Freese and Nichols

# DRAFT MEMORANDUM

**TO:** File

**FROM:** Jon Albright

**SUBJECT:** Modeling of BRA Contracts in the Brazos G Model (TXU/BRA Task 3b)

**DATE:** February 20, 2007

1. I have finished a review of the modeling of BRA contracts in the Brazos G WAM models for the years 2000 and 2060. Table 1 is a summary of the amounts and locations of these water rights. Attachment 1 is a more detailed list of the contract modeling.

**Table 1**
**Summary of BRA Contracts in the Brazos G WAM Models**
(Values in acre-feet per year)

| Location TXU | Contracts | Other Contracts | Total |
|---|---|---|---|
| Possum Kingdom and Lk Granbury | 97,447 | 140,539 [a,b] | 237,986 |
| Lk Granbury to Lk Whitney | 0 | 22,913 | 22,913 |
| Little River System | 0 | 204,131 | 204,131 |
| Lake Limestone | 25,000 | 29,809 | 54,809 |
| Below Lk Whitney | 0 | 241,712 | 241,712 |
| *Total 122,447* | | *639,104* | *761,551* |

a Includes 61,955 acre-feet of 'remaining yield'
b Includes 3,600 acre-feet of reduced yield due to FERC hydropower requirements

2. The Brazos G model has the following general features:
   - Return flows and reservoir storage are the only differences between the 2000 and 2060 models.
   - Diversion amounts are identical in the two models.
   - The modeling includes subordination of three water rights: Lake Alan Henry and Possum Kingdom Reservoir, Lake Stamford to Possum Kingdom Reservoir, and the Clifton off-channel reservoir to Lake Waco.

3. In regard to BRA contracts (excluding contracts between BRA and TXU), the model has



Freese and Nichols, Inc. ◆ Engineers ◆ Environmental Scientists ◆ Architects
4055 International Plaza ◆ Suite 200 ◆ Fort Worth, Texas 76109-4895
(817) 735-7300 ◆ Metro (817) 429-1900 ◆ Fax (817) 735-7491

DRAFT

the following features:

- BRA contract amounts are set to the sum total of BRA water rights (including the full right for Allens Creek Reservoir).
- Some of the diversions have small shortages during the 1950s drought. No adjustment was made to the model to prevent these shortages.
- All BRA contracts are modeled as constant annual diversions. However, many BRA contracts serve to backup other water rights and are not intended to be constant amounts taken every year.
- The model includes a diversion of 61,955 acre-feet per year from Possum Kingdom labeled 'remaining yield'.
- The 3,600 acre-feet reduction in Possum Kingdom yield due to FERC release requirements is also modeled like any other contract.
- Excluding the remaining yield and FERC diversions, the total amount of BRA water supply contracts is 695,996 acre-feet per year.
- The full authorized diversion from Allens Creek Reservoir is taken lakeside, even though Allens Creek is used as a backup for several contracts. This leads to diversions that are more than the authorized amount in some years.
- All diversions associated with Lake Aquilla (11,403 acre-feet per year) and about half of the diversions associated with Lake Belton (49,509 acre-feet per year) are modeled as Type 1 water rights at the Brazos River near Bryan gauge. Therefore these two diversions have access to unregulated flows in the Brazos River at that location as well as reservoir releases.
- All other downstream diversions are modeled as Type 3 rights, so they can only be met by releases from the associated reservoirs. Because of losses between the reservoir and the downstream diversion location, more water will be released from the reservoir than the diversion amount. (I believe this is not the way that BRA structures its contracts; customers are assumed to bear losses during transit.)
- The model includes contracts with Lubbock and Stamford which represent impact on yield by upstream development of Lake Alan Henry and Lake Stamford, respectively. Possum Kingdom is also subordinated to these rights, so this impact may be double-counted.

4. BRA contracts with TXU are modeled as constant annual diversions from Possum Kingdom, Lake Granbury and Lake Limestone. A diversion of 14,000 acre-feet per year comes directly from Possum Kingdom. A diversion of 83,447 acre-feet per year comes from Lake Granbury, backed up by releases from Possum Kingdom. 25,000 acre-feet per year comes from Lake Limestone. The model does not use these contract amounts to backup TXU diversions at any location.

DRAFT