

# MEMO

## State of Idaho

### Department of Water Resources

322 E Front Street, P.O. Box 83720, Boise, Idaho 83720-0098

Phone: (208) 287-4800 Fax: (208) 287-6700

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**Date:** June 13, 2011  
**To:** ESHMC  
**From:** Allan Wylie *AW*  
**cc:** Sean Vincent, Rick Raymondi  
**Subject:** MKMOD6 input file \*.mdl

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This memo discusses the format of the \*.mdl file, an input file for MKMOD6. MKMOD6 generates a MODFLOW 'well' file based on the \*.mdl file and several additional input files discussed elsewhere. The \*.mdl file tells MKMOD6 the number of stress periods, the number of rows, columns and layers in the model, contains non-irrigated lands parameter estimation multipliers, contains a parameter estimation multiplier for wetlands, informs MKMOD6 of the types of points in the fixed point file (\*.fpt), optionally tells MKMOD6 to create additional output files containing summations of selected components of irrigation, and optionally tells MKMOD6 which stress periods to average to form the input for an initial steady state period. The Appendix contains an example of a \*.mdl file. The row numbering in the Appendix is added for reader convenience, line numbering should not be included in any functional \*.mdl file.

The first two lines are ignored by MKMOD6 and commonly used as comment lines (lines 1 and 2 in the Appendix).

Lines 3 and 4 in the Appendix define the native time and distance units.

Line 5 contains three integers, the number of stress periods, and the starting and ending stress periods to average to form the initial steady state period. The example file in the Appendix is for a model with 342 stress periods and stress periods 229 through 240 are averaged to produce an initial MODFLOW steady state period.

The section beginning on line 6 contains one line for each stress period identified in line 5. Each line contains the length of the stress period and an optional comment that can be used to describe the stress period. The \*.mdl file in the Appendix begins in May, 1980 and ends in October, 2008.

The four lines following the stress periods describe the model grid. This section begins on line 16 in the Appendix and continues through line 19. It contains one line each for the number of rows, number of columns, number of layers and the layer to which ground

water pumping is assigned. The example file is for a model containing 104 rows, 209 columns, 1 layer and all pumping is assigned to layer 1.

Lines 20 and 21 in the Appendix pertain to non-irrigated recharge. Line 20 informs MKMOD6 of the number (n) of non-irrigated recharge zones, and line 21 contains n+1 scaling factors. In our example line 20 contains an 11, so the first 11 numbers on line 21 are used to adjust non-irrigated recharge. The last number (n+1), the 12<sup>th</sup> number on line 21 in the Appendix, is the scaling factor used to adjust wetlands net evapotranspiration.

The section beginning on line 22 in the Appendix describes the number of fixed point types and the associated data flags in the fixed point (\*.fpt) file. Line 22 in the Appendix contains the number of point types, the following lines (lines 23 through 26 in the Appendix) define the points. Each line contains the character used to identify the points in the \*.fpt file, followed by the recharge array MKMOD6 assigns the stress to. The point identifiers do not need to be single character, but must be consistent with the identifiers in the \*.fpt file. The recharge arrays are:

WEL - ground water pumping

SWR - used by MKMOD6 to compute the on-farm water budget for surface water entities

GWR - used by MKMOD6 to compute on-farm water budget for ground water entities

PPT - precipitation and evapotranspiration

CNL - canal seepage

TRB - tributary underflow

Optional text can be added to each line following the recharge array assignment without affecting MKMOD6 operation.

The section beginning on line 27 in the Appendix is used to create optional output files containing summations of the various components of the on-farm water budget for any irrigation entity. The first line, line 27, contains the number of components being summed. Options include:

DIV - Total diversions

SEEP - Canal leakage

RET - Returns

ROF - Runoff

APP - Irrigation Water Applied

ET - Evapotranspiration

CIR - Crop Irrigation Requirement

DEF - Irrigation Deficit

EXS - Irrigation Excess

SM - Soil Moisture

RCH - Recharge

AREA - Acreage

Fsp - Sprinkler Fraction

RATE - Application Rate  
EFF - Irrigation Efficiency  
OFF - Off-site pumping  
FPx - Fixed point types (the character identifiers from the preceding section)

The next line, line 28 in the Appendix, contains the suffix for the file to be created (rfx in the Appendix), the component to be summed, and the entities to be combined. Lines 27 and 28 in the Appendix instruct MKMOD6 to make 1 additional output file called \*.rfx, and it is to consist of the sum the runoff (ROF) from entities IESW009, IESW020, and IESW055.

The last section, line 29 in the Appendix is optional and usually contains explanatory text.

# Appendix

- 1) Bev/Cam trib broken into Beaver and Camas and Henry F broken into RtlPine and Henry F. \*.mdl file modified to work with
- 2) MKMOD6, updates to the \*.off and \*.cnl files. New \*.ent file supplied by IWRRI on 04Apr2011
- 3) DAYS
- 4) FEET
- 5) 342 229 240
- 6) 31 05/1980
- 7) 30 06/1980
- 8) 31 07/1980
- 9) .
- 10) .
- 11) .
- 12) 31 07/2008
- 13) 31 08/2008
- 14) 30 09/2008
- 15) 31 10/2008
- 16) 104
- 17) 209
- 18) 1
- 19) 1
- 20) 11
- 21) 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
- 22) 4
- 23) W PPT Wetlands Correction
- 24) U WEL Urban Pumping
- 25) E WEL Exchange Pumping
- 26) M WEL MudLake Pumping
- 27) 1
- 28) rfx ROF IESW009+IESW020+IESW055
- 29) E110315A (created by A Wylie IDWR by modifying E110304A)