MANGANESE PROTOCOL

I. Eligibility. With the goal of optimizing conditions for aquatic life at certain mine sites, the following protocol is suggested for determining eligibility for manganese limit modifications to an NPDES permit Be aware that existing guidelines addressing "Wine mine drainage and post mining am still in effect. Therefore, please consult with your regional NPDES permit writer as to which set of guidelines best serves your situation. Furthermore, regular meetings shall be held with the regional permit writer throughout this process (see attached flow chart).

A. Status. These modifications will be granted only to post mining sites: surface mines, refuse areas, loadouts, prep plants. Post mining deep mine discharges are not eligible, as per 40 CFR Part 434.
B. Intake water testing.

1. A raw water study of six (6) monthly samples must be completed prior to sampling for the treatability and toxic screening tests to determine the characteristics of a representative sample. Samples are to be taken monthly and consecutively until six (6) samples have been obtained. 'No Flows" are not to be counted as samples. The median shall be calculated for the manganese concentration. Ali future tests dealing with intake water, including the toxic screening, shall be done at a manganese concentration equal to or greater than the median. Parameters to be analyzed include:

    a. Manganese
    b. Conductivity
    c. Hardness
    d. Acidity
    e. Alkalinity
    f. Iron (Fe)
    g. Aluminum (Al) - Total
    h. pH
    i. Flow
    j. Sulfates
    k. TSS

2. Intake water shall dm be collected and tested for eligibility by performing Treatability Tests and 49 hour toxic screening at 100% concentration on the influent at the adjusted pH levels: 6.0, 7.5, 9.0, mid the upper pH variance limit in the permit if it is greater than 9.0. (If the raw water demonstrates a pH of greater than 6.0, then that pH shall be the low pH-) This sample shall also be analyzed at each pH level for the Parameters listed in I.B.1. plus Un-ionized Ammonia (where anhydrous ammonia is used as a reagent). "Total" and "Dissolved" metals will be Performed on the raw water and pH adjusted water. The chemical reagent used for

pH adjustment must be the same reagent that is used on site. Also, if a back-up system utilizing an alternative chemical is planned, additional tests must be performed with the alternative chemical used as reagent.

3. If the toxic screening is positive, a preliminary Benthic; Study shall be conducted at this time to establish a base line for invertebrate aquatic life, All benthic studies Am to be conducted at, preferably, two (2) sites to provide, as much as possible, a control representing the unaffected portion of the stream Prior to the discharge point and all sites shall be sampled on the same day. At the time of benthic sampling, the following parameters shall be analyzed:

    a. All parameters of I.B.l.
    b. Chlorides
    c. Sodium
    d. Fecal Coliform
    e. Dissolved Oxygen
    f. Calcium
    g. Magnesium
    h. Temperature

4. If eligibility tests indicate that the effluent will remain toxic despite manganese relief, further testing is superfluous. Each site shall be evaluated with the reasonable goal of habitat and aquatic life improvement.

II. Permit Modification, If results of the Eligibility Tests and Toxic Screening so indicate, the next step is to submit an application for a permit modification. Each site is to be judged on a case-by-case basis. While unfavorable results from the Eligibility Tests and Toxic Screening would preclude modifying the permit for manganese, favorable results do not necessarily mandate such modification. All other factors are to be considered by the Agency, including Title 46, Series 1 Legislative Rules.

A. Permit modification issued with a ninety (90) day Compliance Schedule.

1. If a discharge point under study has a pH variance, the variance will be revoked and pH limits modified to 6.0 - 9.0.
2. Manganese limits modified to "Report Only".
3. Bioassay (toxicity testing) on the discharge.

    a. All sampling and testing performed at this stage must be done during normal seasonal flow conditions.
    b. Analysis will include the parameters fisted in I.B.2.
    c. Bioassay tests shall be performed in accordance with EPA/600/4-90/027F.

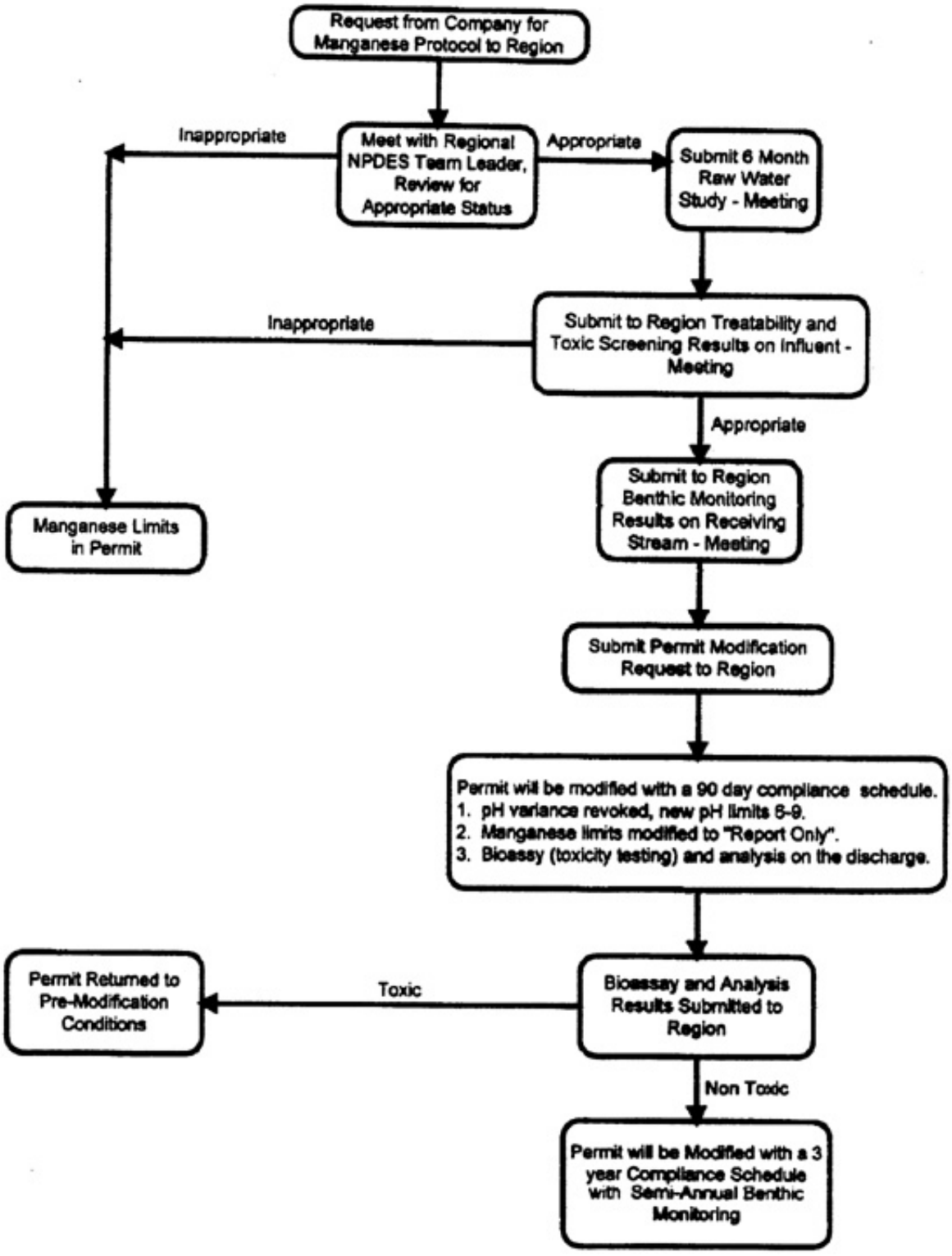
B. If the results of the bioassay indicate that the effluent is toxic to aquatic life, the permit shall be revised back to the pre-modification conditions. Otherwise, the permit will be modified again with a three (3) year Compliance Schedule requiring semi-annual benthic monitoring in the receiving streams.

    1. At a minimum, one benthic survey station will be established downstream of the discharge point (The same stations shall be used as a in I.B.3.)
    2. Benthic surveys shall be conducted according to EPA No. 444/4-89-001 May 1989 and include the parameters listed in I.B.3.

NOTE:Further testing may be needed on a case-by-case basis. All tests must be performed by laboratories certified in the testing procedures involved.

All sampling locations must be mutually agreed upon by the permittee and WVDEP personnel.

NPDES Manganese Protocol



ABC COAL CORPORATION--TOXICITY SUMMARY SHEET

COMPLIANCE PERIOD TOXICITY RESULTS VS. INITIAL BENCH RESULTS FOR OUT.-001

FATHEAD MINNOWS

SITE	PH	LC50	TUA	FE	AL	MN	ALK.	HARD.	ACID.	NA	NI	ZN	LO(0-48) 100%	LO(0-48) 50%	DO 48 100%	PH(0-48) 100%	CON(0-48) 100%
S-777-77-01 RAW	3.91	N/A	N/A	0.49	26.55	136.9	<2.00	2,618	348.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S-777-77-01 RAW	6.00	35.25	2.83	0.05	0.27	98.0	24.00	2,725	1.00	N/A	N/A	N/A	20 00 00	20 06 03	X	6.14 5.77 XX	4450 4465 XXX
S-777-77-01 RAW	7.50	39.20	2.55	<.01	0.10	89.0	13.00	1,996	1.00	N/A	N/A	N/A	20 00 00	20 12 05	X	7.43 6.19 XX	4140 4300 XXX
S-777-77-01 RAW	9.00	N/A	N/A	<.01	0.89	8.50	40.00	3,327	<1.00	N/A	N/A	N/A	20 20 20	20 20 20	7.60	9.21 9.01 8.97	4080 4110 4130
S-777-77-01 RAW	10.5	70.79	1.41	<.01	<0.03	0.32	148.0	2,041	<1.00	N/A	N/A	N/A	20 12 03	20 18 17	5.50	10.5 10.2 10.1	4030 4100 4120
S-777-77-01A RAW	2.87	N/A	N/A	45.8	48.60	186.6	<2.00	3,148	746	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S-777-77-01A RAW	6.00	36.53	2.73	0.01	0.27	100.1	19.00	4,042	1.00	N/A	N/A	N/A	20 00 00	20 04 03	XX	6.18 5.58 XX	5245 5265 XXX
S-777-77-01A RAW	7.50	45.06	2.21	0.01	0.27	68.70	55.00	2,718	1.00	N/A	N/A	N/A	20 00 00	20 14 07	XX	7.49 6.39 XX	4140 4220 XXX
S-777-77-01A RAW	9.00	N/A	N/A	0.01	0.38	6.90	75.00	4,325	<1.00	N/A	N/A	N/A	20 20 00	20 20 20	7.50	9.12 8.94 8.88	5000 5030 5035
S-777-77-01A RAW	10.5	59.46	1.68	0.01	<0.03	0.19	113.0	1,397	<1.00	N/A	N/A	N/A	20 00 00	20 19 15	XX	10.5 10.2 XX	4990 5140 XXX
001/8-22-97-DISC.	7.10	38.88	2.57	<.04	0.22	60.60	18.00	3,162	14.00	106.80	0.459	0.293	20 05 01	20 12 03	5.50	7.10 7.21 7.10	3160 3210 3230
001/9-18-97-DISC.	7.45	64.15	1.56	0.04	0.32	27.60	20.00	2,633	16.00	48.50	0.206	0.068	20 08 03	20 19 14	5.80	7.45 7.32 7.16	3160 3212 3240
001/10-21-97-DISC.	7.94	N/A	N/A	<.04	0.83	17.00	28.00	2,574	26.00	37.47	0.082	0.047	20 20 20	20 20 20	5.90	7.94 7.36 7.22	5300 5385 5420

DAPHNIA PULEX

SITE	PH	LC50	TUA	FE	AL	MN	ALK.	HARD.	ACID.	NA	NI	ZN	LO(0-48) 100%	LO(0-48) 50%	DO 48 100%	PH(0-48) 100%	CON(0-48) 100%
S-777-77-01 RAW	3.91	N/A	N/A	0.49	26.55	136.9	<2.00	2,618	348.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S-777-77-01 RAW	6.00	25.64	3.90	0.05	0.27	98.0	24.00	2,725	1.00	N/A	N/A	N/A	20 00 00	20 03 00	X	6.14 5.64 XX	4450 4465 XXX
S-777-77-01 RAW	7.50	25.99	3.84	<.01	0.10	89.0	13.00	1,996	1.00	N/A	N/A	N/A	20 00 00	20 01 00	X	7.43 6.12 XX	4140 4250 XXX
S-777-77-01 RAW	9.00	N/A	N/A	<.01	0.89	8.50	40.00	3,327	<1.00	N/A	N/A	N/A	20 20 18	20 20 20	7.70	9.21 9.10 8.97	4080 4100 4130
S-777-77-01 RAW	10.5	46.27	2.16	<.01	<0.03	0.32	148.0	2,041	<1.00	N/A	N/A	N/A	20 02 00	20 17 09	4.50	10.5 10.1 10.0	4030 4100 4120
S-777-77-01A RAW	2.87	N/A	N/A	45.8	48.60	186.6	<2.00	3,148	746	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S-777-77-01A RAW	6.00	25.64	3.91	0.01	0.27	100.1	19.00	4,042	1.00	N/A	N/A	N/A	20 00 00	20 04 00	XX	6.18 5.61 XX	5245 5255 XXX
S-777-77-01A RAW	7.50	26.58	3.78	0.01	0.27	68.70	55.00	2,718	1.00	N/A	N/A	N/A	20 00 00	20 03 00	XX	7.49 6.32 XX	5245 5280 XXX
S-777-77-01A RAW	9.00	N/A	N/A	0.01	0.38	6.90	75.00	4,325	<1.00	N/A	N/A	N/A	20 20 17	20 20 20	7.60	9.12 8.91 8.85	5000 5025 5040
S-777-77-01A RAW	10.5	61.56	1.62	0.01	<0.03	0.19	113.0	1,397	<1.00	N/A	N/A	N/A	20 00 00	20 18 16	XX	10.5 10.1 XX	4990 5120 XXX
001/8-22-97-DISC.	7.10	42.04	2.38	<.04	0.22	60.60	18.00	3,162	14.00	106.80	0.459	0.293	20 09 00	20 14 05	5.60	7.10 7.18 6.91	3160 3190 3210
001/9-18-97-DISC.	7.45	50.78	1.96	0.04	0.32	27.60	20.00	2,633	16.00	48.50	0.206	0.068	20 09 01	20 16 09	5.70	7.45 7.26 7.03	3160 3195 3230
001/10-21-97-DISC.	7.94	N/A	N/A	<.04	0.83	17.00	28.00	2,574	26.00	37.47	0.082	0.047	20 20 18	20 20 20	6.00	7.94 7.32 7.15	5300 5370 5390

S-777-77-01A RAW	2.87	*INITIAL BENCH TESTING TOXICITY RESULTS*

001/8-22-97-DISC.	7.10	*90 DAY COMPLIANCE PERIOD FIELD TOXICITY TEST RESULTS*

TOTAL INFORMATION SUMMARY SHEET
OUTLET 001

PARAMETER	8/22-R	8/22-T	8/22-D	9/18-R	9/18-T	9/18-D	10/21-R	10/21-T	10/21-D
PH	3.74	7.65	7.10	3.20	9.95	7.45	3.47	9.30	7.94
ALKALINITY	<2.00	16.00	18.00	<2.00	20.00	20.00	<2.00	320.00	28.00
ACIDITY	360.00	180.00	14.00	300.00	<2.00	16.00	400.00	<2.00	26.00
TURBIDITY	4.20	11.10	1.00	7.20	30.10	1.10	3.60	66.10	2.40
CONDUCTIVITY	6,780	5,970	6,055	4,680	4,390	4,605	5,080	4,575	5,310
SO4	3,373	3,211	3,220	2,674	2,501	2,711	2,336	2,118	2,109
CL	3.10	3.70	4.50	2.60	2.50	3.00	2.80	2.30	2.50
TOTAL FE	19.20	8.83	<0.04	13.27	1.89	0.04	12.41	5.39	<0.04
DISSOLVED FE	17.77	0.58	<0.04	12.40	<0.04	<0.04	12.00	<0.04	<0.04
TOTAL MN	134.50	110.90	60.60	90.70	59.00	27.60	102.40	74.30	17.00
DISSOLVED MN	130.50	102.70	60.40	89.00	1.40	27.30	101.90	17.40	16.50
TOTAL AL	37.95	29.38	0.22	29.70	27.51	0.32	30.39	26.24	0.83
DISSOLVED AL	36.74	1.69	0.21	29.67	0.48	0.23	29.96	0.42	0.76
TOTAL NA	45.73	69.85	106.80	31.75	41.11	48.50	24.32	29.33	37.47
DISSOLVED NA	42.45	68.22	106.70	31.35	39.20	46.44	23.50	28.85	37.01
TOTAL MG	654.50	592.60*	543.10	501.40	370.70*	419.50	519.00	428.70*	420.20
TOTAL CA	227.80	334.30*	370.80	177.90	392.70*	362.80	179.79	323.40*	338.10
HARDNESS	3,264	3,275	3,162	2,508	2,507	2,633	2,585	2,573	2,574
SUS. SOLIDS	10.00	210.00	10.00	5.00	810	5.00	14.00	486	7.00
DISS. SOLIDS	5,511	4,984	5,055	3,998	3,609	4,011	4,265	3,819	3,717
SB	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
AS	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
BE	0.026	0.020	<0.006	0.050	0.048	<0.006	0.032	0.027	<0.006
CD	0.006	<0.005	<0.005	0.022	0.021	<0.005	0.008	0.005	<0.005
CR	0.015	0.011	0.008	0.015	0.011	0.009	0.015	0.014	0.009
CU	0.044	0.034	0.008	0.038	0.030	0.004	0.061	0.050	0.018
CN	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PB	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
HG	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
NI	2.064	1.849	0.459	1.790	1.591	0.206	2.323	2.047	0.082
PHENOLS	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SE	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
AG	0.007	0.007	0.007	0.005	0.003	<0.003	0.008	0.007	0.006
TI	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
ZN	3.370	3.155	0.293	2.220	2.040	0.068	3.145	2.790	0.047
LC50————FH			38.88			64.15			N/A
TUA————FH			2.57			1.56			N/A
LIV. OR. 100%—FH			20/05/01			20/08/03			20/20/20
LIVE ORG. 50%-FH			20/12/03			20/19/14			20/20/20
DIS. O2 100 %—FH			5.50			5.80			5.90
PH-100% (48HR)-FH			7.1/7.21/7.1			7.45/7.32/7.16			7.94/7.36/7.22
LC50————D			42.04			50.78			N/A
TUA————D			2.38			1.96			N/A
LIV. OR. 100%—D			20/09/00			20/09/01			20/20/18
LIVE ORG. 50%—D			20/14/05			20/16/09			20/20/20
DIS. O2 100 %—D			5.60			5.70			6.00
PH-100% (48HR)—D			7.1/7.18/6.91			7.45/7.26/7.83			7.94/7.32/7.15

R–RAW T–TREATED D–DISCHARGE *–DISSOLVED
FH–FATHEAD D–DAPHNIA