Appendices
Total Maximum Daily Loads for Mill Creek in Butler and Hamilton Counties

prepared by

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Appendix A

Development of the Mill Creek Watershed Loading Model

Loading of water, sediment, and nutrients in the Mill Creek watershed was simulated using the Generalized Watershed Loading Function or GWLF model (Haith et al., 1992). The complexity of the loading function model falls between that of detailed, process-based simulation models and simple export coefficient models which do not represent temporal variability. GWLF provides a mechanistic, but simplified simulation of precipitation-driven runoff and sediment delivery, yet is intended to be applicable without calibration. Solids load, runoff, and ground water seepage can then be used to estimate particulate and dissolved-phase pollutant delivery to a stream, based on pollutant concentrations in soil, runoff, and ground water.

GWLF simulates runoff and streamflow by a water-balance method, based on measurements of daily precipitation and average temperature. Precipitation is partitioned into direct runoff and infiltration using a form of the Natural Resources Conservation Service's (NRCS) Curve Number method (SCS, 1986). The Curve Number determines the amount of precipitation that runs off directly, adjusted for antecedent soil moisture based on total precipitation in the preceding 5 days. A separate Curve Number is specified for each land use by hydrologic soil grouping. Infiltrated water is first assigned to unsaturated zone storage where it may be lost through evapotranspiration. When storage in the unsaturated zone exceeds soil water capacity, the excess percolates to the shallow saturated zone. This zone is treated as a linear reservoir that discharges to the stream or loses moisture to deep seepage, at a rate described by the product of the zone's moisture storage and a constant rate coefficient.

Flow in streams may derive from surface runoff during precipitation events or from ground water pathways. The amount of water available to the shallow ground water zone is strongly affected by evapotranspiration, which GWLF estimates from available moisture in the unsaturated zone, potential evapotranspiration, and a cover coefficient. Potential evapotranspiration is estimated from a relationship to mean daily temperature and the number of daylight hours.

The user of the GWLF model must divide land uses into “rural” and “urban” categories, which determines how the model calculates loading of sediment and nutrients. For the purposes of modeling, “rural” land uses are those with predominantly pervious surfaces, while “urban” land uses are those with predominantly impervious surfaces. It is often appropriate to divide certain land uses into pervious (“rural”) and impervious (“urban”) fractions for simulation. Monthly sediment delivery from each “rural” land use is computed from erosion and the transport capacity of runoff, whereas total erosion is based on the Universal Soil Loss Equation (USLE) (Wischmeier and Smith 1978), with a modified rainfall erosivity coefficient that accounts for the precipitation energy available to detach soil particles (Haith and Merrill, 1987). Thus, erosion can occur when there is precipitation, but no surface runoff to the stream; delivery of sediment, however, depends on surface runoff volume. Sediment available for delivery is accumulated over a year, although excess sediment supply is not assumed to carry over from one year to the

next. Nutrient loads from rural land uses may be dissolved (in runoff) or solid-phase (attached to sediment loading as calculated by the USLE).

For "urban" land uses, soil erosion is not calculated, and delivery of nutrients to the water bodies is based on an exponential accumulation and washoff formulation. All nutrients loaded from urban land uses are assumed to move in association with solids.

A.1 GWLF Model Inputs

GWLF application requires information on land use, land cover, soil, and parameters that govern runoff, erosion, and nutrient load generation.

Land Use/Land Cover

Digital Land use/Land Cover (LULC) data for the Mill Creek watershed were obtained from the National Land Cover Dataset (NLCD). The NLCD is a consistent representation of land cover for the conterminous United States generated from classified 30-meter resolution Landsat thematic mapper (TM) satellite imagery data. The NLCD is classified into urban, agricultural, forested, water, and transitional land cover subclasses. The imagery was acquired by the Multi-Resolution Land Characterization (MRLC) Consortium, a partnership of federal agencies that produce or use land cover data. The imagery was taken between 1989-1994. Table 1 summarizes the acreage in each land use category in the Mill Creek watershed.

Table 1. Land uses in Mill Creek watershed, 1989-1994 (MRLC data).

Land Use Code	Land Use	GWLF Land use group	Acres	% of Total
41	Deciduous Forest	FOREST	21,858.5	20.79%
81	Pasture/Hay	PASTURE	6,311.4	6.0%
21	Low Intensity Residential	LDRES	33912.3	32.26%
82	Row Crops	ROWCR	9,850.1	9.37%
23	Commercial/Industrial/Transportation	COMM	18,477.1	17.58%
85	Urban/Recreational Grasses	GRASS	5,656.3	5.38%
91	Woody Wetlands	WETLAND	18.2	0.017%
22	High Intensity Residential	HDRES	7,592.6	7.22%
42	Evergreen Forest	FOREST	653.7	0.62%
11	Open Water	WETLAND	554.2	0.53%
43	Mixed Forest	FOREST	179.1	0.17%
92	Emergent Herbaceous Wetlands	FOREST	57.3	0.05%
Total			105,120.8	100.00%

Soil data for the Mill Creek watershed were obtained from two sources. A county-level soil data coverage for Butler and Hamilton Counties were obtained from the NRCS's Soil Survey Geographic (SSURGO) data base (http://www.ftw.nrcs.usda.gov/ssur_data.html). Attribute data associated with soil map units were used to assign soil hydrologic groups and to estimate values for some of the USLE parameters, as described in sections below.

The entire surface of the Mill Creek watershed was divided into five subwatersheds (Figure 1). The subwatersheds, land uses, and the soils coverages were overlain in a Geographic Information System (GIS) environment. For the purposes of the GWLF modeling of runoff and erosion, the land use categories were grouped as summarized in Table 2. Runoff and erosion potential are expected to be affected both by land use and by the soil hydrologic group, so each land use group was divided into sub-categories based on the hydrologic group (A, B, C or D) of the underlying soil type. Finally, two land use groups which mix substantial amounts of pervious and impervious coverage (HDRES and LDRES) were further subdivided into pervious and impervious areas based on an assumed percent imperviousness for each land use (50% for LDRES and 80% for HDRES).

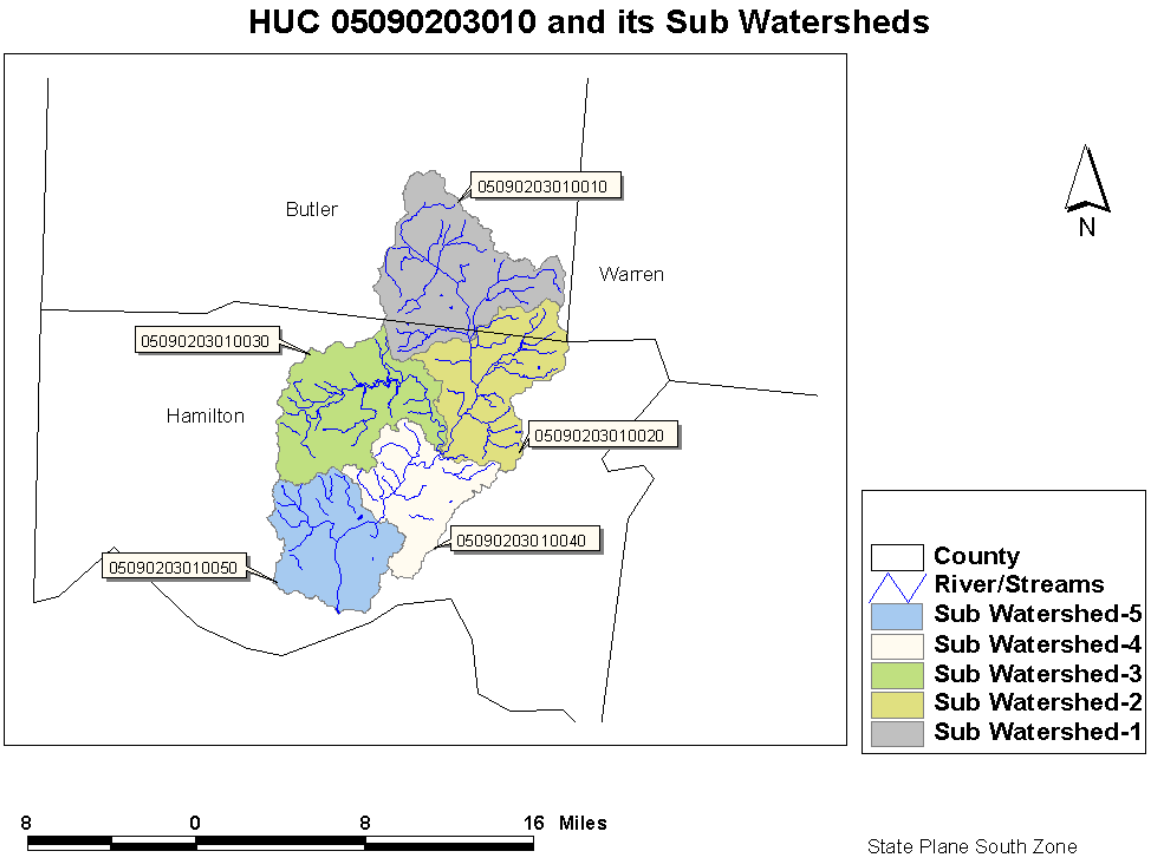

Figure 1. The Mill Creek subwatersheds

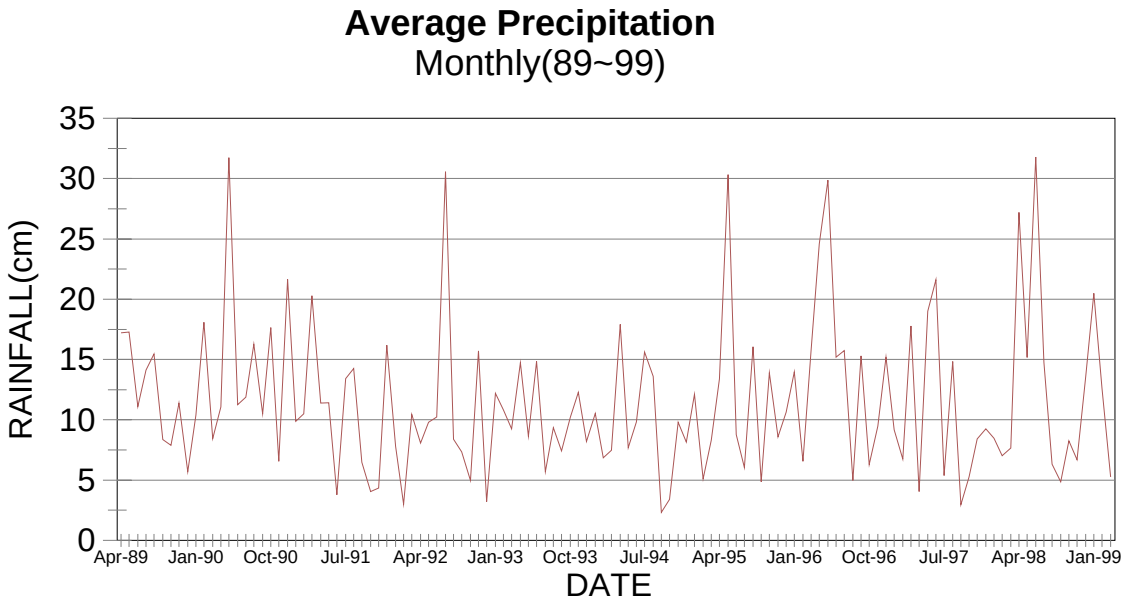

Figure 2. Mill Creek area total monthly precipitation

Table 2. Land Use Groupings for GWLF Modeling

MRLC Land Use	Group Code	Pollutant Simulation
Deciduous Forest	FOREST	Rural
Evergreen Forest		
Mixed Forest		
Urban/Recreational Grasses	GRASS	Rural
Low Intensity Residential	LDRES	Mixed
Pasture/Hay	PASTURE	Rural
Row Crops	ROWCR	Rural
Commercial/Industrial/ Transportation	COMM	Urban
Woody Wetlands	WETLANDS	Rural
Emergent Herbaceous Wetlands		
High Intensity Residential	HDRES	Mixed
Open Water	WATER	--

A.1.2 Rainfall and Runoff Input Data and Parameters

Meteorology

Hydrology in GWLF is simulated by a water-balance calculation, based on daily observations of precipitation and temperature. A search was made of available Midwestern Regional Climate Center reporting stations. Based on this review, the most appropriate available meteorological data appears to be that from the stations at CHEVIOT (Station ID: 331515), located at 39-09'N, 84-37'W, in Hamilton County from 4-89 through 3-99, CINCINNATI FERNBANK (Station ID:

331550), located at 39-07"N, 84-42"W in Hamilton County from 4-75 through 3-99, and FAIRFIELD (Station ID: 332651), located at 39-21'N, 84-35'W in Butler County from 4-86 through 3-99. These stations supplies daily data on precipitation and minimum and maximum temperature. Daily mean temperature was estimated as the mean of the minimum and maximum values.

Data for the above stations for 1975 through 1999 were obtained directly from the Midwestern Regional Climate Center. Average total precipitation and mean daily temperature by month for the 1989 - 1999 time period are summarized in Table 3. Figure 2 shows the variability in monthly precipitation over the April 1989 through March 1999 period.

Runoff Curve Numbers

The direct runoff fraction of precipitation in GWLF is calculated using the curve number method from the SCS TR55 method literature based on land-use and soil hydrologic group (SCS 1986). Curve numbers vary from 25 for undisturbed woodland with good soils, to, in theory, 100, for impervious surfaces. The hydrologic soil group was determined from available soils data and curve numbers were calculated for each land use category/soil hydrologic group. Curve numbers assigned for the Mill Creek watershed are summarized in Table 3. For each land use, the table also indicates whether GWLF simulates nutrient loading via the USLE equation ("rural" areas) or a buildup-washoff formulation ("urban" areas).

Table 3. Runoff Curve Numbers for Mill Creek Watershed.

LAND USE Whole Watershed (Excluding CSO area)					
	Area	**Area**	**GWLF Loading**	**Hydro**	**Curve No**
WATER	554.1707	224.3	USLE	2	100
L.D.RES.	23305.38	9431.4	Buildup-Washoff	2	77
H.D.RES.	2472.344	1000.5	Buildup-Washoff	2	98
COMM	10404.15	4210.4	Buildup-Washoff	2	84
FOREST	20001.23771	8094.2	USLE	2	73
PASTURE	6311.412	2554.1	USLE	2	81
ROWCR	9850.071	3986.2	USLE	2	81
GRASS	4360.28	1764.5	USLE	2	74
WETLANDS	75.548387	30.6	USLE	2	87
Total Area	77334.593797*				

* This area does not include CSO area.

Evapotranspiration(ET) Cover Coefficients

The portion of rainfall returned to the atmosphere is determined by GWLF based on temperature and the amount of vegetative cover. For urban land uses, the cover coefficient was calculated as (1 - impervious fraction). For all other land uses it was assumed that land had vegetative cover during the growing season (cover coefficient = 1) and limited vegetative cover during the dormant season (cover coefficient = 0.3). The cover coefficients were area-averaged and results

for the growing season (March-October) and the dormant season (November-March) are shown in Table 4.

Table 4. ET coefficient for the Mill Creek watershed

ET coefficient for the growing season							
Whole _w/CSO	**Whole -no CSO**	**Huc-1**	**Huc-2**	**Huc-3**	**Huc1&2**	**Huc1~3**	**Huc1~4**
0.712	0.785	0.83	0.642	0.776	0.749	0.758	0.771
ET coefficient for the dormant season							
Whole _w/CSO	**Whole -no CSO**	**Huc-1**	**Huc-2**	**Huc-3**	**Huc1&2**	**Huc1~3**	**Huc1~4**
0.412	0.412	0.382	0.407	0.498	0.393	0.426	0.419

Soil Water Capacity

Water stored in soil may evaporate, be transpired by plants, or percolate to ground water below the rooting zone. The amount of water that can be stored in soil (the soil water capacity) varies by soil type and rooting depth. Based on soil water capacities reported in the SSURGO database, soil types present in the watershed, soil water capacity of 15 cm was used.

Recession and Seepage Coefficients

The GWLF model has three subsurface zones: a shallow unsaturated zone, a shallow saturated zone, and a deep aquifer zone. Behavior of the second two stores is controlled by a ground water recession and a deep seepage coefficient. The recession coefficient was set to 0.025 per day and the deep seepage coefficient to 0.055, based on several calibration runs of the model.

Erosion Parameters

GWLF simulates rural soil erosion using the Universal Soil Loss Equation (USLE). [Note: For land uses indicated as "Buildup-Washoff" in Table 4, solids loads are generated separately, as described below in the section entitled Parameters Governing Nutrient Load Generation.] This method has been applied extensively, so parameter values are well established. This computes soil loss per unit area (sheet and rill erosion) at the field scale by

$$A = RE * K * LS * C * P$$

where

- A = rate of soil loss per unit area,
- RE = rainfall erosivity index,
- K = soil erodibility factor,
- LS = length-slope factor,
- C = cover and management factor, and
- P = support practice factor.

Soil loss or erosion at the field scale is not equivalent to sediment yield, as substantial trapping may occur, particularly during overland flow or in first-order tributaries or impoundments.

GWLF accounts for sediment yield by (1) computing transport capacity of overland flow, and (2) employing a sediment delivery ratio (DR) which accounts for losses to sediment redeposition.

Rainfall Erosivity (RE)

Rainfall erosivity accounts for the impact of rainfall on the ground surface, which can make soil more susceptible to erosion and subsequent transport. Precipitation-induced erosion varies with rainfall intensity, which shows different average characteristics according to geographic region. The factor is used in the Universal Soil Loss Equation and is determined in the model as follows:

$$RE_t = 64.6 * a_t * R_t 1.81$$

where

RE_t = Rainfall erosivity (in megajoules mm/ha-h),

a_t = Location- and season-specific factor, and

R_t = Rainfall on day t (in cm).

The erosivity coefficient (a_t) was assigned a value of 0.3 for the growing season and 0.12 for the dormant season, based on erosivity coefficients provided in the GWLF User's Manual.

Soil Erodibility (K) Factor

The soil erodibility factor indicates the propensity of a given soil type to erode, and is a function of soil physical properties and slope. Soil erodibility factors were extracted from the SSURGO and STATSGO soil coverages. For each land use category, the K factors of the soil types underlying all land of this category were area-averaged to result in an overall K factor for the land use category.

Length-Slope (LS) Factor

Erosion potential varies by slope as well as soil type. The LS factor is calculated following Wischmeier and Smith (1978):

$$LS = (0.045 * L_K)b * (65.41 * \sin^2\phi_k + 4.56 * \sin\phi_k + 0.065)$$

where

ϕ_k = tan - 1(ps_k/100), where ps_k is percent slope

L_k = slope length (m)

b = a factor of percent slope(see Table 5)

Table 5. Slope - b factor relationship

Percent Slope	b
0-1	0.2
1 - 3.5	0.3
3.5 - 5	0.4
5 +	0.5

The slope and slope length are both calculated using the SWAT submodel in U.S. EPA BASINS model, beta version 3.0 (Lahlou et al., in progress; Neitsch et al., 1999), based on the GIS data downloaded from the Multi-Resolution Land Characteristics (MRLC) website and available in BASINS. The GIS data included: 1) the Digital Elevation Maps (DEMs) that cover the watershed, 2) the National Land Cover Data (NLCD) data for land use, and 3) the STATSGO data for soils. The former two data types were available from MRLC; the latter from BASINS. The approach to calculating slope and slope length in the BASINS/SWAT model is briefly described. First, the watershed delineation was created to match the watershed figure provided by OEPA. Average slope and slope length are calculated for each subwatershed. Next, the BASINS/SWAT model divides each subwatershed into units called Hydrologic Response Units (HRUs), which are "lumped" units of similar land use and soil type. The term "lumped" refers to the fact that the HRU includes similar land use and soil type areas that are not necessarily spatially connected. Approximately 35-60 HRUs were defined for each subwatershed, of which there were between 3 to 5 HRUs for each land use. Then, the LS factor was calculated.

For the Mill Creek basin, where the total change in elevation is only 360 ft (according to the DEMs), we believe that the calculation of subwatershed-level LS factors is acceptable. The Mill Creek calculated length slope and slope values also are similar to the typical values identified in the BASINS parameter guidance document (U.S. EPA, 1999) - 200 to 500 ft for slopes ranging from 15% to 1%.

Table 6. LS factor for five different HUCs

	Area (Acre)	**Area (ha)**	**Slope length (m)**	**Slope (%)**	**b**	**LS**
HUC-1	26944.3	10904	121.951	1.9	0.3	0.292
HUC-2	20532.51	8309.2	91.63	4.1	0.4	0.6368
HUC-3	23320.28	9437.4	60.98	5.6	0.5	0.8687
HUC-4	15825.77	6404.5	60.98	8.9	0.5	1.6288
HUC-5	18497.88	7485.8	24.39	12.2	0.5	1.6516
TOTAL WATERSHED	105120.8	42540.9				0.93

Cover and Management (C) and Practice (P) Factors

The mechanism by which soil is eroded from a land area and the amount of soil eroded depends on soil treatment resulting from a combination of land uses (e.g., forestry versus row-cropped agriculture) and the specific manner in which land uses are carried out (e.g., no-till agriculture versus non-contoured row cropping). Land use and management variations are represented by

cover and management factors in the universal soil loss equation and in the erosion model of GWLF. Cover and management factors were drawn from several sources (Wischmeier and Smith, 1978; Haith et al., 1992; Novotny and Olem, 1994), and are summarized in Table 7. Practice (P) factors were generally set to 1, consistent with recommendations for non-agricultural land.

Table 7. Cover and Management Factors for Mill Creek Watershed Land Uses*

GWLF Land Use Group	C	P
FOREST	0.010	1
PASTURE	0.040	1
ROWCR	0.500	0.5
GRASS	0.040	1
WETLAND	0.010	1
WATER	0.010	0

* C and P factors are not required for the "urban" land uses which are modeled in GWLF via a buildup-washoff formulation rather than USLE.

Table 8. USLE values for different Land uses (Excluding CSO area)

	Area (Acre)	Area (ha)	Kf	LS	C	P	Kf.LS.C.P.
WATER	554.1707	224.3	0.25	0.93056	0.01	1	0.002
L.D.RES.	23305.38	9431.4	0.4				
H.D.RES.	2472.344	1000.5	0.4				
COMM	10404.15	4210.4	0.36				
FOREST	20001.23771	8094.2	0.37	0.93056	0.01	1	0.003
PASTURE	6311.412	2554.1	0.37	0.93056	0.04	1	0.014
ROWCR	9850.071	3986.2	0.36	0.93056	0.5	0.5	0.084
GRASS	4360.28	1764.5	0.39	0.93056	0.04	1	0.015
WETLANDS	75.548387	30.6	0.23	0.93056	0.01	1	0.002
Total Area	77334.593797						

Sediment Delivery Ratio

The sediment delivery ratio (DR) converts erosion to sediment yield, and indicates the portion of eroded soil that is carried to the watershed mouth from land draining to the watershed. The BasinSim program (a Windows version of GWLF) includes a built-in utility which calculates the sediment delivery ratio based an empirical relationship of DR to watershed area (SCS, 1973). The sediment delivery ratio for the entire Mill Creek watershed was calculated at 0.08.

Parameters Governing Nutrient Load Generation

Groundwater Nutrient Concentrations

The GWLF model requires input of groundwater nutrient concentrations excluding loads due to septic systems, which are accounted for separately. Even in the absence of septic system loads, groundwater concentrations are expected to increase with a shift from forest to either agriculture or development, due to the input of fertilizer on crops, lawns, and gardens. The effect is greatest for nitrate, which is highly soluble, but some elevation of groundwater concentrations of phosphorus is also expected with increased development.

Groundwater nutrient concentrations were estimated as an area-weighted average of concentrations expected for managed land (agriculture, and residential, commercial, and industrial development) and un managed land (e.g., forest). Groundwater concentrations for un managed land were assigned a value of 0.009 mg/l for phosphorus and 0.060 for nitrogen, consistent with values in the GWLF User's Manual. Managed lands were assigned a groundwater phosphorus concentration of 0.03 mg/l and a groundwater nitrogen concentration of 0.85, (Table 9) which are consistent with national recommendations in Caraco et al. (1998) and Omernik (1977). The resulting groundwater concentrations for the watershed are shown in Table 10.

Table 9. Ground water concentration for managed and unmanaged land

GWLF Land use	Type	Phosphorus	Nitrogen
WATER	U*	0.009	0.06
L.D.RES.	M**	0.03	0.85
H.D.RES.	M	0.03	0.85
COMM	M	0.03	0.85
FOREST	U	0.009	0.06
PASTURE	M	0.03	0.85
ROWCR	M	0.03	0.85
GRASS	M	0.03	0.85
WETLANDS	U	0.009	0.06

* U : Un managed land

** M : Managed land

Table 10. Groundwater concentration in different HUCs

Watersheds	Phosphorus (mg/l)	Nitrogen (mg/l)
Huc-1	0.027	0.73
Huc-1&2	0.026	0.71
Huc-3	0.025	0.65
Huc1~3	0.026	0.69
Huc-1~4	0.026	0.69
Whole Watershed	0.025	0.67

Dissolved and Solid Phase Nutrient Concentrations for Rural Land Uses

GWLF requires a dissolved phase concentration for surface runoff from rural land uses. Particulate concentrations are taken as a general characteristic of area soils, determined by bulk soil concentration and an enrichment ratio indicating preferential association of nutrients with the more erodible soil fraction, and not varied by land use. The estimates of dissolved phase and solid phase nutrient concentrations were selected from the GWLF User's Manual and are shown in Table 11.

Table 11. Dissolved and Solid Phase Nutrient Concentrations for Rural Land Uses

GWLF Land Use Group	Nitrogen		Phosphorus	
	Dissolved Phase (mg/L)	Solids Phase (mg/kg)	Dissolved Phase (mg/L)	Solids Phase (mg/kg)
FOREST	0.34	1000	0.01	1275
PASTURE	3.00	1000	0.25	1275
ROWCR	2.90	1000	0.26	1275
GRASS	0.65	1000	0.06	1275
WETLAND	0.34	1000	0.01	1275

Buildup/Washoff Parameters for Urban Land Uses

Nutrients and solids generated from urban land uses are described by a buildup/washoff formulation. Pollutant accumulation is summarized by an exponential buildup rate, and GWLF assumes that 95% of the limiting pollutant storage is reached in a 20-day period without washoff. The resulting buildup parameters are summarized in Table 12.

Table 12. Pollutant Buildup Rates for Urban Land Uses

Land use	Nitrogen build up (kg/ha-d)	Phosphorus build up (kg/ha-d)
Low Intensity Residential	0.090	0.0112
Commercial/Industrial/Transportation	0.101	0.0112
High Intensity Residential	0.056	0.0067

Septic Systems

GWLF contains routines for the simulation of nutrient loading from both normal and failing septic systems. The number of septic systems in each subwatershed was estimated on information provided to OEPA by the pubic health departments in Butler county and Hamilton county (Table 13).

Table 13 . Septic systems in Hamilton and Butler counties.

Hamilton County/Mill Creek Watershed		
Mechanical Systems		
East Branch	35	HUC2
Pleasant Run	52	HUC4
South Branch	368	HUC5
West Branch	355	HUC3
Non-Mechanical Systems:		
East Branch	63	HUC2
Pleasant Run	18	HUC4

It is assumed that on average each system serves 2.6 persons. Table 14 summarizes the results of these assumptions.

Table 14. Septic system loading

Septic Systems	Assumed Distribution	Huc1	Huc2	Huc3	Huc4	Huc5	Whole Watershed
#of Septic systems		100	141	640	70	574	1525
Direct Discharge	1 %[B]	1	1	6	1	6	15
Short Circuited	3 %[C]	3	4	19	2	17	45
Ponded	16 %[D]	16	23	102	11	92	244
Normal	80 %[E]	80	113	513	56	459	1221
# of people (total)[A] (1S.S.=2.6 people)		260	367	1664	182	1492	3965
Direct Discharge[B]		3	3	16	3	16	39
Short Circuited[C]		8	10	49	5	44	117
Ponded[D]		41	60	265	29	239	634
Normal[E]		208	294	1334	145	1193	3175

A Assume 2.6 persons/Septic System

B Direct Discharge: Illegal systems discharge effluent directly into surface waters. Assume 1% have a Direct Discharge

C Short-circuited: Systems are close enough to surface water (< 15 meters) that negligible absorption of phosphorus takes place. Assume 3% are within 15 m of streams

D Ponded: System failure results in surfacing of effluent. Assume 16% are ponded

E Normal: Septic systems conform to EPA standards and operating effectively. Assume 80% are normal

Table 15 shows the list of all available semi-publics in the Mill Creek watershed.

Table 15. Semi-Public discharges*

Street Address	Name	City	Gallons/Day
6530 Springdale Rd.	New Life Church of God	Colerain Twp.	170
6008 Springdale Rd.	Firehouse II (bar)	Colerain Twp.	690
5919 Springdale Rd.	Trinity Lutheran	Colerain Twp.	No data given
5921 Springdale Rd.	Trinity Lutheran	Colerain Twp.	390
5920 Springdale Rd.	Don Helcher Car Care	Colerain Twp.	20
5906 Springdale Rd.	Joy Baptist Church	Colerain Twp.	30
5744 Springdale Rd.	Trio Lounge	Colerain Twp.	300
5736 Springdale Rd.	Total Image	Colerain Twp.	420
11205 Mosteller Rd.	Turnbull Concrete Inc.	Sharonville	5550
11245 Mosteller Rd.	Imperial Nurseries	Sharonville	170
11641 Mosteller Rd.	Valley Asphalt	Sharonville	6030
11861 Mosteller Rd.	Trinity Industries	Sharonville	9480
3065 Crescentville Rd.	Nobar	Sharonville	1640
2751 Crescentville Rd.	Carolina Freight	Sharonville	710
2889 Crescentville Rd.	Hillsboro Transport Inc.	Sharonville	2380
2839 Crescentville Rd.	Telecom Properties	Sharonville	No data given
2811 Crescentville Rd.	Cincinnati United Container	Sharonville	200
2789 Crescentville Rd.	APA Transport	Sharonville	300
2751 Crescentville Rd.	Carolina Freight	Sharonville	690
6530 Springdale Rd.	New Life Church of God	Colerain Twp.	170
1791 Crescentville Rd.	Winings	Sharonville	240
6947 East Kemper Rd.	Bob Williams Auto Body	Sharonville	645
6949 East Kemper Rd.	Advanced Pools & Spas	Sharonville	429
165 Crescentville Rd.	Adex International	Sharonville	580

* Source: Hamilton County General Health District and Butler County Department of Environmental Services

These are the facilities which have a discharge:

Turnbull Concrete - 5550 gal/day
Trinity Industries - 9480 gal/day
Hillsboro Transport Inc. - 2380 gal/day
Advanced Pools & Spas - 429 gal/day
Valley Asphalt - 6030 gal/day
Nobar - 1640 gal/day
Bob Williams Auto Body 645 gal/day

Since semi-publics loadings function like septic systems; therefore, semi-public discharges are converted into septic system (Table 16). Septic systems and semi-public discharges are combines in Table 17.

Table 16. Converting semi-publics discharges into GWLF septic systems

Semi Public	**Huc1**	**Huc2**	**Huc3**	**Huc4**	**Huc5**	**Whole Watershed**
Semi-public volume	8000	21230	2000	--	--	31230
Semi-public > 5000	--	21060	–	--	--	21060
Semi-public <5000* (Acts like Direct Discharge)	8000	170	2000	--	--	10170
# of People total** (50galloc/person)	400	425 (421)	40	--	--	865 (421)
Direct Discharge	4	421	0	--	--	425
Short Circuited	12	0	1	--	--	13
Ponded	64	0	7	--	--	71
Normal	320	4	32	--	--	356

* Assume discharge > 5000 GPD is a direct discharge.

** Assume 50 Gallon per person per day

Table 17. GWLF septic system input

Septic Systems + Semi Publics	**Huc1**	**Huc2**	**Huc3**	**Huc4**	**Huc5**	**Huc 1&2**	**Huc 1~3**	**Huc 1~4**	**Whole Watershed**
Direct Discharge	7	424	16	3	16	431	447	450	466
Short Circuited	20	10	50	5	44	30	80	85	129
Ponded	105	60	272	29	239	165	437	466	705
Normal	528	298	1366	145	1193	826	2192	2337	3530

Parameters affecting nutrient loading from septic systems were specified at GWLF default values. Effluent phosphorus from failing septic systems was set to 1.5 g/day (default for areas

with non-phosphate detergents), while effluent nitrogen was set to 12.0 g/day. Plant uptake rates were assumed to be 1.6 g/day nitrogen and 0.4 g/day phosphorus.

Point Sources

Nutrient loads from point sources are calculated outside of the GWLF model and are added in directly. Monthly loads from the two facilities in the watershed were estimated based on the average nutrient discharge concentrations and flows available from a 1993-1998 analysis of the L.E.A.P.S. database. These values are shown in Table 18.

Table 18. Estimated Nutrient Point Source Loads in the Mill Creek watershed.

	SUMMER		WINTER	
Facility	**Phosphorus (kg/day)**	**NO2+NO3 (kg/day)**	**Phosphorus (kg/day)**	**NO2+NO3 (kg/day)**
Butler Co. WWTP	68.8*	135.3	68.8	191.8
Glendale WWTP	--	2.95	--	3.95

* Ohio EPA effluent data collection 1997 (7 observations)

A.2 Development of CSO and SSO Nutrient Loads for the Mill Creek Basin TMDL

A.2.1 Approach for Developing CSO Nutrient Loading

Annual urban runoff and combined sewer loads are predicted from the following equation (Tetra Tech, 1985):

$$L_k = \alpha_k F_k \gamma_k P \quad (1)$$

where

L_k = annual load of pollutant due to runoff from land use k (kg/ha)
α_k = pollutant concentration factor (kg/ha-cm)
F_k = population density function
γ_k = street cleaning factor
P = annual precipitation (cm)

Total pollutant load from the urban area is the sum of component loads from various land use types multiplied by the corresponding land use areas. Equation (1) can be viewed as a general loading function which multiplies a water flux ($F_k P$) by a concentration (α_k) and an attenuation ratio (γ_k). Pollutant concentration factors are given in Table 19.

The population density function is as follows:

$$F_k = \begin{cases} 1.0, \text{ commercial and industrial} \\ 0.142 + 0.134\ PD^{0.54}, \text{ residential} \\ 0.142, \text{ other} \end{cases} \quad (2)$$

where PD = population density (persons/ha)

The street cleaning factor γ_k is based on the street cleaning interval N_s (days):

$$\gamma_k = N_s/20 \text{ for } N_s < 20 \quad (3)$$

For $N_s > 20$ days, no street cleaning effects are apparent and $\gamma_k = 1.0$. For combined sewer areas, street cleaning will not significantly reduce loads because most pollution load in combined sewers is due to raw wastewater and sewer scour, and γ_k should be set to 1.0.

Table 19. Pollutant Concentration Factors for Annual Loading Functions (Heaney and Huber, 1979)

Land Use	Pollutant Concentration Factor (kg/ha-cm)	
	PO_4	**N**
Separate Sewers		
Residential	0.015	0.058
Commercial	0.033	0.131
Industrial	0.031	0.122
Other developed	0.004	0.027
Combined Sewers		
Residential	0.061	0.239
Commercial	0.138	0.539
Industrial	0.129	0.504
Other developed	0.018	0.110

The estimated population for the Mill Creek watershed is 453,800 (OKI, 1995). The population was divided between the sub-basins based on the amount of residential land use in each sub-basin, where high intensity residential land use area was weighted twice that of low intensity residential land use.

The above methodology applies to annual urban run-off and combined sewer loads. A method was needed to divide the annual CSO loads into daily values. In order to do this, a threshold precipitation value was needed for each sub-basin. The threshold precipitation value is the lowest value of precipitation for which CSO flow occurs. Any amount of precipitation below the threshold does not produce CSO flow (on a daily basis).

To determine the threshold precipitation for each sub-basin, a value was calibrated based on the number of overflow events for the average rainfall year 1970, as presented in Table 5.3 of the report 'Combined Sewer Overflow Strategy Development and Facilities Planning: Phase I Report, State of the System Report, Mill Creek Drainage Area'. The threshold precipitation value for a given sub-basin was changed by trial and error until the number of overflow events was equal to the number given by the average of the top 10% of overflow producing CSOs per sub-basin. Table 20 lists the threshold precipitation values per sub-basin.

Table 20. Threshold Precipitation by Sub-basin

Sub-Basin No.	Threshold Precipitation, cm
2	0.85
3	0.80
4	0.78
5	0.22

After the threshold precipitation for each sub-basin was determined, the annual CSO loads were divided among days with precipitation exceeding the threshold precipitation in the model period 1989 - 1999. This was done with a simple ratio, dividing the total annual load among days in the corresponding year with excess precipitation, based on each day's amount of excess precipitation.

Note that this methodology also predicts non-CSO loads of nitrogen and phosphorus within the watershed by sub-basin. These predictions can be used to check other modeling results, if desired.

The predicted annual average CSO loads for nitrogen and phosphorus by sub-basin are given in Table 21.

Table 21. Average Annual CSO Loads

Basin	Nitrogen (kg-N/yr)	Phosphorus (kg-P/yr)
Sub-basin 1	0	0
Sub-basin 2	7,140	1,821
Sub-basin 3	8,969	2,283
Sub-basin 4	56,592	14,398
Sub-basin 5	149,984	37,921
Total	2.2E+5	5.6E+4

A.2.1.1 Alternative CSO Approach

An alternative methodology was used to determine an independent estimate of CSO loads, to ensure that the approach described above provides reasonable estimates. Data was taken from 'Combined Sewer Overflow, Phase 1 Report' (1996) on total overflow volume and sanitary flow volume for the year 1970. Given the yearly flows and typical nutrient concentrations in these flows (from literature values), annual loads for nitrogen and phosphorus were determined.

The following runoff and sanitary concentrations are used in the calculations (see Table 22)

Table 22. Runoff and Sanitary concentration

Runoff Concentration (mg/l):	Basin 2	Basin 3	Basin 4	Basin 5
Nitrogen	3.	2.6	2.9	2.2
Phosphorus	0.091	0.078	0.090	0.067

Source: Thomann and Mueller, 1987

Sanitary Concentration (mg/l):	
Nitrogen	40
Phosphorus	8

Source: Metcalf and Eddy, 1979

Table 23 presents the flow volumes and predicted nitrogen and phosphorus CSO loads for 1970.

Table 23. Predicted CSO Loads for 1970

	Basin2	Basin3	Basin4	Basin5	All Basins
Storm Volume (MG/yr)	45	111	787	1462	
Sanitary Volume (MG/yr) [1]	1.3	2.6	212	466	
Total Volume (MG/yr) [1]	46	114	999	1928	3087
Nitrogen					
Storm Load (kg/yr)	498	1075	8716	12176	
Sanitary Load (kg/yr)	197	388	32104	70545	
Total CSO Load (kg-N/yr)	695	1463	40820	82721	1.3E+05
Phosphorus					
Storm Load (kg/yr)	15	33	268	371	
Sanitary Load (kg/yr)	39	78	6421	14109	
Total CSO Load (kg-P/yr)	55	110	6689	14480	2.1E+04

Notes:
(1) Sanitary Volume and Total Volume from 'Combined Sewer Overflow, Phase I Report, Mill Creek Drainage Area', Table 5.5

A comparison indicates that nitrogen and phosphorus loads predicted with the first method (annual averages over the period 1989 to 1999, Table 3) are 1.7 and 2.7 times, respectively, the loads predicted with the second method (annual loads for 1970, Table 4). The average annual precipitation over the period 1989 to 1999 is 136 cm, while the annual precipitation for 1970 is 94 cm. The agreement between the two methods is quite good, especially when the difference in precipitation over the two study periods is considered.

A.2.2 Approach for Developing SSO Nutrient Loading

Flow in sanitary sewers consists of sanitary flows, groundwater infiltration (GWI), and rain-derived infiltration and inflow (RDI/I). During a rain event, RDI/I can be large enough to cause an overflow event. The following approach is proposed to determine sanitary sewer overflows (SSOs) for the study period.

For SSOs in the Mill Creek Basin, the following information is known (MSD, 1993):

Full pipe capacity
Daily GWI
Daily Sanitary flows
Tributary area
Threshold precipitation, the amount of precipitation that causes an overflow event

For any given rainfall event, it is necessary to know the amount of RDI/I that contributes to the overflow. This amount is taken to be a fraction of the total precipitation falling on the tributary area of the sanitary sewer:

$$RDI/I = C\ i\ A \quad (4)$$

where C = the fraction of rainfall volume that contributes to the overflow
i = daily precipitation
A = the tributary area of the sanitary sewer

At the threshold daily precipitation, the amount of RDI/I contributing to the overflow is the pipe capacity minus the daily average dry weather flows:

$$\text{Pipe capacity} - Q_{DW,\,avg} = C\ i\ A \quad (5)$$

This equation can be solved for C, the fraction of total precipitation volume falling on the tributary area of the sanitary sewer.

Then for any precipitation i, the total volume flow through the sanitary sewer is the sum of the sanitary flow, GWI, and RDI/I. The full pipe capacity goes to the WWTP, and the excess flow is the overflow volume.

Given the average concentration of nitrogen and phosphorus in the sanitary flows, GWI and RDI/I water, and the volume of the total flow through the sanitary sewer, the concentration of nitrogen and phosphorus in the overflow can be calculated. The load to the stream is then the overflow volume multiplied by the concentration in the overflow.

The following concentrations are used for the components of the overflow (see Table 24).

Table 24. SSO concentrations

Component	Nitrogen Concentration (mg/l)	Phosphorus Concentration (mg/l)	Source
Sanitary flow	40	8	Metcalf and Eddy, 1979
GWI [1]	0.67	0.025	Table 10 (Appendix A)
RDI/I	0.60	0.015	Thomann and Mueller, 1987

Notes:
(1) Individual values per sub-basin are used; values shown in table are averaged over all sub-basins

The predicted annual average SSO loads for nitrogen and phosphorus by sub-basin are given in Table 25 below.

Table 25. Average Annual SSO Loads

Basin	Nitrogen (kg-N/yr)	Phosphorus (kg-P/yr)
Sub-basin 1	0	0
Sub-basin 2	83,003	12,456
Sub-basin 3	15,117	2,324
Sub-basin 4	1,443	222
Sub-basin 5	40	3
Total	1.0E+5	1.5E+4

SSO number 700, which is reported to be a large problem, contributes 67% of the nitrogen load and 70% of the phosphorus load in Sub-basin 2.

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Appendix B

B. 1 Summary of Point Sources

Butler County Upper Mill Creek Water Reclamation Facility (NPDES # 1PK00016*ID)
The Butler County Upper Mill Creek Water Reclamation Facility is located at 6055 Center Park Drive, Union Township, Butler County. The WWTP was constructed in 1981 with the last modification in 1999/2000. A population of approximately 52,000 is served by the plant which is proposed to expand to an average daily design flow of 16 MGD. The effluent from the facility discharges (River Mile 1.07) to the East Fork Mill Creek. The WWTP consists of flow equalization, bar screens, grit removal, oxidation ditches (biological treatment), secondary clarification, rapid sand filters, ultraviolet disinfection, and sludge holding/stabilization/dewatering. A review of the monthly operating reports from July of 1999 through June of 2000 shows the WWTP operating at an average daily flow of 6.82 MGD.

X Tek Plant 2 Sharonville (NPDES #1IC00018*FD)
X Tek Plant 2 Sharonville discharges directly to Mill Creek at RM 16.91. This facility manufactures a variety of heat treated and carburized steel products from castings and forgings. The facility generates wastewater from quenching operations. The flow rate generated by the quenching process is 0.31 MGD. The water used in the quenching process is produced from on-site wells. Storm water from this facility is also discharged through outfall 001. Sanitary flow is discharged to the sewer system of MSD of Greater Cincinnati. The facility had four oil and grease violations since June 1997. These violations have been resolved. There are discharge limitations on outfall 001 for pH and oil and grease. Monitoring only is required for water temperature and flow rate. Two internal monitoring stations, 601 and 602, discharge through outfall 001. Monitoring only is required from 601 and 602 for oil and grease.

Village of Glendale WWTP (NPDES # 1PB00012*ED)
The Village of Glendale WWTP is located at 576 West Sharon Road, Glendale, Hamilton County. The facility was constructed in 1935, with the last modification in 1988. Treatment at the plant consists of flow equalization, bar screens, grit removal, primary clarification, trickling filter, secondary clarification, chlorination/dechlorination, post aeration, anaerobic digestion, and sludge drying. This WWTP serves a population of approximately 2,400 and has a permitted average daily design flow of 0.43 MGD that discharges to Town Run (RM 0.92). A review of the monthly operating reports from July of 1999 through June of 2000 shows the WWTP operating at an average daily flow of 0.469 MGD.

Timber Ridge Apartments WWTP (NPDES # 1PW00011*DD)
The Timber Ridge Apartments WWTP is located at 11600 Timber Ridge Lane, Sharonville, Hamilton County. The Timber Ridge WWTP was constructed in 1971 with the latest modification in 1983. The plant consists of extended aeration, fixed media clarification, slow sand filters, chlorine contact, and post aeration. It has a permitted average daily design flow of 0.08 (MGD) and discharges (RM 1.08) to an unnamed tributary of Sharon Woods Lake. A

review of the monthly operating reports from July of 1999 through June of 2000 shows the facility operating at an average daily flow of 0.03 MGD.

Village of Glendale WTP (NPDES Application #1IW00029*AD)

The Village of Glendale WTP is located at 2779 East Sharon Road, Glendale, Hamilton County. The drinking water plant utilizes lime softening and discharges filter backwash and settling tank sludge to a series of three lime settling lagoons. These discharge to Mill Creek (RM 16.5). The final settling lagoon discharges approximately 40,000 gallons 2 - 4 times per week (depending on the frequency of filter backwash and settling tank cleaning). The Village of Glendale submitted an NPDES application to the Ohio EPA in December of 1996.

Norfolk Southern Corporation - Sharonville Yard (NPDES # 1IT00002*CD)

The Norfolk Southern Corporation - Sharonville Yard was formerly known at the Conrail Sharonville Yard. This facility discharges to Sharon Creek at RM 0.79 then into the Mill Creek. Ownership was transferred from Conrail to Norfolk Southern on June 1, 1999. This is a railroad switching and terminal yard. Historically, engine refueling and maintenance was conducted at this site. These types of activities are no longer being done. The NPDES permit for this site covers storm water from the fueling pad area. This flow receives treatment for oil and grease removal through a coalescing filter. From the filter, the flow goes through a baffled oil/water separator prior to discharging into Sharon Creek. The facility is has discharge limitations for pH and oil and grease. Norfolk Southern has been in compliance with its discharge limitations.

Formica Corporation (NPDES # 1IQ00000*ED)

Formica Corporation discharges noncontact cooling water directly to Mill Creek (RM 14.59). The facility is located in Cincinnati, Hamilton County. Cooling water is treated via a non-contact cooling water pond. Sanitary and any contact process flows are discharged to the sewer system of MSD of Greater Cincinnati. High pressure decorative laminates are manufactured from thermosetting resins that are coated onto paper, dried, and pressed under elevated temperature and pressure. Non-contact cooling water from the presses. Storm water and air conditioning chiller water are also discharged to Mill Creek. The facility has an average effluent flow of 1.525 MGD. In the summer, Formica adds water from Southwest Water to help cool the discharge to meet its temperature limits. The facility monitors for phenol and oil and grease as indicator parameters. Detection of these parameters would indicate leakage in the non-contact cooling system. The facility is required to document the maximum temperature recorded during a 24 hour period and has had a history of temperature violations. Temperature spikes occur when all five of the presses are discharging at the same time. Discharge limitations of outfall 001 are required for temperature (summer only), pH, oil and grease, and phenol. Monitoring only is required for temperature (winter only), flow rate, and total residual chlorine.

National Starch and Chemical Corporation (NPDES #1IF00007*ED)

National Starch and Chemical Corporation is a water-based adhesives manufacturer located in the Village of Evendale.. The facility discharges directly to the Mill Creek at R M 15.60. The discharge at Outfall 001 consists of once-through non-contact cooling water supplied by the City of Cincinnati's California Water Treatment Plant. Design flow-rate of the discharge is 3,600

gallons per day. A review of monthly operating reports for the period between July, 1999 through July, 2000 indicates an average discharge of 6,573 gallons per day.

Steelcraft Manufacturing Company, Division of Ingersoll-Rand Company (NPDES # 1IC00042*BD)

Steelcraft Manufacturing Company discharges to Cooper Creek(RM 3.78), a tributary of Mill Creek. Steelcraft manufactures hollow metal doors and steel frames. Historically, this facility discharged through two outfalls, 001 and 002. The manufacturer no longer discharges through outfall 001. Non-contact cooling water for spot welders and air compressors is discharged through outfall 002. The process and sanitary flows are discharged to the MSD of Greater Cincinnati. Since June 1996, the facility has had four oil and grease violations. These violations have been resolved. Outfall 002 has discharge limitations for pH, total suspended solids and oil and grease. Monitoring only is required for the flow rate and mercury.

Michelman, Inc. (NPDES # 1IN00129*BD)

Michelman, Inc. discharges to Cooper Creek at RM 3.78. And is a manufacturer of water based coatings for the corrugated industry and wax emulsions for other industries. All coatings and emulsions are manufactured by the blending of raw materials. The NPDES discharge into waters of the State is for non-contact cooling water only. Average flow rate from the facility is approximately 0.092 MGD. Temperature violations in April 1999 apparently were related to operator error. These issues have been resolved. Outfall 001 has monitoring only for water temperature and flow rate.

General Electric Aircraft Engines (NPDES # 1IN00006*FD)

General Electric Aircraft Engines manufactures jet and marine engines for commercial and military applications. The facility has two discharge locations covered by NPDES permit. Outfall 001 discharges at RM 13.85 to Mill Creek and outfall 002 discharges at RM13.30. Outfall 001 discharges approximately 5 MGD which results from various buildings and storm water runoff. This includes the water used in the testing of engines. Treatment for this water entails oil/water separators and a oily wastewater treatment system prior to discharge. Outfall 002 discharges approximately 0.2 MGD. The flow is from non-contact cooling water and storm water and no treatment occurs prior to discharge. On August 1, 2000, General Electric signed Director's Final Findings and Orders (DFFOs) regarding PCB discharges. These DFFOs require General Electric to conduct PCB monitoring on the internal outfalls prior to the final discharge with defined response actions for any PCBs that may be detected. The facility has discharge limitation at outfall 001 for water temperature, dissolved oxygen, pH, oil and grease, toluene, ethylbenzene, naphthalene, and 1,2,4-trimethylbenzene. Monitoring only is required for benzene, PCBs, flow rate, and xylene. Discharge limitations for pH are required from outfall 002 and monitoring only required for oil and grease and flow on this outfall. The facility has been in compliance with its discharge limitations. General Electric is currently appealing a few provisions concerning the written requirements of the Stormwater Pollution Prevention Plan required by their NPDES permit. Metal finishing process wastewater and sanitary flows are all discharged to the sewer system of MSD of Greater Cincinnati Mill.

General Polymers (NPDES # 1IN00014*CD)

General Polymers discharges through one discharge point (Outfall 001) to Congress Run at RM 0.21. Congress Run is a tributary to Mill Creek, and enters the Mill Creek at RM 9.31. Ownership of this company has been transferred to Sherwin-Williams. The facility is located at 145 Caldwell Drive in Cincinnati and manufactures epoxy floor and wall coatings. The only water discharged to Congress Run permitted by NPDES is storm water from the roof drains and site run-off. The discharge permit is in the process of being renewed. Outfall 001 has discharge limitations for oil and grease. Monitoring only is required for water temperature and flow rate. The facility has been in compliance with its discharge limitations. All the sanitary and associated process flow is discharged to MSD of Greater Cincinnati.

Borden Chemical, Inc. (NPDES # 1IN00074*DD)

Borden Chemical, Inc. (formerly known as Borden Packaging and Industrial Products Coatings Division) discharges to the West Fork Mill Creek at RM 4.50. West Fork Mill Creek joins the mainstem of Mill Creek at RM 11.57. Borden Chemical mixes, blends and disperses colorants into printing inks. The facility has one outfall, 003 which discharges storm water runoff from the building roofs and grounds, as well as cooling water. The storm water discharge is approximately 0.2078 MGD, and the cooling water discharge is approximately 0.170 MGD. The process and sanitary flows from the facility discharge to the MSD of Greater Cincinnati Mill Creek WWTP. The facility has had twenty-two suspended solids violations since March 1997 at outfall 003. There were also three monthly operating reports that could not be found. All of these items have been addressed. Outfall 003 has discharge limitations for pH and oil and grease. There are monitoring only parameters for total suspended solids, chromium (total), copper (total), iron (total), zinc (total), phenol and flow rate.

City of Wyoming Water Treatment Plant (NPDES # 1IW00250*ED)

The City of Wyoming Water Treatment Plant discharges to the West Fork Mill Creek at RM 2.86. There is one outfall, 001, that discharges wastewater from the lime softening of water, backwash of rapid sand filters, and storm water runoff. The flow rate from the lime softening is approximately 0.009 MGD. The lime is allowed to settle out in lagoons prior to discharge to the West Fork Mill Creek. The solids are periodically removed by tanker trucks. The rapid sand filter backwash generates approximately 0.015 MG per back wash. There is no treatment prior to discharging. There is also no treatment on the storm water discharge. The facility appears to be in compliance with its NPDES permit. Outfall 001 has discharge limitations for total suspended solids and pH. There are monitoring only parameters for the flow rate and trihalomethane (total).

Procter and Gamble - Ivorydale (NPDES # 1IN00075*HD)

Procter and Gamble Company Ivorydale Plant has seven outfalls discharging to Mill Creek. These outfalls are located between RMs 6.76 and 6.62. This facility is involved in the production of soap, detergent and food products for household consumption. It also produces industrial chemicals for internal use and sale. Historically the plant discharged through Outfalls 001 through 006, however these are no longer being used. The facility is now discharging through outfalls 007 through 013. Outfalls 007 through 009 contain discharges from the non-contact cooling water, cooling tower blowdown, and glycerine non-contact cooling water.

Outfalls 010 through 013 discharge storm water only to Mill Creek. Discharge limitations exist at outfalls 007, 008 and 009 for temperature and pH and monitoring only requirements for flow rate. Outfalls 010 through 013 do not have any limitations. These are storm water only outfalls covered under Parts IV, V and VI of the NPDES permit. Process and sanitary flows from this facility are discharged to the MSD of Greater Cincinnati Mill Creek WWTP.

Since February 1997, the facility has had eleven temperature violations. These violations have been resolved. In addition, the facility has had the following spills/accidental discharges:

Date	Type of Spill	Date of Response
02/23/1999	Foam Visible at Outfall	03/05/1999
03/23/1999	White Soapy Discharge at Outfall	03/26/1999
12/16/1999	White Film at Outfall	12/16/1999

Each of these spills was addressed as required in the facility's NPDES permit.

Airy Pointe Condominiums WWTP(NPDES # 1PW00020*CD)

The Airy Pointe Condominium WWTP is located at 3501 West Fork Road, Cincinnati, Hamilton County. The WWTP was constructed in 1983 and consists of extended aeration, fixed media clarifier, slow surface sand filters, and chlorination. It has a permitted average daily design flow of 0.016 MGD and discharges (RM 4.45) to West Fork Creek. A review of the monthly operating reports from July of 1999 through June of 2000 shows the WWTP operating at an average daily flow of 0.007 MGD.

Metropolitan Sewer District of Greater Cincinnati (MSD) Mill Creek WWTP (Auxiliary Outfall 004)

MSD Mill Creek Wastewater Treatment Plant (WWTP) is located at 1600 Gest Street, Cincinnati. The Mill Creek WWTP is designed to discharge an average daily flow of 130 million gallons per day (MGD) of treated effluent to the Ohio River. Outfall 004 is an auxiliary outfall station that discharges directly to Mill Creek when the Ohio River Stage reaches 41 feet and plant effluent can no longer be discharged directly to the Ohio River through Outfall 002. The location of the discharge is Latitude 39° 06' 08", Longitude 84° 32' 42". The discharge from Outfall 004 receives chlorination and may include combined flows from secondary treated effluent and internal secondary treatment bypass (Outfall 603). A review of monthly operating reports from the period between January, 1998 through August, 2000 indicates this station was utilized a total of 34 days, corresponding to an average flow rate of 51 million gallons per day (MGD), with a maximum rate of 230 MGD.

Metropolitan Sewer District of Greater Cincinnati (MSD) Combined Sewer Overflows (CSOs) (NPDES #1PX00022*AD)

Mill Creek and several of its tributary streams (including the West Fork Mill Creek, Bloody Run, West Fork Creek, and Ross Run), are impacted during wet-weather periods from combined sewer overflows (CSOs). USEPA uses the following language to provide a general description of CSOs.

> *"Combined sewer systems (CSSs) are designed to carry sanitary sewage (consisting of domestic, commercial, and industrial wastewater) and storm water (surface drainage from rainfall or snowmelt) in a single pipe to a treatment facility. During dry weather, combined sewers convey sanitary sewage to a publicly owned treatment works (POTW). In periods of rainfall or snowmelt, total wastewater flows can exceed the capacity of the CSS of the treatment facilities. When this occurs, the CSS is designed to overflow directly to surface water bodies. These overflows, called Combined Sewer Overflows (CSOs) can be a major source of water pollution."*

The Mill Creek watershed in Hamilton County currently contains 98 CSOs which are operated by the Metropolitan Sewer District of Greater Cincinnati (MSD) and are part of the combined sewer system tributary to MSD Mill Creek Wastewater Treatment Plant (WWTP). Each of these CSO locations are depicted in Figure 5 in the main TMDL report, along with the location of MSD's associated in-stream monitoring sites. The CSO discharge monitoring and in-stream sampling requirements to which MSD is subject are contained in NPDES Permit No. 1PX00022*AD.

Each individual CSO is listed in the NPDES Permit by its geographical coordinates, along with the associated pollutant monitoring schedules and requirements. In addition, the NPDES Permit includes conditions which require completion of various studies, reports, and program development. One of these conditions required development of a CSO Operational Plan by MSD. This plan was submitted as required, and, after being revised in March, 1997, was approved by Ohio EPA. The CSO Operational Plan for MSD Mill Creek drainage area includes a physical description of each CSO and its control structures as well as an operations strategy to comply with each of the Nine Minimum Controls as detailed in Ohio EPA's and USEPA's CSO Control Strategies.

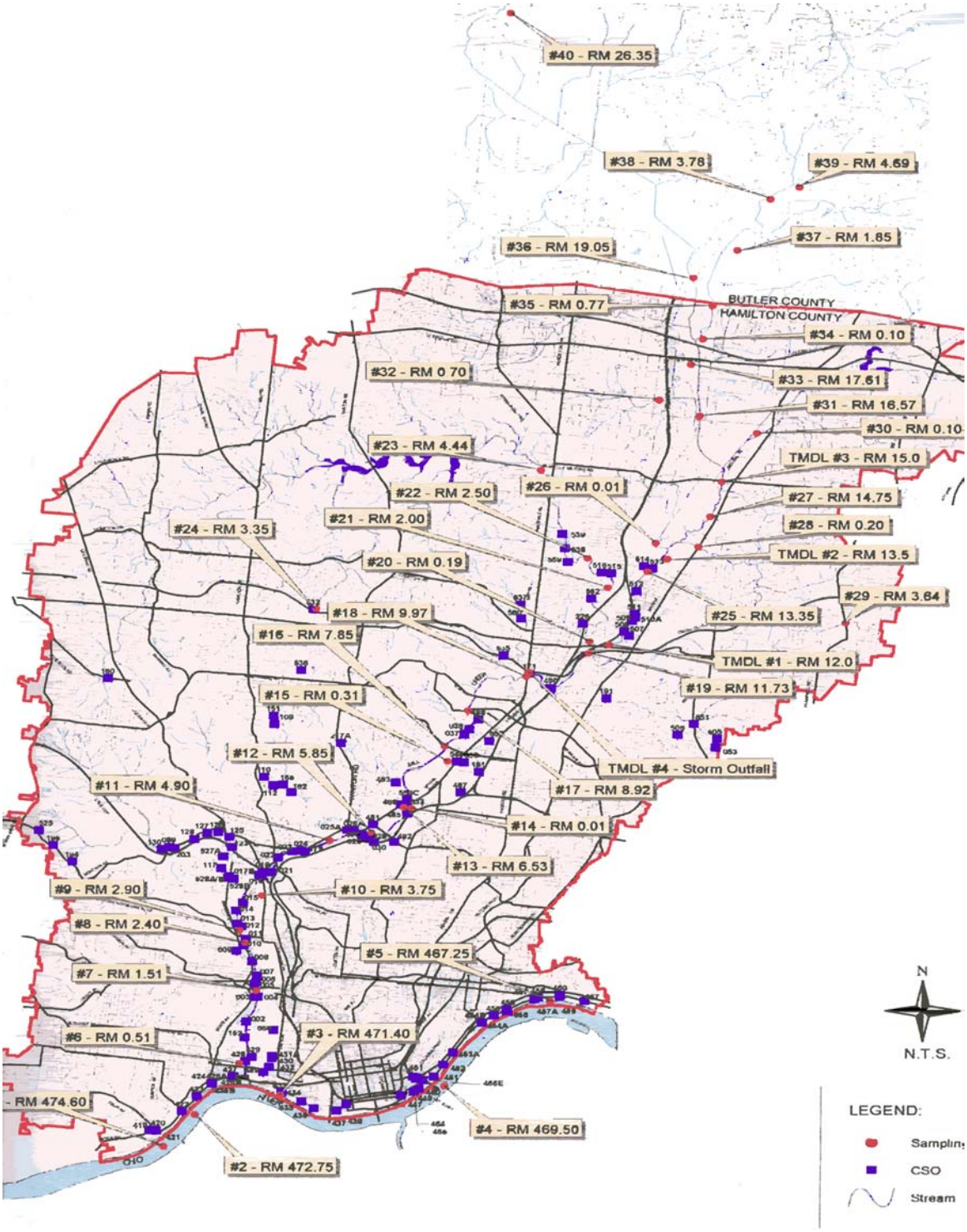
One of the initial requirements imposed by the NPDES Permit was elimination of High-Water, Dry-Weather CSOs. This program involved identification and implementation of various projects to eliminate these types of overflows. Some of these projects have already been completed.

The NPDES Permit also required development and submittal of a CSO Monitoring Plan and annual CSO Monitoring Program Evaluation Reports. The contents of the annual CSO Monitoring Program Evaluation Reports describe the most recent findings from CSO discharge monitoring and in-stream sampling studies performed by MSD and its consultants. The data in the report indicates numerous instances of water quality violations near CSOs and cases where water quality impairment has occurred and was found to be directly attributable to upstream CSOs. Such findings are consistent with Ohio EPA stream evaluations which occurred in 1992 and 1997.

While not required by the NPDES Permit, MSD has voluntarily submitted to Ohio EPA a CSO Facilities Plan, a.k.a. "CSO Long-Term Control Plan". This is a detailed plan addressing each of its known CSOs and outlining means of control or elimination by various capital improvement

projects along with detailed cost-estimates and time schedules. The plan calls for an investment of over $300 million for CSO control over a twenty-five year period. Although not officially approved by Ohio EPA at this time, the LTCP represents the planned restoration activities to address CSO impacts in the watershed for the purpose of the TMDL.

Figure . Combined Sewer Outfall Locations in the Mill Creek Watershed and adjacent Ohio River.



Hamilton County Residents Home (NPDES Application Submitted)

Hamilton County Resident Home, a.k.a. RHMR/Monfort Heights Family Home is a resident mental care facility which discharges to an unnamed tributary of West Fork Creek at Latitude 39° 10' 48", Longitude 84° 35' 16". The treatment system consists of a trash trap, extended aeration, sand filtration, and chlorination and is located at 3030 West Fork Road, Green Township, Hamilton County. An NPDES permit has not been issued to this facility.

St. Ignatius Church (NPDES Application Submitted)

St. Ignatius Church is located at 5222 North Bend Road, Green Township, Hamilton County, Ohio. The treatment system was installed in August, 1986 and is designed to discharge an average flow of 15,000 gallons per day to an unnamed tributary of West Fork Creek at Latitude 39° 10' 57", Longitude 84° 35' 59". The treatment system consists of a trash trap, extended aeration, fixed media and sand filtration, chlorination, and sludge holding. The system serves a church, school, and community center. An NPDES permit has not been issued to this facility.

Appendix C

C.1 Summary of Nonpoint Sources

B & O Dump
ID # OHD000607606, OHD0980509731
Baltimore and Ohio Railroad Dump was a landfill designed to dispose of incinerator waste from the West Fork incinerator. The landfill, located between the incinerator facility and the railroad tracks, was about 8 acres in size. The site is presently owned by CSX Transportation. The B & O dump was used for the disposal of demolition debris, household waste, non-hazardous material, and non-combustible waste. It was operated as a permitted solid waste landfill by the City of Cincinnati from 1955 - 1975. There was a possibility that this site may have received some unknown quantities of industrial waste.

The B & O dump also had a few problems with management control of the landfill. Large heaps of poorly burned incinerator residue were dumped at the landfill without proper cover. There was little control to prevent public access, causing open dumping and scavenging on the site. More restrictions were instituted by the City Health Department to render the landfill free of violations of the solid waste disposal regulations. The disposal of the incinerator residue on the landfill became a problem also. Eventually the site was closed.

Two leachate seeps were observed flowing from the site into Mill Creek on April 14, 1996 by city personnel. The city's Office of Environmental Management collected samples of the leachate. Laboratory analysis did not identify detectable concentrations of volatile organic compounds, semi-volatile compounds or PCBs. The orange leachate was a result of the high iron content of the incinerator ash. Lead was found in unfiltered samples at 0.11 ppm. Efforts were made by the city to minimize the solids discharging from the seeps by installing silt fence in 1996. Due to the fluctuation of the streams flow, the silt fence became ineffective. The leachate still discharges to Mill Creek, especially during high water events.

Canal Ridge Road Dump
4100 Canal Ridge Road
Cincinnati, Ohio 45223
ID #: OHD980509665
Canal Ridge Road Dump (OHD980509665) is located in the Northside neighborhood, Millcreek Township, Cincinnati. The site is located just south of Mitchell Avenue, and it is directly adjacent to Mill Creek and I-75. It is approximately a five acres that is now a grass-covered tract of land.

In the early 1960s, open dumping occurred at the site, then under the name of Carthage Auto Parts Co. In 1970 a "fill permit" was acquired to allow disposal of junk autos and billboards. In the late 1960s or early 1970s, the property was leased to Glenn Mullins.

The site was used by Mullins for open dumping and industrial processing of wastes between 1967 and 1984. This site was never permitted or licensed to receive and/or treat solid wastes. The site was claimed to have been only used as a transfer station. The industrial processing of waste at the site consisted of mixing the waste (liquid or sludge) with foundry sand, saw dust, or other dry materials. This procedure was conducted in unlined pits over porous foundry sand fill and soils consisting of sand and gravel. Some of the companies that used Mullins Services include: H.B. Fuller Company, Cincinnati Enquirer, Steelcraft Manufacturing Company, Heekin Can (Division of Diamond International Corporation), Emery Industries, Inc., Carthage Mills, Melben Products Company, Inc., Bitucote Products Co. , Delco Products, Superior Label Co., Schauer Mfg. Corp., Mullen Industries, Ashland Chemical, Dubois Chemicals, and others.

Results from a sample (leachate) taken by Ohio EPA on 11/14/84 documented lead (<500 mg/l), cadmium (<50 μg/l) and chromium (<250 μg/l). Volatile organic chemicals were not detected. Ohio EPA worked with the operator to stabilize the site and prevent leachate discharges from entering waters of the State. A surface cleanup was performed at the site in 1985. The cleanup report included the removal of the visible drums and the covering of the area with earth and seed. Some drums (containing industrial hazardous wastes) maybe buried at the site. The underlying geology is composed mostly of sand and gravel. The site overlies an unconsolidated aquifer yielding 100 gallons/minute. The operator capped the site with two feet of well-compacted soil. One January 13, 1987, Ohio EPA approved the closure of the site. The site was put on the Master Sites list and given a medium priority. On 5/14/87, two members from Ohio EPA observed several leachate seeps at the site. Vegetation was not growing around the seeps. No samples were taken at the time.

Because of a highway expansion project, the City of Cincinnati acquired the property on March, 1984 by appropriation. The adjoining property , 4300 Canal Ridge Road – owned by Glenn Mullins, was also acquired by the City by appropriation.

Railway line construction on adjacent CSX property, released significant amount of leachate just north of the Canal Ridge Dump property. This has prompted investigation into the source and chemical constituents of the leachate.

A limited Phase II Site investigation was conducted during October 1996 by the Foppe-Thelen Group for the City of Cincinnati. Three test borings and associated monitoring wells were installed along the property line between the CSX site and the Canal ridge Dump property. A number of chemical contaminants were detected, some of which are listed in Appendix C Table 1.

Appendix C Table 1. Canal Ridge Road Dump Soil sample results from October 1996		
Parameter	Surface Sample	Below grade sample
styrene	15.3 mg/kg	
xylene	1890 mg/kg	
ethyl benzene	596 mg/kg	
PCB	24.4 mg/kg	< 5 mg/kg
Cr - T	96 mg/kg	395 mg/kg
Pb - T	403 mg/kg	121 mg/kg
Hg - T	2.5 mg/kg	1.9 mg/kg

Sampling from a storm sewer which runs through the property did not detect VOCs or SVOCs, but did detect mercury at 1µg/l, 1.3 mg/l of barium and 14 µg/l of selenium.

A hydrogeologic investigation of the Canal Ridge site was conducted by Geraghty and Miller for the City of Cincinnati and CSX during June through November 1997. A total of twenty test borings and fifteen monitoring wells were installed in fourteen locations. It was determined that groundwater from this site flows to Mill Creek. Fifteen volatile organic compounds were detected in the groundwater. Three of these exceeded drinking water MCLs (1,2-dichloroethene at maximum of 8400 µg/l; vinyl chloride at 1100 µg/l; and trichloroethene at 1500 µg/l). Seven semivolatile compounds were also detected in the monitoring wells. The amount of contaminants entering Mill Creek as groundwater infiltration was not determined.

Rohm & Haas (formerly Morton International, formerly Carstab)
ID#: OHD000724138

Rohm & Haas, is located on 1560 West Street in Reading, Hamilton County, east of Mill Creek. Rohm & Haas manufactures chemical additives for the plastics and petroleum industries.

Several ponds were dug in 1950 for the disposal of different products. Materials discharged to the ponds include various acids, organic compounds, and oils. The last of these ponds was dredged and filled in 1980.

In 1980, leachate was discovered discharging from the bank of Mill Creek near the site. Samples were taken and different organic compounds were detected. This leachate was flowing to Mill Creek. Monitoring wells were sample on 6/10/80 and heavy metals such as chromium (550 µg/l) and arsenic (270 µg/l) were detected above Drinking Water Standards. Organic compounds were also detected in the wells. The wells were drilled into a sand and gravel layer between two clay layers. Contaminates attributable to Carstab (then named) were found in this upper aquifer. Two water-bearing formations are present in the Mill Creek Valley separated by an impermeable gray clay. Only the upper aquifer has been contaminated by this facility.

Carstab installed a ground water collection and treatment system consisting of a slurry wall along the northern site boundary and a french drain collection system along the western boundary. This system intercepts contaminated ground water from the lagoon before it enters the Mill Creek. The water is treated and discharged to MSD.

In 2000, a RCRA 3008 (h) Corrective action Order was issued to Morton International. A RCRA Facilities Investigation/Corrective Measures Study (RFI/CMS) will be conducted to characterize the nature and extent of contamination caused by operations at the facility. Phase I (March 2001) will characterize the hydrogeology of the shallow aquifer, the effectiveness of the groundwater collection system, delineation of the on-site impact to the shallow aquifer and potential releases from the sewer system. Phase II (September 2001) will assess the shallow aquifer both on and off site, characterize the hydraulics of the shallow aquifer and its communication with the deeper aquifer, characterize soil impacts and releases to Mill Creek and identify potential ecological receptors.

Carthage Avenue Landfill
Carthage Avenue
Arlington Heights, Ohio 45215
ID #: OHD980615827

Carthage Avenue Landfill is located about 1/4 mile north of Galbraith Road, directly east of I-75, adjacent to Mill Creek on Carthage Avenue, in Arlington Heights. It is about five acres in size and was owned and operated by the City of Cincinnati. The landfill closed in June of 1969 when Ohio's solid waste laws became effective. The initial operation date is unknown. Portions of the landfill are now covered with pavement and are being leased and used for parking space.

The landfill was listed on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) because of a CERCLA 103(c) form submitted by Borden Chemicals, Inc. According to the form, the types of waste at the landfill included bases and paints and pigments. The total amount of these wastes is reported to be 100 tons. According to a June 1, 1987 letter from Borden, the total amount of the wastes included cardboard, paper, "etc.". The types of pigments included compounds of lead chromate, cadmium, barium lithols, zinc, zinc oxide, benzidine yellow, calcium lithols, and titanium dioxide. One to two percent of each batch (ink) was considered unuseable and was discarded. No information is available as to how many batches the company produced that were eventually disposed at the landfill. Other types of wastes included alcohols, some ketones, and aliphatic and aromatic hydrocarbon solvents from the fluid inks production. About one-half to one percent of a batch is reported to be discarded.

Other than Borden Chemical's notification, there is no other available information as to the nature and types of waste that were disposed at the landfill. Other industrial wastes are suspected at this site.

The site overlies a portion of the Mill Creek buried valley aquifer. Therefore, depending on the quantities of wastes containing hazardous substances disposed at the site, there is a potential for ground water contamination. The City of Wyoming, 1.5 miles northwest of the landfill, has five

(5) wells. There is a potential for surface water contamination, because the site is directly adjacent to Mill Creek.

Another CERCLIS site, the old Galbraith Road landfill, (OHD980994412) for which information is very limited, may be the same site as the Carthage Avenue landfill.

Center Hill Landfill/Este Avenue Dump
5700 Center Hill Road
Cincinnati, Ohio 45232
ID #: OHD980509988

The Center Hill Landfill (also called Este Avenue Dump, CERCLAS) covers 55 acres extending northeast from Center Hill Road. It is bordered on the southeast by Mill Creek, northeast by Ridgewood Arsenal, north by the Center Hill Business Park and northwest by ELDA Landfill. The Elwood Place Dump is situated adjacent to the south of Center Hill Landfill. The site overlies a general area of unconsolidated aquifer, sand and gravel glacial outwash deposits. Open pits generated by mining of the upper unit were likely the initial repositories for landfilling at the site. The city of Wyoming water supply wells are about 3 miles from the site. Several private and industrial wells are in the area.

Fill operations initiated at the site in 1946. Pre-1955 filling operations were not documented. City of Cincinnati acquired the site in 1955 for construction of a municipal waste incinerator and related ash/non-combustible waste. All types of waste were land filled at the site from June 1955 through January 1972, including materials which bypassed incineration. In 1972 the city stopped disposing of municipal wastes but continued with the disposal of residue wastes. Sample results of the residue quench water and residue leachate indicated incomplete combustion of wastes that did not render the wastes inert. Daily covering of the wastes was not practiced at this site. Lack of coverage and the undesirable chemical quality of the residue, could have resulted in groundwater and /or surface water contamination. In 1973, the city operated the site for incinerator/ash residues only. Ohio EPA and Cincinnati Health Department worked with the operators to stop the open dumping of unincinerated wastes. In 1977 the landfill stopped taking residue wastes. A portion of the property received “inert” fill, including wastewater grit form MSD through the early 1980s. Open dumping continued at the site through 1983.

The northwest side of the site was reclaimed and developed as baseball fields in 1983-87. On July 8, 1986, three employees of a city contractor who were working on a storm sewer line for the Recreation Commission’s Crosley Field Sports Center were injured when “landfill gas” exploded after one of the workers lit a cigarette. The fields were closed due to problems with methane gas migration. Cincinnati Health Department performed a limited methane study in October 1986. Methane was detected at 68-80 % of four gas vents on the northwest side of the ballfield area. Investigation of the site concluded that methane gas migration was generally to the west and north. Methane gas as high as 80 % concentration has been detected on site.

In 1987, Ohio EPA assigned the site a medium priority for state/federal action. Waste disposed of on site include paint waste, 55 gallon drums of old coatings, cinders, fly/coal ash, wood pulp,

foundry sand, zinc oxide and cutting oils. Leachate outbreaks were observed in 1987 in the drainage swale separating Center Hill Landfill from Ridgewood Arsenal. During installation of a leachate collection system, several containers still full of waste were discovered. Waste material contained VOCs, SVOCs, metals and some PCBS. Waste containers were over packed into drums and disposed of off-site as hazardous waste.

Two seeps from the Este Avenue/Center Hill landfill/Elmwood Place were sampled by Ohio EPA on September 18, 1997. Samples were also collected from Mill Creek up and downstream of the landfill area.

One of the seeps (Seep 1) sampled was from a leachate spring on the southern part of the site, or "Elmwood Place". This seep discharged orange leachate into Mill Creek upstream from Center Hill Road bridge (RM 7.61). The second seep (Seep 2) was located on the northern part of the site or near Center Hill (Este Ave.) Landfill. An interceptor trench had been installed to prevent leachate from entering Mill Creek, but Seep 2 still occurred. Flow from Seep 2 was very low.

Results from the 1997 sampling indicated Seep 1 contained 18.8 mg/l of ammonia, 95 µg/l of arsenic and numerous organic compounds. Seep 2 contained 5.34 mg/l of ammonia, 10 µg/l of arsenic and aldrin at 0.003 µg/l. Although chlorobenzene and D-BHC were detected in the water column of Mill Creek downstream from the seeps, no exceedences of State Water Quality Standards were documented in Mill Creek due to the seeps.

During this same 1997 sampling event, Lindane (y-BHC) was detected upstream and downstream from the site in concentrations exceeding State Water Quality Standards. Lindane was not detected in either of the samples collected from the seeps.

Clarke Incinerator (Clarke Transfer Station
240 East Kemper Road
Sharonville

Clarke Incinerator is a 15 acre site at 2040 East Kemper Road in Sharonville. All Star Container Corporation, owned by Martin Clarke, presently operates on the site as a recycling facility for metals. Other businesses located on the 15 acres are: 3-R Solutions Recycling Company, Dogwatch, Inc. and W.G. Fairfield Company.

Municipal wastes from Sharonville were incinerated on site from 1961 through 1974. Industrial wastes were also accepted at this location. Incinerator residue, demolition waste, and organic debris were contained in a former surface impoundment. The unlined surface impoundment was 7 acres in size and 20 feet deep. Three other unlined residue pits were also located on this site.

In October 1989, the Sharonville Health Department had the surface water impoundment at the Clarke Incinerator site sampled for organic compounds and heavy metals. Toluene was detected at 8.7 µg/l and zinc at 0.05 mg/l in the impoundment water. Some of the organic compounds were analyzed passed acceptable holding times and the results were therefore invalid. Ohio EPA also sampled the impoundment in October 1989. Water samples were collected from the surface and bottom of the impoundment. Arsenic and lead were detected at low levels in both the

surface and bottom samples taken from the impoundment. Manganese was detected at approximately 1 mg/l in both samples. No semi volatile organic compounds were confirmed in either sample. Volatile organic compounds were not analyzed.

In 1990, the surface impoundment was backfilled with residue from fill areas, concrete, and construction debris. A cap of clean soil, two to five feet in depth, was placed over the impoundment.

U.S. EPA conducted three investigations at the facility. A screening site inspection was conducted in July, 1996 and follow up investigations conducted in April and September 1999. Groundwater samples were collected in from 18 locations on site and eight locations off site. The maximum 1999 results detected in the shallow aquifer were: vinyl chloride (38 µg/l); 1,1 - dichloroethene (56 µg/l); 1,1 - dichloroethane (µg/l); 1,2 - dichloroethane (200µg/l); trichloroethene (55µg/l); benzene (57µg/l); and toluene (54µg/l). Metals were analyzed and found not in the elevated range. As with most sites under investigation for hazardous constituents, nutrients were not analyzed. The Site Assessment Team report suspects that the upper aquifer is in communication with Mill Creek, to the east of the site. Groundwater flow is toward Mill Creek. No contamination has been documented reaching Mill Creek.

CSX Transportation
Phase II Site Assessment

The Spring Grove Avenue site was formerly used as a maintenance yard for equipment cleaning, fueling, and repairs. Maintenance yard operations ceased in 1981, following a fire which destroyed a large portion of the repair shop. The site was subsequently abandoned. A portion of the property along Spring Grove Avenue was leased to Garden Street Iron & Metal, Inc.. Garden Street used the property to store miscellaneous debris, abandoned vehicles, tanks, scrap metal, and shavings. The lease was terminated on 15 July 1989.

The CSX property was included in a site assessment program commissioned by Hamilton County, Ohio in 1988. The purpose of the assessment was to choose a site for the construction of a minimum security correctional facility. The environmental investigation report noted potential environmental impairment at the site. The information contained in the report was submitted to Ohio EPA. Ohio EPA, upon review of the report, requested that CSX initiate a site assessment to address environmental concerns raised during the Hamilton County site assessment.

WAPORA conducted a preliminary site assessment from 19 September to 2 October 1988. The investigation addressed environmental concerns set forth in the above-mentioned report. Eight monitoring wells were installed on the property to determine groundwater levels, flow directions, and environmental impairment within the uppermost aquifer. A series of 33 soil borings were drilled at various locations on a grid system. The soil borings were installed to determine the presence and relative concentrations of suspected contamination.

Strong petroleum hydrocarbon (PHC) odor and free-phase oil were detected in the monitoring wells and soil borings. Laboratory testing of samples revealed variable concentrations of PHC.

The PHC concentrations of composite samples retrieved during Phase I from soil borings ranged from 12 to 14,000 ppm. Groundwater samples were found to have PHC concentrations ranging from 2 to 200 ppm.

Soil and water samples were also tested for volatile organics, PCBs, EP Toxicity, total metals, and flash point. The information contained in the Preliminary Contamination Assessment Report was submitted to Ohio EPA . Ohio EPA requested that CSX expand the site investigation prior to implementation of remedial activities.

General Electric/Evendale - Aircraft Engines Group
ID #: OHD000817312

General Electric Aircraft Engine (GEAE) is located in Evendale, just west of Mill Creek. The facility manufactures and tests jet aircraft engines. General Electric is under the RCRA 3008 (h) Corrective Action Program, administered by USEPA Region V. This facility is classified as a Large Quantity Generator. A RCRA Facility Assessment was completed in 1989. The RCRA Facility Investigation was completed by GEAE and approved by USEPA in 1996. Human Health Risk Assessment was completed by GEAE and approved by USEPA in 1999.

Groundwater treatment systems are in place at three different locations within the property boundaries. One soil vapor extraction system to remediate contaminated soils is also in place at the site. A site-wide groundwater monitoring program is also in place. Volatile organic compounds are monitored in the wells and analyzed by method 8260.

Laidlaw City Dump (Laidlaw Avenue Dump)
ID #: OHD000810176

Laidlaw City/Avenue dump was originally operated as a municipal waste landfill by Cincinnati from 1938-1956. It is located on the northeast corner of Mill Creek Expressway and the Norwood Lateral (State Route 562) at 735 Laidlaw Avenue. The B&O Railroad runs south of the site. Solid and industrial wastes were disposed of on-site in a shallow unlined lagoon. Records are not available to document the nature and volumes of the wastes disposed of on site. Procter and Gamble purchased the site in 1962 and eventually filled the lagoon with fly ash and building rubble. Other waste disposed of on site by Procter and Gamble included bleach, fly ash, building material (including asbestos), plastics, glass, metal, liquid glycerine residues, wood, paper, garbage and manufactured waste products. Waste was dumped at the five acre site in a mismanaged fashion. During the 1960s, the site had a history of spontaneous fires associated with combustion of the bleach. According to records, the lagoon received approximately 120 tons per moth of liquid residue from the distillation of glycerine. This site was not in compliance with the solid waste regulations because there was no daily cover and material other than solid wastes were dumped in the landfill.

Cincinnati Health Department notified Procter and Gamble of their violations and restricted their activities to hardfill such as concrete, bricks and sand. Records did note indicate that hazardous waste was disposed of on-site. Procter and Gamble was commended for their cooperation and

improved solid waste practices. The site presently has dense groundcover. This site is a medium priority site for State and Federal activities.

A FIT (Field Investigation Team) inspection is recommended because the site is located in a sand and gravel buried valley aquifer. This creates the potential for glycerine to leach through the lagoon into the groundwater.

Lockland Works (EI Dupont de Nemours and Company, Inc.)
606 Shepard Drive
Lockland, Ohio 45215
ID #: OHD980704704

Preliminary Assessment Narrative

The Lockland Works facility is located in the Village of Lockland in a mixed industrial and residential area. Former property boundaries of the facility are unknown, but it is believed that the site was bounded by Anthony Wayne Road to the east, West Fork Mill Creek to the west and south, and the southern city limits of Lincoln Heights to the north. Access to the site is off of Shephard Drive in Lockland. EI DuPont de Nemours & Company, Inc. owned and operated a sulfuric acid manufacturing plant at this site between 1929 and 1951. DuPont sold the 137 acre landholding in three separate parcels during the 1950's. The land has since been parceled further, redeveloped, and is currently occupied by Meiners Supply, Kilgore Auto salvaging, Club Chef, Springwall, Creanova, Office Depot, Anchor Fence, Valley Power, Evergreen Inc. (Chemicals Inc.) and Pilot Chemical.

The historical area of concern at this site is reported to have covered approximately 1600 square feet withing the 137 acre landholding. The exact location of the facility operations is not known, but it is believed the location to have been at 606 Shepard Drive, which is currently occupied by Pilot Chemical Company. The site was brought to the attention of Ohio EPA by a Notification of Hazardous Waste form.

DuPont Lockland manufactured sulfuric acid by the lead chamber process which generated lead sulfate sludge. The sludge was disposed of on-site in shallow pits, directly onto the ground surface, by sluicing it with water and then directing it to West Fork Mill Creek, and landfilling. The southern portion of the property was used to dispose of incinerator wastes from the old Municipal Incinerator operated on site.

During investigation of the DuPont Lockland Works site, groundwater sampling results from U.S. EPA documented high levels of chlorinated VOCs (vinyl chloride, 1,1-dichloroethane, 1,1-dichloroethene, 1,1,1-trichloroethane, trichloroethylene, Tetrachloroethane) and heavy metals (cobalt, manganese, zinc) in the shallow sand aquifer which discharges to West Fork Mill Creek.

Soils at the site are also contaminated with pockets of RCRA hazardous lead from the pits used to dispose of the lead sulfate sludge during operation of Dupont Lockland Works. When the foundation was dug for Creanova (previously Hulls America), one of the waste pits was opened. Soils from this area were highly contaminated with lead and disposed of as hazardous waste.

The contamination extended to the American Fence property, but was not remediated off site from Creanova. Disturbance of the soils at the Lockland Works site has potential to expose lead contamination which could result in lead discharging from the site via storm water.

Based on an Expanded Site Inspection done by Ecology and Environment in November 1998, the Regional Decision Team for U.S. EPA determined the site did not qualify for Superfund monies and recommended No Further Remedial Action Planned (NFRAP). The decision will take the site of f the CERCLIS list. The recommendation was made because the November 1998 study did not find any potential impact upon the wells for the city of Wyoming.

Additional contamination of the site also has occurred because of more recent operations. Kilgore Auto Salvaging, has occupied two acres of the site since 1973. Crankcase oil, transmission oil, antifreeze and battery acid saturate the soils and contaminate storm water runoff. Runoff from the Kilgore facility enters a drainage ditch that flows to West Fork Mill Creek.

Soils of the Pilot Chemical property are contaminated with alkyl benzene and groundwater is contaminated with petroleum hydrocarbons and chlorinated volatile organic compound (VOCs). Pilot Chemical had a history of spills (38,000 gallons of alkyl benzene in 1984, 100 gallons of sulfonic acid in 1989) and air releases of sulfuric dioxide. In 1990, a leaking 10,000 gallon underground storage tank used for alkyl benzene was removed. Four other underground storage tanks were also removed. The VOC contamination of the groundwater appears to be coming from a source upgradient from Pilot Chemical on another area of the DuPont Lockland Works property.

Evergreen Inc., owns property which was operated until 1997 by Chemicals Inc.. The site is located at 614 Shepherd Drive and has been vacant since 1997. Chemicals Inc. was a repackager and distributor of over 600 chemicals, including solvents, caustics and acids. The site became of concern to Ohio EPA in 1989 due to the number of spills reported on the property. Evergreen and Ohio EPA entered into an Administrative Order on Consent (AOC) in July, 1991 which required Evergreen to conduct an investigation to identify volatile organic chemical (VOC) sources to ground water. The company was also required to prevent off-site migration of the contaminated groundwater. Investigations identified VOC contaminated soils and groundwater on the Evergreen Inc. site. Two plumes of VOC contaminated groundwater were identified. The west plume was a result of activities by Chemical Inc.. The east plume is migrating on site from an upgradient source.

Evergreen Inc. installed a groundwater extraction system to capture the VOC contaminated west plume, which is discharged untreated to MSD's combined sewer system. Evergreen was not required to remediate the east plume which is believed to discharge to West Fork Mill Creek via a sand seam in the upper aquifer.

Riverwood International USA, Inc. (formerly Riverwood International Corporation, formerly Manville Forest Products Corporation)
10600 Evendale Drive
Sharonville, OH 45241
USEPA # OHD037493707

Riverwood International USA, Inc. is located east of Evendale Drive, west of the CSX railroad lines, north of the Maxwell Tank Lines, Inc., and one half mile south of Sharon Road in Hamilton County. Historically, the facility produced printed cartons and utilized various solvents. These solvents were stored in eight underground storage tanks (USTs). The facility now manufactures wood products which also generate small quantities of regulated hazardous waste. This facility is classified as a RCRA generator.

During the operation under Manville Forest Products Corporation (MFP), several spills occurred. On May 21, 1986, a RCRA inspection revealed spillage from a slop drain. This spillage, outside the solvent room, appeared to have taken place over a long period of time. On January 28, 1988, MFP discovered a leak in a fitting to an underground tank used for storage of house blend solvent. This house blend solvent contained toluene, normal propyl acetate, and isopropyl acetate. While personnel from Ohio EPA's Division of Ground Water were investigating this spill, they became aware of four other spills. Some contaminated soils were removed.

A 500 gallons spill in the tank farm on October 12, 1988. A toluene tank overflowed in the same cavity as the January 28, 1988 spill. A tanker truck spilled a white liquid on November 7, 1988. The substance was rinsed off into a drainage ditch. Manville and the distributor claim it is a glue consisting of water, clay, and polyvinyl alcohol. Ohio EPA sampling of the run-off wash water documented it to contain concentrations of 1,1,1-Trichloroethane and 1,1-Dichloroethane.

Upon discovery of the January 28, 1988 spill, MFP shut down the solvent pump and notified the USEPA National Response Center. The initial estimate was 3,500 gallons of the solvent were spilled. Soil removal began the following day; by the first week in February, 80 cubic yards of contaminated soil had been removed. S&ME (now known as Westinghouse Environmental Engineering) was retained by MFP to conduct the initial investigation. Monitoring wells were put into place to determine if groundwater contamination was present. Results from monitoring well sampling (concentrations given in µg/l) were: Toluene (1,280,000), Normal Propyl Acetate (1,100,000), Isopropyl Acetate (1,160,000), Benzene (680), 1,1-Dichloroethane (88), Ethylbenzene (680), 1,1,1-Trichloroethene (3,910); Methylene Chloride (13,130); Chloroethane (8); 1,2-Dichloroethane (190); Acetone (187,000); Total Xylenes (169); and Methyl Isobutyl Ketone (8,260). In addition, samples from the 11/7/88 spill runoff showed 1,1-Dichloroethane (790) and 1,1,1-Trichloroethane (16,850).

Several remedial actions have taken place since the initial spill. Manville's consultant, Westinghouse, collected soil samples from three bore holes and performed a soil gas survey using an organic vapor analyzer; however, the results were never received by Ohio EPA. By October 1988, 20 wells were in place (monitoring and recovery). A soil vapor extraction system was implemented in October of 1989. MFP reported on August 28, 1990, that the system had

removed approximately 5,200 gallons of spilled toluene. In their report they also stated that toluene was recovered in low volumes from the shallow aquifer beneath the plant site. They stated that no detectable toluene is leaving the site in groundwater, whereas significant concentrations in low volumes were still recovered from the groundwater in the immediate area of the spill. A groundwater pump and treat facility was installed which discharges to MSD sewers.

Three major well fields within the three mile target area draw from the Mill Creek buried valley aquifer. The well fields are: Village of Glendale (serves 2,500), Lockland (4,300), and the City of Wyoming (9,700). Several surface water routes exist in the target area: Mill Creek, West Fork Mill Creek, Sharon Creek, and Sharon Lake. Sharon Lake is part of Sharon Woods, a Hamilton County Park.

North Bend Dump
200 W. North Bend Road
Cincinnati, Ohio 45216
Hamilton County
ID #: OHD980510317

North Bend Dump is located on West North Bend Road in Cincinnati, Ohio. The site lies adjacent to Mill Creek and Congress Run Creek and overlies the buried valley aquifer North Bend Dump operated from 1960 until 1974. There are no available records to indicate exactly what types and amounts of waste were disposed here. Frederick Steel Corporation is now located adjacent to, or very close to where the original location of the North Bend Dump is supposed to exist.

The dump is listed on the Comprehensive Environmental Response Compensation, and Liability Information System (CERCLIS) as being a potential hazardous waste site. The types of waste allegedly disposed at the site were foundry sand, demolition waste, heavy metals, organic and inorganic chemicals, but no known documentation is presently available as to the nature and quantity of the wastes which may have been disposed of at the site.

The City of Wyoming, 2.1 miles to the northwest of the dump, has 6 wells. The City of Lockland, 2.3 miles to the northeast of the dump, has 4 wells. There is potential for surface water contamination because Mill Creek and Congress Run Creek surface flow adjacent to the site.

Premium Finishes

Facility Description/History

The plant was built in 1961 and was first occupied by the Black Diamond Paint and Varnish Works (Black Diamond). It is located at 10448 Chester Road, Woodlawn, Ohio. Gloria and Dr. Ronald Savin purchased the facility in 1968 and it was renamed “Premium Finishes, Inc.” (PFI). The Savins operated PFI as a specialty coatings manufacturing facility up until March of 1991, when it was purchased by Hunting. Based upon existing information, the basic nature, operations, and production process at the facility has remained constant from the purchase by

PFI up until the present. Little information is available concerning the nature of Black Diamond operations; it is presumed, however, that the basic nature of the facility operations was similar to PFI's.

The Black Diamond facility reportedly utilized an 11 tank underground storage tank (UST) farm for storage of raw materials. The USTs were of steel construction and had no cathodic protection. The Black Diamond underground storage tanks were reportedly were used for storage of the raw materials listed in Appendix C Table 2.

Appendix C Table 2. Black Diamond (Premium Finishes Inc.) Underground Storage Tanks

Tank Number	Gallon Capacity	Product
1	6000	Mineral Spirits
2	1000	VM & P Naphtha
3	1000	APCO 467
4	1000	Kerosene
5	1000	Xylol
6	2000	60% Alkyd
7	2000	Quick Dry Alkyd
8	2000	70% Alkyd
9	2000	Z-2 Oil
10	1500	Aged Linseed Oil
11	4000	Latex

In July of 1989, toluene was discovered in a surface drainage located east of the facility. The product was subsequently traced to a leak in Tank #4 at PFI. Ohio EPA Emergency Response and subsequently PFI retained a contractor to contain the product and remove the tank. According to a February 1988 report by Environmental Assessment Services, Inc. (EAS), tank removal included removal of approximately three cubic yards of soil and the installation of two groundwater collection sumps.

According to EAS (February 1989), a small hole was observed in the toluene tank cylinder following its removal. The cumulative period during which the product release occurred was not known. From 1988 to 1990, PFI retained several consulting firms to assist with the assessment of the integrity of the tank farm, characterize conditions at the site, and to implement interim remedial actions.

Contaminant Nature

A significant amount of information has been collected to date concerning the nature of contaminant presence at the site. Investigation of the site indicated that the direction of the groundwater flow is toward the southeast. Analyses of soil samples collected from the tank pit by PET in April 1990, analyses of groundwater samples collected from monitoring wells at the site by PET in June 1990, as well as analyses of a number of water samples collected by PFI and Hunting from monitoring well #2, the tank pit sump, the interceptor trench sump, and the catch basin at the site. A summary of the maximum levels of constituents identified by the media is presented in Appendix C Table 3.

Appendix C Table 3. Organic Constituents Identified in the Groundwater or Soil (Premium Finishes)

Constituent	Phase	Maximum Conc. Water (µg/l)	Maximum Conc. Soil (µg/kg)
1,1,1-Trichloroethane	Water and Soil	9.12	144
1,1,2,2-Tetrachloroethane	Soil	–	466
1,1,2-Trichloroethane	Water	1.55	--
1,1-Dichloroethane	Soil	–	484
Tetrachloroethylene	Water and Soil	3.56	2,490
2-Hexanone	Soil	–	5,928
Benzene	Water and Soil	3.6	81
Ethylbenzene	Soil	–	282,430
Toluene	Water and Soil	40,000	887,200
Total Xylene	Water and Soil	25,767	1,211,640
MEK	Water	67,000	–
MIBK	Water and Soil	58,000	375,975
Total Purged Hydrocarbons	Soil	–	2,370

Contaminant Extent in Soil

There is limited information available concerning the extent of contaminant presence in soil at the site. The PET analytical results form soil samples collected at the base of the tank pit excavation in April 1990 indicate that the presence of organic constituents is probably ubiquitous in the former tank pit.

Contaminant Extent in Groundwater

The existing groundwater data presented indicates the presence of volatile organic constituents (VOCs) in groundwater at the site. The monitoring well located near the site property boundary and directly downgradient (southeast) from the former tank pit has historically exhibited the presence of significantly elevated levels of VOCs. The proximity of a contaminated monitoring well to the site's southwestern property boundary indicates that a plume of VOC contaminants may have moved off-site towards the southeast.

Pristine, Inc.

Pristine Inc. Liquid Waste Management Services is located in the city of Reading (Population 12,843), a suburb of Cincinnati. The site occupies approximately 3.5 acres. It is bordered by residential and industrial areas. Industrial operations owned by Cincinnati Drum Service and Rohm & Haas (Carstab Corporation) are located to the west and south of the facility. Cincinnati Drum Service cleans, reclaims and recycles steel drums. Rohm & Haas manufactures synthetic stabilizers and plasticizers. The immediate eastern limit of the site is bordered by Conrail Railroad right-of-way. Northeast of the site, beyond the railroad is residential trailer park. The company was founded by Professor Riley Kinman, PhD, P.E., also Chair of the Board for Pristine.

Pristine Inc. was one of three major facilities in the tri state area that treated industrial waste during the 1970s. By 1979, the Pristine site had over 6000 55-gallon drums stacked on the small site. Industrial chemicals saturated the soils, contaminated the groundwater and routinely were discharged to Mill Creek through gross spillage and seeps along the bank of the stream. Contaminants from this site also had effected the Reading well field which was adjacent to Pristine. The well field was in operation for several years until it was recently closed during the last five years.

U.S. EPA placed Pristine on the National Priorities List (NPL) September 8, 1983. The site is presently being addressed through Federal, State, and potentially responsible parties' actions. Cleanup efforts consist of four phases. The demolition of the former Pristine incinerator and associated structures/tanks was completed in January 1992. Thermal desorption of 13,000 tomes of contaminated soil was completed in May 1994. The construction of an In-situ Soil Vapor Extraction (ISVE) and cap system was completed in November 1995 and startup of the ISVE system began in October 1997. The groundwater pump and treatment system was constructed in two phases. The first phase (150 gallons per minute) began operation in October 1997 and the second phase (300 gallons per minute) began operation in 1998. The soil vapor extraction system is expected to operate for about 10 years and the ground water pump and treatment system is expected to operate for approximately 30 years. Discharge from the treatment system is directed to Mill Creek, meeting the substantive requirements established by Ohio EPA.

Ridgewood Arsenal
Seymour Avenue
Cincinnati, Ohio 45232

The Ridgewood Arsenal site (RA) is approximately a 50 acre sub-parcel of land. An additional 75 acre sub-parcel located across Este Avenue was not part of the industrial and arsenal activities. The arsenal site is bordered by the Este Avenue Dump/Center Hill Landfill (EAD) (OHD980509988) to the southwest, the Mill Creek on the east, and Seymour Avenue to the north. Ridgewood Arsenal is located in a mixed industrial, commercial, and residential area. The site was originally operated by the Pollack Steel Company from 1911 to 1926. After 1926, is appears to have housed an asbestos shingle manufacturing company and possibly a gravel hopper operation. In 1942, the Ridgewood Steel company acquired the property and the plant was used to forge weaponry during World War II. The forge plant was in operation until 1972. During operation, several buildings, two 100,000 gallon above-ground storage tanks, and several petroleum underground storage tanks were on site. A power plant, coal storage, sewage system and 10 water supply wells were added to the site in 1942. From 1946 until 1950 a coffin manufacturer leased the property which was reacquired by the US Army in 1950. Radiological activities were conducted on site in conjunction with the Fernald Weapons Plant. An Army Corps of Engineers' (ACOE) report stated that all former Department of Defense (DOD) buildings, debris, hazardous or toxic waste and unexploded ordnance removed from site. No subsurface investigations were reportedly conducted in association with the report.

The City of Cincinnati acquired the site in 1981 with plans to develop the site for industrial use. Unauthorized dumping and vandalism reportedly occurred during time when the site sat idle. Transformers were scavenged for copper wire. Numerous fires periodically occurred, at least one involving a PCB-containing transformer.

All buildings associated with the Ridgewood Arsenal facility were demolished in 1983 and the site was covered with six to eight feet of fill material from various ACOE Mill Creek projects, foundry sand and unauthorized fill material.

In 1992 a large storm sewer was installed through part of the site in conjunction with the extension of Este Avenue. An iridescent sheen was noted at the storm sewer outfall which is believed to have become an artificial conduit for the contaminants on site.

Several environmental studies have occurred at the site since mid-1980s. A gamma ray survey was conducted in 1985 and a radiation detector was used in 1992 as part of the health and safety monitoring during one of the phases of the site study. Neither of these studies reported significant levels of residual radiation on site.

A total of 21 soil borings and 13 monitoring wells were installed during three separate subsurface investigations. Waters contained in the storm water trench and sewer outfall were also tested. Existing underground storage tanks were removed and soils tested for petroleum compounds. Nine trenches were installed in 1993 to assess potential releases from diesel delivery lines at the site. Water supply wells were abandoned from 1992 to 1995 to remove

potential contaminant migration pathways. A groundwater recovery system was installed in 1994-95 which is designed to discharge to MSD sewers.

A site history report developed for ACOE in 1996 noted that combustion products of PCBs (dibenzofurans) were detected in water samples collected on site and at the sewer outfall areas. The report noted that impact to Mill Creek may be of concern in the future since these PCB combustion products were detected at the outfalls, however no further PCB investigation was recommended by the report. The report also indicated three dissolved phase plumes of petroleum substances on site. Two of the plumes were upgradient of the storm sewer area and a third was in the northeast portion of the site migrating toward Mill Creek.

Sherwin Williams Company
501 Murray Road
Cincinnati, Ohio 45217
ID #: 004261301

Preliminary Assessment Narrative

Sherwin-Williams Chemicals, a division of the Sherwin-Williams Company, owned and operated a chemical manufacturing facility at 501 Murray Road in St. Bernard from 1966 to 1985. In 1985 ownership was transferred to PMC Specialties Group, a division of PMC, Inc.. The site was formerly occupied by the American Agricultural Chemical Company and production at the facility is documented to have occurred since the late 1800's. The site occupies approximately 33 acres in mixed industrial and residential area within the St. Bernard city limits, due west of I-75 and the Norwood Lateral Interchange. Currently, PMC Specialties Group handles the following materials: dimethyl sulfate (U103), methyl alcohol (U154), toluene diamine (U221), phthalic anhydride (U190), dimethylamine (U092), methyl isobutyl ketone (U161), methylene chloride (U080), n-butyl alcohol (U031), chlorobenzene (U037), formaldehyde (U122), xylene (U239), toluene (U220), saccharin and salts (U202), and 1,2-benzenedicorboxylic acid (U028). These materials are used in the manufacture of saccharin products, organic intermediates and triazole corrosion inhibitors, the same products formerly manufactured by Sherwin-Williams Chemicals.

Hazardous wastes generated by the manufacturing process are stored in eight drums on-site which are disposed of quarterly in an approved hazardous waste facility. Sherwin-Williams has a record of violations regarding the on-site accumulation of hazardous wastes. A previous on-site inspection by Ohio EPA (3/30/84) revealed leaking pumps and tanks from which hazardous materials orthonitroaniline and orthoditoluenediamene were exuding, resulting in several hundred square feet of soil contamination. The facility is situated over the Mill Creek buried valley aquifer in the upper northwestern reaches of the Norwood Trough, a sand and gravel unit with estimated yields of several hundred gallons per minute. Migration of contaminants could result in deterioration of groundwater quality in the underlying aquifer. Although surrounding communities within a three mile radius obtain municipal water from Cincinnati sources, the City of Norwood, located to the southeast of the facility does have one well which draws groundwater from the underlying sand and gravel aquifer. This well is available for use by that portion of the public sector which prefers to utilitize non-municipal water sources for daily drinking water

purposes. In addition, dead earthworms and dead vegetation were observed near some triazole, loosely discarded on the ground surface, along low-lying areas within the bounds of the facility. Ross Run, a small intermittent tributary to Mill Creek, formerly passed through the low-lying areas at the southern bounds of the facility property. Heavy rains could expedite the dissolution and migration of surface contaminants located along this old watercourse through the subsurface to the water table. Soil borings taken during three preliminary subsurface investigations in 1974 and 1975 as well as during two geotechnical investigations in 1980 for on-site construction proposal purposes, revealed the presence of buried chemical wastes at depths ranging from 2.5 to 14.0 feet. Surface drainage at the facility was noted to be very poor, with water ponding at several locations on-site.

Between 1966 and 1974, an on-site settling tank was utilized in an industrial wastewater treatment system which generated approximately 200,000 gallons of wastewater treatment sludge within the tank. Analysis of the sludge in 1981 revealed the presence of dischlorobenzene, tetrachlorobenzene, and pentachlorobenzene at unknown concentrations as well as the presence of arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver, although the concentrations did not exceed EP Toxicity levels. This sludge remained in the tank between 1974 and 1980, during which time, industrial wastewater was being pumped into the tank to balance pH swings before being discharged to the Metropolitan Sewer District (MSD). On March 7, 1980, a faulty pump switch on a storage tank resulted in the overflow of 1,017 gallons of trichlorobenzene (TCB) to the process sewer which drains to the MSD.

In June of 1978, six employees were exposed during the processing of a chemical mixture of chlorothiaxanthones in powder form. All six employees experienced a burning sensation on the faces after exposure to sunlight. Although redness was noted to last about 2 hours, there were no observable, apparent long-term effects to anyone. On March 30, 1984, Ohio EPA personnel conducted a PCB inspection to determine compliance with the PCB disposal and marketing regulations as stated in the 40 CFR Part 761. During the inspection, samples were taken from various locations on-site. Soil debris collected from around a surge tank near facility building #40 showed levels of PCB at 21 ppm. Materials scooped up from the floor near an old Therminol boiler in facility building #38 contained 20,000 ppm of PCB.

PMC Specialties Group is regulated under RCRA as a generator of hazardous waste. Based on information regarding location of the facility over potentially valuable groundwater resources as well as the discarded materials on-site, a high priority for FIT and a medium priority for State activity is recommended. FIT activity should include the installation and sampling of groundwater monitoring wells and soil sampling.

Skinner Landfill

Skinner Landfill is located on Cincinnati-Dayton Road in southeast Butler County in the village of West Chester. The Skinner property is approximately 78 acres, of which about 45 acres are considered the"Site". The landfill portion of the property covers approximately 11 acres of the Site. Prior to 1934 the Site was used for the mining of sand and gravel. From 1934 to 1990 the Site was used for the disposal of a wide variety of wastes, including a variety of chemical

wastes, construction and demolition debris, and household refuse. A low area in the center of the Site, referred to as the waste lagoon, was used for the disposal of paint wastes, ink wastes, creosote, pesticides, and other chemical wastes.

In 1976 Ohio EPA responded to a reported fire at the Site and noted a lagoon containing a black, oily liquid. Ohio EPA returned with a search warrant and found over 100 drums reportedly containing industrial and chemical wastes. In an apparent effort to deter further investigations, Mr. Skinner asserted that the landfill contained buried mustard gas, nerve gas, and various explosive devices.

Ohio EPA and U.S. Army officials returned to the Site to inspect and sample the lagoon area, at which time Mr. Skinner retracted his claims that ordnance and explosives were present at the Site. Record searches by the U.S. Army revealed no records indicating the shipment of ordnance or explosives from the U.S. Army to the Skinner Site. The samples collected from the lagoon were found to contain pesticides, volatile organic compounds (VOCs) and heavy metals. In a further attempt to limit Ohio EPA's investigation Mr. Skinner then covered the lagoon area with 30 feet of debris.

Between August 1977 and January 1979 Ohio EPA tried repeatedly to obtain a court order requiring the Skinners to remove the wastes disposed of on the Site. The court rejected those requests but ordered the Skinners to stop all disposal activities unless granted permission by Ohio EPA and the Butler County Board of Health. The landfill ceased accepting chemical waste but continued taking C&D waste until 1990.

U.S. EPA began investigations into the Site in 1981 and the property was placed on the National Priorities List in 1982. Access to the Skinner site by environmental and health regulators was hindered and often denied by the Skinner family from the middle 1970s until middle 1980s. Administrative orders issued in October 1987 permitted USEPA and its subcontractors access to the site and prevented further disruption of the site investigation work schedule. Additionally, the Ohio EPA achieved site closure to all landfilling activities. U.S. EPA and it's contractors began the Remedial Investigation/Feasibility Study (RI/FS) in September, 1984 and completed the RI in 1990. In 1991 a fence was erected around 25 acres of the Site which enclosed the landfill area. By April, 1992 the FS was complete. The FS proposed to incinerate the lagoon wastes, cap the landfill, and collect and treat groundwater. This proposal was vigorously opposed by the local citizens, who didn't want an incinerator in the town. U.S. EPA then re-evaluated the alternatives and dropped the incinerator from the remedy, deciding instead to extend the cap over the lagoon area.

In 1993 the U.S. EPA entered into an Administrative Order on Consent (AOC)with several PRPs to complete the Remedial Design for the selected remedy. The RD was completed in June, 1996. The Consent Decree to perform the remedial action was signed by U.S. EPA and the PRPs in the Summer of 2000. It is anticipated that the installation of the remedy will begin in the Spring of 2001, but legal problems with a local citizens' group may delay implementation another year.

The remedial action will place a cap on the landfill, and place interceptor trenches downstream from the facility to collect contaminated groundwater. If the interceptor trench system fails to reduce the contamination in the groundwater, another interceptor trench will be constructed upgradient of the site to prevent groundwater recharge of the landfill.

Ray Skinner continues to operate a recycling operation at the facility. Allegations were made to Ohio EPA in 1998 that Ray Skinner is placing fill material in East Fork Mill Creek.

Vine Street Dump
ID #: OHD980510531

The Vine Street Dump was once owned by the Philip Carey Corporation. The landfill is located between Vine Street and Mill Creek, immediately west of the Hamilton County Fairgrounds in the Carthage neighborhood. The site lies over the buried preglacial sand and gravel valley occupying the Mill Creek flood plain. It was operated from 1968 to 1970.

The twenty acre site was comprised of the landfill and two abandoned gravel pits. (The gravel pits have been covered.) The Philip Carey Corp. disposed of cuttings, defective shingles, asbestos, asphalt waste, sludges of asphalt, cement, fly ash, and sludge from the production of transit pipe in the landfill. The asbestos products and the fly ash were intended to be used as a sealant for the landfill.

Wastes had been dumped along Mill Creek with little protection to the creek. This created the potential for surface water contamination. Most of the compounds disposed of at the landfill were not volatile or reactive. However, records show that the sludge from the production of transit pipe had volatile properties. The City Health Department determined through investigations that incinerator waste and solids wastes were not suitable for the landfill because the pit was located in gravel; it was filled with groundwater which fluctuated with the level of Mill Creek. The Health Department recommended that only inert wastes such as concrete and demolition debris be disposed of on-site.

Six acres of the site is presently used as a gravel parking lot associated with three buildings on-site which are used for flea market activities. The remainder of the site is used by Barrett Paving and Byrnes Convey.

In 1996 Ohio EPA recommended installation of monitoring wells. The site may be addressed by the City of Cincinnati in conjunction with a federal grant for Brownfields initiative through the State of Ohio's Voluntary Action Program.

ELDA Landfill

ELDA landfill is owned and operated by Waste Management Inc. and was operating from the early 1970s. It is typical of older landfills that preceded Ohio BAT requirements. The landfill was never lined with a barrier system and a nominal leachate collection system was installed in portions of the facility. Leachate that is collected from the facility is discharged to MSD's sewer system.

Mobil Chemical Company reported that it used ELDA for hazardous waste disposal from 1973 to 1979. Forms that Mobil submitted to the USEPA indicate Mobil contracted with two hazardous waste haulers to transport wastes from Mobil to the ELDA landfill. Borden, Inc. (Pigments Division of the Printing Ink Division of the Chemical Graphic Division of Borden) reported that the company hauled wastes to ELDA in 1977. The type of wastes listed in the reporting form were "organics; inorganics; heavy metals; and other - paints and pigments."

According to an April 1986 memorandum from Health Commissioner Stanley Broadnax, Hilton Davis received approval from the then State Public Health Engineer's Office of Land Pollution Control to dispose of "wastewater sludge cake". Broadnax does not specify for what time period the State's permission to Hilton Davis extended.

The Ohio EPA's Preliminary Assessment on the ELDA landfill was completed on April 1986. In July 1986, migrating gases alternatively referred to as "methane gas" and "landfill gas" were discovered in the surface soil and below the ground in the vicinity of ELDA Landfill and Varsity Circle residential area of Winton Hills. A methane recovery plant was constructed on the southeast portion of the facility.

In the early 1990s, ELDA updated their ground water monitoring system to meet newer landfill regulations (HB 592). The groundwater monitoring system around the perimeter of the landfill was supplemented to meet the requirements of OAC 3745-27-10. In approximately 1995, Waste Management performed additional hydrogeological investigations in an attempt to expand landfill operations to the Rack Sand Inc. quarry property. Ohio EPA denied the application for expansion due to the high yield aquifer underlying the site. Portions of the facility are located above a 100 - gpm aquifer. The aquifer is a separate depositional unit from the Mill Creek Valley Aquifer. As a result, ELDA was closed in 1999.

The facility received a final cover material during 1998 through 1999. The newer cap consists of two feet of recompacted clay barrier, a synthetic drainage composite on the side slopes, sandy drainage material on the flatter top, and a 30 inch vegetative soil at the surface.

As required in OAC 3745-27-10, ground water monitoring continues to occur on a semiannual basis at the site. Volatile organic compounds (VOCs) have been detected in an upgradient shallow well screened at the bedrock till interface. It is believed that the VOCs are related to gas migration. An active gas collection system is located in this area and the VOC occurrences seem to be decreasing in the ground water samples.

Surface water management at ELDA is divided into three watersheds. To the west, the cap drains directly into an intermittent stream. To the north, a small area at the lowest elevations drains into the neighboring property. The majority of the landfill cap runoff is directed into a sedimentation pond to the south and east.

Citizen involvement has been extensive at the site. Ohio EPA monitoring of the landfill is expected to continue for 30 years from the date Waste Management Inc. submitted the final closure certification.

Winton Ridge Dump

Winton Ridge Dump (WRD) site, formerly an unrestricted dump for drums and foundry sands, is located in Hamilton County, Cincinnati at latitude 39º11'28.0" N and longitude 84º31'20.5" W.

The WRD encompasses 1 to 2 acres and is located in a ravine between Winton Ridge Lane and Winton Road. Dense vegetation covers the steep slopes, and Winton Ridge tributary flows through the ravine into Mill Creek. The surrounding area, which is predominantly residential, includes an apartment complex to the north of the site, and the Cincinnati Academy of Physical Education (CAPE) to the south. Dutch Colony Drive forms the southern border and Winston Ridge Lane the eastern border of the site.

At least two water wells are located within 1 mile of the WRD site. The average well depth is 110 feet. The wells are developed in a low sand layer that lies stratigraphically above a shale layer. These wells are reportedly used to irrigate a local plant nursery and cemetery, and are not used as a drinking water source.

Site Background

On April 11, 1985, the site was reported to the Cincinnati Fire Department (CFD) by David Rosenburg, a local resident. CFD investigated the site and discovered leaking drums. After contacting Ohio EPA, CFD wrapped the drums in plastic to prevent the release of paint sludge into the creek. Representatives of the Ohio EPA inspected the WRD, at the request of Cincinnati Health Department (CHD), and determined it was not suitable for use as a sanitary landfill. In a letter to the CHD, Ohio EPA recommended that the 20 barrels of paint-like material previously dumped at the site should be removed. Information concerning WRD for the period between 1969 and 1985 is unavailable.

The Ohio EPA Division of Solid and Hazardous Waste Management (DSHWM) contracted Enviromental Enterprises, Inc, (EEI), to mitigate the immediate hazard posed by the site. On April 11, 1985, EEI over packed three leaking drums, constructed a straw dam in the creek to stop the flow of contaminants, and collected samples of the soils and foundry sands. The over packed drums along with three other containing contaminated creek sediment were dispose of on April 19, 1985. Numerous extensively corroded drums were scattered over the hillside along with assorted garbage such as furniture springs and bales of plastic. Several additional drums were suspected to be buried on site. Ohio EPA observed several dead trees along the edge of the creek, that were in the direct path of any leachate migration from the leaking drums.

Analytical results of the sample collected by the Ohio EPA indicated levels of lead in the stream sediment that were as high as 20.9 mg/l using the Extraction Procedure Toxicity Test (EP Tox). Materials with lead levels above 5.0 mg/l, as determined with the EP Tox test, are considered to be hazardous wastes according to the Resource Conservation and Recovery Act (RCRA) regulations. These results are summarized in Table 1.

In April 1985, the Ohio EPA contacted the current owners, Wilbur Hodde and Henry Coors, in an attempt to procure a responsible party cleanup; both owners, however, denied any knowledge of dumping activities. According to a former resident of the area, Mullins Brothers Hauling had dumped drums at the site approximately 15 years ago.

On July 24, 1985, the Ohio EPA requested a US Environmental Protection Agency (USEPA) Field Investigation Team (FIT) inspection. The FIT conducted and investigation on March 19, 1986, and observed partially buried drums, in addition to, the other material cited by the Ohio EPA investigation. Although no Hazardous Ranking System (HRS) score was determined, the FIT team indicated the site would potentially receive a high score because of the direct contact threat.

In January 1987, the Environmental Advisory Council (EAC) to the Cincinnati City Council considered the site a high priority and recommended both federal and state action, because of the elevated lead levels detected in the stream and the potential for buried drums containing hazardous waste. In addition, the unrestricted access to the site was a concern.

After unsuccessful attempts by Ohio EPA to persuade the potentially responsible parties to mitigate the hazards present at WRD, the USEPA Region V Emergency Response Section was requested to investigate the site.

3.0 Site Inspections

On October 22, 1987, TAT members Larry Mencin and William Scoville investigated the Winton Ridge site, accompanied Ohio EPA. The TAT confirmed Ohio EPA and FIT findings.

A second site assessment was conducted on March 10, 1988, by TAT to confirm the initial site assessment observations and to delineate sampling locations.

The site was located in a deep ravine covered with dense vegetation, and stressed or dead trees bordered Cape Creek, which flowed through the site. The 45 degree slopes of the ravine made access difficult.

The TAT observed approximately 100 drums, mounds of foundry sands, bundles of shredded cellophane, hardened polyresin blocks, and other assorted debris scattered in the ravine. Almost all of the drums observed were extensively corroded and empty. However, one drum, labeled “Cincinnati Varnish Company”, was approximately 80% full of liquid. Another drum was

observed in a horizontal position protruding from the hillside and was full of what appeared to be foundry sands. Other drums were suspected to be buried by foundry sands on the slopes.

Air Monitoring

Air monitoring was conducted by TAT with a Combustible Gas Indicator (CGI), an Organic Vapor Analyzer (OVA), and a Radiation Meter. Readings were taken at the top of the slope, on the side slopes, in the bottom of the ravine, and in and around the drums. Only one reading above background as recorded – inside a drum marked "Cincinnati Varnish Company". The drum contained approximately 45 gallons of liquid and deflected 25 units above the 0 to 3 unit background level on the OVA.

Sampling

A sampling plan was prepared by the TAT and approved by USEPA. On May 31, 1988, sampling was performed by TAT, who were accompanied by Ohio EPA. The purpose of the sampling was to confirm the presence of suspected contaminants; i.e., metals and volatile organic compounds (VOCs). A total of nine samples were collected: two drum samples, three water samples, two sediment samples, and two soil samples. The two drum samples were grab samples. Sample 1 was a liquid sample collected with a drum thief from the drum labeled "Cincinnati Varnish Company". Sample 2 was a solid sample collected with a garden trowel from a rusted drum containing foundry sands. Both samples were analyzed for RCRA characterization (i.e., EP Toxicity test, flash point, and pH).

Three water samples were collected for analysis. Sample 3, distilled water, was submitted as a quality control blank. Sample 4 was collected upstream of the drum site (as a background sample), and Sample 5 was collected in approximately the middle of the site. These grab samples were analyzed for metals, to determine if the metals were being washed onto the site through the storm sewer located in the parking lot north of the site.

The two samples of stream bed sediment were analyzed for metals, extractable organic compounds, and VOCs because of the possibility that any organics remaining on site potentially may have collected in the stream sediment. Sample 6, a grab sample collected upstream of the site, was used as a background sample, and Sample 7 was a composite sample of sediments collected along the stream bed throughout the site.

Sample 8, which was a soil composite sample of this hillside, was analyzed for metals, extractable organic compounds and VOCs. Sample 9 was a background soil sample.

Sample Analyses

Analyses of the liquid drum sample confirmed that the drum labeled “Cincinnati Varnish Company” contained no EP Tox metals. The pH was 6.9, which is very near neutral, and the flash point (>200^{o}F) was above the RCRA ignitability level of 140^{o}. The values of total cyanides and total sulfides were below detection limits, and thus, may be considered non-hazardous. Because the bung on this drum was missing during the site investigations and sampling, the contents of the drum were probably diluted by rain water. The results of soil and sediment analyses of VOCs revealed that off-site samples contained more contaminants than on-site samples.

Appendix D

Mill Creek TMDL Technical Advisory Group

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D1. Public Comments to Draft Report

State of Ohio
Environmental Protection Agency

A Responsiveness Summary for Comments on the Draft Mill Creek TMDL Report

Prepared by Ohio EPA
Division of Surface Water

May 2, 2001

Introduction

Ohio EPA began the development of a Total Maximum Daily Load for the Mill Creek in 1999. Discussions with stakeholder groups and the public were started in August 1999 and continued until October 2000. The Agency released a first draft TMDL report dated January 29, 2001. The availability of this document was public noticed and comments were received through March 2, 2001. As a result of these comments Ohio EPA is planning additional public involvement and participation steps for the Mill Creek Total Maximum Daily Load (TMDL) project. This decision was reached in consultation with members of the Mill Creek Watershed Council. A final TMDL report will be produced following a series of at least 3 additional public meetings.

Responsiveness Summary

This document provides a summary of the comments received on the January 29, 2001 draft TMDL report. Statements made herein do not represent the Agency's final position on technical or policy content of the Mill Creek TMDL. Copies of the original comments are available from the Ohio EPA contacts listed.

For additional information

If would like more information or have questions please contact:

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Comments regarding the January 29, 2001 Mill Creek TMDL draft report

Comments Identical to Butler County DES and Mill Creek Watershed Council TAG

The TMDL implementation plan focuses primarily on two point sources while there are still up to 20 other NPDES permit holders in the area studied as well as the entire watershed which will be subject to Phase II storm water regulations.

Response: Only two of the NPDES point source facilities in the Mill Creek watershed discharge effluent containing nutrients. The other NPDES permit holders discharge non-contact cooling water. This information is contained in the Appendix for the Mill Creek TMDL report. Any sanitary or process wastes from these other facilities are discharged to the sewer system of the Metropolitan Sewer District of Greater Cincinnati, and therefore these facilities were not included in the TMDL development for nutrients.

It is unacceptable to wait until the Phase II storm water NPDES permits are issued before beginning the process of restoration in Mill Creek. General permits for the Phase II storm water regulations for small regulated municipalities and small constructions sites of one to five acres, are scheduled to be issued by December 2002. Notices of Intent (NOIs) for small construction sites covered under the permit are due March 10, 2003. Municipal applications and storm water management plans with schedules to implement best management practices (BMP), are due March 10,2003. The compliance schedules for these BMPs may extend many months to up to five years after the first permit is issued to each municipality. The local communities in the Mill Creek watershed are presently determining how to address these regulations. Mill Creek ranked very high on the TMDL priority list because of the severity and complexity of impairment. The process to begin to deal with the impairment needs to be initiated before December 2002 if there is to be progress with the restoration of the watershed. Once the Phase II storm water permits are issued, then they will certainly be part of the implementation plan and can be phased into the process.

MSD comments

REPORT.

Report, Page 2 – last paragraph. "During storm events, much of the flows in the combined sewer systems bypassed the treatment plants and ….." Comment. The Mill Creek WWTP was placed in operation in 1959.

Response: The suggested clarifying language will be included in the report.

Same Para. "…some of which occur in during dry weather conditions." Comment. Except for when high water levels exist in rivers and streams, dry weather CSOs are not normal for the MSD system.

Response: This sentence will be revised to: "Additional flow to the system due to added development and increased impervious area has resulted in more frequent discharges from the overflow points including dry weather overflows. It is noted that dry weather CSO events are typically associated with high water levels in rivers and streams and gate blockages allowing stream flow intrusion. Dry weather CSO improvements have been implemented by MSD as required by its NPDES Permit and the overflow structures are inspected regularly to prevent these occurrences."

Same Para. "…eliminate some overflow points and basement flooding…" Comment. The CSO Long Term Control Plan primarily addresses combined sewer overflows and not basement flooding per se.

Response: While Ohio EPA has received reports of basement flooding, this language will be deleted as requested due to its not being a primary focus of the LTCP. The sentence will be revised to state" The Metropolitan Sewer District of Greater Cincinnati (MSD) has developed a long term CSO strategy to reduce discharge frequencies and provide treatment to some of the major overflows."

Report, Page 55 Section 6.1 last paragraph "are in the process of negotiating the elimination of the CSOs and SSOs within the watershed." Comment. MSD is continuing with discussions and negotiations with Ohio EPA and USEPA addressing comprehensive programs for CSOs and SSOs within the watershed.
Response: This sentence will be revised with the suggested language as requested. To add specificity to this item (as this language is from the Section on Reasonable Assurance) the following will also be added to this part as given in the draft report on Page 3, Item5 " Discussions are ongoing with MSD through a joint consent order with Ohio EPA/Attorney General's Office and USEPA/U.S. Department of Justice."

APPENDIX B.
CSO Nutrient Loading:

Two methods were employed to assess the nutrient loadings from the combined sewers discharging to Mill Creek. The first method (Method 1) is based on a generalized annual loading function. This kind of approach is characteristic of watershed level non-point source models. In Method 1, the quantity component of the model was "calibrated" to the results of the simulations presented in the MSD Phase I Mill Creek Long Term CSO Control Plan (LTCP) report. Pollutant unit loading data was obtained from literature values.

On this basis, the following annual N, P loadings were estimated:

CSO Nitrogen Annual Total Loading 22,000 kg N/yr. or 48,458 lbs. N/yr. (Method 1)
CSO Phosphorus Annual Total Loading 56,000 kg P/yr. or 123,348 lbs. P/yr. (Method 1)

An alternative approach (Method 2) was used directly using the simulated volume of 3,087 MG developed through the MSD LTCP and using literature values for the N, P concentrations in storm water runoff and sanitary wastewater.

On the basis of this approach, the following annual N, P loads were estimated:

CSO Nitrogen Annual Total Loading 13,000 kg N/yr. or 28,634 lbs. N/yr.
(Method 2)
CSO Phosphorus Annual Total Loading 21,000 kg P/yr. or 46,256 lbs. P/yr.
(Method 2)

SSO Nutrient Loading:

SSO nutrient loadings were also assessed for Mill Creek using data regarding pipe capacity, sanitary and GWI flows obtained from MSD reports and estimates of RDI/I flows prepared by

the TMDL study team. On the above basis, the following annual N and P loadings were determined:

SSO Nitrogen Annual Total Loading 100,000 kg N/yr. or 220,026 lbs. N/yr.

SSO Phosphorus Annual Total Loading 15,000 kg P/yr. or 33, 040 lbs. P/yr.

It was reported that Sub-basin 2, which contains SSO 700, contributed the preponderance of the above loadings, and that SSO700 contributes 67% N loadings and 70% P loadings in Sub-basin 2. On this basis the estimated SSO 700 loadings were:

SSO 700 Nitrogen Annual Loading 55,612 kg N/yr. or 122,493 lbs. N/yr.

SSO 700 Phosphorus Annual Loading 8,719 kg P/yr. or 19,205 lbs. P/yr.

The actual SSO volumes associated with the loadings were not provided in the TMDL report but can be calculated using estimated SSO concentrations. Assuming a 50:50 mixture of sanitary flow and GWI plus RDI/I gives estimated SSO N and P concentrations of about 20 mg/L and 4 mg/L respectively (based on data presented in Table 24 of Appendix A2). Using these concentrations and the estimated loadings presented above, the following SSO volumes can be calculated:

SSO Total Annual Volume 1161 MG (average of N and P calculations)

SSO 700 Annual Volume 658 MG (average of N and P calculations)

Analysis

a) Modeling analysis of SSO 700 carried out for the MSD East Branch Mill Creek Study indicated an annual overflow volume of 64 MG for all SSOs discharging to the study reach with SSO 700 discharging 61 MG in an average year.

Comparison of the modeled results with the volumes for SSO 700 estimated from TMDL report data indicates an order of magnitude discrepancy which should be examined and addressed in the updated draft of the TMDL document.

b) Comparison of the SSO and CSO Method 1 nutrient loadings indicates a disproportionately high estimate of nitrogen loading for SSO and a disproportionately high estimate of phosphorus for CSO. In contrast, our consultant's experience has shown that CSO and SSO are reasonably similar in terms of water quality characteristics.

This discrepancy should be addressed in the updated TMDL and if possible, actual SSO/CSO data used to determine loadings.

Response: We believe your calculation are in error. The Nitrogen value in the report was 2.2E+5 which is 220,000 not 22,000 as used in the comment's analysis. Predicted CSO nitrogen load in the report was 1.3E+05, which is 130,000 not 13,000 as used in the comment's analysis; therefore, there is not such a disproportional in Nitrogen load estimation for SSO vs CSO. As can be seen, CSO and SSO are reasonably proportional in terms of phosphorus and nitrogen loadings.

c) Comparison of the two methods used to estimate CSO loadings yielded nearly a two times differential in N loadings and nearly a three times differential for P loadings. A preferred method based ideally on observed CSO quality should be selected and employed.

Response: Comparison of the two methods to estimate CSO loadings, indicates nitrogen and phosphorus loadings evaluated with the first method, are respectively 1.7 and 2.7 times the load by the second method. The annual precipitation over the period 1989 to 1999 is 136 cm, while the annual precipitation for 1970 is 94 cm. Considering the difference in precipitation over the two study periods, the agreements are considered good.

Comments from Harry J. Stone

Attached are comments on the Mill Creek Draft TMDL. I appreciate the efforts that you and your team have put forth to develop a plan to improve one of the reputed worst streams in America. I also appreciate the constraints within which you were working.

I particularly compliment your team for recognizing the critical importance of habitat in achieving water quality standards. Without addressing habitat issues at a variety of scales, reducing loads in the Mill Creek is not likely to result in meeting water quality standards.

Given that the TMDL will largely shape the future of the Mill Creek, I am concerned that the Draft TMDL will not achieve the water quality goal because (1) it fails to address all necessary loads and (2) the loads that are established are too high.

My comments are attached.
The Clean Water Act requires Ohio to develop "total maximum daily load [TMDL], for those pollutants which the Administrator identifies (…). Such load shall be established at a level necessary to implement the applicable water quality standards [WQS] with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." The January 2001 *Rough Draft Total Maximum Daily Loads for the Mill Creek in Butler and Hamilton Counties* (Draft) fails to meet the specifications of this requirement in at least two particulars. First, it fails to establish loads for all pollutants impacting water quality standards. Second, for the pollutants for which limits are established in the Draft, the limits are not sufficient to reasonably be expected to achieve the water quality objectives.

The first point is acknowledged in the Draft in Section 3, page 32: "The water quality and biological assessment indicates that non-attainment of WQS is *in part* due to nutrient and organic enrichment, and habitat degradation. (…) Thus, the parameters evaluated for Total Maximum Daily Loads are total phosphorus (TP) and nitrate-nitrite (NO2-NO3)[sic]" [emphasis mine] Numerous other pollutants are not addressed in this "phased" approach to setting limits. Failing to address ammonia and sediments, among others, is likely to result in failure to achieve water quality standards.

For example, failure to establish siltation standards places at particular risk the headwaters of the Mill Creek and its tributaries in the areas with development pressure. Sedimentation in the Mill Creek is already identified as "excessive" and suppressing fish communities upstream of the East Fork Mill Creek. Sedimentation is also a recognized problem for Winton Lake and Sharon Lake. Executive summary item 14 indicates support for best management practices for the upper watersheds of Winton and Sharon Lakes only. The only approach mentioned for addressing siltation in these lakes is the construction permits for projects of greater than 5 acres. (Additional no-till agriculture may also have some positive impact on the upper East Fork Mill

Creek.) No load limits are being established in this TMDL and no plans to protect other headwaters are offered.

Likewise, ammonia is of concern. In each of the Ohio ecoregion's headwaters, wadeable waters and small rivers, IBI ranges above 40, as required to achieve the WQS, are achieved only with a median ammonia level of 0.05 mg/L (or less). (Ohio EPA, 1999) (See figure below.) These data suggest that WQS are not likely to be achieved without ammonia being addressed. Above the Butler County Upper Mill Creek Water Reclamation Facility (WWTP), on both the East Fork and the Mill Creek, ammonia levels are about (0.064) or below this 0.05 mg/L threshold. Ammonia concentrations are described in the Draft as "high risk range downstream from the WWTP." Ammonia concentrations show a correlation with nitrate + nitrate concentrations, suggesting that the former will be reduced by addressing the latter. However, ammonia levels of 0.382 mg/L are associated with nitrate + nitrite levels of 3.0 mg/L. This may suggest that if the relationship is causal the proposed 3 mg/L level for nitrate + nitrate will maintain ammonia at high risk levels. If, conversely, there is no causal relationship, ammonia has not been limited even indirectly in the Draft.

Increasing the discharge from the Facility will increase this problem. The TMDL (page 11) acknowledges that, "an analysis of risk associated with elevated concentrations of total phosphorus, nitrate-nitrite and ammonia revealed that all three parameters increased into the high risk range downstream from the WWTP [Upper Mill Creek Water Reclamation Facility] and at least three miles downstream in Mill Creek. Increased flow at existing nutrient levels may cause this problem to extend further downstream in Mill Creek."

While habitat issues are not directly addressed in the statutory TMDL requirements, Ohio EPA (Ohio EPA) is to be commended for recognizing the necessity of improving habitat. As stated in Ohio EPA's research, "*habitat data must be considered an integral part of any attempt to restore aquatic life in a stream or river if such efforts are to succeed* [emphasis theirs]. Given the importance of habitat in determining the fate and availability of nutrients in the water column, meeting Clean Water Act goals will likely be frustrated without consideration of the critical role of riparian zone and in stream habitat."
Response: USEPA has indicated that "phasing" is acceptable for TMDL development. Ohio EPA's intention of using a phased, iterative approach for the Mill Creek TMDL was explained early in the process at the first meeting with the Mill Creek Watershed Council in August, 1999 and in the first meeting of the subsequently formed Technical Advisory Group in October, 1999. The complex nature of the watershed makes this approach a necessity, as does the need to collect additional pollutant data that was not included in the 1997 study by Ohio EPA in support of this report. Ohio EPA committed to address in its modeling efforts in this first phase, only those causes of impairment for which assessment data indicated an impact over the entire watershed. Future studies are planned to focus on "pollutants" impacting discrete stream segments listed in the 303(d) list, while all known causes of impairment would be listed in this phase of the report
for future study.

The QHEI habitat quality data are highly correlated with IBI scores in Ohio. The habitat appears to set the upper limits on the potential IBI scores. High nutrient loads appear to lower IBI scores below the limit established by the habitat quality. Given the low QHEI scores for some reaches of the Mill Creek, particularly the lower eight miles with mean QHEI of 37.9, reduction in nutrient loads is not likely to result in the achievement of the WQS. (See figure below.)

In the figure above, the sizes of the "bubbles" are proportional to nitrate/nitrite concentrations. Upper Mill Creek IBI and QHEI show an approximately linear relationship when nitrate/nitrite concentrations are low. Nutrients appear to lower IBI below the potential established by habitat quality. (Data from Draft TMDL.)
Response: It is clear that habitat is a significant limiting factor for aquatic life in much of Mill Creek and its tributaries. Where the streams have a WWH designation, nutrients are likely responsible for some of the impairment and are being initially addressed through the TMDL. The nutrient values on the graph in the comments reflect current conditions and will be reduced through the TMDL process. Further downstream in Mill Creek, the use changes to MWH in the lower eight stream miles. The tolerant communities associated with that aquatic life use can attain at higher nutrient concentrations than a WWH assemblage. After nutrient reductions take place, the stream will be reassessed and, if still impaired, further limiting factors will be identified and actions taken.

While progress made by the Butler County wastewater treatment facility is laudable and worthy of being highlighted, it is important to use the latest possible data in analyzing the current loads and necessary reductions. It provides the clearest picture of where we are today and how much change is required. For example, the current flow rate is 6.82 MGD (1999-2000) and the 44,800 kg/yr of NO2 + NO3 is the appropriate base for the Butler County wastewater treatment facility. The higher figures of 8 MGD and 80,600 kg/yr are misleading for a plan to reduce existing pollutant loads.
Response: We defined the loading capacity of the stream in every HUC. We need to add up NPS and PS loadings. The model is calibrated to 1992 conditions. NPS loading is the average of 1989~1999. Point source loadings are the average of 1994~1999. Considering the existing fluctuating in point sources nutrient discharges, it seemed more appropriate to use an average number than the last years to reflect the average performance. In addition, the calculated reduction factor is calculated from in stream 1992 data with the defined target value.

The discussion of the margin of safety in the Draft indicates that the standards are set from reference sites that were relatively unimpacted. Yet, as indicated above, waters studied in setting those standards included waters with total phosphorus of 0.25 mg/L and higher among the headwaters and wadeable steams. No group of water bodies with a mean level of total phosphorus of 0.25 mg/L had an IBI of 40 required to achieve the WQS. The reference sites do no seem to provide a margin of safety.

Minor and editorial comments
Page 2: The Appendix (page 27) notes that the July 1999 through June 2000 average daily discharge from the Butler County Upper Mill Creek Water Reclamation Facility was 6.82 million gallons.
Response: The section on page two will be revised to be consistent with the 6.82 MGD figure given in Appendix B.

Page 3: Evendale also has a small amount of agriculture within the watershed as noted on page 30.
Response: The agricultural activities in Hamilton County will be noted on page 3.
Page 3: last line Lloan.
Response: Completed

Page 41: 80,600 kg/yr (not day) and 44,800 kg/yr (not day)
Response: The corrections will be made to the document.

Comments from the Ohio Environmental Council

The Ohio Environmental Council (OEC) is writing to share a few concerns regarding draft Total Maximum Daily Load (TMDL) for Mill Creek. We urge the Ohio EPA to address these concerns in the final TMDL report.

(1) The draft TMDL does not include TMDLs for three segments: Sharon Creek, Bloody Run and Winton Woods Lake. There are no commitments or scheduling for completion of these TMDL's.
Response: As indicated in the response to the comment above regarding phasing of TMDL development, this first phase of the Mill Creek TMDL will address those causes of impairment for which the assessment data indicates a problem over the entire watershed. Further studies and phases of the TMDL will address specific causes and sources of impairment to discrete stream segments identified in the 303(d) list.

(2) Bacteriological impairments are not addressed.
Response: Bacteria had been planned to be addressed as it was found to be among the causes of impairment common throughout the watershed. Prior to completing modeling for this parameter, during a meeting between Ohio EPA and the Mill Creek TMDL Technical Advisory Group, it was pointed out by a stakeholder that bacteria was not included on the 303(d) list for the Mill Creek watershed. Ohio EPA consulted with USEPA Region V to determine whether information regarding this parameter could be included in this first phase of the TMDL. It was explained that any information relative to bacteria would only be considered by USEPA as "informational" and thus, not enforceable for any suggested improvements. The decision was then made by Ohio EPA to revise the next 303(d) list to include bacteria as a cause of impairment within the watershed and that this parameter would be a focus in the next phase of the TMDL.

(3) No schedules or milestones are included for the future development of TMDLs for metals, priority organics, unknown toxicity, contaminated sediments or oil and grease.
Response: It is the intension of Ohio EPA to begin working on future TMDLs after the development of the 2002 305b report and 303d list.

(4) No provisions for specific monitoring activities are included.
Response: As discussed in the TMDL report, monitoring of improvement in the use designation attainment in Mill Creek will be conducted under the Five Year Monitoring Program established by Ohio EPA. The protocols for this monitoring program are discussed in several references listed in the TMDL report.

(5) The draft TMDL does not specify the schedule for establishment of tighter NPDES effluent limitations for specific point sources.
Response: The draft TMDL report does include this information. Section 6.1, Reasonable Assurances includes a proposed Schedule of Compliance related to nutrient removal for Glendale WWTP and an existing Schedule of Compliance for Butler County Upper Mill Creek WWTP to be enforced through the facilities' NPDES Permits.

(6) The justification for not establishing target concentrations for CSO's and SSO's is not addressed. Specific actions and time frames for control of CSO's and SSO's are not included.
Response: SSOs are by definition, illegal discharges to Waters of the United States and thus, cannot be assigned a target concentration value as they must instead be eliminated. As

indicated in the draft report on Page 3, Item 5, Ohio EPA and the USEPA are engaged in settlement discussions with MSD as part of a joint consent order presently being negotiated. The purpose of this settlement agreement is to establish a comprehensive plan for elimination of known SSOs through a program involving study of its entire collection system along with defined programs for monitoring, operation and maintenance, reporting obligations, as well as penalties for missed deadlines and continued overflows. Target dates for elimination of highly active SSOs are still being negotiated through this enforcement mechanism and as such, are not appropriate to include in this report.

Regarding CSOs, MSD has submitted its Long Term Control Plan for CSOs which identifies a detailed schedule for capital improvements for improved control, treatment (elimination where possible) of specific CSOs along with associated costs over a 25 year period. This plan is discussed in Item 4 on Page 3 of the draft TMDL Report and further described in the Attachments.

(7) The implementation plan must include specific time frames for restoration and monitoring activities. The plan should also establish the target date for attainment of water quality standards and include provisions for actions at that time if the water quality standards are not yet attained.
Response: The implementation plan did not include specific time frames for restoration scenarios to allow for implementation flexibility. The stakeholder involvement in Mill Creek is very dynamic and projects to improve the watershed are continually being developed. A watershed action plan is proposed to be developed over the next year or two. In addition, Butler County has a compliance schedule for compliance with the nutrient limits, and Glendale's permit can be modified to include nutrient limitations. The monitoring activities will follow the Ohio EPA five year basin sampling program.

(8) The implementation plan must be included in the TMDL and must contain corresponding reasonable assurances for each component of the implementation plan. The implementation strategies should specify the public and private actions to be taken and include written documentation from the parties to provide reasonable assurance that the actions will be taken (see attached references).
Response: This TMDL is not required to have specific reasonable assurances because it is being completed under the old rules. These were kept non-specific to allow for flexibility in the implementation phase of the TMDL. Additional information regarding implementation plans was requested by Ohio EPA, but little was received. Reasonable assurances could only be provided for issues which Ohio EPA has direct regulatory authority or for which 319 grant funding was provided.

Comments from the Village of Glendale

The Village of Glendale has requested the engineering firm of URS Corporation to review the Rough Draft of the "Total Maximum Daily Loads for the Mill Creek in Butler and Hamilton Counties" on behalf of the Village of Glendale, Ohio (Hamilton County). The attached letter summarizes their comments concerning TMDL. Should you have any questions, do not hesitate to contact our Utility Superintendent Roger Campbell (513-771-6860) or me. Your assistance in this matter is appreciated.

Pursuant to the request of Roger Campbell, URS has prepared comments for the Village concerning the Rough Draft of the "Total Maximum Daily Loads for the Mill Creek in Butler and Hamilton Counties." This Total Maximum Daily Loads (TMDL) document presents an analysis of water quality in the Mill Creek and identifies controls to reduce the pollution from

both point and nonpoint sources. Our review of the TMDL identified a concern in the recommendation for a reduction in the phosphorus and nitrate-nitrite effluent limitations for Glendale's WWTP. The following discusses the basis of our concern.

As implied in the TMDL, the effluent limits for Glendale's WWTP will be around 1.0 mg/l phosphorus and 3.0 mg/l nitrate-nitrite. Glendale has been sampling the WWTP effluent for nitrate-nitrite for several years and for phosphorus during the month of January 2001. Review of the sampling results show that the effluent concentrations for phosphorus have been below 1.0 mg/l during the month of January and, during the last two years effluent concentrations of nitrite-nitrate have exceeded 3.0 mg/l in only three out of 24 samples collected. Because Glendale's WWTP is currently not specifically designed to remove these parameters, it is likely that effluent concentrations will occasionally exceed the proposed limits. Therefore, the Village will have to provide additional treatment to ensure compliance with the proposed effluent limits. This treatment will likely consist of the addition of a new tank subsequent to the trickling filters to promote the removal of phosphorus and nitrate-nitrite. It is probable that effluent pumping will also be required due to the limited hydraulic head available at the WWTP. An additional consideration is that there is limited room for expansion at the existing WWTP site. This expansion will be a major capital expenditure for the Village.

We question whether this capital expenditure will result in a measurable reduction in overall nutrient loads to the Mill Creek. We offer the following observations from the TMDL:

- Glendale should not be considered a major point source discharge compared to the Upper Mill Creek WWTP, CSOs, SSOs and other industrial NPDES permit holders.

Response: The Village of Glendale is currently permitted to discharge 0.43 MGD of sanitary wastewater year round. Although this facility is not considered a "Major" discharger by USEPA's definition (for the purposes of permitting and compliance inspections), it is a major contributor of nutrients to the Mill Creek; especially during low flow periods.

- The WWTP effluent quality is generally below the proposed limitations without expansion. An expansion would only improve the probability of continual compliance and result in a marginal reduction in loads. Even with improvements, equipment failure and other unusual circumstances could cause violations of the parameters.

Response: Ohio EPA expects that a wastewater treatment plant using Trickling Filter technology, such as the Village of Glendale's, would need to upgrade its technology to meet the phosphorus and nitrate+nitrite limits proposed in this report. Based on our experience, very infrequent violations are caused by equipment failure or other unusual circumstances, regardless if the treatment plant is new or old as long as it is well maintained. Ohio EPA believes that the Village of Glendale's WWTP would violate the proposed nutrient limits with a much greater frequency (because of its current technology) compared to those violations that would be caused by equipment failures to an upgraded plant. A review of the Village's MORs for the year 2000, shows approximately 56 violations of their NPDES permit (without nutrient limits). This high number of violations does not appear to be something that happens on an "infrequent" basis because of equipment failure or unusual circumstances, especially for a facility that has only secondary limits.

- The WWTP's load contribution is only a small percentage of the GWLF loadings for both nitrogen and phosphorus. Using the numbers included in Table 11 and Table 12 of the TMDL and an average daily flow of 0.5 mgd from the WWTP results in Glendale contributing about 2% of the total nitrogen load and 1.5% of the total phosphorus load.

Response: As indicated in Section 4 of the draft Mill Creek report, both nonpoint and point source pollution sources contributing nutrients must be addressed if the upper Mill Creek is to achieve water quality standards and the goals of fishable and swimmable in the CWA. Although compared to Upper Mill Creek WRF, Glendale appears as a small contributor, it is still a contributor and must address the nutrient issues.

- Other sources of impairment are apparent in the Mill Creek according to the TMDL such as habitat alteration and sedimentation. Implementation of habitat restoration activities and best management practices for storm water control may be more effective than imposing further NPDES permit restrictions on only two point sources.

Response: Both habitat restoration and best management practices for storm water controls are excellent candidates to be included in the implementation plans and a few have been included under Section 6 of the draft Mill Creek TMDL report, and some examples of these are listed in the implementation plan section. The enforcement of the NPDES permits for storm water Phase 1 are presently the responsibility of Ohio EPA and Hamilton SWCD. Ohio EPA will work with the local communities in the Mill Creek watershed to implement Phase II of the NPDES storm water regulations. The responsibility of habitat restoration must be undertaken by the local stakeholders and property owners. To date, only Butler County and Mill Creek Restoration Project have presented information regarding habitat restoration projects for the Mill Creek watershed. Unless proposals of habitat restoration and the assurances that those projects will undertaken, and the benefit of those projects are presented to Ohio EPA, no projects can be included in the implementation plan. However, it must be pointed out that habitat restoration and sedimentation controls alone will not reduce nutrient enrichment impairment, especially in a watershed dominated by effluent as is the upper Mill Creek. Nutrient reduction controls must be in place at the point sources contributing the pollutants, if any benefit from habitat restoration is to be realized. This is indicated in the summary regarding the Denver Metro project on the South Platte River in Colorado. The address for the website summary is noted on page 52 of the draft Mill Creek TMDL report. Both nitrification and de nitrification were installed at the Denver Metro plant, but dissolved oxygen levels continued to be a problem in the South Platte River. It was not until after the nutrient controls were installed at the plant, that the decision made to undertake the habitat enhancement project on the South Platte. In the Mill Creek watershed, both nonpoint source controls and nutrient controls at the point source discharges will also have to be in place before attainment of the water quality standards can be achieved. Nonpoint source controls such as enforcement of Phase I and II of the storm water regulations, no till farming practices, improved livestock and manure management, stream habitat and riparian vegetation restoration, development of greenways plans and follow through of those plans, reduction and elimination of CSOs and SSOs and perhaps even reduction of fertilizer applications in urban and suburban areas will improve the water quality of the Mill Creek watershed. Many of these recommendations are in the Mill Creek TMDL report or already in the implementation section and are underway in the watershed. It must be emphasized though, that both point source and non point source controls are essential if attainment of the water quality standards are to be achieved.

- The implementation plan included ammonia as a future NPDES Permit limit for Glendale. As mentioned in the TMDL, nitrite-nitrate is 90% of the total nitrogen load. Therefore, applying ammonia limits would have little affect on the total nitrogen load.

Response: Ohio EPA is presently evaluating the ammonia issue.

While Glendale supports the efforts to improve the quality of the Mill Creek, it is also apparent that additional treatment at the WWTP will have only a minimal affect on the water quality in

the stream, if any affect at all. Other proposed improvements, such as upgrade of the Upper Mill Creek WWTP and reduction and elimination of CSOs and SSOs, will produce benefits much greater than an upgrade of Glendale's WWTP. Another appropriate utilization of resources would be to support the initiatives in both Butler and Hamilton Counties to promote stream restoration and implementation of best management practices (BMPS) as a viable means of reducing nutrient levels and promoting biological diversity in the Mill Creek.

Comments from Ohio River Advocacy:
The Mill Creek Total Maximum Daily Load (TMDL) Technical Advisory Group (TAG) is submitting comprehensive comments regarding the *Rough Draft Total Maximum Daily Loads for the Mill Creek in Butler and Hamilton Counties* (hereafter referred to as the Mill Creek TMDL) dated January 29, 2001. ORA has had the opportunity to review the Mill Creek TMDL and the TAG comments and it is disappointed that despite the time and effort given by the many people and organizations working on this matter a better Mill Creek TMDL was not produced.

ORA is concerned about all tributaries and waterways in the Ohio River watershed. The health of those waterways has a direct impact upon the health of the Ohio River. TMDLs that address non-point and point sources of pollution for all waterways within the watershed should be of paramount consideration to preserve, protect, and improve water quality in those waterways and waterways into which they flow. The overall impaired condition of Mill Creek affected by different sources of pollution requires such an approach. Failure to address contamination of this waterway from non-point source pollution would create a TMDL with limited effectiveness. The Mill Creek Total Maximum Daily Load (TMDL) Technical Advisory Group (TAG) is We strongly support the comments, conclusions, and recommendations of the TAG, and recommend that Ohio EPA consider adopting those recommendations.
Response: Ohio EPA agrees that communication problems occurred with all parties regarding the TMDL process. To help alleviate this issue, Ohio EPA is proposing to bring in a professional facilitator to lead a series of meetings to allow for additional stakeholder input regarding the TMDL. This stakeholder process would go beyond the scope of the current Mill Creek public participation to allow for the participation of any additional interested parties. Ohio EPA is proposing to delay the submittal of the Mill Creek TMDL until these meetings occur.

Comments from Mill Creek Watershed Council
This comment document is divided into two sections: general and specific comments. We ask that this letter and the attached comments be appended to the next draft and final Mill Creek TMDL reports. We submit our comments understanding they will be considered, and integrated where appropriate, in the next draft and the final Mill Creek TMDL submitted to the U.S. Environmental Protection Agency.

We feel compelled to express disappointment with the Mill Creek TMDL process and its apparent results, as described in the draft report. The TAG is uncomfortable with a likely public perception that the TAG and Ohio EPA have reached consensus on the TMDL when that is not the case. We are disturbed that dialogue with Ohio EPA suffered during the past several months, as evidenced by the fact that the Agency has not yet briefed the TAG on the results of its modeling efforts, as was expected. In addition, the TAG is especially troubled by the complete lack of opportunity to discuss and make recommendations on the critically important TMDL implementation strategies. The TAG is frustrated because the TMDL was an opportunity to make significant progress towards water quality improvement. We believe that these issues are not insurmountable, and we ask for your immediate attention to these matters. Given MaryLynn

Lodor's recent discussions with you, we are optimistic about potential resolutions through the use of the Watershed Action Plan. The TAG recommends that requirements for point source restrictions be deferred until the action plan is complete and a more informed decision can be made as to whether any additional point source restrictions are needed.
Response: Ohio EPA tried to keep the Mill Creek Watershed Council TAG workgroup updated on the TMDL status. We regret that there was not an advanced presentation to the TAG regarding the modeling associated with the TMDL. This did not occur due to time constraints. We were able to provide the written modeling results to the TAG two weeks prior to public noticing of the document.

The TAG was asked on several occasions to provide implementation plans, BMPs, and updates on actions occurring within the watershed which could improve water quality. Everything that was provided to the Ohio EPA was included in the TMDL report and is in Section 6 of the report. Other items discussed in this set of comments were not previously provided to Ohio EPA.

Ohio EPA staff attended a Watershed Action Plan (WAP) meeting in June 2000, but received no communication since that time regarding the matter. After looking into this option, it was found that nothing has occurred since the initial meeting. One of the requirements of the 319 grant funding recently provided to the Mill Creek Watershed Council through ODNR for the executive director position for Mill Creek, is that a WAP will be developed within two years of the funding being provided. Ohio EPA is interested in pursuing the development of a WAP with the stakeholders and is looking forward to receiving progress reports related to the WAP from the council.

It is unlikely that the permit limits will be removed from the TMDL report. The USEPA requires the inclusion of NPDES permit limits into the report for point sources that affect the TMDL. In the case of the upper Mill Creek, both nonpoint and point source reductions will need to occur if attainment of the water quality standards are to be achieved. The other point source dischargers in the watershed do not have nutrients in their discharges, i.e., non-contact cooling water, so they were not given limits during this phase of the Mill Creek TMDL development. As future implementation strategies are developed, these point sources could have limits regarding other parameters included in their permits.

<u>Process-Oriented Comments</u>
P-1. The draft TMDL report is poorly crafted - not representing the typical caliber of an important, professional document released for formal public review. The report is inconsistently formatted and has numerous typographical errors, indicating that it is a "Rough Draft" as referenced on the cover page. While these problems can be easily fixed, it raises doubts concerning the overall quality of the materials contained in and underlying the document and indirectly calls into question the thoroughness of effort applied to the technical aspects of this report. For this and the reasons to follow, the TAG respectfully requests that the revised document undergo another public comment period to reflect the fact that substantial changes are needed before this TMDL can be finalized.
Response: The TMDL report followed the format used for other TMDLs being developed in Ohio. The report was intentionally put on the website as a working document to provide the opportunity for the public to have input. Since this report is a draft and a working document, the necessary corrections to formatting and typographic errors will be corrected. In addition, there may have been some conversion issues with regards to pagination when the document was converted from a WordPerfect document to an Adobe Acrobat file.

P-2. Ohio EPA's public participation process failed to include the Mill Creek TAG in developing the TMDL, the implementation scenarios and restoration strategies. Because Ohio EPA spent most of the year determining data gaps and trying to understand the selected model, the TAG was robbed of meaningful participation in the TMDL process. In December 2000, due to the fact that implementation and restoration strategies had not yet been discussed with the TAG, the TAG requested that Ohio EPA provide additional time for completing the Mill Creek TMDL. The request for additional time was denied by Ohio EPA, citing a US EPA-imposed deadline. The lack of time and TAG inclusion in developing the TMDL implementation and restoration strategies seriously affects the outcome of Mill Creek TMDL. The Mill Creek TMDL, as drafted, is bound for failure and is documented as such in the report's Modeling Results section. The TAG's role in the TMDL development process was undermined by the Agency's rush to get something published. TAG members invested in a process that short-circuited their involvement.

Response: On the contrary, Ohio EPA involved the TAG and its workgroup in many meetings and discussions. A table of those meetings is listed in Section 5 of the report. Several summaries and data provided by TAG members are included in the draft report for the Mill Creek TMDL. Ohio EPA requested implementations plans and BMPs for inclusion in the TMDL report. The items that were received by Ohio EPA were included in the report. At a December 2000 Mill Creek Watershed Council meeting, Butler County asked about submitting a request for an extension of the Mill Creek TMDL report submission to USEPA. The only request Ohio EPA received for extension of the TMDL deadline, was received from MaryLynn Lodor of Butler County, Department of Environmental Services. No letter was received from the Mill Creek Watershed Council TAG requesting an extension.

Ohio EPA is under deadlines to submit TMDLs to USEPA. In attempting to meet the deadline for the Mill Creek report, the TAG was not included as much as would have been preferred during the final stages of the draft report or in the modeling. The deadline for submittal of the TMDL to USEPA had already been delayed by two months. However, as had been mentioned previously, the TAG was asked on several occasions to submit implementation plans and BMPs for inclusion in the report. Those items submitted, were included in the report. There was no intention of undermining the TAGs role in the TMDL process.

Ohio EPA is proposing a series of meetings open to all stakeholders in the watershed to allow for their input into the TMDL. Ohio EPA contracted a professional facilitator to lead these meetings.

P-3. On January 16, 2001, a "Rough Draft" Mill Creek TMDL Report dated January 12, 2001 was provided by Ohio EPA to the TAG for review. The TAG was informed that the report would be public noticed in early February. The early release of the document to the TAG was supposed to give the TAG a jump-start on the review of the final report while Ohio EPA made minor formatting changes to ready the document for public review. The TAG requested this review, given the TAG's overall perception that the process was rushed and provided for little TAG involvement and participation. The extra weeks of review by the TAG were to allow the TAG to generate better, more substantial comments. Unfortunately, Ohio EPA public noticed the TMDL report with substantially different recommendations than the January 12th version, further compromising the TAG's involvement. The January 29th draft Mill Creek TMDL report contains substantive new information, including stricter permit limits for point sources, which were not included in the January 12th draft. These last minute changes were not discussed with either stakeholders or the TAG prior to release of the report.

Response: The changes in the report the TAG received on January 16, 2001 and that released on February 2 contained changes recommended by individual TAG members and permit limits for two point source discharges. Additional data and maps were provided by TAG members and included in the later draft of the report. While the nitrite- nitrate limit was lowered from 5 mg/l to 3 mg/l compared to the earlier draft, the phosphorus limit was increased from 0.8mg/l to 1.0 mg/l, as requested by Butler County who submitted comments to Ohio EPA on January 25, 2001.

P-4. In contrast to the TAG's understanding of the TMDL development process (based on diagrams and information provided to us by the Ohio EPA) and the public participation discussion presented in Section 5 of the report itself, the TAG had no involvement in the final phases of the development of the final draft Mill Creek TMDL. The inclusion of the names of several TAG organizations on the report cover and in Section 5: Public Participation creates the perception that the final draft report reflects the consensus and substantial TAG participation. In fact, the TAG had no active involvement in the process after the model to be used to generate loading values was discussed. The TAG never had the opportunity to review the modeling results nor were they involved in the development of the proposed implementation strategy - the most publicly-oriented aspect of the entire TMDL. The implementation strategy as presented came as a complete surprise to the TAG and the reasonable assurances presented were never discussed with the affected parties. This lack of meaningful public participation seriously compromises our ability to give the TAG's full support to the Mill Creek TMDL.
Response: It has been acknowledged the TAG did not have a role in calculations of the modeling for Mill Creek. The TAG was given two weeks to review the modeling prior to its release to the public on February 2, 2001. This was provided as soon as Ohio EPA completed the modeling data. It was never the intent of Ohio EPA to purposefully exclude the TAG from input and commenting. Some of the members of the TAG workgroup did provide data used in the modeling, and comments were received by some of the TAG workgroup members prior to the report being released to the public on February 2, 2001. Other than the permit limits proposed in the TMDL report, the remainder of the implementation plans and BMPs in Section 6 of the report were submitted by TAG workgroup members.

As explained to the TAG and its workgroup, Ohio EPA has limited authority in implementation of any TMDL, unless impairment is due to NPDES issues. Ohio EPA can only give reasonable assurances of those regulations, such as the NPDES program, for which Ohio EPA has authority. Reasonable assurances can also be given for projects funded with grants from the 319 program, which Ohio EPA administers. It is these reasonable assurances that are included in the Mill Creek TMDL report. Other reasonable assurance must come from the stakeholders.

Ohio EPA would not want any organization to have their name included in this report, if they did not want it. The names will be removed of those organizations requesting it.

The draft report is a working document. It was public noticed to give the opportunity for additional comments to be submitted from the public that could be included in the report.

P-5. Ohio EPA has outlined its plans to conduct a "phased approach" to the Mill Creek TMDL. How many phases will there be and what is the timeline for these future phases of the Mill Creek TMDL that will address other serious impairments and pollutants of concern?
Response: It is the intention of Ohio EPA to begin the next phase or additional TMDLs for Mill Creek after the development of the 2002 305b report and the 303d list.

P-6. Ohio EPA stated that the TMDL objectives are to address watershed-wide pollutants first. Sediments and bacteria are both serious problems throughout the Mill Creek watershed and impact habitat and recreation - both designated uses for Mill Creek. The TMDL TAG understands from Ohio EPA that these two impairments were not included on the State's 303(d) list and that therefore the first TMDL phase could not fully address them. However, Ohio EPA did promise to conduct "an informational TMDL" on bacteria and that is not included in the TMDL report.

Response: Bacteria had been planned to be addressed as it was found to be among the causes of impairment common throughout the watershed. Prior to completing modeling for this parameter, during a meeting between Ohio EPA and the Mill Creek TMDL Technical Advisory Group, it was pointed out by a stakeholder that bacteria was not included on the 303(d) list for the Mill Creek watershed. Ohio EPA consulted with USEPA Region V to determine whether information regarding this parameter could be included in this first phase of the TMDL. It was explained that any information relative to bacteria would only be considered by USEPA as "informational" and thus, not enforceable for any suggested improvements. The decision was then made by Ohio EPA to revise the next 303(d) list to include bacteria as a cause of impairment within the watershed and that this parameter would be a focus in the next phase of the TMDL. Sedimentation was discussed in the initial TAG workgroup meetings. It was recommended by one of the TAG's consultants that sediments not be addressed in this TMDL due to the complexity of the issue. No workgroup members disagreed with this recommendation, therefore Ohio EPA did not include sedimentation in this phase of the Mill Creek TMDL.

P-7. The draft Mill Creek TMDL does not incorporate important technical data and/or documents readily available to Ohio EPA. For example, the TMDL does not include the United States Army Corps of Engineers 2000 Mill Creek surveillance report prepared by Mike Saffron or the results of the qualitative habitat index (QHEI) surveys conducted in Butler County with Ohio EPA in 1998.

Response: The United States Army Corps of Engineers 2000 Mill Creek surveillance report prepared by Mike Saffron has not been approved for release by Army Corps. The Corps has assured Ohio EPA that once the report has been approved for release, it will be shared with Ohio EPA.

The habitat scores referenced in this comment were not Qualitative Habitat Evaluation Index (QHEI) scores and therefore were not included in the report. The scores measured in 1998 were taken for a specific purpose and the procedure for taking these measurements modified the established protocol of the QHEI evaluation. Three Ohio EPA staff members met with Woolpert and Butler County DES in 1998 to discuss the concept of Butler County's habitat enhancement project for East Fork Mill Creek. Woolpert proposed to modify the protocol for QHEI measurements for the purpose of developing structures to place in the stream. Woolpert took the measurements and asked questions of Ohio EPA staff during this time. The modification of the QHEI procedure was discussed and it was agreed that the scores generated by this modification of protocol could not be compared to true QHEI scores and would not be interpreted as such. The QHEI protocol requires that a given length or "reach" of a stream be evaluated for habitat attributes to determine the functionality of that stream reach to provide a healthy habitat for the aquatic biota. The modified scores generated in 1998 were to be used to evaluate small subsections of the stream to determine what habitat enhancement structures could be developed for the subsection. They were not generated to evaluate the functionality of the required stream reach for QHEI development. Woolpert purposely selected some of the worse subsections to evaluate for the enhancement structure project.

In 1995, Butler County hired Jordan, Jones & Goulding to evaluate habitat and biota in East Fork Mill Creek. The purpose of this work was to evaluate the aquatic life use attainment of the stream. This data followed the required protocol used by Ohio EPA, and is included in the Mill Creek TMDL report in Table 4. If the TAG strongly feels that the modified habitat scores generated in 1998 for the development of the Butler County stream enhancement project should be included in the report, Ohio EPA will add this. However, these scores will be presented in the context for which they were taken and it will be clarified that they are habitat evaluation scores developed by a modified protocol.

P-9. We recommend that the entire existing Executive Summary be deleted and that a new summary be created to more accurately reflect the contents of the next and final versions of this report after appropriate changes are made in response to public comments.
Response: Modifications will be made to some of the Executive Summary, however the entire section will not be deleted.

Technical oriented comments

T-2. The TAG has already identified two alternative TMDL implementation strategies that may be included the Watershed Action Plan. They include:

Reforestation TMDL Strategy. The University of Cincinnati Department of Biological Sciences measured chlorophyll on five different occasions in summer 2000 at 11 different stream segments. The results suggest that periphyton chlorophyll do not begin to exhibit high concentrations until stream segments south of Caldwell Park. After evaluating chlorophyll concentrations throughout the East Fork and Mill Creek, it can be extrapolated that the limiting factor to chlorophyll production is riparian cover. Ironically, just past Caldwell Park riparian cover is substantially non-existent.

According to the Ohio EPA technical bulletin *Association Between Nutrients, Habitat, and the Aquatic Biota in Ohio Rivers and Streams*: "Wooded riparian buffers are a vital functional component of the stream ecotone and are instrumental in detention, removal and assimilation of nutrients from or by the water column … Because habitat is a critical component [to] stream function, habitat data must be considered as an integral part of any attempt to restore aquatic life in a stream or river if such efforts are to succeed." Riparian corridors throughout the Mill Creek watershed should be targeted for reforestation and revegetation, preferably with appropriate native species. Not only would a reforestation TMDL help reduce nonpoint source nutrient loading, but also resolve some of the algal problems referenced by Ohio EPA, but it will also help the implementation of the locally developed and supported Greenway Master Plan.
Response: Ohio EPA agrees that healthy stream habitat and riparian vegetation is essential for a viable stream ecosystem. A reforestation implementation plan would do much to improve the health of Mill Creek and its tributaries. Is the Mill Creek Watershed Council proposing to take responsibility for this project? Ohio EPA would be most interested in discussing this project with the Council.

Phosphorus Reduction Strategy. Phosphorus reductions can also be addressed in an alternative fashion not discussed in Ohio EPA's report. Ohio EPA should use the example identified in the Little Miami TMDL of advocating a statewide ban on phosphate containing detergents and other consumer products. This ban already exists in the Great Lakes Basin. It would be far more effective on a regional basis rather than requiring every WWTP to add costly phosphorus removal to the treatment plants.
Response: This was not an issue that was discussed with any depth at the Mill Creek TAG workgroup meetings, although Bob Niederschmidt of the TAG workgroup did raise this as a concern. A phosphate ban has not been proposed for the Upper Little Miami TMDL. During the Upper Little Miami TMDL workgroup meetings, this proposal was suggested as a potential restoration strategy, but was eliminated by the workgroup as being not feasible or economical.

T-4. Because the TAG has not been involved with the modeling, we have a number of questions and concerns about the modeling development. Due to the lack of TAG participation we do not have confidence in the model. To illustrate this point, we provide three examples. These are only a few observations of those that cause members to be skeptical of the end product.

a. Based on Table 1 of Appendix A, land use data used in the modeling does not represent accurate watershed conditions. The model inputs assume that nearly 70% of the watershed is either low-density residential, forest or agricultural land. Under this false assumption, the model inputs suggest that 50% of the land area is impervious; 16% impervious from low density

residential and 37% forest and agriculture, respectively. Additionally, the use of literature values for phosphorus and nitrogen is inappropriate since Ohio EPA collected soil samples and determined much higher phosphorus concentrations in the soils. These land use and soil values are totally inappropriate for the Mill Creek watershed and raise serious concerns about any and all modeling results. The TAG recommends that Ohio EPA calibrate the model inputs using more appropriate values and eliminate all implementation requirements, including the more restrictive permit limits on the two point sources. The action plan will be developed with all of the key stakeholders and more informed decisions could be made as to whether any additional point source restrictions are needed.

Response: The land use data used in the modeling for Mill Creek was the most complete data set available. While it is recognized that the upper watershed of Mill Creek in Butler County is developing rapidly, land use data alone is insufficient for water quality modeling. A GIS database is needed to provide several different layers of information. Land use percentages are only a part of the model. If more recent land use data is available, it must have several different layers of information associated with it to be useful for modeling purposes. The data set used for Mill Creek modeling spanned from 1989 through 1994. None of the members of the TAG were able to provide Ohio EPA with a more recent GIS.

Land uses in Mill Creek watershed, 1989-1994 (MRLC data).

Land Use Code	Land Use	GWLF Land use group	Acres	% of Total
41	Deciduous Forest	FOREST	21858.5	20.79%
81	Pasture/Hay	PASTURE	6311.4	6.0%
21	Low Intensity Residential	LDRES	33912.3	32.26%
82	Row Crops	ROWCR	9850.1	9.37%
23	Commercial/Industrial/Transportation	COMM	18477.1	17.58%
85	Urban/Recreational Grasses	GRASS	5656.3	5.38%
91	Woody Wetlands	WETLAND	18.2	0.017%
22	High Intensity Residential	HDRES	7592.6	7.22%
42	Evergreen Forest	FOREST	653.7	0.62%
11	Open Water	WETLAND	554.2	0.53%
43	Mixed Forest	FOREST	179.1	0.17%
92	Emergent Herbaceous Wetlands	FOREST	57.3	0.05%
Total			105120.8	100.00%

The actual calculation of pervious area and impervious areas are as follow:

Pervious area:

20.79 + 6.0 + 0.75(32.26) + 9.37 + 0.15(17.58) + 5.38 + 0.017 + 0.2(7.22) + 0.62 + 0.53 + 0.17 + 0.05 ~~ 71.2 percent

Impervious area:

0.25(32.26) + 0.85(17.58) + 0.8(7.22) ~~ 28.8 percent or 100 - 71.2 = 28.8

The land use data for the Mill Creek watershed are generated from satellite imagery data. The imagery was taken between 1989 ~ 1994. The model is calibrated to 1992 conditions and allowances are made in the TMDL for changes since that time(uncertainty). It is unrealistic to

propose that a point source that contributes an overwhelming amount of flow to the system not be regulated.

Land use data is needed with some associated soil data. The data used in the model is an integrated GIS package with multiple data layers. Land use percent must be in a GIS format to be useful. Simple percentages are not adequate without location. Ohio EPA needs to know what changes in land use have occurred, exactly where it has changed, and the associated soil data.

Ohio EPA collected four sediment samples from the Mill Creek watershed, not soil samples. These samples were taken from a few selected sites, however does not represent the phosphorus for the whole watershed. The sediment samples collected in 1997 documented a higher concentration of phosphorus than the literature values and have been incorporated in the project. The sediment samples did not have nitrate-nitrite results, so the literature values will remain in the model for nitrogen.

b. Based on Tables 11 and 12, how can the loadings from point sources be so consistent throughout the length of the stream when Ohio EPA is only focussing on restricting the Upper Mill Creek WRF and Glendale WWTP that are located in HUC1 and HUC2. How do the remaining NPDES point source dischargers not identified in the modeling results factor into the loading amounts? How does the model account for CSO and SSO inputs?
Response: The only point sources that are discharging nutrients are Butler County Upper Mill Creek Water Reclamation Facility and Glendale WWTP. These loads flow through the downstream HUCs.

The available low flow summer data were used for model calibration. These data do not reflect CSO and SSO events. CSO and SSO loads are not considered part of the long term loading especially during low-flow periods; therefore the target criteria can't be applied to it. They are calculated separately.

i. Similarly, how is it that nonpoint sources can account for one-third of the loadings in HUC1 and nearly two times that of the point sources in HUC5 but are not recommended for specific reduction requirements or at the very least source identification?

Response: Results in HUC5 includes all upstream HUCs, or for example results in HUC2 includes HUC1. Loading in HUC5 includes loading from HUC1 through HUC5, there is an accumulating effect, and that is the reason for having an increase in NPS and Ground water loading. The point source loads in HUC1 are diluted by loads from other sources in later HUCs.

c. Inter-basin transfer from water supplies, which contribute significantly to the low flow condition, does not appear to be factored into the model.
Response: Unfortunately the model does not allow for consideration of any inter-basin water supply transfer.

T-5. The draft Mill Creek TMDL contains numerous mathematical errors that bring into question the technical accuracy of the entire document and its proposed approaches. Based on the model results and Appendix A, the input values are skewed and inappropriate and do not reflect actual watershed characteristics. The model output is based on indefensible nonpoint source data and weak characterization of nonpoint sources.

Response: The last minute editing of the report and final adjustments with the model resulted in some mixed values. We regret the errors. Without more detailed information in the comment, we can not respond to the second part regarding non point source.

T-10. There are no recommendations for septage and construction activities. There are really no recommendations for how to reduce nonpoint source loadings and to what levels these should be reduced.
Response: The Ohio EPA does require the submittal of Notices of Intents (NOIs) for construction activities five acres or over under Phase I of the NPDES storm water program. This requires the contractors to develop and implement Storm Water Pollution Prevention Plans (SWP3) to reduce or eliminate the amount of sediment being eroded from construction sites. In addition, Phase II of the storm water rules require the submittal of NOIs for sites from five to one acre in size. This will provide some reductions in the amount of sediment reaching the Mill Creek. The reduction in sediment loading should result in an incremental decrease in the amount of nutrients.

The local health districts in Butler and Hamilton Counties have authority over the residential sewage systems. Hamilton County Health District, which regulates the county that contains the most of onsite systems in the Mill Creek watershed, conducts routine inspections of the facilities under its jurisdiction. Both Butler and Hamilton County health districts require home owners to repair failing onsite systems. Septic tanks from the area can be placed on regular pumping schedules. This would need to be done through the local health districts. The septage collected from these systems can be disposed of at either the MSD of Greater Cincinnati Mill Creek Wastewater Treatment Plant or the Butler County LeSourdsville Wastewater Treatment Plant. This would prevent it from being disposed of through land application.

T-11. The nutrients target values used in the TMDL calculation were based on long-term exposure. They do not apply to CSO and SSO nutrient loadings, which are short-term events. Therefore, we are not sure what effects, if any, these CSO and SSO events would have on the nutrient loading modeling results. Also, the load calculations for CSO's and SSO's are calculated separately in the Appendix. We question the validity of values used to calculate the mass loadings for nutrients.
Response: We agree that CSO and SSO events introduce uncertainty to the system. The model focuses on low-flow conditions with the assumption that CSOs are not impacting the system because they are not continually discharging.. The uncertainty introduced by the assumption is taken into account in the discussion of needed loadings. However, based on the negotiations between MSD, Ohio EPA and USEPA, it is assumed that CSOs will continue to be eliminated, and that future monitoring will reflect the impact of these higher flow load reduction. The available low flow summer data were used for model calibration. These data do not reflect CSO and SSO events, which occur, for the majority of events, during wet weather.

T-12. There is a lack of reference to microbial standards, even though microbial impairments occur watershed-wide and affect attainment of recreational designated uses.
Response: The lack of reference to Water Quality Standards bacterial criteria was an oversight. This will be included in the revision of the report.

T-13. The accuracy and quality of maps and figures are poor in the draft TMDL report. For example, Amberley Creek, a major tributary to Mill Creek does not appear on any map in the report. Also, Ross Run, which has been piped underground, appears on maps but Lick Run and Clearwater Creek do not. For consistency, the TMDL TAG requests that all of the tributaries be

included on all maps and figures. (Note: There are specific recommendations addressing this issue in the next section.)
Response: Some of the maps included in the report were provided by stakeholders, but were not available in an electronic format. These had to be scanned into electronic format to be included in the report and the quality suffered. If electronic formats had been available for the maps, the quality would have been improved.

Portions of Ross Run are not piped underground and were sampled during Ohio EPA's survey of Mill Creek in 1992. We were unfamiliar with Clearwater Creek and Lick Run. The intention was not to include waterways that no longer function as streams.

T-14. The document does not include a discussion concerning Mill Creek Restoration Project (MCRP) initiatives. Add the following narrative to Section 6:

Mill Creek Restoration Project (MCRP) Initiatives
MCRP is a major cosponsor of five pilot greenway projects (four inner-city sites along Mill Creek and its Dan's Creek tributary, and one suburban project along West Fork Mill Creek). MCRP is working collaboratively with the City of Cincinnati, Ohio EPA, Village of Woodlawn, and scores of other public-private partners. These projects are being designed to accomplish the following goals: 1) Improvement of riverine-riparian ecosystem health and water quality; 2) Prevention and reduction of nonpoint source pollution: 3) Restoration and enhancement of aquatic and terrestrial habitat; and4) Mitigation of physical impacts from storm water runoff. The sites include: Caldwell-Seymour Parks Greenway, Queen City Centre-Salway Park Greenway, North Fairmount Research and Training Park Greenway, South Mill Creek Greenway, and West Fork Mill Creek Greenway.
Response: A description of the Greenway Master Project is included on page 54 of the report. The language proposed by the Mill Creek Watershed Council TAG will be used to supplement the description in the draft report.

Specific Comments:
S-1. Entire document. Check pagination.

S-2. Entire document. Perform a spell check and grammar check to eliminate some of the existing errors.

S-3. Entire document. Delete the word "County" from "Butler County Soil and Water Conservation District."

S-4. Entire document. The correct name is Hamilton County General Health District. Various wording is found throughout the document.

S-5. Entire document. The correct name is Metropolitan Sewer District of Greater Cincinnati.

S-6. Entire document. Correct references to the "303(d) list" to be consistent.

S-7. Cover sheet. Correct spelling to Ohio-Kentucky-Indiana Regional Council of Governments.
Response to S-1 through S-7: Completed

S-8. Page ii, List of Tables and Figures. "Mill Creek Flood Protection Project" should read "Mill Creek Flood Damage Reduction Project" for Figure 1 and Table 1.
Response: The Mill Creek Conservancy District had provided the figure and table with this title. They have agreed with the name change, therefore it will be incorporated into the report. In a later revision, this table and figure were moved to the appendix.

S-9. Page 1, Executive Summary. There is no mention of point source limitations (new permit limits.) There is also no mention of the split between point sources and nonpoint sources for the TMDL.
Response: The point source limitations information is provided in Section 6.1 of the draft TMDL report (Reasonable Assurances). This section includes a proposed Schedule of Compliance related to nutrient removal for Glendale WWTP and an existing Schedule of Compliance for Butler County Upper Mill Creek WWTP to be enforced through the facilities' NPDES Permits. Modifications will be made to the Executive Summary to bring clarification regarding these issues.

S-10. Page 1, paragraph 2, sentence 5, Executive Summary. Change "were" to "are."

S-11. Page 1, paragraph 4, sentence 2, Executive Summary. This sentence, discussing bacteria, appears to be unrelated to the first sentence in the paragraph.

S-12. Page 2, paragraph 2, sentence 4, Executive Summary. Amend sentence to read "systems are located in Hamilton County to serve residences."

S-13. Page 2, paragraph 2, sentence 5, Executive Summary. Add a comma after "operations".

S-14. Page 2, paragraph 2, sentence 12, Executive Summary. Change "flood control" to "flood damage reduction."

S-15. Page 2, paragraph 3, sentence 2, Executive Summary. Change "1990s" to "1995."
Response to S-10 through S-15: Completed

S-16. Page 2, paragraph 3, sentence 3, Executive Summary. Delete "Rivers Unlimited" in front of "Mill Creek Restoration Project."
Response: The present legal name of the organization is "Rivers Unlimited-Mill Creek Restoration Project". After discussion with the Executive Director and staff of MCRP, it was learned that the organization intends to legally change the name to "Mill Creek Restoration Project". Ohio EPA will change the name in the report.

S-17. Page 2, paragraph 5 (bullet 1), Executive Summary. Add: "The NPDES Phase II program will also regulate development/construction sites greater than one acre and the program is expected to apply to 32 political jurisdictions in the watershed that are located in a Bureau of Census-designated "urbanized area" and owning or operating a small municipal separate storm sewer system. Additionally, Ohio EPA will continue to regulate Phase I industrial/commercial storm water dischargers in the watershed." The TAG believes that a TMDL implementation strategy must include all of the entities regulated under Phase I and Phase II NPDES programs (in addition to non-regulated and nonpoint sources.)
Response: This recommendation will be included in the report.

S-18. Page 3, bullet 1, Executive Summary. Capitalize "education."

Response: Completed.

S-19. Page 3, recommendation 10, Executive Summary. Change sentence to read: "Encourage both Butler and Hamilton Counties and local jurisdictions to develop more comprehensive and progressive development, flood plain and storm water plans and ordinances.
Response: This recommendation will be included in the report.

S-20. Page 3, recommendation 11, Executive Summary. Delete the second "l" from "Lloan."
Response: Completed.

S-21. Page 4, recommendation 13, Executive Summary. Move the discussion of SSO 700 (everything after the first sentence) to the body of the report. (Section 4.5 is suggested.) Too much discussion is provided here.
Response: Completed.

S-22. Page 4, recommendation 14, Executive Summary. State who should be responsible for implementing this recommendation.
Response: Ohio EPA has an Memorandum of Understanding (MOU) with Hamilton SWCD to enforce Phase I of the NPDES Storm water program. Ohio EPA will discuss this responsibility with the SWCD.

S-23. Page 4, Executive Summary. Add recommendation 17. "Increase surveillance and step up enforcement of existing regulations to reduce filling, illegal dumping, tree removal, NPDES violations, and streambank modifications.
Response: Ohio EPA has authority over only the NPDES compliance and enforcement recommended in this comment. The other activities fall under the jurisdiction of U.S. Army Corps of Engineers, ODNR, local health departments and districts, and local ordinances. Ohio EPA will add some of this language into the report.

S-24. Page vii (Page 5?), Table 1, Executive Summary. Add "watershed groups" to the list of local organizations Ohio EPA will work with in the Implementation Plan.
Response: This recommendation will be included.

S-25. Page 2, section 2.1, paragraph 1. Add: Beaver Run, Town Run, Amberley Creek, Congress Run, Ross Run, Bloody Run, Dan's Creek, Lick Run, Winton Ridge Tributary, and Clearwater Creek as recognized tributaries to the Mill Creek.
Response: The tributaries that are not enclosed in culverts will be mentioned in the report. "Dan's Creek" will be referred to as the "Seymour Nature Reserve Tributary".

S-26. Page 2, section 2.1, paragraph 3, sentence 5. Delete "that gave it the name that is still used today" as this statement is untrue.
Response: This will be deleted.

S-27. Page 3, section 2.1, paragraph 3, sentence 1. Replace "in" with "near" as Winton Lake does not lie within the corporate limits of Greenhills.

S-28. Page 3, section 2.1, paragraph 4, sentence 1. Replace "Center" with "Centre."

S-29. Page 6, section 2.1, paragraph 1, sentence 1. Add "and the Ohio-Kentucky-Indiana Regional Council of Governments" to the end of the sentence.

Response for S-27 through S-29: Completed.

S-30. Page 6, section 2.1, paragraph 2. Use information from and reference the more current Army Corps Mill Creek Surveillance Report (2000) that includes a complete listing of hazardous, toxic, radioactive waste (HTRW) sites. Members of the TAG team provided this document to Ohio EPA.
Response: The U.S. Army Corps of Engineers has not approved this report for release, but has assured Ohio EPA that it will be provided once it has been released. Bruce Koehler of OKI provided the cover page from a draft report to Ohio EPA, but no draft report has been given to Ohio EPA by the TAG or U.S. Army Corps of Engineers.

S-31. Page 7, section 2.2, paragraph 3. Should Table 3 be Table 4?
Response: Yes, the change will be made.

S-32. Page 8, section 2.2, paragraph 2, sentence 1. Add "refer to Table 3" to the end of the sentence.
Response: Reference to Table 3 will be made.

S-33. Page 8, section 2.2.1. Incorporate a statement recognizing that the QHEI completed by the Ohio EPA in 1992 on the lower eight miles was completed during a period of time when the Army Corps local sponsor used broadcast spraying of herbicides inside the channel and on the streambanks to control vegetation. Since this practice stopped, significant vegetation has returned within the riverine-riparian zones resulting in improved habitat. Thirty-two species of fish-eating birds have been documented in the lower eight miles due in part to the significant fish nursery in this location. Note that there is a current request for Ohio EPA to assign a "WWH" designation or, alternatively, a "Black-crowned Night Heron" designation for this section.
Response: Ohio EPA conducted QHEI evaluations in the lower three miles in 1997 as well as in 1992. The habitat scores in 1997 ranged in the thirties, which still indicated modified habitat quality. The lower eight miles of the stream have been designated as Modified Warmwater Habitat (MWH) and that use designation change was made official in the Ohio Water Quality Standards in 2001. There is no plan to change the use designation of this section from MWH.

S-34. Page 8, section 2.2.1, paragraph 1, sentence 9. Change the sentence to read "The lower two miles of the main stem are impounded by the Ohio River, but the section has extensive riparian canopy on both streambanks.
Response: Language will be added to the report as: "The lower one to two miles are impounded by the Ohio River and a small low-head dam, but the riparian canopy is intact along both streambanks in this section." The riparian is relatively narrow in this area and would not qualify as "extensive" in its functionality.

S-35. Page 8, section 2.2.1, paragraph 3, sentence 2. Change to read: " The project was funded in part by a Clean Water Act, Section 319 grant in partnership with the Mill Creek Restoration Project and by Butler County matching funds."
Response: The suggested language change will be added to the report.

S-36. Page 10, section 2.2.2.1, paragraph 2, sentence 1. Remove the first sentence, as it is not a true statement.
Response: A review of the survey data indicates this statement is true, no wide swings in dissolved oxygen were document or heavy algal growths were observed in the downstream

reach. The sentence will stay in the report unless additional data is provided to Ohio EPA contrary to the Agency's findings.

S-37. Page 11, table 3. Add a column to show applicable water quality standards.
Response: The target values for the TMDL are thoroughly discussed in Sections 3 and 4 of the report. There is no benefit to including that information in the table.

S-38. Page 11, section 2.2.2.1, paragraph 1, sentence 1. Change "east" to "East".
Response: Completed.

S-39. Page 12, section 2.2.2.2. The nutrient risk assessment section seems out of place between the Upper and Lower Mill Creek Basins discussion. Relocate this section to its proper place.
Response: The Nutrient Risk Assessment is located in this section because of the impact from the Upper Mill Creek Water Reclamation Facility on East Fork Mill Creek and the lower Mill Creek. The section will stay.

S-41. Page 13, section 2.2.2.3, paragraph 3. Replace paragraph with "During 2000, about eighty stakeholders participated in six canoe outings along various portions of the Mill Creek. They observed the Black Crown Night Heron rookery in the lower two miles, counted 32 bird species between Reading and St. Bernard, saw evidence of beavers, watched turtles and frogs, caught a variety of fish (including shiners, shad, sunfish and bass), observed children swimming in the creek, and saw residents fishing. The sunfish and bass appeared healthy with no external anomalies." Note also that when Ohio EPA completed a QHEI for this section in 1992, the Army Corps local sponsor had been using broadcast spraying of herbicides to control vegetation. This process has been discontinued and there has been significant revegetation within the riverine-riparian zones resulting in improved habitat.
Response: Some of the proposed language will be used to supplement the report. Ohio EPA also conducted QHEI scores in the lower three miles in 1997. The QHEI scores didn't show improvement in the quality of the habitat in the three miles.

S-42. Page 17, Figure 2. Change the two red colors so that there is a visual distinction between "Poor" and "Very Poor." Add Clearwater Creek, Dan's Creek, Lick Run, Winton Ridge Tributary and Congress Run.
Response: Ohio EPA will adjust the color of the streams. No additional streams will be added to the map. No biological data is available for the streams suggested for addition.

S-43. Page 18, section 2.3, paragraph 2, sentence 5. The term "causes" is not used in Table 1. Is this a deviation?

Response: Table 1 refers to causes as "current deviation from target". Clarification in the text on this page will be made.

S-44. Page 23, Figure 3. Where is Figure 3 referenced? If it is not to be referenced, consider deleting it from the report. Note also that there are several problems with the Figure as presented. A sampling of these problems includes:

a. Swan Lake no longer exists (there is a subdivision built on top of it).
Response: This has been corrected.

b. The locations of Glendale's WWTP and WTP are not correct.
Response: The location of Glendale's WWTP is correct. The Glendale WTP has been moved to the opposite side of the schematic.

c. Amberley Creek should appear on the right-hand side of the schematic south of the West Fork Mill Creek. It does not appear anywhere on the schematic.
Response: This has been corrected with information from the Greenways Master Plan.

d. Lick Run, Dan's Creek and Clearwater Creek are missing from the schematic.
Response: Since it appears both Lick Run and Clearwater Creek are culverted, these will not be added to the schematic. Since "Dan's Creek" is an unnamed tributary, will be added as the "Seymour Nature Reserve tributary".

S-45. Page 28. The Figure number and name (found on the next page) should appear with the figure. The Figure is also not referenced in the text. The Figure is also difficult to read.
Response: During conversion to a PDF file, the figure name and number were bumped to the next page. We will try to address this. A reference to the figure will be made in the text in the discussion of CSOs. The map was provided by a TAG member and was not available in an electronic format. The map had to be scanned into the computer to be included in this report, which caused the loss of quality. If the map was available electronically, the quality would be better.

S-46. Page 29, section 2.3.1. Where is a table containing Butler County residential sewage systems? This information was provided on maps to Ohio EPA during development of the TMDL.
Response: No table was provided to Ohio EPA by Butler County. The total of residential sewage systems in the upper Mill Creek watershed is included in the text of the report.

S-47. Page 29. The TAG is not familiar with the Pleasant Run sub-watershed identified in the Table 6 - where is it located? A figure showing the sub-watershed delineations identified in Table 6 should be added.
Response: These sub-watersheds refer to the various sewer sheds discharging to the MSD of Greater Cincinnati Mill Creek Wastewater Treatment Plant. This will be clarified in the table.

S-48. Page 29, sections 2.3.2. Why is the U.S. Army Corps of Engineers listed as a nonpoint source?
Response: Stream habitat modification is categorized as Non Point Source Pollution. The flood reduction project for Mill Creek may require habitat modification and supplemental structures to some of the tributaries of Mill Creek which is why this project is listed as Non Point Source.

S-49. Page 30, sections 2.3.2. Why are Butler County residential systems identified as nonpoint sources and Hamilton County systems identified as point sources in the previous section?
Response: Residential systems can be either a point source or non-point source. Most of the systems from Butler County are leach fields and mound systems. These do not have a discharge. Any pollution associated with these system would be associated with runoff from failing systems, i.e., non-point source. Many of the systems in Hamilton County are home aeration systems. These systems have a pipes with discharges. These would be considered as point sources.

S-50. Page 30, section 2.3.2, paragraph 1. Add to the end of the paragraph: "The Army Corps has not yet fully evaluated environmentally beneficial nonstructural solutions and watershed approaches. The deep-tunnel is a long-term solution to the problems of flooding and sewage in the Mill Creek. In addition, short-term solutions are also needed and should be developed and integrated into the Mill Creek TMDL implementation strategies."
Response: Ohio EPA has not received information from U.S. Army Corps of Engineers regarding this. Before this language is added to the report, it will be confirmed with the Corps.

S-51. Page 30, section 2.3.2, paragraph 3, sentence 2. Insert after the second sentence: "There is a small horse farm located along the West Fork Creek within the Mt. Airy upstream portion of the tributary."
Response: This information will be added to the report.

S-52. Page 31, section 2.3.2, paragraph 1, sentence 3. Ohio EPA is supposed to receive NOIs. Should this not be required to receive and should an indication of enforcing this regulation appear here. Ohio EPA has authority over this program and can give assurances it is being met, but later in the report, Ohio EPA indicates they only have authority over point sources.
Response: Ohio EPA receives a large number of NOIs for construction under the NPDES storm water program. When the program first began in 1992, not all construction sites complied with submittal of NOIs for construction. Compliance with submittal of the NOIs is now significantly higher and when sites are discovered that have not submitted NOIs, the regulations are enforced. Ohio EPA has a memorandum of understanding with the Hamilton SWCD to verify implementation of the SWP3s.

S-53. Page 32, section 3. Habitat degradation is not really addressed adequately in this section of the problem statement.
Response: Since TMDLs develop loads for pollutants and not pollution, the problem statement focuses on the pollutants of phosphorus and nitrate-nitrite. Habitat degradation is not responsible for nutrient enrichment. Habitat is most definitely an issue of degradation in the Mill Creek watershed, which is why it is mentioned, but it is not modeled in this report.

S-54. Page 32, section 3.1, Table 8. Is a table necessary for one line of data?
Response: Yes, it indicates the importance of the information.

S-55. Page 33, Table 9. The data in the table should be listed chronologically so that any changes in levels over time could be observed.
Response: This recommendation has been completed.

S-56. Page 35, Figure 6. The figure is hard to read.
Response: This figure was downloaded from a Geographic Information System. It may not be possible to modify, but Ohio EPA will evaluate the possibility.

S-57. Page 40, Table 11. The actual reduction in HUC 1 is 88% because no effort is being proposed to reduce levels in groundwater. Groundwater should be considered as base and not used in calculating percent reductions required.
Response: The calculations can be done this way and reduction will be 89% (not 88%). This still doesn't affect the capacity.

S-58. Page 40, Table 11. The HUC1 total should be 90,327. The HUC5 total should be 161,049.
Response: We agree with the comment and report has been corrected.

S-59. Page 40, section 4.4.1.1, paragraph 2, sentence 1. The "total loading capacity" is not defined on page 39.
Response: "Loading Capacity" is the greatest loading of a pollutant that a water body can receive without violating water quality standards under specific flow conditions; Also referred to as assimilative capacity. Reference: OAC rule # 3745-2-02(39).

S-60. Page 41, section 4.4.1.1, paragraph 1, line 4. It will not be possible to meet the nitrate target. If it is impossible to meet these limits, what are we going to do? The report on all these sections does not address this very well. This same comment applies to the sections on the other HUCs.
Response: We agree that meeting the nitrate target will be difficult. However, given the uncertainty associated with the data and the flexibility inherent in the target itself, the TMDL recommends a strategy that should bring the water into attainment.

S-61. Pages 41 through 46. Check the math in all the calculation presented. There are numerous inaccuracies.
Response: We agree with the comment and report has been corrected.

S-62. Page 41, Figure 7 doesn't clearly show the Nitrate-Nitrite Load Reduction.
Response: We believe the decrease in load is clearly shown by the negative slope of the line.

S-63. Page 41, section 4.4.1.1, paragraph 1. "Estimated loading capacity" is not defined.
Response: "Loading Capacity" is the greatest loading of a pollutant that a water body can receive without violating water quality standards under specific flow conditions; Also referred to as assimilative capacity. Reference: OAC rule # 3745-2-02(39).

S-64. Page 42, section 4.4.1.2, paragraph 1, sentence 2. Should Table 11 be Table 12?
Response: Yes It should be Table 12 (not 11).

S-65. Page 42, section 4.4.1.2, paragraph 2. There are mathematical errors in the equations presented (e.g. 6,374 kg/yr should be 6,211 kg/yr). Recheck all math.
Response: We agree with the comment and report has been corrected.

S-66. Page 43, section 4.4.2.2, paragraph 2. The wrong number is used on the equation. The correct number should be 45,400 not 46,417 (according to the table), therefore the answer may also be incorrect. Recheck the math.
Response: We agree with the comment and report has been corrected.

S-67. Page 45, section 4.4.4.2, paragraph 2. The first number used in the equation (54,107) is not the number reported in Table 12. The result provided may not be correct.
Response: We agree with the comment and report has been corrected.

S-68. Page 46, sections 4.4.5.1 and 4.4.5.2. The recommendations contain equations in the text that are somewhat confusing. Where did these numbers come from?
Response: We agree with the comment and report has been corrected.

S-69. Page 46, section 4.4.5.2, paragraph 3. The first number in the first equation is not the same as the one presented in Table 12. The result provided may not be correct.
Response: We agree with the comment and report has been corrected.

S-70. Page 49. Correct the spelling to George Zukovs.
Response: Our apologies to Mr. Zukovs. The spelling of his name will corrected in the report.

S-71. Page 55, section 6.1, paragraph 5, sentence 1. Insert "MCRP" after "Butler County Department of Environmental Services."
Response: This will be added to the report.

Comments from Butler County Department of Environmental Services:
Butler County submits the following comments regarding the *Rough Draft Total Maximum Daily Loads for the Mill Creek in Butler and Hamilton Counties* (hereafter referred to as the Rough Draft TMDL report) dated January 29, 2001.

Based on our review of the report and participation in the process, we are compelled to express our disappointment in the Rough Draft TMDL report. The primary disappointment is that the Mill Creek TMDL establishes a command and control approach and relies on assumptions, in place of critically important, missing data. The Rough Draft TMDL report also leaps to the unsupported conclusion that the only specific method to achieve water quality standards in the Mill Creek is through even more stringent limits on the already severely limited point sources, in violation of the Federal TMDL guidance. Moreover, we are also displeased because the process missed an opportunity to provide a forum which could have culminated a number of watershed improvement efforts and other reasonable assurances that the watershed is so direly lacking. Fortunately, we do see a sensible way to resolve this problem. Our recommendations are spelled out below. We hope that the Agency will use them as I think it would provide the best solution for the watershed and the stakeholders
Response: As stated to the Mill Creek Watershed Council and the TAG from the beginning of this process, Ohio EPA has authority over the NPDES programs and can only give reasonable assurances over these programs and the administration of the 319 Grants program that certain implementation plans will occur. The TMDL report states very clearly throughout that nonpoint source pollution must be controlled if attainment of the water quality standards are to be achieved. Some of these controls are under Ohio EPA authority through the NPDES programs and some will need to be implemented by the local communities. Butler County submitted some of these implementation plans that are included in Section 6 of the report. There is no violation of the Federal TMDL guidance. The guidance clearly requires that permit limits be established for point source NPDES permit holders affecting the parameters addressed by the TMDL.

More stringent permit limits on the Upper Mill Creek WRF are not justified.
We were surprised by the last minute revisions of the TMDL that further reduced nitrate/nitrite limits from 5mg/L to 3 mg/L. The Upper Mill Creek WRF was recently upgraded and expanded at a cost of $22 Million. It was designed and constructed based on extensive modeling, surveys and discussions with Ohio EPA. For Ohio EPA to now recommend more stringent limits ignores all the joint modeling and survey efforts and negotiations undertaken by Ohio EPA and Butler County. Secondly, the stream restoration project has not been given any time to demonstrate biological improvements. Thirdly, the 5-mg/L nitrate/nitrite limit is not in effect yet and may not be needed if improved habitat achieves biological attainment. Thirdly, the modeling has many fatal flaws discussed later in this letter.

Response: At the time the current permit for the Upper Mill Creek WRF was developed, nutrient target values or criteria for phosphorus and nitrogen were not available from either Ohio EPA or USEPA. Both Agencies now have target values available for phosphorus and nitrogen. USEPA will require nutrient criteria to be established by the States in 2004. Under Part II of the NPDES permit for the Upper Mill Creek Water Reclamation Facility, Ohio EPA has the authority to modify the permit. Based on the modeling conducted for the Mill Creek TMDL using the target values recommended from Ohio EPA, the current permit limits established for the compliance schedule will not achieve attainment in East Fork Mill Creek or Mill Creek downstream from the confluence with East Fork. Although the modeling did contain some minor errors, not "fatal flaws", these did not change the outcome of the modeling. The Upper Mill Creek WRF effluent dominates the quality of the streams downstream from its discharge point. As pointed out in Section 4 of the report, both nonpoint source controls and point source controls will be required to bring the streams into attainment. The local communities and stakeholders will need to make efforts to develop nonpoint source controls beyond those under authority of Ohio EPA through the NPDES storm water program.

In short, we believe that it is necessary to eliminate the implementation plans <u>including</u> the 3 mg/L nitrate/nitrite limit on the Upper Mill Creek Water Reclamation Facility (WRF) as proposed. Deferring the permit limits allows the Mill Creek Watershed Council (MCWC) and Mill Creek Restoration Project (MCRP) to develop a Watershed Action Plan (WAP) with all stakeholders. Without the deferment of the more restrictive permit limits, Butler County would have serious reservations about agreeing to participate in a WAP. By eliminating the 3 mg/L nitrate/nitrite limit in the Rough Draft TMDL report, the Ohio EPA will enable the WAP to develop a cost effective, comprehensive watershed improvement approach. It will ultimately be up to the stakeholders to agree to participate, then implement outcomes of the WAP. We welcome dialogue with you in the coming weeks to resolve these issues and offer our assistance in good faith to develop the necessary reasonable assurances to satisfy your requirements to USEPA.

Response: It is unlikely that the permit limits will be eliminated from the implementation plans as these are required by USEPA. However, compliance schedules are negotiable. If Butler County would like to remove the implementation plans it submitted for this section that are not tied to NPDES or 319 grant requirements, Ohio EPA will oblige the County. However, we would hope that the goals of the County and the rest of the stakeholders in the watershed are the same, which is to improve water quality to achieve Water Quality Standards.

The existing Upper Mill Creek WRF NPDES permit was recently modified to include new nutrient limits. The Permit Support Document and Fact Sheet supports these new limits which were added in March 2000; nutrient limits were recently reduced and are already in effect now. More restrictive limits will be effective in 2004 as indicated in the NPDES final effluent limit table. These limits were derived by Ohio EPA and Butler County based on extensive modeling analysis, stream surveys and discussions. However Butler County accepted the NPDES permit without appeal based on Ohio EPA's agreement to evaluate the stream restoration project to determine biological improvement. Demonstration of biological improvements would further validate Butler County's contention that the stream is impaired due to habitat deficiencies, not chemical water quality. Ohio EPA specifically stated in the Upper Mill Creek WRF NPDES Permit Fact Sheet that:

In the event that evidence becomes available that demonstrates to the Director's satisfaction that biological indices applicable to the East Fork Mill Creek at river mile 0.8 and 0.3 are in full

attainment and will be able to maintain full attainment at the 16 MGD flow of the expanded facility, the Director will evaluate any proposed modification of the NPDES permit to remove the final limits for phosphorus and nitrate/nitrite.

This agreement is inconsistent with the recommendations in the Rough Draft TMDL to further reduce nutrient limits.
Response: As stated above, at the time the current permit for the Upper Mill Creek WRF was developed, nutrient target values or criteria for phosphorus and nitrogen were not available from either Ohio EPA or USEPA. Both Agencies now have target values available for phosphorus and nitrogen. Nutrient criteria will be established in the near future. Under Part II of the NPDES permit for the Upper Mill Creek Water Reclamation Facility, Ohio EPA has the authority to modify the permit. Although Butler County disagrees, Ohio EPA is confident that much of the impairment documented in East Fork Mill Creek and Mill Creek downstream from East Fork is due to the nutrient contribution from Upper Mill Creek WRF. The toxic impacts documented in 1992 downstream from the plant prior to the plant upgrade in 1994, were absent in 1997, but impairment continued to exist. The fish and macroinvertebrate species present in 1997, as well as the chemical data, pointed to nutrient impacts. Habitat plays a part in this impairment, but nutrients play a significant part due to the volume of effluent discharged from the plant. This impact will only increase as the plant flow increases to 16 million gallons per day. Butler County was told this when they proposed the habitat enhancement project for East Fork Mill Creek. Ohio EPA agrees to wait until the benefits of the enhancement project can be documented. Ohio EPA will work with Butler County to develop a compliance schedule acceptable to both the County and Ohio EPA.

The use of phosphorus and nitrogen literature values for soil is inappropriate based on the fact that in 1997 Ohio EPA sampled soil in various locations and determined much higher phosphorus concentrations in the soils. In this case, we question the validity of using literature values when actual data is readily available to Ohio EPA.
Response: Ohio EPA did not collect soil samples in 1997. In stream sediment samples were collected from selected sites in the watershed. Only phosphorus was analyzed in these samples. The data will be used in the model.

Modeling Concerns
There are substantial questions about the modeling that remain a major obstacle in the approval of this TMDL. Generally, the GWLF model is known to rank very poorly with regard to calibration. Additionally, the GWLF's time scale is continuous, meaning that it cannot incorporate combined sewer overflows (CSO) and sanitary sewer overflows (SSO) loadings. We question the use of the GWLF based on the fact that input values do not include these major sources and contributions. If these loadings are known and documented, how can Ohio EPA require specific reductions at the Upper Mill Creek WRF, but not any on CSOs, SSOs or nonpoint sources. Butler County has made tremendous improvements to reduce its SSOs by implementing an aggressive I/I reduction plan and capital improvements plan?
Response: This model was recommended by Tetra-Tech based on available data. The quality and quantity of our available data doesn't allow use a complex, detailed model. Mid-size models such as GWLF and SITEMAP are the only ones that deal with both rural and urban areas and Total Phosphorus and Nitrogen. SITEMAP requires N and P concentrations in runoff from different land uses, which is not available data for the Mill Creek watershed.

We agree that CSO and SSO events introduce uncertainty to the system. The model focuses on low-flow condition with the assumption that CSOs are not impacting the system. The uncertainty introduces by the assumption is taken into account in the discussion of needed loadings. However, it is assumed that CSOs will continue to be eliminated, and that future monitoring will reflect the impact of these higher flow load reduction. The available low flow summer data were used for model calibration. These data do not reflect CSO and SSO events.

CSO and SSO are not included in GWLF. They are calculated separately; in addition, target values don't apply to them because these types of overflows don't continuously discharge during low flow conditions. Ohio EPA recognizes and has acknowledged that Butler County has made improvements; however, additional reductions are needed as identified in the TMDL.

The GWLF is a medium detail model and is not well suited for developing TMDL implementation requirements or permit limits. This point is made in USEPA's *Compendium of Tools for Watershed Assessment and TMDL Development*, May 1997. Therefore, we agree with this USEPA guidance and contend that no permit limits should result from the use of the GWLF without better evaluation of all loadings and sources and elimination of the faulty input values. *Response: Compendium of Tools....., Section 4-3, Table 20 talks about this point; however, permit limit are not derived from use of GWLF alone. The rough draft TMDL report included limits of 1 mg/l for phosphorus, and 3 mg/l for nitrogen, and considered many other factors such as being the most dominant source of nutrients and the feasibility of achieving these limits.*

Because Ohio EPA's application of GWLF for the Mill Creek is based primarily on literature values and, faulty land use data, the model results are arbitrary and capricious. Specifically, the model inputs assume that nearly 70% of the watershed is either low-density residential, forest or agricultural land. Therefore, under this false assumption, the model suggests that 50% of the land area is impervious; 16% impervious from low-density residential and 37% forest and agriculture, respectively. While it assumes that the watershed is only 30% urban/suburban, it is likely closer to being 70% urban/suburban. Even if the data is nearly ten years old, it still does not reflect existing conditions at that time. More reliable data is readily available from planning and zoning departments. I would think the MCWC can help track down more realistic data in a timely manner and would be happy to assist in this regard. Using the current inputs is totally inappropriate for the Mill Creek watershed and raises serious concerns about any and all modeling results.

Based on the model's bad assumptions the modeling results over-emphasize point source loadings and recommends point source reductions prior to making any nonpoint source reductions. The whole point of the TMDL development process is to address nonpoint sources first, before additional restrictions are placed on point sources. Clearly, the current Mill Creek TMDL does not take this approach. The whole concept of nonpoint source characterization and loading evaluations was missing from this process.

Response: The percent land use in various categories will be re-assessed before a final report is prepared. However, it cannot be ignored that the Butler County Upper Mill Creek WRF dominates the flow in East Fork Mill Creek and in Mill Creek for several miles downstream from the confluence of East Fork and the mainstem. Modeling of the data highlights this fact. Habitat modification (which is a NPS issue) and NPS loading control as well as PS loading control has been addressed in every HUC.

Based on Tables 11 and 12, how can the loadings from point sources be so consistent throughout the length of the stream when Ohio EPA is only focussing on restricting the Upper Mill Creek WRF and Glendale WWTP that are located in HUC1 and HUC2. How do the remaining NPDES point source dischargers not identified in the modeling results, factor into the loading amounts? How does the model or restoration plan account for CSO and SSO inputs?
Response: The only point sources are discharging nutrients are Butler County Upper Mill Creek WRF and Glendale WWTP. CSO and SSO loads are not considered as long term loading systems, especially during summer time; therefore the target criteria can't be applied to it. There are calculated separately.

a) Similarly, how is it that nonpoint sources can account for one-third of the loadings in HUC1 and nearly two times that of the point sources in HUC5 but are not recommended for specific reduction requirements or at the very least source identification?

Response: Results in HUC5 includes all upstream HUCs, or for example results in HUC2 includes HUC1. Loading in HUC5 includes loading from HUC1 through HUC5, there is an accumulating effect, and that is the reason for having an increase in NPS and Ground water loading. The point source loads in HUC1 are diluted by loads from other sources in downstream HUCs.

The nutrients target values used in the TMDL calculation were based on long-term exposure. They do not apply to CSO and SSO nutrient loadings nutrient loadings, which are short term events. Therefore, Butler County questions what effects, if any, these CSO and SSO events would have on the nutrient loading modeling results.
Response: The available low flow summer data were used for model calibration. These data do not reflect CSO and SSO events.

- Butler County recommends that Ohio EPA modify the model inputs using representative and readily available land use and CSO/SSO data, re-calibrate the model inputs, allow more flexibility of the nutrient target values and eliminate all implementation requirements, including the more restrictive permit limits on the two point sources before submittal to USEPA. Based on the level of changes, the report should be reissued for public noticed. Alternatively, if Ohio EPA does not reissue the public notice, then the Mill Creek TAG should at the very least get a chance to review another draft final document with at least two weeks to comment before it is finalized for USEPA submittal.

Response: The land use data needed for this model was taken from a GIS data set and required associated soil data. Geographic Information System data is a data package and contains several layers of associated data. Changing the land use without having the complete data package is not useful. Associated data must be available and presented in GIS format. The data set used from the Mill Creek GIS spanned 1989 through 1994. More recent information was not presented from the stakeholder workgroup when Ohio EPA asked.

Implementation Plan - Watershed Action Plan
If implementation plans go foreword as proposed in the Rough Draft TMDL report, particularly relating to the additional nitrogen reduction at the Upper Mill Creek WRF, limited resources will wasted and will not result in any meaningful water quality improvements. The reduction strategies are not based on sound. Rather, they were developed under severe time restrictions and without proper merit given to realistic and practical restoration strategies. Prior to submittal to USEPA, the TMDL report should be modified to eliminate all references to more stringent NPDES permit restrictions and implementation plans. The removal of such restrictions is

justified based on the fact that they are arbitrary and capricious as discussed above. These restrictions were developed without a fair and just evaluation of nonpoint source loadings and with no evaluation of alternative strategies. Evaluation of nonpoint source reduction strategies would likely prove to be more effective than more restrictions on the Upper Mill Creek WRF.

While the implementation plan is a critical component to the TMDL process, it should be a separate piece developed after approval and acceptance of the TMDL. Butler County and the Mill Creek Technical Advisory Group (TAG) fully supports eliminating the point source-targeted implementation requirements from the TMDL report. Specifically, the 3 mg/L nitrate/nitrite restriction should be eliminated.

In order to develop an implementation plan and reasonable assurances, Butler County supports a joint effort by the Mill Creek Watershed Council and the Mill Creek Restoration Project to facilitate, construct and implement a Watershed Action Plan (WAP). The WAP will identify implementation plans and outreach strategies, working with all the stakeholders to implement the required actions to achieve water quality standards. This approach is much more sound and will be far more effective than that proposed by Ohio EPA.

Support for Watershed Action Plan Approach
As stated previously, Butler County is supportive of an alternative approach to the Mill Creek TMDL that eliminates the implementation plan, including the 3 mg/L nitrate/nitrite permit limit, from the TMDL report. If this is done there are a number of issues that would be resolved with the development of a WAP. However, if Ohio EPA moves forward without eliminating all implementation aspects of the Rough Draft TMDL report, Butler County is still concerned with the various points as, summarized below.
Response: Ohio EPA staff attended a Watershed Action Plan (WAP) meeting in June 2000, but received no communication since that time regarding the matter. After looking into this option, it was found that nothing has occurred since the initial meeting. One of the requirements of the 319 grant funding recently provided to the Mill Creek Watershed Council through ODNR for the executive director position for Mill Creek, is that a WAP will be developed within two years of the funding being provided. Ohio EPA is interested in pursuing the development of a WAP with the stakeholders and is looking forward to receiving progress reports related to the WAP from the Watershed Council. It is unlikely that Ohio EPA will relinquish its authority under the NPDES program to allow permit limits to be developed by the local stakeholders. This actually would not be legal. Compliance schedules, additional implementation plans and restoration scenarios are all issues that can be addressed during development of a WAP.

In December 2000, due to the fact that implementation and restoration strategies had not yet been discussed with the Mill Creek TAG, the TAG and Butler County requested that Ohio EPA provide additional time for completing the Mill Creek TMDL. The request for additional time was denied by Ohio EPA, citing a US EPA-imposed deadline. The lack of time and TAG inclusion in developing the TMDL implementation and restoration strategies seriously affects the outcome of Mill Creek TMDL.
Response: *At a December 2000 Mill Creek Watershed Council meeting, Butler County asked about submitting a request for an extension of the Mill Creek TMDL report submission to USEPA. The only request Ohio EPA received for extension of the TMDL deadline, was received from MaryLynn Lodor of Butler County, Department of Environmental Services.*

Ohio EPA requested implementation plans and BMPs for inclusion in the TMDL report. The items that were received by Ohio EPA were included in the report. Only a letter from Butler County was received requesting an extension. No letter was received from the Mill Creek Watershed Council TAG requesting an extension.

Ohio EPA agrees that additional restoration scenarios and implementation plans are needed to bring Mill Creek and its tributaries into attainment. Those items already submitted by the TAG workgroup and programs over which Ohio EPA has authority were included in the present draft report for the implementation plans. Ohio EPA is open to additional recommendations as long as there are some assurances that they will be implemented.

The magnitude of the changes between the January 12, 2001, "Rough Draft" and the January 29, 2001 were significant and not anticipated by Butler County or the TAG. While we were anticipating some minor formatting changes, we certainly were not anticipating substantial permit limit reductions.
Response: The changes in the report the TAG received on January 16, 2001 and that released on February 1 contained changes recommended by individual TAG members and permit limits for two point source discharges. Additional data and maps were provided by TAG members and included in the later draft of the report. While the nitrite- nitrate permit limit was lowered from 5 mg/l to 3 mg/l the earlier draft, the phosphorus limit was increased from 0.8mg/l to 1.0 mg/l, as requested by Butler County who submitted comments to Ohio EPA on January 25, 2001.

Ohio EPA has outlined its plans to conduct a "phased approach" to the Mill Creek TMDL. How many phases will there be and what is the timeline for these future phases of the Mill Creek TMDL that will address other serious impairments and pollutants of concern?
Response: Ohio EPA envisions the need for only one additional phase for Mill Creek. Due to the complexity of the remaining pollutant issues, this phase will be much more complex and detailed. Doing the second phase of the TMDL work in the Mill Creek watershed would be at least 3 or more years in the future. The Ohio EPA cannot provide any commitment on an exact timeline to do the next phase in Mill Creek because our budget and resources are set on a 2 year cycle.

How can Ohio EPA justify this TMDL that identifies SSO No. 700 as contributing up to 70% of the nutrients in HUC3 but places all the restrictions on the Upper Mill Creek WRF with more stringent nitrate/nitrite limits of 3 mg/L? Butler County supports the use of the WAP to generate a strategy that integrates all point and nonpoint source components.
Response: SSOs are by definition, illegal discharges to Waters of the United States and thus, cannot be assigned a target concentration value as they must instead be eliminated. As indicated in the draft report on Page 3, Item 5, Ohio EPA and the USEPA are engaged in settlement discussions with MSD as part of a joint consent order presently being negotiated. The purpose of this settlement agreement is to establish a comprehensive plan for elimination of known SSOs through a program involving study of its entire collection system along with defined programs for monitoring, operation and maintenance, reporting obligations, as well as penalties for missed deadlines and continued overflows. Target dates for elimination of highly active SSOs are still being negotiated through this enforcement mechanism and as such, are not appropriate to include in this report.

The inclusion of the Butler County's name on the report cover and in Section 5: Public Participation creates the perception that the final draft report reflects the consensus and substantial participation. In fact, Butler County never had the opportunity to review the modeling

results nor were they involved in the development of the proposed implementation. The implementation strategy, as presented came as a complete surprise to Butler County and the reasonable assurances as presented were never discussed with us.
Response: Ohio EPA would not want any organization to have their name included in this report, if they did not want it. It would be unfortunate if Butler County would request their name be removed from the report. Ohio EPA appreciates the amount of time the County allowed from both the Health Department and Department of Environmental Services for input into the process. Butler County wrote and submitted several sections of the TMDL report. Some of these submissions are in Section 6 of the implementation plan and other submissions are scattered throughout the report. Butler County was given two weeks prior to the public notice period to review the modeling. It was during these two weeks that Butler County requested an increase in the draft phosphorus permit limit of the report. To state that Butler County had no input into the implementation plan or had no opportunity to review the modeling results is inaccurate.

Ohio EPA stated that the TMDL objectives are to address watershed-wide pollutants first. Sediments and bacteria are both serious problems throughout the Mill Creek watershed and impact habitat and recreation - and ultimately aquatic attainment. Sediments represent a significant problem for the Upper Mill Creek as Butler County documented through the stream evaluation and design of the stream restoration projects.
Response: Bacteria had been planned to be addressed as it was found to be among the causes of impairment common throughout the watershed. Prior to completing modeling for this parameter, during a meeting between Ohio EPA and the Mill Creek TMDL Technical Advisory Group, it was pointed out by a stakeholder that bacteria was not included on the 303(d) list for the Mill Creek watershed. Ohio EPA consulted with USEPA Region V to determine whether information regarding this parameter could be included in this first phase of the TMDL. It was explained that any information relative to bacteria would only be considered by USEPA as "informational" and thus, not enforceable for any suggested improvements. The decision was then made by Ohio EPA to revise the next 303(d) list to include bacteria as a cause of impairment within the watershed and that this parameter would be a focus in the next phase of the TMDL. Sedimentation was discussed in the initial TAG workgroup meetings. It was recommended by one of the TAG member's consultant that sediments not be addressed in this TMDL due to the complexity of the issue. No workgroup members disagreed with this recommendation, therefore Ohio EPA did not include sedimentation in this phase of the Mill Creek TMDL.

The draft Mill Creek TMDL does not incorporate important technical data and/or documents readily available to Ohio EPA. For example, the results of the qualitative habitat index (QHEI) surveys conducted in Butler County with Ohio EPA in 1998 are not provided in the current draft. While these were a modified QHEI format, the results still capture the stream's habitat deficiencies and are certainly relevant to the TMDL.
Response: *The habitat scores referenced in this comment were not Qualitative Habitat Evaluation Index (QHEI) scores and therefore were not included in the report. The scores measured in 1998 were taken for a specific purpose and the procedure for taking these measurements modified the established protocol of the QHEI evaluation. Three Ohio EPA staff members met with Woolpert and Butler County DES in 1998 to discuss the concept of Butler County's habitat enhancement project for East Fork Mill Creek. Woolpert proposed to modify the protocol for QHEI measurements for the purpose of developing structures to place in the stream. Woolpert took the measurements and asked questions of Ohio EPA staff during this time. The modification of the QHEI procedure was discussed and it was agreed that the scores*

generated by this modification of protocol could not be compared to real QHEI scores and would not be interpreted as such. The QHEI protocol requires that a given length or "reach" of a stream be evaluated for habitat attributes to determine the functionality of that stream reach to provide a healthy habitat for the aquatic biota. The modified scores generated in 1998 were to be used to evaluate small subsections of the stream to determine what habitat enhancement structures could be developed for the subsection. They were not generated to evaluate the functionality of the required stream reach for QHEI development. Woolpert purposely selected some of the worse subsections to evaluate for the enhancement structure project.

In 1995, Butler County hired Jordan, Jones & Goulding to evaluate habitat and biota in East Fork Mill Creek. The purpose of this work was to evaluate the aquatic life use attainment of the stream. This data followed the required protocol used by Ohio EPA, and is included in the Mill Creek TMDL report in Table 4. If the TAG strongly feels that the modified habitat scores generated in 1998 for the development of the Butler County stream enhancement project should be included in the report, Ohio EPA will add this. However, these scores will be presented in the context for which they were taken and it will be clarified that they are habitat evaluation scores developed by a modified protocol.

Additionally, I would recommend adding a "Habitat Risk Assessment" evaluation to the TMDL report, which would help characterize and determine potential habitat improvements. This could help factor habitat into restoration plans.
Response: The general equivalent of a "Habitat Risk assessment" for streams in the Mill Creek basin was employed during the use designation process. Besides the overall QHEI scores, the analysis included QHEI matrix tables which categorized 27 key habitat parameters as WWH attributes or High and Moderate influence Modified attributes. The matrix tables are included in the 1994 Mill Creek TSD (Table 5 on pages 56-57) and the Butler Co. Upper Mill Creek PSD (Table 11 on pages 41-43).

Selected physical habitat parameters were also evaluated as part of the Nutrient Risk Assessment performed for the 1998 UMC WWTP PSD (Table 8 on pages 35-36). The Nutrient Risk Assessment was included in the TMDL <u>but the Table wasn't added</u> . Ohio EPA will add the table into the draft TMDL.

The Mill Creek TMDL, as proposed, will not work. The approaches recommended by Ohio EPA will not meet water quality standards - the TMDLs are not attainable. This fact is stated in the report. Ohio EPA is taking the wrong approach to the Mill Creek TMDL. Based on the information presented, even if the point sources were eliminated, water quality standards will not be attained. Yet, Ohio EPA has proposed nothing in the realm of nonpoint source reduction that will result in meaningful results. Why propose a strategy that will not work?
Response: It is a true statement that, the implementation plans by themselves, as proposed in the draft Mill Creek TMDL report will not achieve WQS, if no other implementation plans and restoration strategies are proposed. That is part of the reason for putting the document out for public comment. This allows stakeholders to participate in the process and to make recommendations. From the comments generated by putting this document out for public review, it is obvious that several parties are now willing to come to the table to develop a Watershed Action Plan in a timely manner.

- Butler County recommends a joint effort by the Mill Creek Watershed Council and the Mill Creek Restoration Project to facilitate, construct and implement a Watershed Action

Plan (WAP). The WAP will identify implementation plans and outreach strategies, working with all the stakeholders to implement the required actions to achieve water quality standards. This approach is much more sound and will be far more effective than that proposed by Ohio EPA.

Response: Since a WAP development is part of the conditions under which the 319 grant funding approval was given to the Mill Creek Watershed Council, there are assurances that a WAP will be developed within two years. Ohio EPA is interested in participating in this project and would like to include it in the implementation plans.

- There are no recommendations for septage and construction activities. There are really no recommendations for how to reduce nonpoint source loadings and to what levels these should be reduced.

Response: The Ohio EPA does require the submittal of Notices of Intents (NOIs) for construction activities five acres or over under Phase I of the NPDES storm water program. This requires the contractors to develop and implement Storm Water Pollution Prevention Plans (SWP3) to reduce or eliminate the amount of sediment being eroded from construction sites. In addition, Phase II of the storm water rules require the submittal of NOIs for sites from five to one acre in size. This will provide some reductions in the amount of sediment reaching the Mill Creek. The reduction in sediment loading should result in an incremental decrease in the amount of nutrients.

The local health districts in Butler and Hamilton Counties have authority over the residential sewage systems. Hamilton County Health District, which is the county that contains the most of onsite systems in the Mill Creek watershed, conducts routine inspections of the facilities under

Appendix E

MEETING NOTES

MILL CREEK TMDL
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MAY 1, 2001

Attendees:

Fred Bartenstein, Professional Facilitator, Al Damico, ERC, Inc, Brian Frazier, RD Zande & Associates, Greg Jaspers, General Electric Aircraft Engines, Dan Dudley, Ohio Environmental Protection Agency, Kris Singleton, Cognis Corporation, Eugene Langschwager, Greater Cincinnati Chamber of Commerce, George Zukovs, XCG Consultants Ltd., Steve McKinley, FMSM Engineers, Sandra Hance, Environmental Quality Management, Al Grogan, Continental Mineral, Bruce Koehler, OKI Regional Council of Governments, Rick Evans, OVDC, Nancy Ellwood, Mill Creek Watershed Council, Bob Jansen, Mill Creek Valley Conservancy District, Ken Edgell, Hamilton County Department of Environmental Service, MaryLynn Loder, Butler County Department of Environmental Services, Roger Campbell, Village of Glendale, Mohammad Asasi, Ohio Environmental Protection Agency, Robin Corathers, Mill Creek Restoration Project, Aaron Shultz, Ohio Environmental Protection Agency, Kaniz Siddiqui, Metropolitan Sewer District, Tom Quinn, Hydro Mechanics, Frank Rothfuss, Woolpert LLP, Mari Piekutowski, Ohio Environmental Protection Agency, Diana Zimmerman, Ohio Environmental Protection Agency, Joshua Jackson, Ohio Environmental Protection Agency, Hugh Trimble, Ohio Environmental Protection Agency, Betty Parcels, Ohio Environmental Protection Agency, and Greg Buthker, Ohio Environmental Protection Agency.

Agenda:

Introductions
Background and Summary of Stream Assessment Results
TMDL Process
Purpose of this and next two meetings, Ground Rules
Watershed Action Plan (WAP), work to date
Brainstorming Implementation Scenarios
- Introduction, BMPs with promise
- Generate List
- Consolidate, link to Watershed Action Plan

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Agenda: (Continued)
Feasibility of the Suggested Scenarios
selecting scenarios to investigate further
Champions of the Scenarios
Stakeholder volunteers needed to prepare rough framework for scenarios will report back to all participants by May 18, 2001 (this was changed to the May 29th meeting).

Minutes:
Dan Dudley began the meeting by thanking all for coming. He discussed the need for public meetings for the draft report. Fred Bartensten, professional facilitator, discussed ground rules at the beginning of the meeting. The ground rules agreed upon were:

Looking for respectful communications.
Keep on track.
Folks be clear in speaking.
People participate fully and come prepared.
The process works if you participate
Facilitator is expected to intervene.
Take care of needs.

Fred then asked attendees to introduce themselves.

MaryLynn Lodor, Butler County DES, commented that the responsiveness summary from the comments related to the TMDL draft report and the notes from the last meeting were not on the Internet. Dan Dudley, Ohio Environmental Protection Agency said he would provide this hopefully by next week. Reasonable reassurance model documents were discussed. The question was asked for clarification as to what documents are needed for reasonable reassurances to be supplied to the Ohio Environmental Protection Agency from the external stakeholders. Dan Dudley mentioned documents on Clermont County as an example.

MaryLynn Lodor, Butler County Department of Environmental Services, asked how many were invited to attend this meeting. Dan Dudley responded over 600 people were notified of this meeting from a list provided by Nancy Ellwood, Mill Creek Watershed Council. Diana Zimmerman, Ohio Environmental Protection Agency, also responded the list included everyone that was invited to the public meeting in July of last year and many more.

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Background and Summary of Stream Assessment Results:

Diana Zimmerman, Ohio Environmental Protection Agency, stated that she became involved with Mill Creek in 1991. This was the first time Ohio EPA did an extensive look at Mill Creek. The initial survey was conducted in 1992. The Hamilton County Action Committee was briefed from some of the results of the 1992 survey. Mill Creek needed a group to champion Mill Creek and it was recommended that a watershed council be created. Extensive data was available from

various entities i.e. U.S. Army Corps of Engineers, R.D. Zande and Associates and Butler County sampling. She went on to describe what is included in stream surveys. The District results of surveys documented good quality in the upper reaches of the watershed only. The majority of Mill Creek is in poor quality. Mill Creek made it on the TMDL list due to its presence on the 303D list. Robin Corathers, Mill Creek Restoration Project discussed the chemical parameters of concerns. Questions were asked as to why all the items were not included in the TMDL. Diana stated that all are going to be addressed in the next TMDL phase. Diana discussed items will be phased in. There is no way to deal with all complicated parameters for this first TMDL. MaryLynn Lodor asked what portion are metals a problem. Diana responded that around river mile 14 or 15 maybe. Robin asked when the next phase will be. Diana responded lets get through this phase first, develop something that is acceptable to USEPA and then tackle the next phase.

The question was asked why target only two point sources? Diana Zimmerman responded only two of the twenty-some point sources discharge nutrients in their effluent. MaryLynn Lodor stated that she felt we didn't really know what the problems were. Diana Zimmerman responded that we know nutrients are an issue throughout the watershed. Once nutrients are taken care of in this phase, then the other parameters of concern will come to the forefront. At that time they will be taken care of by addressing other sources.

Robin Corathers, Mill Creek Restoration Project stated that the concept of proportionate share should be used to look at other sources and felt that any kind of strategy should embody for that share. She commented that these should be negotiated in an agreement so that problems would be addressed. Non point source has to be addressed. This may not be recognized as a biological criteria and the recommended targets of nutrients are applicable at the low flow time of the year. She voiced her concern that in the Mill Creek draft report, the models used are not addressing these concerns. Robin stated there are CSO concerns, sewage in the system. Diana said they would address bacteria in the next phase of TMDL. CSO are being addressed now with negotiations between MSD, USEPA and Ohio EPA. A gentleman asked if Ohio EPA was mapping the Mill Creek on GIS. Diana said no, but that CAGIS (Cincinnati Area GIS) has some of the watershed mapped. The Watershed Action Plan Committee said they would generate a map.

Nancy Ellwood asked since the TMDL is generated under existing regulations, what is the potential for turning in a separate implementation plan with reasonable assurances? Diana

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Zimmerman said they would ask USEPA if this would be acceptable.

MaryLynn Loder commented that it is something hard to swallow when no other controls, other than those recommended for the two point sources, are being put on. Butler County would have to add some additional technology to meet a 3mg/l NO2-NO3 on permit. Diana Zimmerman stated that the technology needed to get the plant to 5 mg/l NO2-NO3, could also get the plant to 3 mg/l. MaryLynn said that this was true, but the technology would not meet 3 mg/l consistently. Butler County is going to have to spend more money if the permit has 3 mg/l. Right now Butler County has 5 mg/l on permit (nitrates). Ohio EPA has given them no time to see if alternative results, such as the habitat work done on East Fork Mill Creek will work.

Dan Dudley responded that we have to have a nonpoint source waste allocation and one for the point sources. We are justifying the recommended limits using the allocations. We need consensus with the stakeholders and build upon a common ground. The basin wide impairment is due to nutrients. End point is the biology. Dan asked that the watershed action plan help Ohio EPA rough out a frame work of those parts and pieces. MaryLynn Loder stated that we are not able to put together a full time scale action plan within this time frame. Diana Zimmerman acknowledged this and said we should be able to put enough together for the report that would be acceptable. It was discussed with USEPA, Region V, and they seemed receptive to the idea of the WAP. Diana Zimmerman then proceeded with graphic presentation.

TMDL PROCESS:

Diana Zimmerman, Ohio Environmental Protection Agency displayed the following charts for the TMDL Process. The chart depicts a twelve step process that Ohio EPA developed to provide guidance for developing a TMDL. It is the process that was used for the Mill Creek report development. Prior to Ohio EPA contacting the Mill Creek Watershed Council for assistance, steps one through three had already taken place. The Council was brought in during step four.

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Step 1 Design Watershed Survey ←	Step 2 Collect Water Quality Data Assessment	Step 3 Assess Water bodies Phase	Step 4 Identify Target Conditions →
Step 5 Develop Restoration Targets ← Development	Step 6 Select Restoration Scenario → ←	Step 7 Prepare Implementation Plan Implementation	Step 8 Submit TMDL Report Phase →
Step 9 Implement TMDL Inside Ohio EPA ← →	Step 10 Implement TMDL Outside Ohio EPA ←	Step 11 Annual Validation Activities Validation	Step 12 Are WQS Achieved ? Phase →

Diana Zimmerman outlined how to handle the TMDL program in a 12 Step Process. She stated that we are on Step 6.

Dan Dudley commented on the three meeting series to get public input for development of the implementation plans for Mill Creek. The meeting dates are May 1, 2001, May 29, 2001 and June 8, 2001. Dan commented that we can reach a lot of common ground of what's in the report if we work together. Dan stated that we are basically trying to set public policy for how clean you want your streams. Dan was impressed with the enthusiasm of people regarding water quality of Mill Creek. Fred Bartenstein, professional facilitator, mentioned the three c's ability. We are trying to be good public servants and being civil. Failure to do that makes it hard to reach consensus.

The question was raised as to what steps will it take to create good water quality.

It was mentioned to generate credibility with citizens. Eugene Langschwager, Greater Cincinnati Chamber of Commerce commented that he disagreed that we (the TMDL and the people working on it) are setting public policy. He said the State already has

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established Water Quality Standards that stipulate this. The question seems to be how do we get to those values. What are we going to do to get us to the values or are we throwing out ideas to meet paperwork? The comment was made that we are going to spend dollars. Can we consistently comply. It was suggested that there needs demonstrated compliance to keep treatment plant in compliance. Concerns were voiced as to whether we have a plan to get us at the target values.

Dan Dudley thanked Gene for pointing out that OEPA is responsible for setting policy through standards. It was asked that instead of a step by step process, we do it all at once. The question was raised for a show of hands if anyone disagrees they want a cleaner Mill Creek. Bob Jansen, Mill Creek Valley Conservancy District commented that there should be a certain level of clean we want to get to. He stated that people want something we can succeed at. Nothing as stringent that we cannot achieve.

Purpose of this and next 2 Meetings, Ground Rules:
Fred Bartenstein, professional facilitator, stated at this time of the work together process that the group will be working on coming up with and assigning responsibilities. He went on to mention the meeting to be held on May 29, 2001 and reiterated the outline of the total three meeting series.

MaryLynn Loder suggested going to the community through the Watershed Action Plan. Nancy Ellwood stated that public officials don't have three days to provide for these meetings. MaryLynn Loder said council members will get out to community leaders and provide information.

Watershed Action Plan (WAP), work to date:
Nancy Ellwood, Mill Creek Watershed Council stated that this presentation is a group presentation (Nancy Ellwood, Robin Corathers, and George Zukovs, XCG Consultants Ltd.). As part of the presentation, wanted to give sense of where they are going with the watershed action plan process. There have been five or six studies done on Mill Creek. Water quality has been affected by floods and degrading habitat. There is a list of six or seven issues that the watershed as a whole faces. Not all parts of the watershed are facing the same issues. It would be difficult to tackle the watershed

issues as a whole for the WAP. The watershed was divided into to a set of sub basins. Maps were displayed showing eight subwatersheds. This was based on scientific definition of what a watershed is. Mini strategy - series of planning meetings for sub basins and getting representatives from sub basin to address issues. Working with communities identifying issues and work with prioritizing issues. Some are water quality issues, some are flooding. Develop subbasin plan to identify time line of how to approach issues. Keep in mind subbasin

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Watershed Action Plan (WAP), work to date: (Continued)

goals will fall into the watershed goals. What kind of resources needed to accomplish this? They are looking at May 25 to launch process. A deadline of June 25th to have the process done. The idea is to have draft accomplished and final done. The Mill Creek nutrient TMDLs will fit into the process.

Robin Corathers stated that one way to have reasonable assurance is to have government involved with agreement. It is needed for regulatory requirements. Need some way of measuring progress of goals for the watershed. The Watershed program is looking at water quality and habitat. Need input from each subbasin community. The TMDL is looking at nutrients, the Army Corps of Engineers, flood reduction, and the Hamilton County Storm water Manage Program for NPDES Phase II Storm water regulations. Other historical issues with tributaries are left out of discussions. Watershed Action Plan gives all of us in our communities some local control. This is something that will be developed within our watershed with the local community involved.

George Zukovs, XCG Consultants Ltd., conducted a power point presentation on the Mill Creek Wet Weather Watershed Action Plan. More benefit from watershed program as a whole.

Work program agenda, trying to present just an overview of what we proposed for a watershed action plan. Set goals for the activity. Other elements mentioned funding came in part from USEPA. Second part who is going to pay for it? It is important to agree what problems are, who is doing what, who is paying for it.

In December of 1999 went through and identified some of the issues associated with Mill Creek. From those issues, components of action plan came forward. Outreach strategy, regeneration, clean water how to get there, water quality both dry and wet weather. TMDL taken a slice and deal with nutrient issues. Issues of erosion and sedimentation are problems. As a consequence of development, have a lot more flow than Mill Creek capable of handling. Flood damage.

One of the things essential to move forward is to identify a lead coordinating agency.
Institutional structure, i.e. road map of who does what. Clarify roles and mandates, develop framework for watershed partnerships, summarize regulations. Felt strongly as part of our framework they have Technical workshops. Felt it essential to have some understanding what the goals and objectives are for Mill Creek. See if they can develop some parameters and targets. Robin Corathers mentioned starting with present goals and which they are working with now and gather addition goals. This came from steering committee that met over a period of several months. Felt they have collected goals from a good many sources.

Need to focus and talk about what is specific about each part of watershed.

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Watershed Action Plan (WAP), work to date: (Continued)
Model Management Strategies. Last one of Watershed tools. Hoping these things are a bit of a legacy of someone holding onto these tools.

Clean water strategy (3 components): Framework components, source control components, sediment legacies in Mill Creek.

Source Control Programs
Issues are with respect to source, treatment plants, industrial NPDES
Storm water Phase I & II
CSO
SSO
Dry weather out fall discharge
Other sources.

It was mentioned that one of the things that doesn't get looked at from all of the outfalls is what the quality of this stuff is in dry weather. This really dominates the water quality from a bacteria issue.

Eugene Langschwager, Greater Cincinnati Chamber of Commerce asked if the solution of the deep tunnel is not being considered or worked on at this time?

George Zukovs, XCG Consultants Ltd.,commented that the solution of a tunnel has been in long term consideration for some length of time. There are CSO and SSO negotiations ongoing. There has been practical work and much discussion on both fronts. Local ordinances have been put in place in some of these programs. Mapping the systems will be a real boon. Steve (?) is collecting system data in Hamilton County. Identifying locations in CAGIS. They will not be looking for dry weather discharges for this project.

It was suggested Mill Creek stakeholders think about integrating clean water process for our lakes, clean water strategy, TMDL process, and Watershed Water Quality Objectives.
One of the scenarios mentioned was when putting together a water quality program is to have some method of measuring progress.

Important to have follow up. Working with MEV in Hamilton County base system for reporting water quality format in a web page .

Clean Sediment Program. The U.S. Army Corps of Engineers is now thinking about doing the sediment upstream from barrier dam pumping station.

It was mentioned that flood damage reduction be one of the components listed.

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Watershed Action Plan (WAP), work to date: (Continued)
Watershed flooding reduction strategy. The issues we struggle with as we look at our flood reduction strategy is that we need to be consistent with our other objectives of good stream and habitat.

Watershed storm water management strategy. The question was asked how far can we go with a storm water retrofit schedule? Robin Corathers wanted to stress storm water is a natural resource that we should value. Hoping watershed will provide tangible ways to recycle storm water. Mentioned developing natural hydrology. MaryLynn Loder mentioned a retrofit storm water program in Butler county.

Erosion & Sedimentation control strategy. Mill Creek eroding quite rapidly in some regions. Need to deal with source issues and sediment removal.

Regeneration components were mentioned. Trying to reestablish riparian habitats. It was stated that there is not one mile of Mill Creek that has not been disturbed. Last item of project is outreach and education, i.e. public involvement programs, school programs, technical workshops.

Dan Dudley questioned as to the expectation of USEPA funding. George Zukovs, XCG Consultants Ltd., stated he is looking for addressing storm water CSO and SSO issues. Looking for some kind of action plan, and now have our action plan with some specific plans to tackle issues. It was stated to call Robin Corathers if need something specific .

Robin mentioned a draft policy document to take a watershed approach to urban wet weather. It was suggested to give copy of draft policy document. It was thought that USEPA is looking at the process as well and the product. Hoping to implement the plan within the next year. George stated that it is important there is no divide of watershed. These are things we have done all along. Robyn Corathers stated that we are a year behind to where she would like to be.

Mary Ann Loder mentioned things we can be used for report. Diana Zimmerman stated that the deadline is the end of June. Dan Dudley mentioned that regulations don't require this now, here is a road map to show how we are going to hit nutrient items. This is just a matter of can we think of some ways to be innovative about nutrients to hitch together with the water action plans. Robin Corathers to provide a list of some of the stake holders involved in the process.

Nancy Ellwood said the official launching will be at the Mill Creek Council Meeting on May 25, 2001. In addition to having USEPA money to fund program there is another US grant program. Robyn Corathers mentioned another little piece of funding they will have from our upcoming 319 Program. They may have out of pocket funding for printing documents, possibly use 319 for this.

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Watershed Action Plan (WAP), work to date: (Continued)
Bruce Koehler, OKI Regional Council of governments wanted to have two concepts put on the table, surveillance and enforcement. He commented that if you go to the creek you will see new violations i.e. concrete. Bruce commented that the second concept of public health and environmental justice feels like the low income and minority are bearing the brunt of the Mill Creek problems.

Nancy Ellwood mentioned she feels strongly regarding development of an enforcement program in the subbasin mode. These are things going into the watershed project.

There are fliers for Thursday (5/3) night. This will be first public information session on the Mill Creek tunnel project.

Robyn Corathers suggested that clarification is needed. She stated that a lot of people are confused on who is responsible for what. Think clarification of role responsible is very helpful. Needs to be local action where local government officials should be involved.

Nancy Ellwood stated that tunnel cost was an issue back in 1988. There has been a lot of planning involved. There will be a public information session held at the MSD Division of Industrial Waste Building, Woodrow Avenue, Cincinnati, Ohio from 7:00 to 8:30 PM on Thursday, May 3, 2001.

Robyn Corathers made the announcement that Port Authority of Greater Cincinnati Development thrust will be held on Thursday, May 3, 2001 from 7:00 to 9:00 PM at the Morning Star Baptist Church Fellowship Hall located at 722 Oak Street, Walnut Hills. On Tuesday, May 8th from 7:00 to 9:00 PM their will be a public meeting held at the Drake Center located at 151 West Galbraith Road, Hartwell. The May 8th meeting will be held to get public input for Brownfield sites.

Break for Lunch.....

Brainstorming Implementation Scenarios:
Fred Bartenstein stated the next stage implementation strategies should be discussed. The group was asked to write down implementation of Nitrates, Phosphorus, Sediment, and Biological Endpoints Reduction.

Diana Zimmerman, Ohio Environmental Protection Agency presented a slide program to inform those who have not read the TMDL report. The GWLF modeling software for the TMDL Report came up with 5 HUCs. Loadings evaluation resolved nitration for each HUC, loading from point sources, non-point, sources and then a percent reduction to meet our target area.

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Brainstorming Implementation Scenarios (Continued)
Greg Jaspers, General Electric Aircraft Engines, questioned the 10,000 to be allocated between point and nonpoint sources. Diana Zimmerman stated we are still not going to meet reduction with extremes. Greg Jaspers asked if object when finished with process and whenever action is implemented that it would take you to 22,000 pounds as our ultimate goal? Dan Dudley stated until we figure things out more, there is a smaller step to take first. Diana Zimmerman mentioned Ohio EPA has four years to develop nutrient
standards for the State.

Roger Campbell, Village of Glendale commented that when point source dischargers meet we are still going to exceed if nothing is done to eliminate the non-point sources.
Diana Zimmerman stated that controls have to take place by the stakeholders. That is what is being asked today. We have to get progress in developing non point source controls.

It was stated that we are developing watershed action plans. We need to give USEPA an idea of where we are heading.

MaryLynn Loder asked about government agreements. Dan Dudley commented that USEPA will allow us to use professional judgements in targeting reduction.

MaryLynn Loder voiced her concern that the numbers reflect a watershed not to the one we are sitting on now. She wanted land use data reevaluated.

Diana Zimmerman showed various pollution prevention information she pulled from the Internet. The website address is www.stormwatercenter.com .
The website mentioned many pollution prevention measures and useful BMPs for Nonpoint Source Pollution control. Examples of ideas to reduce septic system loads by 50% and the benefits of buffer zones were discussed.

Fred Bartenstein stated that the next step was to catagorize items. The following are charts of Result of Brainstorming and development of implementation strategy options:
Everyone was given five blue dots to place beside what they considered the most promising projects.

Nitrates, Phosphorus, Sediment, Reduction and Biological Endpoints.

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Brainstorming Implementation Scenarios: (Continued)
Charts as a result of Brainstorming:

Erosion and Sedimentation (Total 11 Dots)	**Storm water** (Total 8 Dots) **Combine w Erosion & Sed.**
Stabilize Eroding Streambeds & Tributaries (7 Dots) Sedimentation Traps for Lakes & Ponds (Storm water Facilities) (1 Dot) Reduce Stream Flash Flows (By Storage) (2 Dots) Inventory and Assessment of Sediment quality and remediation strategy (1 Dot) Energy Dissipaters at end of storm water effluent structures (0 Dot)	Reuse treated wastewater and rain water (e.g. irrigation golf courses, non potable) (4 Dots) Implement BMPs for Storm water and evaluate them (3 Dots) Demonstrate water quality inlets and other retrofits (1 Dot) Demonstration projects for down spout disconnection (0 Dot)

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Listed Below are the Pro's and Con's generated by the Brainstorming session:

Erosion and Sedimentation and Storm water	
Pro	**Con**
● Can be an amenity	● Takes up build able space
● Preserves usable land	● Pond can be an enforcement headache (labor intensive)
● Very effective when implemented properly	● High maintenance, continued attention
● Reduces maintenance cost for sediment removal	● Hazard (drowning)
● Saves potable water	● Need to overcome public resistance (new in many jurisdictions)
● Decreases physical impacts on storm water	● High capital cost
● Decreases sediment as a pollutant carrier and route of contamination (protects conveyance capacity of stream)	● Risk of cross — connection (backflow)
● Improves habitat and water quality	● Land base needed for practical implementation (high rainfall area)
	● Responsibility for maintenance

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Brainstorming Implementation Scenarios: (Continued)

Lawn Care and Homeowners (Total 13 Dots)
Reduce use of high phosphorous or nitrogen lawn fertilizers (5 Dots)
Reduce lawn care herbicides (4 Dots)
Domestic animal waste collection (compost, solid waste) (4 Dots)
Soil testing for lawn care (0 Dot)
Effective management of lawn and tree litter (0 Dot)
Supplemental State funding for household hazardous waste collection (0 Dot)
Require drop spreaders in lawn applications (0 Dot)

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Brainstorming Implementation Scenarios: (Continued)

Lawn Care and Homeowners	
Pro	**Con**
● People can take ownership ● Less work needed (mow less often) ● If done properly saves money for the homeowner ● Effective water quality benefits ● Could save tax expenditures ● Domestic animal health improvement (cancer and allergies) ● With proper public education, could be one of most effective control strategies	● Government butting in my business (literally NIMBY) ● Flea and tick infestation where pets are present ● Can lead to more pesticide use ● Harder to implement (so many people involved) ● Hard to measure results ● Unpopular with some ● Not the way we've always done it ● Resistance from vendors (lawn care) ● Isn't very effective (doesn't control a great deal

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Brainstorming Implementation Scenarios: (Continued)

Incentives/Alternative Approaches (Total 23 Dots)	**Green BMPS - combine with incentives & Alt. App.** (Total 14 Dots)
Stream Restoration (Riverine Riparian Restoration) (7 Dots) Incentives for developers to put wetlands downstream of retention ponds (5 Dots) Take credit for in stream nutrient processing (if proper stream habitat) (3 Dots) Discharging treated wastewater to Ohio River (3 Dots) Trading program for loads of phosphorus and nitrates (3 Dots) Habitat equivalency analysis (1 Dot) Create and implement comprehensive pollution prevention program for all sectors (1 Dot) Blue Barrel Program (Collect and reuse residential rainwater (0 Dot) Porous Pavement in light traffic) (0 Dot) Reconnect stream to flood plain (0 Dot)	Forested buffer zones (4 Dots) Implement greenway master plan throughout watershed (3 Dots) Grass Buffer zones (2 Dots) Flood Plain management (2 Dots) Emphasize green BMPs (2 Dots) Reforestation of bare areas where sunlight penetration is high (1 Dot) Grass swales along street pavements (0 Dot) Inventory assessment design installation and maintenance of soil bio-engineering to stabilize stream banks (0 Dot) Eliminate irresponsible urban and suburban sprawl (0 Dot) Remove cement in the channel (0 Dot)

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Brainstorming Implementation Scenarios: (Continued)

Incentives/Alternative Approaches also Green BMPs	
Pro	**Con**
● Multi-objective solutions ● Specifically stream restoration, can tie to biological end points ● Low capital cost ● Voluntary ● Can be required ● Political impact (feather for those that work) ● Stakeholder driven ● Funded by people who've traditionally funded WQ improvement ● Can open recreation area ● Addresses the impairment ● Allows/encourages more holistic approaches	● May not work ● Maintenance costs high on some ● Voluntary ● Hard to measure ● Potentially high capital cost ● Requires building public awareness ● Funded by people who've traditionally funded WQ improvement ● Health concerns (attractive nuisance)

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Brainstorming Implementation Scenarios: (Continued)

Regulations and Ordinances Including Enforcement (Total 14 Dots)
Septic System Inspection Program (3 Dots)
Greenspace Zoning Ordinances (3 Dots)
Create a "Stream keeper" Enforcement Job & Surveillance (Sanitarian License) (1 Dot)
Enforce construction erosion controls (3 Dots)
Eliminate illicit storm connections (2 Dots)
Enforce old and new regulations (1 Dot)
Solve CSO 700 and accelerate CSO elimination program (1 Dot)
Cat leash laws (0 Dot)
Hookup semi-public dischargers to public treatment plants (0 Dot)
Implement storm water Phase II and Phase I (0 Dot)
Ban channelization (Mill Creek Upstream) (0 Dot)

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Brainstorming Implementation Scenarios: (Continued)

Regulations & Ordinances & Enforcement	
Pro	**Con**
● Quantifiable ● Local enforcement (not state or federal) ● There's someone to blame (whether they deserve it or not) ● concentrates on offenders	● Another layer which can be dissimilar community to community, state to state ● Less politically acceptable ● More expensive ● May not work (give results you want, be enforceable) ● Enforcement can be resource intensive ● Allocation of community resources more complex

Farming (Total 3 Dots)	
Farming BMPs (2 Dots)	Less Fertilizer in agricultural lands (1 Dot)

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Brainstorming Implementation Scenarios: (Continued)

Farming	
Pro	**Con**
● No - till farming reduces costs ● Large average impact (compared to residential and commercial uses) ● Significant reductions in sediment loads ● Simple solutions produce significant gains (e.g. fencing livestock reduces nutrients and sediments)	● Too little farming land use in the watershed ● Not the way we've always done it ● Regulating unregulated matters ● Farm loads are less at critical times ● Land use is declining compared to residential

Public Education (Total 4 Dots)	
Educate public and businesses about pollution prevention practices regarding onsite car washing (2 Dots) Public awareness campaigns on lawn chemicals (1 Dot) Use nonpoint education for municipal officials program (OSU Extension) (0 Dot)	Educate homeowners to ease and beauty of native plants and grasses (1 Dot) Locally sponsored educational programs to promote compliance (e.g. illegal dumping) (0 Dot) Enhance Public Education on waste disposal (Batteries, tires, antifreeze) (0 Dot)

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Brainstorming Implementation Scenarios: (Continued)

Public Education	
Pro	**Con**
● Reaches a large number of people ● If you do it right, you start to educate the young and change habits ● Kids can get to the parents ● Good P.R. ● Motherhood and apple pie (popular) ● Tax deduction for corporations ● Media likes to cover lots of people and kids doing good work	● Hard to quantify benefits ● Confusion among messages (information overload) ● hard to teach old dogs new tricks ● Takes time energy and respected credible champions ● Hard to get media attention (not photogenic)

Inventory and Assessment and Research (Total 9 Dots)	
Inventory unknown discharges to Mill Creek and Eliminate by Plan (5 Dots) Research linkages between nutrient loadings and biological criteria (1 Dot) Investigate a two-tier nutrient target in report (0 Dot)	Eliminate phosphate detergents (2 Dots) Monitor stream restoration program to gauge trends on approaching biological targets (1 Dot) Assessment and cleanup of Brownfield Sites (0 Dot) Monitor water quantity and quality during storm events at multiple points (0 Dot)

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Brainstorming Implementation Scenarios: (Continued)

Inventory, Assessment and Research	
Pro	**Con**
● Better assessment of situation ● Facilitates less expensive implementation ● Could find previously unknown sources ● Better planning ● Better projects ● May disclose faulty assumption ● Employs PhD.	● Resource intensive ● Takes time ● The strategies don't directly improve water quality ● You can study something to death and not get it done

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Feasibility of the Suggested Scenarios:

Dan Dudley stated what would be the picture of what would happen now by May 18, rough outline of scenario's as they might appear in the watershed action plan (3 or 4 pages in advance of May 29, 2001 meeting). What we think we can bite off and what it might mean in source reductions who might be champions. How it might be implemented by decision-makers.

MaryLynn Loder asked regarding the deadline on rough outline of how this might unfold? How many things are we going to champion?

Champions of the Scenarios:

Incentives/Alternative Approaches - MaryLynn Loder
Green BMPS - Robin

Regulations Ordinances Enforcement
Champion?

Lawn Care and Home Owner
Champion?

Erosion Sedimentation and storm water.
Kaniz Siddiqui (research)

It was commented this gives roughly 14 days to generate a rough scope. This is not enough time. Kaniz Siddiqui suggested that we could research topics, but not be able to write a summary of them. It was suggested on the 29th meeting we take the morning to discuss the results of the research on the topics.

MaryLynn Loder stated she had a problem with the concept of Ohio Environmental Protection Agency "knowing when they see it" and the stakeholders still not knowing what to place on the paper.

Gene Langschwager asked what is it you need in your hip pocket when you meet with USEPA? Marianne Piekutowski, Ohio Environmental Protection Agency informed the group that a point source reduction is needed, commitment is needed for reduction of loadings associated with nonpoint source.

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Champions of the Scenarios: (Continued)
MaryLynn Loder questioned whether she can predict source reductions and loadings. What we need to focus on is how are we meeting biological criteria. Eugene Langschwager commented that a lot of these things are going to be demonstrated over time, two to three years.

Facilitator Fred Bartenstein stated we need something hypothetical saying Mill Creek Action Plan developed and list some of the kind of strategies the stakeholders came up with. The rough draft outline is one more step as to speculation as to what it might mean and what do we think might be more practical.

Diana Zimmerman gave as an example the Greenways Program. The amount of land restored with vegetation should have a nutrient reduction outcome. Robin Corathers was asked if the location of the projected Greenways projects was done for a strategic reason such as nutrient removal or buffering of the stream. Robin Corathers remarked that some of the pilot projects were for strategic reasons, but some of it was recommended because the property was already owned by a city. Reasons other than loading and resources. Diana Zimmerman asked can you put in an association between number of acres restore we should improve the loading by this number of nitrates?

George Zukovs commented that we are dictated by frame work of the current Clean Water Act. My concern is from maybe the framework is a little too narrow. Unless the dialog can get broadened out, we may be limited on what we can do.

Kaniz Siddiqui commented that because of time line, we cannot say really how much effect can be attributed to certain BMPs. Other communities did projects before us, we can kind of estimate how much effect it has.

George Zukovs commented that not necessarily acting on impact of loadings . We have a framework that fundamentally asking one question and come around the other way to fit into the framework. Kanis Siddiqui commented that this is very far fetched predictions.

Diana Zimmerman stated that all we are asking is what can be done in the watershed.

Dan Dudley stated that we are not all that sure about the first cut of this project. We all know the end point is the biology, we are relying on stakeholders to put this target as a first step out, instead of all the way. Help us figure out what you feel you can market.

MaryLynn Loder stated she felt they have an existing NPDES fact sheet that specifically will go into effect if not obtaining biological criteria in stream. USEPA needs to consider OEPA having put the 5 mg/l NO2-NO3 in the permit.

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Champions of the Scenarios: (Continued)
Marianne Piekutowski stated that there was a part two in the permit that would allow for permit modification. Marianne commented that we have a stream of non attainment. How can we fix it?

MaryLynn Loder commented that whatever the number of nitrates are may not be a problem with the biology.

Dan Dudley commented on what happens with this scenario.

Mohamad Asasi, commented on how effective every scenario is. Diana Zimmerman stated that the web site she discussed has loading reductions that can be used as examples for determining effective BMPs for nonpoint source pollution. She informed the group of the website address.

George Zukovs stated that the key ingredients is update. How many neighbors are willing to buy into it and over what time frame. If I told you 100% using lawn care, my goal is 50 years from now only 50% would be using lawn care.

Dan Dudley stated that what we are asking for in June is a willingness to follow through with whatever you postulate.

MaryLynn Loder expressed her concern of the whole time issue and writing things they may be committing to. They don't have responsive summary to comments submitted about the rough TMDL report. Really concerned about the whole time. Haven't seen model from Mohamed. Don't think can put any weight on it at all.

Diana Zimmerman commented that the stakeholders are asking for clarification.

The following Champions of Scenarios were listed:

Incentives Alternative and Green BMPs
MaryLynn Loder, Robin Corathers, and Nancy Ellwood

Erosion Sedimentation and Storm water
Kaniz Siddiqui

Robin Corathers stated that it was hard to quantify impact by herself.

Diana Zimmerman commented that we need to come up with something. The TAG is not happy with the TMDL report. The stakeholders need to provide Ohio EPA with some alternatives for nonpoint source.

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Champions of the Scenarios: (Continued)
Kaniz Siddiqui suggested that we come up with as much information as possible for the next meeting and as a group can develop something.

MaryLynn Loder commented that we only have 3 meetings before deadline of USEPA.

MaryLynn Loder asked what is Ohio OEPA doing? Diana Zimmerman responded that Ohio EPA is revising the report and hoping to get something from these next meetings to put into the report.

Comments were made that what is wanted is a feel for where we are now. Will take a work in progress?

Eugene Langschwager commented that one challenge is that we are possibly trying to put something together that will commit the local jurisdiction and people of watershed to doing something. The opportunity is that not everybody that is available for this information is here in the meeting room. We need notes from today.

Diana Zimmerman stated that she needed e-mail addresses to send notes.

Fred Bartenstein, stated that notes will be made available to Nancy Ellwood by Friday to the Watershed Council.

Eugene Langschwager commented that the challenging piece is getting commitment to implement.

MaryLynn Loder inquired about the meeting on the May 11 between USEPA and Ohio EPA. She asked Dan Dudley to find out from USEPA a detailed envision what a watershed plan would entail. Bob Jansen, Mill Creek Valley Conservancy District stated you had specifics on point source. Are you wanting us to pick what has the most impact from nonpoint source?

Diana Zimmerman stated that we need some kind of write up to put in the report.

Fred Bartenstein, the facilitator stated that all we can do by July 1 is a hypothetical plan. Eugene Langschwager commented he had two questions for the meeting with USEPA. He stated that he hoped they will be willing. We seem to have public involvement with this TMDL process. In the past we have not seen this. Robin Corathers stated she thought the technical committee has had people.

Eugene Langschwager commented that this is trying to do as USEPA often speaks out of two sides of its mouth. They often short circuit time on process so you don't have enough time. He asked do you expect to give us an overview of discussion of USEPA meeting?

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Champions of the Scenarios: (Continued)
George Zukovs stated that the Clean Water Act has specified steps. Unless USEPA can play outside of the box. Take note.

MaryLynn Loder stated that you have to have point sources, unless have reasonable assurances.

Facilitator Fred Bartenstein addressed the group. He stated that the group has worked hard today, hypothetical work, the region will communicate by e-mail.

On May 29 come back together as a group. Massage as best we can with what we got.

Facilitator Fred Bartenstein thanked the group and stated see you on 29th and on the Internet.

Action Items:
Stakeholder volunteers prepare rough framework for scenarios and report back to all participants on May 29, 2001.

Next Meeting:
May 29, 2001 and June 8, 2001.

DZ/bjp

MEETING NOTES: MAY 29, 2001

MILL CREEK TMDL PAGE 1 OF 11 PAGES

Attendees:

Fred Bartenstein, Professional Facilitator, Dan Dudley, Ohio Environmental Protection Agency, Robert Jansen, Mill Creek Valley Conservancy District, Diana Zimmerman, Ohio Environmental Protection Agency, Marianne Piekutowski, Ohio Environmental Protection Agency, Mohammad Asasi, Ohio Environmental Protection Agency, Dave McCallon, Sawmill Steel, MaryLynn Lodor, Butler County Department of Environmental Services, Brian Ball, Specialist with County Department of Environmental Services, Rick Evans, Hamilton County Soil and Water Conservation District, George Zukovs, XCG Consultants Ltd., Nancy Ellwood, Mill Creek Watershed Council, Harry Stone, Private Citizen, Bruce Koehler, OKI Regional Council of Governments, Roger Campbell, Village of Glendale, Dr. Michael Miller, University of Cincinnati, Biology, Brian Frazier, R. D. Zande & Associates, Greg Jaspers, General Electric Aircraft Engines, Robin Corathers, Mill Creek Restoration Project, Thomas Quinn, Friends of the Great Miami, Hugh Trimble, Ohio Environmental Protection Agency, Greg Buthker, Ohio Environmental Protection Agency, Eugene Langschwager, Greater Cincinnati Chamber of Commerce, and Kaniz Siddiqui, Metropolitan Sewer District.

Minutes:
The May 29, 2001 Mill Creek TMDL meeting was held in the Board Room of the City of Sharonville Municipal Building, 10900 Reading Road, Sharonville, Ohio. The preliminary agenda for this meeting included the following:

- OPENING (Introductions, Ground Rules, Agenda)
- RECAP LAST MEETING (Process and Results)
- OEPA REPORT UPDATE, CHANGES
- REACTION (Discussion of Interim and Long-Range Targets, Phased in point source reductions, reach consensus)
- STATUS REPORT ON 2 SCENARIOS
- IDENTIFY NEEDED FOLLOW-UP (What, Who, When)
- PLAN JUNE 8 MEETING

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Fred Bartenstein, Professional Facilitator began the meeting with introductions. He then went over the ground rules. He asked if there were any changes to the last meeting's minutes. Nancy Ellwood commented there was a correction for the date of June 25th to be removed regarding the Watershed Action Plan located on page 6. MaryLynn Lodor, Butler County Department of Environmental Services, asked about parking lot issues from the last meeting and Dan Dudley, Ohio Environmental Protection Agency, provided notes regarding these issues.

Dan commented that the process and the purpose of this series of meetings was to develop an acceptable report to submit to USEPA. The Agency thought it needed to take a fresh look at the report with a series of meetings. The last meeting scoped out concepts and theories. What does Ohio EPA expect in the plan and the TMDL report from these meetings. The concept was we want to open the door for how we will achieve nutrient loading reductions, and have people to contribute implementation scenarios. Dan stated he thought we had a good meeting last time and things are moving forward. From the minutes, seven or eight implementation scenarios were brain stormed. The Agency wanted to hear from people what they thought about these scenarios. There was a brief recap of last meeting. Consensus was reached on the concept of several implementation scenarios. The hope is that these will be implemented as part of the Watershed Action Plan (WAP) which would be outlined in the report sent to USEPA by early July.

MaryLynn Lodor asked about the scheduled conference call with USEPA. She mentioned the WAP and asked if Ohio EPA had gotten any feed back from the USEPA on the WAP proposal. Dan Dudley responded that the scheduled conference call with USEPA had been canceled. Nancy Ellwood, Mill Creek Watershed Council, passed a letter around that the Watershed Council intend to use as its reasonable assurance. Dan Dudley responded that the letter is being reviewed by his chief. Dan stated that he had not heard back from the USEPA's technical review personnel regarding the letter or their comments.

MaryLynn asked about previous TMDLs being submitted to USEPA. Dan Dudley mentioned that as he recalled the TMDLs were placed on the web unofficially, but they did not have a specific waste load allocations. These TMDLs did not have waste load allocations for the permitted point sources. Because there are permitted point sources, you need to step through the waste load allocation process. With nutrients, there may be more flexibility with the waste load allocation for later implementation because at this time, there are not water quality standards. MaryLynn commented that you don't have the details for how the non-point sources will be implemented, but for nutrients, a process that may be phased in later.

Dan Dudley noted that looking back on an approved TMDL, there were two prongs of attack for dissolved oxygen. The first was to remove dams, and the second was for the installation of additional treatment at the point sources.

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MaryLynn commented on the two option scenarios. If one option doesn't work, then the other option can be pursued. George Zukovs, XCG Consultants Ltd., commented he thought the dam removal was not an option.

Facilitator Fred Bartenstein mentioned the modeling had been rerun. Dan Dudley handed out information regarding the changes in the modeling. Dan stated that this reflects new thinking on timing of the permit and nitrogen. He mentioned discussions involving Mohammad Asasi, Ohio Environmental Protection Agency, regarding this. This was done for each of the five subbasins. First, a different nitrogen target was used. This value came about after looking through additional agency data dealing with nitrogen and the four other TMDLs this year. The initial justification for the nutrient target came from a 2-year study in 1999. Performance of a stream showed a stronger relationship with phosphorous levels than with the nitrogen levels. Dan commented that he conferred with the Ecological Assessment Section regarding the nitrogen

levels. He also reviewed the assessment guidance, and noted the nitrogen was at 2 to 3 milligrams per liter (mg/L). Based on this, a target value of 2.5 mg/L was given to Mohammad to rerun the model. In addition, 1997 data from Butler County was also used. The previous run had a median concentration of 4.29 mg/L, but this now changes to 3.29 mg/L. The additional data also shows that the phosphorus levels were 0.6 mg/L higher than in the previous run. (Changes shown in model)

MaryLynn Lodor mentioned the nitrogen and phosphorous target values. She felt there may be a way to come up with a better target value for Mill Creek. Dan Dudley commented that we need to proceed with the rest of the information regarding nitrogen, and then proceed with the phosphorous. MaryLynn mentioned her thought as to whether it is feasible to go higher for nitrogen when the stronger association is with the phosphorous.

Roger Campbell, Village of Glendale, asked if phosphorus would be considered the most important since it affects point and non-point sources.

Dan Dudley noted that the International Commission on the Great Lakes had a new limit of 0.5 mg/L for phosphorus in its treaty. Ohio was still using the value of 1.0 mg/L. The new phosphorus limit has not been incorporated into the water quality standards.

Harry Stone, Private Citizen, asked what impact does ammonia have on the nitrogen level. Does the nitrate revert back to ammonia? Harry commented that the ammonia levels are going up but as you go downstream the nitrate and nitrite levels start to decline. This could be related to toxins in the Mill Creek, and/or the impact of the Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs).

Diana Zimmerman said this impact in noted around River Mile 15 or 16 in the main stem of Mill Creek.

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Dan Dudley referred to the next page on the handout for our reference of nitrate loadings. There is a revised Table 11. The new values provided in the table reflect two changes. These are the different target value for nitrogen, and different background loadings. There is now a 24 percent nitrogen loading reduction needed in HUC1 and a 13 percent nitrogen loading reduction needed in HUC 2. HUCs 3 through 5 have no reductions noted. The phosphorus reductions also change because it becomes more stringent and a little more challenging. Dan stated phosphorus values are higher in the background for 1997. The target loading reductions for phosphorus shown on Table 12 have also changed. The target reductions have increased from the draft report. Table 13 showing the NO2-NO3 effluent scenarios for the Upper Mill Creek Reclamation Facility would be added to the report.

MaryLynn Lodor mentioned flow projections at the Upper Mill Creek plant for the next 10 years. MaryLynn asked if these are numbers of the design flow or actual flow values. Dudley said yes on the design flow. MaryLynn mentioned the plant is discharging at a much lower flow rate than the permitted design flow. MaryLynn asked if some type of reduction could be justified since they are not at design flow. MaryLynn also noted the facility's flow is being projected to stay around 10 million gallons per day (MGD) for the next ten years. Dan mentioned the graphs showing the nitrogen loading is going down. MaryLynn commented this

is occurring even though the plant flows are going up. It was asked if the plant would be on the existing permit 10 MGD value versus the 16 MGD currently in the permit.

MaryLynn stated the County would like to see the nitrogen loading be phased into the permit. MaryLynn also asked if the permit could be modified to allow for a phased in approach.

Mohammad Assasi, Ohio Environmental Protection Agency, asked MaryLynn about the flow values used in the modeling.

MaryLynn commented as to whether or not more time could be given to the stream restoration process. She noted that she is not sure if that would be enough time to demonstrate attainment from the habitat restoration.

Diana Zimmerman, Ohio Environmental Protection Agency, asked how much time for the project.

MaryLynn responded that it will be two years next fall since the project was installed. She commented that if we can at least show a trend of biological results increasing, this should merit results. In the end, if your stream restoration has not achieved full attainment, then the capital improvements/treatment option would be implemented.

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MaryLynn commented that there have been reductions, and the new facility was just put on. There is a decline for both phosphorus and nitrogen in the discharge. MaryLynn also noted that the County has only recently began sampling for these parameters and additional time for data collection may be needed.

Diana Zimmerman asked when would the County propose Ohio EPA reevaluate attainment in the stream. Diana also noted that in the fact sheet it spells out that Ohio EPA would be out to reevaluate the stream. This has been shifted from 2001 to 2002. MaryLynn commented on picking 5 years to coincide with the NPDES permit cycle.

Diana Zimmerman commented that the Ohio EPA reevaluation was required as a condition of 401 certification for the project. Diana noted that she would have to look into this to determine if it is possible to change the reevaluation time frame. It is unclear if this modification could occur.

MaryLynn mentioned that the city of Sharonville had damaged one of the habitat improvements when bridge work had been done. She mentioned a lack of communication regarding the issues related to construction in the stream and damage to the habitat.

Diana Zimmerman mentioned that much of this construction is being done through a nationwide permit. This information could be dealt with through the nationwide permit.

MaryLynn noted the watershed council would be willing to get the information out there on construction BMPs. Ohio EPA's involvement in the development of this training would also be

critical. It was commented that Ohio EPA has permitted some damaging projects. Staff involved in the 401 program also need to get involved and understand the process.

Bruce Koehler, OKI Regional Council of Governments, mentioned an example of construction impacts is located behind Continental Processing.

Roger Campbell stated that most people don't know what the best management practices are especially associated with road construction.

Diana Zimmerman stated that Ohio EPA has a strong working relationship with ODOT to address construction issues.

Nancy Ellwood mentioned that DOT will come in and gut a stream during construction and noted an instance where the stream had been rerouted and was overflowing its banks.

Roger Campbell, Village of Glendale, mentioned that work is always from the lowest bidder. He commented that a low bidder will do work that can be performed easily and cheapest. This may not always include storm water construction BMPs.

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There was discussion about the riparian habitat along the Mill Creek. This included the lack of cover and the impact of sunlight on the stream. There was also discussion regarding how much of an improvement could be seen in the QHEI score using just habitat restoration.

MaryLynn responded that depending on what the project is in a particular area, not sure what kind of number.

Diana Zimmerman stated that the goal for the QHEI score is 60. This would be consistent with the Warm Water Habitat designation.

Dan Dudley stated that this urban landscape is not going to perform as well as a less disturbed area. The Mill Creek may not be returned to where it was several hundred years ago, but with a little care, it should be able to maintain Warm Water fisheries.

MaryLynn mentioned that the biology living in a stream will show that there is good water quality.

Harry Stone commented without a good QHEI score you would not be able to attain the use designation. He noted that his issue the better the QHEI score the more likely you are to have a higher use designation. If you don’t improve nitrates in the stream, the higher score may not be achievable.

Dan Dudley, Ohio Environmental Protection Agency, redirected the meeting back to the charts with the modeling changes. Dan said the point is that in some point in time that we have a limit of 5 mg/L to attain compliance with. The first attempt of Mill Creek habitat restoration began around 2000. We need to double check the nitrogen load. If the biology does not show signs of recovery, the limits will need to be reduced further.

MaryLynn commented that she does not think two years is enough to show full recovery of the biology, but thinks Ohio EPA should hold off on applying the 5 mg/L limit. There needs to be additional time to show the recovery of the biology.

Diana Zimmerman responded that we would have to rewrite the permit. We will have to read the wording of the permit and the 401 certification would allow for additional time.

Dan Dudley stated that right now the existing permit for Upper Mill Creek expires in 2004. Dan mentioned that the current loading of nitrogen 12,000 kilograms per year. Dan noted that in the report to USEPA, we would have to map out is that the emphasis is on the biological criteria and that we need a long period of time to show improvements.

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Facilitator Fred Bartenstein went over the points generated from the meeting.

GROUP CONSENSUS ON POINT SOURCE IN EAST FORK APPROACH TO NITROGEN AND PHOSPHORUS
1. Phased permit limits, decreased if stream biology is not improving. (Butler & Glendale).
2. Time Line of Phasing: Ohio EPA and Butler County assessment of trend through 2005 -Nitrogen of 5, 1 Phosphorus. Compliance with permit limits by 2007 (Butler and Glendale)
3. Continued improvements demonstrated, providing reasonable assurance that targets will be met through a minimum of annual monitoring by OEPA, Butler, MSD of aquatic life, in-stream nitrogen and phosphorus. (OEPA will monitor in 2002)
4. Good faith participation by Butler County and Glendale in Watershed Action Plan, (including stream restoration).

Discussion was held regarding the effect of development on the Mill Creek.

Rick Evans, OVDC, commented that the people buy these homes and the developers build what people want.

Marianne Piekutowski, Ohio Environmental Protection Agency asked if porous pavement is something that could be proposed as an option for developers to offer to the buyers.

Rick commented builders will build what the consumer wants. He mentioned zoning boards need to allow for higher density development to reduce the sprawl. Rick expressed his opinion that if you don't have a market for it, the developers will not build it.

Facilitator Fred Bartenstein revisited the group consensus on the long range target. He then asked does any of the constituencies you represent have concern about any of the points proposed. No concerns were presented. The meeting then moved onto scenarios.

Dr. Michael Miller, University of Cincinnati, mentioned riparian, riparian, and riparian.

Robin Corathers mentioned an idea of a partnership with Glendale on a 319 grant for stream restoration work. She also mentioned the Greenway program.

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Fred Bartenstein then went over a review of status of items from parking lot from the last meeting.

5/1 Parking Lot, before June 8.
1. Responsiveness summary (addressing comments submitted, agency responses) On the web.
2. Load amounts (input to scenarios)
3. Reasonable assurance (model documents)
4. Next TMDL Phase (need to address metals and other parameters of concern).
5. Next Phase Proportionate share (agreement to avoid unfair burdens)
6. Mapping of sources (will be addressed in Watershed Action Plan)
7. Submit with generalized implementation plan? (Meeting with USEPA on whether we must include nitrogen and phosphorus limits)
8. Time to assess results of experimental strategies (stream vs. plants)
9. Nitrogen limits.
10. A full scale watershed action plan (but not by this deadline) WAP
11. Can our strategies achieve the target? (Consistently?)
12. Are the values justifiable?
13. Deadline for plan to USEPA is end of June.
14. Sketch out letter on watershed plans before 5/11.
15. Surveillance and enforcement of existing regulations.
16. Public health and environmental justice (low income people bear the brunt)
17. Need to address/beef up enforcement (requires coordination, not a lot of sticks, clarify responsibility and who gets complaint)

MaryLynn Lodor, Butler County Department of Environmental Services gave a brief presentation of the scenario for habitat restoration.

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Fred noted that Kaniz Siddiqui, Metropolitan Sewer District, would be sending out her information on sediment and erosion controls via email.

The facilitator went over various points brought out in the meeting.

PARKING LOT 5-29-01
1. Should we reevaluate .25 phosphorus target? (and/or timing for reduction in view of biological findings)
2. Would an area phosphate ban contribute to significant reductions?
3. Postpone 5 mg/liter and 1 mg/liter limits to 1/09 (beyond 1/04) to give existing and additional stream restoration time to kick in? Proposed OEPA reevaluation in 2002?
4. Educate agencies on proper BMPs for an construction in or near a stream? Also 401 permit writers and developers.
5. Concept of seasonal limits for targeted loadings.
6. Downstream of East Fork need for strategies for habitat improvements.
7. Pattern our non-point strategy on Rocky River TMDL?
8. Need a schedule for when other parameters will be addressed by OEPA and local stakeholders. (E.g. metals, bacteria, landfill, CSO)
9. When 303D list is done, 2002, synchronize Butler and Glendale permits with second phase of the TMDL.
10. Any outstanding issues from the comment period?
11. E-mail 5/29 minutes out 5/30.
12. Attempt contact between OEPA and USEPA before June 8. E-mail outcome.
13. Revisions to TMDL need to be circulated to this group before finalized and transmitted to USEPA, bring as much as possible on June 8.

The facilitator directed the meeting to the next piece of the agenda (identify needed follow up).

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Nancy Ellwood, Mill Creek Watershed Council, suggested that we pattern our non-point source implementation by scenarios similar to the Rocky River TMDL. They use reasonable assurances, existing organizations, memorandums of understanding that are couched in general terms versus providing specific strategies. She suggested this is something that we would submit to USEPA spelling out our watershed specifics and trends.

Robin Corathers, Mill Creek Restoration Project, asked do you have copies of the Rocky River Watershed Program?

Diana Zimmerman responded that it is on the Division of Surface Water web site. The specific address is: http://www.epa.state.oh.us/dsw/tmdl/RockyRiverTMDL.html

It was commented that Mill Creek TMDL would be stronger here because we have some programs to demonstrate reasonable assurances.

MaryLynn Lodor asked the question of "What if USEPA does not accept the TMDL?". Clarification is needed on what USEPA will do in the event they do not accept something.

Dan Dudley commented that Ohio EPA would then propose it as an informational TMDL with what we think is best for this watershed. This would be a black mark against Ohio EPA because the State would have not met your commitment to USEPA. The biggest issue would be if somebody not on the board with the report said this isn't good enough and a full TMDL with other requirements should be implemented. To clarify Nancy's comment, there could be an improvement of the BMPs. Dan will take the group consensus back to his superiors for input.

Robin Corathers commented that it is her understanding that this is going to be a phased in TMDL so that other parameters will be considered at future points in time. There is a need for a schedule as to when the other parameters will be addressed. This should be a part of the watershed program. She suggested an idea to maybe find a way to synchronize permits with this second phase of the TMDL.

Roger Campbell, Village of Glendale mentioned concerns about making complete process changes to meet limits from this TMDL, and then coming up with additional resources to address the second phase. He commented to don't throw rocks to us one at a time. Throw all the rocks at one time so we know what we are facing. We can't keep building new plants every five years.

Nancy Ellwood commented that probably these issues will be involved with the Watershed Program.

Facilitator Fred Bartenstein stated that in ten days from today we will have a meeting session.

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There was a discussion regarding informing people of the upcoming meeting. It was mentioned that the web site would have it listed as well as e-mail to people involved with the meetings.

Roger Campbell, Village of Glendale, mentioned there are things we haven't discussed outside of the TMDL group, and what to do with the rest of these things.

Dan Dudley, Ohio Environmental Protection Agency responded that when the 303(d) list comes out we will address additional parameters of concern.

Facilitator Fred Bartenstein suggested an agenda be developed for the next meeting. It will begin at 9:00 a.m. This meeting will be finalizing a three to four page document to be included in Part 6.0 of the TMDL. A team of four will draft this document. (MaryLynn Lodor, Robin Corathers, Nancy Ellwood, and Diana Zimmerman). A briefing from OEPA and where they stand and the time line for the remainder of the process will also be discussed.

The following are items listed for our June 8 meeting:

JUNE 8, 2001 MEETING
• Point Source: need summary of today's discussion
• 3 or 4 page document to be e-mailed circulated by June 6 in advance. (Point and non-point strategies) (MaryLynn Lodor, Nancy Ellwood, Diana Zimmerman, and Robin Corathers)
• Need targeted buy-in from people who commented on the draft TMDL (elected officials come later on WAP).
• At the Meeting: Comment and fine-tune on the document.
• Clear today's consensus with Lisa @ OEPA. (Dan), after checking 401 water quality certification.
• E-Mail announcement of meeting and summary proposal to Storm water Steering Committee list (Jim Rozelle via Diana Zimmerman and Nancy Ellwood)

The meeting ended. The next meeting will be held on June 8, 2001 at the Sharonville City Hall.

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JUNE 8, 2001

Attendees:

Fred Bartenstein, Professional Facilitator, Dan Dudley, Ohio Environmental Protection Agency, Robert Jansen, Mill Creek Valley Conservancy District, Philip Gray, XCG Consultants Ltd., Bruce Koehler, OKI Regional Council of Governments, MaryLynn Lodor, Butler County Department of Environmental Services, Nancy Ellwood, Mill Creek Watershed Council, Kenneth Edgell, Hamilton County Department of Environmental Services, Roger Campbell, Village of Glendale, Jim Carleton, Xtek, Inc., Robin Corathers, Mill Creek Restoration Project, Diana Zimmerman, Ohio Environmental Protection Agency, Betty Parcels, Ohio Environmental

Protection Agency, Marianne Piekutowski, Ohio Environmental Protection Agency, Dan Garrison, Diversey Lever, Barbara L. Swafford, Brown and Caldwell Ohio, LLC, John Foged, Formica Corporation, Rick Evans, OVDC/Henderson & Bodwell, Eugene Langschwager, Greater Cincinnati Chamber of Commerce, Michele Smith, General Mills, Ayse S. French, R.D. Zande & Associates, Brian Frazier, R.D. Zande & Associates, Maria Turner, Metropolitan Sewer District of Greater Cincinnati, Charles Waller, Rivers Unlimited, Robert Mason, Hamilton County Park District, Patrick T. Karney, Metropolitan Sewer District of Greater Cincinnati and Tom Ryther, Oxbow River & Stream Restoration.

Minutes:

The June 8, 2001 Mill Creek Public Participation TMDL Implementation Strategies meeting was held in the board room of the City of Sharonville Municipal Building, 10900 Reading Road, Sharonville, Ohio. The preliminary agenda for this meeting included the following:

- Opening (Introductions, Ground Rules, Agenda)
- Recap Last Meeting
- Ohio EPA Report Update, Changes
- Implementation Strategies Draft
- Other Issues
- Next Steps
- Adjourn

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Fred Bartenstein, Professional Facilitator, began the meeting by welcoming everyone to the Mill Creek Public Participation TMDL Implementation Strategies Meeting. After the introductions, Fred reviewed the Proposed Ground Rules:

- Free and open exchange. Respect diverse points of view.
- Respectful communication.
- Keep yourself and the process on track.
- Be clear and seek clarity.
- Participate fully. Come prepared.
- Communicate with constituents and among yourselves between meetings.
- Facilitator is expected to intervene on the ground rules.
- Take care of your needs.

Robin Corathers, Mill Creek Restoration Project, commented on the partnership efforts she, MaryLynn Lodor, and Nancy Ellwood experienced while generating their draft point and non-point strategies for this project.

Handouts given in today's meeting included rough draft copies of the May 29, 2001 TMDL Mill Creek Meeting, a rough draft of the four page Mill Creek TMDL Implementation Strategies which was developed by Nancy Ellwood and MaryLynn Lodor, and a two-page document with information regarding The Mill Creek Restoration Project (mandated through grant requirements

from the USEPA Urban Wet Weather Initiative grant program) to complete the WAP, and copies of an example of a TMDL report for total phosphorus in Lake Allegan, Michigan.

Comments and questions regarding the rough draft copy of the May 29, 2001 meeting minute notes were discussed. Diana Zimmerman, Ohio Environmental Protection Agency, wanted to address a comment in the minutes regarding Harry Stone's question mentioned on page six. Clarification was given by Diana Zimmerman that the goal was attainment of the warm water habitat not a particular QHEI value. Robert Jansen, Mill Creek Valley Conservancy District, mentioned corrections he would provide the note taker with at the end of this meeting.

Dan Dudley, Ohio Environmental Protection Agency, began with reports from the Ohio EPA. Dan looked into the parking lot issues and checked with his management on the comfort level of placing a deferred schedule of having permit limits in Butler County Upper Mill Creek Waste Water Treatment Plant. He mentioned projecting out to the year 2007 and later. He checked with staff, and said they will make a recommendation based on the consensus of the meeting and present it to the Director. Dan commended the efforts of the Mill Creek Watershed Council on their commitment. Dan checked in with the Ohio Environmental Council regarding the January report. They are aware of what we are doing. They may be contacting the various groups individually about where local environmental groups stand in regards to the draft TMDL.

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Robin Corathers stated that she was not contacted or aware of any contact.

MaryLynn Lodor, Butler County Department of Environmental Services, asked if upper level DSW management felt comfortable with the Watershed Action Plan approach? Dan Dudley thought they were on the right track.

Diana Zimmerman mentioned that there are people from companies attending today's meeting who did not attend the previous TMDL Mill Creek Project meetings. Diana asked Nancy Ellwood, Mill Creek Watershed Council, to review the Watershed Action Plan and how it could affect the companies.

Nancy explained that in the Watershed Action Plan (WAP) the watershed will be divided into eight subbasins, and involve working with the appropriate groups for each subbasin. Part of the process is coming up with prioritized issues from the community, and developing a plan of how to address these issues and a schedule of when to achieve the goal. The goal of this will be to show a trend improvement in the subbasins. The WAP is to get local and public input so all of the issues can be addressed. This also relates to TMDL process because there are nutrient loading issues across the entire watershed.

Robert Mason, Hamilton County Park District, asked if the TMDL will be used as a basis for meeting water quality.

MaryLynn Lodor responded that this will be used to meet the warm water habitat goal.

Robin Corathers commented that everyone recognizes nutrients are not the only contaminants. She mentioned other problems and organizations, and what they are doing for the ecological restoration. This is a way to really begin to tackle these issues.

Facilitator Fred Bartenstein directed the meeting to the topic of Ohio EPA's report of things that happened from the last meeting.

Diana Zimmerman discussed the 401 Certification for Butler County's project. MaryLynn Lodor inquired about the time limit. Diana stated Ohio EPA was initially committed to doing the water quality assessment the first year after the installation of the project. Ohio EPA will hold off for one year as requested by Butler County.

MaryLynn Lodor said Butler County will start their testing this year.

Diana Zimmerman conferred with Central Office regarding this issue and it was determined that there was no problem with delaying this sampling one year.

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Robin Corathers asked if Ohio EPA had spoken to USEPA since the last meeting, if so, what was USEPA's response.

Dan Dudley mentioned he had an example provided by USEPA regarding the waste load allocations in a TMDL. He stated that USEPA had not required specified limits. They crafted a term for this. Dan commented what we would add onto this is a biological endpoint, and the need for load reduction in the long range. Dan then discussed some issues that USEPA's technical staff could have, but they would like to approve it. There are some rigid guidelines they have to follow in order for the TMDL to meet legal requirements.

Robin Corathers commented that the existing permits stay in place. This action plan does not replace permits, but adds some things in addition to the existing permits.

Dan Dudley mentioned seeking load reduction to nitrogen and phosphorous.

MaryLynn Lodor asked if anything has to be modified with regard to phosphorous or nitrate limits?

Dan Dudley stated he thought there was a need to change the compliance schedule in the Upper Mill Creek NPDES permit.

MaryLynn Lodor asked if we need to put in for a modification. It was agreed that a modification was needed.

MaryLynn Lodor went over the four page document to be included in Part 6.0 of the TMDL. MaryLynn stated that we have two separate documents we are going to end up merging. The document recognizes the fact that we have complicated issues. MaryLynn expressed her opinion that she felt the reduction of nutrient loading alone will not obtain the attainment that Ohio EPA is expecting. She stated that the objective is to write the document in a way that

USEPA will accept it. Then the burden is placed locally on addressing the issues. One other thing discussed in this section is the Butler County Stream Restoration Project. It is the belief of Butler County that this approach is more of what a stream will respond to and benefit from. She mentioned that this implementation strategy could be cost saving.

Robin Corathers commented that it was her understanding with regard to nutrient loads, that even if a couple of the sources are eliminated, they still would have a nutrient problem. Then we address another concept.

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Eugene Langschwager, Greater Cincinnati Chamber of Commerce, commented that this document is supposed to be incorporated into the Ohio EPA report. The outline of how to approach this has yet to be developed. Is that correct?

Robin Corathers mentioned it is important to develop incentives, and that there is a need to beef up the reasonable assurance section.

Mr. Philip Gray, XCG Consultants, Inc., commented that the document mentioned CSO's. He stated that CSO's are point sources, and they are listed as non-point.

Robin Corathers commented that some other non-point sources are, for example, illicit cross connections, leachate from landfills and dumps, sediments from stream bank erosion, etc. We want to look at all the non-point sources as well as the point sources.

Nancy Ellwood asked for the folks who are looking at this document for the first time if there are any changes or corrections? She stated that the TMDL will explain what nutrient loadings are in Section 6.

Robert Jansen, Mill Creek Valley Conservancy District, made the suggestion to put an acronym list in the front of the document.

MaryLynn Lodor discussed the point source reduction schedule.

Fred Bartenstein then asked if there was anything to add to the point source reduction schedule.

Robin Corathers mentioned that the Village of Glendale was not added under the point source reduction schedule.

Roger Campbell, Village of Glendale, commented that Glendale has always been monitoring for nutrients. Phosphorus is the only thing added to the permit, but they do not have limits.

Facilitator Fred Bartenstein then asked if anyone else in the room wanted to say anything about the point source reduction? There was no response.

Nancy Ellwood then went over the watershed action schedule. She mentioned that Robin Corathers' comments did not get placed into the four page document. Nancy stated that Robin's comments will be merged into the document. We are emphasizing how TMDL incorporates

with our long term objectives for the WAP. The watershed council is scheduling to finalize the plan within a year.

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A discussion was held regarding the second paragraph. A suggestion was made to add another sentence, i.e., the Ohio EPA TMDL does not take into account the implementation and maybe some other things to add. Another suggestion was made that part of the plan should be a snapshot of what has happened and where we are now.

Nancy Ellwood mentioned some sort of reporting system should be developed to show how the Mill Creek is doing and list what the council is looking into for dealing with each issue. There should be something so that the community at large can look at watershed and know how it is doing.

Rick Evans, OVDC/Henderson & Bodwell, mentioned Green BMPs. He commented that this is something important to stress in working with the Zoning Board for incentives for developers.

MaryLynn commented that the WAP is an attempt to get that information out there and get support for these projects.

Rick Evans stated that the incentives should include being able to allow for green space in the area.

Robin Corathers apologized that there have been several versions and corrections. She stated that you may not have a current copy of the Watershed Action Plan document. Robin added the goal is to achieve water quality standards which is the objective of the Ohio EPA and the communities.

Comments were made regarding the list of potential BMPs on page three. A change was suggested that course pavement be changed to say that course and semi porous pavement be added. Also, adding soil bioengineering. This is better for ecological reasons.

Nancy Ellwood mentioned this is just a list of different options and technologies.

Robin Corathers stated that the watershed training is really watershed effluent training.

It was suggested that there is a need to explore and see if this is going to be part of the implementation strategy.

Dan Dudley responded to a comment that the document Ohio EPA submits to USEPA will not have specific technologies. He commented that the report should consider alluding to the fact that this is one of the things you will step through in doing and in addition to one of the things to meet the targets. Add on this water quality analysis later with real thinking of how we think we will do it. You won't have it ironed out through the year but allude to it. Dan commented that everyone contributes to the Watershed Action Plan without the heavy hand of someone requiring them to do this.

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Bruce Koehler, OKI Regional Council of Governments, stated that he was pleased to see Xtek and Formica attending the meeting. He suggested adding the riparian land owners to the listing.

MaryLynn Lodor agreed to put that into the document and also to list the process spelled out.

Fred Bartenstein, Professional Facilitator, clarified that this meeting is to finalize the draft to be submitted. The drafters will e-mail a final copy out to anyone who asks. There will not be another comment opportunity. This is the last meeting for finalizing the TMDL report to be transmitted to USEPA. The next steps are listed in the chart below:

Next Steps:

- 6/20/01, Draft Strategies e-mailed out.
- 6/29/01, TMDL Report edited and e-mailed to participants and placed on the Mill Creek web site. Transmit package to USEPA early in July. Prior alert of any significant changes when received. USEPA response e-mailed out after internal discussions and placed on the web site.
- Summer 2001 - Watershed Action subbasin meetings.

Fred Bartenstein asked if there was anything else on the Watershed Action Plan.

Bruce Koehler stated that on page three he would like to add another bullet for surveillance, guidance and, if necessary, enforcement along the riparian habitat. He stated he thought the riparian owners want to do good but just didn't know what was needed.

Diana Zimmerman said it depends on what it is. For some things there is not a legal mechanism for enforcement.

The facilitator Fred Bartenstein directed the discussion to move onto reasonable assurances.

During the discussion of reasonable assurances, the terminology USEPA requires in the report was mentioned. It was commented that there is the need to show someone is accountable. Grants for the Watershed Coordinator were mentioned. Comments were made that this is a pretty good assurance that the WAP will be done. This is one major reasonable assurance.

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Another reasonable assurance is that Butler County and the Village of Glendale have NPDES permits, and Ohio EPA will be able to exercise their authority regarding permit issuance. A comment was made that if the stream is not in attainment then they can reduce the loadings in the permits that are issued. It was stated that additional reasonable assurance can be brought in later, after there is more buy in from stakeholders involved in the process.

Robin Corathers mentioned a couple of other reassurances. She mentioned that there are funds available, and this may be a good indication that the timing to do this is right.

MaryLynn Lodor mentioned the 319 grant to incorporate a pilot program for Butler County. There is an ordinance on the books that is now being implemented on site. The County is already enforcing above and beyond requirements.

Eugene Langschwager commented that there seems to be a conflict in the time schedules with regard to the Village of Glendale and Butler County NPDES permits. He stated that the WAP will need at least two years. Eugene voiced his concern that there may not be enough time allocated within the time schedules to see the results of the improvements made. He wondered whether we have adequately allowed enough time to see if we are reaching attainment.

Robin Corathers commented that some of the stream restoration projects started two years ago. So we will have a little more time to see the effects on the stream.

MaryLynn Lodor mentioned that there will be other restoration projects going on, and that she understood the assessment will be done on the East Fork of the Mill Creek Stream. She would like to focus on this section of the stream.

Robert Mason asked how do you define the public involvement of the WAP?

Nancy Ellwood replied that she is envisioning meetings with key stakeholders, and generating as much involvement from the general public. The public needs to be incorporated into the process as much as possible.

Robert Mason suggested surveys of public intent.

Nancy Ellwood stated we may incorporate something like that.

Robert Mason explained the reason he brought this up, is that too often the focus workshop does not reflect the focus of the community at large. He suggested that a follow up survey tool is needed.

Nancy Ellwood mentioned the intent to use everything from TV spots and web site surveys.

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Facilitator Fred Bartenstein asked if there were any more comments on the draft and drafting process.

Robin Corathers mentioned the two page document handout is to be used as a guidance. She suggested starting with the upper subbasin of the creek. The second part is technical training workshops. Anyone who has business and property along Mill Creek will be offered this training. Robin mentioned Nancy Ellwood's workshop to be held in November.

It was suggested to have a professional facilitator. Robin suggested incorporating a bimonthly status report with a portion of it devoted to the development of the plan and to publish the progress made. Continuing problems would be noted, and strategies of how it could be dealt

with could also be listed. Robin mentioned that key components have already been agreed to by the Mill Creek Restoration Project.

The question was asked does this process make sense? Have we forgotten anything?

Nancy Ellwood added flood streams. No other comments were given.

Fred Bartenstein stated that this concludes the discussion on the strategy draft.

Please see page 10 for the comments and strategies chart developed during the meeting:

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COMMENTS ON STRATEGIES DRAFT
(Nancy Ellwood, MaryLynn Lodor, Robin Corathers, and Diana Zimmerman will edit)

- Add incentives.
- Beef up reasonable assurances.
- CSOs are a point source.
- Include an acronym list.
- Include Glendale in Point Source Reduction Schedule.
- WAP: add objectives beyond 10 years.
- Stress green BMPs and economic incentives (e.g., zoning and land use).
- Note NPDES and Corps of Engineers improvements.
- Add "textbook value" targets of the various BMPs?
- Add technical workshops for riparian landowners.
- Add a BMP: surveillance guidance and if necessary, enforcement of riparian land uses.
- Mention Mill Creek Storm water Managerial Project (OKI).
- Reasonable Assurances: Add Mill Creek Watershed Council commits to WAP. Add Greenway Project, add Corps of Engineers Flood Plain and Stream restoration funding expected, Butler's flood plain compensation, onsite storage, and quality enhancement.
- Does 2005 permit deadline give us enough time to make and measure improvements? (Focus assessment on East Fork, which will have the most mature restorations)
- Devise ways to involve the general public (e.g., surveys)
- Include examples from Lake Allegan precedent on 30% reduction.
- Address cost benefit of BMPs vs. Point source reductions (esp. Glendale)
- Add language on Glendale Plant and Town Run potential improvements.
- Mention Ohio EPA's guidance on development of a WAP.
- Address environmental justice in WAP (low income, minority, elderly, children populations abound in the watershed)
- Process: add stream bank restoration and flood plain management to training.

Fred Bartenstein, Professional Facilitator asked if there were any other issues people have in mind to bring before the group?

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Dan Dudley volunteered to go over the parking lot discussion from the last meeting.

PARKING LOT 5/29/01

- Should we reevaluate .25 phosphorus target (and/or timing for reduction in view of biological findings?
- Would an area phosphate ban contribute to significant reductions?
- Postpone 5 MG/Liter and 1 MG/Liter limits beyond 1/04 to 1/09? To give existing and additional stream restoration time to kick in? (Proposed Ohio EPA reevaluation in 2002).
- Educate agencies on proper BMPs for construction in or near streams? (Also 401 permit writers, developers).
- Concept of seasonal limits for targeted loadings.
- Downstream from East Fork strategies for habitat improvements.
- Pattern our non-point strategy on Rocky River TMDL?
- Schedule for when other parameters will be addressed by Ohio EPA and Local stakeholders (E.G., Metals, Bacteria, Landfill, CSO)
- When 303d list is done, 2002, synchronize Butler and Glendale permits with second phase of TMDL.
- Any outstanding issues from comment period?

Roger Campbell, Village of Glendale stated his concern was for the recreational use of the streams. There is a seasonal limit for fecal coliform, could the same type of thing be done for nutrients?

Dan Dudley mentioned we could do that for the nitrogen and phosphorus. That would be something to put into the point source program. Dan mentioned that from the few comments received from the Ohio Environmental Council he thought the conversation from Keith went pretty well.

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The facilitator posted the following chart showing implementation scenarios.

IMPLEMENTATION SCENARIOS
• EROSION, SEDIMENTATION, STORM WATER • LAWN CARE & HOMEOWNERS • INCENTIVES, ALTERNATIVES, GREEN BMPs • REGULATIONS, ORDINANCES, ENFORCEMENT • FARMING • PUBLIC EDUCATION • INVENTORY, ASSESSMENT, RESEARCH

Fred Bartenstein, Professional Facilitator asked if there were any other issues people have in mind to bring before the group? None were brought up.

Nancy Ellwood wanted to thank everyone for all their hard work.

Diana Zimmerman commented that one of the positive things the Ohio EPA sees is an increased awareness of Mill Creek. She stated that she has received comments from a lot of people.

Roger Campbell, Village of Glendale commented that he had never been involved in this type of forum for these strategies meetings. He expressed his appreciation for being involved in this part of the TMDL process.

MaryLynn Lodor commented that for the most part consensus was achieved, and that is a positive outcome from these meetings.

The meeting was adjourned.

Next Steps:

- 6/20/01, Draft Strategies e-mailed out.
- 6/29/01, TMDL Report edited and e-mailed to participants and placed on the Mill Creek web site. Transmit package to USEPA early in July. Prior alert of any significant changes when received. USEPA response e-mailed out after internal discussions and placed on the web site.
- Summer 2001 - Watershed Action subbasin meetings.

/bjp