

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

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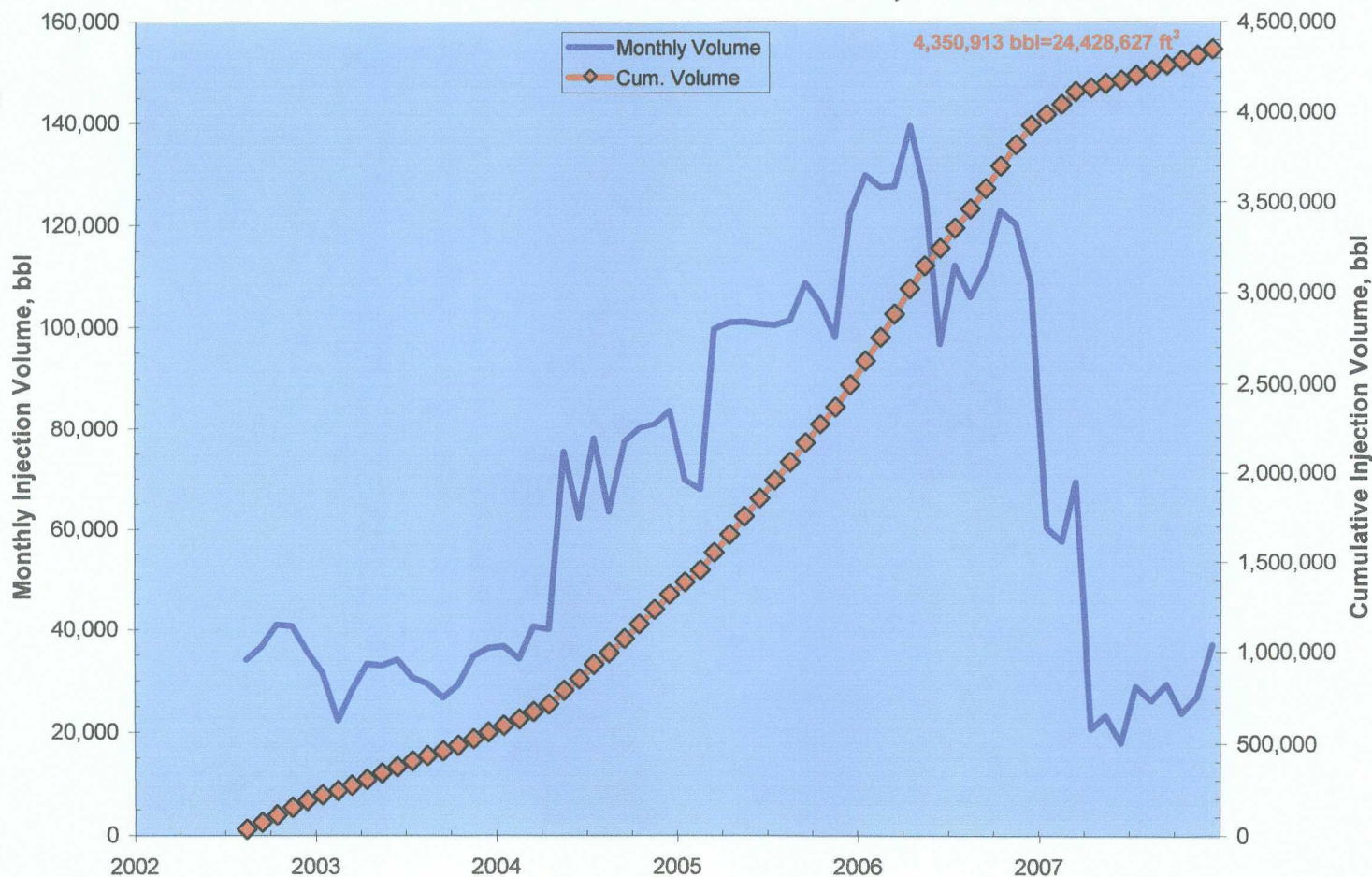
**BEFORE THE OIL CONSERVATION
COMMISSION
Santa Fe, New Mexico
Case No. 13812 Exhibit No. 17
Submitted by:
COLEMAN OIL & GAS, INC.
Hearing Date: March 13, 2008**

WATER INJECTION VOLUME

Beginning in August 2002, produced water from the Fruitland Formation CBM field was injected into the Juniper SWD #1 well. The injection zone had a total of 501 feet in thickness. The well did not require pumping pressure for injection. In January 2007 the injection zone was limited to perforations below 3,000 feet for a total of 124 feet in thickness. Monthly volumes were recorded in barrels and reported to the New Mexico Energy and Minerals Department. The data through December 2007 is shown on Figure 4. The minimum rate was 18,168 bbl/month in June 2007 (18 gallons per minute, gpm, 0.04 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 generally increased through 2006, but has decreased through 2007 due to volumes going to other disposal wells. The thinner injection zone was pressuring up.

The cumulative injection volume is shown on the right axis. The total through December 2006 was 3,927,412 bbl or 22,050,839 cubic feet. The total through December 2007 was 4,350,913 barrels or 24,428,627 cubic feet. Overall large amounts of water for an oil and gas operation to dispose, but a relatively small amount compared to surface water.

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



WATER CYLINDER CALCULATIONS- 2006 DECEMBER

The injected water would enter the formation through the perforations. Through December 2006 the thickness was 501 feet. 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:

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

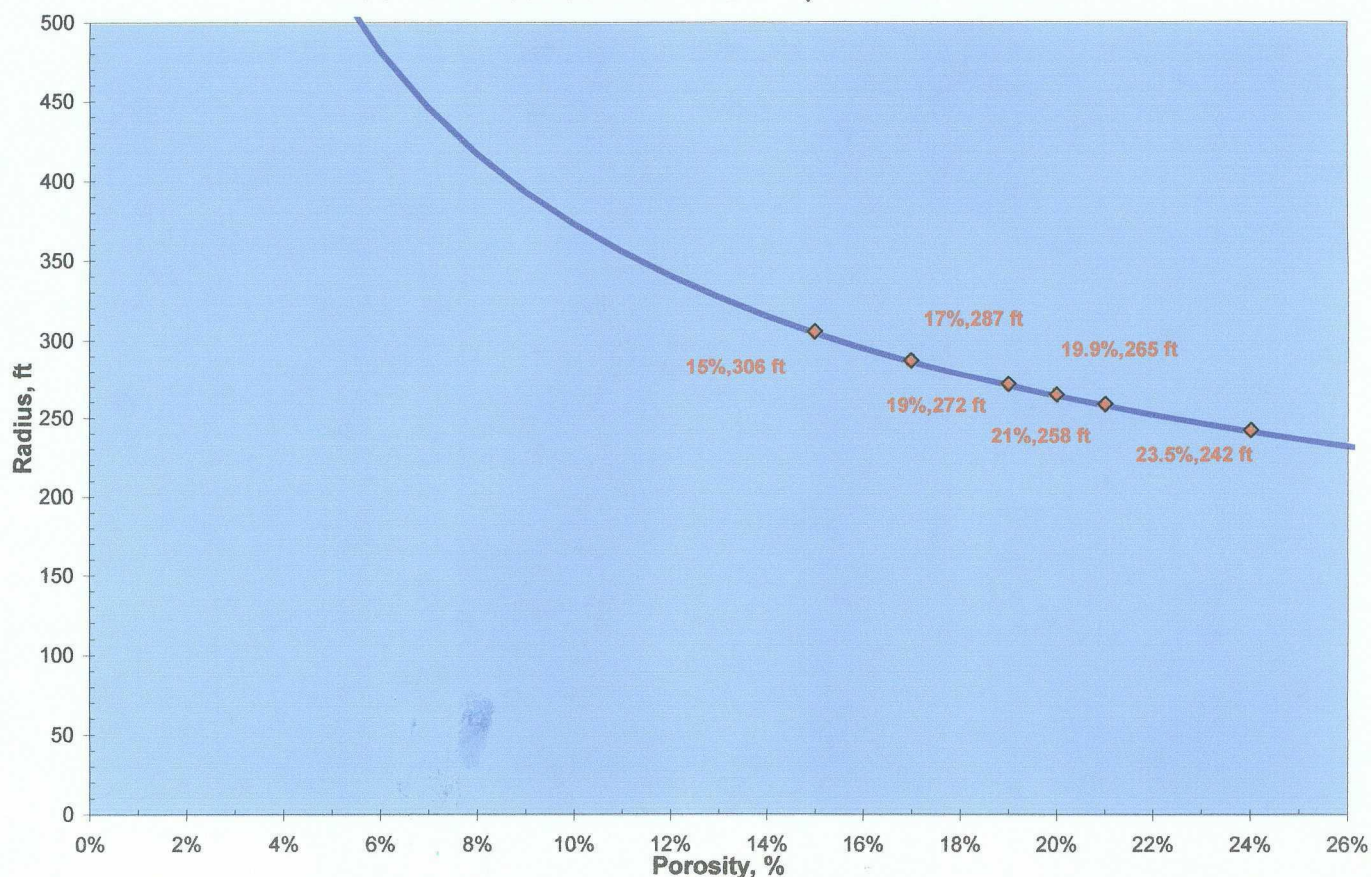
The equation solved for radius is:

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

$$r (\text{radius}) = \text{SQRT} \{ 22,050,839 \text{ ft}^3 / [501 \text{ ft} * \text{Porosity} * \text{Pi}] \}$$

This equation is plotted as radius versus porosity on Figure 5A. For the zone porosity range of 15 to 23.5%, the radius varies from 242 to 306 feet with the total mean of 19.9% resulting in a radius of 265 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 265 feet or an increase of 4.5 feet per month (54 feet in one year).

FIGURE 5A-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:

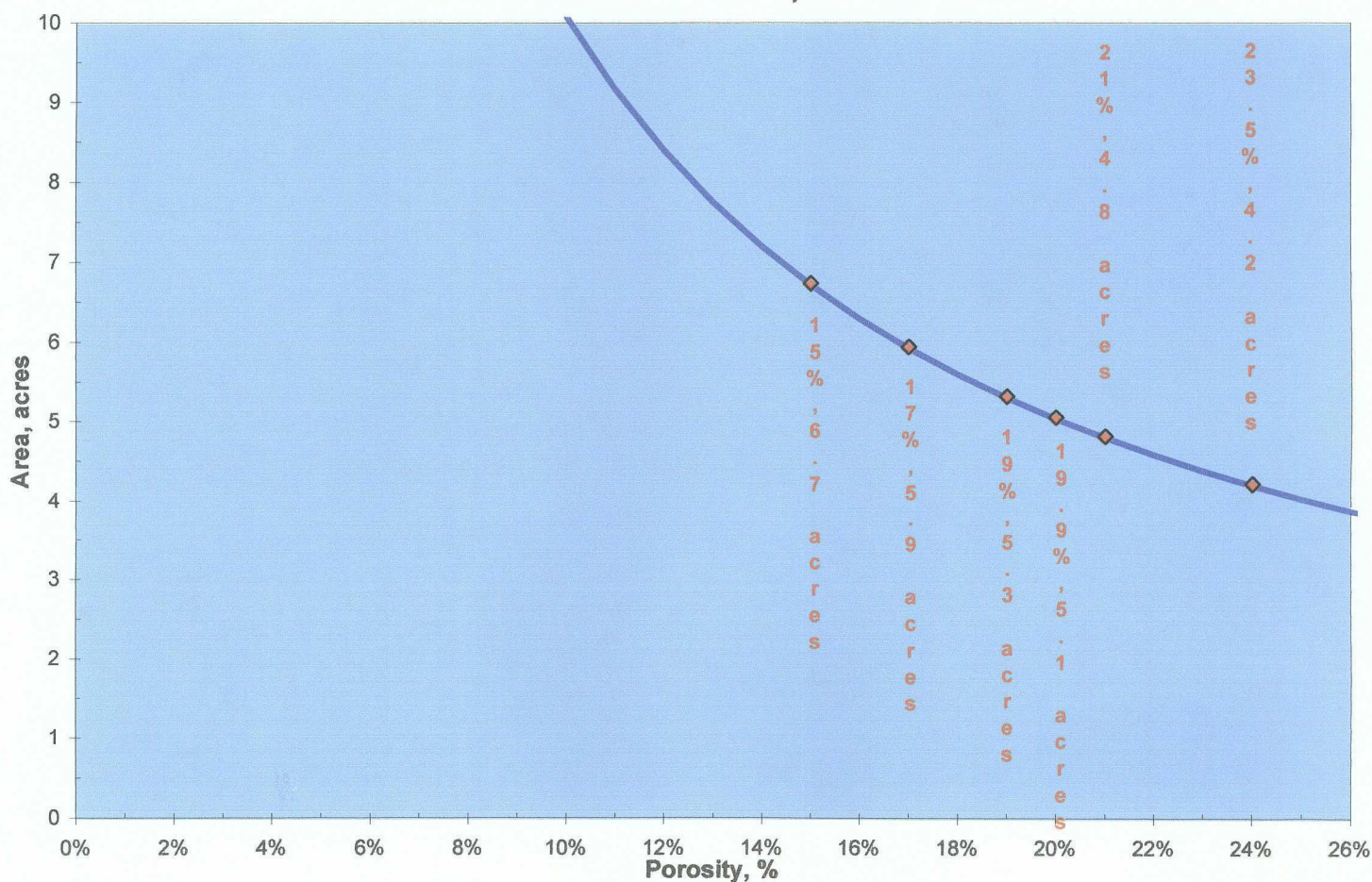
$$A = r^2 (\text{radius}) * \pi = V (\text{volume injected}) / [h \text{ thickness} * \text{Porosity}]$$

$$A (\text{acres}) = \{22,050,839 \text{ ft}^3 / [501 \text{ ft} * \text{Porosity}]\} / 43,560 \text{ ft}^2 / \text{acre}$$

This equation is plotted as area versus porosity on Figure 5B. For the porosity range of 15 to 23.5%, the area varies from 4.2 to 6.7 acres with the total mean of 19.9% resulting in a radius of 5.1 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 5.1 acres or an increase of 0.16 acre per month (1.9 acres in one year).

FIGURE 5B-AREA vs. POROSITY, JUNIPER SWD #1



The equation solved for radius or area is exponential as shown on Figures 5A and 5B. In these calculations the injection rate was constant. So the change in radius or area will decrease over time. If the injection rate decreases over time then the change in radius or area will also decrease over time. This was seen in the numbers from 2005 to 2006. Rate of radius change decreased from 4.7 feet/month to 4.5 feet/month.

After December 2006, no more water was injected into perforations above 3,000 feet. So no further expansion of the water cylinder was possible in these perforations.

WATER CYLINDER CALCULATIONS- 2007 DECEMBER

The injected water would enter the formation through the perforations. Through December 2006 the thickness was 501 feet. After that time the thickness was 124 feet. 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 and a change in thickness is:

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

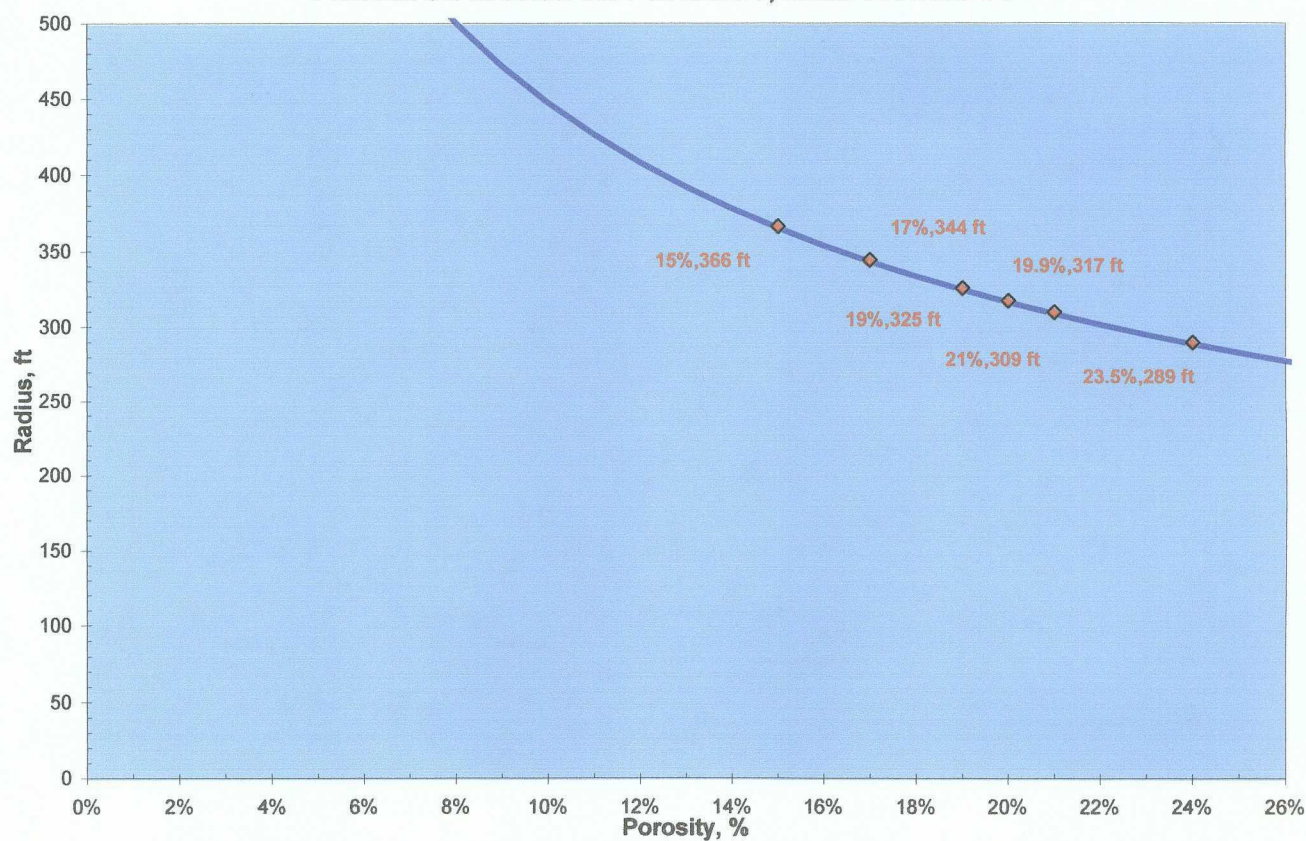
The equation solved for radius is:

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

$$r (\text{radius}) = \text{SQRT} \{ [(24,428,627-22,050,839)+22,050,839 \text{ ft}^3 * (124 \text{ ft}/500 \text{ ft})] / [124 \text{ ft} * \text{Porosity} * \pi] \}$$

This equation is plotted as radius versus porosity on Figure 5C. For the zone porosity range of 15 to 23.5%, the radius varies from 289 to 366 feet with the total mean of 19.9% resulting in a radius of 317 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 317 feet or an increase of 4.4 feet per month (106 feet in two years).

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



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

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

The equation solved for area is:

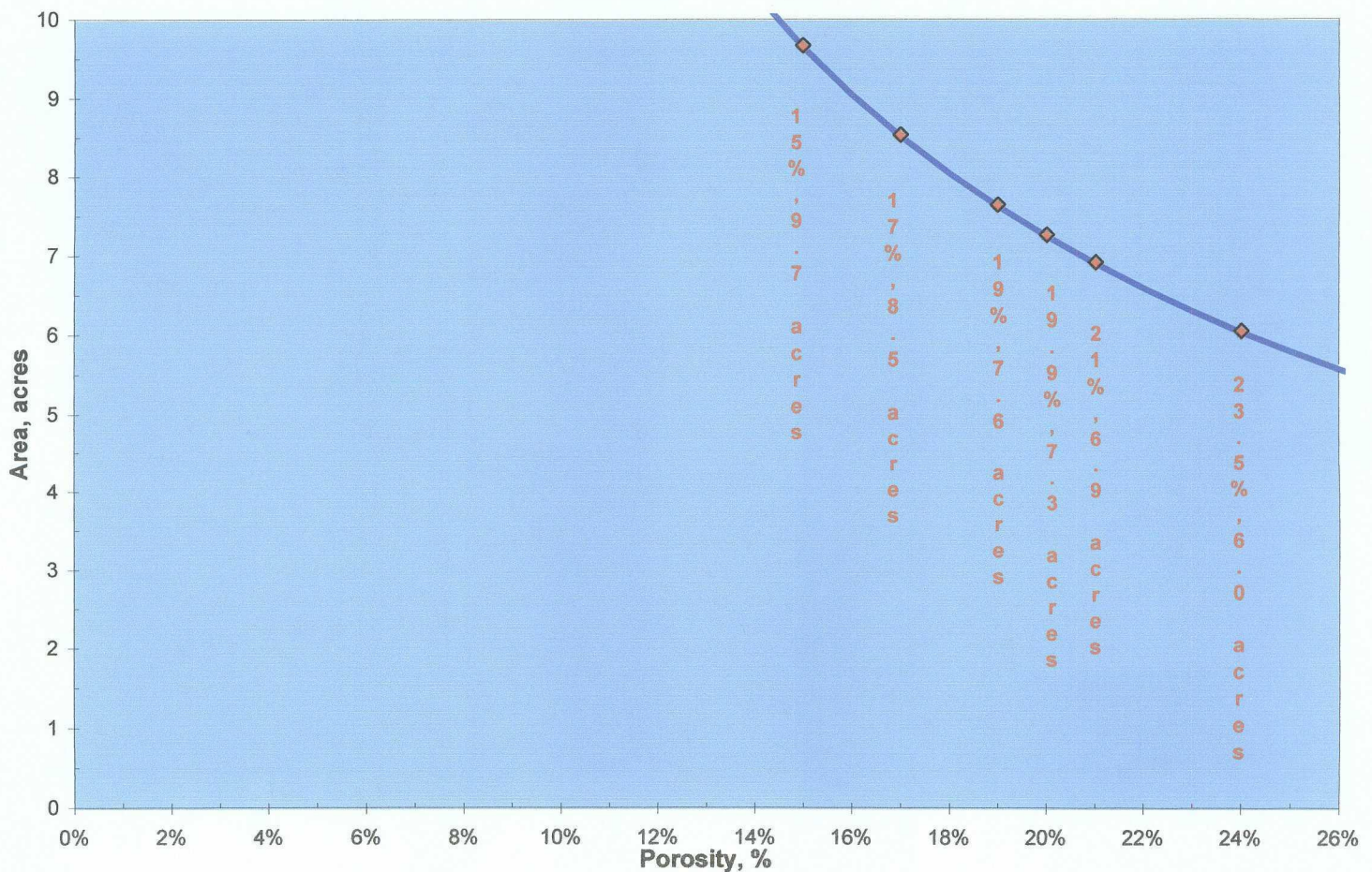
$$A = r^2 (\text{radius}) * \text{Pi} = V (\text{volume injected}) / [h \text{ thickness} * \text{Porosity}]$$

$$A (\text{acres}) = \{ [(24,428,627 - 22,050,839) + (22,050,839 \text{ ft}^3 * 124 \text{ ft} / 500 \text{ ft})] / [124 \text{ ft} * \text{Porosity}] \} / 43,560 \text{ ft}^2 / \text{acre}$$

This equation is plotted as area versus porosity on Figure 5D. For the porosity range of 15 to 23.5%, the area varies from 6.0 to 9.7 acres with the total mean of 19.9% resulting in a radius of 7.3 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 7.3 acres or an increase of 0.17 acre per month (4.1 acres in two years).

FIGURE 5D-AREA vs. POROSITY, JUNIPER SWD #1



The equation solved for radius or area is exponential as shown on Figures 5C and 5D. So the change in radius or area will decrease over time. If the injection rate decreases over time then the change in radius or area will also decrease over time. This was seen in the numbers from 2005 to 2007. Rate of radius change decreased from 4.7 feet/month to 4.4 feet/month.

Injection rates are declining (Figure 4) due to the water production characteristics of the CBM reservoir (Figure 8) and water volumes going to other disposal wells. These injection rate declining trends are expected to continue.

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 was 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:

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

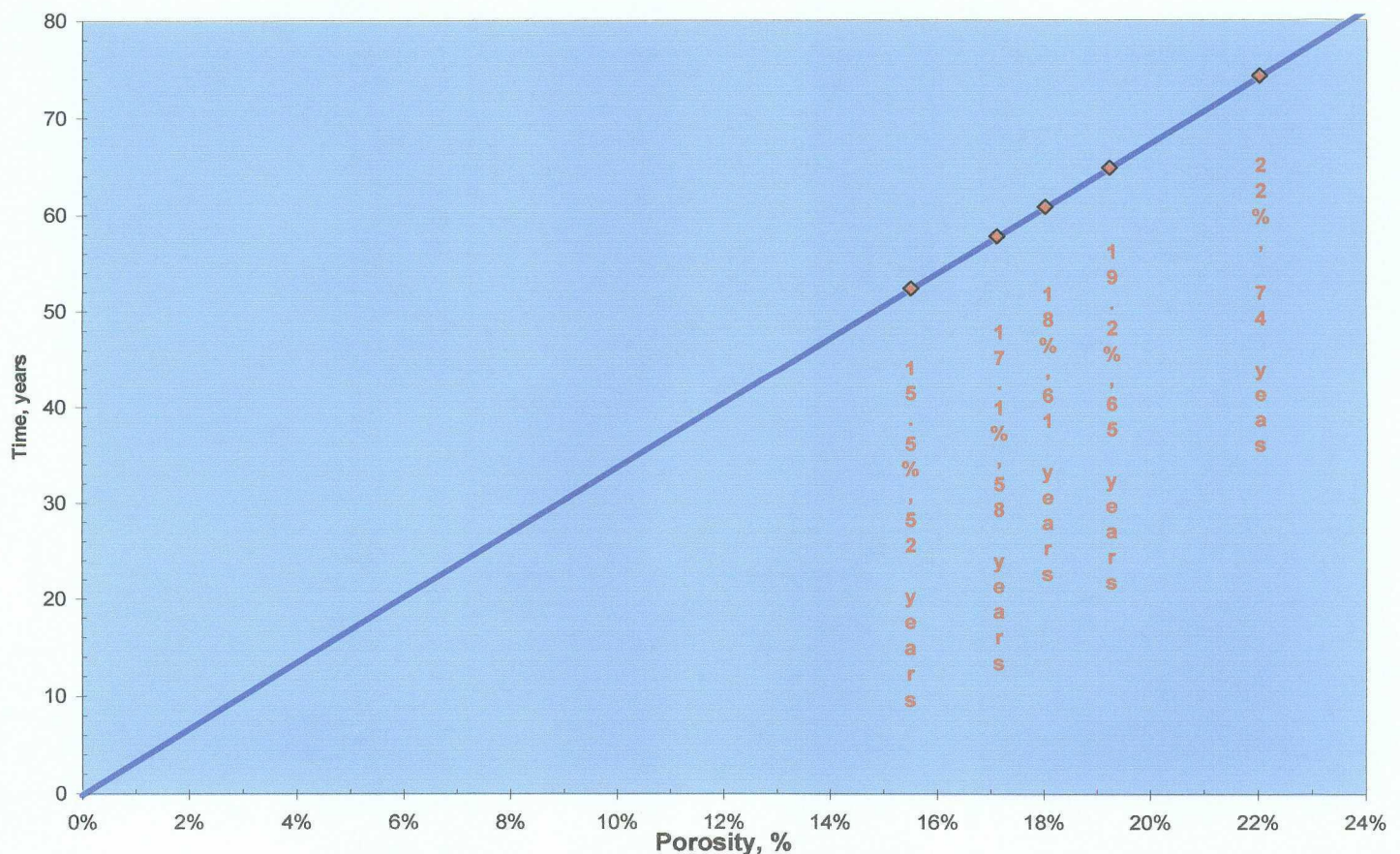
The equation solved for time is:

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

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

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.

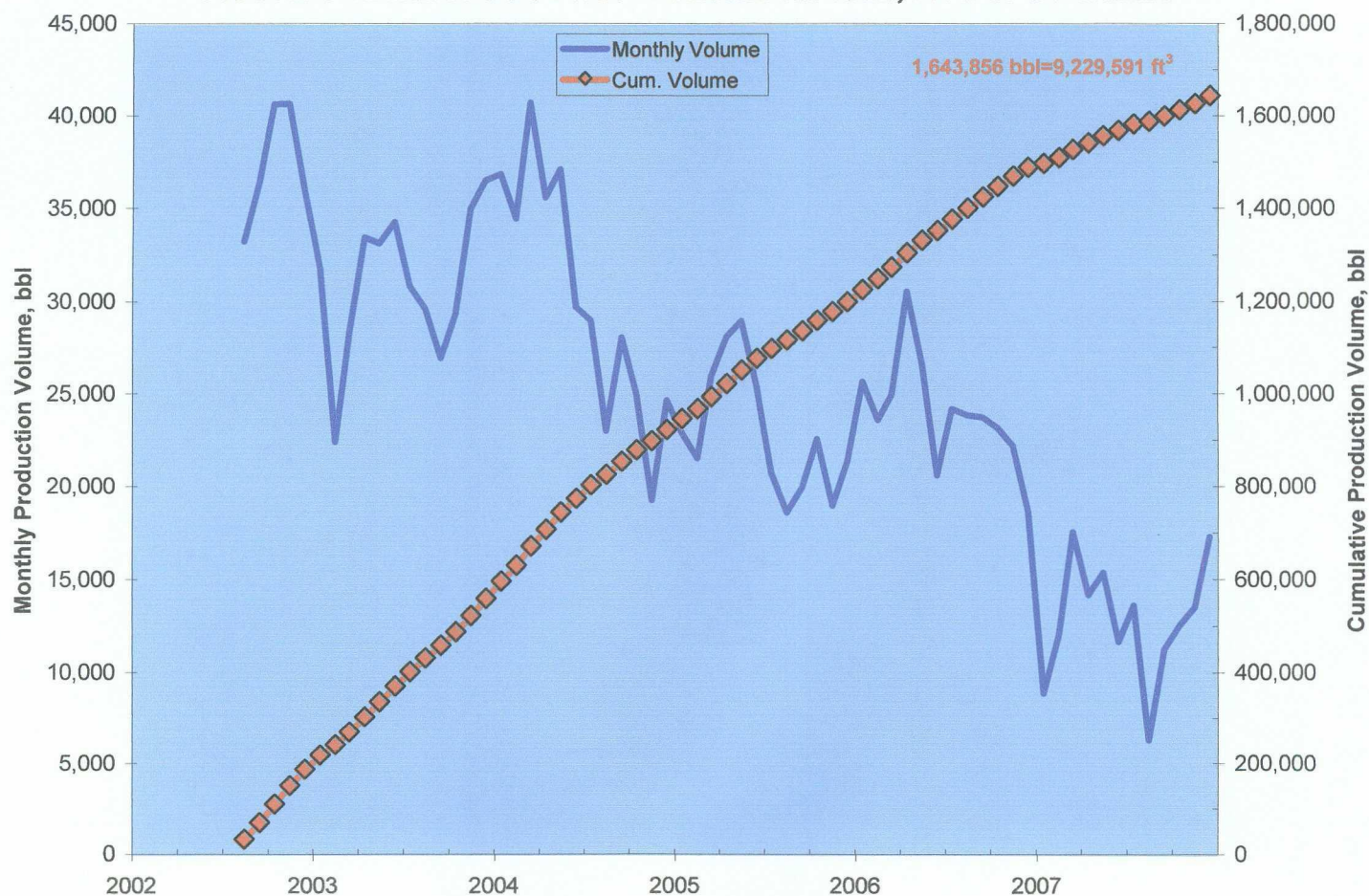
FIGURE 7- POROSITY vs. TIME, JUNIPER SWD #1



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 five years of production, water production has declined to about 12,500 bbl/month. This water production decline is characteristic of a coal bed methane reservoir. Ultimately the water production from the entire CBM field is expected to decline so injection water volumes will also decline.

FIGURE 8-WATER PRODUCTION VOLUME vs. TIME, FIVE SPOT WELLS



UPDATED CONCLUSIONS

4. The water injection rate ranged from 18,168 bbl/month to 139,756 bbl/month (18 to 136 gpm, 0.04 to 0.3 cfs). The total injected through December 2007 was 4,350,913 bbl (24,428,627 ft³). Overall this is a relatively small amount of water compared to surface water.

5. Through December 2006 all the water injection was into 501 feet of thickness. For water production through December 2006, the radius of injected water ranged from 242 to 306 feet with an overall mean of 265 feet. The relatively small volume of water limits the radius. The rate of radius change from December 2005 through December 2006 has been 4.5 ft per month (54 feet in one year). Due to a declining injection rate the change of radius of 54 feet in one year (4.5 feet/month) is a maximum prediction and will be less.

From December 2006 through December 2007 all the water injection was into 124 feet of thickness. For water production through December 2007, the radius of injected water ranged from 289 to 366 feet with an overall mean of 317 feet. The relatively small volume of water limits the radius. The rate of radius change from December 2005 through December 2007 has been 4.4 ft per month (106 feet in two years). Due to a declining injection rate the change of radius of 106 feet in two years (4.4 feet/month) is a maximum prediction and will be less.

6. Through December 2006 all the water injection was into 501 feet of thickness. The area of injected water ranged from 4.2 to 6.7 acres with an overall mean of 5.1 acres. The relatively small volume of water limits the area. The rate of area change from December 2005 through December 2006 has been 0.16 acre/month (1.9 acres in one year). So the change of area of 1.9 acres in one year (0.16 acre per month) is a maximum prediction and will be less.

From December 2006 through December 2007 all the water injection was into 124 feet of thickness. The area of injected water ranged from 6.0 to 9.7 acres with an overall mean of 7.3 acres. The relatively small volume of water limits the area. The rate of area change from December 2005 through December 2007 has been 0.17 acre/month (4.1 acres in two years). So the change of area of 4.1 acres in two years (0.17 acre per month) is a maximum prediction and will be less.

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 to a quarter in the five spot wells in five years of production. Water production from the five spot is expected to continue to decline.