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EPA SITE INSPECTION REPORT

Whiting Site #915027 Sept 1986

NUS CORPORATION
A Halliburton Company

FILE COPY COMPLETED

PROJECT FOR PERFORMANCE OF REMEDIAL RESPONSE ACTIVITIES AT UNCONTROLLED HAZARDOUS SUBSTANCE FACILITIES—ZONE 1

NUS CORPORATION
SUPERFUND DIVISION

02-8603-34A-SI

FINAL DRAFT
SITE INSPECTION REPORT
AND HAZARD RANKING SYSTEM MODEL
WHITING DEVELOPMENT CORPORATION
NEWSTEAD, NEW YORK

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8603-34A
CONTRACT NO. 68-01-6699

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

SEPTEMBER 11, 1986

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY

Joseph Mayo
JOSEPH MAYO
PROJECT MANAGER

REVIEWED/APPROVED BY

RONALD M. NAMAN
REGIONAL PROJECT MANAGER

NUS
CORPORATION
RARITAN PLAZA III
KING GEORGE ROAD
EDISON, NEW JERSEY 08837
(201) 225-6160

C-584-09-86-51

September 19, 1986

Ms. Diana Messina
U.S Environmental Protection Agency
Region II
Edison, New Jersey 08817

Dear Diana:

Enclosed are the Site Inspection Report (EPA Form 2070-13) and the MITRE Hazard Ranking System (HRS) documents for Whiting Development Corp., Newstead, New York. The site inspection was authorized under TDD #02-8603-34A.

Very truly yours,

Joseph Mayo

Joseph Mayo

Reviewed and Approved:

JM/ci

Enclosures

CONTENTS

SECTION 1

SITE INSPECTION REPORT EXECUTIVE SUMMARY

NUS CORPORATION
A Halliburton Company

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
EXECUTIVE SUMMARY

Whiting Development Corp.	NYD980535579
Site Name	EPA Site ID Number
13350 Bloomingdale Road Newstead, New York	02-8603-34A
Address	TDD Number

Date of Site Visit: 6/13/86

SITE DESCRIPTION

Whiting Development Corp. is currently a small industrial park located in Newstead, Erie County, New York. The site was formerly owned by Georgia Pacific Corp. who operated a landfill on the property from 1930 to 1968 for the disposal of gypsum wastes from their wallboard manufacturing process. The landfill is currently inactive.

The landfill is approximately 20-25 ft. high and 3-4 acres in area. It is composed primarily of gypsum wastes with wood, paper, tires and drums as minor components. Some of the landfilled waste has been excavated and used as cover material for the Township of Newstead landfill.

The New York Department of Environmental Conservation (NYDEC) indicated that the landfill had not been closed according to Resource Conservation and Recovery Act (RCRA) standards and reclamation of the landfill material for cover and fill should not exempt the site from compliance with RCRA standards. The NYDEC also indicated that there was a potential for fugitive dust generation associated with the reclamation process.

On 6/13/86 NUS Region II FIT conducted a site inspection at the Whiting Development Corp. Four soil and two sediment samples were collected from the landfill area. Volatile organic compounds and polycyclic aromatic hydrocarbons (PAH's) were detected in a sediment sample collected in a ditch adjacent to the landfill.

SECTION 2

ENVIRONMENTAL PROTECTION AGENCY FORM 2070-13

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION
01 STATE 02 SITE NUMBER
NY D980535579

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)
Whiting Development Corp.

02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
13350 Bloomingdale Road

03 CITY
Newstead

04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST.
NY	14001	Erie	29	NY38

09 COORDINATES

LATITUDE	LONGITUDE
43° 02' 00". N	078° 28' 40". W

10 TYPE OF OWNERSHIP (Check one)
X A. PRIVATE _ B. FEDERAL _ C. STATE
_ D. COUNTY _ E. MUNICIPAL _ F. OTHER
_ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION
6 / 13 / 86
MONTH DAY YEAR

02 SITE STATUS
X ACTIVE
_ INACTIVE

03 YEARS OF OPERATION
Early 1900's / Present
BEGINNING YEAR ENDING YEAR
_ UNKNOWN

AGENCY PERFORMING INSPECTION (Check all that apply)
_ A. EPA X B. EPA CONTRACTOR NUS Corporation (Name of firm) _ C. MUNICIPAL _ D. MUNICIPAL CONTRACTOR ____ (Name of firm)
_ E. STATE _ F. STATE CONTRACTOR ____ (Name of firm) _ G. OTHER ____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Joseph Mayo	Environmental Scientist	NUS Corporation	(201) 225-6160
09 OTHER INSPECTORS	**10 TITLE**	**11 ORGANIZATION**	**12 TELEPHONE NO.**
Laurie Gneiding	Toxicologist	NUS Corporation	(201) 225-6160
Peter Babich	Toxicologist	NUS Corporation	(201) 225-6160
Steve Maybury	Environmental Scientist	NUS Corporation	(201) 225-6160
Dennis Sutton	Geologist	NUS Corporation	(201) 225-6160

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO.
Patrick Whiting	Unknown	Whiting Roll-Up Door 113 Goar St., Akron, N.Y.	(716) 542-5427

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
X PERMISSION _ WARRANT	0900	Cloudy and cool, temp 60° - 70° F, some rain on previous night

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Diana Messina	U.S. EPA Region II, Edison, N.J.	(201) 321-6685

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Joseph Mayo	U.S.EPA	NUS FIT II	(201) 225-6160	7 /14 / 86 MONTH DAY YEAR

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D980535579

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

X A. SOLID
X B. POWDER, FINES
_ C. SLUDGE
_ D. OTHER ______ (Specify)
_ E. SLURRY
_ F. LIQUID
_ G. GAS

02 WASTE QUANTITY AT SITE

(Measures of waste quantities must be independent)

TONS ______
CUBIC YARDS 96,800*
NO. OF DRUMS ______

03 WASTE CHARACTERISTICS (Check all that apply)

X A. TOXIC
_ B. CORROSIVE
_ C. RADIOACTIVE
X D. PERSISTENT
X E. SOLUBLE
_ F. INFECTIOUS
_ G. FLAMMABLE
_ H. IGNITABLE
_ I. HIGHLY VOLATILE
_ J. EXPLOSIVE
_ K. REACTIVE
_ L. INCOMPATIBLE
_ M. NOT APPLICABLE

*Landfill is composed of gypsum wastes which cannot be considered in HRS.

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			Landfill is allegedly
PSD	PESTICIDES			composed of gypsum
OCC	OTHER ORGANIC CHEMICALS			wastes. Estimate is
IOC	INORGANIC CHEMICALS	96,800	yds^3	based on a 3 acre
ACD	ACIDS			landfill with an average
BAS	BASES			height of 20 ft.
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
SOL	1,1-Dichloroethane	75-35-4	Unknown	11	ug/kg
SOL	Trichloroethene	79-01-6	Unknown	15	ug/kg
SOL	Tetrachloroethene	127-18-4	Unknown	30	ug/kg
SOL	Toluene	108-88-3	Unknown	6	ug/kg
OCC	Benzoic Acid	65-85-0	Unknown	6000	ug/kg
OCC	Naphthalene	91-20-3	Unknown	510	ug/kg
OCC	2-Methylnaphthalene	999	Unknown	760	ug/kg
OCC	Phenanthrene	85-01-8	Unknown	1000	ug/kg
OCC	Fluoranthene	206-44-0	Unknown	920	ug/kg
OCC	Pyrene	129-00-0	Unknown	740	ug/kg
OCC	Benzo(a)Anthracene	56-55-3	Unknown	940	ug/kg
OCC	Chrysene	218-99-2	Unknown	1000	ug/kg
OCC	Benzo(b)Fluoranthene	205-99-2	Unknown	1500	ug/kg
OCC	Benzo(k)Fluoranthene	207-08-9	Unknown	1500	ug/kg
OCC	Benzo(a)Pyrene	50-32-8	Unknown	1100	ug/kg
SOL	2-Butanone	78-93-3	Unknown	J	Not Applicable
OCC	Pentachlorophenol	87-86-5	Unknown	J	Not Applicable
OCC	Anthracene	120-12-7	Unknown	J	Not Applicable
OCC	Benzo (g,h,i) Perylene	191-24-2	Unknown	J	Not Applicable
OCC	Benzyl Alchohol	100-51-6	Unknown	J	Not Applicable
OCC	4-Methylphenol	106-44-5	Unknown	J	Not Applicable
OCC	Acenaphthylene	208-96-8	Unknown	J	Not Applicable
OCC	4-Nitrophenol	100-02-7	Unknown	J	Not Applicable
OCC	Fluorene	86-73-7	Unknown	J	Not Applicable

SEE ATTACHMENT

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (See specific references. e.g., state files, sample analysis, reports)

Site Inspection of Whiting Development Corp. conducted on 6/15/86 by NUS Corporation
U.S. Geological Survey Topographic Maps, Akron and Wolcottsville, NY Quadrangles

ATTACHMENT

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	Lead	7439-92-1	Unknown	376	mg/kg
MES	Mercury	7439-97-6	Unknown	0.6	mg/kg

Note: J - Compound present below the specified detection limit.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

1. IDENTIFICATION
01 STATE 02 SITE NUMBER
NY D980535579

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 X A. GROUNDWATER CONTAMINATION 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 19 04 NARRATIVE DESCRIPTION

The potential exists. Since the landfill is unlined and uncovered, substances leached from the landfill could percolate through the soil and enter groundwater. However, it should be noted that gypsum deposits are present in much of the geology of the area around the site. Results of sampling conducted at the facility on 6/13/86 indicate that volatile organics and polycyclic aromatic hydrocarbons (PAH's) were present in a sediment sample collected from the facility. There is a potential that these contaminants could migrate to groundwater.

01. X B. SURFACE WATER CONTAMINATION 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 5,932 04 NARRATIVE DESCRIPTION

There is a small potential that contaminated runoff from the site could reach Ledge Creek, located 0.6 miles northeast and downgradient of the site.

01 X C. CONTAMINATION OF AIR 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: Unknown 04 NARRATIVE DESCRIPTION

There is a small potential for air contamination from wind blown dust. At the time of the site investigation, which was conducted after a wet spring season, the material in the landfill was well compacted and showed little potential for fugitive dust generation. It is not known if fugitive dust generation is a problem during dry periods.

01. X D. FIRE/EXPLOSIVE CONDITIONS 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 376 04 NARRATIVE DESCRIPTION

There is a small potential for a large woodpile at the base of the landfill to catch fire. However, the bulk of the landfill appears to be composed of waste gypsum which is not flamable.

01. X E. DIRECT CONTACT 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 3,522 04 NARRATIVE DESCRIPTION

The potential is small since the site is located in a sparsely populated rural area. However, the site is not fenced and access is not restricted.

01 X F. CONTAMINATION OF SOIL 02 X OBSERVED (DATE: 6/13/86) _ POTENTIAL _ ALLEGED
03 AREA POTENTIALLY AFFECTED: Unknown (ACRES) 04 NARRATIVE DESCRIPTION

Volatile organic compounds and PAH's were detected in a sediment sample collected in a ditch at the base of the landfill.

01. X G. DRINKING WATER CONTAMINATION 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 19 04 NARRATIVE DESCRIPTION

The potential exists. There are at least eight wells within a 3 mile radius of the site. Five of the wells are used for domestic purposes, two are agricultural and one is commercial. The Village of Akron draws its drinking water supply from a reservoir, 15 miles to the east, in Wyoming County. There is a potential for contaminants found on the site to enter groundwater.

01 X H. WORKER EXPOSURE/INJURY 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: 3,522 04 NARRATIVE DESCRIPTION

There is a potential for workers near the site to be exposed to fugitive dusts from the landfill.

01 X I. POPULATION EXPOSURE/INJURY 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 5,932 04 NARRATIVE DESCRIPTION

Major potential for population exposure is via groundwater contamination of domestic wells and by fugitive dusts from the landfill.

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 X J. DAMAGE TO FLORA — 02 _ OBSERVED (DATE: ______) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

The disposal area was sparsely vegetated. Potential for damage to surrounding wetlands and forested areas is possible from toxic and persistent compounds.

01 X K. DAMAGE TO FAUNA — 02 _ OBSERVED (DATE: ______) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

The potential exists. The site is located near a wetland area. There is potential for toxic and persistent substances on the site to migrate to the wetland area and damage the fauna.

01 X L. CONTAMINATION OF FOOD CHAIN — 02 _ OBSERVED (DATE: ______) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

The potential exists. There is agricultural land approximately 50 yards from the site.

01 X M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff/standing liquids/leaking drums) — 02 X OBSERVED (DATE: 6/13/86) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: Unknown
04 NARRATIVE DESCRIPTION

The landfill is unlined and uncapped and does not have a runoff or leachate collection system.

01 X N. DAMAGE TO OFFSITE PROPERTY — 02 _ OBSERVED (DATE: ______) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

There is a small potential for damage to off-site drinking water wells.

01 _ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 _ OBSERVED (DATE: ______) _ POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

No potential exists. The area around the landfill is not drained by sewers or storm drains.

01 X P. ILLEGAL/UNAUTHORIZED DUMPING — 02 _ OBSERVED (DATE: ______) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

The potential exists. It is not known if the landfill was operated legally or if wastes other than gypsum were deposited.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

No other known, potential or alleged hazards.

III. TOTAL POPULATION POTENTIALLY AFFECTED: Unknown

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references. e.g., state files, sample analysis, reports)

Site Inspection of Whiting Development Corp., conducted on 6/13/86 by NUS Corp.
U.S. Geological Survey Topographic Maps, Akron and Woolcottsville Quadrangles.
N.Y. State Atlas of Community Water System Sources, N.Y. State Department of Health, 1982.
Erie-Niagara Basin Groundwater Resources, N.Y. State Water Resources Commission, 1968.
Buehler, E.J., and Tesmer, I.H., Geology of Erie County, Buffalo Society of Natural Sciences Bulletin, Vol. 21, No. 3, 1963.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

1. IDENTIFICATION
01 STATE NY
02 SITE NUMBER D980535579

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
_ A. NPDES				
_ B. UIC				
_ C. AIR				
_ D. RCRA				
_ E. RCRA INTERIM STATUS				The landfill is
_ F. SPCC PLAN				currently inactive.
_ G. STATE (Specify)				
_ H. LOCAL (Specify)				
_ I. OTHER (Specify)				
X J. NONE				

III. SITE DESCRIPTION

01 Storage/Disposal (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE	04 TREATMENT (Check all that apply)	05 OTHER
_ A. SURFACE IMPOUNDMENT			_ A. INCINERATION	X A. BUILDINGS ON SIT
_ B. PILES			_ B. UNDERGROUND INJECTION	
X C. DRUMS, ABOVE GROUND	4	55 gal	_ C. CHEMICAL/PHYSICAL	
_ D. TANK, ABOVE GROUND			_ D. BIOLOGICAL	06 AREA OF SITE
_ E. TANK, BELOW GROUND			_ E. WASTE OIL PROCESSING	
X F. LANDFILL	96,800	yds^3	_ F. SOLVENT RECOVERY	
_ G. LANDFARM			_ G. OTHER RECYCLING/RECOVERY	10 (Acres)
_ H. OPEN DUMP			_ H. OTHER None (Specify)	
_ I. OTHER (Specify)				

07 COMMENTS

The Whiting Development Corp. has sold some of the landfilled material to the Town of Newstead for use as cover material for the Town of Newstead municipal landfill. Four drums were found on the landfill during the site inspection conducted on 6/13/86. The contents of the drums appeared to be gypsum wastes.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

_ A. ADEQUATE, SECURE _ B. MODERATE _ C. INADEQUATE, POOR X D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

The landfill is unlined and uncovered. Site investigation found four drums on the surface of the landfill.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: X YES _ NO

02 COMMENTS

The site is not fenced and the eastern border of the landfill is only 10-20 ft. from Scotland Road.

VI SOURCES OF INFORMATION (Cite specific references. e.g., state files, sample analysis, reports)

Site Inspection of Whiting Development Corp., conducted on 6/13/86 by NUS Corp.
Background information supplied by New York Department of Environmental Conservation (NYDEC).

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable) | 02 STATUS | 03 DISTANCE TO SITE

	SURFACE	WELL	ENDANGERED	AFFECTED	MONITORED	DISTANCE TO SITE
COMMUNITY	A. X	B. _	A. _	B. _	C. _	A. 15 (mi)
NON-COMMUNITY	C. _	D. X	D. _	E. _	F. _	B. 1.1 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

X A. ONLY SOURCE FOR DRINKING

_ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available)

_ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available)

_ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER: 19

03 DISTANCE TO NEAREST DRINKING WATER WELL: 1.1 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
14.9 (ft)	Northwest	14.9 (ft)	1.7×10^6 (gpd)	_ YES X NO

09 DESCRIPTION OF WELLS (Including useage, depth, and location relative to population and buildings)

Well descriptions are provided on the following page.

10 RECHARGE AREA

_ YES
X NO

COMMENTS

11 DISCHARGE AREA

X YES
_ NO

COMMENTS Groundwater discharges to Ledge Creek and its tributaries as well as Murder Creek.

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

X A. RESERVOIR, RECREATION DRINKING WATER SOURCE

_ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES

_ C. COMMERCIAL, INDUSTRIAL

_ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Ledge Creek	Unknown	0.6 (mi)
Murder Creek	Unknown	1.6 (mi)
		(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 376 NO. OF PERSONS	B. 3522 NO. OF PERSONS	C. 5932 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION: 0.1 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE: 828

04 DISTANCE TO NEAREST OFF-SITE BUILDING: 0.1 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site. e.g., rural, village, densely populated urban area)

The site is located in a sparsely populated rural area about 0.6 mi. from the Erie-Genesee county border. The town of Akron, population about 3,100, is located 0.6 mi. southwest of the site. The Tonawanda Indian reservation is located 1.5 mi. northeast of the site.

WELLS WITHIN A 3 MILE RADIUS OF WHITING DEVELOPMENT CORP.

Location	Total Depth (ft.)	Depth of Groundwater (Ft)	Well Type	Use	Depth to Bedrock	Water Bearing Material	Owner	Comments
300-826-1	53	16.3	DRL	D	___	Limestone	E. Vanalstine	
300-826-2	30	9.1	DRL	D	___	"	A. Bettio	___
300-827-1	120	45	DRL	D	___	"	L. Weaver	___
302-825-1	49	20	DRL	D	___	Camillus Shale	C. Moses	Yield 20gpm
303-826-1	26.7	20.2	DRL	D	___	"	J. Patterson	Yield 10gpm
303-828-1	39.4	12.0	DRL	Ag	___	Sand	J. Laughlin	Used for watering stock.
303-829-1	25.8	14.9	DRL	C	___	Camillus Shale	Dade Farms Country Club	___
303-830-1	18.2	10.3	DRL	F	___	Sand and Gravel	G. Cook	___

USE CODES: D - Domestic
Ag - Agricultural
F - Dairy Farm
C - Commercial

WELL TYPE: DRL - Drilled

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

X A. 10^{-6} - 10^{-8} cm/sec * *Glacial Till _ B. 10^{-4} - 10^{-6} cm/sec _ C. 10^{-4} - 10^{-3} cm/sec _ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

_ A. IMPERMEABLE (Less than 10^{-6} cm/sec) _ B. RELATIVELY IMPERMEABLE (10^{-4} - 10^{-6} cm/sec) X C. RELATIVELY PERMEABLE (10^{-2} - 10^{-4} cm/sec) _ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK 14.9 (ft)

04 DEPTH OF CONTAMINATED SOIL ZONE 0* (ft)
*contaminants found in surface sample

05 SOIL pH Unknown

06 NET PRECIPITATION 6 (in)

07 ONE YEAR 24 HOUR RAINFALL 2.8 (in)

08 SLOPE
SITE SLOPE: 7.5+ %
DIRECTION OF SITE SLOPE: Site slopes in all directions **
TERRAIN AVERAGE SLOPE: 1.3%+ %

+ site slope and terrain slope differ from HRS slopes because the gypsum waste could not be considered in HRS scoring process.

09 FLOOD POTENTIAL

10

SITE IS IN 500 YEAR FLOODPLAIN _ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE A. >3 (mi) OTHER B. 0.2 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species) >3 (mi)

ENDANGERED SPECIES: N/A

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL A. 0 (mi)

RESIDENTIAL AREAS: NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES B. 0.6 (mi)

AGRICULTURAL LANDS
PRIME AG LAND C. Unknown (mi)
AG LAND D. adjacent (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

The site is located in the Township of Newstead, 0.5 mi. northeast of the town of Akron and 0.6 mi. west of the Erie-Genesee County Border. The general slope of the topography around the site is from southeast to northwest towards Tonawanda and Murder Creeks. Immediately north of the site is a wetland area which contains a number of small intermittent and perennial streams which are tributary to Murder Creek and Ledge Creek. The site is bordered on the north by the Conrail Railroad tracks and on the east by Scotland Road. The landfill is elevated approximately 20-25 ft with respect to the surrounding topography.

**The site is a landfill and slopes in all directions.

VII SOURCES OF INFORMATION (Cite specific references e.g., state files, sample analysis, reports)

Site Inspection of Whiting Development Corp. conducted on 6/13/86 by NUS Corp.
Bueler, E.J., and Tesmer, I.H., Geology of Erie County, Buffalo Society of Natural Science Bulletin, Vol. 21, No. 3, 1963.
Erie-Niagara Basin Groundwater Resources, N.Y. State Water Resources Commision, 1968.
New York State Atlas of Community Water System Sources, N.Y. State Department of Health, 1982.
U.S. Geological Survey Topographic Maps, Akron and Wolcottsville, N.Y. Quadrangles.
Hazard Ranking System (HRS) Users Manual, MITRE Corporation.
Flood Insurance Rate Map (FIRM) for the town of Newstead, National Flood Insurance Program.

I. IDENTIFICATION
01 STATE 02 SITE NUMBER
NY D980535579

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER		Organic Samples: California Analytical Labs 2544 Industrial Blvd. W. Sacramento, CA 95691	Received 8/7/86
SURFACE WATER			
WASTE			
AIR		Inorganic Samples: Rocky Mountain Analytical Labs 5530 Marshall St. Arvada, CO 80002	Received 8/7/86
RUNOFF			
SPILL			
SOIL	4		
VEGETATION			
OTHER Sediment	2		

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Air Monitoring	Air monitoring readings using an OVA flame ionization detector and an HNu photoionization detector. No readings above background were obtained while on-site.

IV. PHOTOGRAPHS AND MAPS

01 TYPE X GROUND _ AERIAL 02 IN CUSTODY OF NUS Corp. Region II FIT, Edison, NJ
(Name of organization or individual)

03 MAPS 04 LOCATION OF MAPS

X YES NUS Corp. Region II FIT, Edison, NJ
_ NO

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Photographs of sample collection activities.
Logbook #1645, filed under TDD #02-8603-34A.

VI. SOURCES OF INFORMATION (Cite specific references. e.g., state files, sample analysis, reports)

Site inspection of Whiting Development Corp. conducted on 6/13/86 by NUS Corp.

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D980535579

II. CURRENT OWNER(S) / PARENT COMPANY (If applicable)

01 NAME	02 D + B NUMBER	08 NAME	09 D + B NUMBER
Whiting Development Corp.			

03 STREET ADDRESS (P.O. Box, RFD#, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD#, etc.)	11 SIC CODE
13350 Bloomingdale Road			

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE
Newstead	NY	14001			

01 NAME | 02 D + B NUMBER | 08 NAME | 09 D + B NUMBER
03 STREET ADDRESS (P.O. Box, RFD#, etc.) | 04 SIC CODE | 10 STREET ADDRESS (P.O. Box, RFD#, etc.) | 11 SIC CODE
05 CITY | 06 STATE | 07 ZIP CODE | 12 CITY | 13 STATE | 14 ZIP CODE

01 NAME | 02 D + B NUMBER | 08 NAME | 09 D + B NUMBER
03 STREET ADDRESS (P.O. Box, RFD#, etc.) | 04 SIC CODE | 10 STREET ADDRESS (P.O. Box, RFD#, etc.) | 11 SIC CODE
05 CITY | 06 STATE | 07 ZIP CODE | 12 CITY | 13 STATE | 14 ZIP CODE

01 NAME | 02 D + B NUMBER | 08 NAME | 09 D + B NUMBER
03 STREET ADDRESS (P.O. Box, RFD#, etc.) | 04 SIC CODE | 10 STREET ADDRESS (P.O. Box, RFD#, etc.) | 11 SIC CODE
05 CITY | 06 STATE | 07 ZIP CODE | 12 CITY | 13 STATE | 14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first) / IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME	02 D + B NUMBER	01 NAME	02 D + B NUMBER
Whiting Development Corp.			

03 STREET ADDRESS (P.O. Box, RFD#, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD#, etc.)	04 SIC CODE
13350 Bloomingdale Road			

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
Newstead	NY	14001			

01 NAME | 02 D + B NUMBER | 01 NAME | 02 D + B NUMBER
03 STREET ADDRESS (P.O. Box, RFD#, etc.) | 04 SIC CODE | 03 STREET ADDRESS (P.O. Box, RFD#, etc.) | 04 SIC CODE
05 CITY | 06 STATE | 07 ZIP CODE | 05 CITY | 06 STATE | 07 ZIP CODE

01 NAME | 02 D + B NUMBER | 01 NAME | 02 D + B NUMBER
03 STREET ADDRESS (P.O. Box, RFD#, etc.) | 04 SIC CODE | 03 STREET ADDRESS (P.O. Box, RFD#, etc.) | 04 SIC CODE
05 CITY | 06 STATE | 07 ZIP CODE | 05 CITY | 06 STATE | 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Background information supplied by NYDEC.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

1. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980535579

II. CURRENT OPERATOR(S) / OPERATOR'S PARENT COMPANY (If applicable)

01 NAME Same		02 D + B Number	10 NAME		11 D + B NUMBER
03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD#, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER				

III. PREVIOUS OPERATOR(S) (List most recent first: Provide only if different from owner) / PREVIOUS OPERATOR'S PARENT COMPANIES (If applicable)

01 NAME Georgia Pacific Corp.		02 D + B Number	10 NAME		11 D + B NUMBER
03 STREET ADDRESS (P.O. Box, RFD#, etc.) 13350 Bloomingdale Road		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD#, etc.)		13 SIC CODE
05 CITY Newstead	06 STATE NY	07 ZIP CODE 14001	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER				

01 NAME		02 D + B Number	10 NAME		11 D + B NUMBER
03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD#, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER				

01 NAME		02 D + B Number	10 NAME		11 D + B NUMBER
03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD#, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER				

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Background information provided by NYDEC.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

1. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D980535579

II ON-SITE GENERATOR

01 NAME		02 D + B NUMBER
None		
03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE

III OFF-SITE GENERATOR(S)

01 NAME		02 D + B NUMBER	01 NAME		02 D + B NUMBER
None					
03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
01 NAME		02 D + B NUMBER	01 NAME		02 D + B NUMBER
03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME		02 D + B NUMBER	01 NAME		02 D + B NUMBER
None					
03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
01 NAME		02 D + B NUMBER	01 NAME		02 D + B NUMBER
03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD#, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

II. PAST RESPONSE ACTIVITIES

01 ___ A. WATER SUPPLY CLOSED 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ B. TEMPORARY WATER SUPPLY PROVIDED 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ C. PERMANENT WATER SUPPLY PROVIDED 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ D. SPILLED MATERIAL REMOVED 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ E. CONTAMINATED SOIL REMOVED 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ F. WASTE REPACKAGED 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 X G. WASTE DISPOSED ELSEWHERE 02 DATE: Unknown 03 AGENCY: Township of Newstead
04 DESCRIPTION

The Whiting Development Corp. has sold some of the gypsum wastes from the landfill to the Township of Newstead for use as cover material.

01 ___ H. ON SITE BURIAL 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ I. IN SITU CHEMICAL TREATMENT 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ J. IN SITU BIOLOGICAL TREATMENT 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ K. IN SITU PHYSICAL TREATMENT 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ L. ENCAPSULATION 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ M. EMERGENCY WASTE TREATMENT 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ N. CUTOFF WALLS 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ O. EMERGENCY DIKING/SURFACE WATER DIVERSION 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ P. CUTOFF TRENCHES/SUMP 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

01 ___ Q. SUBSURFACE CUTOFF WALL 02 DATE: ______ 03 AGENCY: ______
04 DESCRIPTION

No previous history

II. PAST RESPONSE ACTIVITIES

01 ___ R. BARRIER WALLS CONSTRUCTED 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

01 ___ S. CAPPING/COVERING 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

01 ___ T. BULK TANKAGE REPAIRED 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

01 ___ U. GROUT CURTAIN CONSTRUCTED 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

01 ___ V. BOTTOM SEALED 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

01 ___ W. GAS CONTROL 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

01 ___ X. FIRE CONTROL 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

01 ___ Y. LEACHATE TREATMENT 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

01 ___ Z. AREA EVACUATED 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

01 ___ 1. ACCESS TO SITE RESTRICTED 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

01 ___ 2. POPULATION RELOCATED 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

01 ___ 3. OTHER REMEDIAL ACTIVITIES 02 DATE: ________ 03 AGENCY: ________
04 DESCRIPTION

No previous history

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Background information provided by NYDEC.

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION _ YES X NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

No regulatory or enforcement actions have been taken against Whiting Development Corporation in the past.

The New York Department of Environmental Conservation (NYDEC) indicated that the landfill had not been closed according to Resource Conservation and Recovery Act (RCRA) standards and reclamation of the landfill material for cover and fill should not exempt the site from compliance with RCRA standards. The NYDEC also indicated that there was a potential for fugitive dust generation associated with the reclamation process.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, report)

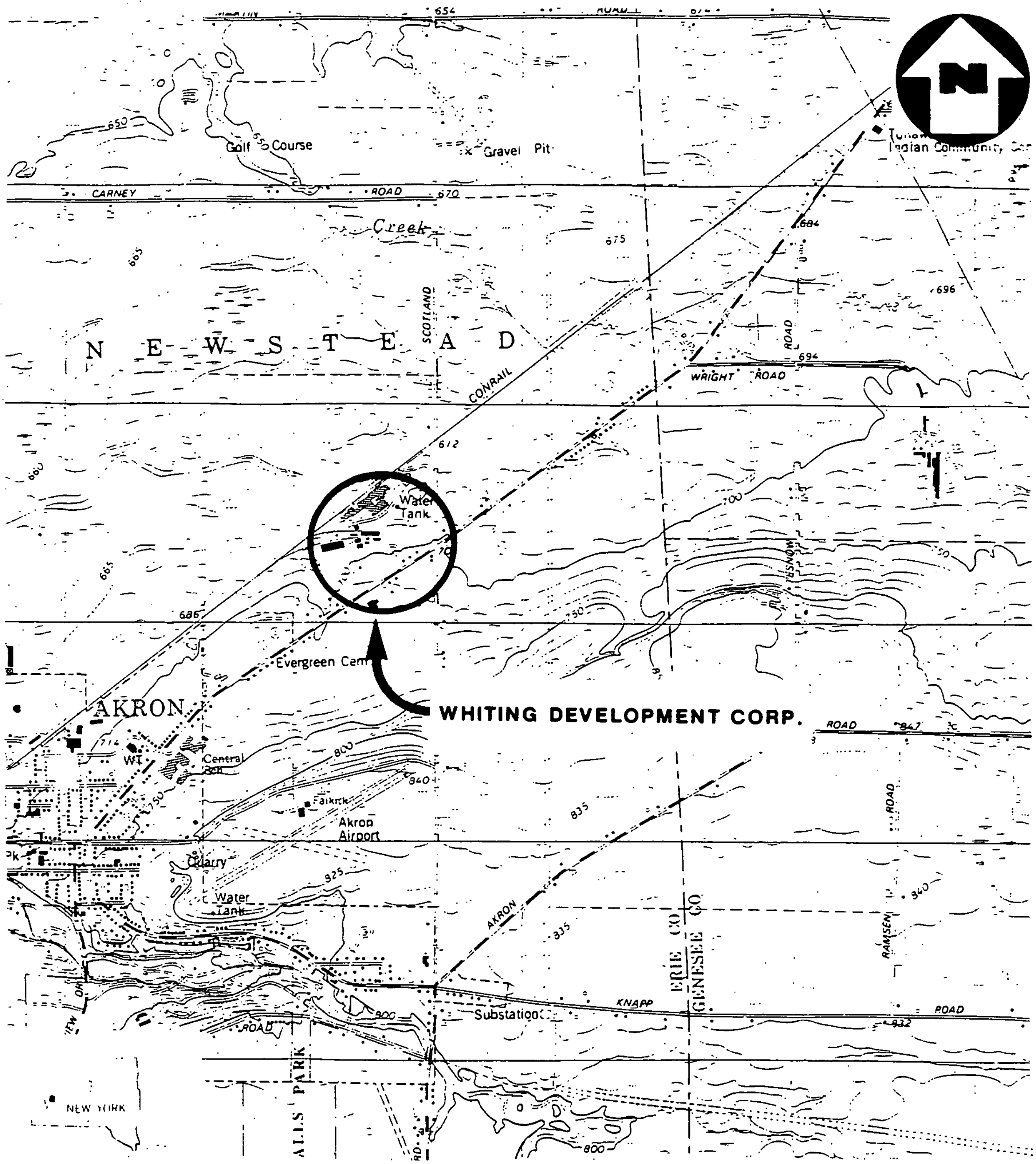
Site Inspection of Whiting Development Corp. conducted on 6/13/86 by NUS Corporation.

SECTION 3

MAPS AND PHOTOGRAPHS

WHITING DEVELOPMENT CORPORATION
NEWSTEAD, NEW YORK
TDD# 02-8603-34A

Figure 1 provides a Site Location Map
Figure 2 provides a Site Map
Figure 3 provides a Sample Location Map
Exhibit A provides Site Photographs



(QUAD) AKRON, N.Y.

FIGURE 1

SITE LOCATION MAP

WHITING DEVELOPMENT CORP., NEWSTEAD, N.Y.

SCALE: 1" = 2000'

NUS CORPORATION

A Halliburton Company

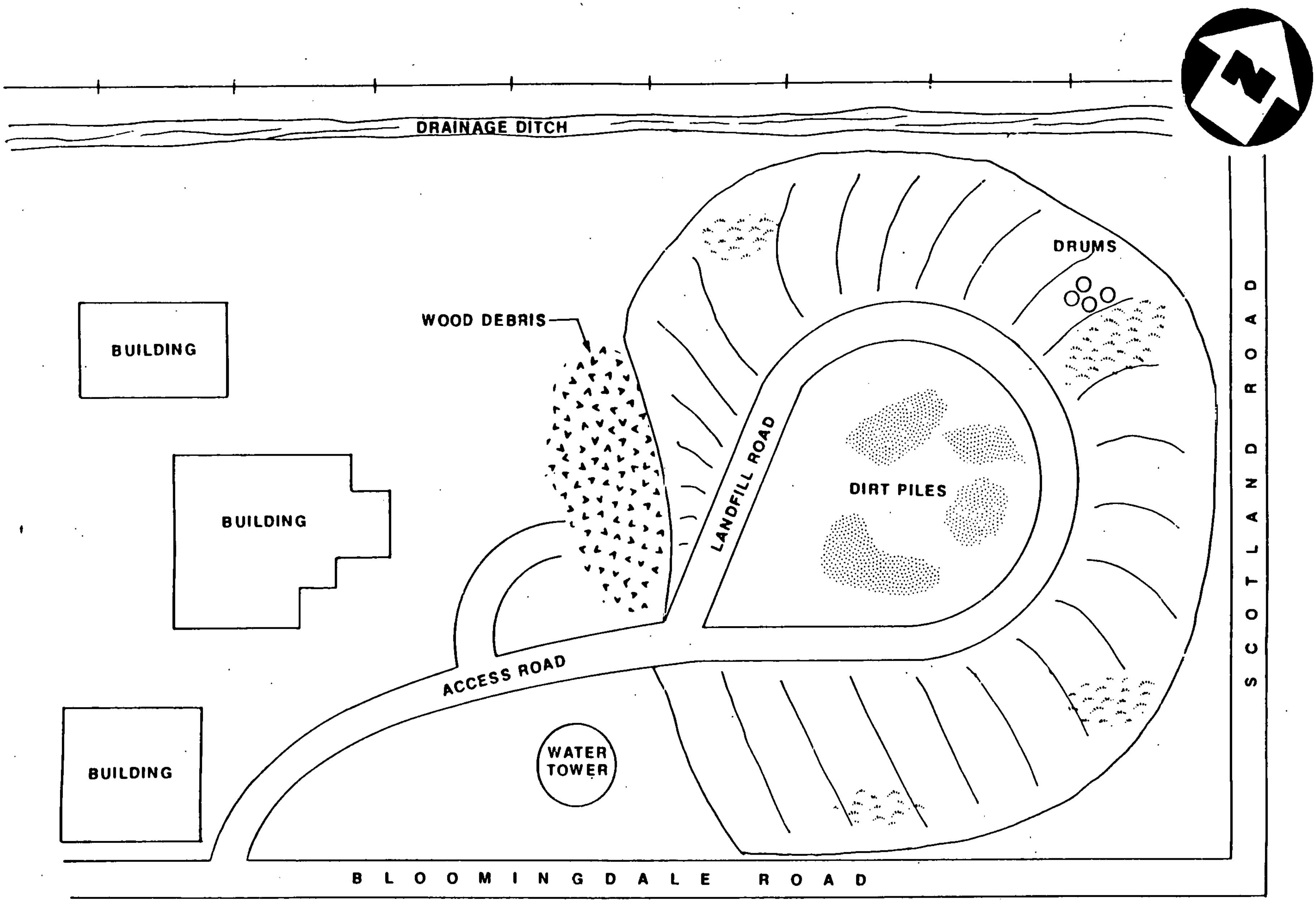


FIGURE 2

NUS CORPORATION
A Hallibu[illegible]ompany

SITE MAP

WHITING DEVELOPMENT CORP., NEWSTEAD, N.Y.

(NOT TO SC[illegible]E)

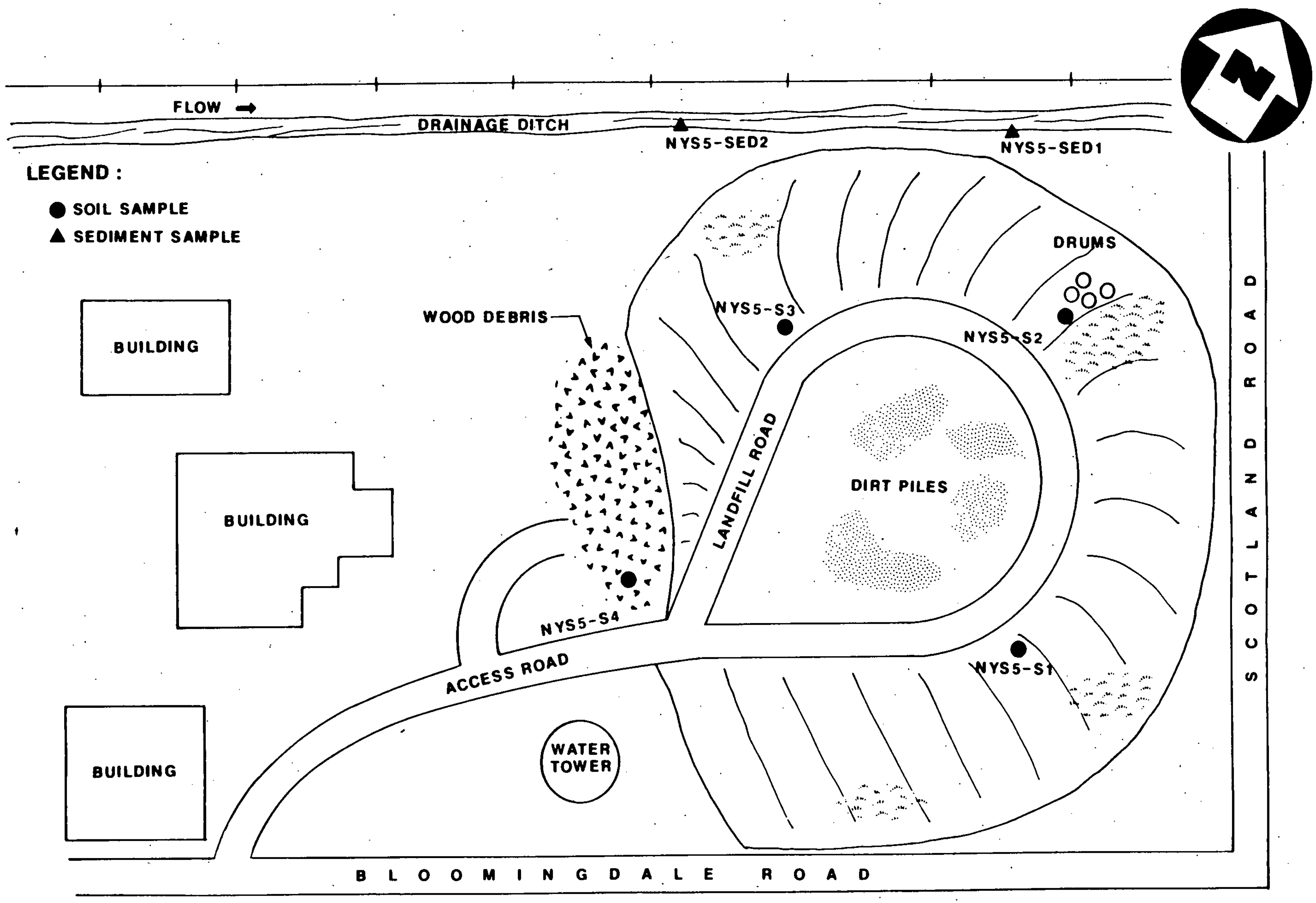


FIGURE 3

NUS CORPORATION
A Halliburton Company

SAMPLE LOCATION MAP

WHITING DEVELOPMENT CORP., NEWSTEAD, N.Y.

(NOT TO SCALE)

WHITING DEVELOPMENT CORP.
NEWSTEAD, NEW YORK
TDD# 02-8603-34A
JUNE 13, 1986

PHOTOGRAPH INDEX

WHITING DEVELOPMENT CORP.
NEWSTEAD, NEW YORK
TDD# 02-8603-34A
JUNE 13, 1986

PHOTOGRAPH INDEX

ALL PHOTOGRAPHS TAKEN BY JOE MAYO

Photo Number	Description	Time
1P-1	Collection of soil sample NYS5-S1 on the east side of the landfill, 20 yards east of the access road. Sampler: Steve Maybury.	1012
1P-2	East face of the landfill in relation to Scotland Road with farmlands in background.	1019
1P-3	Collection of soil sample NYS5-S2 on the north end of the landfill near a drum. Sampler: Steve Maybury.	1032
1P-4	Three drums found on the landfill, 20 feet north of sample location NYS5-S2.	1037
1P-5	Looking northwest from the top of the landfill showing the landfill in relation to the railroad tracks. Wetland area is in background.	1045
1P-6	Collection of sediment sample NYS5-SED1 in a drainage ditch adjacent to the railroad tracks at the base of the north face of the landfill. Sampler: Dennis Sutton.	1100
1P-7	Collection of soil sample NYS5-S3 on the face of a pile on the east side of the landfill, adjacent to the landfill road. Sampler: Dennis Sutton.	1111
1P-9	Collection of sediment sample NYS5-SED2 in drainage ditch near woodpiles, 10 feet east of railroad tracks. Sampler: Steve Maybury.	1125
1P-10	Collection of soil sample NYS5-S4 at the base of the landfill near woodpiles. Sampler: Dennis Sutton.	1137
1P-11	Decontamination operations at the Whiting Development site.	1140

NUS CORPORATION

WHITING DEVELOPMENT CORP., NEWSTEAD, NEW YORK

1P-1 June 13, 1986 1012
Collection of soil sample NYS5-S1 on the east side of the landfill, 20 yards east of the access road.
Sampler: Steve Maybury. Photographer: Joe Mayo.

1P-2 June 13, 1986 1019
East face of the landfill in relation to Scotland Road with farmlands in background.
Photographer: Joe Mayo.

WHITING DEVELOPMENT CORP., NEWSTEAD, NEW YORK

1P-3 June 13, 1986 1032

Collection of soil sample NYS5-S2 on the north end of the landfill near a drum.

Sampler: Steve Maybury. Photographer: Joe Mayo.

1P-4 June 13, 1986 1037

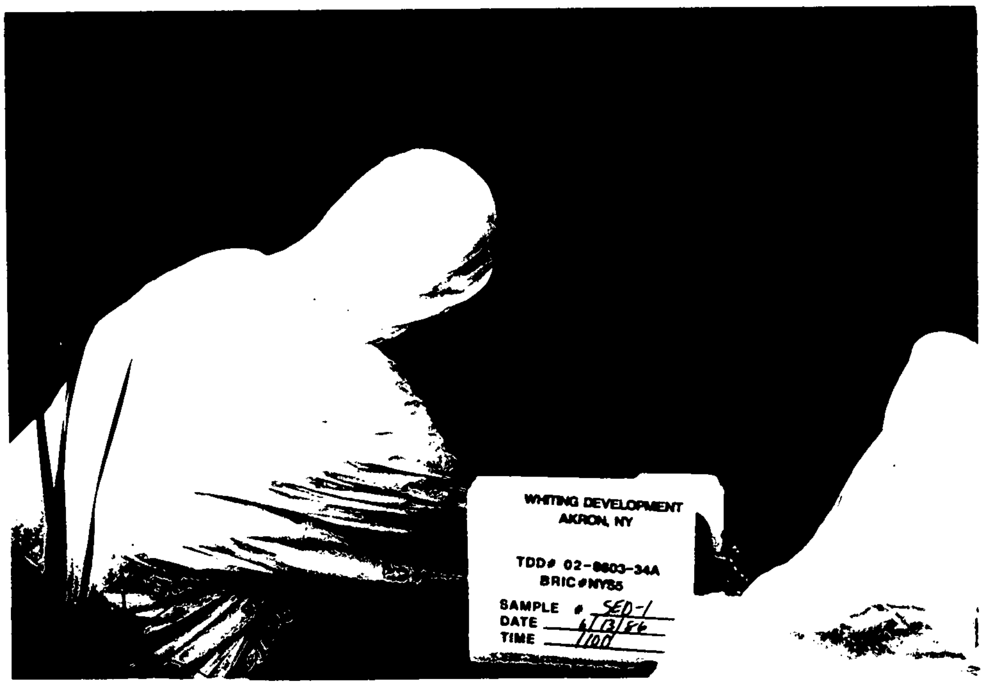
Three drums found on the landfill, 20 feet north of sample location NYS5-S2.

Photographer: Joe Mayo.

NUS CORPORATION

WHITING DEVELOPMENT CORP., NEWSTEAD, NEW YORK

1P-5 June 13, 1986 1045
Looking northwest from the top of the landfill showing the landfill in relation to the railroad tracks. Wetland area is in background. Photographer: Joe Mayo.



1P-6 June 13, 1986 1100
Collection of sediment sample NYS5-SED1 in a drainage ditch adjacent to the railroad tracks at the base of the north face of the landfill. Sampler: Dennis Sutton. Photographer: Joe Mayo.

NUS CORPORATION

WHITING DEVELOPMENT CORP., NEWSTEAD, NEW YORK

1P-7 June 13, 1986 1111
Collection of soil sample NYS5-S3 on the face of a pile on the east side of the landfill, adjacent to the landfill road.
Sampler: Dennis Sutton. Photographer: Joe Mayo.

1P-9 June 13, 1986 1125
Collection of sediment sample NYS5-SED2 in drainage ditch near woodpiles, 10 feet east of railroad tracks.
Sampler: Dennis Sutton. Photographer: Joe Mayo.

NUS CORPORATION

WHITING DEVELOPMENT CORP., NEWSTEAD, NEW YORK

1P-10 June 13, 1986 1137
Collection of soil sample NYS5-S4 at the base of the landfill near woodpiles.
Sampler: Dennis Sutton. Photographer: Joe Mayo.

1P-11 June 13, 1986 1140
Decontamination operations at the Whiting Development site.
Photographer: Joe Mayo.

SECTION 4

DOCUMENTATION RECORDS FOR HAZARD RANKING SYSTEM

FIT QUALITY ASSURANCE TEAM
DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference. Include the location of the document.

FACILITY NAME: Whiting Development Corp.

13350 Bloomingdale Road

LOCATION: Newstead, New York

DATE SCORED: 8/20/86

PERSON SCORING: Joseph Mayo

PRIMARY SOURCE(S) OF INFORMATION (e.g., EPA region, state, FIT, etc.):

FIT Region II Library.

NYDEC files

EPA Contract laboratory data.

FACTORS NOT SCORED DUE TO INSUFFICIENT INFORMATION:

Air monitoring to detect the presence of specific air contaminants was not conducted at the site. Consequently, the air route of the MITRE model was scored a value of zero.

COMMENTS OR QUALIFICATIONS:

The fire and explosion route was not scored because field observations did not indicate a significant fire and explosion threat.

GROUNDWATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

Since groundwater samples were not collected from the site, observed release is scored a value of zero.

Ref: #2, #3

Rationale for attributing the contaminants to the facility:

* * *

2 ROUTE CHARACTERISTICS

__**Depth to Aquifer of Concern**__

Name/description of aquifer(s) of concern:

There are 4 surficial bedrock formations within a 3 mile radius of the site. Proceeding from north to south, they are: the Camillus Shale, Bertie Formation, Akron Dolostone and Onondaga Limestone. The Camillus Shale lies above the Lockport Dolomite and crops out south of where the dolomite is exposed. This formation consists primarily of gray shale with considerable amounts of limestone, dolomite and gypsum interbedded with the shale. As a source of water supply, it is the most productive bedrock aquifer in the area. The remaining three formations, the Bertie Formation, Akron Dolostone and Onondaga Limestone, are collectively termed the "limestone unit". These formations are composed of dolomite, dolomitic limestone and limestone which are occasionally interbedded with shale. The Akron Dolomite often contains sandy sediments derived from the erosion of stream channels. The yields of wells in these formations are generally less than those in the Camillus Shale.

For purposes of HRS scoring, all the above formations are considered to be part of the same aquifer. There is no evidence available which indicates the presence of confining layers between the formations and since these are bedrock formations in

which groundwater flows through bedding planes and solution cavities, these formations are considered to be hydraulically connected.
Ref: #1, #4

Depth(s) from the ground surface to the highest seasonal level of the saturated zone water table(s) of the aquifer of concern:
Depth to groundwater was not available on the site. Depth to water in the nearest well, 1.1 miles to the northeast and drilled in the Camillus Shale, is 14.9 ft.
Ref: #3, #4

Depth from the ground surface to the lowest point of waste disposal/storage:
Contaminants were detected in a sediment sample in a ditch adjacent to an on-site gypsum landfill. Since the sample was collected at the surface the depth to the lowest point of waste disposal is 0 feet.
Ref: #2, #3

<u>Net Precipitation</u>

Mean annual or seasonal precipitation (list months for seasonal):
Mean annual percipitation is 32 inches.
Ref: #3

Mean annual lake or seasonal evaporation (list months for seasonal):
Mean annual lake evaporation is 26 inches.
Ref: #3

Net precipitation (subtract the above figures):
6 inches.

<u>Permeability of Unsaturated Zone</u>

Soil type in unsaturated zone:
The unsaturated zone in the area of the site is glacial till. This material is composed of nonsorted rock material deposited from glacial ice, generally forming a thin mantle over bedrock. The till has a low permeability and will yield only small water supplies from large diameter wells.
Ref: #1

Permeability associated with soil type:

Permeability associated with these deposits is generally less than 10^{-7} cm/sec.

Ref: #1

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Contaminants were detected in a sediment sample collected in a ditch adjacent to the on-site landfill. The physical state of the substances at the time of disposal is unknown. Since the hazardous substances were detected in a sediment sample, they are not consolidated or stabilized. Physical state is scored a value of 1, solid, unconsolidated or unstabilized.

Ref: #2, #3

3 CONTAINMENT

<u>Containment</u>

Method(s) of waste or leachate containment evaluated:

Uncontained contaminants detected in a sediment sample adjacent to the landfill.

Ref: #2

Method with highest score:

Uncontained soil contaminants. Assign a value of 3.

Ref: #3

4 WASTE CHARACTERISTICS

<u>Toxicity and Persistence</u>

Compound(s) evaluated:

Naphthalene	Phenanthrene
2-Methylnaphthale	Benzo(a)Pyrene
Tetrachloroethene	Benzo(k)Fluoranthene
Mercury	

Ref: #10

Compound with highest score:

Benzo(a)pyrene has a toxicity/persistence value of 18.

Ref: #3

<u>Hazardous Waste Quantity</u>

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

Uncontained Hazardous Substance List (HSL) constituents were found in a sediment sample from the site. Hazardous waste quantity is unknown. Score a value of 1.

Ref: #3, #10

Basis of estimating and/or computing waste quantity:

Hazardous waste quantity is unknown.

Ref: #2

5 TARGETS

<u>Groundwater Use</u>

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Groundwater within 3 miles of the facility is used for domestic, agricultural and commercial purposes.

Ref: #1

<u>Distance to Nearest Well</u>

Location of nearest well drawing from <u>aquifer of concern</u> or occupied building not served by a public water supply:

The nearest well is located 1.1 miles from the site.

Ref: #1

Distance to above well or building:

1.1 miles.

Ref: #1, #5

<u>Population Served by Groundwater Wells Within a 3-Mile Radius</u>

Identified water-supply well(s) drawing from <u>aquifer(s) of concern</u> within a 3-mile radius and populations served by each:

See the following attachment, "Wells within a 3-mile radius of Whiting Development Corp." Counting only domestic wells, the population severed is: 5 wells x 3.8 persons/well=19 persons.

Ref: #1

Computation of land area irrigated by supply well(s) drawing from <u>aquifer(s) of concern</u> within a 3-mile radius, and conversion to population (1.5 people per acre).

Supply wells within a 3 mile radius of the site are not used for irrigation. Dairy farm and agricultural wells in the area are used for watering livestock.

Ref: #1

Total population served by groundwater within a 3-mile radius:

Total population served by groundwater is 19.

WELLS WITHIN A 3 MILE RADIUS OF WHITING DEVELOPMENT CORP.

Location	Total Depth (ft.)	Depth of Groundwater (Ft)	Well Type	Use	Depth to Bedrock	Water Bearing Material	Owner	Comments
300-826-1	53	16.3	DRL	D	___	Limestone	E. Vanalstine	
300-826-2	30	9.1	DRL	D	___	"	A. Bettio	___
300-827-1	120	45	DRL	D	___	"	L. Weaver	___
302-825-1	49	20	DRL	D	___	Camillus Shale	C. Moses	Yield 20gpm
303-826-1	26.7	20.2	DRL	D	___	"	J. Patterson	Yield 10gpm
303-828-1	39.4	12.0	DRL	Ag	___	Sand	J. Laughlin	Used for watering stock.
303-829-1	25.8	14.9	DRL	C	___	Camillus Shale	Dade Farms Country Club	___
303-830-1	18.2	10.3	DRL	F	___	Sand and Gravel	G. Cook	___

USE CODES:
- D - Domestic
- Ag - Agricultural
- F - Dairy Farm
- C - Commercial

WELL TYPE: DRL - Drilled

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

The analytical results of samples collected from the drainage ditch were insufficient to document an observed release.

Rationale for attributing the contaminants to the facility:

* * *

2 ROUTE CHARACTERISTICS

<u>**Facility Slope and Intervening Terrain**</u>

Average slope of facility in percent:

Facility slope is 0%. Contaminants were detected in a sediment sample on the site.

Ref: #2, 3, 10

Name/description of nearest downslope surface water:

The nearest downslope surface water is Ledge Creek which is located 0.6 miles northeast of the site.

Ref: #5

Average slope of terrain between facility and above-cited surface water body in percent:

Average slope is: $\frac{670 \text{ ft.} - 665 \text{ ft.}}{3168 \text{ feet}} \times 100 = 0.16\%$

Ref: #5

Is the facility located either totally or partially in surface water?

No. The facility is not in surface water.

Ref: #5

Is the facility completely surrounded by areas of higher elevation?

No. The general slope of the topography is from southeast to northwest toward Tonawanda Creek.

Ref: #5

<u>1-Year 24-Hour Rainfall in Inches</u>

One-year 24-hour rainfall is 2 inches.

Ref: #3

<u>Distance to Nearest Downslope Surface Water</u>

Ledge Creek is 0.6 mi. northeast of the site.

Ref: #5

<u>Physical State of Waste</u>

The physical state of the substances at the time of disposal is unknown. Since the hazardous substances were detected in a sediment sample collected in a ditch adjacent to the landfill, they cannot be considered consolidated or stabilized. Physical state is scored a value of 1, solid, unconsolidated or unstabilized.

Ref: #2, 3, 10

* * *

3 CONTAINMENT

<u>Containment</u>

Method(s) of waste or leachate containment evaluated:

Uncontrolled hazardous substances were detected in a sediment sample adjacent to the landfill.

Ref: #2, 10

Method with highest score:

Uncontrolled soil contaminants. Score a value of 3.

Ref: #3

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

Napthalene	Phenanthrene
2-Methylnaphthalene	Benzo(a)Pyrene
Tetrachloroethene	Benzo(k)Fluoranthene
Mercury	

Ref: #10

Compound with highest score:

Benzo(a)Pyrene has a toxicity/persistence value of 18.

Ref: #3

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

Uncontained Hazardous Substance List (HSL) constituents were found in a sediment sample collected from the site. The hazardous waste quantity is unknown. Score a value of 1.

Ref: #3, 10

Basis of estimating and/or computing waste quantity:

The hazardous waste quantity is unknown.

* * *

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

The New York State Department of Environmental Conservation has classified Ledge Creek as a Class C surface water with a CT designation. Class C waters are suitable for fishing and other uses except as a source of drinking water and primary contact recreation. The CT designation indicates that the stream is known to be a trout spawning stream with specific physical and chemical properties.

Ref: #7

Is there tidal influence?

No. The site is well inland.

Ref: #5

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

There are no coastal wetlands within 2 miles of the site.

Ref: #5

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

There is a wetland area 0.2 mi. north of the site.

Ref: #5

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

There are no critical habitats or national wildlife refuges within 1 mile of the site.

Ref: #8

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

The population served is 0. Ledge Creek is not used as a source of water supply or for irrigation.

Ref: #6, 7

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

Ledge Creek is not used for irrigation.

Ref: #6, 7

Total population served:

Total population served is zero.

Name/description of nearest of above water bodies:

Not applicable.

Distance to above-cited intakes, measured in stream miles.

Not applicable.

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:

No air contaminants that were attributable to the site were detected during the site investigation.

Ref: #2

Date and location of detection of contaminants

Not applicable.

Methods used to detect the contaminants:

Not applicable.

Rationale for attributing the contaminants to the site:

Not applicable.

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Not applicable.

Most incompatible pair of compounds:

Not applicable.

Toxicity

Most toxic compound:

Not applicable.

Hazardous Waste Quantity

Total quantity of hazardous waste:

Not applicable.

Basis of estimating and/or computing waste quantity:

Not applicable.

* * *

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi	0 to 1 mi	0 to 1/2 mi	0 to 1/4 mi

Not applicable.

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Not applicable.

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Not applicable.

Distance to critical habitat of an endangered species, if 1 mile or less:
Not applicable.

Land Use

Distance to commercial/industrial area, if 1 mile or less:
Not applicable.

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:
Not applicable.

Distance to residential area, if 2 miles or less:
Not applicable.

Distance to agricultural land in production within past 5 years, if 1 mile or less:
Not applicable.

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:
Not applicable.

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?
Not applicable.

FIRE AND EXPLOSION

1 CONTAINMENT

Hazardous substances present:

The fire and explosion route was not scored because field observations did not indicate a significant fire and explosion threat.

Ref: #2

Type of containment, if applicable:

* * *

2 WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

Ignitability

Compound used:

Reactivity

Most reactive compound:

Incompatibility

Most incompatible pair of compounds:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

Basis of estimating and/or computing waste quantity:

* * *

3 TARGETS

Distance to Nearest Population

Distance to Nearest Building

Distance to Sensitive Environment

Distance to wetlands:

Distance to critical habitat:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

<u>Population Within 2-Mile Radius</u>

<u>Buildings Within 2-Mile Radius</u>

DIRECT CONTACT

1 OBSERVED INCIDENT

Date, location, and pertinent details of incident:

There are no known observed incidents of direct contact.

Ref: #2

* * *

2 ACCESSIBILITY

Describe type of barrier(s):

There are no barriers. The site is not fenced and the eastern border of the landfill is 10-20 ft. from Scotland Road. Score a value of 3.

Ref: #2, 3

* * *

3 CONTAINMENT

Type of containment, if applicable:

Contaminants are present in sediment on the facility property. Score a value of 15.

Ref: #2, 3, 10

* * *

4 WASTE CHARACTERISTICS

<u>Toxicity</u>

Compounds evaluated:

Naphthalene	Phenanthrene
2-Methylnaphthalene	Benzo(a)Pyrene
Tetrachloroethene	Benzo(k)Pyrene
Mercury	

Ref: #10

Compound with highest score:

Benzo(a)Pyrene has a toxicity value of 3.

Ref: #3

5 TARGETS

Population Within One-Mile Radius

Population within one mile is 376 people.

Ref: #9

Distance to Critical Habitat (of Endangered Species)

No critical habitat of endangered species is located within 3 miles of the site.

Ref: #2, 8

SECTION 5

HAZARD RANKING SYSTEM SCORING FORMS

Removed

SECTION 6

BIBLIOGRAPHY OF INFORMATION SOURCES

BIBLIOGRAPHY OF INFORMATION SOURCES

HRS MODEL

	SOURCE	LOCATION
1.	La Sala, Jr., A.M., Groundwater Resources of the Erie-Niagara Basin, New York. U.S. Department of the Interior, Geological Survey and N.Y. Conservation Department, Division of Water Resources. Basin Planning Report ENB-3. 1968.	NUS Corp. Edison, NJ
2.	Site Inspection of Whiting Development Corp. conducted on 6/13/86 by NUS Corp., Region II FIT.	NUS Corp. Edison, NJ
3.	MITRE Corporation, 1984. Uncontrolled Hazardous Waste Site Ranking System. A User's Manual. Prepared for U.S. Environmental Protection Agency.	NUS Corp. Edison, NJ
4.	Buchler, EJ., and Tesmer, I.H., Geology of Erie County New York. Buffalo Society of Natural Sciences Bulletin, Vol. 21, No. 3, 1963.	NUS Corp. Edison, NJ
5.	U.S. Geological Survey Maps, 7.5 minute series. Akron and Wolcottsville, New York Quadrangles, edited 1981 and 1980 respectively.	NUS Corp. Edison, NJ
6.	Telecon Note: Telephone conservation between Mr. Ed Paolini of the Erie County Health Department and Joseph Mayo of NUS Corp. on 9/2/86.	NUS Corp. Edison, NJ
7.	Telecon Note: Telephone conversation between Tom Wantuck of N.Y. Department of Environmental Conservation and Joseph Mayo of NUS Corp. on 9/4/86.	NUS Corp. Edison, NJ
8.	U.S. Fish and Wildlife Service List of Endangered and Threatened Wildlife and Plants, CFR 17.11, 17.12 10/1/83, Revised 1/9/85.	NUS Corp. Edison, NJ
9.	General Software Corp., 1984. Graphical Exposure Modeling System (GEMS) Prepared for U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances.	NUS Corp. Edison, NJ
10.	U.S. EPA Contract Laboratory Program, Organic and Inorganic Laboratory analysis data for case# 6062.	NUS Corp. Edison, NJ

SECTION 7

PRESS RELEASE SUMMARY–MITRE HAZARD RANKING SYSTEM

SUMMARY STATEMENT
WHITING DEVELOPMENT CORPORATION
NEWSTEAD, NEW YORK

Whiting Development Corporation is currently a small industrial park located in Newstead, Erie County, New York. The site was formerly owned by Georgia Pacific Corporation who operated a landfill on the property for the disposal of gypsum wastes from their wallboard manufacturing process. The landfill is currently inactive.

The landfill is approximately 20-25 ft. high and 3-4 acres in area. It is composed primarily of gypsum wastes with wood, paper, tires and drums as minor components. Some of the landfilled waste has been excavated and used as cover material for the Township of Newstead landfill.

The area arround the facility is sparsely populated. Approximately 5900 people live within 3 miles of the facility and most of them are in the Town of Akron, 0.5 miles to the southwest. Major potential for population exposure is via contaminant migration to groundwater and from fugitive dusts from the landfill.

The New York Department of Environmental Conservation (NYDEC) indicated that the landfill had not been closed according to Resource Conservation and Recovery Act (RCRA) standards and reclamation of the landfill material for cover and fill should not exempt the site from compliance with RCRA standards. The NYDEC also indicated there was a potential for fugitive dust generation associated with the reclamation process. No enforcement actions have been taken against Whiting Development Corporation.

On 6/13/86 a site inspection was conducted at the Whiting Development Corporation. Four soil and two sediment samples were collected from the landfill area. Volatile organic compounds and polycyclic aromatic hydrocarbons (PAH's) were detected in a sediment sample collected in a ditch adjacent to the landfill.

SECTION 8

ATTACHMENTS-CITED DOCUMENTS

REFERENCE #1

Erie-Niagara Basin

Ground-Water Resources

ERIE-NIAGARA BASIN REGIONAL WATER RESOURCES PLANNING BOARD

THE NEW YORK STATE WATER RESOURCES COMMISSION

CONSERVATION DEPARTMENT • DIVISION OF WATER RESOURCES

ENB-3

GROUND-WATER RESOURCES OF THE ERIE-NIAGARA BASIN, NEW YORK

EXCELSIOR

Prepared for the
Erie-Niagara Basin Regional Water Resources
Planning Board

by

A. M. La Sala, Jr.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
in cooperation with
THE NEW YORK STATE CONSERVATION DEPARTMENT
DIVISION OF WATER RESOURCES

STATE OF NEW YORK
CONSERVATION DEPARTMENT
WATER RESOURCES COMMISSION

Basin Planning Report ENB-3
1968

INTRODUCTION

PURPOSE AND SCOPE

This report presents the results of an investigation by the U.S. Geological Survey conducted for the Erie-Niagara Basin Regional Water Resources Planning Board. The area of study, called "Erie-Niagara basin" in this report, extends from the Cattaraugus Creek basin on the south to the Tonawanda Creek basin on the north, and includes Grand Island as shown in figure 1.

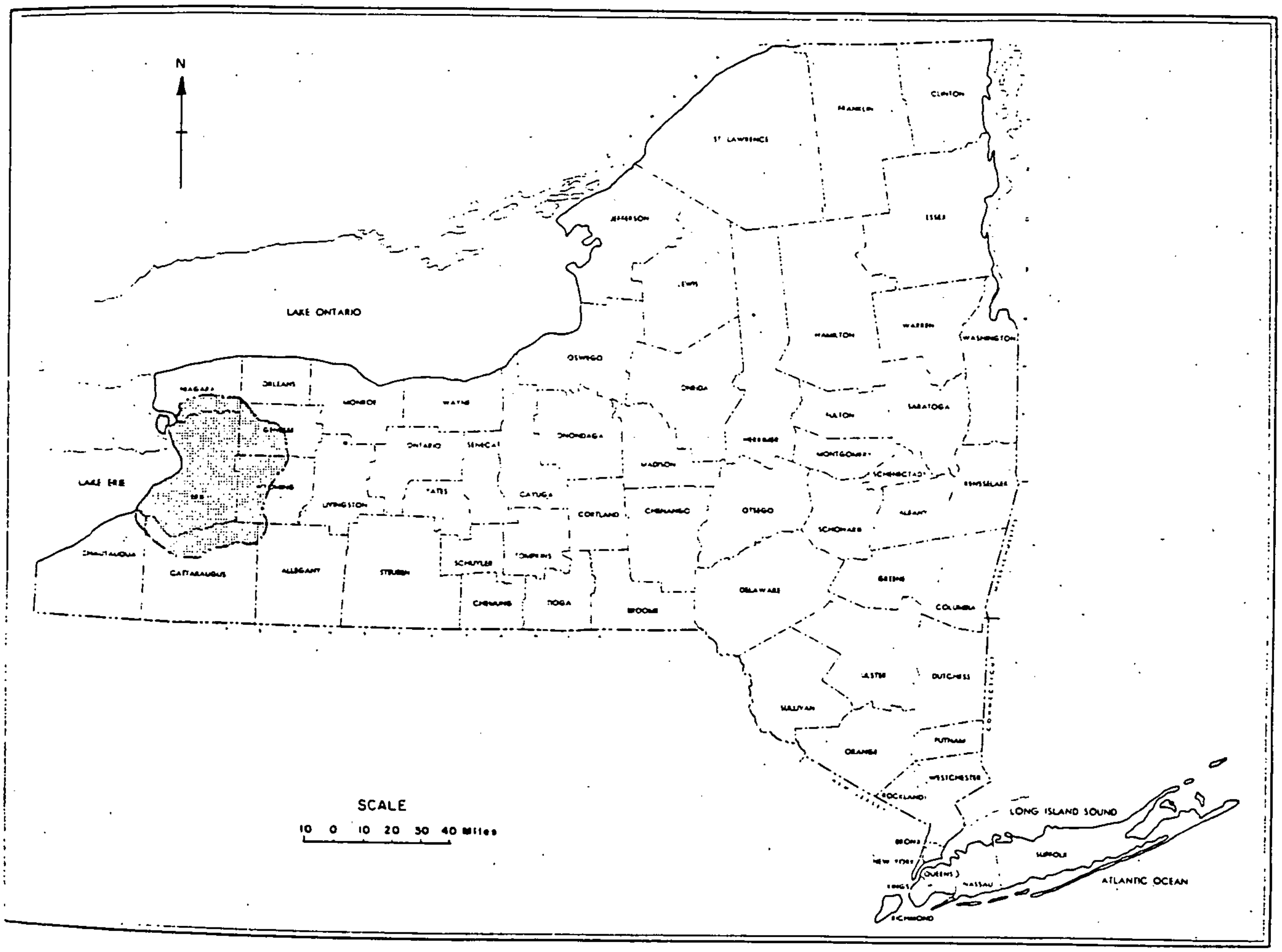


Figure 1.--Location map of the Erie-Niagara basin.

The plan of study called for the Geological Survey to provide the Planning Board with an evaluation of the ground-water resources of the Erie-Niagara basin and a description of the geology to the extent required for broad planning of water-resources development. Evaluation of the ground-water resources included appraising the quantity and quality of water available for development, its areal distribution, and seasonal variations. Existing and potential pollution and their effect on the availability of ground water were also included in the work.

The Geological Survey's investigations followed several lines of attack, and the most important of these are described below.

A major endeavor was to define the areal extent, lithology, thickness, and water-bearing properties of the geologic units. The unconsolidated deposits were mapped during field-reconnaissance studies (pl. 3). A previously published map of unconsolidated deposits (Kindle and Taylor, 1913) was available for a northern segment of the area and this mapping was slightly revised for the present report. Geologic maps and descriptions of the bedrock units were previously published (Broughton and others, 1962) and further bedrock mapping was not required for this report. About 400 wells and several springs distributed through the various geologic units were inventoried in order to define the water-bearing properties of the units. The data for all wells and springs mentioned in this report or indicated on maps are given in tables 6 and 7, respectively. Data on wells collected during previous studies of the Buffalo area (Reck and Simmons, 1952) and of the Western New York Nuclear Service Center site at Ashford were also used. Hydraulic properties of the more productive water-bearing units were studied by means of specific-capacity and pumping-test data.

The quantity of ground water discharging to the streams was estimated from streamflow data and the fluctuations of ground-water levels. The quantity of ground water available for development in the principal unconsolidated aquifers was estimated from data on ground-water discharge, geology, and topography.

Data on the chemical quality of ground water were obtained by sampling wells and streams at base flow. The analytical results for about 270 samples from about 250 wells are given in this report in tables 8 and 9. Chemical analyses of streamflow are given by Archer and others (1968). The New York State Division of Water Resources facilitated the evaluation of ground-water pollution by providing data on sanitary analyses of samples from more than 700 wells that were made by the several County Health Departments of the area.

WELL-NUMBERING AND LOCATION SYSTEM

The wells, springs, and miscellaneous sites of geologic or hydrologic information described in this report are numbered according to a grid system based on latitude and longitude. The Erie-Niagara basin lies between latitude 42°16' and 43°11'N. and between longitude 78°06' and 79°03'W. The grid is composed of quadrangles of 1 minute of latitude and

and longitude. Each well number consists of three parts: first, the digits of latitude, such as 231 for 42°31' (omitting the digit "4"); second, the digits of longitude, such as 842 for 78°42' (omitting the digit "7"); and, third, the number assigned to the well with the 1-minute quadrangle. The complete well number of the first well listed within the 1-minute quadrangle described above is 231-842-1, as illustrated in plate 1. The location of each well is indicated by a circle in the plate. Where two or more wells are close together, a single circle is used to mark their locations and the last digits of the well numbers, set off by commas, are given as illustrated in plate 1 for wells 230-840-1 and -2.

A spring is numbered by the same system used for wells, except that the letters Sp are added, such as with spring 229-842-1Sp (pl.1). A site at which only geologic or miscellaneous observations were made is identified by a letter following the grid numbers, such as 221-840-A. Springs and miscellaneous sites are also distinguished by different location symbols as shown in plate 1.

On the well-location map in this report (pl.1), the three-digit numbers of latitude and longitude designations are shown along the margin of the map, and only the number of the site within each 1-minute quadrangle is shown with the appropriate well, spring, or miscellaneous-site symbol.

GEOLOGY AND TOPOGRAPHY

The Erie-Niagara basin is underlain by layers of sedimentary bedrock which are largely covered with unconsolidated deposits. Descriptions of the various bedrock units are given in figure 2. The bedrock consists mainly of shale, limestone, and dolomite; the Camillus Shale contains a large amount of interbedded gypsum. All the bedrock units were built up by fine-grained sediments deposited in ancient seas during the Silurian and Devonian Periods and, therefore, are bedded or layered. The dip of the rocks (inclination of the bedding planes) is gently southward at from 20 to 60 feet per mile, but the average dip is between 30 and 40 feet per mile. The dip is so gentle that it is hardly perceptible in outcrops.

The unconsolidated deposits are mostly glacial deposits formed during Pleistocene time about 10,000-15,000 years ago when an ice sheet covered the area. The glacial deposits consist of: (1) till, which is a nonsorted mixture of clay, silt, sand, and stones deposited directly from the ice sheet; (2) lake deposits, which are bedded clay, silt, and sand that settled out in lakes fed by the melting ice; and (3) sand and gravel deposits, which were laid down in glacial streams. The glacial sand and gravel deposits are of both the ice-contact and outwash types, as will be explained later in the report. The glacial deposits generally are less than 50 feet thick in the northern part of the basin. They are considerably thicker in some valleys in the southern part and reach a maximum known thickness of 600 feet near Chaffee. Other unconsolidated deposits are alluvium formed by streams in Recent times and swamp deposits formed by accumulation of decayed plant matter in poorly drained areas.

Relief of the present land surface is due to preglacial erosion of the bedrock and subsequent topographic modification by glaciation. In contrast to the southward dip of the rocks, the land surface rises to the south largely because preglacial erosion was more vigorous in the northern part of the basin. The shale in the southern part of the basin is somewhat more resistant to erosion than the rocks in the northern part of the basin but not significantly so. Figure 3 shows the relationship of the topography and rock structure and delineates the two topographic provinces of the basin: the Erie-Ontario Lowlands and the Appalachian Uplands. The rocks crop out in belts which trend generally east-west. The bedrock geologic map, plate 2, shows that the outcrop belts bend around to the southwest near Lake Erie. They assume this direction mainly because relatively intense erosion in the Erie-Ontario Lowland near Lake Erie has exposed the rock at lower elevations than farther east. The Lockport Dolomite and the Onondaga Limestone, because they are relatively resistant to erosion, form low ridges in the northern part of the basin. Tonawanda, Murder, and Ellicott Creeks descend the escarpment of the Onondaga at falls and cataracts.

In the hilly southern half of the basin (the Appalachian Uplands), preglacial valleys, deepened by glacial erosion, are cut into the shale. The valleys are partly filled with glacial deposits so that some of the present streams flow 200 to 600 feet above the bedrock floors of the valleys as shown in figure 3.

System	Series	Group	Formation	Thickness in feet	Section	
Devonian	Upper	Conneaut Group of Chadwick (1934)		500		Shale, siltstone, and fine-grained sandstone. Top is missing in area.
Devonian	Upper	Canadaway Group of Chadwick (1933)	Undivided	600		Gray shale and siltstone, interbedded. (section broken to save space)
Devonian	Upper	Canadaway Group of Chadwick (1933)	Perrysburg	400-450		Gray to black shale and gray siltstone containing many zones of calcareous concretions. Lower 100 feet of formation is olive-gray to black shale and interbedded gray shale containing shaly concretions and pyrite.
Devonian	Upper		Java	90-115		Greenish-gray to black shale and some interbedded limestone and zones of calcareous nodules. Small masses of pyrite occur in the lower part.
Devonian	Upper		West Falls	400-520		Black and gray shale and light-gray siltstone and sandstone. The lower part is petroliferous. Throughout the formation are numerous zones of calcareous concretions, some of which contain pyrite and marcasite.
Devonian	Upper		Sonyea	45-85		Olive-gray to black shale.
Devonian	Upper		Genesee	10-20		Dark-gray to black shale and dark-gray limestone. Beds of nodular pyrite are at base.
Devonian	Middle	Hamilton	Moscow Shale	12-55		Gray, soft shale.
Devonian	Middle	Hamilton	Ludlowville Shale	65-130		Gray, soft, fissile shale and limestone beds at top and bottom.
Devonian	Middle	Hamilton	Skaneateles Shale	60-90		Olive-gray, gray and black, fissile shale and some calcareous beds and pyrite. Gray limestone, about 10 feet thick is at the base.
Devonian	Middle	Hamilton	Marcellus Shale	30-55		Black, dense fissile shale.
Devonian	Middle	Unconformity	Onondaga Limestone	108		Gray limestone and cherty limestone.
Silurian	Cayuga	Unconformity	Akron Dolomite	8		Greenish-gray and buff fine-grained dolomite.
Silurian	Cayuga	Salina	Bertie Limestone	50-60		Gray and brown dolomite and some interbedded shale.
Silurian	Cayuga	Salina	Camillus Shale	400		Gray, red, and green thin-bedded shale and massive mudstone. Gypsum occurs in beds and lenses as much as 5 feet thick. Subsurface information indicates dolomite (or perhaps, more correctly, magnesian-lime mudrock) is interbedded with the shale (shown schematically in section). South of the outcrop area, at depth, the formation contains thick salt beds.
Silurian	Niagara		Lockport Dolomite	150		Dark-gray to brown, massive to thin-bedded dolomite, locally containing algal reef and gypsum nodules. At the base are light-gray limestone (Gasport Limestone Member) and gray shaly dolomite (DeCew Limestone Member).
Silurian	Niagara	Clinton	Rochester Shale	60		Dark-gray calcareous shale.

Figure 2.--Bedrock units of the Erie-Niagara basin.

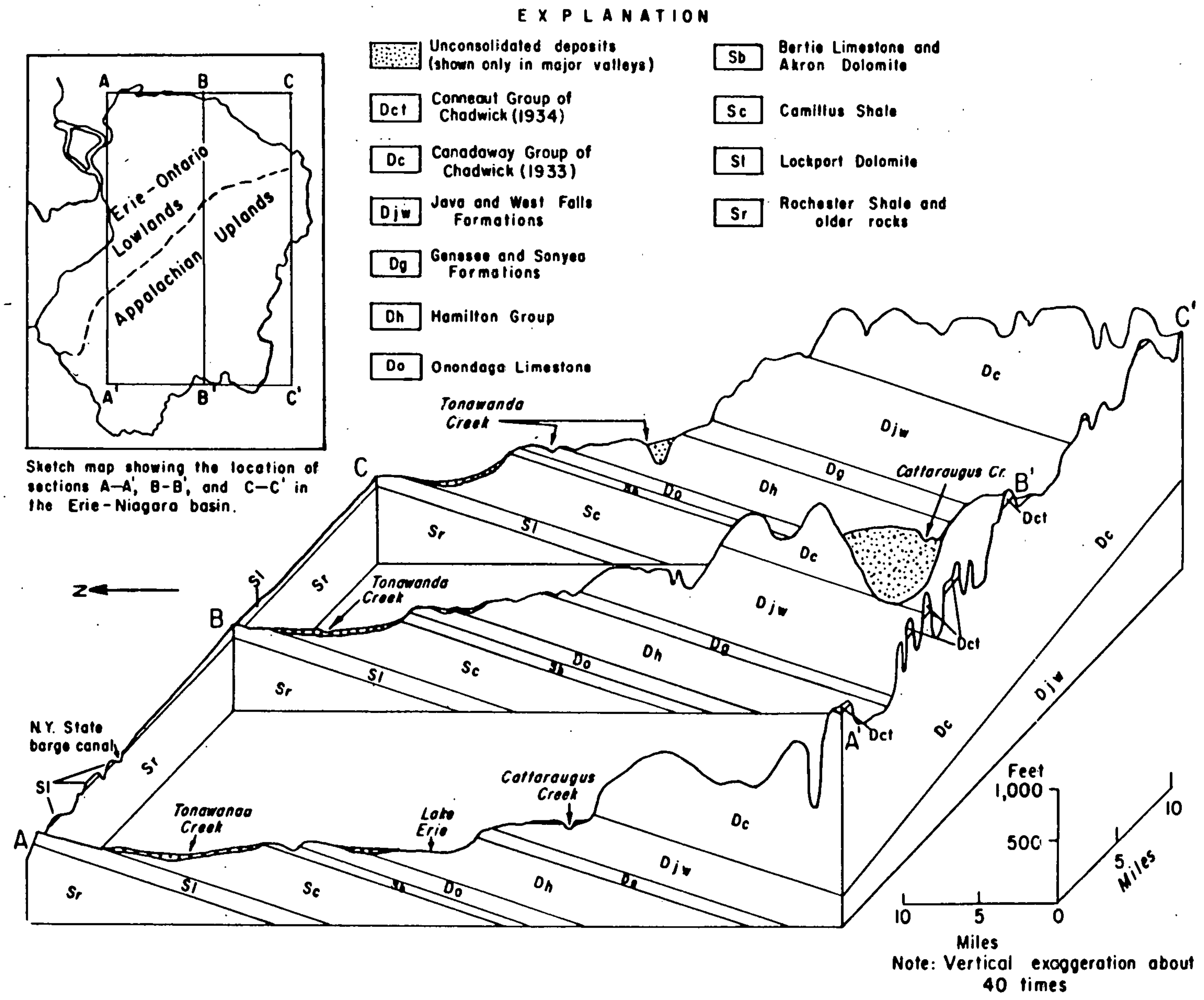


Figure 3.--Fence diagram of part of the Erie-Niagara basin.

OCCURRENCE OF GROUND WATER

Ground water is commonly thought of as water that comes from wells and springs. This definition makes the essential point and distinguishes ground water from other subsurface water. Water wells provide the most easily obtainable information on ground-water resources, but the information can be misleading. A casual inspection of a body of random data on wells in the area may lead to the notion that ground water occurs in a haphazard fashion. For example, it is apparent from the data in table 6 that wells vary greatly in depth and yield. Depths range from about 10 to 500 feet, and yields from a few gallons per day to more than 1,000 gpm. What is more, wells of large yield are interspersed with wells of low yield. A more careful study of the data shows that some of the variations in well characteristics reflect differences in well construction rather than in the availability of ground water. A carefully planned and constructed public-supply well gives a more complete picture of water availability than does a driven well constructed for lawn watering. But after accounting for variations in well construction, profound differences in the availability of ground water are still apparent. These differences arise mainly from the geologic and topographic features of the basin.

Ground water occurs in the saturated zone of the earth's crust. The water in the saturated zone (ground water) fills the interconnected openings in the rocks and is under hydrostatic pressure. As shown in figure 4, ground water will flow through the zone of saturation following a course that takes it from a point of higher head to a point of lower head. In this way water entering the ground on a hill may discharge through a spring on the side of the hill, into a nearby stream, or into a river many miles away. When the water standing in a well is pumped out, the head (water level) in the well is lowered. Water from the saturated zone can then move toward the well in the same manner it moves toward points of natural discharge. Where the saturated zone is not overlain by impermeable materials, its upper surface is the water table. The depth to the saturated zone in the area varies from 0 feet in some swamps to possibly more than 75 feet along the edges of some glacial terraces.

The unsaturated materials over the saturated zone make up the zone of aeration, the zone in which the openings are partly filled with air (fig. 4). Water in the zone of aeration is held to the walls of the openings by molecular forces. This prevents the free movement of water in the zone of aeration; water in this zone drains slowly downward but not laterally. Wells and springs, therefore, cannot obtain water from the zone of aeration. The zone is important, however, because water must pass through it to reach the saturated zone.

The unconsolidated deposits and the bedrock differ markedly in the types of water-bearing openings they contain (fig. 4). The unconsolidated deposits are composed of grains packed together with open spaces, or pore spaces, between the grains. Water truly permeates the unconsolidated deposits because it can fill the myriad of tiny pore spaces between the grains.

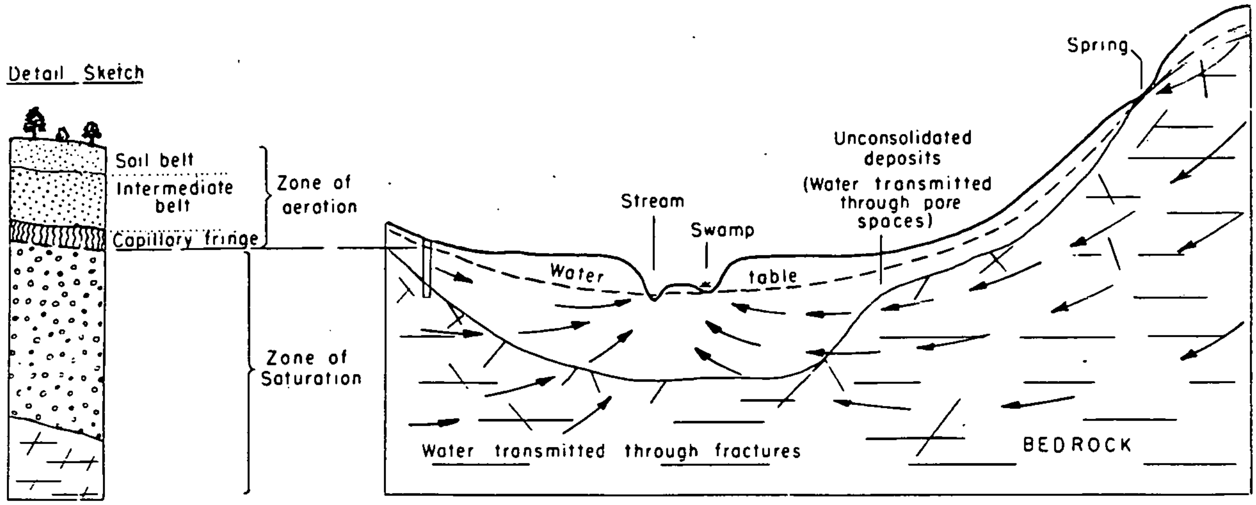


Figure 4.--Occurrence of ground water. Arrows show direction of ground-water movement.

The sediments composing the bedrock initially also contained pore spaces, but these pores were closed when the sediments were compacted and cemented. A solid piece of rock from any of the bedrock units in the area is nearly or completely impermeable. But in each of the units, masses of rock have separated along fractures. These fractures transmit ground water through the bedrock.

OCCURRENCE OF WATER IN BEDROCK

The principal water-bearing fractures in the bedrock are joints which are regularly arranged. They are caused by geologic forces acting through broad areas and occur in sets, all the joints of which are roughly parallel. In the Erie-Niagara basin, the rocks are cut typically by two sets of vertical joints. One set trends northeast and the other northwest, forming diamond-shaped patterns at the surface. These vertical joints are spaced from a few feet to perhaps 30 feet apart and may be 50 feet to a few hundred feet long at the surface. More important joints, however, are the horizontal ones that are parallel to the bedding planes of the rocks. These joints develop along planes of weakness between adjacent layers of rocks. The evidence suggests that bedding-plane joints are the principal water-bearing openings in the bedrock.

Faults, which are fractures along which adjacent masses of rock have been offset, may also provide openings for ground-water circulation. A fault trending south through Batavia is the only major one known in the area (pl. 2). However, other faults may exist but are not recognized because they are covered by the glacial deposits.

Still another factor in regard to the water-bearing openings in bedrock must be considered. Some of the rocks are relatively soluble in water; some are essentially insoluble. Ground water circulating through joints removes soluble material by dissolving it, thereby widening the joints and making them still better conduits for ground water. Such solution has enhanced considerably the water-bearing properties of the more soluble rocks.

On the basis of lithology and water-bearing properties, the numerous bedrock units in the Erie-Niagara basin can be divided into two groups: soluble bedrock and shale bedrock. Of the two, the soluble rocks are an important source of water, whereas the shale yields only small supplies.

The Lockport Dolomite, Camillus Shale, Bertie Limestone, Akron Dolomite, and Onondaga Limestone (fig. 2 and pl. 2) are composed of rock materials that are relatively soluble in water. Subsurface water has been relentlessly quarrying the rocks by solution, particularly during the 10,000 years or so since the ice sheet melted from the area. In more extensive and more weathered limestone terranes elsewhere, such as in Kentucky, this process has produced numerous caves and underground streams. In the Erie-Niagara basin, the same process is underway but has advanced only enough to widen considerably many of the water-bearing openings and to enhance the circulation of ground water.

Four of the five formations listed as soluble rocks are either limestone or dolomite. Limestone is composed mainly of the mineral calcite which is a natural form of calcium carbonate. Dolomite is composed of calcium-magnesium carbonate and is less soluble than limestone. Both rocks are attacked by acid. Water that percolates through soil generally dissolves carbon dioxide and, therefore, becomes a weak acid. The initial acidity gives ground water much of its ability to dissolve the carbonate rocks.

The fifth formation, the Camillus Shale, seems out of place listed with dolomite and limestone as a soluble rock. Shale is not by any stretch of the imagination a soluble rock. But the Camillus Shale is unique among the shale formations of the area because it contains a large proportion of gypsum, a calcium-sulfate mineral which is even more soluble than limestone. The gypsum is interbedded with and even diffused through the shale.

Except where removed by erosion, the soluble rocks lie one above another with the Lockport Dolomite on the bottom, the Camillus Shale in the middle, and the Bertie, Akron, and Onondaga on top. For hydrologic purposes the Bertie, Akron, and Onondaga can be considered to form a single aquifer or water-bearing unit, which is called the limestone unit. (These three formations are distinct in a geologic sense but not in a broad hydrologic sense.) All the soluble rocks dip (are inclined) southward at about 40 feet to the mile.

The soluble rocks are bounded top and bottom by shale formations of much lower permeability. The Rochester Shale is at the base of the Lockport Dolomite, and the Marcellus Shale overlies the Onondaga Limestone.

The water-bearing properties of the soluble rocks developed to a large degree in response to the composition of the rocks (lithology) and the primary sedimentary structures (bedding). The soluble rocks are composed of dense materials that are innately not water bearing. These rocks transmit water only through fractures and solution openings. The nature of the water-bearing openings can be studied both from exposures of the rocks and from data on wells. How good any unit is as a source of water can be judged from records of wells. All of these hydrologic properties and characteristics for each rock unit will be discussed in the following sections.

LOCKPORT DOLOMITE

Bedding and lithology

The lowest aquifer, the Lockport Dolomite, consists mainly of gray, fine- to coarse-grained dolomite. The Gasport Limestone Member near the base of the formation is a light-gray limestone. The thickness of the Lockport is approximately 150 feet. A general summary of the lithology and thickness of the lithologic units is given in figure 5.

The rock units within the Lockport are bedded and dip southward in the study area at 35 to 40 feet per mile. In the extensive exposures Johnston (1964, p. 22) observed in excavations for the Niagara Power Project at Niagara Falls, the beds ranged generally from 1 inch to 3 feet in thickness. In some zones, beds were only 1/4 inch thick. On the other hand, a few massive beds are as much as 8 feet thick at places. The beds thicken and thin laterally. Approximate positions of some fairly persistent zones of massive and thin beds are shown in figure 5 by the widths of the bands of lithologic symbols. The bedding planes are flat except at the few places where they curve over ancient reefs in the upper part of the formation. These reefs are massive (nonbedded) structures as much as 50 feet across and 20 feet thick. Nodules of gypsum 1/2 to 5 inches across are common in the dolomite. Particles composed of the sulfide minerals of zinc, lead, and iron are disseminated through the rock.

Water-bearing openings

With respect to water-bearing openings in the Lockport Dolomite near Niagara Falls, Johnston's (1964) report may be considered a type study for rocks of this sort. Johnston found that bedding-plane joints are the principal water-bearing openings in the Lockport. Vertical joints and voids from which gypsum nodules were dissolved are minor water-bearing openings.

Water-bearing bedding-plane joints can occur at any stratigraphic horizon in the Lockport Dolomite. However, those that are persistent commonly occur in zones of thin beds overlain by thick or massive beds. Johnston identified seven persistent water-bearing joints or zones (several closely spaced joints) in the Niagara Falls area. (His findings are summarized in figure 5.) These joints are continuous for some miles, but they are not water

Many domestic-supply wells penetrate from 1 foot to a few feet into the soluble rocks and produce small but adequate yields. On the other hand, industrial wells that were intended to produce large supplies of water give a truer picture of the water-supply potential of the rocks. Data on industrial wells show that the Camillus Shale will yield as much as 1,200 gpm and the limestone unit as much as 300 gpm and probably more. But the data also show that the rocks produce low yields at places. This is shown by such wells as 301-848-1 which was drilled to obtain a large supply for an industry but which yielded only 30 gpm. The water-bearing zones obviously are unevenly distributed through the rocks. Factors that control the occurrence of the water-bearing zones cannot be evaluated at the present time to the extent necessary to predict exactly where the zones occur.

The Lockport Dolomite is the least productive unit of the soluble rocks. Within the Erie-Niagara basin yields of wells in the Lockport range from about 4 to 90 gpm. Depth of the wells range from 20 to 70 feet. Most of the deeper wells were drilled where the depth to bedrock is greatest. Domestic-supply wells generally are finished in the fracture zone at the rock surface or in a bedding joint within the uppermost 30 feet of the rock. It is usually not necessary to drill deeper into the Lockport if only a small supply is needed.

Drilling deeper in an attempt to intersect additional bedding-plane openings at depth would provide higher yields but, generally, at the expense of lower water levels and therefore higher pump lifts. Johnston (1964) collected data on a much larger number of wells along the outcrop belt of the Lockport Dolomite than were inventoried in the Erie-Niagara basin. He found that wells drawing water from the lower 40 feet of the Lockport (the northern part of the outcrop area) yield from 1/2 to 20 gpm and have an average yield of 7 gpm. Wells finished in the upper part of the Lockport (the southern part of the outcrop area) yield from 2 to 110 gpm and have an average yield of 31 gpm. Yields of as much as 50 or 100 gpm are possible from the Lockport in the Erie-Niagara basin but would be exceptional.

CAMILLUS SHALE

Bedding and lithology

The Camillus Shale lies above the Lockport Dolomite and crops out to the south of where the dolomite is exposed. Exposures of the Camillus Shale are rare in the Erie-Niagara basin because of the low relief of the outcrop area and the cover of glacial deposits. Geologists who have studied the Camillus in the study basin agree that it consists mostly of gray shale. (For example, see Buehler and Tesmer, 1963, p. 29-30.) Subsurface data, on the other hand, indicate that a considerable amount of gray limestone and dolomite is interbedded with the shale. Along with these carbonates, gypsum comprises a significant part of the Camillus Shale. Some of the gypsum beds are as much as 5 feet thick. Gypsum also occurs in the Camillus as thin lenses and veins. Table 1,

Table 1.--Log of a gypsum-mine slope near Clarence Center

(Site 300-839-A)

Log	Depth below land surface (feet)
Topsoil, subsoil, gravel and clay	0-25.5
Soft gray limestone mixed with clay	25.5-27.5
Soft dark-gray limestone	27.5-29.5
Soft shaly limestone, thin bedded	29.5-38.0
Crushed dark-gray limestone interbedded with 2-inch seams of brown limestone	38.0-40.8
Dark-gray limestone interbedded with seams of gypsum 1 1/2 to 3 inches thick	40.8-43.6
Hard gray limestone interbedded with thin streaks of gypsum 1/8 to 1/2 inch thick	43.6-45.1
Soft gray limestone	45.1-49.1
Hard gray limestone interbedded with thin streaks of gypsum	49.1-52.1
Hard gray limestone	52.1-57.6
Gypsum	57.6-58.3
Brown limestone	58.3-59.3
Gray limestone	59.3-61.3
Soft, crumbly green-gray material (shale)	61.3-64.3
Mottled rock rich in gypsum	64.3-65.1
Soft brown limestone	65.1-65.7
Cap rock -- hard dark-gray limestone	65.7-66.8
Soft shaly material	66.8-66.9
Gypsum	66.9-71.4

which is a log compiled during construction of a mine slope, illustrates the occurrence of gypsum and the predominance of carbonate rocks in some parts of the Camillus.

Though the Camillus dips southward at approximately 40 feet to the mile, the dip is not uniform. Gypsum miners say the formation "rolls," to describe the gentle folding of its beds. The formation is marked by broad, low folds with amplitudes of a few feet and spacings of a few hundred feet between crests. The fold axes generally are east-west.

Water-bearing openings

The extensive beds of gypsum make the Camillus Shale unique among the shale formations of the basin. The importance of the gypsum lies in its solubility; gypsum is far more soluble than the enclosing rocks, whether shale, dolomite, or limestone. Where gypsum has been dissolved, openings exist for the passage and storage of water.

The effect of the solution of gypsum on the water-bearing properties of the Camillus Shale (and other rocks) can be readily appreciated. Where the topmost beds of the Camillus crop out at the base of the falls of Murder Creek at Akron, the Camillus seems to be an impermeable shale. If one judged the water-bearing properties of the Camillus on the basis of this outcrop alone, he would be wrong. Yields of water wells and drainage into gypsum mines prove that large volumes of water do move through the Camillus.

Clues to the nature of the water-bearing openings in the Camillus can be obtained by considering some of the circumstances where large volumes of water were obtained. About 1885, the Buffalo Cement Company located a 4-foot thick bed of gypsum only 43 feet below land surface by test drilling in Buffalo on Main Street near Williamsville. A shaft was sunk with the intention of beginning a subsurface mining operation, but when the gypsum was struck the shaft was flooded with ground water. The report is that "..... a pump with a capacity of 2,000 gallons per minute failed to make any impression upon it [the water] and the attempt was abandoned" (Newland and Leighton, 1920, 209-210).

In 1964, a gypsum mine near Clarence Center received an unexpected inflow of ground water. Several hundred gallons of water per minute continuously enters the mine at a place about midway down the entry slope. This water is pumped out by a drainage system diagrammatically shown in figure 6. Ordinarily, only small seeps occur in the remainder of the mine from roof bolts and small cracks in the roof. At a distance of more than a mile from the entry slope, the working face intersected an unplugged drill hole. Water poured into the mine at an alarming rate until the hole was plugged with much effort.

Large-yield wells, such as those at Tonawanda and North Tonawanda, obtain water from thin intervals of gypsum-bearing rock. The gypsum in the Camillus Shale obviously is related to the occurrence of large quantities of water. Gypsum is a highly soluble mineral and is

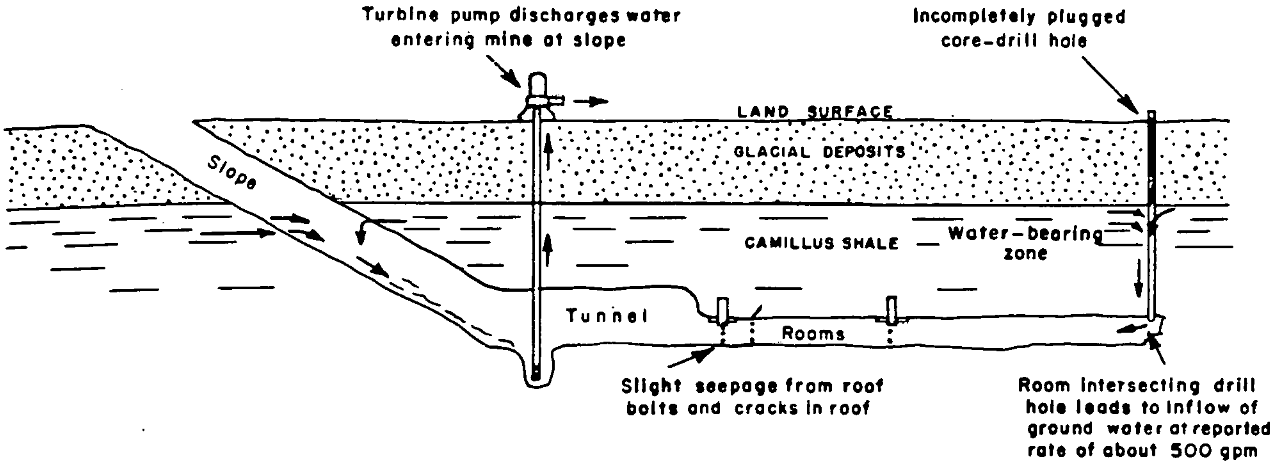


Figure 6.--Occurrence of ground water in the Camillus Shale at a gypsum mine near Clarence Center.

dissolved by circulating ground water faster than are the enclosing rocks. Very likely the openings in the Camillus that yield copious amounts of water were formed by the solution of gypsum by ground water. The water-bearing zones are mainly horizontal because most of the gypsum occurs in horizontal beds and thin zones of gypsiferous shale and dolomite. Only those gypsum zones actually exposed to circulating ground water can be widened by solution. The gypsum must be in contact with an open fracture through which the water can move. If no open fracture exists, the gypsum cannot be dissolved. The occurrence of ground water at the gypsum mine shown in figure 6 is a further illustration. The 4 1/2-foot thick bed that is mined at a depth of 66.9 feet (table 1) is dry because of the lack of vertical fractures to transmit water to it.

The solution-widened water-bearing zones occur at various depths and stratigraphic horizons in the Camillus. The existence of such zones is borne out by well data. For instance, wells 303-850-1 and -2 are 90 feet apart and obtain water from the same 2- to 3-foot thick zone at a depth of 67 to 68 feet. Such zones may be continuous for as much as 1 or 2 miles but information is not available on the extent of individual zones. The gypsum occurs principally in lenticular beds. The thicker beds may be 3 or 4 miles in lateral extent. The thinner beds can be expected to be much smaller in extent.

A zone of fracturing and solution extending several feet below the rock surface yields relatively small but sufficient water supplies for domestic use. This zone appears to be present throughout the area and is unrelated to stratigraphic position.

Hydrologic and hydraulic characteristics

The Camillus Shale forms a low topographic trough split down the axis by Tonawanda Creek. Ground water that enters the formation discharges mainly to the creek. Little water is discharged to the small, barely incised streams on the Camillus. These streams are dry much of the year.

Coefficients of transmissibility given in table 2 were computed for the Camillus Shale on the basis of specific capacities of wells penetrating a considerable thickness of the aquifer, by the method described by Walton (1962, p. 12-13).

Table 2.--Specific-capacity tests of wells finished in the Camillus Shale

Well number	Pumping rate (gpm)	Duration of pumping (hours) e: estimated	Drawdown (feet)	Specific capacity (gpm/ft)	Coefficient of transmissibility (gpd/ft)
a/ 258-853-1	1,090	e8	53	21	40,000
-2	90	--	22	4	7,000
258-855-1	500	e8	17	29	55,000
-2	1,000	e8	26	38	70,000
-3	1,500	e8	38	39	70,000
303-850-1	700	24	10	70	--
-2	660	e8	8	83	--

a/ Well also penetrates water-bearing zone in Lockport Dolomite.

The large specific capacities of wells 303-850-1 and -2 probably result in part from recharge induced from Sawyer Creek. Measurements of recovery of water levels in well 303-850-1 were made when well 303-850-2 was shut down after a year of continuous pumping. From these data, a coefficient of transmissibility of about 80,000 per foot and a coefficient of storage of 0.025 were computed. The computed transmissibility is about half the transmissibility that would have been indicated from specific capacity if recharge were not induced from Sawyer Creek.

Yields of wells

The Camillus Shale is by far the most productive bedrock aquifer in the area. Except in the vicinity of Buffalo and Tonawanda, where industrial wells produce from 300 to 1,200 gpm, no attempt has been made to obtain large supplies from the formation. However, the inflow of water to gypsum mines near Clarence Center and Akron indicate that large supplies are not necessarily restricted to the Buffalo and the Tonawanda area. Two examples of large flows of water encountered in gypsum mining have already been mentioned. Pumpage from gypsum mines near Clarence Center (including the mine mentioned previously) is substantial. The water pumped is discharged to Got Creek. On July 2, 1963, the creek had a flow of 2.1 mgd (million gallons per day) about half a mile downstream from the mines, that was due almost entirely to the pumpage. Water for industrial use is pumped from a flooded, abandoned gypsum mine at Akron. This pumpage, at a rate of 500 to 700 gpm, has had no appreciable effect on the water level in the mine.

Probably the larger solution openings are most common in discharge areas near Tonawanda Creek and its tributaries and near the Niagara River; the flow of ground water becomes concentrated as it approaches the streams to which it discharges. Other discharge areas, such as low-lying swampy areas and headwaters of small streams that have perennial flow, are likely places to drill wells.

LIMESTONE UNIT

Bedding and lithology

The term "limestone unit" in this report is applied to a sequence of limestone and dolomite overlying the Camillus Shale. The limestone unit includes the Bertie Limestone at the base, the Akron Dolomite, and the Onondaga Limestone at the top. The lithology and thickness of these units are shown in figure 7. The Bertie Limestone and the Akron Dolomite are Silurian in age and are separated from the overlying Onondaga Limestone of Devonian age by an unconformity or erosional contact.

The Bertie Limestone is mainly dolomite and dolomitic limestone but contains interbedded shale particularly in the thin-bedded lower part of the formation. The middle part is brown, massive dolomite, and the upper part is gray dolomite and shale whose beds are of variable thickness. The total thickness of the formation is about 55 feet (Buehler and Tesmer, 1963, p. 30-31).

The Akron Dolomite is composed of greenish-gray and buff dolomite beds varying from a few inches to about a foot in thickness. The upper contact of the Akron is erosional and is often marked by remnants of shallow stream channels. Thin lenses of sandy sediments lie in the bottoms of some channels. The thickness of the formation is generally between 7 and 9 feet (Buehler and Tesmer, 1963, p. 33-34).

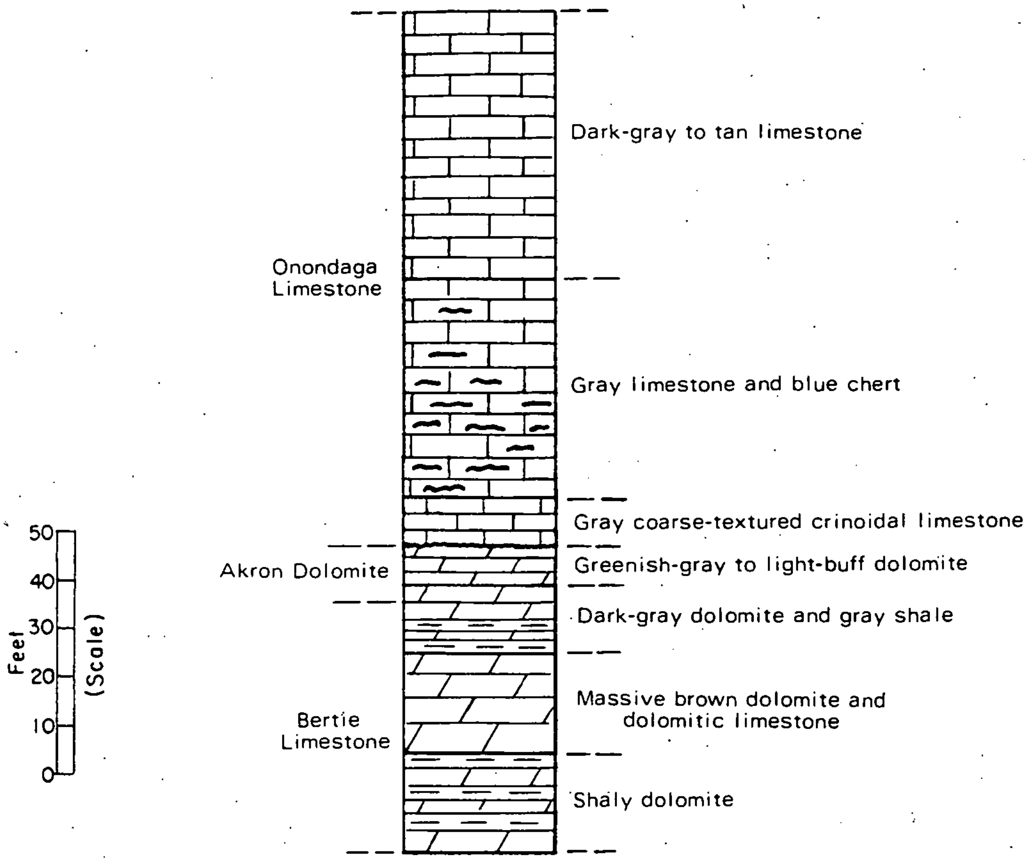


Figure 7.--Lithology of the limestone unit.

The Onondaga Limestone, about 110 feet thick, makes up the greatest thickness of the limestone unit. The formation consists of three members. The lowest member is a gray coarse-grained limestone, generally only a few feet thick. At places this member grades laterally into reef deposits which increases its thickness (Buehler and Tesmer, 1963, p. 35-36).

The middle member of the Onondaga is a cherty limestone. In some zones the chert exceeds the amount of limestone. The unit is probably 40-45 feet thick.

The upper unit is a dark-gray to tan limestone of varying texture and is probably about 50-60 feet thick.

Water-bearing openings

The limestone unit contains water-bearing openings that are similar to those of the Lockport Dolomite. Because the limestone unit is more soluble, however, solution widening of the openings appears to be more pronounced. The types of water-bearing joints in the limestone can be seen at the falls of Murder Creek at Akron. Not all of the flow of Murder Creek plunges over the falls. A considerable part of the flow percolates into the limestone unit upstream from the falls and discharges from bedding joints both at the face and along the sides of the falls. The principal zones of discharge are at the base of the Bertie, and at a contact of a shaly zone and overlying thick-bedded dolomite 20 feet above the base.

The falls at Akron also illustrate in an exaggerated way the role of vertical joints. Water from Murder Creek percolates into the rock through solution-widened vertical joints before reaching the bedding-plane joints. The continuous and concentrated flow of water in the creek has widened the vertical joints to an unusual degree. Vertical joints are ordinarily very narrow. They probably are most effective in aiding the movement of water to the bedding joints where the bedding joints are close to the rock surface.

Locally, solution along bedding joints in the limestone unit has been great enough to cause the rock overlying the solution opening to settle. Settling of this type probably accounts for at least some of the small depressions in the outcrop belt of the Onondaga Limestone. A collapsed solution zone in the Onondaga Limestone discharges a large volume of water into a quarry (257-840-A) near Harris Hill. About 3,000 gpm is pumped from the quarry, and most of the water is reported to come from the solution zone.

The limestone unit is cut by a fault on the east side of Batavia. Faults cutting limestone are likely to cause shattering along the fault and, thus, create a permeable water-bearing zone.

Hydrologic and hydraulic characteristics

The limestone unit is similar to the Lockport Dolomite in structure. However, its hydrology is different. The limestone unit is cut transversely by Tonawanda Creek and its major tributaries. Small tributaries flow across it in northerly and westerly directions. The limestone unit receives water in the interstream areas by percolation into joints. The water is discharged laterally to the streams and at places along the north-facing scarp or enters the Camillus Shale at depth.

The coefficient of transmissibility of the limestone unit probably ranges from about 300 to 25,000 gpd per foot. Specific capacity data are given in table 3. Drillers' reports indicate high transmissibilities for the limestone unit in Williamsville which probably arise from relatively intense circulation of ground water near Ellicott Creek. The coefficients of transmissibility given in table 3 were computed from specific capacity data by the method described by Walton (1962, p. 12-13).

Table 3.--Specific-capacity tests of wells finished in the limestone unit

Well number	Pumping rate (gpm)	Duration of pumping (hours)	Drawdown (feet)	Specific capacity (gpm/ft)	Coefficient of transmissibility (gpd/ft)
252-852-1	85	34	7	12.1	25,000
-2	30	--	17	2	4,000
255-848-1	130	--	10	13	25,000
255-850-1	180	6	45	4	8,000
259-824-1	100	8	30	3.3	6,000
-2	100	8	12	8.3	15,000
300-824-1	104	8	28	3.7	7,000

The coefficient of storage of the limestone unit is probably between those of the Lockport Dolomite and the Camillus Shale. The storage coefficients of these three units vary mainly with the volume of the openings in the rocks which, in turn, vary with the solubility of the rocks. Limestone is more soluble than dolomite but less soluble than gypsum. Storage coefficients in the limestone unit should, therefore, be somewhat higher than those of the Lockport Dolomite but somewhat lower than those of the Camillus Shale.

Yields of wells

The limestone unit is more productive than the Lockport. A number of large-yield wells in Buffalo, Cheektowaga, Williamsville, Pembroke, and Batavia are finished in the limestone unit and indicate that yields of 300 gpm and possibly more can be obtained. Like the Lockport Dolomite, the yields of wells in the limestone unit range through a broad spectrum. However, the more productive wells in the limestone unit are relatively abundant when compared to those in the Lockport. Of significance also is that three wells half a mile apart drilled for an industrial firm near Pembroke, each sustained a discharge of about 100 gpm (table 6, wells 259-824-1, -2, and 300-824-1). These three wells indicate that such yields are available in some areas.

Table 6.--Records of selected wells in the Erie-Niagara basin

Well number: See "Well-Numbering and Location System" in text for explanation.

Year completed: a - about
b - before

Type of well: Drl - drilled
Drv - driven

Depth of well: All depths below land surface.
a - about
r - reported
all others measured

Diameter of well: Diameters of dug wells are approximate.
Where two or more sizes of casings were used, they are shown in descending order.

Depth to bedrock: All depths below land surface
a - about
m - measured
all others reported

Water-bearing material: Gravel, sand, silt, and till - glacial deposits of Pleistocene age.
Camillus Shale - Camillus Shale of Silurian age.
Limestone - limestone unit consisting of the Onondaga Limestone of Devonian age and the Bertie Limestone and Akron Dolomite of Silurian age.
Lockport Dolomite - Lockport Dolomite of Silurian age.
Shale - Hamilton Group and Conneaut Group of Chadwick (1934) and intervening units, all of Devonian age.

Altitude above sea level: Estimated from topographic maps to nearest 5 feet.

Water level: All water levels are below land surface except those preceded by a (+) sign, which are above land surface.
a - about
p - pumping effect is probable
Flow - water flows above land surface but static head could not be measured.
r - reported
all others measured by U.S.G.S. personnel

Method of lift: AL - air lift
Dw - deep well cylinder pump
Jet - deep well jet pump
Sub - submersible pump
Sw - shallow-well pump
Tur - turbine pump

Type of power is indicated as -- I - internal combustion engine
M - manual
all others are electrically powered

Estimated pumpage: Average daily pumpage supplied by owner, tenant, or operator, or computed on basis of per capita consumption of 50 gpd per person or 20 gpd per milk cow.

Use:
A - abandoned
Ag - agricultural
C - commercial
D - domestic
F - dairy farm
GT - gas test
I - industrial
In - institutional
Ir - irrigation only
PS - public supply
T - test
U - unused
X - destroyed

Remarks: anal - chemical analysis in this report
dd - drawdown
est - estimated
gas - flammable gas issues from well
gpd - gallons per day
gpm - gallons per minute
H_2S - hydrogen sulfide gas present in ground water
Iron - water has noticeable iron content
LS - land surface
OW - observation well, series of water-level measurements available
r - reported
swl - static water level
temp - temperature, in degrees Fahrenheit, measured by U.S.G.S. on same day water level was measured unless otherwise noted

Table 6.--Records of selected wells in the Erie-Niagara basin (Continued)

Well number	County	Owner	Year completed	Type of well	Depth of well (feet)	Diameter (inches)	Depth to bedrock (feet)	Water-bearing material	Altitude above sea level (feet)	Water level: Below land surface (feet)	Water level: Date	Method of lift	Estimated pumpage or flow (gallons per day)	Use	Remarks
259-823-1	Genesee	R. Reid	a1961	Drl	64.4	6	--	Sand	885	p36.8	9-17-63	Jet	300	D	Anal; Iron; yield 30 gpm (r); cased to about 69 ft (r).
259-824-1	do.	Bell Aircraft Corp.	1957	Drl	r95	12	41.5	Limestone	870	r22	6- 3-57	--	--	T	Pumping test, 100 gpm, swl 22 ft, dd 30 ft.
-2	do.	do.	1957	Drl	r63.5	12	36	do.	870	r19	6-13-57	--	--	T	Pumping test, 100 gpm, swl 19 ft, dd 12 ft.
259-830-1	Erie	B. Wurthman	1964	Drl	32	6	--	Sand	795	11.9	8-18-64	Sw	250	D	Anal.
259-835-1	do.	R. Cummings	1959	Drl	77.1	6	--	Camillus Shale; sand	675	47.1	8-18-64	Jet	--	D	Anal; H_2S; cased to 88 ft (r).
-2	do.	J. Burns	1957	Drl	88.1	6	88	do.	675	45.2	8-18-64	Jet	--	D	Anal.
259-841-1	do.	Community Reformed Church	1955	Drl	51.7	6	a46	Camillus Shale	620	4.8	8-14-64	Jet	--	D	H_2S.
259-846-1	do.	A. Adorjan	1954	Drl	42.6	6	--	do.	595	14.3	8-13-64	Sw	--	D	Iron.
259-847-1	do.	D. Kuss	1954	Drl	30	6	--	do.	595	19.7	8-13-64	Jet	--	U, D	H_2S.
259-857-1	do.	Mesmer & Sons Dairy, Inc.	1953	Drl	r58	6	55	do.	595	r15	--	--	--	A	H_2S; yield 60 gpm (r).
259-900-1	do.	G. Franke	--	Drl	63.6	6	--	do.	590	28.5	7- 9-64	Jet	--	A	H_2S; low yield.
300-814-1	Genesee	W. Cox	1957	Drl	26.4	6	--	Limestone	885	p9.1	6-26-63	Sw	250	D	Anal; H_2S; temp 49.0.
300-815-1	do.	N. Johnson	--	Dug	20.9	32	--	Sand and gravel	900	17.5	9-16-63	Sw	400	D	Anal.
-2	do.	Alden Farms Co.	1962	Drl	33.7	6	--	Limestone	900	21.7	9-16-63	Sw	100	D	Do.
300-817-1	do.	W. McMullen	1961	Drl	r85	6	--	do.	920	--	--	Sub	400	D	Anal; H_2S.
300-820-1	do.	R. Gross	1956	Drl	r60	--	--	do.	890	--	--	Jet	250	D	Anal; Iron.
300-824-1	do.	Bell Aircraft Corp.	1957	Drl	r100	12	24	do.	860	r33	6-25-57	--	--	T	Pumping test, 104 gpm, swl 33 ft, dd 28 ft.
-2	do.	J. Fuller	1955	Drl	42.3	6	--	Sand	855	12.9	7-23-64	Sw	100	D	Anal.
300-826-1	do.	E. VanAlstine	1952	Drl	53	6	--	Limestone	830	16.3	7-22-64	Jet	50	D	
-2	do.	A. Bettio	1960	Drl	r30	6	--	do.	840	9.1	7-23-64	Sw	200	D	
300-827-1	Erie	L. Weaver	--	Drl	r120	6	--	do.	830	45	7-22-64	Jet	150	D	
300-831-1	do.	A. Drachenberg	1963	Drl	38.5	6	a35	Camillus Shale	675	11.4	8-18-64	Sw	50	D	Anal; Iron; H_2S.
300-833-1	do.	C. Colf	1960	Drl	46.3	6	a35	do.	685	7.6	8-18-64	Jet	200	D	Anal; Iron.
300-839-1	do.	H. Thompson	1964	Drl	26	6	--	do.	610	18.1	8-17-64	Sw	--	U	Anal; H_2S.
300-842-1	do.	R. Blatter	--	Drl	41.9	6	--	do.	595	12.4	7-10-64	Sw	200	D	
300-844-1	do.	J. Calehan	1948	Drl	50	6	--	do.	585	2.4	8-14-64	--	--	A	Iron; H_2S.
300-848-1	do.	R. Lewis	1940	Drl	33.7	8, 6	--	do.	585	10.5	8-13-64	Sw	--	Ir	H_2S.
300-859-1	do.	L. Fleishman	1910	Drl	r55	6	55	do.	590	r14	--	Dw	--	Aq	Iron; H_2S.
-2	do.	--	1952	Drl	53	6	--	do.	595	10.3	7- 9-64	--	--	A	
301-813-1	Genesee	R. and B. Call	1961	Drl	r70	6	3	Limestone	935	--	--	Sub	--	[illegible]	Anal; Iron; yield 10-15 gpm (r).
-2	do.	do.	[illegible]	Drl	[illegible]	6	[illegible]	do.	[illegible]	[illegible]	[illegible]	--	--	A	Iron.
[illegible]	do.	J. [illegible]	--	Drl	r30	6	--	do.	[illegible]	--	--	--	--	[illegible]	Anal.
[illegible]	do.	W. [illegible]	[illegible]	Drl	[illegible]	6	[illegible]	do.	[illegible]	[illegible]	11-61	Jet	[illegible]	[illegible]	Yield [illegible] gpm (r)
301-833-1	Erie	C. Jones	1964	Drl	23.6	6	a18	Camillus Shale	645	6.6	8-18-64	--	--	U, D	
301-838-1	do.	H. Frey	1959	Drl	40.6	6	a40	do.	630	25.1	8-17-64	Sub	350	D	Anal; Iron.
301-848-1	do.	--	1964	Drl	[illegible]	[illegible]	[illegible]	do.	[illegible]	[illegible]	[illegible]	--	--	A, T	Yield 30 gpm; water-bearing zones at top of rock [illegible]

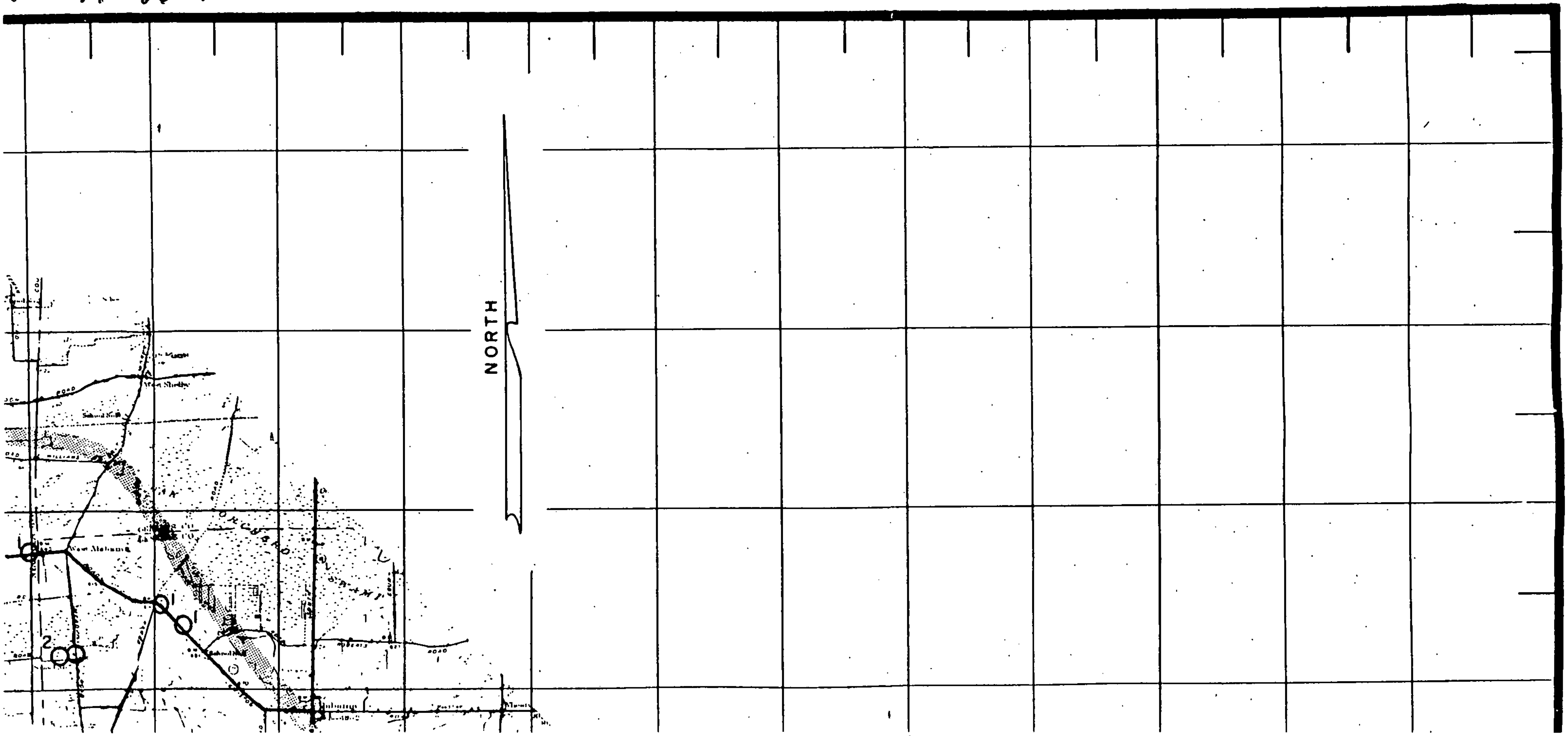
Well number	County	Owner	Year completed	Type of well	Depth of well (feet)	Diameter (inches)	Depth to bedrock (feet)	Water-bearing material	Altitude above sea level (feet)	Water level: Below land surface (feet)	Water level: Date	Method of lift	Estimated pumpage or flow (gallons per day)	Use	Remarks
301-833-1	Erie	C. Jones	1964	Drl	23.5	6	a18	Camillus Shale	645	6.6	8-18-64	--	--	U, D	
301-838-1	do.	H. Frey	1959	Drl	40.5	6	a40	do.	630	25.1	8-17-64	Sub	350	D	Anal; Iron.
301-848-1	do.	--	1964	Drl	75.3	12	43	do.	575	13.2	10- 2-64	--	--	A, T	Yield 30 gpm; water-bearing zones at top of rock and at 65-70 ft interval.
301-857-1	do.	Grand Island Ready Mix Concrete Corp.	1954	Drl	r60	6	--	do.	595	--	--	Jet	6,000	I	H_2S.
302-821-1	Genesee	W. Phelps	1959	Drl	67.3	6	a5	Limestone	895	25.6	8-20-63	Sw	1,500	F	Anal.
-2	do.	B. Knapp	1956	Drl	r102	6	--	do.	870	46.5	7-15-64	Sub	1,500	F	
302-825-1	do.	C. Moses	1959	Drl	r49	6	--	Camillus Shale	690	r20	--	Sw	50	D	Yield 20 gpm (r).
302-841-1	Erie	H. Moretti	1947	Drl	61.4	6	--	do.	585	10.6	7-10-64	Sw	--	U	
302-842-1	do.	R. Wood	1960	Drl	64.6	6	a25	do.	580	2.6	7-10-64	Jet	200	D	
302-844-1	do.	R. Coleman	1953	Drl	r60	6	48	do.	580	--	--	Jet	200	D	H_2S; water-bearing zone at 48 ft (r).
302-846-1	do.	A. Hardy	1953	Drl	46.4	6	--	do.	580	11.6	7-10-64	Jet	--	Ir	Used only to water garden; Iron.
302-848-1	do.	E. Czlapinski	1951	Drl	33.5	6	--	do.	575	11.8	7-10-64	Sw	--	U	Original depth 47 ft (r); partly filled in by silt from tile drain emptying into well.
302-851-1	Niagara	Durez Div., Hooker Chemical Corp.	1938	Drl	r105	12	36	do.	575	r28.3	4-23-45	Tur	--	I	H_2S; cased to 42 ft; pumping rate 1,200 gpm (r); infrequently used because quality of water is poor.
-2	do.	do.	1947	Drl	r106	10	50	do.	575	p60.5	9-10-63	Tur	200,000	I	Anal; H_2S; pumping rate 350 gpm (r).
-3	do.	do.	1948	Drl	r107	12	--	do.	576	p,r78	5- 8-58	Tur	1,000,000	I	Anal; H_2S; pumping rate 750 gpm (r).
302-855-1	Erie	V. Konefal	--	Drl	40.4	5	--	do.	575	7.5	7- 9-64	Sw	--	Ir	Anal; H_2S; used only for watering garden.
302-858-1	do.	L. Runions	1957	Drl	44.4	5	a30	do.	575	11.7	7- 9-64	Jet	--	Ir	Iron; used only for watering garden.
303-823-1	Genesee	R. Long	--	Dug	27.5	30	--	Till	720	20.4	8-20-63	Sw	50	D	Anal.
-2	do.	H. Wallace	1961	Drl	28.4	6	a20-25	Camillus Shale	760	24.8	8-20-63	Sw	300	D	Anal; temp 49.1.
303-826-1	do.	J. Patterson	1961	Drl	26.7	6	--	do.	665	20.2	8-22-63	Sw	50	D	Anal; temp 49.5; yield 12 gpm (r).
303-828-1	Erie	J. Laughlin	1942	Drl	39.4	6	--	Sand	640	12.0	8-22-63	Jet	400	Ag	Drilled and cased to 42 ft (r); used only for watering stock during grazing season.
303-829-1	do.	Dande Farms Country Club, Inc.	1960	Drl	25.8	6	--	Camillus Shale	665	14.9	8-22-63	Sw	300	C	Anal.
303-830-1	do.	G. Cook	1941	Drl	18.2	6	--	Sand and gravel	630	p10.3	8-22-63	Sw	350	F	Do.
303-831-1	do.	F. Frey	1945	Drl	26.5	6	--	Camillus Shale	615	5.3	8-22-63	Sw	350	D	Do.
303-834-1	do.	M. Logel	1960	Drl	37.7	6	--	do.	600	13.6	8-22-63	Jet	400	D	Anal; Iron; not used for drinking.
303-836-1	do.	G. Thompson	--	Drl	33.3	4	--	do.	590	Flow	--	--	5,500	D	Anal; temp 49.8, 8-23-63; flows 4 gpm 0.3 ft above LS.
303-840-1	do.	C. Scherer	1963	Drl	61.0	6	58	do.	587	6.2	8-23-63	Jet	200	D	Anal; Iron; yield 10 gpm (r); water for laundering is purchased and stored in a cistern.
303-844-1	do.	W. Gallagher	--	Dug, Drl	r71	72, 6	--	do.	578	r18	--	--	--	A	
303-846-1	do.	E. Hirsch	1956	Drl	69.4	6	--	do.	579	19.7	8-28-63	Jet	--	Ir	Anal; Iron; H_2S; used only for watering lawn.

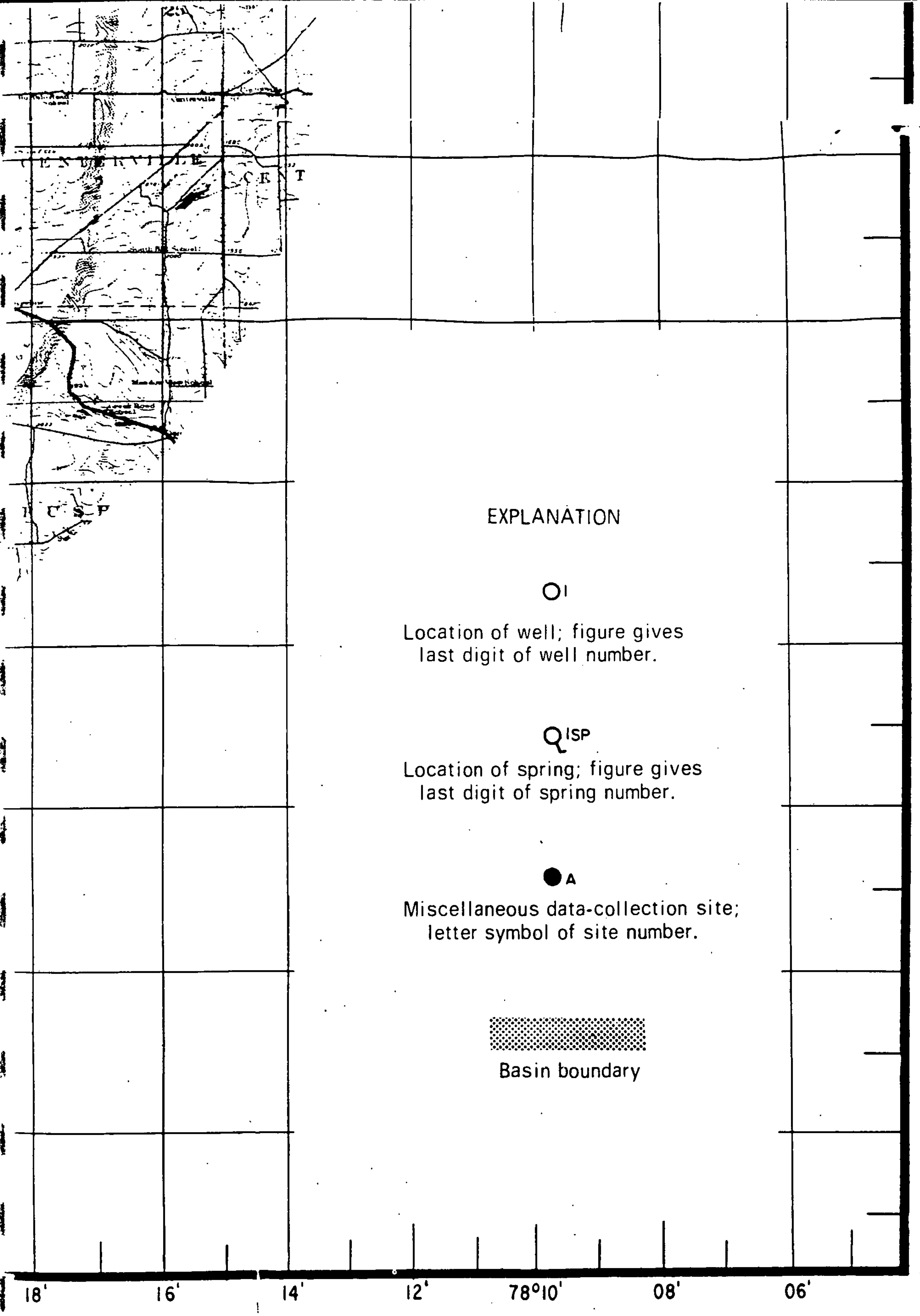
BASIN PLANNING REPORT ENB 3 PLATE 1

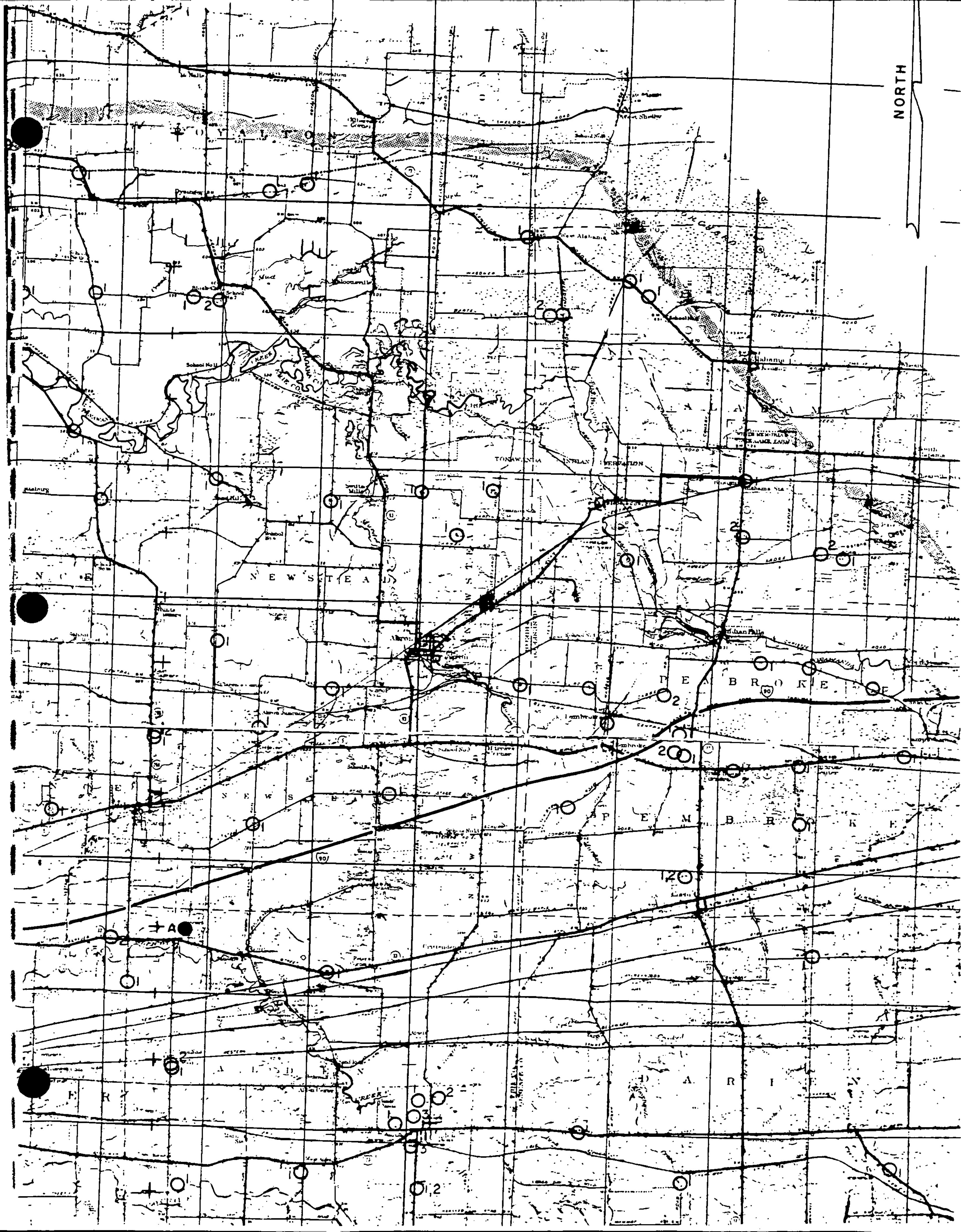
Published by NEW YORK STATE WATER RESOURCES COMMISSION

CONSERVATION DEPARTMENT, DIVISION OF WATER RESOURCES

28 29 26 25




EXPLANATION
1
Location of well; figure gives last digit of well number.
1SP
Location of spring; figure gives last digit of spring number.
A
Miscellaneous data-collection site; letter symbol of site number.
Basin boundary
18'
16'
14'
12'
78°10'
08'
06'



NORTH
N E W S T E A D
P E M B R O K E
A L A B A M A
TONAWANDA INDIAN RESERVATION

REFERENCE #4

GEOLOGY

OF

ERIE COUNTY

New York

By

EDWARD J. BUEHLER

Professor of Geology
State University of New York at Buffalo

AND

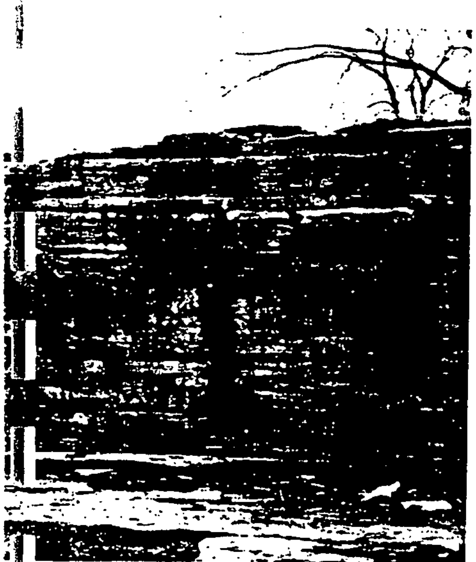
IRVING H. TESMER

Professor of Geology
State University College at Buffalo

BUFFALO SOCIETY OF NATURAL SCIENCES
BULLETIN

Vol. 21. No. 3 Buffalo, 1963

...m), OATKA, FALKIRK (*top*)
... at Akron Falls



. BERTIE (*bottom*), AKRON, ONONDAGA
NEDROW) (*top*)
from Akron Falls

Detailed Stratigraphy and Paleontology

Silurian System

UPPER SILURIAN (CAYUGAN) SERIES

SALINA GROUP

TYPE REFERENCE: Dana (1863, pp. 246-251).

TYPE LOCALITY: Vicinity of Syracuse, New York, formerly known as Salina.

TERMINOLOGY: Approximately the same as the "Onondaga salt group" of early writers. The Salina Group included three formations: the Vernon Shale (oldest), Syracuse Formation, and Camillus Shale. Only the Camillus is seen in western New York. See Fisher (1960).

AGE: Late Silurian (Cayugan).

THICKNESS: In western New York, the Salina Group is about 400 feet thick, but this unit increases considerably in thickness to the east.

LITHOLOGY: The Salina Group in Erie County is largely shale but considerable amounts of gypsum and anhydrite are also present.

PROMINENT OUTCROPS: Outcrops are rare in Erie County. The uppermost portion can be seen at the base of Akron Falls.

CONTACTS: The lower contact is not exposed near Erie County and the contact with the overlying Bertie Formation is difficult to define precisely.

ECONOMIC GEOLOGY: The Camillus Shale of the Salina Group is a source of gypsum and anhydrite in Erie County. To the east, the Salina Group also includes salt beds.

PALEONTOLOGY: No fossils have been reported from the Salina Group of Erie County.

CAMILLUS SHALE

TYPE REFERENCE: Clarke (1903, pp. 18-19).

TYPE LOCALITY: Village of Camillus, Onondaga County, New York; Baldwinsville quadrangle.

TERMINOLOGY: See Alling (1928) and Leutze (1954).

AGE AND CORRELATION: Late Silurian (Cayugan). Equivalent to lower part of Brayman Shale in eastern New York.

THICKNESS: Approximately 400 feet.

LITHOLOGY: The Camillus varies from thin-bedded shale to massive mudstone. The color is gray or brownish gray but some beds show a tinge of red or green. According to Alling (1928, pp. 24-26), the Camillus at the type locality is a massive gray magnesian-lime mudrock. Gypsum and anhydrite are present in Erie County.

It is probable that during much of Late Silurian time the northeastern United States was a desert basin. Salt and gypsum were precipitated by evaporation of the shrinking inland Salina Sea.

PROMINENT OUTCROPS: The Camillus Shale extends across Erie County in an east-west trending belt approximately six to eight miles wide. This belt is largely lowland in which outcrops are rare. The top of the formation is exposed at Akron Falls (pl. 6, upper). A small section can be seen in the valley of Murder Creek north of Akron. Houghton (1914, pp. 7-8), Luther (1906, p. 8) and others report outcrops on Grand Island but these could not be located.

CONTACTS: The lower contact of the Camillus Shale is not exposed near Erie County. The contact with the overlying Bertie Formation is difficult to define.

ECONOMIC GEOLOGY: The Camillus Shale is an important source of gypsum. National Gypsum Company has a mine at Clarence Center, Certain-Teed Company at Akron, and United States Gypsum Company at Oakfield in neighboring Genesee County.

PALEONTOLOGY: No fossils have been reported from the Camillus Shale of Erie County. Apparently animal life could not survive in the "dead sea" environment of the time.

BERTIE FORMATION

TYPE REFERENCE: Chapman (1864, p. 190).

TYPE LOCALITY: Bertie township, Welland County, Ontario, Canada.

TERMINOLOGY: This unit is commonly called the Bertie Waterlime. Chadwick (1917) divided the Bertie into four units: the Oatka (oldest), Falkirk, Scajaquada, and Williamsville. The Williamsville Member was formerly called the "Buffalo cement bed" (see fig. 4).

AGE AND CORRELATION: Late Silurian (Cayugan). Equivalent to upper part of Brayman Shale in eastern New York.

THICKNESS: 50 - 60 feet total. Approximate figures for the members are Oatka 20 feet, Falkirk 20 feet, Scajaquada 8 feet, and Williamsville 6 feet.

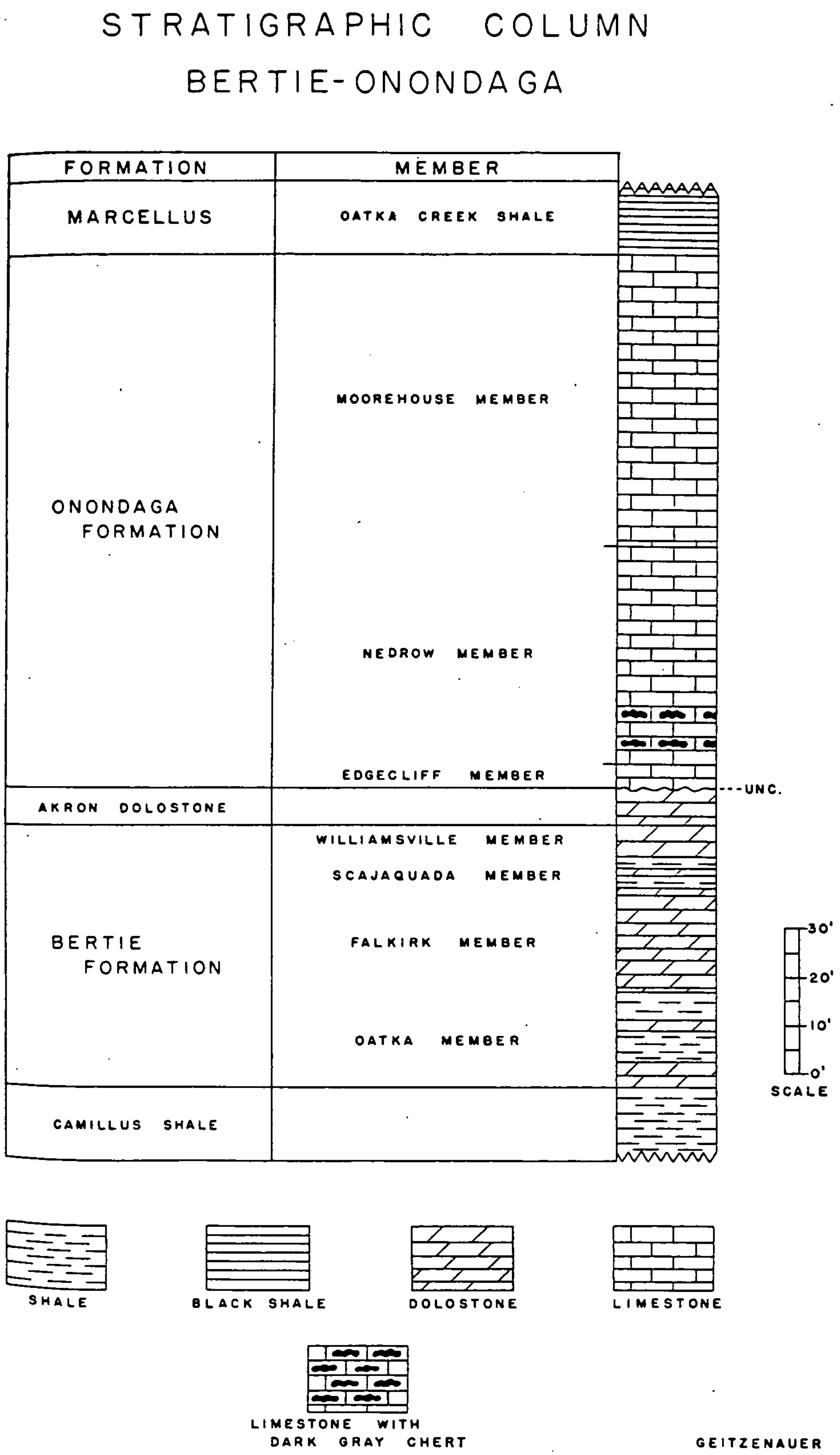

STRATIGRAPHIC COLUMN
BERTIE-ONONDAGA
FORMATION
MEMBER
MARCELLUS
OATKA CREEK SHALE
ONONDAGA FORMATION
MOOREHOUSE MEMBER
NEDROW MEMBER
EDGECLIFF MEMBER
AKRON DOLOSTONE
UNC.
BERTIE FORMATION
WILLIAMSVILLE MEMBER
SCAJAQUADA MEMBER
FALKIRK MEMBER
OATKA MEMBER
CAMILLUS SHALE
30'
20'
10'
0'
SCALE
SHALE
BLACK SHALE
DOLOSTONE
LIMESTONE
LIMESTONE WITH DARK GRAY CHERT
GEITZENAUER

Fig. 5

LITHOLOGY: The Bertie Formation consists predominantly of dolostone or dolomitic limestone. The Oatka Member contains shaly dolostone and is difficult to differentiate from the underlying Camillus Shale. The Falkirk Member is a massive brown dolostone. The Scajaquada and Williamsville Members consist of dark gray shale and gray dolostone beds of variable thickness. The dolostone tends to fracture conchoidally. Cross-bedding, salt hopper casts, and a variety of unidentified sedimentary structures are displayed.

It has been argued by O'Connell (1916) that the Bertie Formation represents a deltaic or lagoonal rather than a marine environment. The eurypterids are envisioned as river-dwelling animals whose exoskeletons were washed onto a delta. Ruedemann (1924) and others regard the eurypterids as marine animals although they interpret the Bertie as a lagoonal deposit.

PROMINENT OUTCROPS: In Buffalo, the Bertie may be seen near the Main Street entrance to Forest Lawn cemetery; in the storm sewer on East Amherst Street and in the railroad cut on Amherst Street, a few blocks west of Main Street. There is a good exposure at the falls of Ellicott Creek in Williamsville; in the Louisville Cement Company quarry on the north side of New York route 5 near Clarence; and, at the falls in Akron Falls Park (pl. 6, lower).

CONTACTS: Both the lower and upper contacts are difficult to define.

ECONOMIC GEOLOGY: This rock has been quarried for crushed stone and cement manufacture. Near Akron there are several abandoned mine shafts, no longer accessible.

PALEONTOLOGY: The Bertie is famous for its eurypterids, collections of which are housed in the Buffalo Museum of Science and in the New York State Museum at Albany. See Heubusch (1959) for an account of the stratigraphic distribution of these. The eurypterids are found in the Williamsville Member.

The faunal list has been compiled from the following sources: Pohlman (1881; 1886), Clarke and Ruedemann (1903; 1912), Luther (1906, p. 9), O'Connell (1914), Clarke (1919, pp. 531-532), Ruedemann (1925), Bassler (1939), Kilfoyle (1954), Caster and Kjellesvig-Waering (1956), Kjellesvig-Waering (1958), Heubusch (1959 and personal communication), Howell (1959), Kjellesvig-Waering and Heubusch (1962):

PLANTS

Callithamnopsis silurica Ruedemann
Hostimella silurica Goldring
Nematophyton (?) sp.
Sphenophycus (?) sp.
Stigmatella sp.

COELENTERATES

Ceratopora (?) sp.
Metaconularia perglabra (Ruedemann)
Serpulites sp.
Stromatopora sp.

BRYOZOANS

Hernodia (?) *monahani* Bassler
Reptaria cayuga Bassler

ANNELID

Ruedemannella obesa Ruedemann

AGE AND CORRELATION: Late Silurian (Cayugan). The Akron Dolostone correlates with the Cobleskill Dolomite of eastern New York.

THICKNESS: Approximately 8 feet.

LITHOLOGY: The beds vary from a few inches to over a foot in thickness. The color ranges from greenish-gray to light buff and displays a characteristic mottled and banded appearance. In texture the rock is fine-grained but vuggy and rough-weathering. A pitted surface results from the weathering of fossil corals.

PROMINENT OUTCROPS: Forest Lawn cemetery in Buffalo; storm sewer on Amherst Street; railroad cut on Main Street near Jewett Avenue; Louisville Cement Company quarry on New York route 5 near Clarence; Cummings old cement works one mile north of New York route 5 on Cummings Road; Murder Creek near Akron Falls Park (pl. 6, lower).

CONTACTS: The lower contact is conformable with the top of the Bertie Formation. The upper contact with the Onondaga Limestone is a conspicuous disconformity which has cut out most or all of the Lower Devonian. The top of the Akron Dolostone is broadly undulating and has channels which are commonly ten feet across and three feet deep, containing some sand grains and clay at the bottom. Clastic dikes filled with sand have been described. See Grabau (1900, pp. 355-361) for a thorough description of the contact and the dikes.

ECONOMIC GEOLOGY: The Akron Dolostone has been used as a building stone and in the manufacture of cement.

PALEONTOLOGY: This list has been compiled from Grabau (1900 pp. 363-376), Hartnagel (1903), Ruedemann (1925), Kilfoyle (1954), Kjellsvig-Waering (1958):

PLANTS

Nematophyton crassum Penhallow

COELENTERATES

Cyathophyllum hydraulicum Simpson

Favosites sp.

BRACHIOPODS

Delthyris eriensis (Grabau)
Orthotetes interstriatus Hall
Rhynchonella sp.
Whitfieldella cf. *laevis* (Whitfield)
W. nucleolata (Hall)
W. cf. *rotundata* (Whitfield)
W. sulcata (Vanuxem)

MOLLUSKS

Gastropods

Loxonema (?) sp.
Pleurotomaria (?) sp.

Cephalopods

Foersteoceras turbinatum (Hall)
Mitroceras gebhardi (Hall)

Middle Devonian

Hamilton Group

Dl

Ludlowville Formation

Tichenor Limestone Member, thin, massive, fossiliferous, resistant limestone occurs at top; Wanakah Shale Member, medium-gray, fossiliferous, calcareous shale with some calcareous concretions; Ledyard Shale Member, dark-gray calcureous shale; Centerfield Limestone Member, thin, massive limestone unit at base.

Dsk

Skaneateles Formation

Levanna Shale Member, dark-gray calcareous shale; Stafford Limestone Member, massive, fossiliferous limestone at base.

Dma

Marcellus Formation

Oatka Creek Shale Member, black calcareous shale with some calcareous concretions.

Do

Onondaga Limestone

Moorehouse Limestone Member, light-gray limestone containing numerous corals and considerable dark-gray chert nodules; Nedrow Member, intermixed light-gray limestone and dark-gray chert; Edgecliff Member, light-gray limestone with some light-gray chert nodules, locally represented by a coral bioherm.

UNCONFORMITY

Upper Silurian

SILURIAN

Sa

Akron Dolostone

Light-gray dolostone

Sb

Bertie Formation

Williamsville Member, light-gray argillaceous limestone; Scajaquada Member, interbedded dark-gray shale and argillaceous limestone; Falkirk Member, light-gray dolostone; Oatka Member, dark-gray shale with argillaceous limestone at base containing eurypterids.

Sc

Camillus Shale

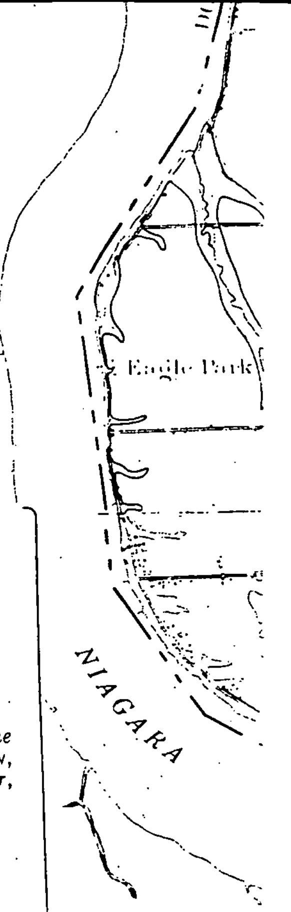
Gray shale containing large amounts of gypsum

Contact

Inferred Contact

GEOLOGIC MAP OF ERIE COUNTY, NEW YORK BEDROCK GEOLOGY

by Edward J. Buehler and Irving H. Tesmer



EXPLANATION

DEVONIAN

Upper Devonian

Arkwright Group

Dcg

Dcsw

Dcd

Canadaway Formation

Gowanda Shale Member, and younger beds undifferentiated, Dcg, *siltstones and silty shales in the upper part, dark shale and thin siltstones in the lower part; South Wales Shale Member,* Dcsw, *medium-gray shale containing many siltstones and calcareous nodules; Dunkirk Shale Member,* Dcd, *massive black shale containing some gray shale and large septaria.*

Seneca Group

Dj

Java Formation

Hanover Shale Member, gray shale containing many calcareous nodules, some black shale and a few thin siltstones; Pipe Creek Shale Member, massive black shale at base.

Dwa

Dwr

West Falls Formation

Nunda Sandstone Member, Dwn, *massive siltstones with some thin siltstones and silty shales; Angola Shale Member,* Dwa, *medium light-gray to light-gray shale containing a little black shale, a few thin siltstones and many calcareous nodules of various sizes; Rhinestreet Shale Member,* Dwr, *black shale containing some gray and dark-gray shale, many large septaria and some small nodules.*

Dso

Sonyea Formation

Cashaqua Shale Member, gray and olive-gray shale containing many discoidal calcareous nodules and septaria; Middlesex Shale Member, black shale at base.

Dg

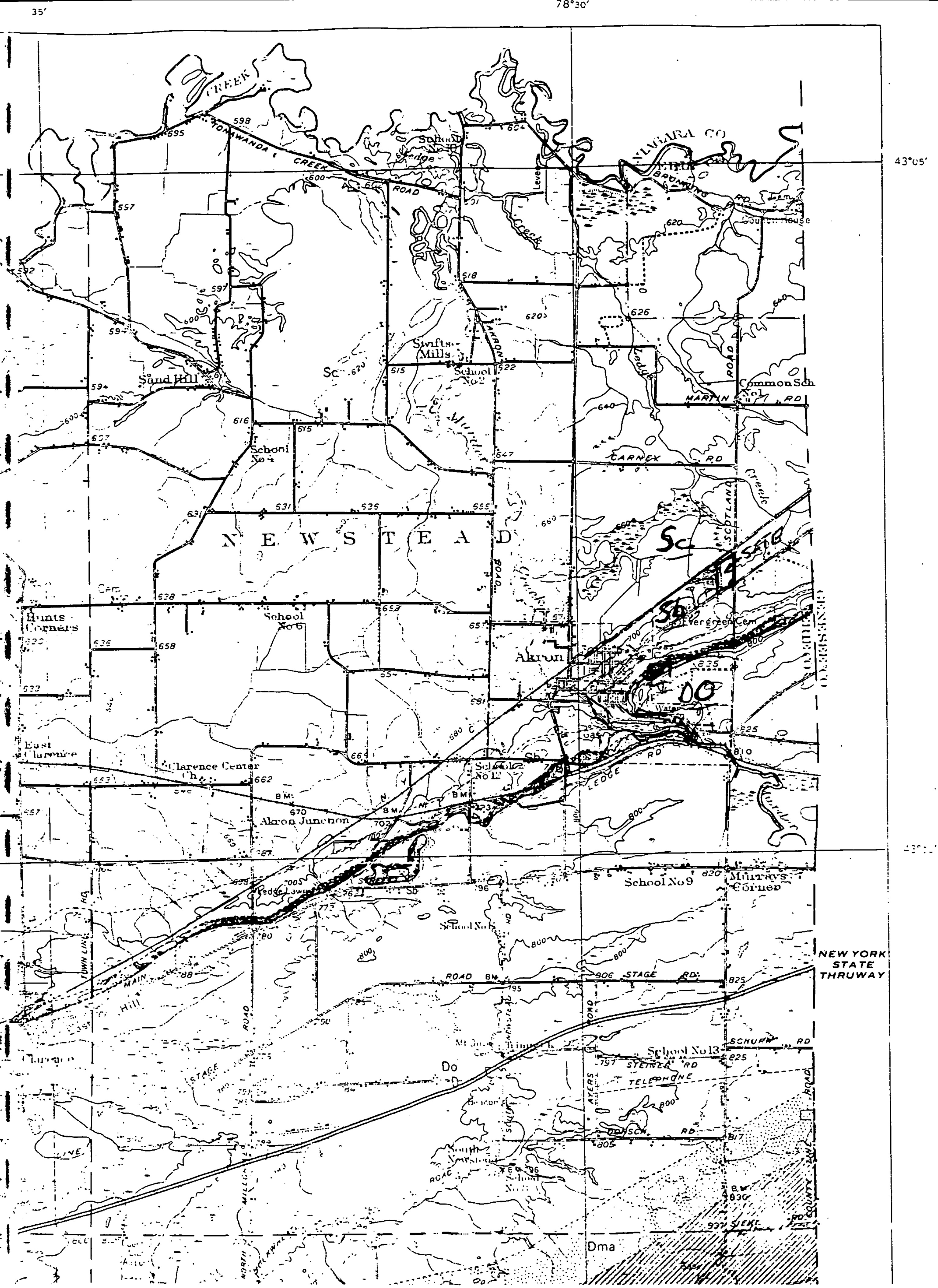
Genesee Formation

West River Shale Member, dark-gray shale with some very thin beds of black shale and siltstones; Genundewa Limestone Member, thin limestone containing Styliolina fissurella; Penn Yan Shale Member, thin unit of dark-gray shale; Geneseo Shale Member, thin unit of black shale at base.

Dmo

Moscow Formation

Windom Shale Member, medium-gray to olive-gray calcareous shale with many calcareous concretions; Kashong Shale Member, thin unit of soft gray shale at base. Thin lenses of Leicester Pyrite sometimes occur between the Moscow and Genesee Formations.


35'
78°30'
43°05'
TONAWANDA CREEK
CREEK
NIAGARA CO
BROMLEY RD
Council House
School No 3
Swifts Mills
School No 2
AKRON
Sand Hill
Common Sch No 1
MARTIN RD
CARNEY RD
SCOTLAND
School No 4
N E W S T E A D
ROAD
Sc
Sb
Hunts Corners
School No 6
Evergreen Cem
Akron
DO
Water
Gas
East Clarence
Clarence Center
School No 12
LEDGE RD
Akron Junction
School No 9
Murrays Corner
School No 8
NEW YORK STATE THRUWAY
MAIN
Hill
STAGE RD
ROAD
School No 13
SCHURR RD
STEINER RD
TELEPHONE
AYERS
DOBSON RD
Clarence
Do
South Newstead
School No 11
SIEHL
COUNTY LINE ROAD
TOWN LINE RD
NORTH
Dma

REFERENCE #6

NUS CORPORATION | **TELECON NOTE**

CONTROL NO:	DATE:	TIME:
	~~8~~ 9/2/84	1030

DISTRIBUTION:

File

BETWEEN:	OF:	PHONE:
Ed Paolini	Erie County Health Dept.	(716) 846-7677

AND: J. Mayo (NUS)

DISCUSSION:

Questioned Mr. Paolini on water use of Ledge Creek and Murder Creek.

Creeks are not used for water supply or irrigation. Not sure of recreational use.

ACTION ITEMS:

NUS 067 REVISED 0581

REFERENCE #7

NUS CORPORATION | **TELECON NOTE**

CONTROL NO:	DATE: 9/4/86	TIME: 0950

DISTRIBUTION:

File.

BETWEEN: Tom Wantuck	OF: NYDEC Region 9, Water office Senior Eng. Tech.	PHONE: (716) 8474590
AND: J. Mayo		(NUS)

DISCUSSION:

Questioned Mr. Wantuck about uses of Ledge Creek in Erie Co. N.Y.

Classified as Class C stream with a CT designation.

- suitable for fishing and other uses except as a source of drinking water and primary contact recreation.

- CT designation - trout spawning stream must have specific chemical + physical properties.

pH 6.5 - 8.5

TDS < 500 mg/l

D.O. ~~[illegible]~~ 7 mg/l

J. Mayo 9/4/86

ACTION ITEMS:

REFERENCE #9

DRAFT

GRAPHICAL EXPOSURE MODELING SYSTEM

(GEMS)

USER'S GUIDE

Prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDES AND TOXIC SUBSTANCES
EXPOSURE EVALUATION DIVISION
Task No. 4
Contract No. 68016618
William Wood - Project Officer
Loren Hall - Task Manager

Prepared by:

GENERAL SOFTWARE CORPORATION
8401 Corporate Drive
Landover, Maryland 20785

Submitted: June 25, 1984

MASTER AREA REFERENCE FILE (MARF) OF THE 1980 CENSUS

Source

The Master Area Reference File (MARF) is a proprietary product of Donnelly Marketing, Inc., a subsidiary of Dunn and Bradstreet, and is available only to EPA users and to contractors engaged in EPA projects.

Description

The complete corrected MARF of the 1980 Census, with geographic coordinates for small geographic areas, is installed for GEMS on a separate disk pack. It consists of four subfiles, one for each major census geographic region, and is available to users when that disk pack is mounted. The file has a variety of location identification information, including region, state, county, place, census tracts and enumeration districts or block groups (See Figure C-1 for illustrations). It also contains population count by race, the number of occupied and owner-occupied housing units, group quarters, and number of families for all the enumeration districts/block groups for the continental United States, Hawaii, and Alaska.

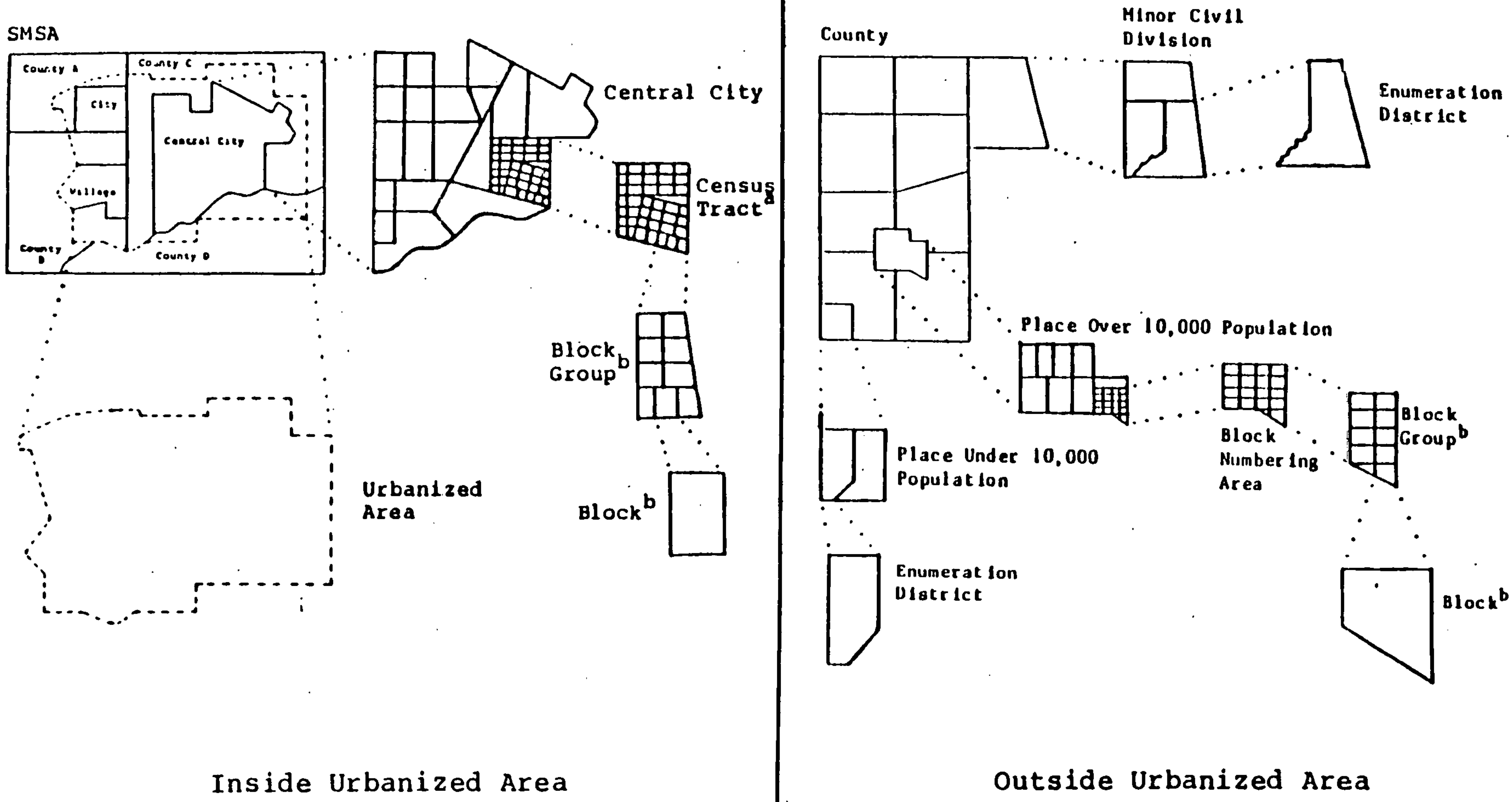
CEDPOP, a subset of the MARF of the 1980 Census, is accessible through GEMS. In addition to total population and household counts, the file includes geographic coordinates for the population-weighted centroid of each census block group or enumeration district (BG/ED) in the file.

Use

The complete MARF 80 Census file, installed in GEMS on a separate disk, is expected to be used heavily by GEMS users to identify household and population by racial groups at any required geographic level. County aggregate populations have already been created from this file.

CEDPOP was interfaced with ATM80 in GEMS to provide estimates of population sizes exposed to concentrations of airborne chemicals around a release site and with BOXMOD80 to provide population estimates within area source regions. The population centroids are identified, and populations are accumulated in sectors (typically the sixteen wind direction sectors) surrounding the center point within a user-specified number of radial distances out from the center.

The CEDPOP file also is accessed by CENSUS DATA and RADII-5 procedures under the GEODATA HANDLING operation in GEMS. CENSUS DATA accumulates population and housing counts by up to ten user-specified radial distances and from one-to-sixteen sectors. The RADII-5 program tabulates the same information (except housing counts) and displays the centroid locations for user-specified circular distances around a center point.



[a]The entire SMSA is subdivided into census tracts.

[b]Blocks and block groups do not have symbolized boundaries as do the other areas, but are identified by number.

Figure C-1. Geographic Hierarchy Inside and Outside Urbanized Areas (UA's)

02-8603-34A/NYS5

MENU: Process Census Data by Latitude and Longitude

ref	par-name	parameter description	value
1.	LAT	latitude (DDMMSS or degree)	430200
2.	LON	longitude (DDDMMSS or degree)	782840
3.	RINGDIST	ring distances in Km	6.4
4.	NSECTORS	number of sectors	1
5.	DATASET	Name of the output dataset	NYS5
6.	TAG	tag field of the output dataset	*

Enter one or more combinations of: reference or parameter name
[ref1 value1, ref2 value2, ...] or a command: HELP,NEXT,BACK,EN
?

Data List of Dataset: NYS5   Number of Records = 6

REC #	POP	HOUSE	DISTANCE	SECTOR
1	0	0	0.400000	1
2	0	0	0.810000	1
3	0	0	1.60000	1
4	3782	1429	3.20000	1
5	2150	691	4.80000	1
6	2705	987	6.40000	1

REFERENCE #10

SAMPLE DESCRIPTIONS
CASE #6062
6/3/86

Sample Number	Sample Type	Traffic Report #	Federal Express Airbill #	Time	Location
NYS5-S1	Soil	BG918 MBG309	495160234 495160245	1012	Collected on the east side of the landfill, 20 yds. east of access road. Sample depth, 1 ft.
NYS5-S2	Soil	BG919 MBG310	495160234 495160245	1032	Collected on the north side of landfill near drums. Sample depth, 0-2 in.
NYS5-SED1	Sediment	BG922 MBG313	495160234 495160245	1100	Collected in drainage ditch adjacent to railroad at base of north face of the landfill.
NYS5-S3	Soil	BG920 MBG311	495160234 495160245	1111	Collected on north side of the landfill from piles adjacent to the landfill road. Sample depth, 0-2 in.
NYS5-SED2	Sediment	BG923 MBG314	495160234 495160245	1125	Collected in drainage ditch near wood piles, 10 ft. east of railroad tracks.
NYS5-S4	Soil	BG921 MBG312	495160234 495160245	1137	Collected at base of west face of the landfill near the wood piles. Sample depth, 6-8 in.
NYS5-BL1	Blank	BG926	495160234	N/A	EPA Laboratory, Edison, NJ

ANALYTICAL DATA
NAME: WHITING DEVELOPMENT CORP.
SAMPLING DATE: 6/13/86
CASE: 6062

VOLATILES

SAMPLE NUMBER MATRIX UNITS	NYS5-S1 SOIL UG/KG	NYS5-S2 SOIL UG/KG	NYS5-SED1 SEDIMENT UG/KG	NYS5-S3 SOIL UG/KG	NYS5-SED2 SEDIMENT UG/KG	NYS5-S4 SOIL UG/KG	NYS5-BL1 BLANK UG/KG
Chloromethane							
Bromomethane							
Vinyl Chloride							
Chloroethane							
Methylene Chloride	B	BJ	BJ	B	B	B	J
Acetone	BJ	BJ	B	BJ	B	BJ	13
Carbon Disulfide							
1,1-Dichloroethene							
1,1-Dichloroethane					11		
Trans-1,2-Dichloroethene							
Chloroform							
1,2-Dichloroethane							
2-Butanone	BJ	BJ	BJ	BJ	B	BJ	J
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Vinyl Acetate							
Bromodichloromethane							
1,1,2,2-Tetrachloroethane							
1,2-Dichloropropane							
Trans-1,3-Dichloropropene							
Trichloroethene					15		
Dibromochloromethane							
1,1,2-Trichloroethane							
Benzene							
Cis-1,3-Dichloropropene							
2-Chloroethylvinylether							
Bromoform							
2-Hexanone							
4-Methyl-2-Pentanone							
Tetrachloroethene					30		
Toluene					6		
Chlorobenzene							
Ethylbenzene							
Styrene							
Total Xylenes							

NOTES:
Blank space - compound analyzed for but not detected
E - analysis did not pass QA/QC requirements
J - compound present below the specified detection limit.
B - compound found in laboratory blank as well as the sample, indicates possible/probable blank contamination

ANALYTICAL DATA
[illegible] WHITING DEVELOPMENT CORP.
SAMPLING DATE: 6/13/86
[illegible]: 6062

SEMI-VOLATILES

SAMPLE NUMBER MATRIX UNITS	NYS5-S1 SOIL UG/KG	NYS5-S2 SOIL UG/KG	NYS5-SED1 SEDIMENT UG/KG	NYS5-S3 SOIL UG/KG	NYS5-SED2 SEDIMENT UG/KG	NYS5-S4 SOIL UG/KG
N-Nitrosodimethylamine						
Phenol						
Aniline						
Bis(2-Chloroethyl)Ether						
2-Chlorophenol						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Benzyl Alcohol					J	
1,2-Dichlorobenzene						
2-Methylphenol						
Bis(2-Chloroisopropyl)Ether						
4-Methylphenol			J		J	
N-Nitroso-Di-n-Propylamine						
Hexachloroethane						
Nitrobenzene						
Isophorone						
2-Nitrophenol						
2,4-Dimethylphenol						
Benzoic Acid					6000	
Bis(2-Chloroethoxy)Methane						
2,4-Dichlorophenol						
1,2,4-Trichlorobenzene						
Naphthalene	J				510	J
4-Chloroaniline						
Hexachlorobutadiene						
4-Chloro-3-Methylphenol						
2-Methylnaphthalene	J			J	750	J
Hexachlorocyclopentadiene						
2,4,6-Trichlorophenol						
2,4,5-Trichlorophenol						
2-Chloronaphthalene						
2-Nitroaniline						
Dimethyl Phthalate						
Acenaphthylene					J	
3-Nitroaniline						
Acenaphthene						
2,4-Dinitrophenol						
4-Nitrophenol	J					
Dibenzofuran				J	J	
2,4-Dinitrotoluene						
2,6-Dinitrotoluene						
Diethylphthalate						
4-Chlorophenylphenyl ether						
Fluorene					J	
4-Nitroaniline						

ANALYTICAL DATA
NGM & WHITING DEVELOPMENT CORP.
SAMPLING DATE: 6/13/86
CASE: 6062

SEMI-VOLATILES

SAMPLE NUMBER MATRIX UNITS	NYS5-S1 SOIL UG/KG	NYS5-S2 SOIL UG/KG	NYS5-SED1 SEDIMENT UG/KG	NYS5-S3 SOIL UG/KG	NYS5-SED2 SEDIMENT UG/KG	NYS5-S4 SOIL UG/KG
4,6-Dinitro-2-Methylphenol						
N-Nitrosodiphenylamine						
4-Bromophenylphenyl ether						
Hexachlorobenzene						
Pentachlorophenol	J				J	
Phenanthrene	J	J		J	1000	J
Anthracene	J				J	
Di-n-Butylphthalate	B	B	B	BJ	B	BJ
Fluoranthene	J			J	920	J
Benzidine	J					
Pyrene		J		J	740	J
Butylbenzylphthalate						
3,3' Dichlorobenzidine						
Benzo(a)Anthracene					940	
bis(2-Ethylhexyl)Phthalate		3000	J		1600	J
Chrysene	J		J	J	1050	J
Di-n-Octyl Phthalate						
Benzo(b)Fluoranthene	J				1500	
Benzo(K)Fluoranthene	J				1500	
Benzo(a)Pyrene	J	J			1100	
Indeno(1,2,3-cd)Pyrene						
Dibenzo(a,h)Anthracene						
Benzo(ghi)Perylene	J					

NOTES:

Blank space compound analyzed for but not detected
E - analysis did not pass QA/QC requirements
J - compound present below the specified detection limit
B - compound found in laboratory blank as well as the sample, indicates possible/probable blank contamination

ANALYTICAL DATA
NAME: WHITING DEVELOPMENT CORP.
SAMPLING DATE: 6/13/86
CASE: 6062

PESTICIDES/PCBs

SAMPLE NUMBER MATRIX UNITS	NYS5-S1 SOIL UG/KG	NYS5-S2 SOIL UG/KG	NYS5-SED1 SEDIMENT UG/KG	NYS5-S3 SOIL UG/KG	NYS5-SED2 SEDIMENT UG/KG	NYS5-S4 SOIL UG/KG
Alpha-BHC						
Beta-BHC						
Delta-BHC						
Gamma-BHC (Lindane)						
Heptachlor						
Aldrin						
Heptachlor Epoxide						
Endosulfan I						
Dieldrin						
4,4'-DDE						
Endrin						
Endosulfan II						
4,4'-DDD						
Endosulfan sulfate						
Endrin Aldehyde						
4,4'-DDT						
Methoxychlor						
Endrin Ketone						
Chlordane						
Toxaphene						
Aroclor-1016						
Aroclor-1221						
Aroclor-1232						
Aroclor-1242						
Aroclor-1248						
Aroclor-1254						
Aroclor-1260						

NOTES:
Blank space - compound analyzed for but not detected
E - analysis did not pass QA/QC requirements
J - compound present below the specified detection limit
B - compound found in laboratory blank as well as the sample, indicates possible/probable blank contamination

ANALYTICAL DATA
NAME: WHITING DEVELOPMENT CORP.
SAMPLING DATE: 6/13/85
CASE: 6062

INORGANICS

SAMPLE NUMBER MATRIX UNITS	NYS5-S1 SOIL MG/KG	NYS5-S2 SOIL MG/KG	NYS5-SED1 SEDIMENT MG/KG	NYS5-S3 SOIL MG/KG	NYS5-SED2 SEDIMENT MG/KG	NYS5-S4 SOIL MG/KG
Aluminum	2100	6900	6150	2430	2750	1350
Antimony						
Arsenic						
Barium	J	J	J	J	J	
Beryllium						J
Cadmium						
Calcium	200000	198000	11700	205000	98000	
Chromium	16	24	8.5	18	25	8.7
Cobalt			J	J		
Copper	18	57	25	42	115	21
Iron	4560	3500	15400	11800	22800	7110
Lead	53	97	22	63	376	47
Magnesium	17700	17400	J	18700	18000	8370
Manganese	56	97	225	112	281	37
Mercury	0.6	1.4		0.6	0.6	0.3
Nickel	J	J	J	J	J	J
Potassium	J	J	J	J	J	
Selenium	J	J	J	J	J	J
Silver				J		
Sodium	J	J		J		J
Thallium						
Tin						
Vanadium	J	J	J	J	J	
Zinc	145	303	84	113	912	297

NOTES:
Blank space : compound analyzed for but not detected
C - analysis did not pass QA/QC requirements
J compound present below the specified detection limit
B - compound found in laboratory blank as well as the sample, indicates possible/probable blank contamination

INORGANIC DATA QUALIFIER

Footnotes:

NR	-	not required by contract at this time.
Form I:		
Value	-	If the result is a value greater than or equal to the instrument detection limit but less than the contract required detection limit, report the value in brackets (i.e., [10]. Indicate the analytical method used with P (for ICP/Flame AA) or F (for furnace).
U	-	Indicates elemant was analyzed for but not detected. Report with the detection limit value (e.g., 10U).
E	-	Indicates a value estimated or not reported due to the presence of interference. Explanatory note included on cover page.
s	-	Indicates value determined by Method of Standard Addition.
R	-	Indicates spike sample recovery is not within control limits.
*	-	Indicates duplicate analysis in not within control limits.
+	-	Indicates the correlation coefficient for method of standard addition is less than 0.995

Form I

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

00002

EPA Sample No.
MBG309

Date 6-26-86

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL
SOW NO. 784
LAB SAMPLE ID. NO. -

CASE NO. 6062
QC REPORT NO. 56058

Elements Identified and Measured

Concentration: Low X Medium ____
Matrix: Water ____ Soil X Sludge ____ Other ____

mg/kg dry weight

1.	ALUMINUM	2100	P	13.	MAGNESIUM	17700	P
2.	ANTIMONY	18U	P	14.	MANGANESE	56	P
3.	ARSENIC	6.9U	F	15.	MERCURY	0.6	CV
4.	BARIUM	[109]	P	16.	NICKEL	[12]	P
5.	BERYLLIUM	0.69U	P	17.	POTASSIUM	[504]	P
6.	CADMIUM	3.5U	P	18.	SELENIUM	35U	F R
7.	CALCIUM	200000	P	19.	SILVER	2.1U	P
8.	CHROMIUM	16	P	20.	SODIUM	[1130]	P
9.	COBALT	4.9U	P	21.	THALLIUM	6.9U	F
10.	COPPER	18	P	22.	TIN	11U	P
11.	IRON	4560	P	23.	VANADIUM	[5.4]	P
12.	LEAD	53	P X	24.	ZINC	145	P

Cyanide NR

Percent Solids (%) 72

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: Selenium value reported at a 10X dilution

Lab Manager JML

Form I

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

EPA Sample No.
MBG310

Date 6-26-86

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL
SOW NO. 784
LAB SAMPLE ID. NO. -

CASE NO. 6062
QC REPORT NO. 56058

Elements Identified and Measured

Concentration: Low X Medium ____
Matrix: Water ____ Soil X Sludge ____ Other ____

mg/kg dry weight

1.	ALUMINUM	6900	P	13.	MAGNESIUM	17400	P
2.	ANTIMONY	18U	P	14.	MANGANESE	99	P
3.	ARSENIC	6.9U	F	15.	MERCURY	1.4	CV
4.	BARIUM	[64]	P	16.	NICKEL	[14]	P
5.	BERYLLIUM	0.69U	P	17.	POTASSIUM	[720]	P
6.	CADMIUM	3.5U	P	18.	SELENIUM	35U	F R
7.	CALCIUM	198000	P	19.	SILVER	2.1U	P
8.	CHROMIUM	24	P	20.	SODIUM	[1400]	P
9.	COBALT	4.9U	P	21.	THALLIUM	6.9U	F
10.	COPPER	57	P	22.	TIN	11U	P
11.	IRON	3500	P	23.	VANADIUM	[11]	P
12.	LEAD	97	P X	24.	ZINC	303	P

Cyanide NR

Percent Solids (%) 72

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: Selenium value reported at a 10x dilution

Lab Manager JML

Form I

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

EPA Sample No. MBG311

Date 6-26-86

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL
CASE NO. 6062
SOW NO. 784
LAB SAMPLE ID. NO. -
QC REPORT NO. 56058

Elements Identified and Measured

Concentration: Low X Medium ____
Matrix: Water ____ Soil X Sludge ____ Other ____

mg/kg dry weight

1.	ALUMINUM	2430	P	13.	MAGNESIUM	18700	P
2.	ANTIMONY	16U	P	14.	MANGANESE	112	P
3.	ARSENIC	6.3U	F	15.	MERCURY	0.6	CV
4.	BARIUM	[44]	P	16.	NICKEL	[13]	P
5.	BERYLLIUM	0.63U	P	17.	POTASSIUM	[451]	P
6.	CADMIUM	3.1U	P	18.	SELENIUM	31U	F R
7.	CALCIUM	205000	P	19.	SILVER	[2.2]	P
8.	CHROMIUM	18	P	20.	SODIUM	[1260]	P
9.	COBALT	[6.3]	P	21.	THALLIUM	6.3U	F
10.	COPPER	42	P	22.	TIN	10U	P
11.	IRON	11800	P	23.	VANADIUM	[8]	P
12.	LEAD	63	P X	24.	ZINC	113	P

Cyanide NR
Percent Solids (%) 80

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: Selenium value reported at a 10x dilution

Lab Manager JML

Form I

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

EPA Sample No.
MBG312

Date 6-26-86

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL
SOW NO. 784
LAB SAMPLE ID. NO. -

CASE NO. 6062
QC REPORT NO. 56058

Elements Identified and Measured

Concentration: Low X Medium ____
Matrix: Water ____ Soil X Sludge ____ Other ____

mg/kg dry weight

1.	ALUMINUM	1350	P	13.	MAGNESIUM	8320	P
2.	ANTIMONY	19U	P	14.	MANGANESE	39	P
3.	ARSENIC	7.1U	F	15.	MERCURY	0.4	CV
4.	BARIUM	[25]	P	16.	NICKEL	[5.5]	P
5.	BERYLLIUM	0.71U	P	17.	POTASSIUM	387U	P
6.	CADMIUM	3.6U	P	18.	SELENIUM	36U	F R
7.	CALCIUM	203000	P	19.	SILVER	2.1U	P
8.	CHROMIUM	8.7	P	20.	SODIUM	[840]	P
9.	COBALT	5U	P	21.	THALLIUM	7.1U	F
10.	COPPER	21	P	22.	TIN	11U	P
11.	IRON	7110	P	23.	VANADIUM	3.6U	P
12.	LEAD	47	P X	24.	ZINC	297	P

Cyanide NR
Percent Solids (%) 70

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: Selenium value reported at a 10X dilution

Lab Manager JML

Form I

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

EPA Sample No. MBG313

Date 6-26-86

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL
SOW NO. 784
LAB SAMPLE ID. NO. -

CASE NO. 6062
QC REPORT NO. 56058

Elements Identified and Measured

Concentration: Low X Medium
Matrix: Water Soil X Sludge Other

mg/kg dry weight

1.	ALUMINUM	6150	P	13.	MAGNESIUM	[3630]	P	
2.	ANTIMONY	21U	P	14.	MANGANESE	225	P	
3.	ARSENIC	7.9U	F	15.	MERCURY	0.2U	CV	
4.	BARIUM	[18]	P	16.	NICKEL	[12]	P	
5.	BERYLLIUM	0.79U	P	17.	POTASSIUM	[494]	P	
6.	CADMIUM	4U	P	18.	SELENIUM	4U	F	R
7.	CALCIUM	11700	P	19.	SILVER	2.4U	P	
8.	CHROMIUM	8.5	P	20.	SODIUM	518U	P	
9.	COBALT	[7.2]	P	21.	THALLIUM	7.9U	F	
10.	COPPER	25	P	22.	TIN	13U	P	
11.	IRON	15400	P	23.	VANADIUM	[15]	P	
12.	LEAD	22	F	24.	ZINC	84	P	

Cyanide NR

Percent Solids (%) 63

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments:

Lab Manager JML

Form I

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

EPA Sample No. MBG314

Date 6-26-86

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL
SOW NO. 784
LAB SAMPLE ID. NO. -

CASE NO. 6062
QC REPORT NO. 56058

Elements Identified and Measured

Concentration: Low X Medium ____
Matrix: Water ____ Soil X Sludge ____ Other ____

mg/kg dry weight

1.	ALUMINUM	9750	P	13.	MAGNESIUM	18000	P
2.	ANTIMONY	38U	P	14.	MANGANESE	281	P
3.	ARSENIC	15U	F	15.	MERCURY	0.6	CV
4.	BARIUM	[118]	P	16.	NICKEL	[38]	P
5.	BERYLLIUM	1.5U	P	17.	POTASSIUM	[1600]	P
6.	CADMIUM	7.4U	P	18.	SELENIUM	7.4U	F R
7.	CALCIUM	98000	P	19.	SILVER	4.4U	P
8.	CHROMIUM	95	P	20.	SODIUM	960U	P
9.	COBALT	10U	P	21.	THALLIUM	15U	F
10.	COPPER	115	P	22.	TIN	24U	P
11.	IRON	22800	P	23.	VANADIUM	[58]	P
12.	LEAD	376	P X	24.	ZINC	912	P

Cyanide NR

Percent Solids (%) 34

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments:

Lab Manager JML

ORGANIC DATA REPORTING QUALIFIERS

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of such flags must be explicit.

Value -If the result is a value greater than or equal to the detection limit, report the value.

U -Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g., 10U) based on necessary concentration/dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J -Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g., 10J)

C -This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides $\geq$10 ng/ul in the final extract should be confirmed by GC/MS.

B -This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

Other -Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

Sample Number
BG 918

Organics Analysis Data Sheet
(Page 1)

Laboratory Name: California Analytical Laboratories, Inc.
Lab Sample ID No: L2081
Sample Matrix: SOIL
Data Release Authorized By:

Case No: 6062
QC Report No: 146
Contract No: 68-01-6958
Date Sample Received: 6/16/86

Volatile Compounds

Concentration: Low
Date Extracted/Prepared: 6/25/86
Date Analyzed: 6/25/86
Conc/Dil Factor: 1 pH: 7.8
Percent Moisture: 34
Percent Moisture (Decanted): NR

CAS Number		ug/Kg
74-87-3	Chloromethane	10 U
74-83-9	Bromomethane	10 U
75-01-4	Vinyl Chloride	10 U
75-00-3	Chloroethane	10 U
75-09-2	Methylene Chloride	120 B
67-64-1	Acetone	8 BJ
75-15-0	Carbon Disulfide	5 U
75-35-4	1,1-Dichloroethene	5 U
75-34-3	1,1-Dichloroethane	5 U
156-60-5	Trans-1,2-Dichloroethene	5 U
67-66-3	Chloroform	5 U
107-06-2	1,2-Dichloroethane	5 U
78-93-3	2-Butanone	7 BJ
71-55-6	1,1,1-Trichloroethane	5 U
56-23-5	Carbon Tetrachloride	5 U
108-05-4	Vinyl Acetate	10 U
75-27-4	Bromodichloromethane	5 U

CAS Number		ug/Kg
78-87-5	1,2-Dichloropropane	5 U
10061-02-6	Trans-1,3-Dichloropropene	5 U
79-01-6	Trichloroethene	5 U
124-48-1	Dibromochloromethane	5 U
79-00-5	1,1,2-Trichloroethane	5 U
71-43-2	Benzene	5 U
10061-01-5	cis-1,3-Dichloropropene	5 U
110-75-8	2-Chloroethylvinylether	10 U
75-25-2	Bromoform	5 U
108-10-1	4-Methyl-2-Pentanone	10 U
591-78-6	2-Hexanone	10 U
127-18-4	Tetrachloroethene	5 U
79-34-5	1,1,2,2-Tetrachloroethane	5 U
108-88-3	Toluene	5 U
108-90-7	Chlorobenzene	5 U
100-41-4	Ethylbenzene	5 U
100-42-5	Styrene	5 U
	Total Xylenes	5 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/ dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read: U - Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample

J Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J). If limit of detection is 10ug/l and a concentration of 3ug/l is calculated, report as 3J

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10ng/ul in the final extract should be confirmed by GC/MS

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

Other Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

NA Not Analyzed.
See cover letter.
NR Not Required.
S Spiked Compound.

20

CLF: 11/14/85 Form I Prepared by: 10/85

Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 918

Organics Analysis Data Sheet
(Page 2)

Semivolatile Compounds

Concentration: Low

Date Extracted/Prepared: 6/20/86

Date Analyzed: 7/7/86

Conc/DiL Factor: 20G/1ML

GPC Cleanup: NO

Separatory Funnel Extraction: YES

Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
108-95-2	Phenol	330 U
111-44-4	bis(-2-Chloroethyl)Ether	330 U
95-57-8	2-Chlorophenol	330 U
541-73-1	1,3-Dichlorobenzene	330 U
106-46-7	1,4-Dichlorobenzene	330 U
100-51-6	Benzyl Alcohol	330 U
95-50-1	1,2-Dichlorobenzene	330 U
95-48-7	2-Methylphenol	330 U
39638-32-9	bis(2-chloroisopropyl)Ether	330 U
106-44-5	4-Methylphenol	330 U
621-64-7	N-Nitroso-Di-n-Propylamine	330 U
67-72-1	Hexachloroethane	330 U
98-95-3	Nitrobenzene	330 U
78-59-1	Isophorone	330 U
88-75-5	2-Nitrophenol	330 U
105-67-9	2,4-Dimethylphenol	330 U
65-85-0	Benzoic Acid	1600 U
111-91-1	bis(-2-Chloroethoxy)Methane	330 U
120-83-2	2,4-Dichlorophenol	330 U
120-82-1	1,2,4-Trichlorobenzene	330 U
91-20-3	Naphthalene	57 J
106-47-8	4-Chloroaniline	330 U
87-68-3	Hexachlorobutadiene	330 U
59-50-7	4-Chloro-3-Methylphenol	330 U
91-57-6	2-Methylnaphthalene	53 J
77-47-4	Hexachlorocyclopentadiene	330 U
88-06-2	2,4,6-Trichlorophenol	330 U
95-95-4	2,4,5-Trichlorophenol	1600 U
91-58-7	2-Chloronaphthalene	330 U
88-74-4	2-Nitroaniline	1600 U
131-11-3	Dimethyl Phthalate	330 U
208-96-8	Acenaphthylene	330 U
99-09-2	3-Nitroaniline	1600 U

CAS Number		ug/Kg
83-32-9	Acenaphthene	330 U
51-28-5	2,4-Dinitrophenol	1600 U
100-02-7	4-Nitrophenol	79 J
132-64-9	Dibenzofuran	330 U
121-14-2	2,4-Dinitrotoluene	330 U
606-20-2	2,6-Dinitrotoluene	330 U
84-66-2	Diethylphthalate	330 U
7005-72-3	4-Chlorophenyl-phenylether	330 U
86-73-7	Fluorene	330 U
100-01-6	4-Nitroaniline	1600 U
534-52-1	4,6-Dinitro-2-Methylphenol	1600 U
86-30-6	N-Nitrosodiphenylamine(1)	330 U
101-55-3	4-Bromophenyl-phenylether	330 U
118-74-1	Hexachlorobenzene	330 U
87-86-5	Pentachlorophenol	64 J
85-01-8	Phenanthrene	140 J
120-12-7	Anthracene	250 J
84-74-2	Di-n-Butylphthalate	610 B
206-44-0	Fluoranthene	190 J
129-00-0	Pyrene	91 J
85-68-7	Butylbenzylphthalate	330 U
91-94-1	3,3'-Dichlorobenzidine	660 U
56-55-3	Benzo(a)Anthracene	330 U
117-81-7	bis(2-Ethylhexyl)Phthalate	330 U
218-01-9	Chrysene	130 J
117-84-0	Di-n-Octyl Phthalate	330 U
205-99-2	Benzo(b)Fluoranthene	69 J
207-08-9	Benzo(k)Fluoranthene	69 J
50-32-8	Benzo(a)Pyrene	110 J
193-39-5	Indeno(1,2,3-cd)Pyrene	330 U
53-70-3	Dibenz(a,h)Anthracene	330 U
191-24-2	Benzo(g,h,i)Perylene	81 J

21

(1) - Cannot be separated from diphenylamine

CLF: 10/11/85 Form I Prepared by: [signature] 7/85

Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 918

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: LOW
Date Extracted/Prepared: 6/20/86
Date Analyzed: 7/2/86
Conc/Dil Factor: 0.99G/5ML

GPC Cleanup: NO
Separatory Funnel Extraction: YES
Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
319-84-6	Alpha-BHC	8.0 U
319-85-7	Beta-BHC	8.0 U
319-86-8	Delta-BHC	8.0 U
58-89-9	Gamma-BHC (Lindane)	8.0 U
76-44-8	Heptachlor	8.0 U
309-00-2	Aldrin	8.0 U
1024-57-3	Heptachlor Epoxide	8.0 U
959-98-8	Endosulfan I	8.0 U
60-57-1	Dieldrin	16 U
72-55-9	4,4'-DDE	16 U
72-20-8	Endrin	16 U
33213-65-9	Endosulfan II	16 U
72-54-8	4,4'-DDD	16 U
1031-07-8	Endosulfan Sulfate	16 U
50-29-3	4,4'-DDT	16 U
72-43-5	Methoxychlor	80 U
53494-70-5	Endrin Ketone	16 U
57-74-9	Chlordane	80 U
8001-35-2	Toxaphene	160 U
12674-11-2	Aroclor-1016	80 U
11104-28-2	Aroclor-1221	80 U
11141-16-5	Aroclor-1232	80 U
53469-21-9	Aroclor-1242	80 U
12672-29-6	Aroclor-1248	80 U
11097-69-1	Aroclor-1254	160 U
11096-82-5	Aroclor-1260	160 U

V_i = Volume of extract injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s = NR or W_s =0.99 V_t = 5000 V_i = 5

20

CLF: 11/14/85 Form I Prepared by: 7/85

Sample Number
BG 919

Organics Analysis Data Sheet
(Page 1)

Laboratory Name: California Analytical Laboratories, Inc.
Lab Sample ID No: L2082
Sample Matrix: SOIL
Data Release Authorized By:

Case No: 6062
QC Report No: 146
Contract No: 68-01-6958
Date Sample Received: 6/16/86

Volatile Compounds

Concentration: Low
Date Extracted/Prepared: 6/25/86
Date Analyzed: 6/25/86
Conc/Dil Factor: 1 pH: 7.7
Percent Moisture: 32
Percent Moisture (Decanted): NR

CAS Number		ug/Kg
74-87-3	Chloromethane	10 U
74-83-9	Bromomethane	10 U
75-01-4	Vinyl Chloride	10 U
75-00-3	Chloroethane	10 U
75-09-2	Methylene Chloride	5 BJ
67-64-1	Acetone	9 BJ
75-15-0	Carbon Disulfide	5 U
75-35-4	1,1-Dichloroethene	5 U
75-34-3	1,1-Dichloroethane	5 U
156-60-5	Trans-1,2-Dichloroethene	5 U
67-66-3	Chloroform	5 U
107-06-2	1,2-Dichloroethane	5 U
78-93-3	2-Butanone	9 BJ
71-55-6	1,1,1-Trichloroethane	5 U
56-23-5	Carbon Tetrachloride	5 U
108-05-4	Vinyl Acetate	10 U
75-27-4	Bromodichloromethane	5 U

CAS Number		ug/Kg
78-87-5	1,2-Dichloropropane	5 U
10061-02-6	Trans-1,3-Dichloropropene	5 U
79-01-6	Trichloroethene	5 U
124-48-1	Dibromochloromethane	5 U
79-00-5	1,1,2-Trichloroethane	5 U
71-43-2	Benzene	5 U
10061-01-5	cis-1,3-Dichloropropene	5 U
110-75-8	2-Chloroethylvinylether	10 U
75-25-2	Bromoform	5 U
108-10-1	4-Methyl-2-Pentanone	10 U
591-78-6	2-Hexanone	10 U
127-18-4	Tetrachloroethene	5 U
79-34-5	1,1,2,2-Tetrachloroethane	5 U
108-88-3	Toluene	5 U
108-90-7	Chlorobenzene	5 U
100-41-4	Ethylbenzene	5 U
100-42-5	Styrene	5 U
	Total Xylenes	5 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/ dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read: U - Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample

J Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J). If limit of detection is 10ug/l and a concentration of 3ug/l is calculated, report as 3J

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10ng/ul in the final extract should be confirmed by GC/MS

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

Other Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

NA Not Analyzed.
\# See cover letter.
NR Not Required.
S Spiked Compound.

112

CLF: 11/14/85 Form I Prepared by: 10/85

Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 919

Organics Analysis Data Sheet
(Page 2)

Semivolatile Compounds

Concentration: Low
Date Extracted/Prepared: 6/20/86
Date Analyzed: 7/3/86
Conc/Dil. Factor: 20G/1ML

GPC Cleanup: NO
Separatory Funnel Extraction: YES
Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
108-95-2	Phenol	330 U
111-44-4	bis(-2-Chloroethyl)Ether	330 U
95-57-8	2-Chlorophenol	330 U
541-73-1	1,3-Dichlorobenzene	330 U
106-46-7	1,4-Dichlorobenzene	330 U
100-51-6	Benzyl Alcohol	330 U
95-50-1	1,2-Dichlorobenzene	330 U
95-48-7	2-Methylphenol	330 U
39638-32-9	bis(2-chloroisopropyl)Ether	330 U
106-44-5	4-Methylphenol	330 U
621-64-7	N-Nitroso-Di-n-Propylamine	330 U
67-72-1	Hexachloroethane	330 U
98-95-3	Nitrobenzene	330 U
78-59-1	Isophorone	330 U
88-75-5	2-Nitrophenol	330 U
105-67-9	2,4-Dimethylphenol	330 U
65-85-0	Benzoic Acid	1600 U
111-91-1	bis(-2-Chloroethoxy)Methane	330 U
120-83-2	2,4-Dichlorophenol	330 U
120-82-1	1,2,4-Trichlorobenzene	330 U
91-20-3	Naphthalene	330 U
106-47-8	4-Chloroaniline	330 U
87-68-3	Hexachlorobutadiene	330 U
59-50-7	4-Chloro-3-Methylphenol	330 U
91-57-6	2-Methylnaphthalene	330 U
77-47-4	Hexachlorocyclopentadiene	330 U
88-06-2	2,4,6-Trichlorophenol	330 U
95-95-4	2,4,5-Trichlorophenol	1600 U
91-58-7	2-Chloronaphthalene	330 U
88-74-4	2-Nitroaniline	1600 U
131-11-3	Dimethyl Phthalate	330 U
208-96-8	Acenaphthylene	330 U
99-09-2	3-Nitroaniline	1600 U

CAS Number		ug/Kg
83-32-9	Acenaphthene	330 U
51-28-5	2,4-Dinitrophenol	1600 U
100-02-7	4-Nitrophenol	1600 U
132-64-9	Dibenzofuran	330 U
121-14-2	2,4-Dinitrotoluene	330 U
606-20-2	2,6-Dinitrotoluene	330 U
84-66-2	Diethylphthalate	330 U
7005-72-3	4-Chlorophenyl-phenylether	330 U
86-73-7	Fluorene	330 U
100-01-6	4-Nitroaniline	1600 U
534-52-1	4,6-Dinitro-2-Methylphenol	1600 U
86-30-6	N-Nitrosodiphenylamine(1)	330 U
101-55-3	4-Bromophenyl-phenylether	330 U
118-74-1	Hexachlorobenzene	330 U
87-86-5	Pentachlorophenol	1600 U
85-01-8	Phenanthrene	53 J
120-12-7	Anthracene	330 U
84-74-2	Di-n-Butylphthalate	560 B
206-44-0	Fluoranthene	330 U
129-00-0	Pyrene	51 J
85-68-7	Butylbenzylphthalate	330 U
91-94-1	3,3'-Dichlorobenzidine	660 U
56-55-3	Benzo(a)Anthracene	330 U
117-81-7	bis(2-Ethylhexyl)Phthalate	3000
218-01-9	Chrysene	330 U
117-84-0	Di-n-Octyl Phthalate	330 U
205-99-2	Benzo(b)Fluoranthene	330 U
207-08-9	Benzo(k)Fluoranthene	330 U
50-32-8	Benzo(a)Pyrene	270 J
193-39-5	Indeno(1,2,3-cd)Pyrene	330 U
53-70-3	Dibenz(a,h)Anthracene	330 U
191-24-2	Benzo(g,h,i)Perylene	330 U

(1) - Cannot be separated from diphenylamine

113

Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 919

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: LOW
Date Extracted/Prepared: 6/20/86
Date Analyzed: 7/2/86
Conc/Dil Factor: 1.0G/5ML

GPC Cleanup: NO
Separatory Funnel Extraction: YES
Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
319-84-6	Alpha-BHC	8.0 U
319-85-7	Beta-BHC	8.0 U
319-86-8	Delta-BHC	8.0 U
58-89-9	Gamma-BHC (Lindane)	8.0 U
76-44-8	Heptachlor	8.0 U
309-00-2	Aldrin	8.0 U
1024-57-3	Heptachlor Epoxide	8.0 U
959-98-8	Endosulfan I	8.0 U
60-57-1	Dieldrin	16 U
72-55-9	4,4'-DDE	16 U
72-20-8	Endrin	16 U
33213-65-9	Endosulfan II	16 U
72-54-8	4,4'-DDD	16 U
1031-07-8	Endosulfan Sulfate	16 U
50-29-3	4,4'-DDT	16 U
72-43-5	Methoxychlor	80 U
53494-70-5	Endrin Ketone	16 U
57-74-9	Chlordane	80 U
8001-35-2	Toxaphene	160 U
12674-11-2	Aroclor-1016	80 U
11104-28-2	Aroclor-1221	80 U
11141-16-5	Aroclor-1232	80 U
53469-21-9	Aroclor-1242	80 U
12672-29-6	Aroclor-1248	80 U
11097-69-1	Aroclor-1254	160 U
11096-82-5	Aroclor-1260	160 U

V_i = Volume of extract injected (ul)
V_s = Volume of water extracted (ml)
W_s = Weight of sample extracted (g)
V_t = Volume of total extract (ul)

V_s = NR or W_s =1.0 V_t = 5000 V_i = 5 114

CLF: 11/14/85 Form I Prepared by: [signature] 7/85

Sample Number
BG 920

Organics Analysis Data Sheet
(Page 1)

Laboratory Name: California Analytical Laboratories, Inc.

Lab Sample ID No: L2083

Sample Matrix: SOIL

Data Release Authorized By:

Case No: 6062

QC Report No: 146

Contract No: 68-01-6958

Date Sample Received: 6/16/86

Volatile Compounds

Concentration: Low

Date Extracted/Prepared: 6/25/86

Date Analyzed: 6/25/86

Conc/Dil Factor: 1 pH: 8.0

Percent Moisture: 27

Percent Moisture (Decanted): NR

CAS Number		ug/Kg
74-87-3	Chloromethane	10 U
74-83-9	Bromomethane	10 U
75-01-4	Vinyl Chloride	10 U
75-00-3	Chloroethane	10 U
75-09-2	Methylene Chloride	71 B
67-64-1	Acetone	8 BJ
75-15-0	Carbon Disulfide	5 U
75-35-4	1,1-Dichloroethene	5 U
75-34-3	1,1-Dichloroethane	5 U
156-60-5	Trans-1,2-Dichloroethene	5 U
67-66-3	Chloroform	5 U
107-06-2	1,2-Dichloroethane	5 U
78-93-3	2-Butanone	9 BJ
71-55-6	1,1,1-Trichloroethane	5 U
56-23-5	Carbon Tetrachloride	5 U
108-05-4	Vinyl Acetate	10 U
75-27-4	Bromodichloromethane	5 U

CAS Number		ug/Kg
78-87-5	1,2-Dichloropropane	5 U
10061-02-6	Trans-1,3-Dichloropropene	5 U
79-01-6	Trichloroethene	5 U
124-48-1	Dibromochloromethane	5 U
79-00-5	1,1,2-Trichloroethane	5 U
71-43-2	Benzene	5 U
10061-01-5	cis-1,3-Dichloropropene	5 U
110-75-8	2-Chloroethylvinylether	10 U
75-25-2	Bromoform	5 U
108-10-1	4-Methyl-2-Pentanone	10 U
591-78-6	2-Hexanone	10 U
127-18-4	Tetrachloroethene	5 U
79-34-5	1,1,2,2-Tetrachloroethane	5 U
108-88-3	Toluene	5 U
108-90-7	Chlorobenzene	5 U
100-41-4	Ethylbenzene	5 U
100-42-5	Styrene	5 U
	Total Xylenes	5 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read: U - Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample

J Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J). If limit of detection is 10ug/l and a concentration of 3ug/l is calculated, report as 3J

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10ng/ul in the final extract should be confirmed by GC/MS

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

Other Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

NA Not Analyzed.
\# See cover letter.
NR Not Required.
S Spiked Compound.

155

CLF: 11/14/85 Form I Prepared by: 10/85

Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 920

Organics Analysis Data Sheet
(Page 2)

Semivolatile Compounds

Concentration: Low
Date Extracted/Prepared: 6/20/86
Date Analyzed: 7/3/86
Conc/DiL Factor: 22G/1ML

GPC Cleanup: NO
. eparatory Funnel Extraction: YES
Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
108-95-2	Phenol	330 U
111-44-4	bis(-2-Chloroethyl)Ether	330 U
95-57-8	2-Chlorophenol	330 U
541-73-1	1,3-Dichlorobenzene	330 U
106-46-7	1,4-Dichlorobenzene	330 U
100-51-6	Benzyl Alcohol	330 U
95-50-1	1,2-Dichlorobenzene	330 U
95-48-7	2-Methylphenol	330 U
39638-32-9	bis(2-chloroisopropyl)Ether	330 U
106-44-5	4-Methylphenol	330 U
621-64-7	N-Nitroso-Di-n-Propylamine	330 U
67-72-1	Hexachloroethane	330 U
98-95-3	Nitrobenzene	330 U
78-59-1	Isophorone	330 U
88-75-5	2-Nitrophenol	330 U
105-67-9	2,4-Dimethylphenol	330 U
65-85-0	Benzoic Acid	1600 U
111-91-1	bis(-2-Chloroethoxy)Methane	330 U
120-83-2	2,4-Dichlorophenol	330 U
120-82-1	1,2,4-Trichlorobenzene	330 U
91-20-3	Naphthalene	130 J
106-47-8	4-Chloroaniline	330 U
87-68-3	Hexachlorobutadiene	330 U
59-50-7	4-Chloro-3-Methylphenol	330 U
91-57-6	2-Methylnaphthalene	200 J
77-47-4	Hexachlorocyclopentadiene	330 U
88-06-2	2,4,6-Trichlorophenol	330 U
95-95-4	2,4,5-Trichlorophenol	1600 U
91-58-7	2-Chloronaphthalene	330 U
88-74-4	2-Nitroaniline	1600 U
131-11-3	Dimethyl Phthalate	330 U
208-96-8	Acenaphthylene	330 U
99-09-2	3-Nitroaniline	1600 U

CAS Number		ug/Kg
83-32-9	Acenaphthene	330 U
51-28-5	2,4-Dinitrophenol	1600 U
100-02-7	4-Nitrophenol	1600 U
132-64-9	Dibenzofuran	42 J
121-14-2	2,4-Dinitrotoluene	330 U
606-20-2	2,6-Dinitrotoluene	330 U
84-66-2	Diethylphthalate	330 U
7005-72-3	4-Chlorophenyl-phenylether	330 U
86-73-7	Fluorene	330 U
100-01-6	4-Nitroaniline	1600 U
534-52-1	4,6-Dinitro-2-Methylphenol	1600 U
86-30-6	N-Nitrosodiphenylamine(1)	330 U
101-55-3	4-Bromophenyl-phenylether	330 U
118-74-1	Hexachlorobenzene	330 U
87-86-5	Pentachlorophenol	1600 U
85-01-8	Phenanthrene	150 J
120-12-7	Anthracene	330 U
84-74-2	Di-n-Butylphthalate	270 BJ
206-44-0	Fluoranthene	60 J
129-00-0	Pyrene	120 J
85-68-7	Butylbenzylphthalate	330 U
91-94-1	3,3'-Dichlorobenzidine	660 U
56-55-3	Benzo(a)Anthracene	330 U
117-81-7	bis(2-Ethylhexyl)Phthalate	330 U
218-01-9	Chrysene	120 J
117-84-0	Di-n-Octyl Phthalate	330 U
205-99-2	Benzo(b)Fluoranthene	330 U
207-08-9	Benzo(k)Fluoranthene	330 U
50-32-8	Benzo(a)Pyrene	330 U
193-39-5	Indeno(1,2,3-cd)Pyrene	330 U
53-70-3	Dibenz(a,h)Anthracene	330 U
191-24-2	Benzo(g,h,i)Perylene	330 U

(1) - Cannot be separated from diphenylamine

CLF: 10/11/85 Form I Prepared by: 7/85

Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 920

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: LOW
Date Extracted/Prepared: 6/20/86
Date Analyzed: 7/2/86
Conc/Dil Factor: 1.1G/5ML

GPC Cleanup: NO
Separatory Funnel Extraction: YES
Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
319-84-6	Alpha-BHC	8.0 U
319-85-7	Beta-BHC	8.0 U
319-86-8	Delta-BHC	8.0 U
58-89-9	Gamma-BHC (Lindane)	8.0 U
76-44-8	Heptachlor	8.0 U
309-00-2	Aldrin	8.0 U
1024-57-3	Heptachlor Epoxide	8.0 U
959-98-8	Endosulfan I	8.0 U
60-57-1	Dieldrin	16 U
72-55-9	4,4'-DDE	16 U
72-20-8	Endrin	16 U
33213-65-9	Endosulfan II	16 U
72-54-8	4,4'-DDD	16 U
1031-07-8	Endosulfan Sulfate	16 U
50-29-3	4,4'-DDT	16 U
72-43-5	Methoxychlor	80 U
53494-70-5	Endrin Ketone	16 U
57-74-9	Chlordane	80 U
8001-35-2	Toxaphene	160 U
12674-11-2	Aroclor-1016	80 U
11104-28-2	Aroclor-1221	80 U
11141-16-5	Aroclor-1232	80 U
53469-21-9	Aroclor-1242	80 U
12672-29-6	Aroclor-1248	80 U
11097-69-1	Aroclor-1254	160 U
11096-82-5	Aroclor-1260	160 U

V_i = Volume of extract injected (ul)
V_s = Volume of water extracted (ml)
W_s = Weight of sample extracted (g)
V_t = Volume of total extract (ul)

V_s = NR or W_s =1.1 V_t = 5000 V_i = 5

CLF: 11/14/85 Form I Prepared by: [signature] 1 7/85

Sample Number
BG 921

Organics Analysis Data Sheet
(Page 1)

Laboratory Name: California Analytical Laboratories, Inc.
Case No: 6062
Lab Sample ID No: L2084
QC Report No: 146
Sample Matrix: SOIL
Contract No: 68-01-6958
Data Release Authorized By:
Date Sample Received: 6/16/86

Volatile Compounds

Concentration: Low
Date Extracted/Prepared: 6/25/86
Date Analyzed: 6/25/86
Conc/Dil Factor: 1 pH: 8.1
Percent Moisture: 37
Percent Moisture (Decanted): NR

CAS Number		ug/Kg
74-87-3	Chloromethane	10 U
74-83-9	Bromomethane	10 U
75-01-4	Vinyl Chloride	10 U
75-00-3	Chloroethane	10 U
75-09-2	Methylene Chloride	58 B
67-64-1	Acetone	9 BJ
75-15-0	Carbon Disulfide	5 U
75-35-4	1,1-Dichloroethene	5 U
75-34-3	1,1-Dichloroethane	5 U
156-60-5	Trans-1,2-Dichloroethene	5 U
67-66-3	Chloroform	5 U
107-06-2	1,2-Dichloroethane	5 U
78-93-3	2-Butanone	9 BJ
71-55-6	1,1,1-Trichloroethane	5 U
56-23-5	Carbon Tetrachloride	5 U
108-05-4	Vinyl Acetate	10 U
75-27-4	Bromodichloromethane	5 U

CAS Number		ug/Kg
78-87-5	1,2-Dichloropropane	5 U
10061-02-6	Trans-1,3-Dichloropropene	5 U
79-01-6	Trichloroethene	5 U
124-48-1	Dibromochloromethane	5 U
79-00-5	1,1,2-Trichloroethane	5 U
71-43-2	Benzene	5 U
10061-01-5	cis-1,3-Dichloropropene	5 U
110-75-8	2-Chloroethylvinylether	10 U
75-25-2	Bromoform	5 U
108-10-1	4-Methyl-2-Pentanone	10 U
591-78-6	2-Hexanone	10 U
127-18-4	Tetrachloroethene	5 U
79-34-5	1,1,2,2-Tetrachloroethane	5 U
108-88-3	Toluene	5 U
108-90-7	Chlorobenzene	5 U
100-41-4	Ethylbenzene	5 U
100-42-5	Styrene	5 U
	Total Xylenes	5 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read: U - Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample

J Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J). If limit of detection is 10ug/l and a concentration of 3ug/l is calculated, report as 3J

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10ng/ul in the final extract should be confirmed by GC/MS

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

Other Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

NA Not Analyzed.
See cover letter.
NR Not Required.
S Spiked Compound.

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Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 921

Organics Analysis Data Sheet
(Page 2)

Semivolatile Compounds

Concentration: Low
Date Extracted/Prepared: 6/20/86
Date Analyzed: 7/8/86
Conc/DiL Factor: 19G/1ML

GPC Cleanup: NO
Separatory Funnel Extraction: YES
Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
108-95-2	Phenol	330 U
111-44-4	bis(-2-Chloroethyl)Ether	330 U
95-57-8	2-Chlorophenol	330 U
541-73-1	1,3-Dichlorobenzene	330 U
106-46-7	1,4-Dichlorobenzene	330 U
100-51-6	Benzyl Alcohol	330 U
95-50-1	1,2-Dichlorobenzene	330 U
95-48-7	2-Methylphenol	330 U
39638-32-9	bis(2-chloroisopropyl)Ether	330 U
106-44-5	4-Methylphenol	330 U
621-64-7	N-Nitroso-Di-n-Propylamine	330 U
67-72-1	Hexachloroethane	330 U
98-95-3	Nitrobenzene	330 U
78-59-1	Isophorone	330 U
88-75-5	2-Nitrophenol	330 U
105-67-9	2,4-Dimethylphenol	330 U
65-85-0	Benzoic Acid	1600 U
111-91-1	bis(-2-Chloroethoxy)Methane	330 U
120-83-2	2,4-Dichlorophenol	330 U
120-82-1	1,2,4-Trichlorobenzene	330 U
91-20-3	Naphthalene	54 J
106-47-8	4-Chloroaniline	330 U
87-68-3	Hexachlorobutadiene	330 U
59-50-7	4-Chloro-3-Methylphenol	330 U
91-57-6	2-Methylnaphthalene	87 J
77-47-4	Hexachlorocyclopentadiene	330 U
88-06-2	2,4,6-Trichlorophenol	330 U
95-95-4	2,4,5-Trichlorophenol	1600 U
91-58-7	2-Chloronaphthalene	330 U
88-74-4	2-Nitroaniline	1600 U
131-11-3	Dimethyl Phthalate	330 U
208-96-8	Acenaphthylene	330 U
99-09-2	3-Nitroaniline	1600 U

CAS Number		ug/Kg
83-32-9	Acenaphthene	330 U
51-28-5	2,4-Dinitrophenol	1600 U
100-02-7	4-Nitrophenol	1600 U
132-64-9	Dibenzofuran	330 U
121-14-2	2,4-Dinitrotoluene	330 U
606-20-2	2,6-Dinitrotoluene	330 U
84-66-2	Diethylphthalate	330 U
7005-72-3	4-Chlorophenyl-phenylether	330 U
86-73-7	Fluorene	330 U
100-01-6	4-Nitroaniline	1600 U
534-52-1	4,6-Dinitro-2-Methylphenol	1600 U
86-30-6	N-Nitrosodiphenylamine(1)	330 U
101-55-3	4-Bromophenyl-phenylether	330 U
118-74-1	Hexachlorobenzene	330 U
87-86-5	Pentachlorophenol	1600 U
85-01-8	Phenanthrene	75 J
120-12-7	Anthracene	330 U
84-74-2	Di-n-Butylphthalate	230 BJ
206-44-0	Fluoranthene	50 J
129-00-0	Pyrene	50 J
85-68-7	Butylbenzylphthalate	330 U
91-94-1	3,3'-Dichlorobenzidine	660 U
56-55-3	Benzo(a)Anthracene	330 U
117-81-7	bis(2-Ethylhexyl)Phthalate	150 J
218-01-9	Chrysene	58 J
117-84-0	Di-n-Octyl Phthalate	330 U
205-99-2	Benzo(b)Fluoranthene	330 U
207-08-9	Benzo(k)Fluoranthene	330 U
50-32-8	Benzo(a)Pyrene	330 U
193-39-5	Indeno(1,2,3-cd)Pyrene	330 U
53-70-3	Dibenz(a,h)Anthracene	330 U
191-24-2	Benzo(g,h,i)Perylene	330 U

(1) - Cannot be separated from diphenylamine

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CLF: 10/11/85 Form I Prepared by: [signature] 7/85

Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 921

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: LOW
Date Extracted/Prepared: 6/20/86
Date Analyzed: 7/2/86
Conc/Dil Factor: 0.95G/5ML

GPC Cleanup: NO
Separatory Funnel Extraction: YES
Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
319-84-6	Alpha-BHC	8.0 U
319-85-7	Beta-BHC	8.0 U
319-86-8	Delta-BHC	8.0 U
58-89-9	Gamma-BHC (Lindane)	8.0 U
76-44-8	Heptachlor	8.0 U
309-00-2	Aldrin	8.0 U
1024-57-3	Heptachlor Epoxide	8.0 U
959-98-8	Endosulfan I	8.0 U
60-57-1	Dieldrin	16 U
72-55-9	4,4'-DDE	16 U
72-20-8	Endrin	16 U
33213-65-9	Endosulfan II	16 U
72-54-8	4,4'-DDD	16 U
1031-07-8	Endosulfan Sulfate	16 U
50-29-3	4,4'-DDT	16 U
72-43-5	Methoxychlor	80 U
53494-70-5	Endrin Ketone	16 U
57-74-9	Chlordane	80 U
8001-35-2	Toxaphene	160 U
12674-11-2	Aroclor-1016	80 U
11104-28-2	Aroclor-1221	80 U
11141-16-5	Aroclor-1232	80 U
53469-21-9	Aroclor-1242	80 U
12672-29-6	Aroclor-1248	80 U
11097-69-1	Aroclor-1254	160 U
11096-82-5	Aroclor-1260	160 U

V_i = Volume of extract injected (ul)
V_s = Volume of water extracted (ml)
W_s = Weight of sample extracted (g)
V_t = Volume of total extract (ul)

V_s = NR or W_s =0.95 - V_t = 5000 V_i = 5

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CLF: 11/14/85 Form I Prepared by: 7/85

Sample Number
BG 922

Organics Analysis Data Sheet
(Page 1)

Laboratory Name: California Analytical Laboratories, Inc.
Lab Sample ID No: L2085
Sample Matrix: SOIL
Data Release Authorized By:

Case No: 6062
QC Report No: 146
Contract No: 68-01-6958
Date Sample Received: 6/16/86

Volatile Compounds

Concentration: Low
Date Extracted/Prepared: 6/25/86
Date Analyzed: 6/25/86
Conc/Dil Factor: 1 pH: 7.4
Percent Moisture: 38
Percent Moisture (Decanted): NR

CAS Number		ug/Kg
74-87-3	Chloromethane	10 U
74-83-9	Bromomethane	10 U
75-01-4	Vinyl Chloride	10 U
75-00-3	Chloroethane	10 U
75-09-2	Methylene Chloride	4 BJ
67-64-1	Acetone	19 B
75-15-0	Carbon Disulfide	5 U
75-35-4	1,1-Dichloroethene	5 U
75-34-3	1,1-Dichloroethane	5 U
156-60-5	Trans-1,2-Dichloroethene	5 U
67-66-3	Chloroform	5 U
107-06-2	1,2-Dichloroethane	5 U
78-93-3	2-Butanone	8 BJ
71-55-6	1,1,1-Trichloroethane	5 U
56-23-5	Carbon Tetrachloride	5 U
108-05-4	Vinyl Acetate	10 U
75-27-4	Bromodichloromethane	5 U

CAS Number		ug/Kg
78-87-5	1,2-Dichloropropane	5 U
10061-02-6	Trans-1,3-Dichloropropene	5 U
79-01-6	Trichloroethene	5 U
124-48-1	Dibromochloromethane	5 U
79-00-5	1,1,2-Trichloroethane	5 U
71-43-2	Benzene	5 U
10061-01-5	cis-1,3-Dichloropropene	5 U
110-75-8	2-Chloroethylvinylether	10 U
75-25-2	Bromoform	5 U
108-10-1	4-Methyl-2-Pentanone	10 U
591-78-6	2-Hexanone	10 U
127-18-4	Tetrachloroethene	5 U
79-34-5	1,1,2,2-Tetrachloroethane	5 U
108-88-3	Toluene	5 U
108-90-7	Chlorobenzene	5 U
100-41-4	Ethylbenzene	5 U
100-42-5	Styrene	5 U
	Total Xylenes	5 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read: U - Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample

J Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J). If limit of detection is 10ug/l and a concentration of 3ug/l is calculated, report as 3J

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10ng/ul in the final extract should be confirmed by GC/MS

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

Other Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

NA Not Analyzed.
\# See cover letter.
NR Not Required.
S Spiked Compound.

345

CLF: 11/14/85 Form I Prepared by: 10/85

Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 922

Organics Analysis Data Sheet
(Page 2)

Semivolatile Compounds

Concentration: Low
Date Extracted/Prepared: 6/20/86
Date Analyzed: 7/8/86
Conc/DiL Factor: 20G/1ML

GPC Cleanup: NO
Separatory Funnel Extraction: YES
Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
108-95-2	Phenol	330 U
111-44-4	bis(-2-Chloroethyl)Ether	330 U
95-57-8	2-Chlorophenol	330 U
541-73-1	1,3-Dichlorobenzene	330 U
106-46-7	1,4-Dichlorobenzene	330 U
100-51-6	Benzyl Alcohol	330 U
95-50-1	1,2-Dichlorobenzene	330 U
95-48-7	2-Methylphenol	330 U
39638-32-9	bis(2-chloroisopropyl)Ether	330 U
106-44-5	4-Methylphenol	51 J
621-64-7	N-Nitroso-Di-n-Propylamine	330 U
67-72-1	Hexachloroethane	330 U
98-95-3	Nitrobenzene	330 U
78-59-1	Isophorone	330 U
88-75-5	2-Nitrophenol	330 U
105-67-9	2,4-Dimethylphenol	330 U
65-85-0	Benzoic Acid	1600 U
111-91-1	bis(-2-Chloroethoxy)Methane	330 U
120-83-2	2,4-Dichlorophenol	330 U
120-82-1	1,2,4-Trichlorobenzene	330 U
91-20-3	Naphthalene	330 U
106-47-8	4-Chloroaniline	330 U
87-68-3	Hexachlorobutadiene	330 U
59-50-7	4-Chloro-3-Methylphenol	330 U
91-57-6	2-Methylnaphthalene	330 U
77-47-4	Hexachlorocyclopentadiene	330 U
88-06-2	2,4,6-Trichlorophenol	330 U
95-95-4	2,4,5-Trichlorophenol	1600 U
91-58-7	2-Chloronaphthalene	330 U
88-74-4	2-Nitroaniline	1600 U
131-11-3	Dimethyl Phthalate	330 U
208-96-8	Acenaphthylene	330 U
99-09-2	3-Nitroaniline	1600 U

CAS Number		ug/Kg
83-32-9	Acenaphthene	330 U
51-28-5	2,4-Dinitrophenol	1600 U
100-02-7	4-Nitrophenol	1600 U
132-64-9	Dibenzofuran	330 U
121-14-2	2,4-Dinitrotoluene	330 U
606-20-2	2,6-Dinitrotoluene	330 U
84-66-2	Diethylphthalate	330 U
7005-72-3	4-Chlorophenyl-phenylether	330 U
86-73-7	Fluorene	330 U
100-01-6	4-Nitroaniline	1600 U
534-52-1	4,6-Dinitro-2-Methylphenol	1600 U
86-30-6	N-Nitrosodiphenylamine(1)	330 U
101-55-3	4-Bromophenyl-phenylether	330 U
118-74-1	Hexachlorobenzene	330 U
87-86-5	Pentachlorophenol	1600 U
85-01-8	Phenanthrene	330 U
120-12-7	Anthracene	330 U
84-74-2	Di-n-Butylphthalate	182 BJ
206-44-0	Fluoranthene	330 U
129-00-0	Pyrene	330 U
85-68-7	Butylbenzylphthalate	330 U
91-94-1	3,3'-Dichlorobenzidine	660 U
56-55-3	Benzo(a)Anthracene	330 U
117-81-7	bis(2-Ethylhexyl)Phthalate	260 J
218-01-9	Chrysene	57 J
117-84-0	Di-n-Octyl Phthalate	330 U
205-99-2	Benzo(b)Fluoranthene	330 U
207-08-9	Benzo(k)Fluoranthene	330 U
50-32-8	Benzo(a)Pyrene	330 U
193-39-5	Indeno(1,2,3-cd)Pyrene	330 U
53-70-3	Dibenz(a,h)Anthracene	330 U
191-24-2	Benzo(g,h,i)Perylene	330 U

(1) - Cannot be separated from diphenylamine

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CLF: 10/11/85   Form I   Prepared by: [signature]   7/85

Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 922

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: LOW

Date Extracted/Prepared: 6/20/86

Date Analyzed: 7/2/86

Conc/Dil Factor: 0.93G/5ML

GPC Cleanup: NO

Separatory Funnel Extraction: YES

Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
319-84-6	Alpha-BHC	8.0 U
319-85-7	Beta-BHC	8.0 U
319-86-8	Delta-BHC	8.0 U
58-89-9	Gamma-BHC (Lindane)	8.0 U
76-44-8	Heptachlor	8.0 U
309-00-2	Aldrin	8.0 U
1024-57-3	Heptachlor Epoxide	8.0 U
959-98-8	Endosulfan I	8.0 U
60-57-1	Dieldrin	16 U
72-55-9	4,4'-DDE	16 U
72-20-8	Endrin	16 U
33213-65-9	Endosulfan II	16 U
72-54-8	4,4'-DDD	16 U
1031-07-8	Endosulfan Sulfate	16 U
50-29-3	4,4'-DDT	16 U
72-43-5	Methoxychlor	80 U
53494-70-5	Endrin Ketone	16 U
57-74-9	Chlordane	80 U
8001-35-2	Toxaphene	160 U
12674-11-2	Aroclor-1016	80 U
11104-28-2	Aroclor-1221	80 U
11141-16-5	Aroclor-1232	80 U
53469-21-9	Aroclor-1242	80 U
12672-29-6	Aroclor-1248	80 U
11097-69-1	Aroclor-1254	160 U
11096-82-5	Aroclor-1260	160 U

V_i = Volume of ex[illegible]t injected (ul)

V_s = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

V_t = Volume of total extract (ul)

V_s = NR or W_s =0.93 V_t = 5000 V_i = 5

CLF: 11/14/85 Form I Prepared by: [signature] 7/85

Sample Number
BG 923

Organics Analysis Data Sheet
(Page 1)

Laboratory Name: California Analytical Laboratories, Inc.
Case No: 6062
Lab Sample ID No: L2086
QC Report No: 146
Sample Matrix: SOIL
Contract No: 68-01-6958
Data Release Authorized By:
Date Sample Received: 6/16/86

Volatile Compounds

Concentration: Low
Date Extracted/Prepared: 6/25/86
Date Analyzed: 6/25/86
Conc/Dil Factor: 1 pH: 7.5
Percent Moisture: 62
Percent Moisture (Decanted): NR

CAS Number		ug/Kg
74-87-3	Chloromethane	10 U
74-83-9	Bromomethane	10 U
75-01-4	Vinyl Chloride	10 U
75-00-3	Chloroethane	10 U
75-09-2	Methylene Chloride	12 B
67-64-1	Acetone	66 B
75-15-0	Carbon Disulfide	5 U
75-35-4	1,1-Dichloroethene	5 U
75-34-3	1,1-Dichloroethane	11
156-60-5	Trans-1,2-Dichloroethene	5 U
67-66-3	Chloroform	5 U
107-06-2	1,2-Dichloroethane	5 U
78-93-3	2-Butanone	10 B
71-55-6	1,1,1-Trichloroethane	5 U
56-23-5	Carbon Tetrachloride	5 U
108-05-4	Vinyl Acetate	10 U
75-27-4	Bromodichloromethane	5 U

CAS Number		ug/Kg
78-87-5	1,2-Dichloropropane	5 U
10061-02-6	Trans-1,3-Dichloropropene	5 U
79-01-6	Trichloroethene	15
124-48-1	Dibromochloromethane	5 U
79-00-5	1,1,2-Trichloroethane	5 U
71-43-2	Benzene	5 U
10061-01-5	cis-1,3-Dichloropropene	5 U
110-75-8	2-Chloroethylvinylether	10 U
75-25-2	Bromoform	5 U
108-10-1	4-Methyl-2-Pentanone	10 U
591-78-6	2-Hexanone	10 U
127-18-4	Tetrachloroethene	30
79-34-5	1,1,2,2-Tetrachloroethane	5 U
108-88-3	Toluene	6
108-90-7	Chlorobenzene	5 U
100-41-4	Ethylbenzene	5 U
100-42-5	Styrene	5 U
	Total Xylenes	5 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/ dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read: U - Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample

J Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J). If limit of detection is 10ug/l and a concentration of 3ug/l is calculated, report as 3J

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10ng/ul in the final extract should be confirmed by GC/MS

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

Other Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

NA Not Analyzed.
See cover letter.
NR Not Required.
S Spiked Compound.

399

Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 923

Organics Analysis Data Sheet
(Page 2)

Semivolatile Compounds

Concentration: Low
Date Extracted/Prepared: 6/20/86
Date Analyzed: 7/8/86
Conc/DiL Factor: 12G/1ML

GPC Cleanup: NO
Separatory Funnel Extraction: YES
Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
108-95-2	Phenol	330 U
111-44-4	bis(-2-Chloroethyl)Ether	330 U
95-57-8	2-Chlorophenol	330 U
541-73-1	1,3-Dichlorobenzene	330 U
106-46-7	1,4-Dichlorobenzene	330 U
100-51-6	Benzyl Alcohol	120 J
95-50-1	1,2-Dichlorobenzene	330 U
95-48-7	2-Methylphenol	330 U
39638-32-9	bis(2-chloroisopropyl)Ether	330 U
106-44-5	4-Methylphenol	220 J
621-64-7	N-Nitroso-Di-n-Propylamine	330 U
67-72-1	Hexachloroethane	330 U
98-95-3	Nitrobenzene	330 U
78-59-1	Isophorone	330 U
88-75-5	2-Nitrophenol	330 U
105-67-9	2,4-Dimethylphenol	330 U
65-85-0	Benzoic Acid	6000
111-91-1	bis(-2-Chloroethoxy)Methane	330 U
120-83-2	2,4-Dichlorophenol	330 U
120-82-1	1,2,4-Trichlorobenzene	330 U
91-20-3	Naphthalene	510
106-47-8	4-Chloroaniline	330 U
87-68-3	Hexachlorobutadiene	330 U
59-50-7	4-Chloro-3-Methylphenol	330 U
91-57-6	2-Methylnaphthalene	760
77-47-4	Hexachlorocyclopentadiene	330 U
88-06-2	2,4,6-Trichlorophenol	330 U
95-95-4	2,4,5-Trichlorophenol	1600 U
91-58-7	2-Chloronaphthalene	330 U
88-74-4	2-Nitroaniline	1600 U
131-11-3	Dimethyl Phthalate	330 U
208-96-8	Acenaphthylene	170 J
99-09-2	3-Nitroaniline	1600 U

CAS Number		ug/Kg
83-32-9	Acenaphthene	330 U
51-28-5	2,4-Dinitrophenol	1600 U
100-02-7	4-Nitrophenol	1600 U
132-64-9	Dibenzofuran	160 J
121-14-2	2,4-Dinitrotoluene	330 U
606-20-2	2,6-Dinitrotoluene	330 U
84-66-2	Diethylphthalate	330 U
7005-72-3	4-Chlorophenyl-phenylether	330 U
86-73-7	Fluorene	97 J
100-01-6	4-Nitroaniline	1600 U
534-52-1	4,6-Dinitro-2-Methylphenol	1600 U
86-30-6	N-Nitrosodiphenylamine(1)	330 U
101-55-3	4-Bromophenyl-phenylether	330 U
118-74-1	Hexachlorobenzene	330 U
87-86-5	Pentachlorophenol	120 J
85-01-8	Phenanthrene	1000
120-12-7	Anthracene	310 J
84-74-2	Di-n-Butylphthalate	430 B
206-44-0	Fluoranthene	920
129-00-0	Pyrene	740
85-68-7	Butylbenzylphthalate	330 U
91-94-1	3,3'-Dichlorobenzidine	660 U
56-55-3	Benzo(a)Anthracene	940
117-81-7	bis(2-Ethylhexyl)Phthalate	1600
218-01-9	Chrysene	1000
117-84-0	Di-n-Octyl Phthalate	330 U
205-99-2	Benzo(b)Fluoranthene	1500
207-08-9	Benzo(k)Fluoranthene	1500
50-32-8	Benzo(a)Pyrene	1100
193-39-5	Indeno(1,2,3-cd)Pyrene	330 U
53-70-3	Dibenz(a,h)Anthracene	330 U
191-24-2	Benzo(g,h,i)Perylene	330 U

(1) - Cannot be separated from diphenylamine

CLF: 10/11/85 Form I Prepared by: 4S wo 430 7/85

Laboratory Name: CALIFORNIA ANALYTICAL LABORATORIES, INC.
Case No:6062

Sample Number
BG 923

Organics Analysis Data Sheet
(Page 3)

Pesticide/PCBs

Concentration: LOW
Date Extracted/Prepared: 6/20/86
Date Analyzed: 7/2/86
Conc/Dil Factor: 0.57G/5ML

GPC Cleanup: NO
Separatory Funnel Extraction: YES
Continuous Liquid - Liquid Extraction: NO

CAS Number		ug/Kg
319-84-6	Alpha-BHC	8.0 U
319-85-7	Beta-BHC	8.0 U
319-86-8	Delta-BHC	8.0 U
58-89-9	Gamma-BHC (Lindane)	8.0 U
76-44-8	Heptachlor	8.0 U
309-00-2	Aldrin	8.0 U
1024-57-3	Heptachlor Epoxide	8.0 U
959-98-8	Endosulfan I	8.0 U
60-57-1	Dieldrin	16 U
72-55-9	4,4'-DDE	16 U
72-20-8	Endrin	16 U
33213-65-9	Endosulfan II	16 U
72-54-8	4,4'-DDD	16 U
1031-07-8	Endosulfan Sulfate	16 U
50-29-3	4,4'-DDT	16 U
72-43-5	Methoxychlor	80 U
53494-70-5	Endrin Ketone	16 U
57-74-9	Chlordane	80 U
8001-35-2	Toxaphene	160 U
12674-11-2	Aroclor-1016	80 U
11104-28-2	Aroclor-1221	80 U
11141-16-5	Aroclor-1232	80 U
53469-21-9	Aroclor-1242	80 U
12672-29-6	Aroclor-1248	80 U
11097-69-1	Aroclor-1254	160 U
11096-82-5	Aroclor-1260	160 U

V_i = Volume of extract injected (ul)
V_s = Volume of water extracted (ml)
W_s = Weight of sample extracted (g)
V_t = Volume of total extract (ul)

V_s = NR or W_s =0.57 V_t = 5000 V_i = 5

CLF: 11/14/85 Form I Prepared by:

4/61

Sample Number
BG 926

Organics Analysis Data Sheet
(Page 1)

Laboratory Name: California Analytical Laboratories, Inc.
Lab Sample ID No: L2087
Sample Matrix: WATER
Data Release Authorized By:

Case No: 6040
QC Report No: 146
Contract No: 68-01-6958
Date Sample Received: 6/16/86

Volatile Compounds

Concentration: Low
Date Extracted/Prepared: 6/2[illegible]
Date Analyzed: 6/23/86
Conc/Dil Factor: 1 pH: NR
Percent Moisture: NR
Percent Moisture (Decanted): NR

CAS Number		ug/L
74-87-3	Chloromethane	10 U
74-83-9	Bromomethane	10 U
75-01-4	Vinyl Chloride	10 U
75-00-3	Chloroethane	10 U
75-09-2	Methylene Chloride	1 J
67-64-1	Acetone	14 B
75-15-0	Carbon Disulfide	5 U
75-35-4	1,1-Dichloroethene	5 U
75-34-3	1,1-Dichloroethane	5 U
156-60-5	Trans-1,2-Dichloroethene	5 U
67-66-3	Chloroform	5 U
107-06-2	1,2-Dichloroethane	5 U
78-93-3	2-Butanone	[illegible]
71-55-6	1,1,1-Trichloroethane	5 U
56-23-5	Carbon Tetrachloride	5 U
108-05-4	Vinyl Acetate	10 U
75-27-4	Bromodichloromethane	5 U

CAS Number		ug/L
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79-00-5	1,1,2-Trichloroethane	5 U
71-43-2	Benzene	5 U
10061-01-5	cis-1,3-Dichloropropene	5 U
110-75-8	2-Chloroethylvinylether	10 U
75-25-2	Bromoform	5 U
108-10-1	4-Methyl-2-Pentanone	10 U
591-78-6	2-Hexanone	10 U
127-18-4	Tetrachloroethene	5 U
79-34-5	1,1,2,2-Tetrachloroethane	5 U
108-88-3	Toluene	5 U
108-90-7	Chlorobenzene	5 U
100-41-4	Ethylbenzene	5 U
100-42-5	Styrene	5 U
	Total Xylenes	5 U

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NA Not Analyzed.
\# See cover letter.
NR Not Required.
S Spiked Compound.

CLF: 11/14/85

Form I

Prepared by:

535

10/85