system shall be located with a surveyor's chain and transit and marked using a wooden hub painted fluorescent oranage for identification and marked with a sample point code number similar to that described for the surface water stream sample points. Sample bottles shall be provided by Collis or the independent chemical laboratory as appropriate for the required analyses. Water sampling shall take place after a rainfall event, and the

samples shall be taken at approximately one-half the water depth at the sample point. The depth of water at each sample point shall be measured and care shall be taken to avoid stirring the sediments during the collection process.

SURFACE SOIL SAMPLES

Five surface soil sample locations have been selected. Four of the locations bound the perimeter of the lagoon system while the fifth is located in the center of the lagoon system. These locations should provide samples representative of the lagoon system. Soil samples to be taken will be obtained from the upper 18 inches of the soil strata. Samples collected at the site will be quartered so that approximately two pounds of material will be collected and placed in a clean, dry, glass container which will be stored and shipped in the same manner as surface and well water samples. The sampling device shall be carefully rinsed with soap and distilled water after each set of samples is collected to prevent cross-contamination.

During the sampling process and again in the laboratory, the soil will be visually and tactually examined, classified by color, and in accordance with the Unified Soil Classification System. Such things as odor, moisture, or organic substances shall be also noted. The sample location will also be described with regard to the presence of standing surface water and/or surface water drainage patterns in the immediate proximity relative to the facility grounds. In addition to the horizontal and vertical location of the sample site, the dimensions of the sample zone (i.e. - diameter and depth), and the quantity of material collected will be noted and included in the report.

SEDIMENT SAMPLING

At each water surface stream sampling point, a sufficient mass of sediment shall be collected to allow required analysis to be performed. The sediment sampling point shall be located immediately downstream from the surface water stream sampling point. The sediment sample weight, stream depth, and stream flow conditions shall be noted at the time of collection.

The sediment sample container shall be wiped clean and dry and stored and shipped

in the same manner as surface and well water samples. Sampling devices shall be carefully rinsed with approved distilled water after each set of samples is collected at a particular sampling point to prevent cross-contamination.

PHYSICAL SOIL SAMPLE TESTING

The laboratory testing will involve visual classification and moisture content testing on each soil sample obtained from the borings. Approximately 12 grain size analyses and permeabilities will be performed on representative soil samples from the major strata encountered. Soil pH will be determined by field testing, and cation exchange capacities (CEC) will be determined in the laboratory on each soil sample. Since continuous sampling is to occur in half the borings, we estimate that approximately 150 soil samples will be obtained.

ANALYTICAL TESTING PROGRAM

Testing Rationale and Procedures

The initial round of analytical chemical testing will include testing ground water samples obtained from a minimum of four monitoring wells, stream water and sediment samples obtained from a minimum of two points on the Manufacturers Ditch (one upstream and one downstream of the Collis Plant site), two surface water samples obtained from local surface runoff during or following a rainfall event, and a minimum of two surface soil samples obtained from the vicinity of the operating lagoon system. Each sample selected for analytical testing will be analyzed for total organic carbon (TOC), eight metals, and cyanide. Collis will perform the analyses for chromium, copper, nickel, zinc, and cyanide in-house. Analytical testing for total organic carbon (TOC), arsenic, cadmium, lead, and mercury will be performed by SERCO Laboratories.

Based upon the results of the initial round of testing, modification of the number and type of analyses performed on subsequent testing rounds will be appropriately evaluated. A chemist from SERCO Laboratories shall be present during collection of initial samples to formalize collection procedures to assure future sample integrity. Representatives of Terracon Consultants shall perform the actual sample collection.

SERCO Laboratories shall provide proper sample containers for the parameters being considered and the type of material being sampled. Proper preservatives, where required, will be added to the appropriate sample containers. Duplicate split samples will be collected and transferred to both Collis and SERCO for testing. Preservation during shipping and storage at the laboratories will consist of refrigeration to 4°C.

The TCI representative present at the site during testing will be responsible for preparation of chain of custody documents, sample container labels, and seals - see Figure 8. An example of the chain of custody record used by SERCO is included at the end of the attached SERCO Quality Assurance Program Manual.

Each sample analysis will be performed in accordance with the laboratory procedures described below. The Quality Assurance Manuals for SERCO Laboratories and Collis Division of Chamberlain Manufacturing Company are also attached herewith - see Items 1 and 2.

ANALYTICAL METHODS

Environmental Monitoring Program

Collis Division, Chamberlain Manufacturing Corporation

Clinton, Iowa

Parameter	Laboratory	Method	Detection Limit	Reference
TOC	SERCO	Combustion FID Method	1 mg/l	Method 415.1 - EPA [1]
Cyanide (Total)	Collis	Distillation Method	0.10 mg/l	Page 317 Standard Methods [3]
"	SERCO*	Pyradine-Barbituric Acid Colorimetric	0.01 mg/l	Method 335.2 - EPA [1]

ANALYTICAL METHODS (continued)

Parameter	Laboratory	Method	Detection Limit	Reference
Cyanide (Amenable to Chlorination)	Collis	Distillation Method	0.01 mg/l	Page 324 Standard Methods [3]
"	SERCO*	Pyradine-Barbituric Acid Colorimetric	0.01 mg/l	Method 335.1 - EPA [1]
Arsenic	SERCO	Atomic Absorption-Graphite Furnace	1 μg/l	Perkin-Elmer Manual [2]
Cadmium	SERCO	Atomic Absorption-Graphite Furnace	2 μg/l	Perkin-Elmer Manual [2]
Chromium Total	Collis	Atomic Absorption	0.02 mg/l	Analytical Methods [4]
"	SERCO*	Atomic Absorption-Graphite Furnace	0.05 mg/l	Perkin-Elmer Manual [2]
Copper	Collis	Atomic Absorption	1 μg/l	Analytical Methods [4]
"	SERCO*	Atomic Absorption-Graphite Furnace	.2 μg/l	Perkin-Elmer Manual [2]
Lead	SERCO	Atomic Absorption-Graphite Furnace	.2 μg/l	Perkin-Elmer Manual [2]
Mercury	SERCO	Flameless Atomic Absorption	0.1 μg/l	Method 245.1 - EPA [1]

ANALYTICAL METHODS (continued)

Parameter	Laboratory	Method	Detection Limit	Reference
Nickel	Collis	Atomic Absorption	4 μg/l	Analytical Methods [4]
"	SERCO*	Atomic Absorption-Graphite Furnace	1 μg/l	Perkin-Elmer Manual [2]
Zinc	Collis	Atomic Absorption	0.8 μg/l	Analytical Methods [4]
"	SERCO*	Atomic Absorption-Graphite Furnace	1 μg/l	Perkin-Elmer Manual [2]
pH	Terracon	Electrode	0.1 Unit	Page 460 Standard Methods [3]
Specific Conductance	Terracon	Electrode	0.5 μmho/cm	Page 70 Standard Methods [3]
CEC	Terracon	Ammonia-Selective Electrode	0.1 meq/100gr	Page 354 Standard Methods [3]

*Selective parallel testing may be performed by SERCO on split samples collected to confirm the Collis in-house testing program.

REFERENCES

1. U. S. EPA, 1979, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, U. S. Environmental Protection Agency, Office of Technology Transfer, Washington, D. C. 20460.

2. Perkin-Elmer Corporation, Sept. 1973, Analytical Methods for Atomic Absorption Spectroscopy Using the HGA Graphite Furnace, Perkin-Elmer Corporation, Norwalk, Connecticut.

3. APHA, AWWA, WPCF, 1980, Standard Methods for the Examination of Water and Wastewater, 15th Edition, American Public Health Association, 1015 Eighteenth Street N.W., Washington D. C. 20036.

4. Analytical Methods for Atomic Absorption Spectrophotometry, January 1982, Supplement.

HYDROGEOLOGIC ASSESSMENT

A report will be issued upon completion of field and laboratory testing. The report will summarize field and laboratory testing and monitoring well installation procedures and will include installation details, soil boring logs, and test results. Based upon the information obtained from the soil borings, monitoring wells, and physical and chemical testing, the site stratigraphy to include the upper bedrock surface will be described. Piezometric surfaces, based upon water level readings, will be used in conjunction with the information on site stratigraphy to assess the direction and rate of movement of ground water at the site.

As a result of this assessment, a discussion of the need for additional ground water monitoring points and other test data to more completely describe contamination and movement in the shallow ground water will be made. Regardless of a perceived need for additional information, the relative risk of deep ground water contamination by waste disposed of by Collis at the site will be addressed. Should additional wells appear necessary for more complete assessment, the report will include a discussion of location rationale to include specific locations, depths, and construction details for any proposed additional ground water monitoring wells.

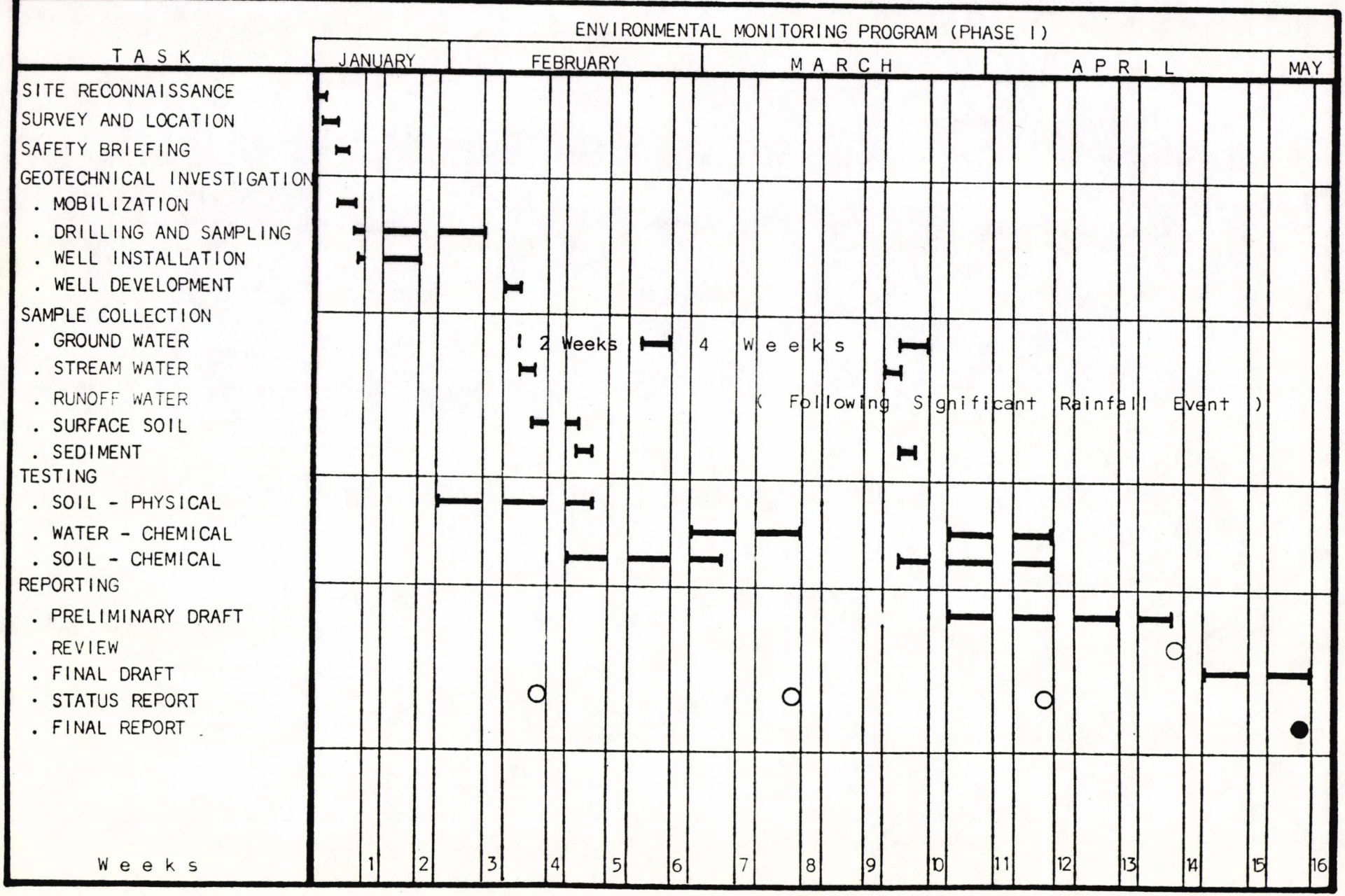
GEOTECHNICAL QUALITY CONTROL

A geologist/geotechnical engineer shall be assigned to the drill rig and will be experienced and familiar with the drilling and sampling procedures proposed, the classification of soils and rock material obtained, and construction details and

installation methods described herein. The drill rig geologist/geotechnical engineer will be present at the rig during all drilling and sampling operations, and well construction, installation, and development and will be present during the sampling and packaging and shipment operations as required.

The prevention of down-hole and cross-hole contamination is of prime importance in the execution of the hydrogeological and geotechnical phase of this project. Subsequently, the geologist/geotechnical engineer will supervise all washing and decontamination activities during drilling, soil sampling, well installation, development, and ground water sampling operations. We propose to decontaminate all drill rod samplers, well casings, and screens, sampling devices, and assorted tubing by means of thorough washing with nonchlorinated water obtained from an approved source. Casing may be required during later phases of this program to prevent deeper aquifer contamination from surface alluvium. During Phase I drilling, the precaution should not become necessary since the soil borings will be grouted to surface following completion.

Each monitoring well and bore hole will be located both horizontally and vertically by means of a surveyor's chain and transit, and a surveyor's level, respectively, and tied to a suitable reference point/bench mark located within the facility. Ground water levels will be measured using a weighted steel tape.

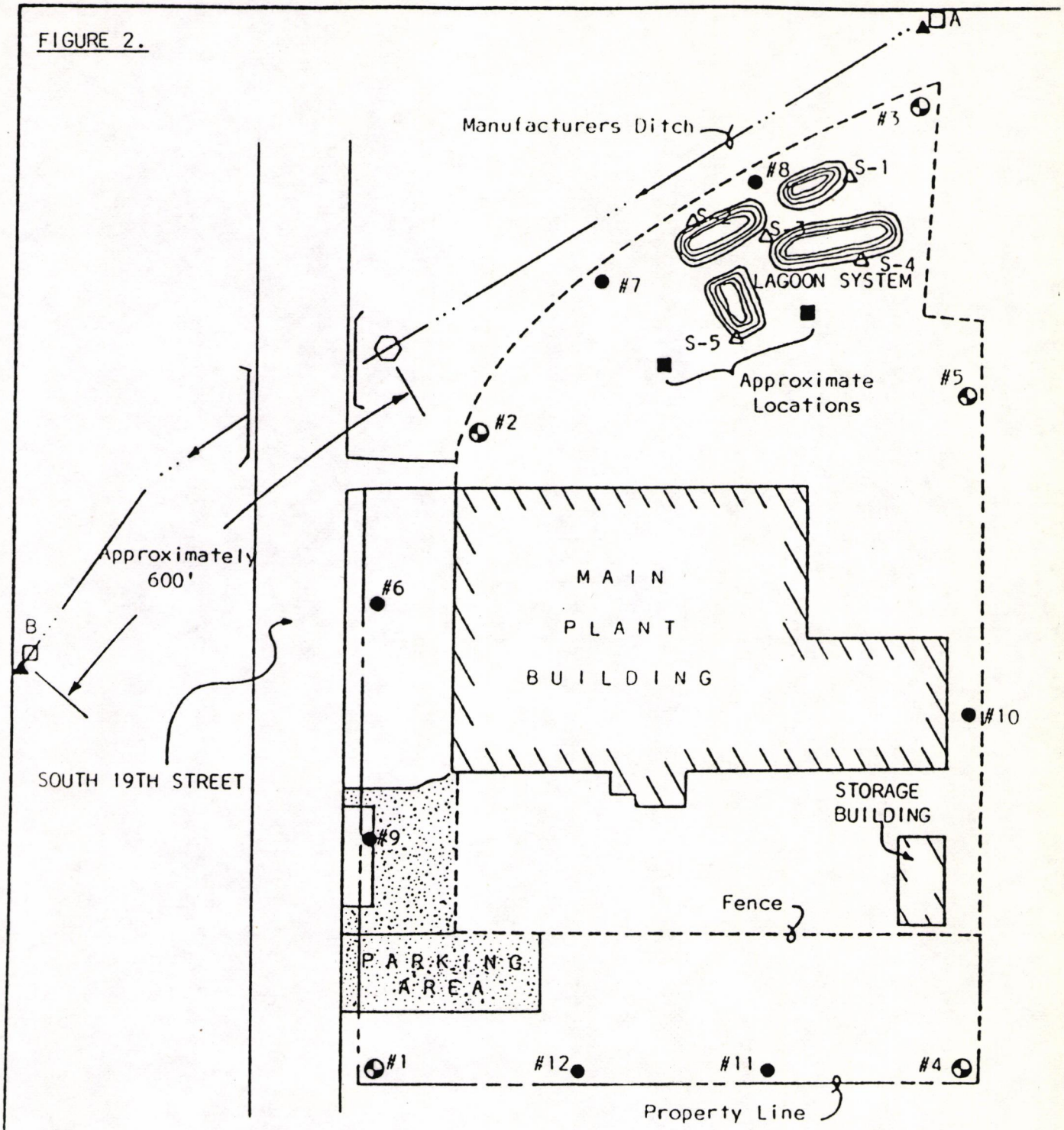


START DATE: JANUARY 17, 1983

FIGURE 1. PROPOSED PROJECT SCHEDULE

TERRACON CONSULTANTS, INC.

FIGURE 2.



△ SURFACE SOIL SAMPLE LOCATION

SOIL BORING/MONITORING WELL TO BEDROCK

□ SURFACE WATER SAMPLE POINT (STREAM)

● SOIL BORING TO BEDROCK

■ SURFACE WATER SAMPLE POINT (RUNOFF PUDDLES

▲ SEDIMENT SAMPLE POINT

⬡ APPROXIMATE LOCATION OF EFFLUENT DISCHARGE

0 50 100 150 200 250

SCALE: 1 inch = 159 feet

LOCATION DIAGRAM
PROPOSED HYDROGEOLOGIC SITE ASSESSMENT
AND SAMPLING PLAN
COLLIS DIV., CHAMBERLAIN MANUFACTURING CO.
CLINTON, IOWA

Terracon Consultants, Inc.
Cedar Falls Cedar Rapids Davenport Des Moines, IA
Kansas City Wichita, KS
Oklahoma City Tulsa, OK

JFH	See Scale Above	6-22-82	782519

TERRACON CONSULTANTS INC. Cedar Rapids/Iowa City — Davenport — Des Moines

ENGINEER _____ SURFACE ELEV. _____

DRILLER _____ BORING STARTED _____

HELPER _____ BORING COMPLETED _____

RIG NO. _____ STATION _____

OFF SET _____

SAMPLING

SS SIZE 1⅛" ID 2" OD

HAMMER: 140# DROP: 30"

ST SIZE _____ ST. SIZE _____

CASING USED _____ SIZE _____

Sheet _____ of _____

WATER LEVEL OBSERVATIONS

WL: _____ WS OR WD

WL: _____ BCR _____ ACR

WL: _____ AB _____ Hr. AB

WL: _____ 24 Hr. AB

JOB NO. _____ BORING NO. _____ CLIENT _____ WEATHER _____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	R Length Recovered in Feet	Qp Penetrometer Test in TSF	Screen Length ____ ft./ Top Screen ____ Gravel Pack Top ____ / B.Seal Length ____ ft. Grout Length ____ ft./ Top of Pipe ____ Well Marking ____ / Protector Pipe Yes/No,/ Lock Yes/No — Sample Description	Soil Ph	Odor

← 2 Feet →

ABBREVIATIONS

A.S. - Auger Sample
H.S. - Hollow Stem Auger
S.T. - Shelby Tube
S.S. - Split Spoon
D.B. - Diamond Bit
P.A. - Power Auger
R.B. - Rock Bit
W.S. - While Sampling
W.D. - While Drilling
B.C.R. - Beforing Casing Removal
A.C.R. - After Casing Removal
A.B. - After Boring

DRILL CREW CHECK LIST

Topsoil Thickness _____

Fill Thickness _____

CAVE IN LEVEL:

While Drilling and Sampling _____

After Boring Completion _____

WATER LOSS:

At _____ To _____

Percent Loss _____

At _____ To _____

Percent Loss _____

BOULDERS OR OBSTRUCTION

At _____ To _____

At _____ To _____

ARTESIAN PRESSURE:

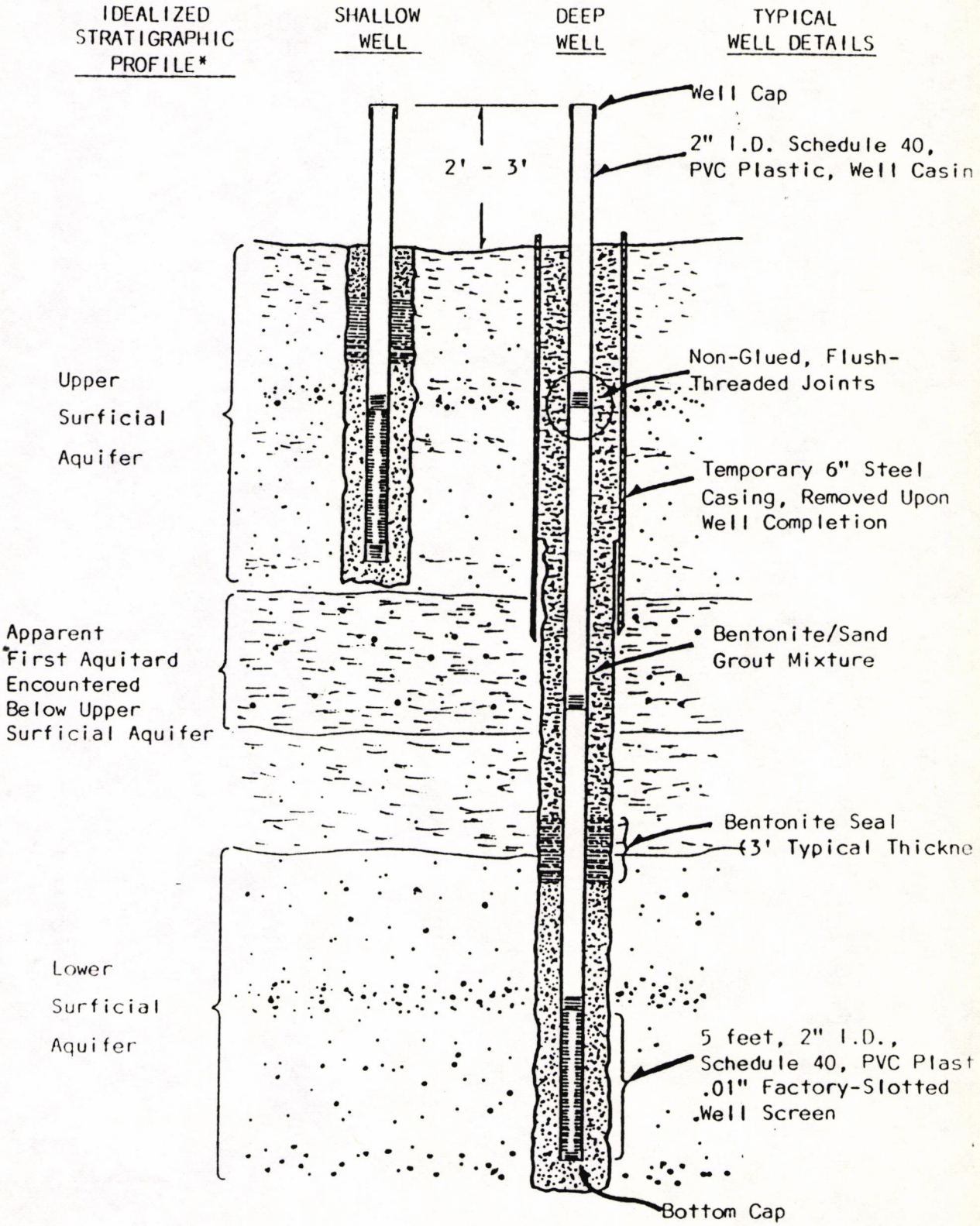
Depth _____

Height of Soil Rise In Casing _____

FIGURE 3.

FIGURE 4.

MONITORING WELL INSTALLATION DETAILS



* Idealized stratigraphic profile shown; for specific profiles encountered, refer to the attached boring logs.

FIGURE 5.

MONITORING WELL DETAIL LEGEND

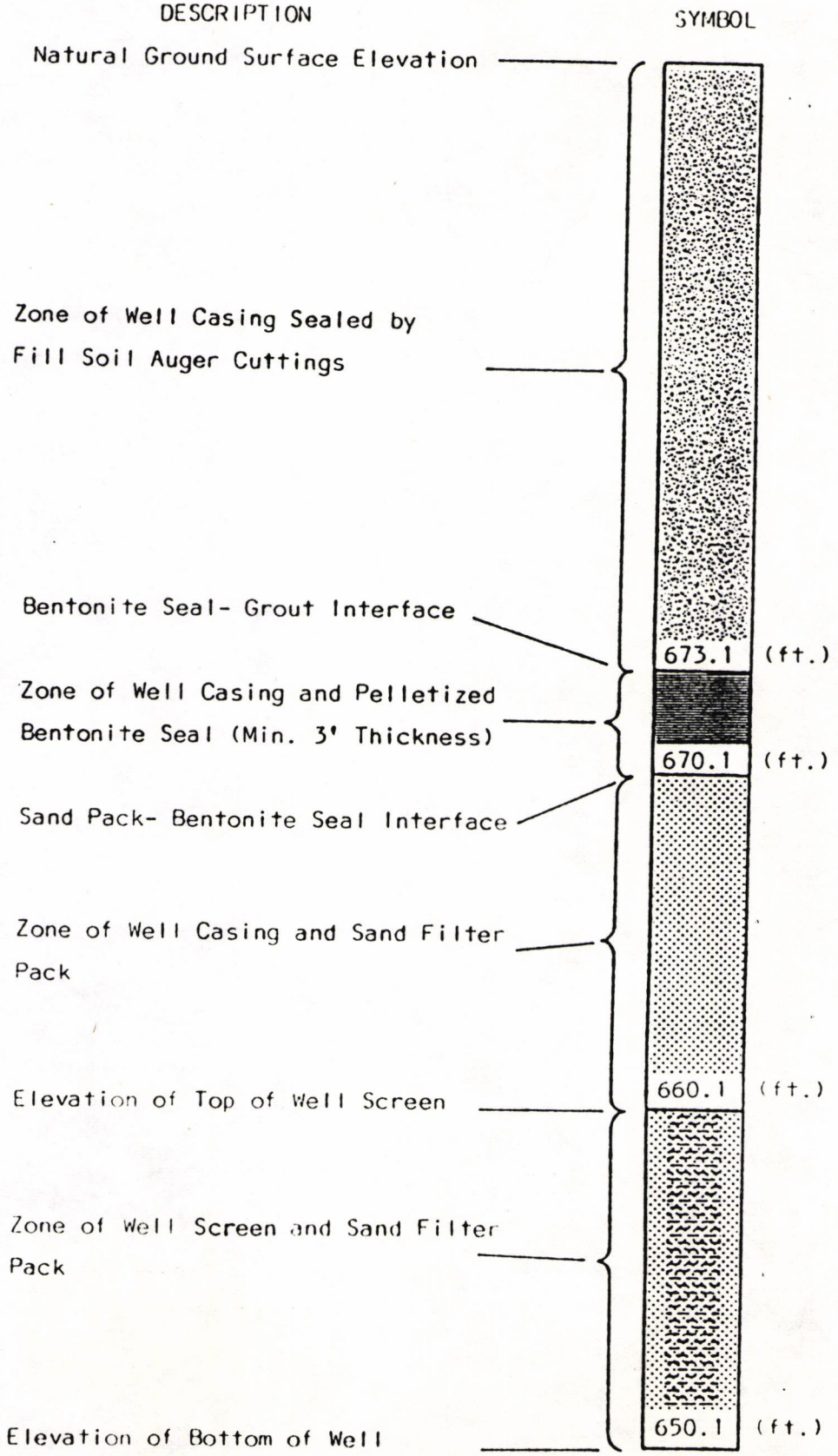


FIGURE 6.

LOG OF BORING NO. 5A

OWNER

ARCHITECT-ENGINEER

SITE

IOWA

PROJECT NAME

GROUND WATER MONITORING PROGRAM, PHASE I

Sample No	Type Sample	Sampling Distance	Recovery	Blows/ft	Unconfined Compressive Strength-lbs/ft²	Water Content-%	Dry Density-lbs/ft³	Unified Class Symbol	Depth	Elevation	Description	Monitoring Well Details
											T.O.P. Monitoring Well = 605.3' Surface Elevation = 602.6'	
	PA											
1	ST	24	15		*1000	32.9		CL			CLAYEY SILT TRACE SAND WITH SAND SEAMS Dark Brown Medium	
	PA											
2	ST	24	13		*1000			CL	5			
	PA										(Chemical Odor Present - Possible "Swamp Gas" - No Film Present)	
3	ST	24	15			48.2	82	CL		595.6 (7.0)		
					*1000	21.4	92	CL			CLAYEY SILT TRACE SAND Grayish Brown Medium to Very Stiff	
	PA											
4	ST	24	24		*5000	19.8		CL	10			
	PA									592.1 (10.5)	SANDY SILTY CLAY TRACE GRAVEL Grayish Brown	
5	ST	24	11			21.4		CL				
	RB**									589.6 (13.0)		589.
6	ST	24	10			15.6	120	SM	15		FINE TO MEDIUM SAND TRACE SILT Brown	
	RB									587.1 (15.5)		
7	SS	12	4								WEATHERED LIMESTONE	586.
	RB								20			
8	SS	1	0	34/1"						581.3 (21.3)		581.
	*Calibrated Hand Penetrometer **6" I.D. Steel Casing Set to 11.0'								25		Auger Refusal at 21.3' Bottom of Boring	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES IN SITU THE TRANSITION MAY BE GRADUAL

WATER LEVEL OBSERVATIONS

W.L	0.5	W.S OR W.D.	A.B
W.L		B.C.R.	A.C.R.
W.L			

Terracon Consultants, Inc.

BORING STARTED	2-3-82
BORING COMPLETED	2-3-82
RIG Bomb #6	FOREMAN JF
APPROVED JFH	JOB #

FIGURE 7.

TERRACON CONSULTANTS, INC.

Project _____ Collector's Sample No. _____

TCI Job No. _____

ENVIRONMENTAL SAMPLE CONTROL

HAZARDOUS MATERIALS

Company's Name _____ Telephone No. ( ) _____

Address _____
Number Street City State Zip Code

Collector's Name _____ Telephone No. ( ) _____
Signature

Date Sampled _____ Time Sampled _____ hours

Sample Point Type: Soil Boring _____ Sediment _____ Surface Soil _____
Sludge _____ Surface Water _____ Ground Water _____
Other _____

Sample Location: _____

Field Information/Remarks: _____

Sample Allocation:

1) _____
Name of Organization

2) _____
Name of Organization

3) _____
Name of Organization

SERCO

FIGURE 8.

Collector's Sample #: _____

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ___ Disposal Site

___ Other: _____

Shipper Name: _____
Sample

Address: _____
number street city state zip

Collector's Name _____ Telephone: (___)_____
signature

Date Sampled _____ Time Sampled _____ hours _____

Type of Process Producing Waste _____

Field Information _____

_____

_____

Sample Receiver:

1. _____
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. _____ _____ _____
signature title inclusive dates

2. _____ _____ _____
signature title inclusive dates

3. _____ _____ _____
signature title inclusive dates