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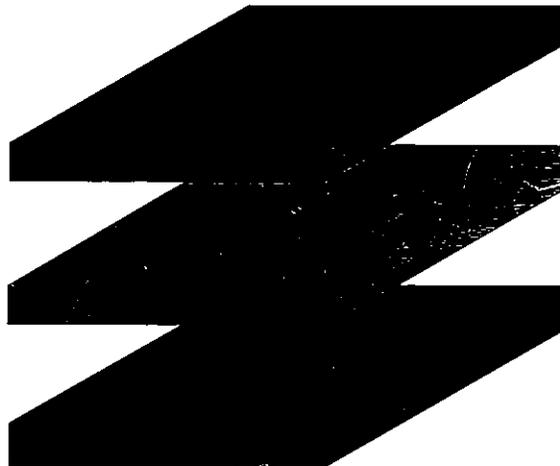
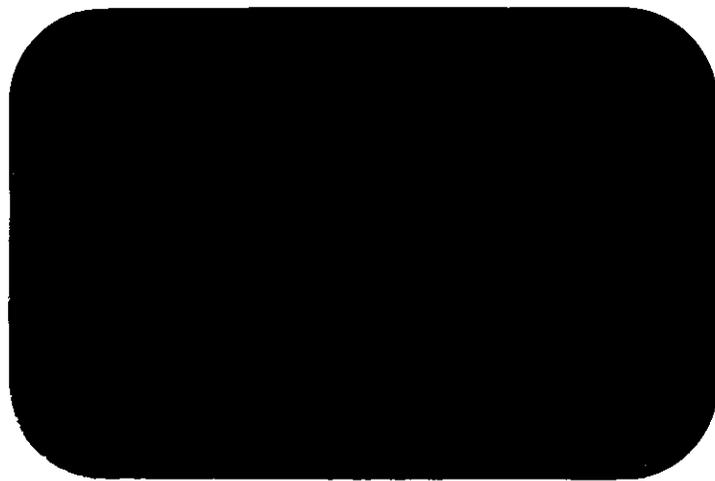
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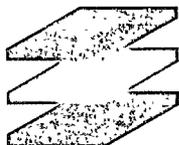
**T.R.
Edgerton,
Inc.**



Ground-Water and Soil Assessment Plan
Annandale Corporation Site

Prepared for:
Worth Chemical Corp.
Greensboro, NC

Prepared by
T. R. EDGERTON, INC.
Cary, NC



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919/469-9795

T.R. Edgerton, Inc.
*Environmental
Consultants*

Mr. Calvin Lynch
Vice-President
Worth Chemical Corp.
P. O. Box 20725
Greensboro, NC 27420

Re: Ground-water and Soil Assessment Plan, Annandale Corporation Site,
T. R. Edgerton, Inc. Job #1052-086-004

Dear Mr. Lynch:

T. R. Edgerton, Inc. is pleased to submit this assessment plan of ground-water and soils and cost estimate for property purchased by P. M. Segal, Jr. December 31, 1986 from Annandale Corporation.

BACKGROUND

Introduction

T. R. Edgerton, Inc. was requested by Worth Chemical Corp. to perform a sub-surface site investigation of the Annandale Corporation property in Charlotte, NC to determine the sub-surface environmental quality of the site. After review of the February 25, 1987 report titled "Environmental Sub-Surface Investigation-Annandale Corporation Site", T. R. Edgerton, Inc. was requested by Worth Chemical Corp. to perform additional sampling of soils on said property and extensive resampling of ground-water monitor wells to further define sources of potential heavy metal contamination and impact, if any, on groundwater underlying the site. Results of this sampling were submitted in a report dated March 27, 1987 to Worth Chemical Corp. titled "Addendum to Sub-Surface Investigation-Annandale Corporation Site".

*An interdisciplinary
approach
to total
environmental problem
solving.*

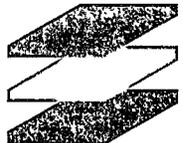
T. R. Edgerton, Inc. in the report, indicated that the heavy metal contaminant Barium was present above background levels in soil and detected in water samples from all wells (AB-1, AB-2, and AB-3). T. R. Edgerton, Inc. proposes a ground-water and soil assessment be performed at the referenced site to determine the impact and possible sources of heavy metal contamination on soils and groundwater.

OBJECTIVES

The objectives of this assessment are to: 1) further define ground-water directional flow for contaminant pathway migration; 2) determine leachability characteristics of Barium in different soil types (i.e. backfill, native); and 3) define source(s) of heavy metal contamination on soils and groundwater and delineate contaminant migration on site.

Scope of Work

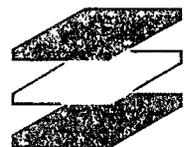
A three phase investigation will be implemented to further define groundwater directional flow; to determine the leachability characteristic of Barium; to define source(s) of heavy metal contamination on soils and groundwater and to delineate contaminant migration on site.



PHASE I

The objective of Phase I is to further define groundwater directional flow for contaminant migration. To determine groundwater directional flow, eight to ten temporary piezometer points will be installed (see Figure 1 for locations). Each piezometer boring will be advanced to depth of groundwater by a stainless steel hand auger and removed soils will be classified and recorded by a qualified geologist. The soils will be retained as samples so that further chemical analyses may be performed. After completion of each boring a temporary piezometer well point will be installed. In general, a two inch diameter PVC casing with a five foot long PVC screen will be inserted into the borehole. The annular space will be backfilled with a coarse sand pack to a minimum of one foot above the screen. To provide a seal against infiltration of surface waters along the sides of the borehole, a neat cement grout will be tremied in over the backfilled material to the surface (see Appendix for well schematics). Two piezometer well points will be screened fully within the watertable so that a slug test may be performed to determine aquifer conductivities and associated velocities. The remainder of the piezometer points will be screened across the phreatic surface.

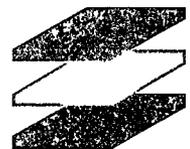
Each piezometer well will be developed upon completion of installation to allow equilibration of the watertable to its static level. The wells will be surveyed for elevation and location so that



static water levels can be monitored. A groundwater contour map will be developed to determine horizontal gradients and directional flow. Upon completion of the assessment each temporary piezometer well will be abandoned and grouted closed from the bottom up using a neat cement grout.

PHASE II

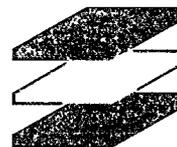
The objective of Phase II is to determine the leachability characteristics of Barium in different soil types. T. R. Edgerton, Inc. previously reported the presence of Barium above background levels from several previous soil sampling locations. A soil sampling grid system is proposed (see Figure 2 for sampling locations) along the Worth property boundary and railroad property to determine the horizontal extent of Barium contamination. Soil samples will be collected from the surface at equal intervals to provide complete coverage of the area. Samples will be collected using previously decontaminated stainless steel spoons and analyzed. E.P. toxicity leachability analysis will be run on the sample that has the highest total concentration of Barium, so that a comparison can be made between the ratio of leachable Barium verses total Barium concentration. An isopleth contour map will be developed to illustrate the concentration levels and areal extent of Barium contamination.



PHASE III

The objectives of Phase III are to define the source(s) of heavy metal contamination on soils and groundwater and contaminant migration on site. The work to be performed in Phase III is dependent on the findings of Phase I and Phase II. T. R. Edgerton, Inc. previously suggested possible sources of contamination were railroad activity and/or fill dirt used during building construction. It is also suggested that Barium may be a natural constituent in the environment at the referenced site due to leaching of the underlying bedrock. To determine if Barium is a natural constituent in the environment, X-ray fluorescence analyses will be performed on the diorite complex. In brief, three to five rock samples will be obtained from the boulders which crop out on property using a rock hammer and/or rock saw. The samples will be crushed and pulverized to form a homogeneous powder. The powder will be jacketed in boric acid to form pellets which will then be analyzed with known standards on the x-ray fluorescence (X.R.F.). If Barium is not found to be a naturally occurring constituent, other sources will have to be considered. The results of the findings in Phase II will determine if railroad activity has contributed to Barium contamination of the soils.

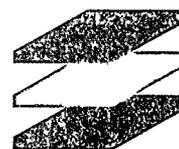
Once the source(s) of contamination has been determined, the next step is to delineate the pathways of contaminant migration on site. A cation exchange capacity analysis will be performed to determine



mobility of inorganic (ionic) compounds in the soil. In brief, the samples will be saturated with an exchangeable cation solution (sodium acetate) and extracted with ammonium acetate. The sodium content will then be measured by atomic absorption (AA) or flame emission. The results of this analysis will then be combined with the findings of Phase I to determine the migration pathway for Barium.

EXECUTIVE SUMMARY

T. R. Edgerton, Inc. recommends a three phase investigation to determine extent, impact and migration pathways of Barium contamination on the Worth Chemical Corp. property (Annandale) in Charlotte, NC. Phase I will further define groundwater directional flow and will involve the installation of eight to ten temporary piezometer well points to monitor groundwater levels. Phase II will determine if the heavy metal contaminant Barium is present in soils above the leachable allowable limits and requires additional soil sampling along the Worth property boundary and railroad property. Phase III will determine the source(s) of Barium contamination on soils and groundwater and the migration of the contaminant on site. Phase III will be dependent on the findings from Phase I and Phase II. X-ray fluorescence will be used on collected bedrock samples to determine the Barium is a natural



constituent in the environment. A cation exchange capacity analysis will be performed of samples of soil to determine the mobility of inorganic compounds in the soil.

If you have any questions concerning this report, please contact our office.

Sincerely,

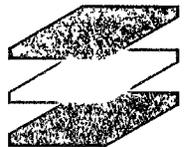
T.R. EDGERTON, INC.



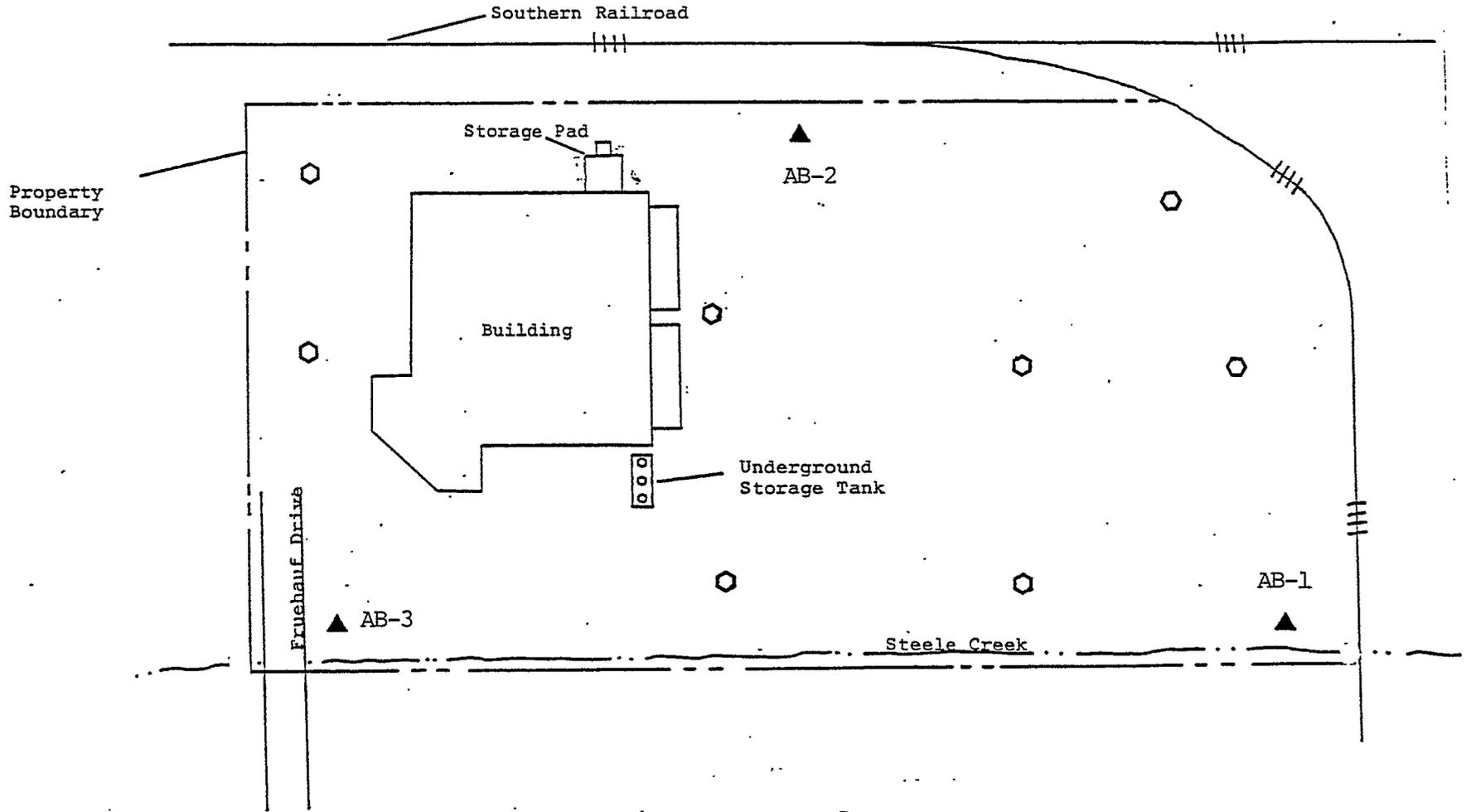
Teri L. Moore
Staff Geologist



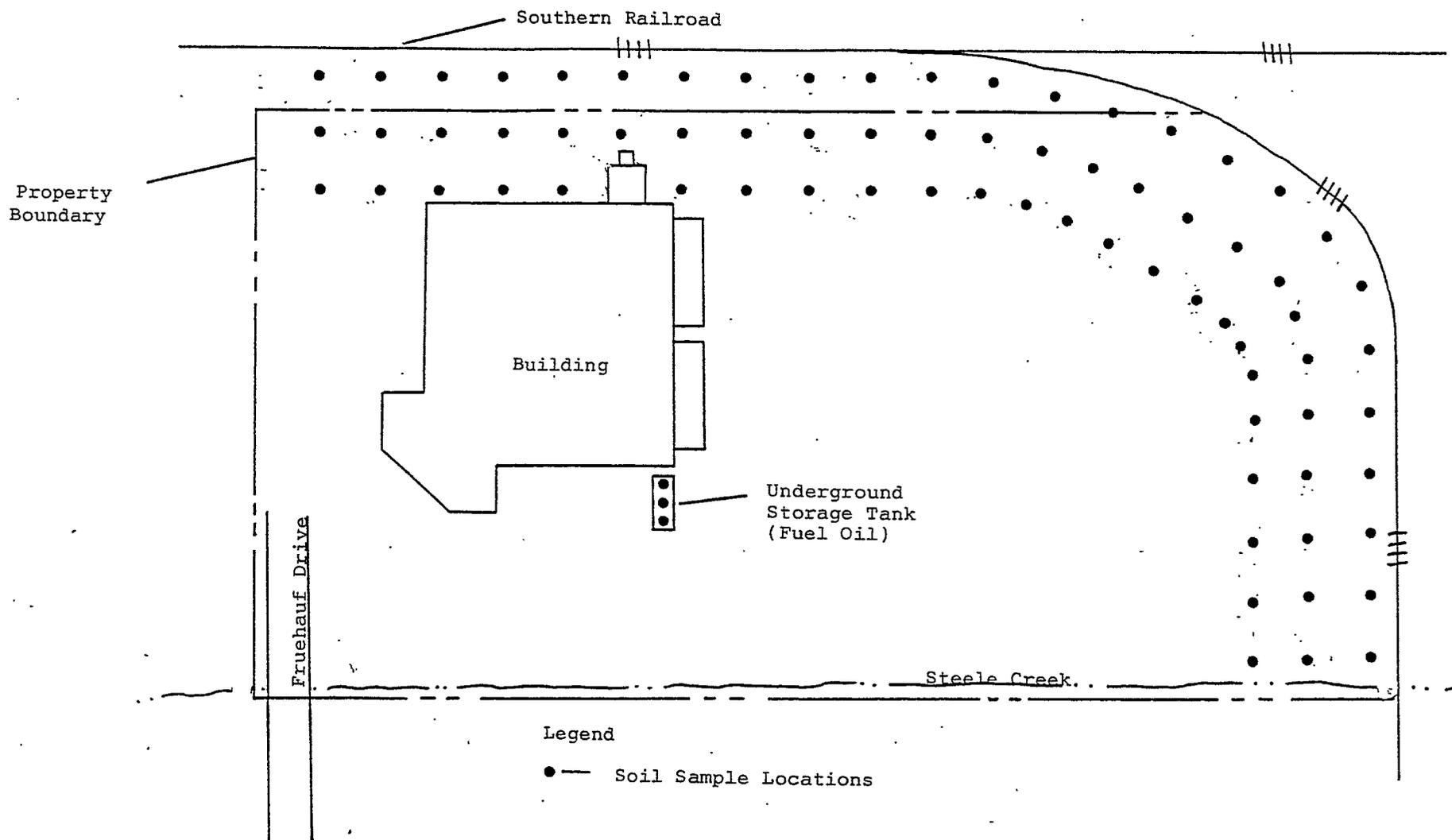
Thomas R. Edgerton
Senior Consultant



Monitor Well Location Map



- ▲ — Well Locations
- ⬡ — Proposed Piezometric Points



Soil Sample Grid Location
Worth Chemical Corporation

TREI
ENVIRONMENTAL CONSULTANTS

Scale: Not to Job No. 1052-003
Fig. No. 2

WELL SCHEMATIC

Well No A-1 through A-10

Geologist _____

Date Drilled _____

Static Water Level _____ Date _____

Drilling Method Hand Auger

Remarks _____

Borehole O.D. 4.0"

Casing O.D. 2.375"

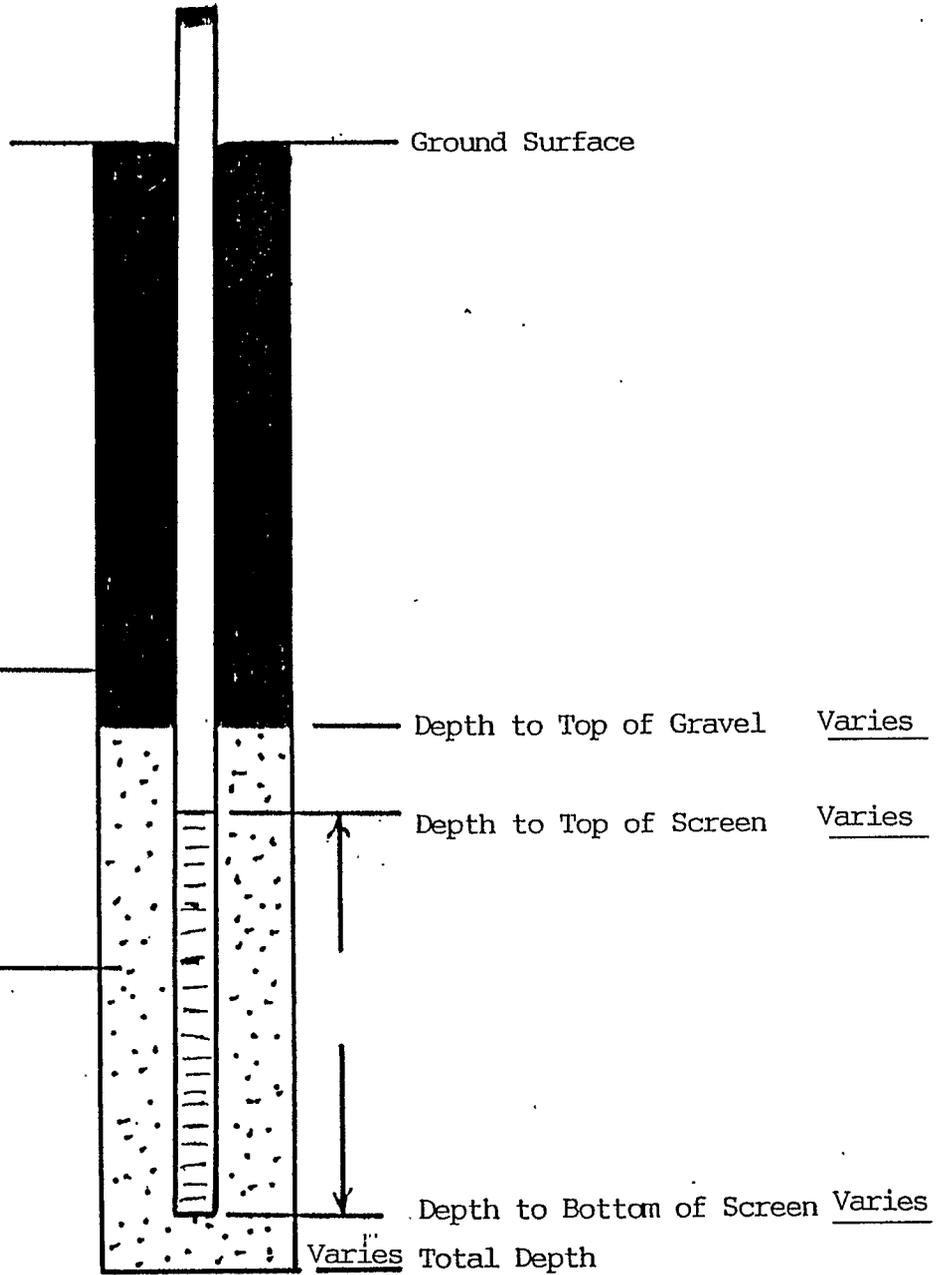
Type PVC

Screen Type PVC

Slot .010

Neat Cement
Grout

Sand Pack



Note: All Depths Referenced from Ground Surface

PROJECT.

JOB NO. 1052-003

FIGURE NO. 3

T. R. Edgerton, Inc.