CRA

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US EPA RECORDS CENTER REGION 5
451201

June 20, 1995

Reference No. 3481

Ms. Sheri Bianchin
UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY (USEPA)
Region V (HSRL-6J)
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Dear Ms. Bianchin:

Re: Proposed Effluent Goals for Discharge
of Treated Groundwater
American Chemical Service

Please find enclosed Montgomery-Watson's proposed effluent standards for the Perimeter Groundwater Containment System.

Sincerely,

CONESTOGA-ROVERS & ASSOCIATES

Ronald Frehner

RF/bam
Enc.
c.c. Holly Grejda; IDEM
George Oliver; IDEM
ACS Technical Committee

MONTGOMERY WATSON

June 20, 1995

United States Environmental Protection Agency
Region V (HSRL-6J)
77 West Jackson Blvd.
Chicago, IL 60604-3590

Project No.: 4077.0102

ATTN: Ms. Sheri Bianchin

SUBJECT: Proposed Effluent Goals for Discharge of Treated Groundwater
American Chemical Service, Inc. Superfund Site
Griffith, Indiana

Dear Ms. Bianchin:

As we discussed in our meeting on June 14, 1995, Montgomery Watson is designing and planning to implement a perimeter groundwater containment system (PGCS) at the American Chemical Service, Inc. (ACS) Site. The PGCS will include a groundwater extraction system in the upper aquifer along the western and northern boundaries of the site, a groundwater treatment system, and a treated effluent discharge system. In accordance with the ROD for the site, treated groundwater must be discharged to the adjacent wetlands and, if necessary, to a nearby surface water body (Turkey Creek). Currently, we are planning to discharge only to the on-site wetlands adjacent to the ACS facility. As stated in the National Contingency Plan (NCP), a permit for discharging the effluent is not required since the discharge point will be on site. We will, however, need to meet the substantiative requirements typically included in a permit, and as such, effluent standards need to be established.

Since the effluent goals are a critical factor in selecting technologies for treatment of the groundwater, it is essential that we expeditiously establish these goals. For our initial evaluation of treatment alternatives, we developed effluent quality goals for the chemicals of concern (in the groundwater) listed in the ROD. Table 1 provides the proposed effluent quality goals for discharge of treated groundwater to the adjacent wetlands. The Table lists the constituents of concern identified in the ROD, and it represents a cross-section of the contaminants present at the site.

The effluent goals presented in the Table are the chronic aquatic water quality criteria from the Water Quality Standards in Article 2 of 327 Indiana Administrative Code (IAC). For some constituents, the state had not established standards, so we calculated them using the procedures specified in Section 8.3 of Article 2 of 327 IAC.

2100 Corporate Drive
Addison, Illinois
60101

Tel: 708 691 5000
Fax: 708 691 5133

This letter is a formal request that you review the proposed initial effluent quality goals presented in Table 1 and provide confirmation of their acceptability, or if unacceptable, proposed alternative effluent goals. To meet our design schedule, we request your comments by June 30, 1995.

During recent groundwater monitoring, several of the compounds listed as chemicals of concern (in the groundwater) in the ROD were found to be at non-detectable concentrations or at concentrations significantly below the proposed effluent goals presented in Table 1. We propose that compounds not present in the groundwater be eliminated from the final effluent goals for the treatment system. To select compounds for elimination, we suggest that a six-month monitoring period be established once a groundwater treatment system is brought on-line. Compounds listed in the initial effluent goals that are non-detectable or at concentrations below discharge limits in the untreated groundwater would be eliminated from the discharge goals and from further routine monitoring.

We trust that this letter provides sufficient information to allow you to address these issues and our proposals. However, should you require additional information or clarification, please do not hesitate to contact me at (708) 691-5000 or Ron Schlicher at (801) 272-1900. Your prompt attention to this matter is greatly appreciated.

Sincerely,

MONTGOMERY WATSON

Joseph D. Adams Jr., P.E.
Vice President

/pa
cc: Holly Grejda; IDEM
George Oliver; IDEM

TABLE 1

PROPOSED EFFLUENT GOALS FOR DISCHARGE OF TREATED GROUNDWATER AMERICAN CHEMICAL SERVICE, INC. NPL SITE

Constituent	Units	Recommended Effluent Goal	Basis
General Water Quality Parameters			
BOD_5	mg/l	30	Discharge standard typically set by IDEM.
TSS	mg/l	30	Discharge standard typically set by IDEM.
pH	s.u.	6 to 9	State CAWQC [b]
Inorganics			
Arsenic [a]	mg/l	0.19	State CAWQC
Beryllium	mg/l	---	Not detected in groundwater at the site.
Manganese	mg/l	---	Not detected at elevated levels in groundwater at the site.
Thallium	mg/l	---	Not detected at elevated levels in groundwater at the site.
Volatile Organics			
Benzene	µg/l	29	Calculated CAWQC [c]
Chloromethane	µg/l	---	No standards have been established and no aquatic toxicity data are available to calculate a standard.
1,1-Dichloroethane	µg/l	---	No standards have been established and no aquatic toxicity data are available to calculate a standard.
1,2-Dichloroethene-cis	µg/l	---	No standards have been established and no aquatic toxicity data are available to calculate a standard.
Ethylbenzene	µg/l	34	Calculated CAWQC
Methylene chloride	µg/l	498	Calculated CAWQC
Tetrachloroethene	µg/l	24	Calculated CAWQC
Trichloroethene	µg/l	189	Calculated CAWQC
Vinyl chloride	µg/l	---	No standards have been established and no aquatic toxicity data are available to calculate a standard.
SemiVolatile Organics			
Acetone	µg/l	---	No standards have been established and no aquatic toxicity data are available to calculate a standard.
bis(2-Chloroethyl)ether	µg/l	533	Calculated CAWQC
bis(2-Ethylhexyl)phthalate	µg/l	49	Calculated CAWQC
2-Butanone	µg/l	7,156	Calculated CAWQC
1,4-Dichlorobenzene	µg/l	---	No standards have been established and no aquatic toxicity data are available to calculate a standard.
Isophorone	µg/l	267	Calculated CAWQC
4-Methyl-2-pentanone	µg/l	1,160	Calculated CAWQC
4-Methylphenol	µg/l	34	Calculated CAWQC
Pentachlorophenol	µg/l	3.83	State CAWQC
PCBs			
PCBs	µg/l	1.0	Standard quantitation limit in water.

(a) Concentration shown is for dissolved arsenic only.

(b) State CAWQC = the State Chronic Aquatic Water Quality Criterion from the Water Quality Standards in Article 2 of 327 Indiana Administrative Code.

(c) Calculated CAWQC means the chronic aquatic criterion was calculated using the procedures described in Section 8.3 of Article 2 of 327 Indiana Administrative Code.

MONTGOMERY WATSON

BY BF DATE 6/27/95 CLIENT ACS TECHNICAL COM. SHEET 1 OF 2
CHKD. BY RTS DESCRIPTION EFFLUENT LOAD CALCULATIONS JOB NO. 4077.0102

SAMPLE CALCULATIONS FOR DETERMINING THE ACUTE AQUATIC CRITERION AND THE CHRONIC AQUATIC CRITERION:

ACS SITE, GRIFFITH, INDIANA.

TO BEGIN, A SEARCH WAS PERFORMED ON US EPA'S AQUATIC TOXICITY INFORMATION RETRIEVAL (AQUIRE) DATABASE.

REFERENCE: US. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
NATIONAL HEALTH AND ENVIRONMENTAL EFFECTS RESEARCH LAB.
MID-CONTINENT ECOLOGY DIVISION

THE PURPOSE OF THE SEARCH WAS TO FIND TOXICITY DATA FOR 5 SPECIES OF AQUATIC LIFE:

DAPHNIA MAGNA
DAPHNIA PULEX
BLUEGILL
RAINBOW TROUT
FATHEAD MINNOW

THE SEARCH WAS PERFORMED FOR ALL ORGANIC PRIORITY POLLUTANTS.

THE FOLLOWING OUTLINE USES <u>ETHYL BENZENE</u> AS AN EXAMPLE:

- DETERMINE THE FINAL ACUTE VALUE (FAV):

THE TOXICITY DATA OBTAINED FROM THE AQUIRE SEARCH IS IN THE FORM OF A 1, 2, or 4 DAY LC50 MEASURING MORTALITY. IN MOST CASES THERE IS MORE THAN ONE LC50 VALUE GIVEN, THEREFORE THE GEOMETRIC MEAN IS FOUND. THE species with the LOWEST GEOMETRIC MEAN IS USED TO DETERMINE THE FAV. IN THE CASE OF ETHYL BENZENE, THE RAINBOW TROUT HAS THE LOWEST MEAN. THAT VALUE IS 7670 µg/L.

MONTGOMERY WATSON

BY BF DATE 6/27/95 CLIENT ACS TECHNICAL COM. SHEET 2 OF 2
CHKD. BY RJS DESCRIPTION EFFLUENT GOAL CALCULATIONS JOB NO. 4077.0102

ACCORDING TO INDIANA WATER QUALITY STANDARDS, THE FAV = LC50 ÷ 5 IF TOXICITY DATA FOR RAINBOW TROUT IS AVAILABLE. IF DATA FOR THE RAINBOW TROUT IS NOT AVAILABLE THEN THE FAV = LC50 ÷ 10.

SO IN THIS CASE FAV = 7670 µg/L ÷ 5 = 1534 µg/L

- DETERMINE THE ACUTE AQUATIC CRITERION (AAC):

THE PROCEDURE FOR DETERMINING THE AAC IS FOUND IN SECTION 8.2 OF THE INDIANA WATER QUALITY STANDARDS. WE FOLLOWED METHOD 3 WHICH GIVES:

AAC = FAV ÷ 2

AAC = 1534 ÷ 2 = 767 µg/L

- DETERMINE THE CHRONIC AQUATIC CRITERION (CAC):

THE PROCEDURE FOR DETERMINING THE CAC IS FOUND IN SECTION 8.3 OF THE INDIANA WATER QUALITY STANDARDS. WE FOLLOWED METHOD 4 WHICH GIVES:

CAC = FAV ÷ 45

CAC = 1534 ÷ 45 = 34.1 µg/L

Development of Effluent Criteria from Aquatic Toxicity Data

	Summary of Acute Toxicity Data (LC50 Values)[a] from AQUIRE Data Base						Effluent Criteria		
	Constituent	LC50, µg/l (a)	Assay Organism (b)	Assay Length, days	No. of References (c)	Trout Present (d)	FAV, µg/l (e)	AAC, µg/l (f)	CAC, µg/l (g)
	AWQC for aquatic life (chronic) except (A - acute)						divisor		included in proposed effluent goals
	Acetone	NA							
5,300(A)	Benzene	6,600	T	4	3	1	5 1,320	660	29.3
	bis(2-Chloroethyl)ether	240,000	DM	2	1	2	10 24,000	12,000	533.3
	bis(2-Ethylhexyl)phthalate	11,000	DM	2	1	1	5 2,200	1,100	48.9
	2-Butanone	3,220,000	FHM	4	1	2	10 322,000	161,000	7,155.6
	Butyl benzyl phthalate	NA							
	Chloroethane	NA							
	Chloromethane	NA							
	4-Chloro-3-methyphenol	2,000	DM	2	1	2	10 200	100	4.4
763	1,2-Dichlorobenzene	NA							
	1,1-Dichloroethane	NA							
20,000	1,2-Dichloroethane	125,000	FHM	4	2	1	5 25,000	12,500	555.6
	1,1-Dichloroethene	135,000	FHM	4	2	2	10 13,500	6,750	300.0
	1,2-Dichloroethene-cis	NA							
	1,2-Dichloroethene-trans	NA							
5,700	1,2-Dichloropropane	52,000	DM	2	1	2	10 5,200	2,600	115.6
	Diethyl phthalate	31,800	FHM	4	1	2	10 3,180	1,590	70.7
530(4d)	2,4-Dimethylphenol 1300(1-hr)	2,100	DM	2	1	2	10 210	105	4.7
3	Dimethyl phthalate	33,000	DM	2	1	2	10 3,300	1,650	73.3
	Di-n-butyl phthalate	820	BG	4	4	1	5 164	82	3.6
32,000(A)	Ethylbenzene	7,670	T	4	2	1	5 1,534	767	34.1
117,000(A)	Isophorone	120,000	DM	2	1	2	10 12,000	6,000	266.7
	Methylene Chloride	224,000	BG	1-4	2	2	10 22,400	11,200	497.8
	4-Methyl-2-pentanone	522,000	FHM	4	2	2	10 52,200	26,100	1,160.0
	4-Methylphenol	7,700	T	4	2	1	5 1,540	770	34.2
620	Naphthalene	3,400	T	4	7	1	5 680	340	15.1
	2-Nitrophenol	66,900	BG	1	1	2	10 6,690	3,345	148.7
2,560	Phenol	8,960	T	4	7	1	5 1,792	896	39.8
	Tetrachloroethene	5,400	T	4	1	1	5 1,080	540	24.0
	Tetrahydrofuran	2,160,000	FHM	4	1	2	10 216,000	108,000	4,800.0
17,500(A)	Toluene	11,700	T	4	2	1	5 2,340	1,170	52.0
	1,1,1-Trichloroethane	40,000	BG	1-4	2	2	10 4,000	2,000	88.9
	Trichloroethene	42,600	T	4	1	1	5 8,520	4,260	189.3
	Trichlorofluoromethane	NA							
	Vinyl chloride	NA							
	Xylenes, p	2,600	T	4	1	1	5 520	260	11.6
	Xylenes, m	8,400	T	4	1	1	5 1,680	840	37.3
1.0014 (24-h)	PCBs						Quantitation Limit		1.0

Footnotes:

NA - Insufficient data available in AQUIRE Database.

(a) The LC50 values reported are the geometric mean for the most sensitive species (i.e., the lowest geometric mean of the four species for which data was available)

(b) The most sensitive species (organism with lowest LC50 value). BG-Bluegill, DM-Daphnia Magna, FHM-Fathead Minnow, T-Rainbow Trout.

(c) Number of references available in the data base for the most sensitive species (number used for calculating the geometric mean).

(d) 1-Bioassay data available for rainbow trout, 2-No bioassay data available for rainbow trout

(e) FAV=LC50/5 if data on rainbow trout were available in the database. FAV=LC50/10 if data on rainbow trout were not available. FAV = LC50/5 for trout data; LC50/10 w/o trout data

(f) ACC=FAV/2 = FAV/2

(g) CAC=FAV/45 = FAV/45

FAV - final acute value

AAC - acute aquatic criteria

CAC - chronic " "

Table 2-1

Surface Water Concentrations
American Chemical Services
Griffith, Indiana

Contaminant	Maximum Detected Concentration (µg/L)		Water Quality Criteria[a] (µg/L)	
	Shallow Aquifer-Wetlands	Drainage Ditches	Acute	Chronic
Volatile Organics				
Chloromethane	6.8E+1	<1.0E+1	1.1E+4	None
Vinyl chloride	7.2E+2	<1.0E+1	None	None
Chloroethane	2.0E+3	3.0E+1	None	None
Methylene chloride	3.8E+2	<5.0E+0	1.1E+4	None
Acetone	9.9E+4	3.8E+2	None	None
1,1-Dichloroethane	2.4E+3	1.0E+0	1.18E+5	2.0E+4
1,2-Dichloroethene (total)	4.0E+2	3.0E+0	None	None
2-Butanone	2.2E+5	1.4E+2	None	None
Trichloroethene	4.5E+1	<5.0E+0	4.5E+4	2.19E+4
Benzene	1.0E+5	4.6E+2	5.3E+3	None
4-Methyl-2-pentanone	5.4E+4	4.9E+1	None	None
2-Hexanone	1.8E+3	4.0E+1	None	None
Tetrachloroethene	2.0E+2	<5.0E+0	5.28E+3	8.4E+2
Toluene	2.3E+3	8.0E+0	1.75E+4	None
Chlorobenzene	9.6E+1	<5.0E+0	2.5E+2	5.0E+1
Ethylbenzene	1.1E+3	6.0E+0	3.2E+4	None
Xylenes (mixed)	3.0E+3	3.5E+1	None	None
Semivolatiles				
Phenol	2.4E+2	4.5E+1	1.02E+4	2.56E+3
Bis(2-chloroethyl)ether	2.5E+2	7.7E+1	2.38E+5	None
1,3-Dichlorobenzene	3.0E+0	<1.0E+1	1.12E+3	7.63E+2

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Table 2-1 (Continued)

Surface Water Concentrations
American Chemical Services
Griffith, Indiana

Contaminant	Maximum Detected Concentration (µg/L)		Water Quality Criteria[a] (µg/L)	
	Shallow Aquifer-Wetlands	Drainage Ditches	Acute	Chronic
1,4-Dichlorobenzene	1.0E+1	<1.0E+1	1.12E+3	7.63E+2
1,2-Dichlorobenzene	3.3E+1	<1.0E+1	1.12E+3	7.63E+2
2-Methylphenol	3.8E+1	5.0E+0	None	None
Bis(2-chloroisopropyl)ether	3.0E+2	2.9E+1	2.38E+5	None
4-Methylphenol	2.2E+3	5.9E+2	None	None
Isophorone	3.5E+1	5.0E+0	1.17E+5	None
2,4-Dimethylphenol	1.1E+2	1.2E+1	2.12E+3	None
Naphthalene	7.1E+1	<1.0E+1	2.3E+3	6.2E+2
4-Chloro-3-methylphenol	5.0E+0	2.0E+0	3.0E+1	None
2-Methylnaphthalene	2.7E+1	<1.0E+1	2.3E+3	6.2E+2
Diethylphthalate	9.0E+0	<1.0E+1	9.4E+2	3.0E+0
Pentachlorophenol	3.0E+0	<5.0E+1	2.0E+1	1.3E+1
Di-n-butylphthalate	2.0E+0	<1.0E+1	9.4E+2	None
Bis(2-ethylhexyl)phthalate	5.0E+1	<1.0E+1	9.4E+2	3.0E+0
Benzoic acid	1.9E+3	8.5E+1	None	None
Pesticides/PCBs				
Aroclor 1248	2.6E+0	<5.0E-1	2.0E+0	1.4E-2
Aroclor 1260	2.7E+1	<1.0E+0	2.0E+0	1.4E-2
Inorganics				
Aluminum	2.8E+2	7.6E+2	None	None
Arsenic	4.32E+1	4.5E+1	3.6E+2	1.9E+2
Barium	1.84E+3	3.3E+2	None	None

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Table 2-1 (Continued)

Surface Water Concentrations
American Chemical Services
Griffith, Indiana

Contaminant	Maximum Detected Concentration (µg/L)		Water Quality Criteria[a] (µg/L)	
	Shallow Aquifer-Wetlands	Drainage Ditches	Acute	Chronic
Beryllium	2.5E-1	2.8E-1	1.3E+2	5.3E+0
Cadmium[b]	3.1E+0	3.7E-1	5.7E+0(9.1E+0)	1.5E+0(2.0E+0)
Calcium	1.04E+6	3.34E+5	None	None
Chromium (VI)[c]	3.9E-1	2.8E+0	1.6E+1	1.1E+1
Chromium (III)[c]	3.51E+0	2.52E+1	2.3E+3(3.2E+3)	2.7E+2(3.8E+2)
Cobalt	<5.0E+1	<5.0E+1	None	None
Copper[b]	<2.0E+1	<2.0E+1	2.4E+1(3.6E+1)	1.6E+1(2.2E+1)
Iron	2.18E+5	1.43E+4	None	1.0E+3
Lead[b]	4.6E+0	1.62E+1	1.2E+2(2.1E+2)	4.9E+0(8.2E+0)
Magnesium	7.88E+4	6.17E+4	None	None
Manganese	4.25E+3	1.85E+3	None	None
Mercury	1.7E+0	<2.0E-1	2.4E+0	1.2E-2
Nickel[b]	5.3E+1	8.0E+1	1.9+3(2.6E+3)	2.0E+2(3.0E+2)
Potassium	9.58E+4	3.0E+4	None	None
Selenium	6.2E+0	2.1E+0	2.0E+1	5.0E+0
Sodium	4.44E+5	7.7E+4	None	None
Thallium	4.0E+0	<5.0E+0	1.4E+3	4.0E+1
Vanadium	2.59E+1	<2.0E+0	None	None

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Table 2-1 (Continued)

Surface Water Concentrations
American Chemical Services
Griffith, Indiana

Contaminant	Maximum Detected Concentration (µg/L)		Water Quality Criteria[a] (µg/L)	
	Shallow Aquifer-Wetlands	Drainage Ditches	Acute	Chronic
Zinc[b]	8.86E+2	8.8E+1	1.5E+2(2.2E+2)	1.4E+2(2.0E+2)
Cyanide	1.0E+1	<1.0E+1	2.2E+1	5.2E+0

[a] Either Ambient Water Quality Criteria or Lowest Reported Toxic Concentration.
[b] Hardness - dependent criteria: assumes 139 mg/L (Ca+Mg) for the drainage ditches and 210 mg/L (Ca+Mg) for the shallow aquifer; values in parentheses are criteria based on the shallow aquifer hardness.
[c] Assumes total chromium is 10% Cr (VI) and 90% Cr (III).
Sources: IRIS, 1991; Verschueren, 1983, U.S. EPA, 1989, U.S. EPA, 1986.
None - Criteria not available.

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