Bay West

CON 12-15
Doc #12652

GROUND WATER SAMPLING SUMMARY REPORT

Novartis Seeds, Inc. Facility
510 North 12th Avenue
Washington, Iowa

Submitted to:

Iowa Department of Natural Resources

Submitted by:

Bay West, Inc.

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Geologist, Technical Services Group

September 30, 1998

BWJ930433

TABLE OF CONTENTS

1.0 INTRODUCTION

At the request of Novartis Seeds, Inc. (formerly Northrup King Company), Bay West, Inc. (Bay West) completed an annual ground water sampling/analyses event at Novartis Seeds' Washington, Iowa, facility on June 23, 1998. The well sampling and water analyses were conducted in general accordance with Bay West's October 1, 1993 work plan submitted to the Iowa Department of Natural Resources (IDNR) and the IDNR's correspondence to Northrup King dated July 11, 1996. The purpose of this report is to summarize the results of the above-described activities.

2.0 SITE BACKGROUND

2.1 Site Description

Site background information has been submitted to the IDNR in McLaren/Hart Environmental Engineering Corporation's (McLaren/Hart's) reports dated January 30, and May 21, 1992, and January 29, 1993, and Bay West's report dated December 22, 1993. In addition to the aforementioned December 22, 1993 report, Bay West had also submitted March 4, 1994, July 1, 1994, October 24, 1994, May 11, 1995, December 20, 1995, June 18, 1996, and July 28, 1997 reports on the ground water sampling activities conducted at the site. The following discussion summarizes the background information contained in the McLaren/Hart reports.

The Novartis Seeds facility is located in the northeast portion of the City of Washington and occupies approximately 8.5 acres (Figures 1 and 2). The facility cleans, treats, stores, and distributes seed corn. The facility is composed of several warehouses, seed conditioning and drying areas, and associated offices (Figure 3). The site is bounded by North 12th Avenue to the west, railroad tracks to the north and south, and agricultural land to the east.

2.2 Site Stratigraphy

Soil underlying the Novartis Seeds facility is classified as Taintor silty-clay loam. The soil survey indicated that this soil formed in loess. As outlined in the McLaren/Hart reports, the surface soil layer is black, friable, silty-clay loam approximately 8 inches thick. The subsurface layer is a black and very-dark gray, firm, silty-clay loam approximately 14 inches thick. The subsoil is approximately 27 inches thick and consists of grayish-brown, olive-gray and light-gray silty clay and silty-clay loam. Taintor silty-clay loam is poorly drained and has moderately slow permeability and runoff. The Soil Survey reports that the soil has a seasonally high water table.

Site soil conditions outlined in the McLaren/Hart reports indicated that the upper five feet consists primarily of silty clay and silty-clay loam underlain by clay, silty clay and silt loam with occasional fine sandy loam lenses. Gravel lenses were also encountered during drilling at depths of approximately 29 to 34 feet in depth. A simplified cross-section illustrating the stratigraphy beneath the site is contained in Figure 4.

3.0 METHODOLOGY

3.1 Ground Water Sampling

Ground water samples were collected from monitoring wells MW-1, MW-3, and MW-7. Prior to initiating the well sampling, Bay West collected water level elevation data from the top-of-casing of each well, including adjacent monitoring wells MW-4 and MW-8. The water level elevation data were collected with an electronic tape accurate to 0.01-foot. The electronic tape was decontaminated after each measurement in an alconox solution followed by a tap water rinse.

Bay West conducted the well purging operations with dedicated, pre-cleaned disposable bailers. Temperature, specific conductivity, and pH measurements were collected during the purging operation. Purging was conducted until five well volumes were purged, the well was purged dry, or three successive readings yielded equivalent values within the following ranges for each of the parameters listed below:

- pH = 0.1 units
- Temperature = 0.5°C
- Specific conductivity = ± 5% of the reading range

Per Bay West's September 30, 1993 telephone conversation with the IDNR, purge water from each monitoring well was discharged directly to the ground in the immediate vicinity of the sampled well.

Following the purging (well stabilization) operation, the ground water samples were collected from each well using a dedicated, pre-cleaned, disposable bailer. The samples were transferred to the appropriate glassware, preserved (when required), and stored and transported to the contract laboratory in a pre-cleaned cooler accompanied by a completed chain-of-custody form.

3.2 Chemical Analyses

Water collected from the monitoring wells was analyzed for Alachlor (Lasso), Dieldrin, Atrazine, and Cyanazine (Bladex) using EPA Methodology.

4.0 RESULTS AND DISCUSSION

4.1 Ground Water Sampling

Ground water samples were collected from monitoring wells MW-1, MW-3, and MW-7 on June 23, 1998. Field sampling data sheets for the ground water sampling activities are contained in Appendix 1.

Prior to initiating the well sampling, Bay West collected water level elevation data from the top-of-casing of each well. Water level data are contained in Table 1. To summarize, ground water was encountered at depths ranging from approximately 3.82 feet below grade (bg) (MW-4) to 7.06 feet bg (MW-7). A ground water contour map generated from the June 1998 sampling event is contained in Figure 5. As illustrated in Figure 5, the surficial ground water flow direction is towards the west-northwest under a gradient of approximately $1.7x10^{-3}$ ft/ft.

4.2 Chemical Analyses

Water samples collected from the monitoring wells in June 1998 were analyzed for selected pesticides. A copy of the analytical report is contained in Appendix 2. Summaries of compounds detected in previous sampling events are contained in Tables 2 and 3, respectively. Table 4 summarizes the results of the May 1997 and June 1998 sampling events. For reference, Table 5 contains U.S. EPA and IDNR ground water quality standards potentially applicable to the site.

To summarize the analytical report, no compounds were detected in MW-7 above their respective analytical detection limits. Alachlor (0.64 ug/L), Dieldrin (1.8 ug/L), Atrazine (17.3 ug/L), and Cyanazine (21.2 ug/L) were detected in MW-1. Alachlor (1.10 ug/L), Atrazine (6.4 ug/L), and Cyanazine (11.8 ug/L) were also detected in MW-3.

In general, Alachlor decreased at MW-1; while Dieldrin, Atrazine, and Cyanazine increased slightly. At MW-3, the concentration of Alachlor was similar to the May 1997 sampling event while Atrazine and Cyanazine decreased. Consistent with previous sampling events, Dieldrin was not detected above the detection limit. None of the parameters were detected at MW-7 during the 1997 or 1998 sampling events.

5.0 RECOMMENDATIONS

Bay West and Novartis Seeds recommend that the site be evaluated by the IDNR for closure. This recommendation is based on the following:

1) Ground water analyses have been regularly performed over a six year period. These analyses have documented an overall decrease in concentrations since the initiation of monitoring in 1992.
2) Monitoring results indicate that the impacts to the ground water are localized in the vicinity of MW-1 and MW-3 and have stabilized at concentrations generally less than 20 ug/L. It is unlikely that future monitoring will indicate a change in this trend.
3) Analytical data collected from a "deep" monitoring well (i.e., MW-7) indicate that the ground water impacts are confined to the upper-most portion of the aquifer. Historical and recent analytical data suggest that the potential risk to the deeper portions of the aquifer from the identified compounds is minimal.
4) The site is located in an industrial sector of the city and based on the limited horizontal and vertical extent of the impacted ground water, the remaining residual impacts pose no threat to human health and the environment.

Bay West

TABLES

TABLE 1
Ground Water Elevation Summary

	Well Number				
	MW-1	MW-3	MW-4	MW-7	MW-8
Top of Casing Elevation	99.38	99.98	98.73	99.15	99.50
Depth to Top of Screen (ft bg)	5.0	5.5	5.5	50.0	28.0
Depth to Bottom of Screen (ft bg)	16.0	15.5	15.5	55.0	33.0
Depth to Water (ft btoc)					
October 14, 1993	4.31	4.74	3.85	19.95	4.73
January 12, 1994	5.30	5.26	4.84	8.24	5.84
May 5, 1994	5.14	5.42	4.50	7.81	5.80
August 15-16, 1994	5.32	6.12	4.77	7.64	9.80
March 29, 1995	5.09	5.23	4.52	7.61	5.56
October 17-18, 1995	5.95	5.94	5.38	7.60	5.96
May 14, 1996	3.95	4.22	3.46	7.74	4.04
May 1, 1997	3.57	4.32	3.50	7.65	5.30
June 23, 1998	4.44	4.83	3.82	7.06	4.53
Ground Water Elevation					
October 14, 1993	95.07	95.24	94.88	79.2	94.77
January 12, 1994	94.08	94.72	93.89	90.91	93.66
May 5, 1994	94.24	94.56	94.23	91.34	93.70
August 15-16, 1994	94.06	93.86	93.96	91.51	89.70
March 29, 1995	94.29	94.75	94.21	91.54	93.94
October 17-18, 1995	93.43	94.04	93.35	91.55	93.54
May 14, 1996	95.43	95.76	95.27	91.41	95.46
May 1, 1997	95.81	95.66	95.23	91.50	94.20
June 23, 1998	94.94	95.15	94.91	92.09	94.97

All elevations relative to a 100 foot datum established by McLaren/Hart.

bg - below grade
btoc - below top of casing

TABLE 2
Detected Organochlorine Compounds

Monitoring Well Number	DETECTED PESTICIDE COMPOUNDS Concentration[2]														
	Compound	11/26/91	3/13/92	8/19/92	8/19/92[3]	11/13/92	12/9/92	10/14/93	1/12/94	5/5/94	8/15/94	3/29/95	10/17-18/95	5/14/96	5/14/96[3]
MW-1	Gamma-BHC	0.84	ND	0.68	ND/ND	0.28		ND (0.8)	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.04)	ND (0.04)	ND (0.04)	0.2
	Beta-BHC	0.15	ND	0.43	ND/ND	ND		ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (0.06)	ND (0.06)	ND (0.06)	ND (0.2)
	Heptachlor	0.70	1.2	0.30	ND/ND	0.48		ND (6.0)	0.22	ND (6.0)	ND (6.0)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.2)
	Dieldrin	3.8	5.0	5.4	4.2/2.7	5.3	NA	ND (0.4)	1.61	ND (0.4)	ND (0.4)	ND (0.02)	ND (0.02)	1.90	1.4
	Chlordane	ND	6.3	2.4	ND/ND	ND		ND (50.0)	ND (50.0)	ND (50.0)	ND (50.0)	ND (2.5)	ND (2.5)	ND (2.5)	ND (0.8)
	Endrin	ND	ND	0.22	ND/ND	0.30		ND (0.8)	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.2)
	Delta-BHC	ND	ND	ND	ND/ND	0.14		ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.2)
	Heptachlor epoxide	ND	ND	ND	ND/ND	1.6		ND (16.0)	ND (16.0)	ND (16.0)	ND (16.0)	ND (0.8)	ND (0.8)	ND (0.8))	ND (0.2)
MW-3	Delta-BHC	NA	ND	0.018	NA	ND	NA	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.1)
MW-4		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	Heptachlor					0.014		ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)		ND(0.03)	ND(0.03)	NA
	Heptachlor epoxide	NA	NA	NA	NA	0.061	ND	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.8)	NS	ND (0.08)	ND (0.08)	NA
	Dieldrin					0.037		ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)		ND (0.02)	ND (0.02)	NA
MW-8		NI	NI	NI	NI	NI	NI	ND	ND	ND	ND	NS	ND	ND	ND

Notes: *1 - EPA Method 8080*
2 - All concentrations given in µg/l (ppb)
3 - Iowa Department of Natural Resources split sample analysis by EPA Method 608/8080; the sample from MW-1 was analyzed in duplicate during the 8/19/92 sampling event.
ND = not detected
NS = not sampled
NA = not analyzed
NI = not installed
(1.2) - compound's detection limit for 10/14/93, 1/12/94, 5/5/94, 8/15/94, 3/29/95, 10/17-18/95, and 5/14/96 sampling events

TABLE 3
Detected Organophosphate and Carbonate Compounds

DETECTED PESTICIDE COMPOUNDS[1]													
Monitoring Well Number	Concentration[2]												
	Compound	8/19/92	8/19/92[3]	11/13/92	12/9/92	10/14/93	1/12/94	5/5/94	8/15/94	3/29/95	10/17-18/95	5/14/96	5/14/96[3]
MW-1	Atrazine	30	61	ND		56.0	115.0	95.4	69.1	56.9	69.9	16.0	12
	Bladex	50	91	62.58		50.5	101.2	107.0	60.7	45.8	63.7	14.9	12
	Dual	56	63	ND		ND (10.0)	24.6	69.7	38.3	62.1	43.5	26.4	14
	Sutan	29	43	20.58	NA	ND (10.0)	58.1	46.5	24.8	46.8	49.1	ND(5.0)	38
	Lasso	ND	ND	18.92		ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (0.5)	ND (0.5)	ND (0.5)	NA
	Furadan	ND	NA	37.0		16.2	15.4	56.8	77.7	19.7	40.1	4.47	18
MW-3	Lasso	NA	NA	32.75	NA	ND (10.0)	ND (10.0)	ND (10.0)	ND (0.50)	ND (0.5)	ND (0.5)	4.3	6
	Bladex			34.55		33.7	37.6	29.9	20.1	19.3	17.5	13.5	15
	Furadan			0.96		ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.1)
	Atrazine			ND		36.8	27.9	18.6	17.8	17.6	19.9	13.4	14
MW-4	Atrazine	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	0.66
	Bladex											ND	ND (0.1)
	Desethyl-Atrazine											NA	0.24
	Desisoprpyl-Atrazine											NA	0.22
MW-7		NA	NA	ND	NA	ND	ND	ND	ND	NS	ND	ND	NA
MW-8	Atrazine	NI	NI	NI	NI	ND	ND	ND	ND	NS	1.11	2.94	4
	Bladex											2.00	2.7

Notes: *1 - EPA Method 614/8140, and 531.1*
2 - All concentrations given in µg/l (ppb)
3 - Iowa Department of Natural Resources Split Sample Analysis
NS = not sampled
ND = not detected
NA = not analyzed
NI = not installed
(1.2) - compound's detection limit for 10/14/93, 1/12/94, 5/5/94, 8/15/94, 3/29/95, 10/17-18/95, and 5/14/96 sampling events.

TABLE 4
Ground Water Analytical Summary
1997 and 1998 Sampling Events

Monitoring Well Number	Compound	Concentration (May 1997)	Concentration (August 1998)
MW-1	Alachlor (Lasso)	3.35	0.64
	Dieldrin	ND (0.2)	1.8
	Atrazine	7.93	17.3
	Cyanazine	8.88	21.2
MW-3	Alachlor (Lasso)	1.19	1.1
	Dieldrin	ND (0.02)	ND (0.2)
	Atrazine	22.0	6.4
	Cyanazine	19.0	11.8
MW-7	Alachlor (Lasso)	ND (0.5)	ND (0.5)
	Dieldrin	ND (0.2)	ND (0.2)
	Atrazine	ND (0.5)	ND (0.5)
	Cyanazine	ND (0.5)	ND (0.5)

Notes:
All concentrations given in µg/L (ppb)
ND = Not Detected
(0.2) - compound's detection limit for sampling event

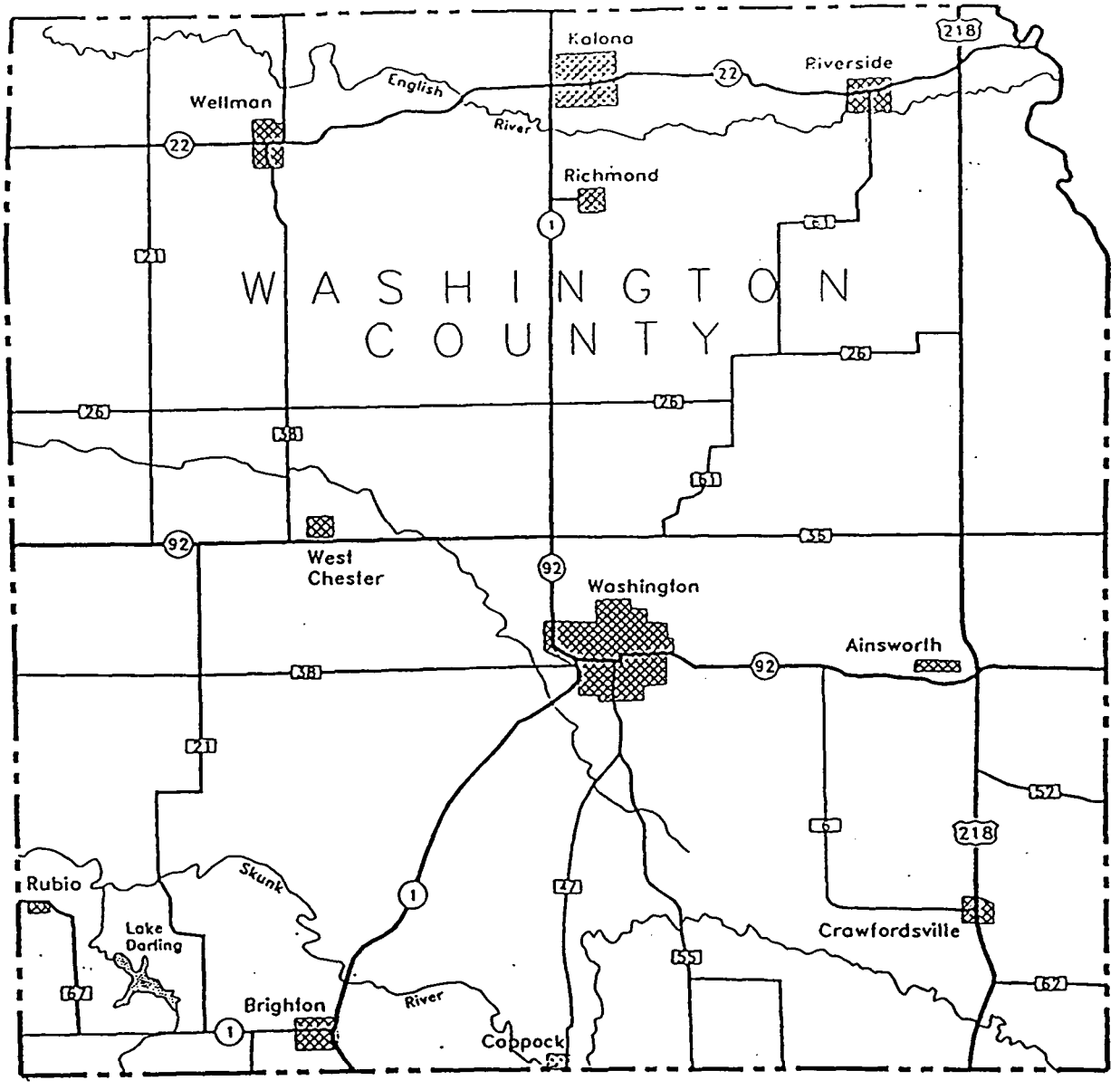
Table 5
U.S. EPA and IDNR Ground Water Quality Standards
Washington, Iowa

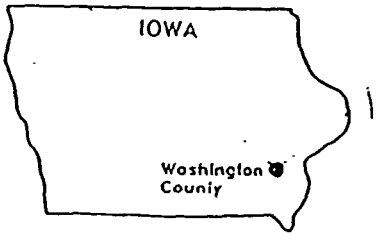
Compound	Maximum Contaminant Level (MCL)*	Health Advisory Level (HAL)
Pesticides		
γ-BHC	0.2 ppb	0.2 ppb
Heptachlor	0.4 ppb	--
Dieldrin	--	--
Aldrin	--	--
Endrin	2.0 ppb	2.0 ppb
Methoxychlor	40 ppb	40.0 ppb
γ-Chlordane	2.0 ppb	--
Heptachlor Epoxide	0.2 ppb	--
Herbicides		
Atrazine	3.0 ppb	3.0 ppb
Bladex (Cyanazine)	--	1.0 ppb
Dual	--	100 ppb
Sutan	--	350 ppb
Lasso (Alachlor)	2.0 ppb	0.4 ppb
Furadan	40 ppb	40 ppb

* = Primary Drinking Water Standard
Source: EPA Internet Site - www.epa.gov/ostwaer/tools/dwstds

Bay West

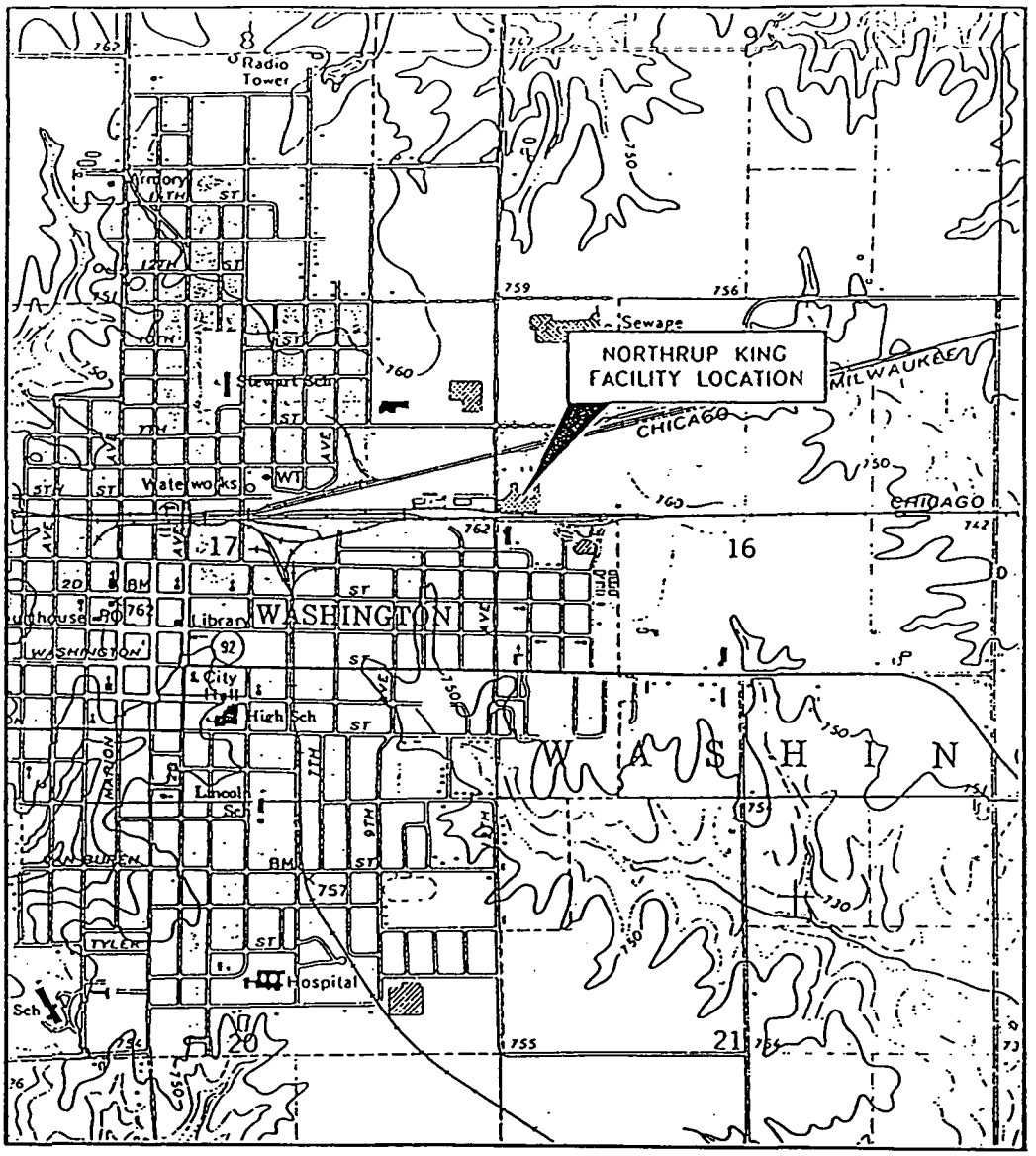
FIGURES





SOURCE:
McLAREN/HART
JANUARY 29, 1993 REPORT

ENGR'G M.W.	DATE		BAY WEST Inc.
DRAWN K.M.	12/21/93		ENVIRONMENTAL SERVICES
REV.			ST. PAUL, MN
PROJECT NAME	NOVARTIS SEEDS- WASHINGTON, IA		
TITLE	SITE LOCATION MAP		
DWG. NO. 93433A1	SCALE		FIGURE # 1



Source: USGS Washington Quadrangle, Iowa – Washington County Scale– 1:24,000

N

SOURCE:
McLAREN/HART
JANUARY 29, 1993 REPORT

ENGR'G M.W.	DATE		BAY WEST Inc.
DRAWN K.M.	12/21/93		ENVIRONMENTAL SERVICES
REV.			ST. PAUL, MN

PROJECT NAME	NOVARTIS SEEDS- WASHINGTON, IA	
TITLE	FACILITY LOCATION MAP	
DWG. NO. 93433A3	SCALE	FIGURE # 2

FORMER CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY

MAN RIM=790.39
F=748.00

S76D 36'39"W
637.47'

5/8" IRON PIN

CURB STOP

GAS METER

SHOP
EL. 759.3

MACHINE STORAGE
W/2 OVERHEAD DOORS
EL. 759.5'

ELECTRIC
JUNCTION BOX

UNDERGROUND TELEPHONE

GREEN CORN DUMP
EL. 76

SLAB EL. 759'

CATWALK

EL. 763'-0"

HUSK & SORT BUILDING
EL. 763'

HUSK SLAB
EL. 759'

RAMP UP

EL. 760'-6"

EL. 760'-0"

CATWALK

SOYBEAN BULK STORAGE
EL. 759

EL. 759'

CORN DRYER
EL. 760.5

EL. 759

EQUIPMENT TO BE RELOCATED

GRAVEL PARKING & DRIVES

CONCRETE

PRIMARY ELECTRICAL METERING

GRAVEL PARKING & DRIVES

DRYER CONTROL BUILDING

GAS REGULATOR I.S.U. TO GAS METER FOR DRYER AND SHOP USAGE.

SANITARY M.H.

CONCRETE WATER PIT

ASPHALT

ASPHALT

CATWALK

SEED STOCK WAREHOUSE
#700

EL. 759.5'

ROCK

N01D 09'05"E
709.69'
(692.75')

S00D 00'00"(ASSUMED)
562.79'
(557.5')

RIM=756.46
E=754.56

TRUCK SCALE

S0D

PIPE GUARDS

S0D

NK SIGN

ASPHALT

ROCK

CONDITIONING TOWER
EL. 759.17'

COLD STORAGE WAREHOUSE
#600

EL. 759.17'

RIM=759.30
F=747.03

OFFICE BUILDING
EL. 760'

ASPHALT

TRUCK SHED
EL. 755'

RESEARCH DRYER

ASPHALT

ROCK & TIMBER EDGING

ROCK & TIMBER EDGING

EL. 758.9

ROCK

GAS METER BY I.S.U. FOR OFFICE AND WAREHOUSE USAGE.

#200

#300

#100

WAREHOUSE
EL. 759.0'

SEED TECHNOLOGY

#400

COMMERCIAL WAREHOUSE (#500)
EL. 758.83

CONDENSOR W/CHAIN LINK FENCE

ELECTRIC JUNCTION BOX

INTAKE
RIM=754.58
E=751.68

DRAINAGE

N 12TH AVENUE

2" IRON BAR

RR BUILDING

5/8" IRON PIN

NOTE: UNDERGROUND UTILITY LOCATIONS AND SIZES WERE TAKEN FROM COMPANY, CITY, AND UTILITY MAPS ACTUAL LOCATION AND SIZE MAY VARY AS SHOWN.

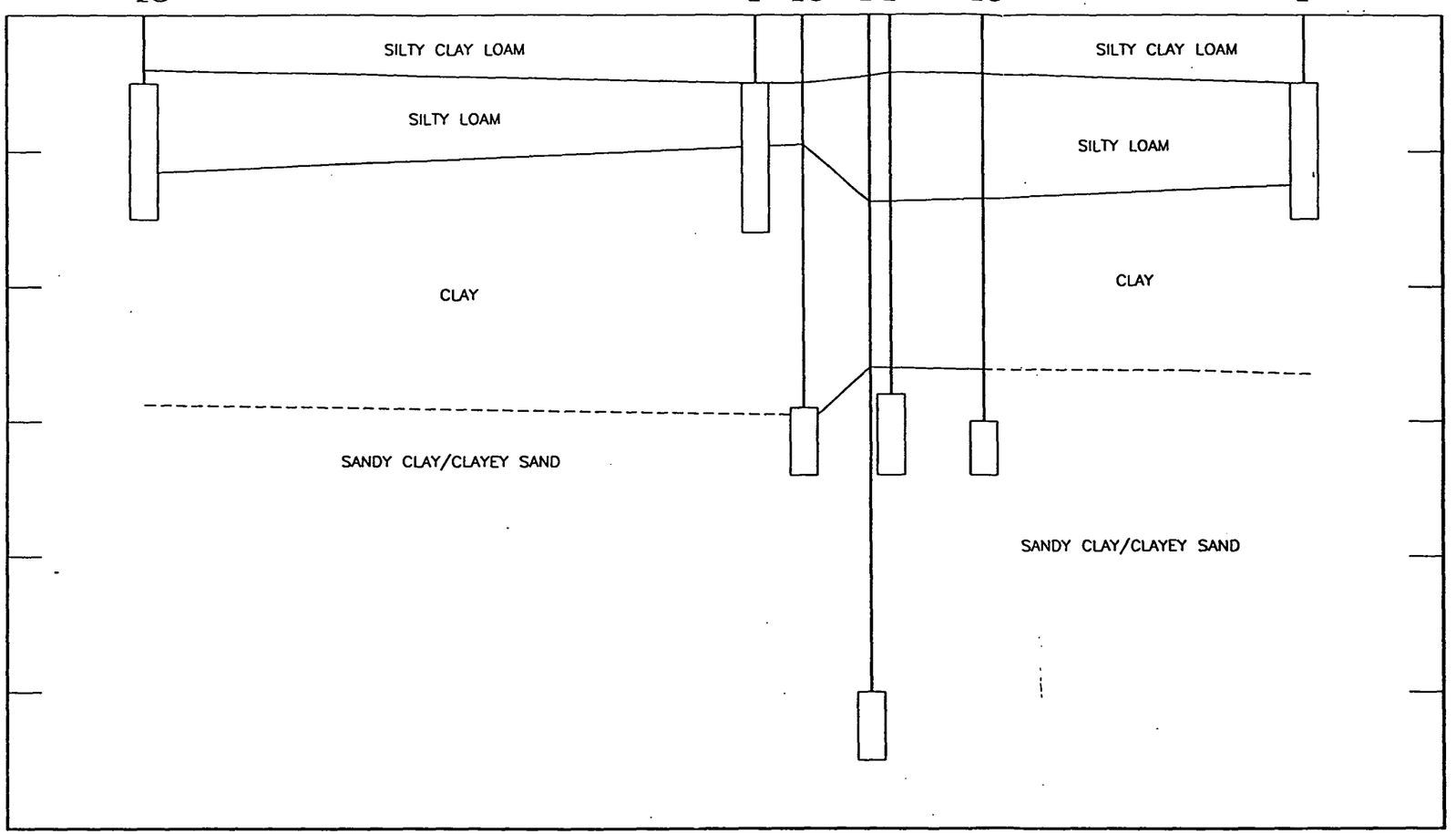
N

0 40' 80'

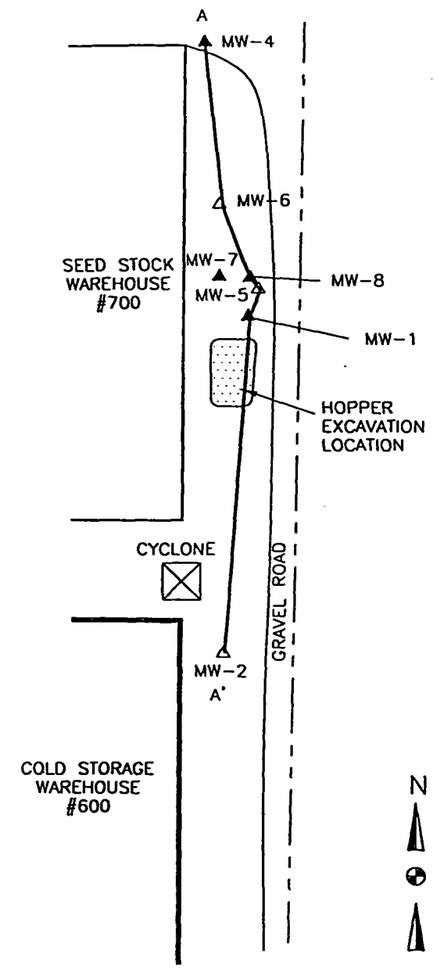
BENCHMARK: TOP ARROWHEAD HYDRANT OFF N. 12TH AVENUE. ELEV.=760.60

ENGR'G M.W.	DATE	BAY WEST Inc.	
DRAWN K.M.	2/24/94	ENVIRONMENTAL SERVICES	
REV.	7/14/97	ST. PAUL . MN.	
PROJECT NAME NOVARTIS SEEDS– WASHINGTON, IA.			
TITLE SITE MAP			
DWG. NO. 93433B10	SCALE 1"=80'	FIGURE # 3	

CROSS-SECTION A-A'



SITE MAP



▲ MONITORING WELL LOCATION

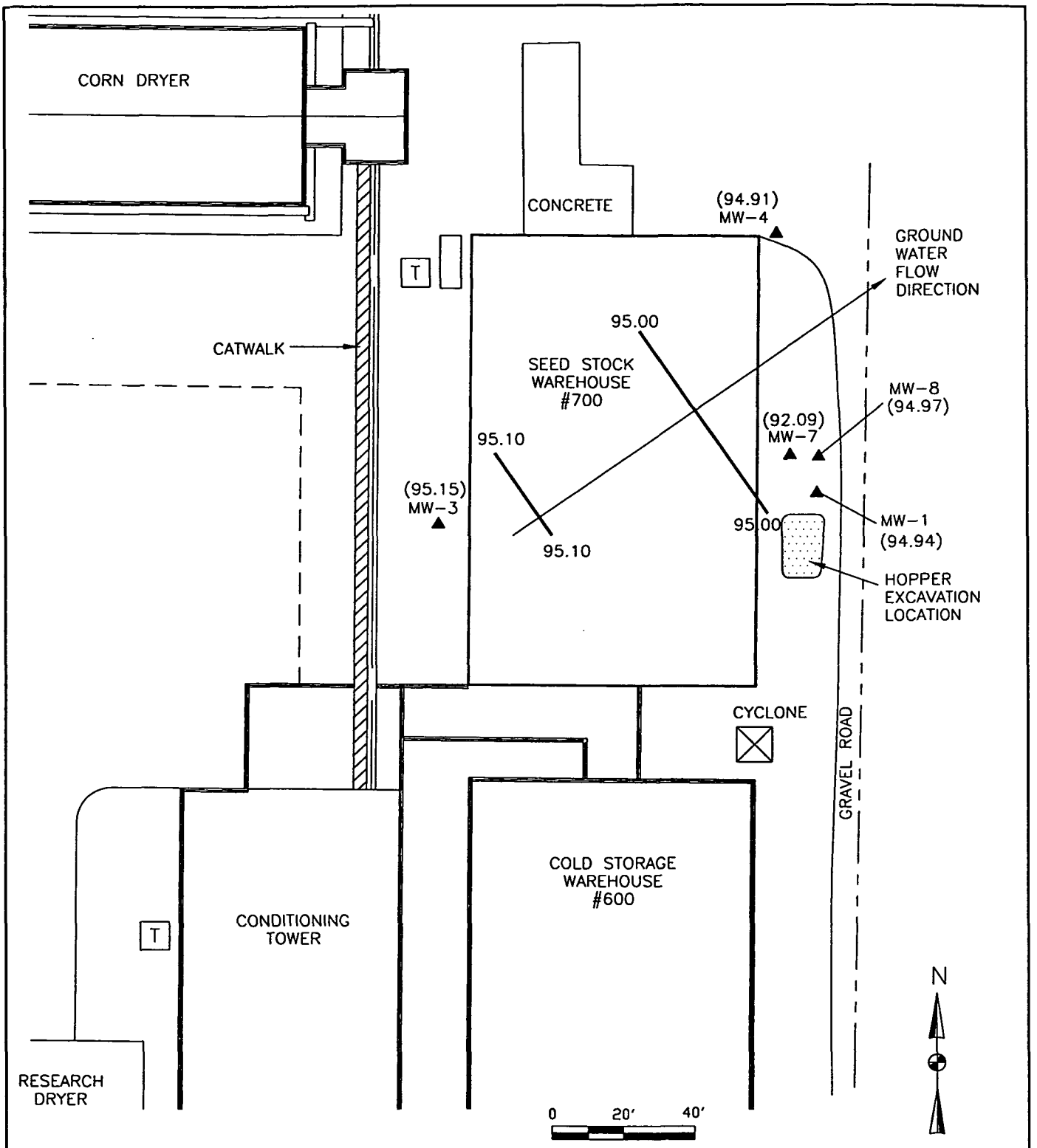
△ ABANDONED MONITORING WELL LOCATION

—— CROSS-SECTION LOCATION

0 10' 20'
HORIZONTAL SCALE

0 5' 10'
VERTICAL SCALE

ENGR'G M.W.	DATE		BAY WEST Inc. ENVIRONMENTAL SERVICES ST. PAUL, MN
DRAWN K.M.	9/28/94		
REV.	7/14/97		
PROJECT NAME NOVARTIS SEEDS- WASHINGTON, IA			
TITLE CROSS-SECTION MAP			
DWG. NO. 93433XS	SCALE	FIGURE # 4	



LEGEND:

▲	MONITORING WELL LOCATION
— — — —	PROPERTY LINE
———	GROUND WATER CONTOUR, 6/23/98
(95.15)	GROUND WATER ELEVATION AT MONITORING WELL, 6/23/98
95.00	GROUND WATER CONTOUR ELEVATION, 6/23/98

ENGR'G M.W.	DATE	BAY WEST Inc.	
DRAWN K.M.	2/24/94	ENVIRONMENTAL SERVICES	
REV.	9/8/98	ST. PAUL, MN	
PROJECT NAME	NOVARTIS SEEDS– WASHINGTON, IA		
TITLE	GROUND WATER CONTOUR MAP, 6/23/98		
DWG. NO. 93433A10	SCALE 1"=40'	FIGURE # 5	

Bay West

APPENDIX 1

Bay West — FIELD SAMPLING DATA SHEET

PROJECT NAME: NORTHRUP KING	SAMPLE #: 1
ADDRESS: 510 N. 12th AVE	PROJECT #: J930433
CITY, STATE, ZIP: WASHINGTON IOWA	DATE: 6-23-98
NAME OF SAMPLER: DAVID OLSON	ANALYTICAL LABORATORY: EMA
AFFLIATION: BAY WEST	COC #: GW - 3879

WELL DATA		PURGE DATA	
WELL #:	MW - 7	PRE-PUMP METHOD:	BAILER
CASING MATERIAL:	PVC	PRE-PUMP RATE (GPM):	
WELL DIAMETER (IN):	2	I.D.# PROBE/ TAPE USED:	
WELL DEPTH (FT BTOC):	55.00	I.D.# PUMP USED:	
DEPTH TO WATER BEFORE PURGING (FT BTOC):	7.06	BAILER TYPE:	DISPOSABLE
LENGTH OF WATER COLUMN (FT):	47.94		
WELL VOLUME (GAL):	7.67		

VOLUME CONVERSION FACTOR: .16 – 2" .65 – 4" 1.47 – 6" 2.61 – 8"

STABILIZATION TEST

VOL #	TIME	VOL (GAL)	TEMP °C	COND (umhos/cm)	pH	OTHER
1	6:15	7.7	17.8	435	7.29	
2	6:32	15.4	13.2	428	7.41	
3		23.1				
4						
5						
6						
7						
8						

STABILIZATION DATA		SAMPLING DATA	
TOTAL VOLUME (GAL):	15.5	TIME OF SAMPLING:	6:50
# CASING VOLUMES:	2	SAMPLE TYPE:	H_2O
STAB. TEMP °C:	13.2	SAMPLE CONTAINERS:	___ 40 ml 4 1 LA
STAB. CONDUCTANCE (umhos/cm):	428		___ OTHER ___ 0.5 LA
STAB. pH:	7.41	SAMPLE VOLUME:	4,000 ml
STAB. Eh :		SAMPLE FILTERED:	___ YES X NO
STAB. D.O. mg/l :		SAMPLE PRESERVATION:	(ICE) HCL H2SO4 HNO3

COMMENTS

SAMPLE DESCRIPTION– COLOR: ODOR:

OTHER:

OBSERVATIONS: COLLECTED 2 WELL VOLUMES AND SAMPLED WELL BAILED DRY @ 2 WELL VOLUMES, LET RECHARGE & SAMPLED

WEATHER DATA– TEMPERATURE: 78° SKY: CLOUDY WIND: SW @ 5-10

Bay West — FIELD SAMPLING DATA SHEET

PROJECT NAME: NORTHRUP KING	SAMPLE #: 2
ADDRESS: 510 N. 12th AVE	PROJECT #: J930433
CITY, STATE, ZIP: WASHINGTON, IOWA	DATE: 6-23-98
NAME OF SAMPLER: DAVID OLSON	ANALYTICAL LABORATORY: EMA
AFFILIATION: BAY WEST	COC #: GW - 3879

WELL DATA		PURGE DATA	
WELL #:	MW - 3	PRE-PUMP METHOD:	BAILER
CASING MATERIAL:	PVC	PRE-PUMP RATE (GPM):	
WELL DIAMETER (IN):	2	I.D.# PROBE/ TAPE USED:	
WELL DEPTH (FT BTOC):	15.50	I.D.# PUMP USED:	
DEPTH TO WATER BEFORE PURGING (FT BTOC):	4.83	BAILER TYPE:	DISPOSABLE
LENGTH OF WATER COLUMN (FT):	10.67		
WELL VOLUME (GAL):	1.70		

VOLUME CONVERSION FACTOR: .16 – 2" .65 – 4" 1.47 – 6" 2.61 – 8"

STABILIZATION TEST

VOL #	TIME	VOL (GAL)	TEMP °C	COND (umhos/cm)	pH	OTHER
1	7:01	1.7	13.1	330	7.50	
2	7:05	3.4	12.7	352	7.47	
3	7:10	5.1	12.1	352	7.45	
4						
5						
6						
7						
8						

STABILIZATION DATA		SAMPLING DATA	
TOTAL VOLUME (GAL):	5.1	TIME OF SAMPLING:	7:15
# CASING VOLUMES:	3	SAMPLE TYPE:	H_2O
STAB. TEMP °C:	12.1	SAMPLE CONTAINERS:	___ 40 ml 4 1 LA
STAB. CONDUCTANCE (umhos/cm):	352		___ OTHER ___ 0.5 LA
STAB. pH:	7.45	SAMPLE VOLUME:	4,000 ml
STAB. Eh :		SAMPLE FILTERED:	(YES) / X NO
STAB. D.O. mg/l :		SAMPLE PRESERVATION:	ICE HCL H2SO4 HNO3

COMMENTS

SAMPLE DESCRIPTION– COLOR: BROWN ODOR:

OTHER:

OBSERVATIONS: COLLECTED 3 WELL VOLUMES AND SAMPLED

WEATHER DATA– TEMPERATURE: 78° SKY: CLOUDY WIND: SW @ 5-10

Bay West — FIELD SAMPLING DATA SHEET

PROJECT NAME: NORTHRUP KING	SAMPLE #: 3
ADDRESS: 510 N. 12th AVE	PROJECT #: J930433
CITY, STATE, ZIP: WASHINGTON, IOWA	DATE: 6-23-98
NAME OF SAMPLER: DAVID OLSON	ANALYTICAL LABORATORY: EMA
AFFLIATION: BAY WEST	COC #: GW-3879

WELL DATA		PURGE DATA	
WELL #:	MW-1	PRE-PUMP METHOD:	BAILER
CASING MATERIAL:	PVC	PRE-PUMP RATE (GPM):	
WELL DIAMETER (IN):	2	I.D.# PROBE/ TAPE USED:	
WELL DEPTH (FT BTOC):	16.00	I.D.# PUMP USED:	
DEPTH TO WATER BEFORE PURGING (FT BTOC):	4.44	BAILER TYPE:	DISPOSABLE
LENGTH OF WATER COLUMN (FT):	11.56		
WELL VOLUME (GAL):	1.84		

VOLUME CONVERSION FACTOR: .16 – 2" .65 – 4" 1.47 – 6" 2.61 – 8"

STABILIZATION TEST

VOL #	TIME	VOL (GAL)	TEMP °C	COND (umhos/cm)	pH	OTHER
1	7:32	1.8	14.0	430	7.06	
2	7:35	3.6	12.8	450	7.02	
3	7:38	5.4	12.6	420	6.98	
4						
5						
6						
7						
8						

STABILIZATION DATA		SAMPLING DATA	
TOTAL VOLUME (GAL):	5.4	TIME OF SAMPLING:	7:45
# CASING VOLUMES:	3	SAMPLE TYPE:	H2O
STAB. TEMP °C:	12.6	SAMPLE CONTAINERS:	___ 40 ml 3 1 LA
STAB. CONDUCTANCE (umhos/cm):	420		___ OTHER ___ 0.5 LA
STAB. pH:	6.98	SAMPLE VOLUME:	3,000 ml
STAB. Eh :		SAMPLE FILTERED:	___ YES X NO
STAB. D.O. mg/l :		SAMPLE PRESERVATION:	(ICE) HCL H2SO4 HNO3

COMMENTS

SAMPLE DESCRIPTION– COLOR: CLEAR ODOR: NONE

OTHER:

OBSERVATIONS: COLLECTED 3 WELL VOLUMES AND SAMPLED

WEATHER DATA– TEMPERATURE: 76° SKY: CLOUDY WIND: SW @ 5-10

Bay West — FIELD SAMPLING DATA SHEET

PROJECT NAME: NORTHRUP KING	SAMPLE #:
ADDRESS: 510 N. 12th AVE	PROJECT #: J930433
CITY, STATE, ZIP: WASHINGTON IOWA	DATE: 6-23-98
NAME OF SAMPLER: DAVID OLSON	ANALYTICAL LABORATORY: EMA
AFFLIATION: BAY WEST	COC #: GW -

WELL DATA	PURGE DATA
WELL #: MW-4	PRE-PUMP METHOD: BAILER
CASING MATERIAL: PVC	PRE-PUMP RATE (GPM):
WELL DIAMETER (IN): 2	I.D.# PROBE/ TAPE USED:
WELL DEPTH (FT BTOC):	I.D.# PUMP USED:
DEPTH TO WATER BEFORE PURGING (FT BTOC): 3.82	BAILER TYPE: DISPOSABLE
LENGTH OF WATER COLUMN (FT):	
WELL VOLUME (GAL):	

VOLUME CONVERSION FACTOR: .16 – 2" .65 – 4" 1.47 – 6" 2.61 – 8"

STABILIZATION TEST

VOL #	TIME	VOL (GAL)	TEMP °C	COND (umhos/cm)	pH	OTHER
1						
2						
3						
4						
5						
6						
7						
8						

STABILIZATION DATA	SAMPLING DATA
TOTAL VOLUME (GAL):	TIME OF SAMPLING:
# CASING VOLUMES:	SAMPLE TYPE:
STAB. TEMP °C:	SAMPLE CONTAINERS: ____ 40 ml ____ 1 LA
STAB. CONDUCTANCE (umhos/cm):	____ OTHER ____ 0.5 LA
STAB. pH:	SAMPLE VOLUME:
STAB. Eh :	SAMPLE FILTERED: ____ YES ____ NO
STAB. D.O. mg/l :	SAMPLE PRESERVATION: ICE HCL H2SO4 HNO3

COMMENTS

SAMPLE DESCRIPTION– COLOR: ODOR:

OTHER:

OBSERVATIONS: COLLECTED WELL VOLUMES AND SAMPLED

DID NOT SAMPLE

WEATHER DATA– TEMPERATURE: SKY: WIND:

Bay West — FIELD SAMPLING DATA SHEET

PROJECT NAME: NORTHRUP KING	SAMPLE #:
ADDRESS: 510 N. 12th AVE	PROJECT #: J930433
CITY, STATE, ZIP: WASHINGTON IOWA	DATE: 6-23-98
NAME OF SAMPLER: DAVID OLSON	ANALYTICAL LABORATORY: EMA
AFFILIATION: BAY WEST	COC #: GW -
WELL DATA	**PURGE DATA**
WELL #: MW-8	PRE-PUMP METHOD: BAILER
CASING MATERIAL: PVC	PRE-PUMP RATE (GPM):
WELL DIAMETER (IN): 2	I.D.# PROBE/ TAPE USED:
WELL DEPTH (FT BTOC):	I.D.# PUMP USED:
DEPTH TO WATER BEFORE PURGING (FT BTOC): 4.53	BAILER TYPE: DISPOSABLE
LENGTH OF WATER COLUMN (FT):	
WELL VOLUME (GAL):	

VOLUME CONVERSION FACTOR: .16 – 2" .65 – 4" 1.47 – 6" 2.61 – 8"

STABILIZATION TEST

VOL #	TIME	VOL (GAL)	TEMP °C	COND (umhos/cm)	pH	OTHER
1						
2						
3						
4						
5						
6						
7						
8						

STABILIZATION DATA	SAMPLING DATA
TOTAL VOLUME (GAL):	TIME OF SAMPLING:
# CASING VOLUMES:	SAMPLE TYPE:
STAB. TEMP °C:	SAMPLE CONTAINERS: ____ 40 ml ____ 1 LA
STAB. CONDUCTANCE (umhos/cm):	____ OTHER ____ 0.5 LA
STAB. pH:	SAMPLE VOLUME:
STAB. Eh :	SAMPLE FILTERED: ____ YES ____ NO
STAB. D.O. mg/l :	SAMPLE PRESERVATION: ICE HCL H2SO4 HNO3

COMMENTS

SAMPLE DESCRIPTION– COLOR: ODOR:

OTHER:

OBSERVATIONS: COLLECTED WELL VOLUMES AND SAMPLED

DID NOT SAMPLE

WEATHER DATA– TEMPERATURE: SKY: WIND:

Bay West

APPENDIX 2

Environmental Micro Analysis, Inc.

40 N. East St., Ste. B, Woodland, CA 95776 (530) 666-6890

ENVIRONMENTAL MICRO ANALYSIS, INC.
ANALYTICAL REPORT

August 11, 1998

CUSTOMER: Martin Wangensteen
Bay West, Inc.
Five Empire Drive
St. Paul, Minn. 55103-1867

Phone: (651) 291-0456
Fax: (651) 291-0099

Date Sampled: 06/23/98 Date Extracted: 06/30/98 Project #930433-3

Customer Sample	EMA Sample #	Sample	Date Analyzed	Method	Chemical	Amount	MRL	Units
MW-7	98062602-01	Water	07/01/98	EPA 608	Alachlor (Lasso)	ND	0.5	µg/L
			07/01/98	EPA 608	Dieldrin	ND	0.2	µg/L
			07/13/98	EPA 619	Atrazine	ND	0.5	µg/L
			07/13/98	EPA 619	Cyanazine (Bladex)	ND	0.5	µg/L
MW-3	98062602-02	Water	07/01/98	EPA 608	Alachlor (Lasso)	1.1	0.5	µg/L
			07/01/98	EPA 608	Dieldrin	ND	0.2	µg/L
			07/13/98	EPA 619	Atrazine	6.4	0.5	µg/L
			07/13/98	EPA 619	Cyanazine (Bladex)	11.8	0.5	µg/L
MW-1	98062602-03	Water	07/01/98	EPA 608	Alachlor (Lasso)	0.64	0.5	µg/L
			07/01/98	EPA 608	Dieldrin	1.8	0.2	µg/L
			07/13/98	EPA 619	Atrazine	17.3	0.5	µg/L
			07/13/98	EPA 619	Cyanazine (Bladex)	21.2	0.5	µg/L

EPA Method 608 - Surrogate Information:

Sample	Surrogate Level	Surrogate Recovery
98062602-01	1 µg/L	81.5
98062602-02	1 µg/L	100
98062602-03	1 µg/L	110

[Surrogate = Dibutyl Chlorendate at 1 µg/L]

EPA Method 619 - Surrogate Information:

Sample	Surrogate Level	Surrogate Recovery
98062602-01	5 µg/L	65.0
98062602-02	5 µg/L	70.5
98062602-03	5 µg/L	90.5

[Surrogate = Ethion at 5 µg/L]

ND = None Detected
MRL = Method Reporting Limit

Excess sample and extracts are stored for 30 days from date of analytical report. Special storage arrangements possible.

Date: Aug 11, 1998 Signed: Donald G. Patterson, Laboratory Director

GROUND WATER CHAIN-OF-CUSTODY RECORD

BW-GW: 7/93

Bay West

LAB: Environmental Micro Analysis | SEND RESULTS TO: Martin Wangensteen

PROJECT NUMBER	PROJECT MANAGER	TURNAROUND REQUEST	SAMPLE RETENTION		CHAIN-OF-CUSTODY NO:
			RETURN	DISPOSE	
930433-3	M.W.				GW- 3879

ITEM NO.	SAMPLE NUMBER	SAMPLE DATE / TIME	MATRIX	NUMBER & TYPE OF CONTAINER	ANALYSIS CODE(S)	DESCRIPTION / COMMENTS
1	930433/mw-7	6-23-98 / 6:50	W	4x1l	22,23	
2	930433/mw-3	6-23-98 / 7:15	W	4x1l	22,23	
3	930433/mw-1	6-23-98 / 7:45	W	3x1l	22,23	
4						
5						
6						
7						
8						P.O.# 7009

SAMPLER: DAVID OLSON | AFFILIATION: BAY WEST | DATE: 6-23-98 | TIME: 8:00

TRANS NO.	ITEM NO.	RELINQUISHED BY	ACCEPTED BY	DATE	TIME
1	1-3	David Olson			
2					
3					
4					
5					

Preservative:
All samples must be preserved on ice (4°C), unless specified otherwise.
GROs -soil preserved with methanol
-water preserved with 3 drops of 1:1 HCL
VOCs -water preserved with 3 drops of 1:1 HCL
DROs -water preserved with 5 mL of 1:1 HCL

Matrix:
W= Water
L = Liquid Sample
S = Soil Sample
SD = Solids Sample
SL = Sludge Sample
O = Other (Specify _____)

ANALYSIS CODES

- Cross out any unwanted parameter.
- List any additional parameters in the "Description / Comments" column.

01 BTEX, MTBE (EPA 8020)
02 VOCs- Ground Water (EPA 601/602-8010/8020)
03 VOCs (by GC/MS) (EPA 624/8240)
04 Semi-Volatiles (by GC/MS) (EPA 625/8270)
05 VOCs- Water/Soil (MDH 465 list)
06 Pentachlorophenol (PCP) (EPA 604/8040)
07 Phenols (EPA 604/8040)
08 Phthalates (EPA 606/8060)
09 PCBs/Pesticides (EPA 608/8080)
10 PAHs (EPA 610/8100/8310)
11 Herbicides (EPA 615/8150)
12 Lead (total)/(dissolved)
13 RCRA Metals (8)
14 Lead, Cadmium, Chromium
15 BOD (EPA 405.1)
16 COD (EPA 410.1) - pH <2 with H_2SO_4
17 pH, TSS (EPA 150.1/160.2)
18 Oil/Grease (EPA 413.1/9071)
19 DROs
20 GROs
21 TPH (8020 modified)
22 DIELDRIN + ALOCHLOR EPA 608/CDFA METHOD
23 ATRAZINE + CYANAZINE EPA 619/8140/CDFA METHOD