aquifer areas in the Des Moines Creek subbasins (determined during HSPF model calibration), were included in the future condition model for Des Moines Creek.

Other changes for future conditions made in the hydrologic routing scheme included the following:

1. SDW subbasin changes proposed in the west draining portion of the Third Runway project;
2. Additional flows from the North Employee Parking Lot (NEPL) and Cargo subbasins;
3. Overflows from the North Cargo and North Snow Melt Pump Stations; and
4. Elimination of SDN2, which drains to the IWS system.

2.6 PERIOD OF HYDROLOGIC RECORD

The analysis of future hydrologic conditions (and comparison to pre-development conditions) was conducted using an extended hydrologic record relative to the period used for the HSPF model calibration. The Miller Creek and Walker Creek model was calibrated using a hydrologic record from October 1992 through August 1996 for reasons described in Appendix B. The Des Moines Creek model was calibrated using a hydrologic record from January 1994 through September 1996, as described in Appendix B.

Long-term records are recommended for flood frequency and flow duration analyses, typically a minimum of 10 years (U.S. Department of Interior 1982). The period used for evaluation of detention facility requirements described in this appendix was based on the rainfall and evaporation data from October 1948 though September 1996 (a 49-year record).

Long-term precipitation and evaporation records were used as follows:

- Hourly precipitation records for STIA (NOAA Weather Service station) from October 1948 through September 1996; and
- Daily pan evaporation data (based on the Puyallup Experiment Station) from October 1948 through September 1996 obtained from King County DNR.

2.7 CALIBRATION OF AIRPORT FILL PARAMETERS

A preliminary analysis was made of the stormwater runoff during a 1-month period (late January through late February 1999) at the 1998 embankment fill site to calibrate HSPF PWATER parameter values. The Hydrocomp Forecast and Analysis Model (HFAM) computer program was used for this analysis. This program incorporates the same numerical algorithms for hydrologic processes as HSPF, but has additional features that facilitate the study of surface runoff, interflow, and base flow components.

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DATE 2-20-03
BY: CHERYL J HAMME

Table A-4. Summary of embankment fill parameter calibration.

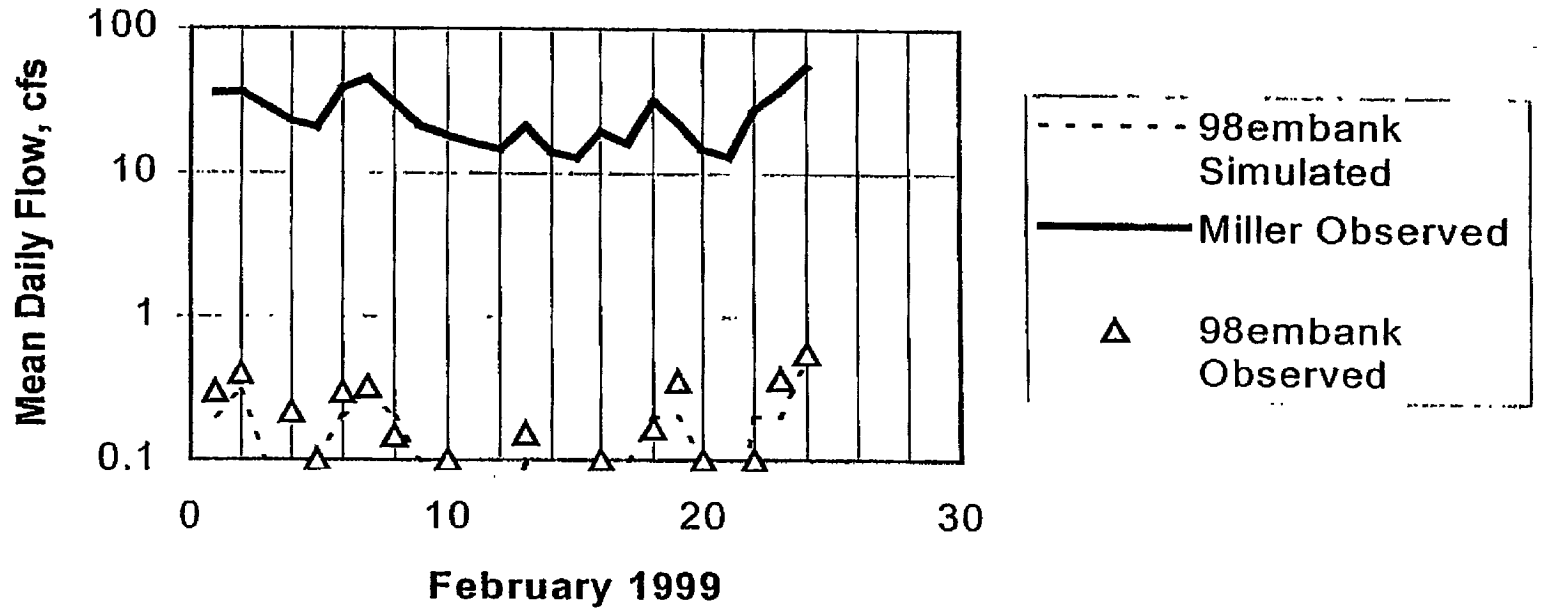
PWATER Parameter	Fill Material Value
LZSN	7.5
INFILT	0.02
INFEXP	2.0
DEEPFR	0.10
BASETP	0.0
UZSN	0.28
AGWRC	0.90
INTFW	6.0
LZETP	0.6
IRC	0.15
AGWETP	0.0
CEPSC	0.10
NSUR	0.25
LSUR	300
SLSUR	0.07

Compared to till, the fill has the following characteristics:

1. The fill is deeper and has a greater lower zone storage (LZSN);
2. The fill has up to 12 percent fines (silt and clay) and lower infiltration at the compac surface; therefore, it has a lower INFILT value;
3. The fill overlies the till layer so it has about the same order of deep percolation loss as till (i.e., DEEPFR is about the same);
4. The fill has no losses from base flow or groundwater to ET pathways; therefo BASETP and AGWETP are zero;
5. The fill has a fast groundwater recession rate, resulting in a similar AGWRC to till;
6. The fill has a faster interflow recession rate and therefore a lower IRC;
7. The fill has a much greater proportion of water moving as interflow and therefo higher INTFW; and
8. The fill has about the same upper zone storage (UZSN) as till.

The simulated versus observed mean daily flow is compared in Figure A-6. The observed at the Miller Creek gage near the mouth is included for reference. Most mean daily fluctuation at the 1998 embankment corresponds to fluctuation near the mouth. There exceptions, such as on February 2 and 4. The accuracy of the estimated embankment flow limited by the frequency at which pond levels were recorded, which limited close correla between simulated and observed daily flow. Nonetheless, the total observed runoff volume February 1999 was approximately 6.83 acre-feet in comparison to the simulated runoff vol of 6.87 acre-feet—a difference of about 0.5 percent.

Figure A-6. Comparison of Simulated 1998 Embankment Flow to Observed Embankment and Miller Creek Flow During Calibration



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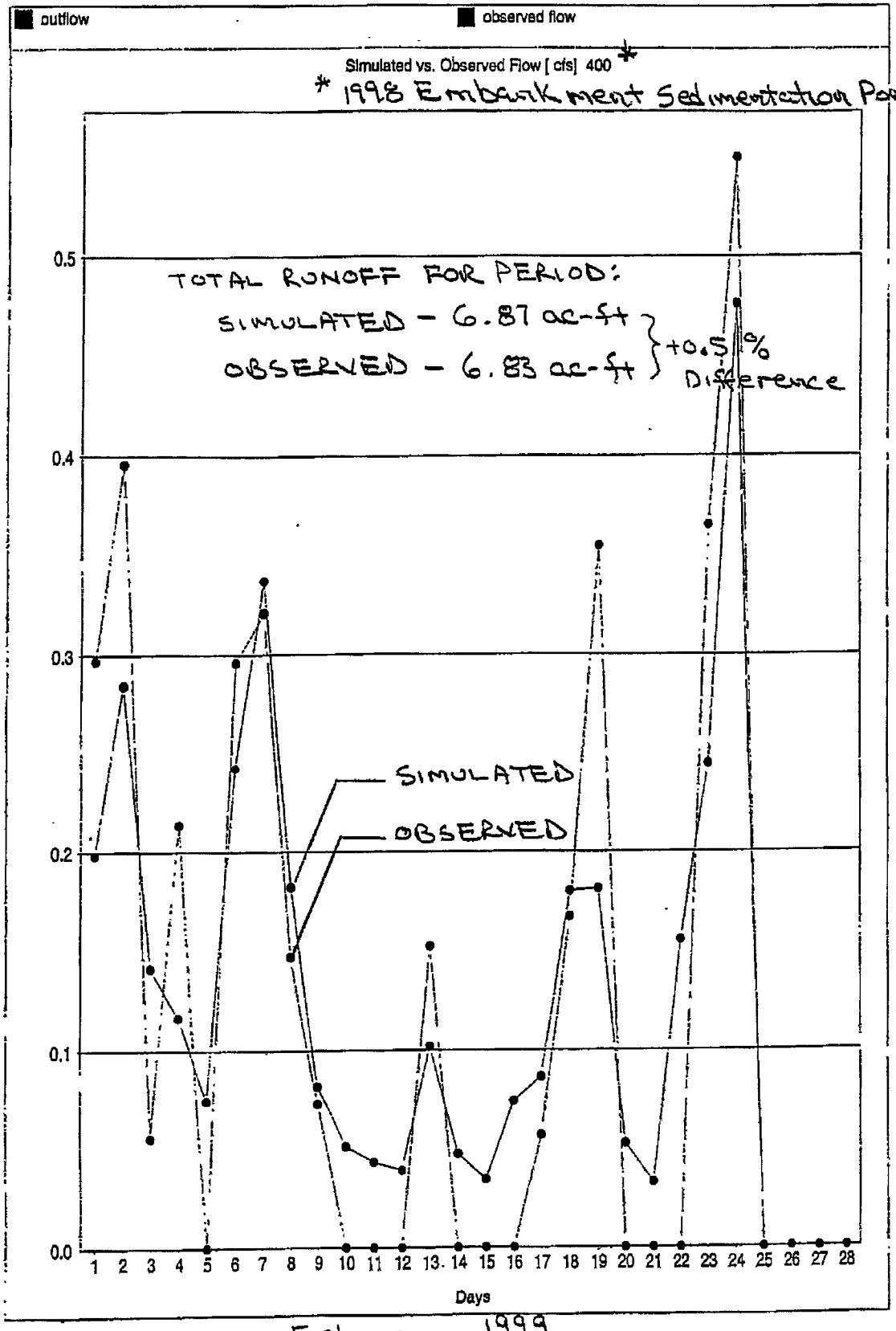
ATTACHMENT B

1998 Embankment Fill Calibration Data

HYDRO OUTPUT



February 1999