AR0020036

ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY

FILE COPY

MEMORANDUM

TO: Larry Wilson, Branch Manager, Construction Grants

FROM: Mark Brady, Engineer, Water Division

DATE: August 24, 1984

SUBJECT: **MILL CREEK AT MELBOURNE, ARKANSAS**

Please find attached the results of stream modeling of Mill Creek using 30/30/15 (BOD_5/TSS/NH_3) conditions. The kinetic rate coefficients as well as temperature and flow setups were identical to values found in the Department's most recent study of Mill Creek (December, 1983). At the conditions you requested, the minimum dissolved oxygen content would fall to 2.87 mg/l corresponding with a travel time of 0.14 days.

MJB/mah
Attachment

MILL CREEK, MELBOURNE 30/30/15 at critical temperature

STREAM TEMPERATURE = 28.00
STREAM FLOW, cfs = 0.10
STREAM D.O. = 6.30
STREAM UOD, mg/l = 3.00

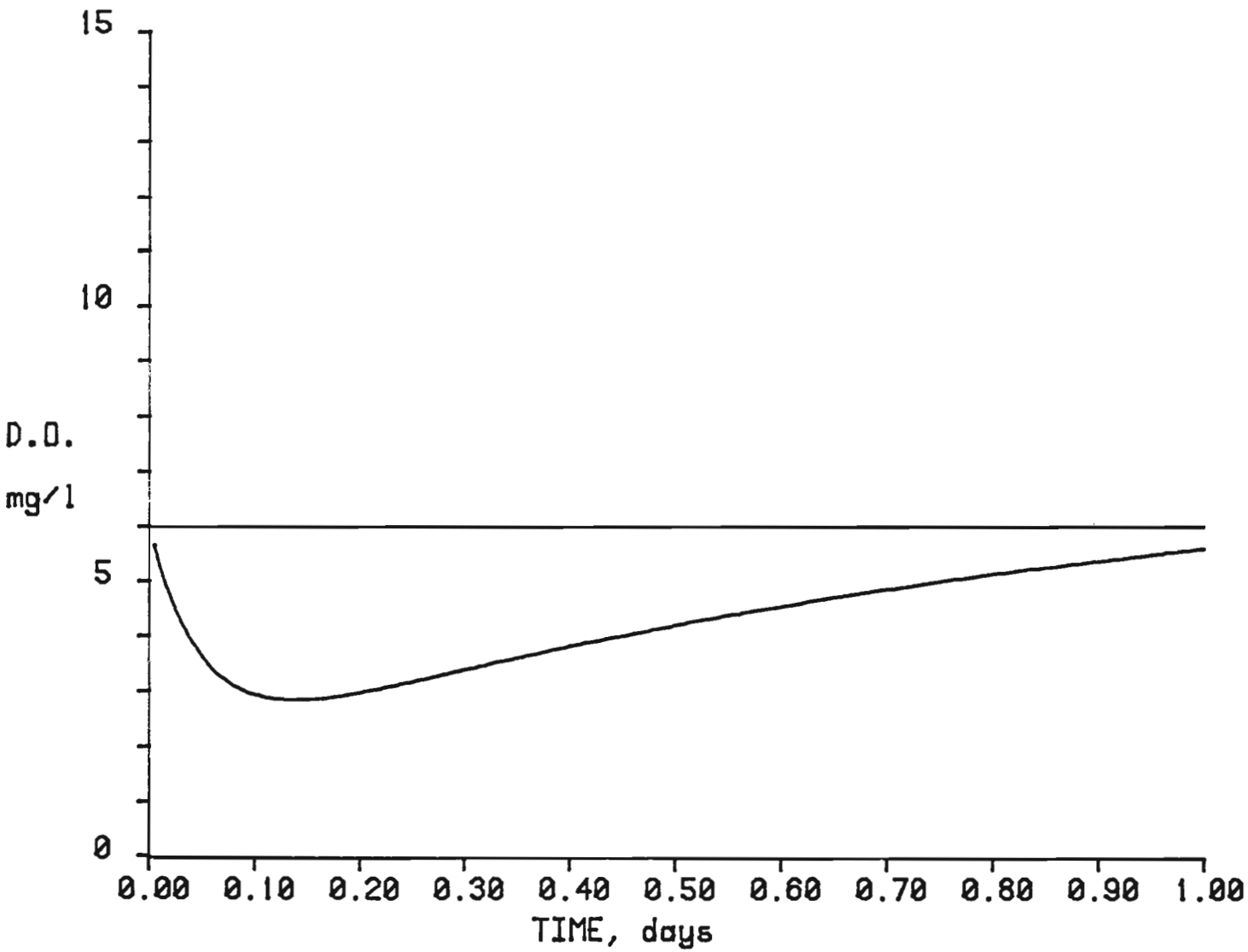
WASTE TEMPERATURE = 28.00
WASTE FLOW, mgd = 0.41
WASTE FLOW, cfs = 0.63
WASTE D.O., mg/l = 6.00
WASTE UOD, mg/l = 69.00

BENTHAL DEMAND, g/m^2/day= 0.30
MEAN DEPTH, ft. = 0.50

AMMONIA NITROGEN, mg/l =15.00
NUOD, mg/l =68.55
TOTAL UOD of waste, mg/l =137.55

RATE CONSTANTS, per day, (base e)
Kd = 0.90 Kd CORRECTED = 1.30
Ka =16.60 Ka CORRECTED =20.07
KN = 0.40 KN CORRECTED = 0.59
S = 1.97 S CORRECTED = 3.43

TEMPERATURE OF MIX = 28.00
D.O. SATURATION, mg/l = 7.90
INITIAL DEFICIT, mg/l = 1.86
CRITICAL DEFICIT, mg/l = 5.03
MINIMUM D.O., mg/l = 2.87
CRITICAL TIME, days = 0.14


MILL CREEK, MELBOURNE 30/30/15 at critical temperature
15
10
D.O.
mg/l
5
0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
TIME, days