

**UPDATE
JUNIPER SWD #1
AREA OF INFLUENCE REPORT
SAN JUAN BASIN, NEW MEXICO**

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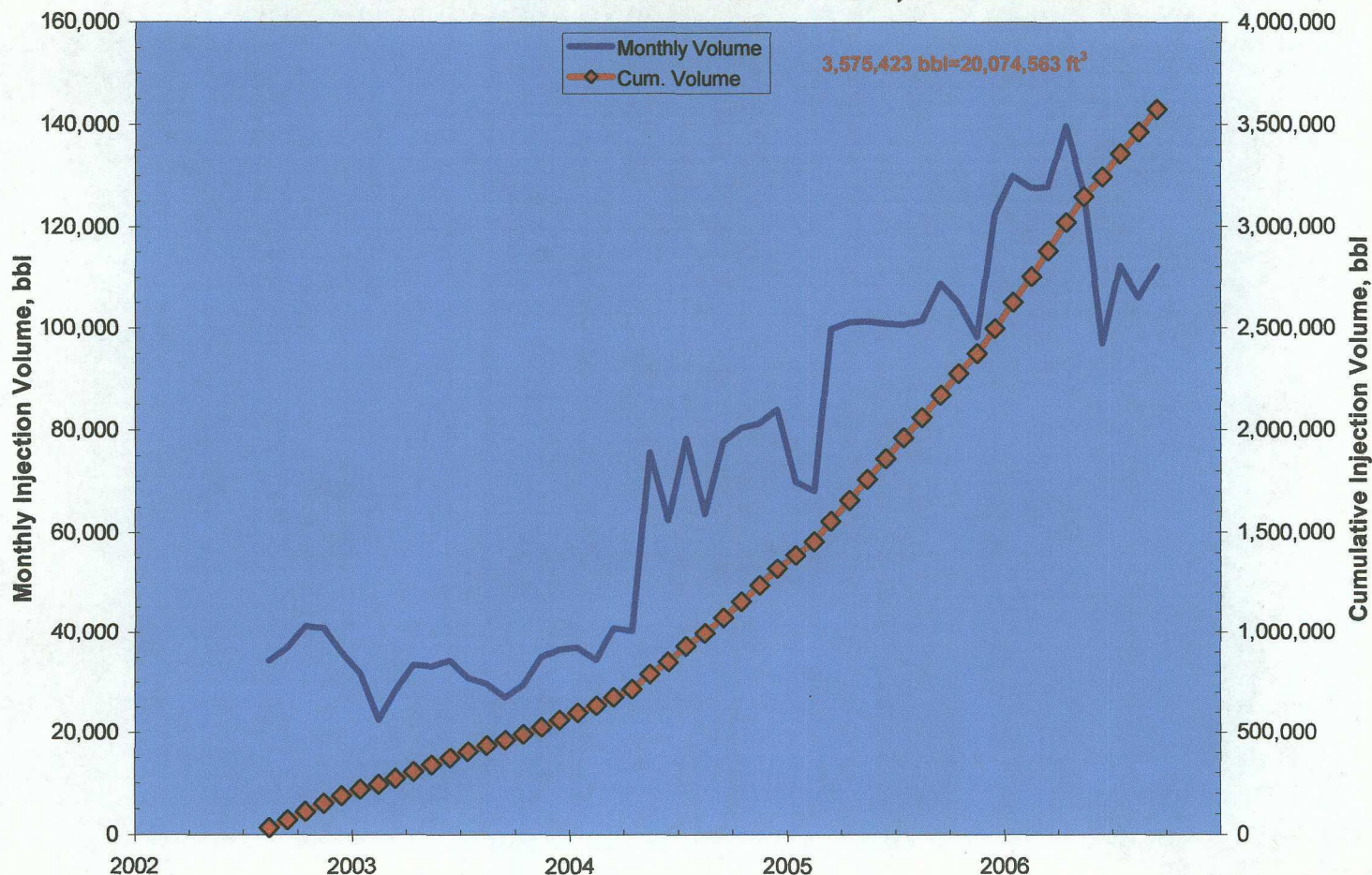
BEFORE THE OIL CONSERVATION DIVISION
Santa Fe, New Mexico
Case No. 13812 Exhibit No. 11
Submitted by:
COLEMAN OIL & GAS, INC.
Hearing Date: November 9, 2006

WATER INJECTION VOLUME

Beginning in August 2002, produced water from the Fruitland Formation CBM field was injected into the Juniper SWD #1 well. The well did not require pumping pressure for injection. Monthly volumes were recorded in barrels and reported to the New Mexico Energy and Minerals Department. The data through September 2006 is shown on Figure 4. The minimum rate was 22,482 bbl/month in February 2003 (22 gallons per minute, gpm, 0.05 cubic feet per second, cfs). The maximum rate was 139,756 bbl/month in April 2006 (136 gpm, 0.3 cfs). The water injection volume has generally increased over four years. The well still does not require pumping pressure for injection.

The cumulative injection volume is shown on the right axis. The total through September 2006 was 3,575,423 barrels or 20,074,563 cubic feet. Overall a large amount of water for an oil and gas operation to dispose of, but a relatively small amount compared to surface water.

FIGURE 4-WATER INJECTION VOLUME vs. TIME, JUNIPER SWD #1



WATER CYLINDER CALCULATIONS

The injected water would enter the formation through the perforations. If radial and consistent flow throughout the perforations is assumed, then the injected water volume is a cylinder around the wellbore. The equation of a cylinder with porosity is:

$$r^2 (\text{radius}) * \pi * h (\text{thickness}) * \text{Porosity} = V (\text{volume injected})$$

The equation solved for radius is:

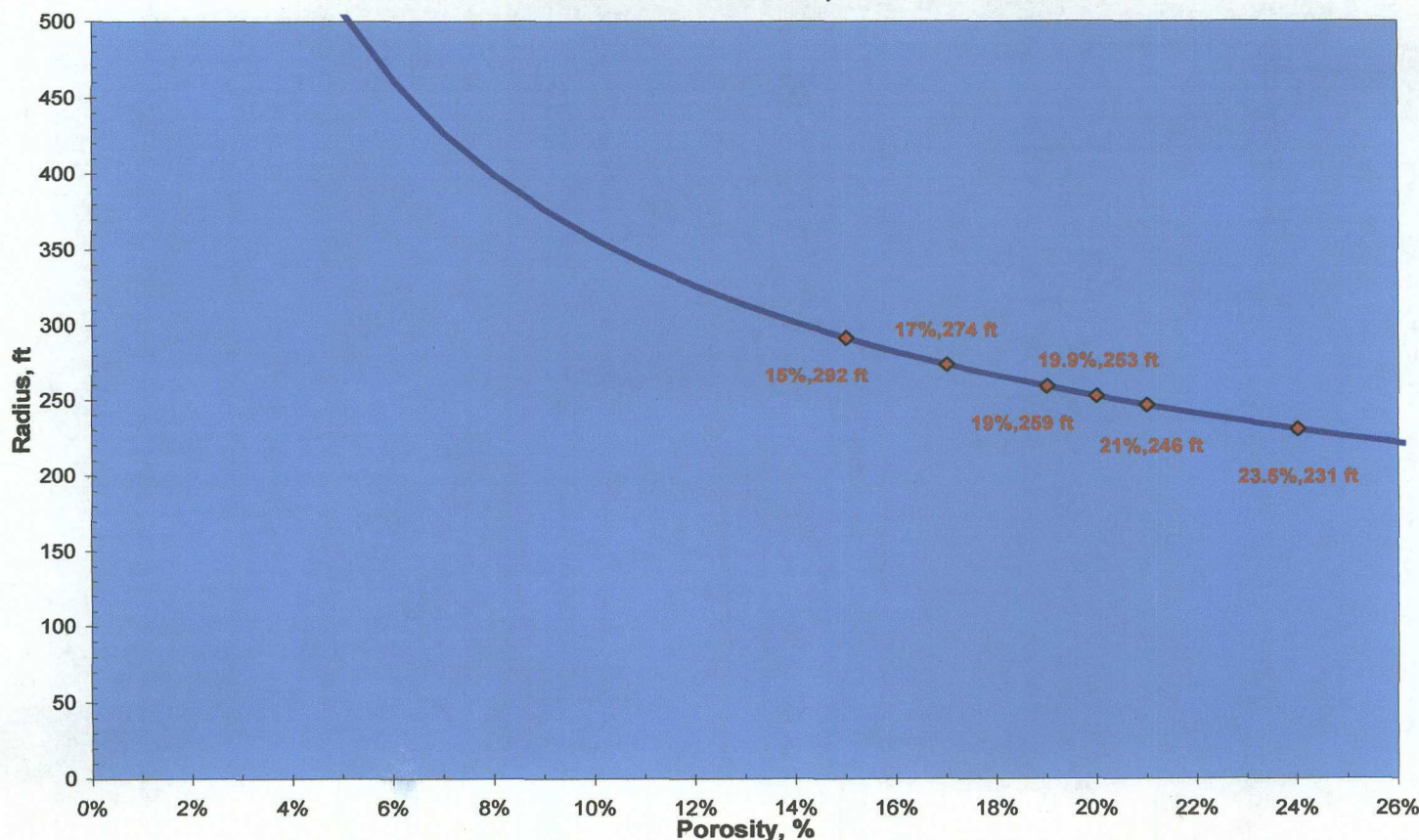
$$r (\text{radius}) = \text{SQRT} \{ V (\text{volume injected}) / [h (\text{thickness}) * \text{Porosity} * \pi] \}$$

$$r (\text{radius}) = \text{SQRT} \{ 20,074,563 \text{ ft}^3 / [501 \text{ ft} * \text{Porosity} * \pi] \}$$

This equation is plotted as radius versus porosity on Figure 5. For the zone porosity range of 15 to 23.5%, the radius varies from 231 to 292 feet with the total mean of 19.9% resulting in a radius of 253 feet. The small range in radius is mainly due to the relatively small amount of water injected.

Comparing to the December 2005 calculated radius (porosity of 19.9%) shows a change from 211 feet to 253 feet or an increase of 4.7 feet per month.

FIGURE 5-RADIUS vs. POROSITY, JUNIPER SWD #1



The equation of a cylinder with porosity can also be solved for area as follows:

$$r^2 (\text{radius}) * \pi * h (\text{thickness}) * \text{Porosity} = V (\text{volume injected})$$

The equation solved for area is:

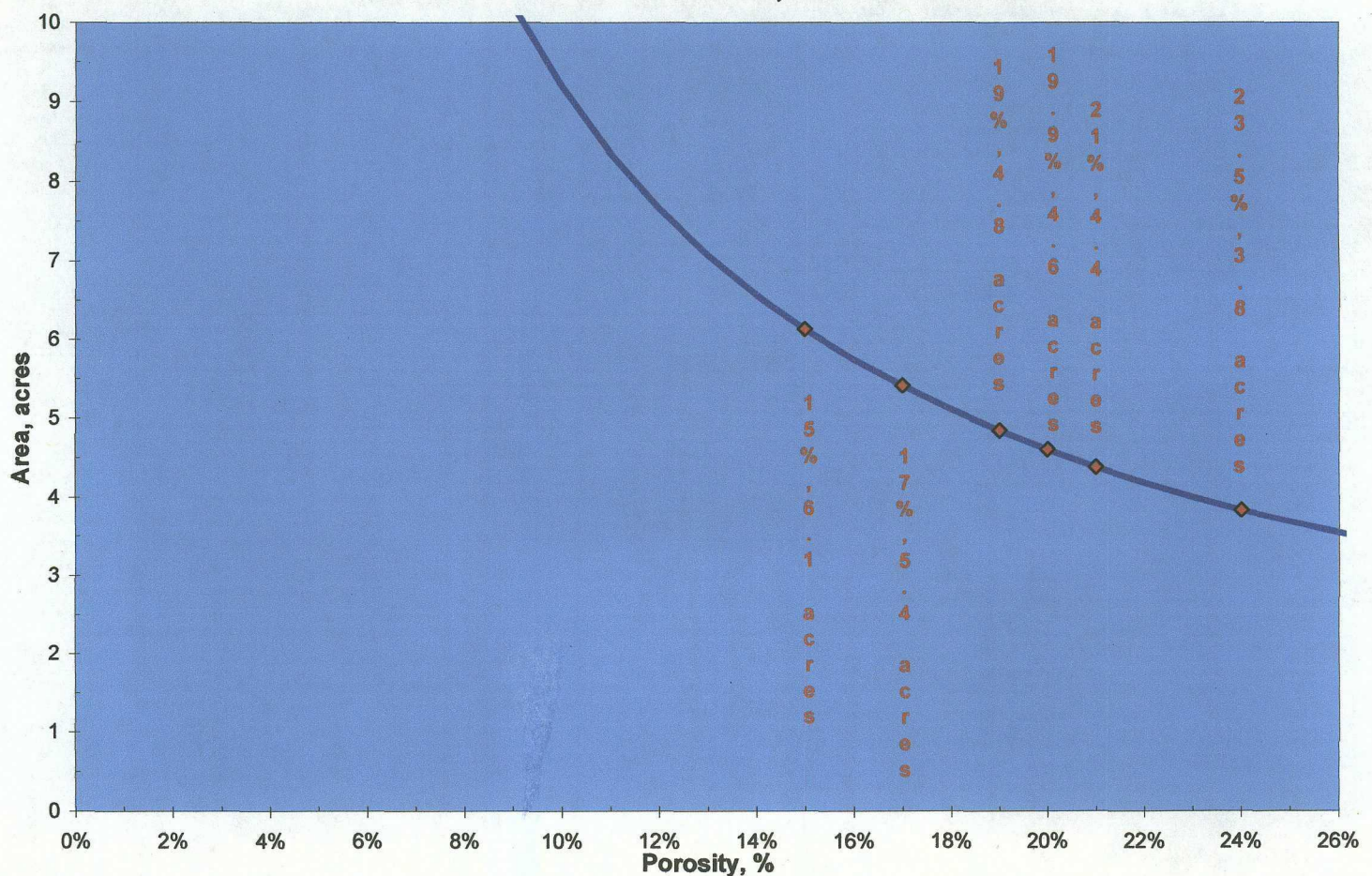
$$A = r^2 (\text{radius}) * \pi = V (\text{volume injected}) / [h \text{ thickness} * \text{Porosity}]$$

$$A (\text{acres}) = \{20,074,563 \text{ ft}^3 / [501 \text{ ft} * \text{Porosity}]\} / 43,560 \text{ ft}^2 / \text{acre}$$

This equation is plotted as area versus porosity on Figure 6. For the porosity range of 15 to 23.5%, the area varies from 3.8 to 6.1 acres with the total mean of 19.9% resulting in a radius of 4.6 acres. The small range in area is mainly due to the relatively small amount of water injected.

Comparing to the December 2005 calculated area (porosity of 19.9%) shows a change from 3.2 acres to 4.6 acres or an increase of 0.16 acre per month.

FIGURE 6-AREA vs. POROSITY, JUNIPER SWD #1



POROSITY vs. TIME

The distance from the Juniper SWD #1 well to an abandoned Dakota well was calculated to be 1,885 feet (0.357 mi) from the reported survey locations. The hypothesis is how long would it take the injected water to reach this abandoned site if the injection was confined to the Menefee and Point Lookout Formations (thickness=124 feet) at a rate of 2,000 bbl/day (11,229 ft³/day)?

The equation of a cylinder with porosity can also be solved for time as follows:

$$r^2 (\text{radius}) * \pi * h (\text{thickness}) * \text{Porosity} = Q_w (\text{injection rate}) * \text{time} = V (\text{volume injected})$$

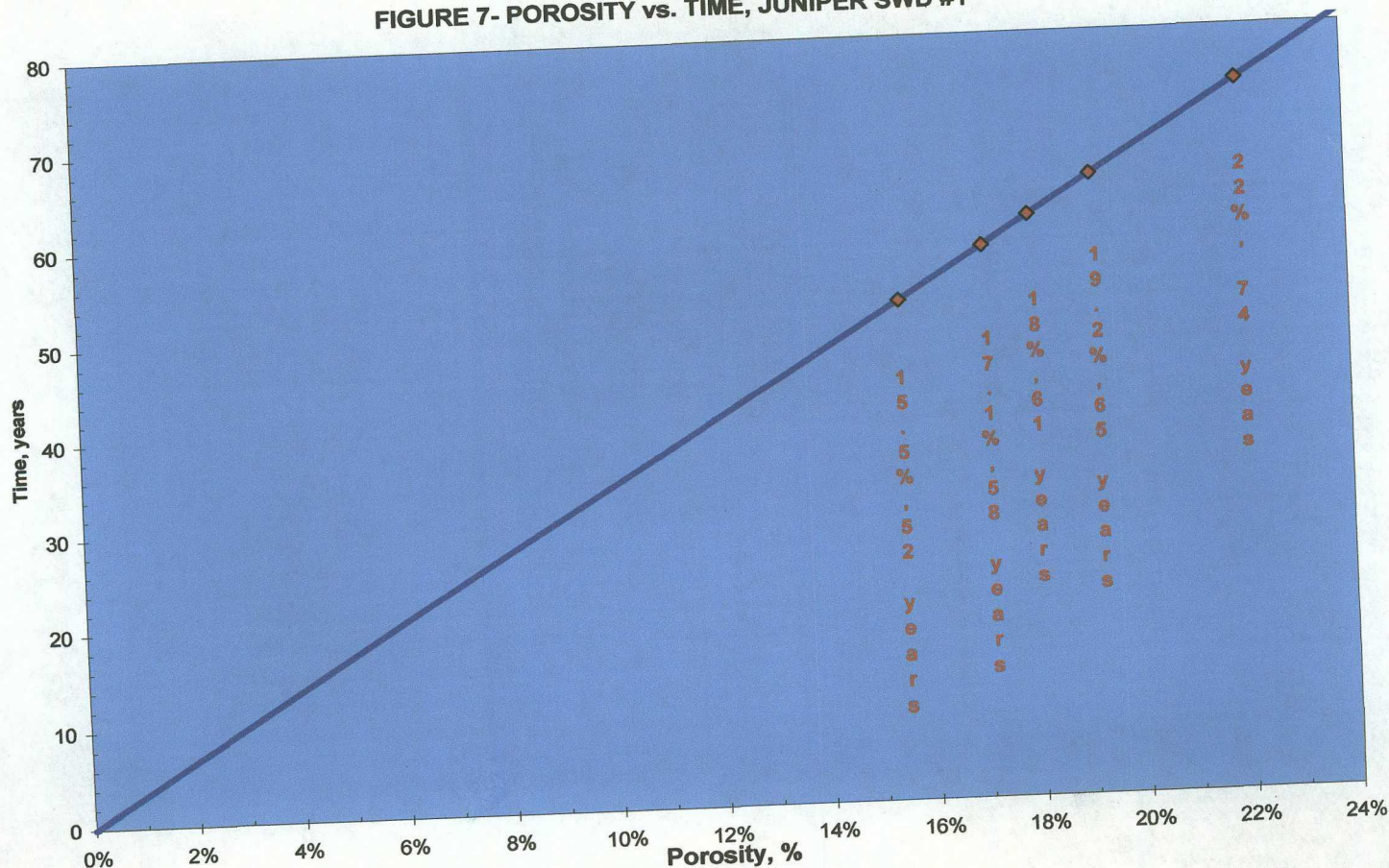
The equation solved for time is:

$$t (\text{time}) = [r^2 (\text{radius}) * \pi * h (\text{thickness}) * \text{Porosity}] / Q_w (\text{injection rate})$$

$$t (\text{time, years}) = [(1,885 \text{ ft})^2 * 3.1416 * 124 \text{ ft} * \text{Porosity}] / 4,098,657 \text{ ft}^3/\text{year}$$

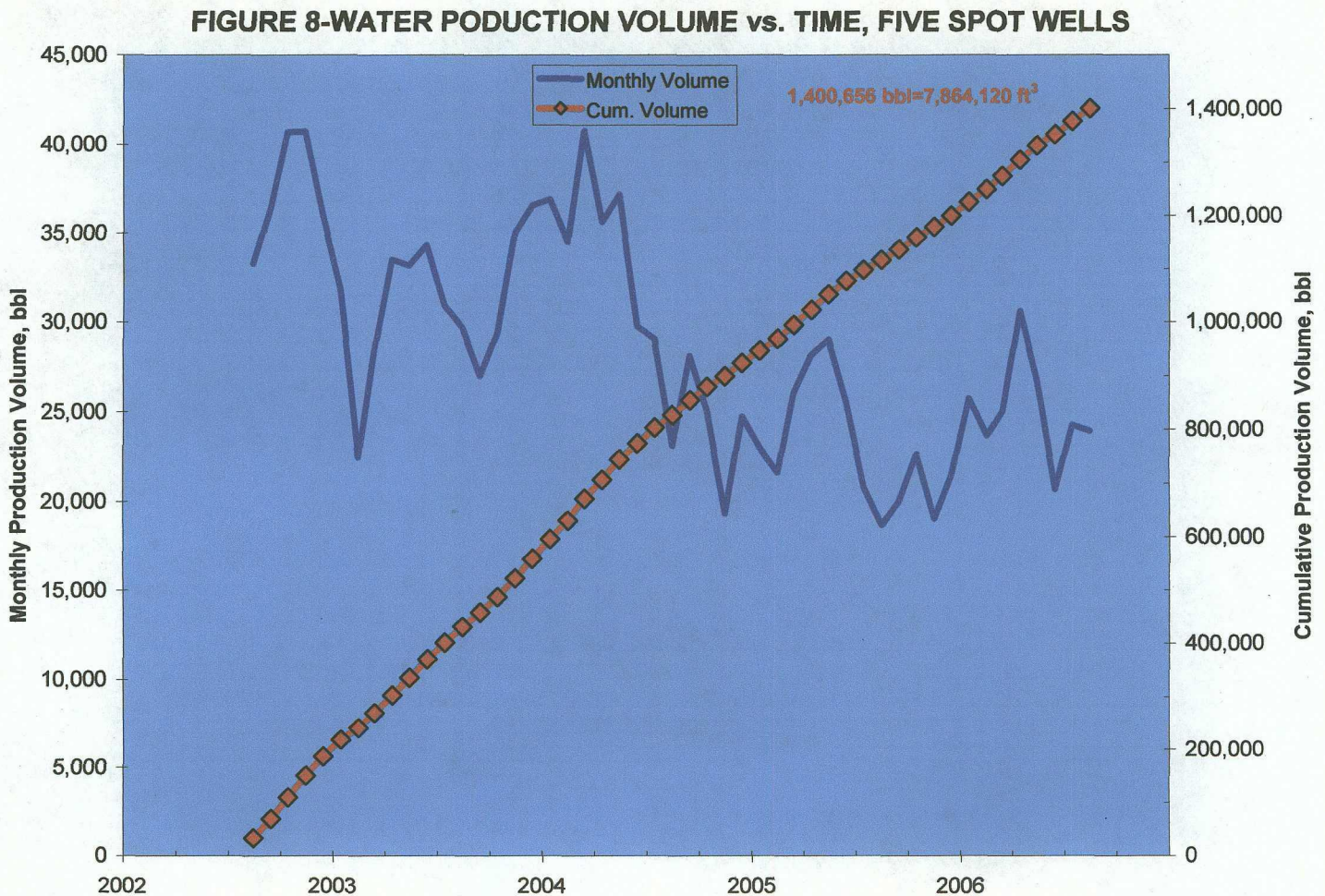
This straight line equation is plotted as time versus porosity on Figure 7. For the porosity range of 15.5 to 22%, the time varies from 52 to 74 years with the total mean of 18% porosity resulting in a time of 61 years.

FIGURE 7- POROSITY vs. TIME, JUNIPER SWD #1



FIVE SPOT PRODUCTION

The Fruitland Formation CBM field dewatering was started using five wells in close proximity (five spot). These were the Juniper #1, Juniper #11-16, Juniper #14-9, Juniper #32-16 and the Juniper #41-17. They began production in August 2002 and continue to the present time. The water production for the five spot is shown on Figure 8. Water production began around 40,000 bbl/month in October 2002. After four years of production, water production has declined to about 20,000 bbl/month. This water production decline is characteristic of a coal bed methane reservoir. Ultimately the water production from the entire CBM field will decline so injection water volumes will also decline.



UPDATED CONCLUSIONS

4. The water injection rate ranged from 22,482 bbl/month to 139,756 bbl/month (22 to 136 gpm, 0.05 to 0.3 cfs). The total injected through September 2006 was 3,575,423 bbl (20,074,563 ft³). Overall this is a relatively small amount of water compared to surface water.
5. For water production through September 2006, the radius of injected water ranged from 231 to 292 feet with an overall mean of 253 feet. The relatively small volume of water limits the radius. The rate of radius change from December 2005 through September 2006 has been 4.7 ft per month.
6. The area of injected water ranged from 3.8 to 6.1 acres with an overall mean of 4.6 acres. The relatively small volume of water limits the area. The rate of area change from December 2005 through September 2006 has been 0.16 acre/month.
8. It will take between 52 and 74 years for Juniper SWD#1 injection water to reach a radius of 1,885 feet if the injection was confined to the Menefee and Point Lookout Formations at a rate of 2,000 bbl/day.
9. CBM water production has declined by half in the five spot wells in four years of production. Water production of the five spot will probably continue to decline.