PRELIMINARY HYDROLOGIC DATA FOR WELLS TESTED IN NASH DRAW, NEAR THE PROPOSED WASTE ISOLATION PILOT PLANT SITE, SOUTHEASTERN NEW MEXICO

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CONVERSION FACTORS

In this report figures for measurements are given in inch-pound units only. The following table contains factors for converting to metric units.

Multiply inch-pound units	By	To obtain metric units
inch	25.40	millimeter
foot	.3048	meter
foot squared per day	.0929	meter squared per day
gallon	3.785	liter
gallon per minute	.06309	liter per second
pound per square inch	.07031	kilogram per square centimeter

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ABSTRACT

Hydrologic testing was conducted at wells WIPP-25, WIPP-26, WIPP-27, WIPP-28, WIPP-29, and WIPP-30 in Nash Draw near the Waste Isolation Pilot Plant site in southeastern New Mexico. The three water-bearing zones tested were the Magenta Dolomite Member of the Rustler Formation, Culebra Dolomite Member of the Rustler Formation, and the Rustler Formation-Salado Formation contact zone. Inflatable packers were used in a variety of test configurations. Tests conducted include bailing, recovery after perforation, shut in, slug, flow, and pressure pulse. Water-pressure response in the tested zone was monitored by a pressure-transducer system.

INTRODUCTION

The U.S. Geological Survey, in cooperation with the U.S. Department of Energy, is investigating the geohydrology of the proposed Waste Isolation Pilot Plant (WIPP) site in southeastern New Mexico (fig. 1). The investigation is designed to supplement work conducted by Sandia National Laboratories, which is responsible for technical development of the site. The proposed facility would be constructed in bedded salts of the Permian Salado Formation.

This report presents preliminary hydrologic-test data, testing methods, and pertinent well-construction details for wells WIPP-25, WIPP-26, WIPP-27, WIPP-28, WIPP-29, and WIPP-30. Locations of these wells are given in table 1 and are shown in figure 1.

The wells tested were drilled to help define the geology of Nash Draw (fig. 1), an area of local subsidence and karst development caused by near-surface salt dissolution in Permian evaporites. The wells were secondarily used for hydrologic testing. Data from the tests were provided to Sandia National Laboratories, which used these data in selection of types of primary long-term testing that was appropriate for water-bearing zones in each well.

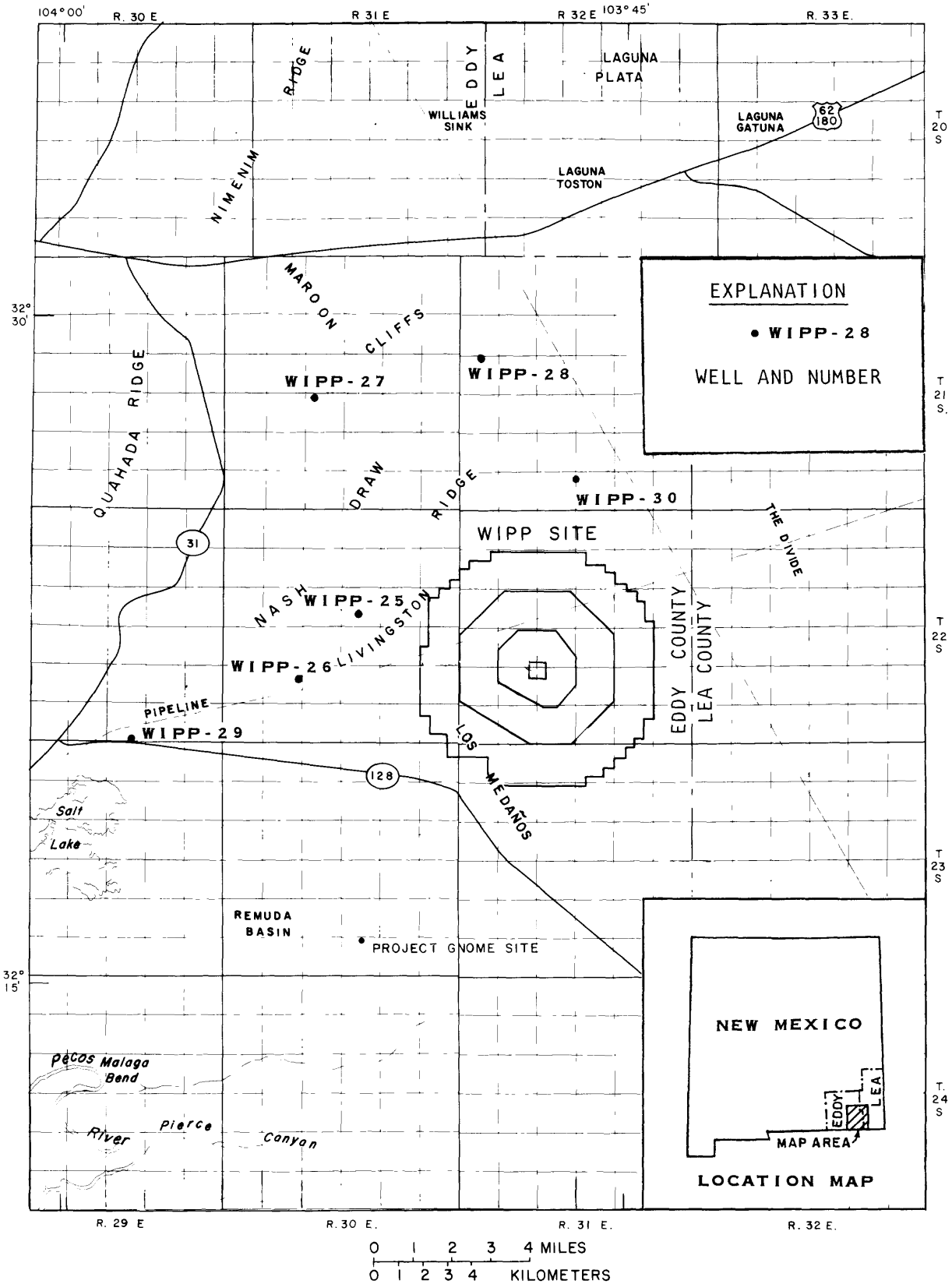

Figure 1.--Location of the proposed Waste Isolation Pilot Plant site and wells tested in Nash Draw.

Table 1. Location of wells tested

[FNL, from north line; FSL, from south line; FEL, from east line; FWL, from west line]

Well	Location						
	Section	Township	Range	Distance (feet)			
WIPP-25	15	22S	30E	1,852.72	FSL	2,838.1	FEL
WIPP-26	29	22S	30E	2,232.27	FNL	12.2	FEL
WIPP-27	21	21S	30E	89.79	FNL	1,485.03	FWL
WIPP-28	18	21S	31E	98.72	FNL	2,400.99	FEL
WIPP-29	34	22S	29E	406.62	FSL	1,827.54	FEL
WIPP-30	33	21S	31E	667.5	FNL	177.41	FWL

The author is indebted to James Basler (U.S. Geological Survey, Albuquerque, New Mexico), who supplied most of the test descriptions used in the preparation of this report and supervised data collection during the WIPP investigations.

HYDROLOGIC-TEST PROCEDURES

Perforation and testing were conducted sequentially from the lower water-bearing zone in the well (the Rustler Formation-Salado Formation contact zone) to the middle zone (the Culebra Dolomite Member of the Rustler Formation) to the upper zone (the Magenta Dolomite Member of the Rustler Formation) where it was present. Test chronologies (tables 2, 5, 9, 13, 16, and 20) are provided to indicate time intervals between tests and to illustrate well conditions at the time of a specific test.

Bailing, recovery after perforation, shut-in, slug, flow, and pressure-pulse tests were used to obtain hydrologic data for water-bearing zones in the wells. Data from these tests are included in tables 3, 6, 10, 14, 17, and 21.

Shut-in, slug, and pressure-pulse tests were used when the test zone yielded only a small quantity of water to the well. These test methods were primarily restricted to wells that were fully developed and fully penetrated a confined zone. In addition, the slug test and pressure-pulse test were restricted to wells completed in zones of minimal transmissivity.

Hydrologic testing was facilitated by using specially modified inflatable packers. These packers were inflated by filling the tubing with water. They were configured in three basic ways:

1. The "bridge-plug packer" was used to seal off and separate two zones from each other so that the upper zone could be tested. It consisted of a hydraulic inflation element with a plug in the bottom of the mandrel to seal it. A lug nipple was placed on top of the packer to enable it to be released and retrieved.

2. The "production-injection packer" was generally used to monitor long-term water levels in two adjacent zones. A shear plug was installed below the packer so it could be inflated. To open the tubing to the lower zone, the shear plug was removed either by dropping a steel bar on a wire-line or by overpressuring the packer and tubing. The zone below the packer could then be monitored through the tubing while the zone above could be monitored in the well annulus. Hydrologic testing was also occasionally performed with this packer.

3. The "feed-through packer" was used to test zones of minimal transmissivity. It was lowered into the well on 2 3/8-inch-diameter tubing to a point just above the test zone. Modifications made to a production-injection packer allowed for continuous monitoring of formation pressure at the surface. A transducer inside a protective housing was strapped to the tubing directly above the packer inflation element. The pressure transducer was connected to feed-through tubing which extended through the inflation element where it was exposed to the test zone. This feed-through tubing allowed the transducer to sense pressures at the test zone after packer inflation (Mercer and others, 1981, p. 9).

Pretest Activities

Special care was taken in the drilling program used to complete each test well. Air, air foam, and brine were used at one time or another as drilling and coring fluids. Drilling was done to avoid contaminating or plugging the test zone so that optimum test results would be possible. The well was first cored to total depth, then reamed and casing was set. Prior to testing, the casing in the interval of the water-bearing zone was gun perforated after the hole was filled with water. The water was then bailed to avoid contaminating formation water and to develop the well.

Pressure-Monitoring System

Data from testing were usually obtained using a pressure transducer to monitor response of the tested zone. A digital-readout data logger at land surface continuously recorded the transducer signal before and during the test period. This method helped to ensure proper initiation and completion of the test. For a comprehensive description of this pressure-monitoring and recording system, the reader is referred to Basler (1983).

Open-Casing Tests

Open-casing tests included recovery from bailing and recovery after perforation. When recovery from bailing indicated a formation transmissivity greater than 1 foot squared per day, the yield was confirmed by using an open-casing slug-injection or slug-displacement test.

The test wells were bailed to help develop the well, to remove foreign water used in testing, and to stress the well for a subsequent test. After bailing, very large or very small formation transmissivity sometimes precluded collection of recovery data. Bailing tests that did not have any recovery data are included in this report because the amount of fluid removed from a well may be significant for some purposes. Detailed discussion of bailing procedures and data collection is presented by Basler (1983, p. 15).

The other open-casing tests used, slug-injection and slug-displacement tests, are similar to each other in principle. The slug-injection test was initiated by pumping a known volume of water down the well, whereas the slug-displacement test was initiated either by lowering a displacement barrel of known volume below the water surface or by raising it above the water surface after being submerged. Aquifer response was then monitored. A detailed description of open-casing slug-injection and slug-displacement tests is presented by Basler (1983, p. 16-18).

Packer Tests

Small yields precluded testing some wells by open-casing methods. Techniques designed to limit the volume of formation water required for testing were utilized. These testing methods involved isolating the perforated zone with a packer to obtain formation head pressures followed by testing through the tubing used to install the packer. Packer tests used during the investigations included shut-in, slug, flow, and pressure-pulse tests.

Every attempt was made to insure the integrity of the chemical quality of formation water. The packers used in testing were hydraulically inflated using formation water whenever possible. Foreign water was seldom utilized in testing and was removed at the first opportunity.

The shut-in test was run immediately after bailing. A packer was placed at the predetermined test depth and inflated using a rig-mounted pump. The increasing pressure from recovery below the packer was then monitored. The test was terminated after a static pressure was reached in the test zone or after a reasonable amount of data had been collected. A detailed description of the shut-in test is presented by Basler (1983, p. 20 and 24).

After the shut-in test, the well was in a configuration suitable for a slug test. Because the packer tubing was full of formation water used for packer inflation, all that had to be done to initiate the packer slug test was to open the tubing to the test zone and monitor the pressure below the packer.

Some test zones did not yield enough formation water from bailing for packer inflation. In these cases, freshwater generally was used for packer inflation and then was removed with a tubing bailer during the shut-in test. After the shut-in test, a flow test could be run by allowing formation water to flow into the empty tubing (Basler, 1983, p. 23 and 26).

The pressure-pulse test was used on formations determined by prior testing to have very small transmissivity. The pressure-pulse test was initiated by applying a nearly instantaneous increase in hydraulic pressure to the test zone. The pressures were then monitored at a point near the well head. A detailed description of the methods used is presented by Basler (1983, p. 26-28).

HYDROLOGIC DATA

The tests within each table are organized chronologically for each well. Data on perforated intervals were obtained from Jerry Mercer of Sandia National Laboratories (oral commun., 1984), except for well WIPP-27. The interval at the Rustler Formation-Salado Formation contact zone in WIPP-27 was obtained from perforation-shot records. Well depths were obtained from logs run by the U.S. Geological Survey in August and September 1978. All depths are referenced to land-surface datum except as indicated. Times are expressed in military time (24-hour clock).

Water-level records from long-term monitoring are provided in tables 4, 8, 12, 15, 19, and 23. Density profiles (tables 7, 11, 18, and 22) were done mainly to aid in interpretation of long-term water-level measurements. The profiles indicate the change of the density gradient of water in the well over time and are not an indication of density gradients of water in the formation. The density profile was obtained by using a point sampler to obtain water samples at selected depths in the well. These samples were checked for density, temperature, and sometimes specific conductance. Density was determined by using a hydrometer.

Well WIPP-25

Testing was conducted at well WIPP-25 from March 3 to September 4, 1980. All three water-bearing zones were penetrated by this well. Table 2 shows that feed-through packers were not used in the testing of this well. Simultaneous long-term monitoring of water levels in the Magenta Dolomite and Culebra Dolomite Members was made possible through the use of a production-injection packer placed between the two zones.

Table 2. Testing chronology for well WIPP-25

[Depths are below land surface, except as indicated. Packer depths are to top of inflation element]

Date	Procedure
09-12-78	Hole completed with 5.012-inch inside diameter casing set from 1 foot above land surface to 648 feet.
03-13-80	Perforated Rustler Formation-Salado Formation contact zone from 579 to 608 feet. Started bailing test 1 with yield of 680 gallons.
03-19-80	Ran bailing test 2 with yield of 280 gallons. Collected water sample.
07-12-80	Ran bailing test 3 with yield of 230 gallons. Ran slug test 1.
07-22-80	Placed bridge-plug packer below Culebra Dolomite Member at 567.7 feet.
08-06-80	Perforated Culebra Dolomite Member zone from 445 to 475 feet. Ran bailing test 1 with yield of 280 gallons.
08-14-80	Ran bailing test 2 with yield of 790 gallons. Collected water sample.
08-26-80	Placed bridge-plug packer below Magenta Dolomite Member at 360.1 feet.
09-03-80	Perforated Magenta Dolomite Member zone from 300 to 330 feet. Ran bailing test 1 with yield of 280 gallons.
09-04-80	Ran bailing test 2 with yield of 580 gallons. Collected water sample.
08-04-83	Removed bridge-plug packer below Magenta Dolomite Member.
08-05-83	Placed production-injection packer at 345.45 feet to separate Culebra Dolomite Member from Magenta Dolomite Member and enable long-term monitoring of water level in both water-bearing zones.

Table 3. Hydrologic-test data for well WIPP-25

Rustler Formation-Salado Formation Contact Zone - Bailing Test 1

Starting date: 03-13-80

Well depth: 648 feet

Perforated interval tested: 579-608 feet

Inside diameter of tested interval: 5.012 inches

Water levels were measured with a pressure transducer.

Measuring point for the recovery from bailing was the pressure transducer, which was 494 feet below land surface.

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 680 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforation

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks	Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-13-80							
1230	1	--	Bailing	1313	22	--	
1232	2	--		1315	23	--	
1234	3	--		1318	24	--	
1236	4	--		1320	25	--	
1238	5	--		1322	26	--	
1240	6	--		1324	27	--	
1242	7	--		1326	28	--	
1245	8	--		1328	29	--	
1247	9	--		1330	30	--	
1249	10	--		1333	31	--	
1251	11	--		1335	32	--	
1253	12	--		1337	33	--	
1255	13	--		1339	34	--	
1257	14	--		1341	35	--	
1259	15	--		1343	36	--	
1301	16	--		1345	37	--	
1303	17	--		1347	38	--	
1305	18	--		1349	39	--	
1307	19	--		1351	40	--	
1309	20	--		1354	41	--	
1311	21	--		1357	42	--	

Table 3. Hydrologic-test data for well WIPP-25 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 1 - Continued

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-13-80			
1359	43	--	
1401	44	--	
1403	45	--	
1405	46	--	
1407	47	--	
1409	48	--	
1411	49	--	
1413	50	--	
1415	51	--	
1418	52	--	
1420	53	--	
1422	54	--	
1424	55	--	
1427	56	--	
1429	57	--	
1431	58	--	
1433	59	--	
1435	60	--	End bailing
1445	--	4.5	Recovery
1446	--	6.0	
1447	--	7.5	
1448	--	9.1	
1449	--	10.7	
1450	--	12.2	
1451	--	13.6	
1452	--	15.1	
1453	--	16.5	
1454	--	17.9	
1455	--	19.3	
1456	--	20.6	
1457	--	22.0	
1458	--	23.3	
1459	--	24.6	
1500	--	25.9	
1501	--	27.1	
1502	--	28.4	
1503	--	27.4	
1504	--	30.8	
1505	--	32.0	
1506	--	33.2	
1507	--	34.3	
1508	--	35.5	
1509	--	36.6	
1510	--	37.7	

Table 3. Hydrologic-test data for well WIPP-25 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test I - Continued

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-13-80			
1511	--	38.8	
1512	--	39.9	
1513	--	41.0	
1514	--	42.1	
1515	--	43.2	
1516	--	44.4	
1517	--	45.2	
1518	--	46.3	
1519	--	47.3	
1520	--	48.3	
1521	--	49.3	
1522	--	50.2	
1523	--	51.2	
1524	--	52.1	
1525	--	53.1	
1526	--	54.0	
1527	--	54.9	
1528	--	55.8	
1529	--	56.7	
1530	--	57.5	
1531	--	58.4	
1532	--	59.2	
1533	--	60.0	
1534	--	60.8	
1535	--	61.6	
1536	--	62.4	
1537	--	63.2	
1538	--	64.0	
1539	--	64.7	
1540	--	65.4	
1541	--	66.2	
1542	--	66.9	
1543	--	67.6	
1544	--	68.3	
1545	--	69.0	
1546	--	69.7	
1547	--	70.3	
1548	--	71.0	

Table 3. Hydrologic-test data for well WIPP-25 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test I - Continued

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-13-80			
1549	--	71.6	
1550	--	72.3	
1551	--	72.9	
1552	--	73.5	
1553	--	74.1	
1554	--	74.7	
1555	--	75.3	
1556	--	75.9	
1557	--	76.5	
1558	--	77.0	
1559	--	77.6	
1600	--	78.1	
1602	--	79.2	
1604	--	80.3	
1606	--	81.3	
1608	--	82.3	
1610	--	83.2	
1612	--	84.2	
1613	--	84.6	
1615	--	85.4	
1618	--	86.7	
1620	--	87.4	
1622	--	88.2	
1625	--	89.2	
1630	--	90.9	
1645	--	95.2	
1700	--	98.7	
1715	--	101.4	
1730	--	103.6	
1745	--	105.2	
1800	--	106.5	
1815	--	107.4	
1830	--	108.1	
1845	--	108.6	
1900	--	109.0	
1915	--	109.2	

Table 3. Hydrologic-test data for well WIPP-25 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test I - Concluded

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-13-80			
1930	--	109.4	
1945	--	109.5	
2000	--	109.6	
2015	--	109.7	
2030	--	109.7	
2045	--	109.8	
2100	--	109.8	
2115	--	109.8	
2130	--	109.9	
2145	--	109.9	
2200	--	109.9	
2215	--	109.9	
2230	--	109.9	
2245	--	109.9	
2300	--	110.0	
2400	--	110.0	
Date: 03-14-80			
0100	--	110.0	
0200	--	110.0	
0300	--	110.0	
0400	--	110.0	
0500	--	110.1	
0600	--	110.1	
0700	--	110.1	
0745	--	110.1	End of test

Table 3. Hydrologic-test data for well WIPP-25 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 2

Starting date: 03-19-80

Well depth: 648 feet

Perforated interval tested: 579-608 feet

Inside diameter of tested interval: 5.012 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 280 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: From 1358 to 1435 ran 25 bailing trips. Collected fluid sample. Recovery not monitored.

Table 3. Hydrologic-test data for well WIPP-25 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 3

Starting date: 07-12-80

Well depth: 648 feet

Perforated interval tested: 579-608 feet

Inside diameter of tested interval: 5.012 inches

Water levels were measured with a pressure transducer.

Measuring point for the recovery from bailing was the pressure transducer, which was 400 feet below land surface.

Static water level was 238.38 feet below land surface on 06-30-80 prior to this testing phase.

Total amount of fluid bailed was 230 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks	Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 07-12-80							
0907	1	--	Bailing	0953	--	46.3	
0914	2	--		0954	--	47.7	
0916	3	--		0955	--	49.1	
0917	4	--		0956	--	50.5	
0919	5	--		0957	--	51.7	
0921	6	--		0958	--	52.6	
0922	7	--		0959	--	53.7	
0924	8	--		1000	--	54.8	
0926	9	--		1002	--	56.7	
0927	10	--		1004	--	58.4	
0929	11	--		1006	--	59.8	
0931	12	--		1008	--	61.1	
0933	13	--		1010	--	62.2	
0935	14	--		1015	--	64.3	
0936	15	--		1020	--	65.7	
0939	16	--		1025	--	66.5	
0940	17	--		1030	--	67.0	
0942	18	--		1035	--	67.2	
0943	19	--		1040	--	67.3	
0945	20	--		1045	--	67.3	
0951	--	43.0	Recovery	1050	--	67.4	
0952	--	44.7		1100	--	67.4	End of test

Table 3. Hydrologic-test data for well WIPP-25 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1

Starting date: 07-12-80

Type of test: Injection

Well depth: 648 feet

Perforated interval tested: 579-608 feet

Inside diameter of tested interval: 5.012 inches

Measuring point was transducer which was 300 feet below land surface.

Static water level was 238.38 feet below land surface on 06-30-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-12-80					
1440:00	21.9		1440:44	83.4	
:02	21.9		:46	87.4	
:04	21.9		:48	91.1	
:06	21.9		:50	93.9	
:08	22.3		:52	97.1	
:10	24.7		:54	97.7	
:12	26.6		:56	98.2	
:14	28.7		:58	99.2	
:16	31.4		1441:00	97.9	
:18	34.4		:02	97.8	
:20	37.4		:04	97.8	
:22	41.1		:06	97.4	
:24	44.5		:08	96.8	
:26	48.5		:10	96.2	
:28	52.4		:12	96.5	
:30	56.3		:14	95.6	
:32	60.0		:16	95.5	
:34	64.0		:18	94.8	
:36	67.4		:20	94.2	
:38	72.0		:22	94.8	
:40	75.2		:24	94.2	
:42	79.2		:26	93.9	

Table 3. Hydrologic-test data for well WIPP-25 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1 - Continued

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-12-80					
1441:28	93.9		1442:12	93.4	
:30	94.0		:15	93.2	
:32	94.8		:20	93.1	
:34	94.5		:25	93.1	
:36	95.5		:30	92.6	
:38	94.6		:35	92.5	
:40	94.7		:40	92.3	
:42	94.5		:45	92.0	
:44	94.3		:50	92.0	
:46	94.2		:55	91.6	
:48	94.5		1443:00	91.5	
:50	94.3		:05	91.3	
:52	94.0		:10	91.1	
:54	94.1		:15	90.9	
:56	93.9		:20	90.6	
:58	93.9		:27	90.3	
1442:00	93.9		:35	90.1	
:02	93.8		:40	89.8	
:04	93.7		:50	89.3	
:06	93.6		1444:00	89.0	
:08	93.4		:10	88.7	
:10	93.5		:20	88.4	

Table 3. Hydrologic-test data for well WIPP-25 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-12-80		
1444:30	88.0	
:40	87.8	
:50	87.3	
1445:00	87.0	
:10	86.7	
:30	86.0	
1446:00	84.8	
:30	83.8	
1447:00	82.8	
:30	81.7	
1448:00	80.7	
:30	79.7	
1449:00	78.7	
:30	77.7	
1450:00	76.7	
1451:00	74.8	
1452:00	73.0	
1453:00	71.3	
1454:00	69.7	
1455:00	68.0	
1456:00	66.5	
1457:00	65.1	
1458:00	63.6	
1459:00	62.2	
1500:00	60.9	
1505:00	54.9	
1510:00	50.3	
1515:00	46.8	
1520:00	43.9	
1525:00	41.6	
1530:00	39.7	
1535:00	37.9	
1540:00	36.4	
1545:00	35.2	
1550:00	34.2	
1600:00	32.6	
1610:00	31.5	
1630:00	30.1	
1700:00	29.1	
1800:00	28.7	
1900:00	28.7	
2000:00	28.6	
2400:00	28.6	
--	--	
Date: 07-13-80		
0400:00	28.5	
0800:00	28.5	
1200:00	28.6	
1600:00	28.7	
2400:00	28.9	
Date: 07-14-80		
0800:00	29.7	End of test

Table 3. Hydrologic-test data for well WIPP-25 - Continued

Culebra Dolomite Member - Bailing Test 1

Starting date: 08-06-80

Well depth: 648 feet

Perforated interval tested: 445-475 feet

Inside diameter of tested interval: 5.012 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 280 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforation. Test was stopped early because of mechanical failure. From 1242 to 1416 ran 25 bailing trips. Recovery not monitored.

Culebra Dolomite Member - Bailing Test 2

Starting date: 08-14-80

Well depth: 648 feet

Perforated interval tested: 445-475 feet

Inside diameter of tested interval: 5.012 inches

Static water level was 172.38 feet below land surface on 08-14-80 prior to this testing phase.

Total amount of fluid bailed was 790 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: From 0958 to 1208 ran 70 bailing trips. Collected fluid sample from last bailer. Fluid level was 171.25 feet below land surface at 1220 and 1300 after bailing stopped. Recovery not monitored.

Table 3. Hydrologic-test data for well WIPP-25 - Concluded

Magenta Dolomite Member - Bailing Test 1

Starting date: 09-03-80

Well depth: 648 feet

Perforated interval tested: 300-330 feet

Inside diameter of tested interval: 5.012 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 280 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforation. From 1505 to 1550 ran 25 bailing trips. Recovery not monitored.

Magenta Dolomite Member - Bailing Test 2

Starting date: 09-04-80

Well depth: 648 feet

Perforated interval tested: 300-330 feet

Inside diameter of tested interval: 5.012 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 580 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Collected fluid sample from last bailer. Fluid level was 163 feet below land surface at 1135 after bailing. From 0946 to 1119 ran 51 bailing trips. Recovery not monitored.

Table 4. Water-level records for well WIPP-25

[Water-bearing zone: M, Magenta Dolomite Member of the Rustler Formation; C, Culebra Dolomite Member of the Rustler Formation; R/S, Rustler Formation-Salado Formation contact zone]

Water-bearing zone	Date	Time	Water level, in feet below land surface
M	10-08-80	1100	158
M	11-03-80	1100	157.75
M	12-01-80	1105	158.25
M	02-06-81	0855	158.57
M	03-02-81	0945	158.55
M	05-07-81	1000	158.70
M	10-05-81	1215	159.81
M	01-19-82	1030	159.62
M	05-18-82	1127	159.77
M	07-19-82	1030	159.76
M	09-08-82	1159	159.75
M	11-19-82	1235	160.27
M	01-12-83	1135	159.69
M	08-24-83	0937	159.80
M	09-29-83	0930	159.15
M	11-21-83	0950	158.55
M	01-23-84	1035	158.27
M	10-18-84	1030	157.65
C	08-24-83	0930	160.44
C	09-29-83	0925	160.36
C	11-21-83	0945	160.50
C	01-23-84	1030	161.29
C	10-18-84	1020	159.70
R/S	03-14-80	0742	263
R/S	04-16-80	1430	255
R/S	05-07-80	1425	250
R/S	06-09-80	1020	241
R/S	06-16-80	0900	240.04
R/S	06-19-80	1150	239.62
R/S	06-24-80	0835	239.07
R/S	06-30-80	1020	238.38

Well WIPP-26

Testing was conducted at well WIPP-26 from March 11 to September 9, 1980. All three water-bearing zones were penetrated by this well. The Magenta Dolomite Member was found to be dry after perforating twice. Table 5 shows that a feed-through packer only was used for testing the Rustler Formation-Salado Formation contact zone. The well was left for long-term monitoring of fluid levels with only the Culebra Dolomite Member accessible.

Table 5. Testing chronology for well WIPP-26

[Depths are below land surface, except as indicated. Packer depths are to top of inflation element]

Date	Procedure
09-11-78	Hole completed with 4.950-inch inside diameter casing set from 0.85 foot above land surface to 502 feet.
03-11-80	Perforated Rustler Formation-Salado Formation contact zone from 228 to 329 feet. Ran bailing test 1 with yield of 340 gallons.
03-18-80	Ran bailing test 2 with yield of 230 gallons.
07-13-80	Ran density profile.
07-14-80	Ran bailing test 3 with yield of 170 gallons.
07-14-80 to 07-15-80	Placed feed-through packer above Rustler Formation-Salado Formation contact zone at 228.0 feet. Ran shut-in test 1.
07-15-80	Ran slug test 1 on Rustler Formation-Salado Formation contact zone with feed-through packer placed at 228.0 feet.
07-16-80	Removed feed-through packer.
08-03-80	Placed bridge-plug packer below Culebra Dolomite Member at 264.0 feet.
08-07-80	Perforated Culebra Dolomite Member zone from 185 to 210 feet. Ran bailing test 1 with yield of 400 gallons.
08-18-80	Ran bailing test 2 with yield of 1,010 gallons.
08-26-80	Placed bridge-plug packer below Magenta Dolomite Member at 134.1 feet.
09-02-80 to 09-09-80	Perforated Magenta Dolomite Member zone from 50 to 100 feet. Magenta Dolomite Member was dry.
08-03-83	Removed bridge-plug packer below Magenta Dolomite Member.

Table 6. Hydrologic-test data for well WIPP-26

Rustler Formation-Salado Formation Contact Zone - Bailing Test 1

Starting date: 03-11-80

Well depth: 495 feet

Perforated interval tested: 228-329 feet

Diameter of tested interval: 4.950 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 340 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforation. From 1131 to 1232 ran 30 bailing trips, with bailer 3 dry. Recovery was not monitored.

Table 6. Hydrologic-test data for well WIPP-26 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 2

Starting date: 03-18-80

Well depth: 495 feet

Perforated interval tested: 228-329 feet

Diameter of tested interval: 4.950 inches

Water levels were measured with a pressure transducer.

Measuring point for the recovery from bailing was the pressure transducer, which was 342 feet below land surface.

Static water level was 197.6 feet below land surface on 03-18-80 prior to this testing phase.

Total amount of fluid bailed was 230 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks	Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-18-80							
0947	1	--	Bailing. Full of sand	1037	--	3.4	Recovery
				1040	--	4.2	
0956	2	--		1045	--	7.3	
0958	3	--		1050	--	9.6	
1000	4	--		1055	--	11.7	
1001	5	--		1100	--	13.5	
1003	6	--		1105	--	14.9	
1005	7	--		1110	--	16.3	
1008	8	--		1115	--	17.7	
1009	9	--		1120	--	18.9	
1011	10	--		1125	--	20.1	
1012	11	--		1130	--	21.3	
1014	12	--		1135	--	22.4	
1016	13	--		1140	--	23.4	
1017	14	--		1145	--	24.4	
1019	15	--		1150	--	25.3	
1021	16	--		1155	--	26.1	
1022	17	--		1200	--	26.9	
1024	18	--		1210	--	28.4	
1026	19	--		1220	--	29.8	
1028	20	--	End of bailing	1230	--	31.1	

Table 6. Hydrologic-test data for well WIPP-26 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 2 - Concluded

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-18-80			
1240	--	32.3	
1250	--	33.5	
1300	--	34.6	
1310	--	35.7	
1320	--	36.6	
1330	--	37.6	
1340	--	38.4	
1350	--	39.3	
1400	--	40.0	
1415	--	41.1	
1430	--	42.1	
1445	--	43.0	
1500	--	43.9	
1515	--	44.7	
1530	--	45.4	
1545	--	46.1	
1600	--	46.7	
1630	--	47.8	
1700	--	48.8	
1730	--	49.6	
1800	--	50.4	
1830	--	51.1	
1900	--	51.7	
1930	--	52.2	
2000	--	52.7	
2100	--	53.6	
2200	--	54.2	
2300	--	54.8	
2400	--	55.3	
Date: 03-19-80			
0200	--	56.1	
0400	--	56.7	
0600	--	57.1	
0755	--	57.5	
0800	--	57.6	End of test

Table 6. Hydrologic-test data for well WIPP-26 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 3

Starting date: 07-14-80

Well depth: 495 feet

Perforated interval tested: 228-329 feet

Diameter of tested interval: 4.950 inches

Static water level was 191.64 feet below land surface on 07-13-80 prior to this testing phase.

Total amount of fluid bailed was 170 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: From 0942 to 1007 ran 15 bailing trips. Recovery not monitored.

Table 6. Hydrologic-test data for well WIPP-26 - Continued

Rustler Formation-Salado Formation Contact Zone - Shut-in Test 1

Starting date: 07-14-80

Well depth: 495 feet

Shut in after: Bailing

Perforated interval tested: 228-329 feet

Diameter of tested interval: 4.950 inches

Type of packer: Production-injection packer with feed-through tubing.

Diameter of packer: 4.5 inches

Packer was set at 228.0 feet below land surface.

Measuring point was transducer tube below packer which was 234.2 feet below land surface.

Static water level was 191.64 feet below land surface on 07-13-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-14-80		
1314:07	3.5	
1319:41	4.6	
:45	4.1	
:50	4.1	
1320:00	4.1	
:05	4.0	
:10	4.0	
:15	4.0	
:20	4.0	
:30	4.0	
:40	4.0	
1321:00	4.0	
:20	4.1	
:40	4.2	
1322:00	4.1	
1323:00	4.2	
1324:00	4.2	
1325:00	4.2	
1330:00	4.5	
1335:00	4.7	
1340:00	4.9	
1345:00	5.2	
1350:00	5.4	
1400:00	5.8	
1410:00	6.2	
1420:00	6.6	
1440:00	7.2	
1450:00	7.5	
1500:00	7.7	
1510:00	7.9	
1520:00	8.1	
1530:00	8.3	
1540:00	8.5	
1550:00	8.7	
1600:00	8.8	
1630:00	9.3	
1700:00	9.7	
1800:00	10.3	
1900:00	10.7	
2000:00	11.0	
2200:00	11.5	
2400:00	11.8	
Date: 07-15-80		
0200:00	12.1	
0400:00	12.2	
1200:00	12.7	End of test

Table 6. Hydrologic-test data for well WIPP-26 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1

Starting date: 07-15-80

Type of test: Injection

Well depth: 495 feet

Perforated interval tested: 228-329 feet

Diameter of tested interval: 4.950 inches

Packer type: Production-injection packer with feed-through tubing.

Packer diameter: 4.5 inches

Packer was set at 228.0 feet below land surface.

Measuring point was transducer tubing below the packer, which was 234.2 feet below land surface.

Static water level was 191.64 feet below land surface on 07-13-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-15-80					
1355:00	12.9	Pretest	1400:47	52.8	
1357:00	12.9		:50	52.5	
1359:54	30.3		:55	51.9	
1400:00	64.2	Start test	1401:00	51.3	
:02	66.0		:05	50.7	
:05	64.0		:10	50.2	
:07	62.1		:15	49.7	
:10	61.6		:20	49.3	
:12	60.4		:25	48.8	
:15	59.4		:30	48.4	
:17	58.4		:40	47.7	
:20	57.9		:50	47.0	
:22	57.1		1402:00	46.3	
:25	56.5		:10	45.7	
:27	56.1		:20	45.1	
:30	55.5		:30	44.5	
:32	55.1		:40	44.1	
:35	54.7		:50	43.6	
:37	54.3		1403:00	43.2	
:40	53.9		:10	42.8	
:42	53.5		:20	42.4	
:45	53.2		:30	42.0	

Table 6. Hydrologic-test data for well WIPP-26 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-15-80					
1403:40	41.6		1412:00	30.9	
:50	41.3		1413:00	30.0	
1404:00	40.9		1414:00	29.3	
:10	40.6		1415:00	28.5	
:20	40.3		1420:00	25.8	
:40	39.7		1425:00	23.9	
1405:00	39.1		1430:00	22.5	
:20	38.6		1435:00	21.4	
:40	38.1		1440:00	20.6	
1406:00	37.6		1450:00	19.4	
:20	37.1		1500:00	18.5	
:40	36.7		1510:00	17.8	
1407:00	36.2		1520:00	17.4	
:30	35.6		1530:00	16.9	
1408:00	35.1		1540:00	16.6	
:30	34.5		1550:00	16.3	
1409:00	33.9		1600:00	16.0	
:30	33.4		1610:00	15.9	
1410:00	32.9		1620:00	15.7	
1411:00	31.8		1630:00	15.5	End of test

Table 6. Hydrologic-test data for well WIPP-26 - Concluded

Culebra Dolomite Member - Bailing Test 1

Starting date: 08-07-80

Well depth: 495 feet

Perforated interval tested: 185-210 feet

Diameter of tested interval: 4.950 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 400 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforating. From 1033 to 1125 ran 35 bailing trips. Fluid level was 145.5 feet below land surface after bailing at 1128, 1135, and 1215.

Culebra Dolomite Member - Bailing Test 2

Starting date: 08-18-80

Well depth: 495 feet

Perforated interval tested: 185-210 feet

Diameter of tested interval: 4.950 inches

Static water level was 146.28 feet below land surface on 08-18-80 prior to this testing phase.

Total amount of fluid bailed was 1,010 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: From 1029 to 1302 ran 90 bailing trips. Fourth bailer was dry. Recovery was not monitored.

Table 7. Density profile for well WIPP-26

Date run: 07-13-80
Perforated interval: 228-329 feet
Well depth: 495 feet

Sample number	Depth collected (feet)	Time collected	Density (grams per cubic (centimeter)
1	200	1050	1.0405
2	275	1100	1.0385
3	350	1105	1.1890
4	425	1110	1.1885

Table 8. Water-level records for well WIPP-26

[Water-bearing zone: M, Magenta Dolomite Member of the Rustler Formation; C, Culebra Dolomite Member of the Rustler Formation; R/S, Rustler Formation-Salado Formation contact zone]

Water-bearing zone	Date	Time	Water level, in feet below land surface
M	09-17-80	1400	127
M	09-22-80	1145	127
M	10-08-80	1310	128
M	11-03-80	1225	127.26
M	12-01-80	1015	127.23
M	03-04-81	1005	127.19
M	05-07-81	1320	127.17
M	01-19-82	1300	129.98
M	05-19-82	1125	127.07
M	07-19-82	1320	127.04
M	09-08-82	1323	127.07
M	11-19-82	1430	127.05
M	01-12-83	1300	127.04
C	08-24-83	1407	141.69
C	09-29-83	1000	141.47
C	11-21-83	1410	140.81
C	01-24-84	0925	141.50
C	10-20-84	0825	137.26
R/S	03-12-80	0800	216.95
R/S	03-14-80	0800	201.26
R/S	03-18-80	0900	197.60
R/S	04-16-80	1350	195
R/S	05-07-80	0815	194
R/S	06-09-80	1425	192.13
R/S	06-30-80	1155	191.74

Well WIPP-27

Testing was conducted at well WIPP-27 from March 14 to September 20, 1980. All three water-bearing zones were penetrated by this well. Table 9 shows that the Rustler Formation-Salado Formation contact zone was perforated twice with 20 feet separating the two perforated zones. Each perforated zone was tested independently using a feed-through packer. A feed-through packer was not used for testing the Magenta Dolomite or Culebra Dolomite Members. Simultaneous long-term monitoring of fluid levels in the Magenta Dolomite and Culebra Dolomite Members was made possible through the use of a production-injection packer placed between the two members. In table 12, water-level measurements for the Rustler Formation-Salado Formation contact zone are referenced to the top of the casing.

Table 9. Testing chronology for well WIPP-27

[Depths are below land surface, except as indicated.
Packer depths are to top of inflation elements.]

Date	Procedure
10-09-78	Hole completed with 5.012-inch inside diameter casing set from 1.15 feet above land surface to 588 feet.
03-14-80	Perforated lower part of Rustler Formation-Salado Formation contact zone from 480 to 510 feet. Ran bailing test 1 with yield of 150 gallons.
03-17-80 to 03-18-80	Perforated upper part of Rustler Formation-Salado Formation contact zone from 426 to 460 feet. Ran recovery after perforation test.
05-21-80	Ran density profile.
06-07-80 to 07-16-80	Ran bailing test 2 with yield of 520 gallons.
07-16-80	Ran bailing test 3 with yield of 220 gallons. Placed feed-through packer between upper and lower perforations in Rustler Formation-Salado Formation contact zone at 465.2 feet.
07-16-80 to 07-22-80	Ran shut-in test 1 on lower perforations.
07-23-80	Ran pressure-pulse test 1 on lower perforations. Removed feed-through packer.

Table 9. Testing chronology for well WIPP-27 - Concluded

Date	Procedure
07-24-80	Placed bridge-plug packer between upper and lower perforations at 465.1 feet. Ran bailing test 4 on upper perforations. Collected sample.
07-25-80	Placed feed-through packer above upper perforations in Rustler Formation-Salado Formation contact zone at 415.1 feet.
07-25-80 to 07-26-80	Ran shut-in test 2 on upper perforations.
07-26-80 to 07-28-80	Ran slug test 1 on upper perforations.
07-28-80	Removed feed-through packer and bridge-plug packer.
08-12-80	Placed bridge-plug packer below Culebra Dolomite Member at 395.4 feet. Perforated Culebra Dolomite Member from 290 to 320 feet. Ran bailing test 1 on Culebra Dolomite Member with yield of 450 gallons.
08-22-80	Ran bailing test 2 with yield of 470 gallons. Collected sample.
08-23-80	Ran slug tests 1 through 6 on Culebra Dolomite Member.
09-18-80	Placed bridge-plug packer below Magenta Dolomite Member at 262.4 feet.
09-19-80	Perforated Magenta Dolomite Member from 175 to 195 feet. Ran bailing test 1 with yield of 400 gallons.
09-20-80	Ran bailing test 2 with yield of 470 gallons. Collected sample. Ran slug tests 1 and 2 on Magenta Dolomite Member.
07-20-83	Removed bridge-plug packer below Magenta Dolomite Member.
07-21-83	Placed production-injection packer at 227.40 feet to separate Magenta Dolomite Member from Culebra Dolomite Member and enable long-term water-level monitoring of both members.

Table 10. Hydrologic-test data for well WIPP-27

Rustler Formation-Salado Formation Contact Zone - Bailing Test 1

Starting date: 03-14-80

Well depth: 588 feet

Perforated interval tested: 480-510 feet

Inside diameter of tested interval: 5.012 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 150 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforating. From 1311 to 1337 ran 15 bailing trips with last two bailers dry. Well did not recover. Perforations were probably in Salado Formation only.

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Recovery Test

Starting date: 03-17-80

Well depth: 588 feet

Perforated interval tested: 426-460 and 480-510 feet

Inside diameter of tested interval: 5.012 inches

Water levels were measured with a pressure transducer.

Measuring point for the recovery from bailing was the pressure transducer, which was 550 feet below land surface.

Static water level was unknown prior to this testing phase.

Remarks: Casing was perforated dry and then recovery was monitored.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 03-17-80					
1030	-	Perforation completed	1830	17.6	
			1900	18.2	
1115	4.0		1930	19.0	
1130	4.2		2000	19.8	
1133	4.3		2030	21.2	
1145	4.5	Fluid level 540 feet below land surface	2100	22.3	
			2130	23.1	
			2200	23.9	
			2230	24.4	
1200	4.7		2300	24.7	
1215	5.0		2330	24.8	
1230	5.3		2400	25.0	
1245	5.7				
1300	6.2		Date: 03-18-80		
1315	6.6				
1330	7.0		0100	26.2	
1345	7.6		0200	27.6	
1400	8.1		0300	29.0	
1430	9.1		0400	30.4	
1500	10.1		0500	31.8	
1530	11.3		0600	33.1	
1600	12.3		0700	34.5	
1630	13.4		0713	34.9	
1700	14.4		0715	35.0	
1730	15.7		0730	35.4	End of test
1800	16.8				

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 2

Starting date: 06-07-80

Well depth: 588 feet

Perforated interval tested: 426-460 and 480-510 feet

Inside diameter of tested interval: 5.012 inches

Water levels were measured with an M-scope.

Static water level was 110.0 feet below land surface on 06-07-80 prior to this testing phase.

Total amount of fluid bailed was 520 gallons.

Type of bailer: unknown Capacity: 10 gallons

Remarks: From 0855 to 1110 made 47 bailing runs, with last one dry.

Date	Clock time	Water level, in feet below land surface	Remarks
06-07-80	0855	--	Bailing
	1120	566	Recovery
06-09-80	0800	518	
06-10-80	0725	499	
06-11-80	0935	489	
06-12-80	0945	471	
06-13-80	0800	453	
06-14-80	0745	434	
06-15-80	0925	414	
06-16-80	0820	396	
06-17-80	0800	378	
06-18-80	0915	358	
06-19-80	1120	339	
06-20-80	0900	315	
06-21-80	0720	308	
06-22-80	0715	292	
06-23-80	0940	276	
06-24-80	0845	263	
06-25-80	0745	252	
06-26-80	0720	240	
06-27-80	1000	229	
06-28-80	0845	220	
06-29-80	0930	212	
06-30-80	0945	204	
07-02-80	0700	192	
07-05-80	0645	176	
07-07-80	0740	166	
07-10-80	0645	155	
07-13-80	0740	146	
07-16-80	0735	139	End of test

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 3

Starting date: 07-16-80

Well depth: 588 feet

Perforated interval tested: 426-460 and 480-510 feet

Static water level was 139.0 feet below land surface on 07-16-80 prior to this testing phase.

Total amount of fluid bailed was 220 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remark: Recovery not monitored.

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Shut-in Test 1

Starting date: 07-16-80

Well depth: 588 feet

Perforated interval tested: 480-510 feet

Shut in after: Bailing

Inside diameter of tested interval: 5.012 inches

Type of packer: Production-injection packer with feed-through tubing.

Packer was set at 465.2 feet below land surface.

Measuring point was transducer tube below packer, which was 471.0 feet below land surface.

Static water level was 139.0 feet below land surface on 07-16-80 prior to this testing phase.

Remark: Test was run on lower perforations.

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-16-80		
0831	--	Bailing
1045	81.0	Shut in
1050	81.2	
1052	114.3	
1053	110.7	
1054	109.1	
1055	108.1	
1100	105.6	
1105	104.5	
1110	103.6	
1115	103.3	
1130	102.8	
1200	102.6	
1230	102.9	
1300	103.6	
1400	104.9	
1600	107.3	
1700	108.7	
1800	109.5	
1900	110.3	
2000	111.2	
2100	111.9	
2200	112.6	
2300	113.6	
2400	114.3	
Date: 07-17-80		
0100	115.0	
0200	115.5	
0300	116.1	
0400	116.7	
0500	117.3	
0600	117.9	
0700	118.7	
0800	119.1	
0900	119.8	
1000	120.3	
1100	120.9	
1200	121.3	

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Shut-in Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-17-80		
1300	121.9	
1400	122.3	
1600	123.1	
1800	124.1	
2400	126.2	
Date: 07-18-80		
0600	128.2	
1200	130.3	
1800	132.0	
2400	133.4	
Date: 07-19-80		
0600	134.8	
1200	135.8	
1800	136.6	
2400	136.5	
Date: 07-20-80		
0600	137.1	
1200	137.7	
1800	138.1	
2400	140.1	
Date: 07-21-80		
0600	139.4	
1200	143.0	
1800	142.6	
2400	142.9	
Date: 07-22-80		
0600	143.0	
1200	144.0	
1800	144.2	
1900	144.1	
2000	144.3	
2100	-	Transducer failed End of test

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Pressure-Pulse Test 1

Starting date: 07-23-80

Well depth: 588 feet

Perforated interval tested: 480-510 feet

Inside diameter of tested interval: 5.012 inches

Packer type: Production-injection packer with feed-through tubing.

Packer diameter: 4.5 inches

Packer was set at 465.2 feet below land surface.

Measuring point was transducer at land surface.

Static water level was unknown prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-23-80					
0948:00	0.	Start test	0949:50	83.6	
:05	0.		:55	83.3	
:10	40.0		0950:05	82.5	
:15	77.4		:15	81.8	
:20	89.0		:25	81.3	
:25	111.8		:32	80.8	
:30	97.2		:40	80.4	
:35	95.2		:50	79.9	
:40	93.8		0951:00	79.4	
:45	92.4		:10	78.9	
:50	91.1		:20	78.5	
:55	90.1		:30	78.1	
0949:00	89.2		:40	77.7	
:05	88.4		:50	77.2	
:10	87.7		0952:00	76.9	
:15	87.0		:10	76.5	
:20	86.5		:20	76.1	
:25	85.9		:40	75.5	
:30	85.4		0953:00	74.8	
:35	84.9		:20	74.2	
:40	84.5		:40	73.6	
:45	84.0		0954:00	73.1	

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Pressure-Pulse Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-23-80								
0954:30	72.3		1008:00	58.9		1140:00	26.1	
0955:00	71.6		1010:00	57.5		1145:00	25.1	
:30	70.8		1012:00	56.3		1150:00	24.1	
0956:00	70.2		1014:00	55.0		1155:00	23.1	
:30	69.6		1016:00	53.9		1200:00	22.3	
0957:00	69.0		1018:00	52.7		1205:00	21.4	
:30	68.3		1020:00	51.6		1210:00	20.5	
0958:00	67.7		1025:00	49.2		1215:00	19.7	
:30	67.2		1030:00	46.9		1220:00	18.9	End of test
0959:00	66.7		1035:00	44.8				
:30	66.1		1040:00	42.9				
1000:00	65.6		1045:00	41.0				
:30	65.1		1050:00	39.3				
1001:00	64.6		1055:00	37.7				
:30	64.2		1100:00	36.1				
1002:12	63.5		1105:00	34.7				
:30	63.2		1110:00	33.4				
1003:00	62.8		1115:00	32.1				
1004:00	61.9		1120:00	30.8				
1005:00	61.2		1125:00	29.5				
1006:00	60.4		1130:00	28.4				
1007:00	59.7		1135:00	27.2				

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 4

Starting date: 07-24-80

Well depth: 588 feet

Perforated interval tested: 426-460 feet

Inside diameter of tested interval: 5.012 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 410 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: From 1110 to 1209 ran 36 bailing trips. Recovery was not monitored.

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Shut-in Test 2

Starting date: 07-25-80

Well depth: 588 feet

Perforated interval tested: 426-460 feet

Inside diameter of tested interval: 5.012 inches

Shut in after: Bailing

Type of packer: Production-injection packer with feed-through tubing.

Diameter of packer: 4.5 inches

Packer was set at 415.1 feet below land surface.

Measuring point was transducer tube below packer, which was 421.3 feet below land surface.

Static water level was unknown prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-25-80					
1052	3.6	Bailing	1109:50	49.1	
	--	began on	1110:00	49.4	
	--	07-24-80	:10	49.6	
	--	at 1110	:20	49.9	
1100	3.6		:30	50.3	
1108:00	4.2	Shut in	:40	50.6	
:05	20.6		:50	51.0	
:10	35.1		1111:00	51.4	
:15	39.0		:10	51.8	
:20	41.9		:20	52.2	
:25	45.5		:40	53.0	
:30	46.5		1112:00	53.8	
:35	54.7		:20	54.5	
:40	54.7		:40	55.3	
:45	53.6		1113:00	56.1	
:51	52.6		:20	56.9	
1109:00	49.6		:40	57.6	
:05	49.4		1114:00	58.3	
:10	49.2		:30	59.4	
:15	49.0		1115:00	60.5	
:20	48.9		:30	61.6	
:25	48.9		1116:00	62.6	
:30	48.9		:30	63.7	
:35	49.0		1117:00	64.7	
:40	49.0		:30	65.6	

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Shut-in Test 2 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-25-80		
1118:00	66.5	
1119:00	68.1	
1120:00	69.6	
1121:00	70.9	
1122:00	72.2	
1123:00	73.4	
1124:00	74.4	
1125:00	75.5	
1126:00	76.3	
1127:00	77.3	
1128:00	78.1	
1129:00	78.8	
1130:00	79.6	
1132:00	80.9	
1134:00	82.0	
1136:00	83.0	
1138:00	83.9	
1140:00	84.8	
1142:00	85.6	
1144:00	86.5	
1146:00	87.2	
1148:00	87.9	
1150:00	88.6	
1152:00	89.2	
1154:00	89.9	
1156:00	90.5	
1158:00	91.0	
1200:00	91.6	
1205:00	92.8	
1210:00	94.0	
1215:00	95.0	
1220:00	95.8	
1225:00	96.7	
1230:00	97.5	
1235:00	98.2	
1240:00	98.8	
1245:00	98.6	
1250:00	100.1	
1255:00	100.6	
1300:00	101.2	
1315:00	102.6	
1330:00	103.9	
1345:00	104.9	
1400:00	105.9	
1415:00	106.9	
1430:00	107.8	
1445:00	108.4	
1500:00	109.3	
1515:00	109.9	
1530:00	110.6	
1545:00	111.3	
1600:00	111.8	
1700:00	113.7	
1800:00	115.5	
1900:00	116.9	
2000:00	118.1	
2100:00	119.3	
2200:00	120.2	
2300:00	121.1	
2400:00	121.9	
Date: 07-26-80		
0200:00	123.2	
0400:00	124.5	
0600:00	125.6	
0800:00	126.5	
1000:00	127.1	
1200:00	127.7	End of test

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1

Starting date: 07-26-80

Type of test: Injection

Well depth: 588 feet

Perforated interval tested: 426-460 feet

Inside diameter of tested interval: 5.012 inches

Inside diameter of tubing: 1.995 inches

Packer type: Production-injection packer with feed-through tubing.

Packer diameter: 4.5 inches

Packer was set at 415.1 feet below land surface.

Measuring point was transducer tubing below the packer which was 421.3 feet below land surface.

Static water level was unknown prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-26-80					
1200:00	127.7	Pretest	1201:40	193.9	
:06	189.4		:50	193.8	
:10	195.8	Start test	1202:00	193.8	
:12	195.2		:10	193.6	
:14	195.1		:20	193.6	
:18	195.2		:30	193.2	
:20	194.9		:40	193.2	
:22	194.9		1203:00	193.0	
:25	194.8		:20	192.9	
:30	194.8		:40	192.7	
:35	194.8		1204:00	192.6	
:40	194.7		:20	192.5	
:45	194.6		:40	192.3	
:50	194.5		1205:00	192.2	
:55	194.3		:20	192.1	
1201:00	194.6		:40	191.9	
:05	194.5		1206:00	191.8	
:10	194.4		:20	191.7	
:15	194.4		:40	191.6	
:20	194.3		1207:00	191.5	
:25	194.2		1208:00	191.2	
:30	194.1		1209:00	190.9	

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-26-80						Date: 07-27-80		
1210:00	190.6		1320:00	181.3		0200:00	153.6	
1211:00	190.4		1325:00	180.9		0400:00	151.9	
1212:00	190.2		1330:00	180.4		0600:00	149.8	
1213:00	190.0		1335:00	180.0		1200:00	146.8	
1214:00	189.8		1340:00	179.6		1800:00	144.2	
1215:00	189.6		1350:00	178.7		2400:00	142.8	
1216:00	189.3		1400:00	177.9				
1217:00	189.2		1410:00	177.1		Date: 07-28-80		
1218:00	189.0		1420:00	176.4				
1219:00	188.8		1430:00	175.8		0600:00	141.7	
1220:00	188.5		1440:00	175.1		1200:00	140.9	
1225:00	187.7		1450:00	174.5		1800:00	140.4	
1230:00	186.8		1500:00	173.9		2400:00	140.0	
1235:00	186.8		1600:00	170.6				
1240:00	186.0		1700:00	167.8		Date: 07-29-80		
1445:00	185.3		1800:00	165.5				
1250:00	184.5		1900:00	163.4		0600:00	139.7	End of test
1255:00	184.0		2000:00	161.6				
1300:00	183.5		2100:00	160.0				
1305:00	182.9		2200:00	158.4				
1310:00	182.4		2300:00	157.1				
1315:00	181.9		2400:00	155.9				

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Culebra Dolomite Member - Bailing Test 1

Starting date: 08-12-80

Well depth: 588 feet

Perforated interval tested: 290-320 feet

Inside diameter of tested interval: 5.012 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 450 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remark: Bailing after perforation.

Clock time	Bailer number	Water level, in feet below top of well head	Remarks
Date: 08-12-80			
1235	1	--	
1310	20	--	Heavy rain started
1337	21	--	
1408	40	--	End bailing
1410	--	107.5	Recovery
1425	--	107.0	
1435	--	107.0	
1445	--	107.0	
1500	--	107.0	End of test

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Culebra Dolomite Member - Bailing Test 2

Starting date: 08-22-80

Well depth: 588 feet

Perforated interval tested: 290-320 feet

Inside diameter of tested interval: 5.012 inches

Static water level was 104.16 feet below land surface on 08-22-80 prior to this testing phase.

Total amount of fluid bailed was 470 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: From 1102 to 1255 ran 42 bailer trips. Saved last bailer for fluid sample. Recovery not monitored.

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Culebra Dolomite Member - Slug Test 1

Starting date: 08-23-80

Type of test: Displacement

Well depth: 588 feet

Perforated interval tested: 290-320 feet

Inside diameter of tested interval: 5.012 inches

Measuring point was transducer, which was 156 feet below land surface.

Static water level was 104.5 feet below land surface on 08-23-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-23-80								
1000:02	21.4	Pretest	1000:46	22.5		1001:40	21.7	
	28.4	Start test	:48	22.4		:44	21.6	
:06	25.5		:50	22.3		:48	21.6	
:08	21.4		:52	22.3		:52	21.6	
:10	25.1		:54	22.3		:56	21.6	
:12	25.5		:56	22.2		:58	21.6	End of test
:14	23.6		:58	22.2				
:16	23.6		1001:00	22.2				
:18	23.5		:02	22.1				
:20	23.3		:04	22.1				
:22	23.3		:06	22.1				
:24	23.2		:08	22.0				
:26	23.2		:10	22.0				
:28	23.1		:12	22.0				
:30	23.0		:14	21.9				
:32	22.9		:16	21.9				
:34	22.8		:18	21.9				
:36	22.8		:20	21.9				
:38	22.7		:24	21.8				
:40	22.6		:28	21.8				
:42	22.6		:32	21.8				
:44	22.5		:36	21.7				

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Culebra Dolomite Member - Slug Test 2

Starting date: 08-23-80

Type of test: Reverse displacement

Well depth: 588 feet

Perforated interval tested: 290-320 feet

Inside diameter of tested interval: 5.012 inches

Measuring point was transducer which was 156 feet below land surface.

Static water level was 104.5 feet below land surface on 08-23-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-23-80								
1010:00	21.6	Pretest	1010:44	20.4		1011:36	21.2	
:02	17.3	Start test	:46	20.4		:40	21.2	
:04	20.6		:48	20.5		:44	21.3	
:06	18.7		:50	20.6		:48	21.3	
:08	18.5		:52	20.6		:52	21.3	
:10	18.7		:54	20.6		:56	21.3	
:12	18.8		:56	20.7		1012:00	21.3	
:14	19.0		:158	20.7		:10	21.3	
:16	19.1		1011:00	20.7		:20	21.4	
:18	19.3		:02	20.8		:30	21.4	
:20	19.4		:04	20.8		:40	21.4	
:22	19.5		:06	20.8		:50	21.4	
:24	19.6		:08	20.9		1013:00	21.5	
:26	19.7		:10	20.9		:30	21.5	
:28	19.8		:12	21.0		1014:00	21.5	
:30	19.9		:14	21.0		:30	21.5	
:32	20.0		:16	21.0		1015:00	21.6	
:34	20.0		:18	21.0		1016:00	21.6	
:36	20.1		:20	21.1		1017:00	21.6	
:38	20.2		:24	21.1		1018:00	21.6	
:40	20.3		:28	21.1		1019:00	21.6	End of test
:42	20.3		1022:32	21.2				

Table 10. Hydrologic test data for well WIPP-27 - Continued

Culebra Dolomite Member - Slug Test 3

Starting date: 08-23-80

Type of test: Displacement

Well depth: 588 feet

Perforated interval tested: 290-320 feet

Inside diameter of tested interval: 5.012 inches

Measuring point was transducer which was 156 feet below land surface.

Static water level was 104.5 feet below land surface on 08-23-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-23-80								
1030:02	21.6	Pretest	1030:46	22.8		1031:50	22.0	
:04	28.5	Start test	:48	22.7		:54	21.9	
:06	26.3		:50	22.7		1032:05	21.9	
:08	22.7		:52	22.6		:10	21.9	
:10	22.3		:54	22.6		:20	21.9	
:12	24.0		:56	22.6		:30	21.8	
:14	24.2		:58	22.6		:41	21.8	
:16	23.9		1031:00	22.5		:50	21.8	
:18	23.8		:02	22.5		1033:00	21.8	
:20	23.8		:04	22.4		:25	21.7	
:22	23.6		:06	22.4		1034:00	21.7	
:24	23.5		:08	22.4		1035:00	21.7	
:26	23.5		:10	22.3		1036:00	21.7	
:28	23.3		:14	22.3		1037:00	21.6	End of test
:30	23.3		:18	22.3				
:32	23.2		:22	22.2				
:34	23.1		:26	22.2				
:36	23.1		:30	22.1				
:38	23.0		:34	22.1				
:40	23.0		:38	22.0				
:42	22.9		:42	22.0				
:44	22.9		:46	22.0				

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Culebra Dolomite Member - Slug Test 4

Starting date: 08-23-80

Type of test: Displacement

Well depth: 588 feet

Perforated interval tested: 290-320 feet

Inside diameter of tested interval: 5.012 inches

Measuring point was transducer which was 156 feet below land surface.

Static water level was 104.5 feet below land surface on 08-23-80 prior to this testing phase.

Remarks: Test was aborted.

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-23-80		
1040:00	21.6	Pretest
:02	19.6	Start test
:04	19.4	
:06	18.4	
:08	18.7	
:10	18.8	
:12	19.0	
:14	19.2	
:16	19.3	Instrumentation malfunction
:40	20.3	
:42	20.4	
:44	20.5	
:46	20.5	
:48	20.6	
:55	20.7	
1041:00	20.8	Test aborted

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Culebra Dolomite Member - Slug Test 5

Starting date: 08-23-80

Type of test: Displacement

Well depth: 588 feet

Perforated interval tested: 290-320 feet

Inside diameter of tested interval: 5.012 inches

Measuring point was transducer which was 156 feet below land surface.

Static water level was 104.5 feet below land surface on 08-23-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-23-80								
1050:00	21.6	Pretest	1050:46	22.8		1052:10	21.9	
:04	22.3	Start test	:48	22.7		:20	21.8	
:06	27.1		:50	22.7		:30	21.8	
:08	26.3		:52	22.6		:40	21.8	
:10	21.3		:54	22.6		:50	21.8	
:12	24.1		:56	22.6		1053:00	21.8	
:14	23.9		:58	22.5		:10	21.8	
:16	23.9		:00	22.5		:30	21.7	
:18	23.8		:02	22.5		1054:00	21.7	
:20	23.7		:04	22.4		:30	21.7	
:22	23.6		:06	22.3		1055:00	21.7	End of test
:24	23.5		:08	22.3				
:26	23.5		:10	22.3				
:28	23.3		:15	22.3				
:30	23.3		:20	22.2				
:32	23.2		:25	22.2				
:34	23.1		:30	22.1				
:36	23.1		:35	22.0				
:38	23.0		:40	22.0				
:40	22.9		:45	22.0				
:42	22.9		:50	21.9				
:44	22.8		1052:00	21.9				

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Culebra Dolomite Member - Slug Test 6

Starting date: 08-23-80

Type of test: Reverse displacement

Well depth: 588 feet

Perforated interval tested: 290-320 feet

Inside diameter of tested interval: 5.012 inches

Measuring point was transducer which was 156 feet below land surface.

Static water level was 104.5 feet below land surface on 08-23-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-23-80					
1100:00	21.6	Pretest	1100:46	20.5	
:04	17.7	Start test	:48	20.6	
:06	18.5		:50	20.6	
:08	18.7		:52	20.6	
:10	18.8		:54	20.6	
:12	19.0		:56	20.7	
:14	19.1		:58	20.8	
:16	19.3		1101:00	20.8	
:18	19.4		:02	20.8	
:20	19.5		:04	20.9	
:22	19.7		:06	20.9	
:24	19.7		:08	20.9	
:26	19.8		:10	21.0	
:28	19.9		:12	21.0	
:30	20.0		:14	21.0	
:32	20.1		:16	21.0	
:34	20.1		:18	21.0	
:36	20.2		:20	21.1	
:38	20.3		:24	21.1	
:40	20.3		:26	21.1	
:42	20.4		:28	21.1	
:44	20.4		:30	21.2	

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Culebra Dolomite Member - Slug Test 6 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-23-80		
1101:35	21.2	
:42	21.3	
:45	21.3	
:50	21.3	
:55	21.3	
1102:00	21.3	
:05	21.3	
:10	21.4	
:15	21.4	
:20	21.4	
:25	21.4	
:30	21.4	
:35	21.4	
:40	21.4	
:50	21.4	
1103:00	21.5	
:20	21.5	
:30	21.5	
:40	21.5	
1104:00	21.5	
:30	21.5	
1105:00	21.6	
:30	21.6	
1106:00	21.6	
:30	21.6	
1107:00	21.6	
:30	21.6	
1108:00	21.6	End of test

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Magenta Dolomite Member - Bailing Test 1

Starting date: 09-19-80

Well depth: 588 feet

Perforated interval tested : 175-195 feet

Inside diameter of tested interval: 5.012 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 400 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforating. From 0946 to 1035 ran 35 bailing trips. Fluid level was 104.0 feet below land surface after bailing at 1100, 1105, and 1130.

Magenta Dolomite Member - Bailing Test 2

Starting date: 09-20-80

Well depth: 588 feet

Perforated interval tested: 175-195 feet

Inside diameter of tested interval: 5.012 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 470 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Ran 42 bailing trips. Collected fluid sample from last bailer. Recovery not monitored.

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Magenta Dolomite Member - Slug Test 1

Starting date: 09-20-80

Type of test: Injection

Well depth: 588 feet

Perforated interval tested: 175-195 feet

Inside diameter of tested interval: 5.012 inches

Measuring point was transducer tubing below the packer which was 115 feet below land surface.

Static water level was unknown prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 09-20-80					
1100:50	49.7	Start test	1102:40	35.0	
:55	48.9		:45	34.4	
1101:00	48.1		:50	33.9	
:05	47.3		:55	33.3	
:10	46.5		1103:00	32.7	
:15	45.8		:05	32.2	
:20	45.1		:10	31.6	
:25	44.4		:15	31.0	
:30	43.7		:20	30.5	
:35	43.0		:25	30.0	
:40	42.3		:30	29.5	
:45	41.7		:35	29.1	
:50	41.0		:40	28.6	
:55	40.3		:50	27.7	
1102:00	39.7		1104:00	26.9	
:05	39.1		:10	26.2	
:10	38.4		:20	25.5	
:15	37.9		:30	24.7	
:20	37.3		:40	23.9	
:25	36.7		:50	23.2	
:30	36.1		1105:00	22.9	
:35	35.6		:10	21.8	

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Magenta Dolomite Member - Slug Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 09-20-80					
1105:20	21.0		1110:20	6.7	
:30	20.4		:40	6.1	
:40	19.8		1111:00	5.6	
:50	19.0		:30	4.9	
1106:00	18.4		1112:00	4.2	
:10	17.7		:30	3.8	
:20	17.2		1113:00	3.2	
:30	16.6		:30	2.7	
:40	16.0		1114:00	2.3	
:50	15.5		:30	2.0	
1107:00	14.9		1115:00	1.7	
:15	14.1		:30	1.5	
:30	13.3		1116:00	1.3	
:45	12.6		:30	1.0	
1108:00	11.9		1117:00	0.9	
:15	11.2		:30	0.8	
:30	10.6		1118:00	0.6	
:45	10.0		1119:00	0.4	
1109:00	9.4		1120:00	0.3	
:20	8.6		1121:00	0.3	
:40	7.9		1122:00	0.3	End of test
1110:00	7.3				

Table 10. Hydrologic-test data for well WIPP-27 - Continued

Magenta Dolomite Member - Slug Test 2

Starting date: 09-20-80

Type of test: Injection

Well depth: 588 feet

Perforated interval tested: 175-195 feet

Inside diameter of tested interval: 5.012 inches

Measuring point was transducer which was 115 feet below land surface.

Static water level was unknown prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 09-20-80					
1130:55	45.8	Start test	1132:45	33.6	
1131:00	45.3		:50	33.1	
:05	44.5		:55	32.6	
:10	43.8		1133:00	32.1	
:15	43.2		:05	31.6	
:20	42.6		:10	31.1	
:25	41.9		:15	30.7	
:30	41.3		:20	30.2	
:35	40.7		:25	29.7	
:40	40.1		:30	29.3	
:45	39.5		:40	28.3	
:50	38.9		:50	27.4	
:55	38.5		1134:00	26.5	
1132:00	37.8		:10	25.6	
:05	37.3		:20	24.8	
:10	36.8		:30	24.0	
:15	36.2		:40	23.3	
:20	36.5		:50	22.6	
:25	35.8		1135:00	21.8	
:30	35.2		:10	21.1	
:35	34.7		:20	20.5	
:40	34.1		:30	19.8	

Table 10. Hydrologic-test data for well WIPP-27 - Concluded

Magenta Dolomite Member - Slug Test 2 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 09-20-80					
1135:40	19.2		1142:30	4.0	
:50	18.6		1143:00	3.5	
1136:00	17.9		:30	3.0	
:10	17.3		1144:00	2.6	
:20	16.8		:30	2.3	
:30	16.2		1145:00	1.9	
:40	15.6		1146:00	1.5	
:50	15.0		1147:00	1.1	
1137:00	14.6		1148:00	0.9	
:15	13.8		1149:00	0.7	
:30	13.0		1150:00	0.6	
:45	12.3		1155:00	0.4	End of test
1138:00	11.7				
:15	11.1				
:30	10.5				
1139:00	9.4				
:30	8.3				
1140:00	7.3				
:30	6.5				
1141:00	5.8				
:30	5.1				
1142:00	4.5				

Table 11. Density profile for well WIPP-27

Date run: 05-21-80

Perforated intervals: 426-460 and 480-510 feet

Well depth: 588 feet

Sample number	Depth collected (feet)	Time collected	Density (grams per cubic centimeter)	Specific conductance[1/] (microsiemens per centimeter at 25° Celsius)	Temperature (°Celsius)	pH (standard units)
1	120	1025	1.0766	122,000	22.5	6.5
2	200	1030	1.0785	126,000	22.5	7.3
3	280	1040	1.0790	125,000	22.0	7.1
4	360	1050	1.0785	124,000	22.5	6.7
5	440	1055	1.0825	130,000	23.0	5.2
6	520	1110	1.2065	231,000	23.0	7.7
7	520	1125	1.2075	231,000	23.0	7.9
8	520	1140	1.2065	231,000	24.0	7.9

[1/] Laboratory tested.

Table 12. Water-level records for well WIPP-27

[Water-bearing zone: M, Magenta Dolomite Member of the Rustler Formation; C, Culebra Dolomite Member of the Rustler Formation; R/S, Rustler Formation-Salado Formation contact zone. All water levels in Rustler Formation-Salado Formation contact zone are in feet below top of casing.]

Water-bearing zone	Date	Time	Water level, in feet below land surface	Remarks
M	10-08-80	1025	106	-
M	11-03-80	1025	104.13	-
M	12-01-80	1145	103.60	-
M	02-06-81	0755	103.42	-
M	03-04-81	0915	103.28	-
M	05-06-81	1410	103.09	-
M	10-05-81	1145	102.06	-
M	01-19-82	0950	102.15	-
M	05-18-82	1027	103.52	-
M	03-02-83	1156	105.63	-
M	07-20-83	1150	107.26	-
M	08-24-83	0857	107.54	-
M	11-21-83	0910	107.00	-
M	01-23-84	1000	106.87	-
M	10-18-84	1115	106.42	-
C	08-24-83	0852	106.13	-
C	11-21-83	0900	105.44	-
C	01-23-84	0955	105.19	-
C	10-18-84	1110	104.47	-
R/S	03-17-80	1130	540	Lower perforated zone only.
R/S	03-18-80	0715	478	Do.
R/S	04-16-80	1505	121	-
R/S	05-07-80	1500	111	-
R/S	06-07-80	0845	110	Recovering from bailing.
R/S	06-07-80	1120	566	Do.
R/S	06-09-80	0800	518	Do.
R/S	06-10-80	0725	499	Do.
R/S	06-11-80	0935	489	Do.
R/S	06-12-80	0945	471	Do.

Table 12. Water-level records for well WIPP-27 - Concluded

Water-bearing zone	Date	Time	Water level, in feet below land surface	Remarks
R/S	06-13-80	0800	453	Recovering from bailing
R/S	06-14-80	0745	434	Do.
R/S	06-15-80	0925	414	Do.
R/S	06-16-80	0820	396	Do.
R/S	06-17-80	0800	377.52	Do.
R/S	06-18-80	0915	358.30	Do.
R/S	06-19-80	1120	338.80	Do.
R/S	06-20-80	0900	315.45	Do.
R/S	06-21-80	0720	308	Do.
R/S	06-22-80	0715	292	Do.
R/S	06-23-80	0940	275.56	Do.
R/S	06-24-80	0805	263.15	Do.
R/S	06-25-80	0745	252	Do.
R/S	06-26-80	0720	240	Do.
R/S	06-27-80	1000	229	Do.
R/S	06-28-80	0845	220	Do.
R/S	06-29-80	0930	212	Do.
R/S	06-30-80	0945	204	Do.
R/S	07-02-80	0700	192	Do.

Well WIPP-28

Testing was conducted at well WIPP-28 from March 15 to September 17, 1980. All three water-bearing zones were penetrated by this well. The Magenta Dolomite Member was dry. Table 13 shows that the Culebra Dolomite Member and the Rustler Formation-Salado Formation contact zone were tested both open hole and with a feed-through packer. Simultaneous long-term monitoring of fluid levels in the Culebra Dolomite Member and Rustler Formation-Salado Formation contact zone was made possible through use of a production-injection packer placed between the two units.

Table 13. Testing chronology for well WIPP-28

[Depths are below land surface, except as indicated. Packer depths are to top of inflation element.]

Date	Procedure
08-28-78	Hole completed with 4.950-inch inside diameter casing set from 1.8 feet above land surface to 800 feet.
03-15-80	Perforated Rustler Formation-Salado Formation contact zone from 549 to 589 feet. Ran bailing test 1 with yield of 450 gallons.
03-20-80	Ran bailing test 2 with yield of 450 gallons.
07-19-80	Ran bailing test 3 with yield of 220 gallons. Placed feed-through packer above Rustler Formation-Salado Formation contact zone at 356.6 feet. Ran shut-in test 1 and slug test 1.
07-21-80	Removed feed-through packer, ran slug test 2 on Rustler Formation-Salado Formation contact zone.
08-09-80	Placed bridge-plug packer below Culebra Dolomite Member at 521.7 feet.
08-11-80	Perforated Culebra Dolomite Member from 420 to 446 feet. Ran bailing test 1 with yield of 340 gallons.

Table 13. Testing chronology for well WIPP-28 - Concluded

Date	Procedure
08-21-80	Ran bailing test 2 with yield of 140 gallons. Collected sample. Placed feed-through packer above Culebra Dolomite Member at 292.7 feet. Ran shut-in test 1 and slug test 1.
08-22-80	Removed feed-through packer.
08-25-80	Ran slug tests 2 through 5.
09-16-80	Placed bridge-plug packer below Magenta Dolomite Member at 360.1 feet.
09-17-80	Perforated Magenta Dolomite Member from 285 to 310 feet. Ran bailing test 1 with yield of 80 gallons. Magenta Dolomite Member was dry.
07-19-83	Removed both bridge-plug packers.
07-20-83	Placed production-injection packer at 483.81 feet to separate Culebra Dolomite Member from Rustler Formation-Salado Formation contact zone and enable long-term monitoring of water level in both units.

Table 14. Hydrologic-test data for well WIPP-28

Rustler Formation-Salado Formation Contact Zone - Bailing Test 1

Starting date: 03-15-80

Well depth: 797 feet

Perforated interval tested: 549-589 feet

Inside diameter of tested interval: 4.950 inches

Water levels were measured with a pressure transducer.

Measuring point for the recovery from bailing was the pressure transducer which was 780 feet below land surface.

Static water level was unknown prior to this testing phase.

Type bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforation.

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-15-80			
1220	1	--	Bailing
1222	2	--	
1225	3	--	
1227	4	--	
1230	5	--	
1233	6	--	
1236	7	--	
1238	8	--	
1241	9	--	
1244	10	--	
1246	11	--	
1248	12	--	
1250	13	--	
1253	14	--	
1255	15	--	
1259	16	--	
1301	17	--	
1304	18	--	
1306	19	--	
1309	20	--	
1312	21	--	
1315	22	--	
1318	23	--	
1320	24	--	
1324	25	--	
1327	26	--	
1329	27	--	
1331	28	--	
1334	29	--	
1336	30	--	
1339	31	--	
1342	32	--	
1344	33	--	
1346	34	--	
1349	35	--	
1351	36	--	
1353	37	--	
1355	38	--	
1358	39	--	
1400	40	--	End of bailing
1408	--	2.2	Recovery
1409	--	2.9	
1410	--	3.6	
1411	--	4.3	
1412	--	4.8	

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test I - Continued

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-15-80			
1413	--	5.5	
1414	--	6.1	
1415	--	6.7	
1416	--	7.3	
1417	--	7.9	
1418	--	8.5	
1419	--	9.1	
1420	--	9.7	
1421	--	10.3	
1422	--	10.9	
1423	--	11.5	
1424	--	12.2	
1425	--	12.8	
1426	--	13.4	
1427	--	14.0	
1428	--	14.6	
1429	--	15.2	
1430	--	15.8	
1431	--	16.4	
1432	--	17.0	
1433	--	17.6	
1434	--	18.2	
1435	--	18.8	
1436	--	19.4	
1437	--	20.0	
1438	--	20.6	
1439	--	21.2	
1440	--	21.8	
1442	--	23.0	
1444	--	24.2	
1446	--	25.4	
1448	--	26.6	
1450	--	27.8	
1452	--	29.0	
1454	--	30.2	
1456	--	31.3	
1458	--	32.5	
1500	--	33.7	
1502	--	34.9	
1504	--	36.0	
1506	--	37.2	
1508	--	38.4	
1510	--	39.6	
1515	--	42.7	
1520	--	45.8	

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 1 - Continued

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-15-80			
1525	--	48.9	
1530	--	52.1	
1535	--	55.4	
1540	--	58.5	
1545	--	61.8	
1550	--	65.0	
1555	--	68.2	
1600	--	71.4	
1601	--	72.0	
1605	--	74.4	
1610	--	77.5	
1620	--	83.6	
1630	--	87.3	
1640	--	90.8	
1650	--	94.3	
1700	--	97.9	
1710	--	101.6	
1720	--	105.3	
1730	--	108.9	
1740	--	112.3	
1750	--	115.6	
1800	--	118.9	
1815	--	123.7	
1830	--	128.2	
1845	--	132.5	
1900	--	136.5	
1915	--	140.4	
1930	--	144.1	
1945	--	147.7	
2000	--	151.0	
2006	--	152.4	
2009	--	152.9	
2015	--	154.2	
2030	--	157.2	
2045	--	160.0	
2100	--	162.7	
2115	--	165.3	
2130	--	167.7	
2145	--	169.9	
2200	--	172.0	
2215	--	174.0	
2230	--	175.8	
2245	--	177.6	
2300	--	179.2	

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test I - Concluded

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-15-80			
2315	--	180.7	
2330	--	182.1	
2345	--	183.4	
2400	--	184.7	
	--		
Date: 03-16-80			
0015	--	185.8	
0030	--	186.9	
0045	--	187.8	
0100	--	188.7	
0115	--	189.6	
0130	--	190.3	
0145	--	191.0	
0200	--	191.7	
0230	--	192.8	
0300	--	193.7	
0330	--	194.4	
0400	--	195.1	
0430	--	195.5	
0500	--	195.9	
0530	--	196.3	
0600	--	196.5	
0700	--	196.9	
0800	--	197.1	
0900	--	197.4	
1000	--	197.6	
1300	--	198.1	
1600	--	198.5	
1900	--	198.7	
2200	--	198.8	
Date: 03-17-80			
0200	--	198.8	
0718	--	199.3	End of test

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 2

Starting date: 03-20-80

Well depth: 797 feet

Perforated interval tested: 549-589 feet

Inside diameter of tested interval: 4.950 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 450 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: From 0845 to 1009 ran 40 bailing trips.

Recovery not monitored. Took sample from last bailer.

Rustler Formation-Salado Formation Contact Zone - Bailing Test 3

Starting date: 07-19-80

Well depth: 797 feet

Perforated interval tested: 549-589 feet

Inside diameter of tested interval: 4.950 inches

Static water level was 303.34 feet below land surface on 06-30-80 prior to this testing phase.

Total amount of fluid bailed was 220 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: From 0815 to 0857 ran 20 bailing trips.

Recovery not monitored.

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Rustler Formation-Salado Formation Contact Zone - Shut-in Test 1

Starting date: 07-19-80

Well depth: 797 feet

Shut in after: Bailing

Perforated interval tested: 549-589 feet

Inside diameter of tested interval: 4.950 inches

Type of packer: Production-injection packer with feed-through tubing.

Diameter of packer: 4.5 inches

Packer was set at 356.3 feet below land surface.

Measuring point was transducer tube below packer, which was 362.1 feet below land surface.

Static water level was 303.34 feet below land surface on 06-30-80 prior to this testing phase.

Remarks: Fluid level was static when packer was set. Therefore, no shut-in data are available.

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1

Starting date: 07-19-80

Type of test: Injection

Well depth: 797 feet

Perforated interval tested: 549-589 feet

Packer type: Production-injection packer with feed-through tubing.

Packer diameter: 4.5 inches

Packer was set at 356.3 feet below land surface.

Measuring point was transducer tubing below the packer which was 362.1 feet below land surface.

Static water level was 303.34 feet below land surface on 06-30-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-19-80					
1128:00	19.0	Pretest	1128:58	137.7	
:16	19.0		1129:00	136.9	
:18	30.5		:02	136.0	
:20	148.1		:04	135.4	
:22	150.3		:06	134.5	
:24	149.5		:08	133.8	
:26	150.8	Start test	:10	133.0	
:28	149.5		:12	132.3	
:30	148.6		:14	131.6	
:32	148.4		:16	130.8	
:34	145.8		:18	130.2	
:36	146.6		:20	129.4	
:38	146.1		:22	128.7	
:40	145.2		:24	128.1	
:42	144.1		:26	127.4	
:44	142.4		:28	126.7	
:46	141.9		:30	126.0	
:48	141.6		:32	125.3	
:50	140.3		:34	124.6	
:52	139.9		:36	123.9	
:54	139.2		:38	123.2	
:56	138.4		:40	122.6	

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-19-80								
1129:42	121.6		1131:45	86.6		1135:10	48.2	
:50	119.2		:50	85.4		:20	46.8	
1130:00	116.0		:55	84.2		:30	45.5	
:08	113.5		1132:00	83.1		:40	44.3	
:13	111.9		:10	80.8		1137:00	35.8	
:20	109.8		:20	78.6		1138:00	31.0	
:25	108.3		:30	76.4		1139:00	27.4	
:30	106.8		:40	74.3		1140:00	25.0	
:35	105.4		:50	72.2		1141:00	23.5	
:40	103.9		1133:00	70.2		1142:00	22.8	
:45	102.4		:10	68.2		1143:00	22.5	End of test
:50	101.0		:20	66.3				
:55	99.7		:30	64.4				
1131:00	98.4		:40	62.6				
:05	96.8		:50	60.8				
:10	95.6		1134:00	59.0				
:15	94.2		:10	57.4				
:20	92.9		:20	55.6				
:25	91.6		:30	54.0				
:30	90.3		:40	52.5				
:35	89.1		:50	51.0				
:40	87.9		1135:00	49.6				

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 2

Starting date: 07-21-80

Type of test: Injection

Well depth: 797 feet

Perforated interval tested: 549-589 feet

Inside diameter of tested interval: 4.950 inches

Measuring point was transducer port which was 350 feet below land surface.

Static water level was 303.34 feet below land surface on 06-30-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-21-80								
1000:00	9.8		1000:57	65.4		1001:55	66.5	
:02	10.2		1001:00	67.7		1002:00	66.5	
:05	11.6		:02	68.3		:05	66.2	
:10	14.4		:04	66.9		:10	65.8	
:12	16.2		:07	67.3		:15	65.8	
:15	18.7		:10	67.6		:20	65.5	
:18	21.3		:12	67.4		:25	65.4	
:20	23.3		:14	67.3		:30	65.2	
:23	26.1		:17	66.9		:35	64.8	
:25	28.7		:20	67.0		:40	64.8	
:28	32.3		:23	66.9		:45	64.5	
:30	34.4		:26	66.6		:50	64.5	
:33	38.1		:28	66.6		1003:00	63.9	
:35	41.3		:30	66.8		:10	63.6	
:38	44.4		:32	67.0		:20	63.3	
:40	46.2		:34	67.0		:30	62.9	
:42	49.3		:37	67.1		:40	62.5	
:44	52.6		:40	67.0		:50	62.0	
:47	55.5		:42	67.1		1004:00	61.5	
:50	58.3		:44	66.9		:10	61.2	
:52	61.3		:47	66.9		:20	60.9	
:55	63.8		:50	66.8		:40	60.2	

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 2 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-21-80								
1005:00	59.3		1013:00	43.1		1042:00	16.4	
:20	58.4		1014:00	41.4		1044:00	15.9	
:40	57.7		1015:00	39.8		1046:00	15.5	
1006:00	57.0		1016:00	38.2		1048:00	15.3	
:20	56.2		1017:00	36.7		1050:00	15.1	
:40	55.5		1018:00	35.2		1052:00	15.0	
1007:00	54.8		1019:00	33.8		1054:00	14.8	
:20	54.0		1020:00	32.5		1056:00	14.8	
:40	53.3		1021:00	31.2		1058:00	14.7	
1008:00	52.6		1022:00	30.0		1100:00	14.6	
:20	51.9		1023:00	28.9		1105:00	14.5	
:40	51.2		1024:00	27.8		1110:00	14.3	
1009:00	50.5		1025:00	26.7		1115:00	14.2	
:20	49.9		1026:00	25.8		1120:00	14.1	
:40	49.2		1027:00	24.8		1125:00	14.0	
1010:00	48.6		1028:00	23.9		1130:00	13.9	
:20	47.9		1030:00	22.3		1135:00	13.9	
:40	47.3		1032:00	20.8		1140:00	13.8	
1011:00	46.7		1034:00	19.6		1145:00	13.7	End of test
:20	46.1		1036:00	18.6				
:40	45.5		1038:00	17.7				
1012:00	44.8		1040:00	16.9				

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Culebra Dolomite Member - Bailing Test 1

Starting date: 08-11-80

Well depth: 797 feet

Perforated interval tested: 420-446 feet

Inside diameter of tested interval: 4.950 inches

Water levels were measured with a steel tape with a bottle tied on the end.

Measuring point for the recovery from bailing was land surface.

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 340 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remark: Bailing after perforating.

Clock time	Bailer number	Water level, in feet below land surface	Remarks
Date: 08-11-80			
1040	1	--	Bailing
1145	30	--	Recovery
1200	--	316.5	
1205	--	313.5	
1215	--	310.0	
1225	--	309.0	
1235	--	307.5	
1245	--	306.0	
1300	--	305.0	
1315	--	304.0	End of test

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Culebra Dolomite Member - Bailing Test 2

Starting date: 08-21-80

Well depth: 797 feet

Perforated interval tested: 420-446 feet

Inside diameter of tested interval: 4.950 inches

Static water level was 283.59 feet below land surface on 08-21-80 prior to this testing phase.

Total amount of fluid bailed was 140 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: From 0922 to 0945 ran 12 bailing trips. Collected fluid sample from last bailer. Recovery not monitored.

Culebra Dolomite Member - Shut-in Test 1

Starting date: 08-21-80

Well depth: 797 feet

Perforated interval tested: 420-446 feet

Inside diameter of tested interval: 4.950 inches

Type of packer: Production-injection packer with feed-through tubing.

Diameter of packer: 4.5 inches

Packer was set at 292.7 feet below land surface.

Measuring point was transducer tube below packer which was 298.2 feet below land surface.

Static water level was 283.59 feet below land surface on 08-21-80 prior to this testing phase.

Remarks: Recovered too fast, test aborted. No test data.

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Culebra Dolomite Member - Slug Test 1

Starting date: 08-21-80

Type of test: Injection

Well depth: 797 feet

Perforated tested interval: 420-446 feet

Inside diameter of tested interval: 4.950 inches

Packer type: Production-injection packer with feed-through tubing.

Packer diameter: 4.5 inches

Inside diameter of tubing: 2.0 inches

Packer was set at 292.7 feet below land surface.

Measuring point was transducer tubing below the packer which was 298.2 feet below land surface.

Static water level was 283.59 feet below land surface on 08-21-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-21-80					
1330:00	6.6	Pretest	1331:45	23.1	
:07	--	Start test	:50	21.5	
:08	54.4		:55	20.0	
:10	110.3		1332:00	18.7	
:13	102.9		:05	17.4	
:18	95.1		:10	16.5	
:20	92.0		:15	15.5	
:25	84.2		:20	14.7	
:30	77.8		:25	13.9	
:35	71.0		:30	13.3	
:40	65.8		:35	12.7	
:50	55.8		:40	12.2	
:55	51.0		:45	11.8	
1331:00	47.3		:50	11.4	
:05	43.3		1333:00	10.8	
:10	40.1		:05	10.6	
:15	36.8		:10	10.4	
:20	34.1		:15	10.2	
:25	31.4		:20	10.0	
:30	29.1		:25	9.8	
:35	26.8		:30	9.7	
:40	25.0		:35	9.6	

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Culebra Dolomite Member - Slug Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-21-80					
1333:40	9.5		1336:30	8.1	
:45	9.4		:40	8.1	
:50	9.3		:50	8.1	
:55	9.2		1337:00	8.0	
1334:00	9.1		:10	8.0	
:05	9.0		:20	8.0	
:10	9.0		:30	7.9	
:15	8.9		:40	7.9	
:20	8.9		:50	7.9	
:25	8.8		1338:00	7.9	
:30	8.7		:10	7.8	
:40	8.7		:20	7.8	
:50	8.6		:30	7.8	
1335:00	8.5		1339:00	7.7	
:10	8.5		:30	7.7	
:20	8.4		1340:00	7.7	
:30	8.4		:30	7.6	
:40	8.3		1341:00	7.6	
:50	8.2		1342:00	7.5	
1336:00	8.2		1343:00	7.5	
:10	8.2		1344:00	7.4	
:20	8.1		1345:00	7.4	
			1350:00	7.2	
			1355:00	7.1	
			1400:00	7.0	End of test

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Culebra Dolomite Member - Slug Test 2

Starting date: 08-25-80

Type of test: Displacement

Well depth: 797 feet

Perforated interval tested: 420-446 feet

Inside diameter of tested interval: 4.950 inches

Measuring point was transducer tubing below the packer which was 334.0 feet below land surface.

Static water level was 283.59 feet below land surface on 08-21-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-25-80					
1000:00	21.7	Pretest	1000:44	23.6	
:02	29.5	Start Test	:46	23.5	
:04	28.7		:48	23.5	
:06	28.3		:50	23.5	
:08	28.3		:52	23.4	
:10	23.4		:54	23.4	
:12	24.6		:56	23.4	
:14	24.7		:58	23.3	
:16	24.3		1001:00	23.3	
:18	24.2		:02	23.2	
:20	24.2		:04	23.2	
:22	24.2		:06	23.2	
:24	24.1		:08	23.1	
:26	24.1		:10	23.1	
:28	24.0		:12	23.1	
:30	23.9		:14	23.0	
:32	23.9		:16	23.0	
:34	23.9		:18	23.0	
:36	23.8		:20	23.0	
:38	23.7		:22	23.0	
:40	23.7		:24	23.0	
:42	23.6		:26	22.9	

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Culebra Dolomite Member - Slug Test 2 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-25-80					
1001:28	22.9		1005:00	22.0	
:30	22.9		:20	22.0	
:34	22.8		:40	21.9	
:38	22.7		1006:00	22.0	
:42	22.7		:30	21.9	
:46	22.6		1007:00	21.9	
:50	22.6		:30	21.9	
1002:00	22.5		1008:00	21.9	
:10	22.5		1009:00	21.9	
:20	22.4		1010:00	21.9	
:30	22.3		1011:00	21.9	
:40	22.3		1012:00	21.9	
:50	22.3		1013:00	21.9	
1003:00	22.2		1014:00	21.8	
:10	22.2		1015:00	21.8	
:20	22.2		1020:00	21.8	
:30	22.1		1025:00	21.8	
:40	22.1		1030:00	21.8	
:50	22.1		1035:00	21.8	
1004:00	22.1		1040:00	21.9	End of test
:20	22.0				
:40	22.0				

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Culebra Dolomite Member - Slug Test 3

Starting date: 08-25-80

Type of test: Reverse displacement

Well depth: 797 feet

Perforated interval tested: 420-446 feet

Inside diameter of tested interval: 4.950 inches

Measuring point was transducer which was 334.0 feet below land surface.

Static water level was 283.59 feet below land surface on 08-21-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-25-80					
1045:00	21.8	Pretest	1045:46	20.0	
:02	14.3	Start test	:48	20.0	
:04	15.7		:50	20.0	
:06	18.6		:52	20.1	
:08	18.8		:54	20.1	
:10	18.8		:56	20.2	
:12	18.9		:58	20.2	
:14	19.0		1046:00	20.2	
:16	19.1		:02	20.3	
:18	19.2		:04	20.3	
:20	19.2		:06	20.3	
:22	19.3		:08	20.4	
:24	19.3		:10	20.4	
:26	19.4		:12	20.5	
:28	19.5		:14	20.5	
:30	19.5		:16	20.5	
:32	19.7		:18	20.6	
:34	19.7		:20	20.6	
:36	19.7		:22	20.6	
:38	19.8		:24	20.6	
:40	19.8		:26	20.7	
:42	19.9		:28	20.7	
:44	20.0		:30	20.7	

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Culebra Dolomite Member - Slug Test 3 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-25-80					
1046:32	20.8		1048:20	21.3	
:34	20.8		:30	21.3	
:36	20.8		:40	21.3	
:38	20.8		1049:00	21.3	
:40	20.8		:10	21.4	
:44	20.9		:20	21.4	
:48	20.9		:50	21.4	
:52	21.0		1050:00	21.4	
:56	21.0		:30	21.4	
1047:00	21.0		1051:00	21.4	
:04	21.0		1052:00	21.5	
:08	21.0		1053:00	21.5	
:12	21.0		1054:00	21.5	
:16	21.1		1055:00	21.5	
:20	21.1		1100:00	21.6	
:24	21.1		1105:00	21.6	
:28	21.1		1110:00	21.6	
:32	21.2		1115:00	21.6	
:36	21.2		1120:00	21.6	
:40	21.2		1125:00	21.6	
:50	21.2		1130:00	21.6	
1048:00	21.3		1135:00	21.6	End of test
:10	21.3				

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Culebra Dolomite Member - Slug Test 4

Starting date: 08-25-80

Type of test: Displacement

Well depth: 797 feet

Perforated interval tested: 420-446 feet

Inside diameter of tested interval: 4.950 inches

Measuring point was transducer, which was 334.0 feet below land surface.

Static water level was 283.59 feet below land surface on 08-21-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-25-80								
1140:00	21.6	Pretest	1140:46	23.5		1141:56	22.5	
:04	28.7	Start test	:48	23.4		1142:00	22.4	
:06	28.6		:50	23.3		:10	22.4	
:08	28.0		:52	23.3		:20	22.3	
:10	21.6		:54	23.3		:30	22.3	
:12	24.4		:56	23.2		:41	22.2	
:14	24.2		:58	23.2		:50	22.2	
:16	24.2		1141:00	23.2		1143:00	22.2	
:18	24.1		:02	23.2		:20	22.1	
:20	24.2		:04	23.1		:40	22.0	
:22	24.0		:08	23.0		1144:00	22.0	
:24	24.0		:12	23.0		:30	22.0	
:26	23.9		:16	22.9		1145:00	21.9	
:28	23.9		:20	22.9		1146:00	21.9	
:30	23.9		:24	22.8		1147:00	21.9	
:32	23.8		:28	22.8		1148:00	21.9	
:34	23.8		:32	22.7		1149:00	21.9	
:36	23.7		:36	22.7		1150:00	21.9	
:38	23.6		:40	22.6		1155:00	21.8	
:40	23.6		:44	22.6		1200:00	21.8	
:42	23.6		:48	22.5		1205:00	21.8	
:44	23.5		:52	22.5		1210:00	21.8	
						1220:00	21.9	
						1230:00	21.9	End of test

Table 14. Hydrologic-test data for well WIPP-28 - Continued

Culebra Dolomite Member - Slug Test 5

Starting date: 08-25-80

Type of test: Reverse displacement

Well depth: 797 feet

Perforated interval tested: 420-446 feet

Inside diameter of tested interval: 4.950 inches

Measuring point was transducer, which was 334.0 feet below land surface.

Static water level was 283.59 feet below land surface on 08-21-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-25-80								
1240:00	21.9	Pretest	1240:44	20.0		1241:56	21.0	
:02	18.9	Start test	:46	20.0		1242:00	21.0	
:04	16.4		:48	20.1		:10	21.1	
:06	18.7		:50	20.1		:40	21.2	
:08	18.7		:52	20.2		:50	21.3	
:10	18.8		:54	20.2		1243:00	21.3	
:12	19.0		:56	20.3		:30	21.3	
:14	19.0		:58	20.3		1244:00	21.2	
:16	19.1		1241:00	20.3		:30	21.2	
:18	19.2		:04	20.4		1245:00	21.2	
:20	19.2		:08	20.5		1246:00	21.2	
:22	19.4		:12	20.5		1247:00	21.3	
:24	19.4		:16	20.6		1248:00	21.3	
:26	19.4		:20	20.6		1249:00	21.3	
:28	19.5		:24	20.7		1250:00	21.3	
:30	19.6		:28	20.7		1255:00	21.3	
:32	19.7		:32	20.8		1300:00	21.4	
:34	19.7		:36	20.8		1310:00	21.3	
:36	19.7		:40	20.9		1320:00	21.3	
:38	19.8		:44	20.9		1330:00	21.3	
:40	19.9		:48	21.0		1340:00	21.3	End of test
:42	19.9		:52	21.0				

Table 14. Hydrologic-test data for well WIPP-28 - Concluded

Magenta Dolomite Member - Bailing Test 1

Starting date: 09-17-80

Hole depth: 797 feet

Perforated interval tested: 285-310 feet

Inside diameter of tested interval: 4.950 inches

Water levels were measured with an M-scope.

Measuring point for the recovery from bailing was land surface.

Static water level was 257.5 feet below land surface prior to this testing phase.

Total amount of fluid bailed was 80 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforating.

Clock time	Bailing number	Water level, in feet below land surface	Remarks
Date: 09-17-80			
1106	1	--	Bailing
1117	5	--	
1126	9	--	
1131	--	346.5	Recovery
1138	--	346.5	
1146	--	346.5	
1155	--	346.5	
1203	--	346.5	
1215	--	346.5	
1230	--	346.5	
Date: 09-18-80			
0730	--	345.0	End of test

Table 15. Water-level records for well WIPP-28

[Water-bearing zone: M, Magenta Dolomite Member of the Rustler Formation; C, Culebra Dolomite Member of the Rustler Formation; R/S, Rustler Formation-Salado Formation contact zone]

Water-bearing zone	Date	Time	Water level, in feet below land surface
M	09-23-80	0735	340
M	10-08-80	0900	305
M	11-03-80	0920	232.78
M	05-06-81	1315	200.96
M	07-07-81	1330	201.67
M	08-03-81	0850	202.59
M	09-01-81	0940	202.88
M	10-05-81	1055	202.81
M	01-19-82	0845	202.39
M	05-19-82	0942	201.99
M	03-02-83	1245	201.40
C	09-29-83	0870	274.39
C	11-21-83	0800	274.19
C	01-23-84	0855	274.81
C	10-18-84	1235	274.55
R/S	03-15-80	1200	410
R/S	03-17-80	0718	330
R/S	04-16-80	1615	314
R/S	05-07-80	1605	308
R/S	06-09-80	0930	304
R/S	06-19-80	1035	303.05
R/S	06-24-80	0720	303.32
R/S	06-30-80	0900	303.34
R/S	08-24-83	0736	295.41
R/S	09-29-83	0800	294.10
R/S	11-21-83	0750	294.20
R/S	01-23-84	0850	293.90
R/S	10-18-84	1225	293.00

Well WIPP-29

Testing was conducted at well WIPP-29 from March 10 to August 20, 1980. Only the Culebra Dolomite Member and Rustler Formation-Salado Formation contact zone were penetrated by this well. Table 16 shows that the Rustler Formation-Salado Formation contact zone was tested both open hole and with a feed-through packer. A malfunctioning bridge-plug packer was not retrievable and was pushed to the bottom of the hole below the Rustler Formation-Salado Formation perforations. Simultaneous long-term monitoring of fluid levels in the Culebra Dolomite Member and Rustler Formation-Salado Formation contact zone was made possible through use of a production-injection packer placed between the two units.

Table 16. Testing chronology for well WIPP-29

[Depths are below land surface, except as indicated.
Packer depths are to top of inflation element]

Date	Procedure
10-10-78	Hole completed with 5.012-inch inside diameter casing set from 0.6 foot above land surface to 11.85 feet and 4.950-inch inside diameter set from 11.85 feet to 376 feet.
03-10-80 to 03-12-80	Perforated Rustler Formation-Salado Formation contact zone from 216 to 250 feet. Ran bailing test 1 with yield of 440 gallons.
07-13-80	Ran density profile.
07-15-80	Ran bailing test 2 with yield of 450 gallons. Placed and removed malfunctioning feed-through packer above Rustler Formation-Salado Formation contact zone. Ran slug test 1.
07-17-80	Placed feed-through packer above Rustler Formation-Salado Formation contact zone at 196.2 feet.
07-18-80	Ran flow test 1; removed feed-through packer.
08-03-80	Placed bridge-plug packer below Culebra Dolomite Member at 198.7 feet.
08-08-80	Perforated Culebra Dolomite Member from 10 to 45 feet. Ran bailing test 1 with yield of 340 gallons.
08-20-80	Ran bailing test 2 with yield of 1,150 gallons. Collected sample.
07-18-83	Unable to retrieve deflated bridge-plug packer, pushed to bottom. Placed production-injection packer at 98.07 feet to separate Culebra Dolomite Member from Rustler Formation-Salado Formation contact zone and enable long-term water-level monitoring of both units.

Table 17. Hydrologic-test data for well WIPP-29

Rustler Formation-Salado Formation Contact Zone - Bailing Test 1

Starting date: 03-10-80

Well depth: 373 feet

Perforated interval tested: 216-250 feet

Inside diameter of tested interval: 4.950 inches

Water levels were measured with a pressure transducer.

Measuring point for the recovery from bailing was the pressure transducer which was 354 feet below land surface.

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 440 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforation.

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks	Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-10-80							
1130	1	--	Bailing	1239	23	--	
1133	2	--		1240	24	--	
1137	3	--		1242	25	--	
1139	4	--		1243	26	--	
1142	5	--		1245	27	--	
1144	6	--		1246	28	--	
1146	7	--		1248	29	--	
1148	8	--		1249	30	--	
1150	9	--		1251	31	--	
1152	10	--		1252	32	--	
1154	11	--		1253	33	--	
1155	12	--		1255	34	--	
1157	13	--		1256	35	--	
1159	14	--		1258	36	--	
1225	15	--		1300	37	--	
1227	16	--		1302	38	--	
1229	17	--		1305	39	--	
1230	18	--		1308	-	2.0	Recovery
1233	19	--		1309	-	3.3	
1234	20	--		1310	-	4.7	
1236	21	--		1311	-	6.1	
1237	22	--		1312	-	7.8	

Table 17. Hydrologic-test data for well WIPP-29 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 1 - Continued

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-10-80			
1313	--	9.2	
1314	--	10.7	
1315	--	12.3	
1316	--	13.9	
1317	--	15.5	
1318	--	17.0	
1319	--	18.6	
1320	--	20.1	
1322	--	23.3	
1324	--	26.3	
1326	--	29.5	
1328	--	32.5	
1330	--	35.6	
1335	--	43.2	
1340	--	50.6	
1345	--	56.4	
1350	--	62.1	
1355	--	69.1	
1400	--	73.5	
1405	--	80.4	
1410	--	85.8	
1420	--	93.1	
1425	--	98.7	
1430	--	102.4	
1435	--	106.9	
1440	--	111.3	
1445	--	114.8	
1450	--	118.2	
1455	--	121.5	
1500	--	124.4	
1505	--	127.4	
1510	--	129.5	
1515	--	131.9	
1520	--	134.1	
1525	--	135.8	
1530	--	137.2	
1535	--	138.5	
1540	--	139.5	
1545	--	140.5	
1550	--	141.3	
1555	--	141.9	
1600	--	142.6	
1605	--	143.1	
1610	--	143.5	

Table 17. Hydrologic-test data for well WIPP-29 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test I - Concluded

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-10-80			
1615	--	143.9	
1620	--	144.2	
1625	--	144.4	
1630	--	144.6	
1635	--	144.8	
1640	--	145.0	
1645	--	145.2	
1715	--	145.9	
1745	--	146.2	
1815	--	146.5	
1845	--	146.5	
1915	--	146.4	
2015	--	146.4	
2045	--	146.5	
2115	--	146.6	
2145	--	146.6	
2215	--	146.7	
2245	--	146.8	
2315	--	146.8	
2345	--	146.9	
Date: 03-11-80			
0015	--	147.0	
0045	--	147.1	
0115	--	147.1	
0145	--	147.2	
0215	--	147.3	
0245	--	147.3	
0315	--	147.4	
0345	--	147.4	
0415	--	147.4	
0445	--	147.5	
0515	--	147.5	
0545	--	147.5	
0615	--	147.5	
0645	--	147.6	
0715	--	147.6	End of test

Table 17. Hydrologic-test data for well WIPP-29 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 2

Starting date: 07-15-80

Hole depth: 373 feet

Perforated interval tested: 216-250 feet

Inside diameter of tested interval: 4.950 inches

Static water level was 17.82 feet below land surface on 07-13-80 prior to this testing phase.

Total amount of fluid bailed was 450 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: From 0830 to 1010 ran 40 bailing trips. Recovery not monitored.

Table 17. Hydrologic-test data for well WIPP-29 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1

Starting date: 07-15-80

Type of test: Injection

Well depth: 373 feet

Perforated interval tested: 216-250 feet

Inside diameter of tested interval: 4.950 inches

Measuring point was transducer which was 50 feet below land surface.

Static water level was 17.82 feet below land surface on 07-13-80 prior to this testing phase.

Remarks: Used about 50 gallons of fluid for slug.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-15-80								
1237:28	14.5		1248:15	23.6		1250:05	22.1	
1246:36	14.3		:20	23.9		:10	22.0	
:43	14.7		:25	24.0		:15	21.9	
:48	15.2		:30	24.3		:20	21.8	
:52	15.6		:35	24.1		:25	21.7	
:56	16.0		:40	24.1		:30	21.6	
1247:00	16.3		:45	24.0		:35	21.5	
:02	16.7		:50	23.9		:40	21.4	
:05	16.9		:55	23.7		:45	21.3	
:10	17.3		1249:00	23.6		:50	21.2	
:15	17.8		:05	23.5		:55	21.1	
:20	18.4		:10	23.4		1251:00	21.0	
:25	18.9		:15	23.2		:05	21.0	
:30	19.5		:20	23.1		:10	20.9	
:35	20.0		:25	23.0		:15	20.8	
:40	20.7		:30	22.9		:20	20.7	
:45	21.2		:35	22.8		:25	20.6	
:50	21.6		:40	22.7		:30	20.5	
:55	22.0		:45	22.6		:35	20.4	
1248:00	22.5		:50	22.5		:40	20.3	
:05	22.9		:55	22.3		:45	20.3	
:10	23.2		1250:00	22.2		:50	20.2	

Table 17. Hydrologic-test data for well WIPP-29 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-15-80								
1251:55	20.1		1253:45	18.7		1300:00	15.9	
1252:00	20.0		:50	18.6		1301:00	15.8	
:05	20.0		:55	18.6		1302:00	15.6	
:10	19.9		1254:00	18.5		1303:00	15.5	
:15	19.8		:10	18.4		1304:00	15.4	
:20	19.8		:20	18.3		1305:00	15.3	
:25	19.7		:30	18.1		1310:00	15.2	
:30	19.6		1255:00	17.9		1315:00	15.1	
:35	19.5		:30	17.6		1330:00	15.1	
:40	19.5		1256:00	17.3		1400:00	15.0	End of test
:45	19.4		:30	17.1				
:50	19.4		1257:00	16.8				
:55	19.3		:30	16.6				
1253:00	19.2		1258:00	16.5				
:05	19.1		:30	16.3				
:10	19.0		1259:00	16.1				
:15	19.0		:30	16.1				
:20	19.0							
:25	18.9							
:30	18.8							
:35	18.7							
:40	18.7							

Table 17. Hydrologic-test data for well WIPP-29 - Continued

Rustler Formation-Salado Formation Contact Zone - Flow Test 1

Starting date: 07-18-80

Well depth: 373 feet

Perforated interval tested: 216-250 feet

Inside diameter of tested interval: 4.950 inches

Inside diameter of tubing: 1.995 inches

Packer type: Production-injection packer with feed-through tubing.

Packer diameter: 4.5 inches

Packer was set at 196.2 feet below land surface.

Measuring point was transducer tubing below the packer, which was 202.4 feet below land surface.

Static water level was 17.82 feet below land surface on 07-13-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-18-80					
0926:00	84.4	Start of test	0926:48	42.4	
:06	43.8		:50	43.3	
:08	20.5		:52	43.9	
:10	23.7		:54	44.8	
:12	24.7		:56	45.5	
:14	27.3		:58	46.0	
:16	28.4		0927:00	46.7	
:18	30.0		:02	47.2	
:20	30.6		:04	47.8	
:22	32.0		:06	48.6	
:24	33.3		:08	49.2	
:26	34.0		:10	50.0	
:28	34.8		:12	50.5	
:30	35.5		:14	51.0	
:32	36.6		:16	51.6	
:34	37.2		:18	52.3	
:36	38.0		:20	52.7	
:38	38.8		:22	53.1	
:40	39.5		:24	53.9	
:42	40.2		:26	54.5	
:44	41.0		:28	55.1	
:46	41.9		:30	55.5	

Table 17. Hydrologic-test data for well WIPP-29 - Continued

Rustler Formation-Salado Formation Contact Zone - Flow Test I - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-18-80								
0927:32	56.0		0928:16	68.3		0929:00	72.3	
:34	56.5		:18	68.6		:02	72.5	
:36	56.9		:20	69.0		:04	72.6	
:38	57.7		:22	69.1		:06	72.8	
:40	58.0		:24	68.7		:08	72.9	
:42	58.4		:26	68.8		:10	73.0	
:44	59.4		:28	69.2		:12	73.2	
:46	60.0		:30	69.3		:14	73.4	
:48	60.8		:32	69.5		:16	73.5	
:50	61.3		:34	69.8		:18	73.7	
:52	62.0		:36	70.2		:20	73.9	
:54	62.6		:38	70.2		:25	74.2	
:56	63.2		:40	70.4		:30	73.9	
:58	63.9		:42	70.9		:35	70.9	
0928:00	64.2		:44	71.0		:39	66.8	
:02	64.6		:46	71.1		:46	57.5	
:04	65.4		:48	71.1		:50	58.6	End of test
:06	65.8		:50	71.4				
:08	66.3		:52	71.7				
:10	66.9		:54	71.8				
:12	67.4		:56	71.9				
:14	67.8		:58	72.2				

Table 17. Hydrologic-test data for well WIPP-29 - Concluded

Culebra Dolomite Member - Bailing Test 1

Starting date: 08-08-80

Well depth: 373 feet

Perforated interval tested: 10-45 feet

Inside diameter of tested interval: 5.012 inches to 11.85 feet, 4.950 inches from 11.85 to 376 feet.

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 340 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforation. From 1426 to 1505 ran 30 bailing trips. Recovery not monitored.

Culebra Dolomite Member - Bailing Test 2

Starting date: 08-20-80

Well depth: 373 feet

Perforated interval tested: 10-45 feet

Inside diameter of tested interval: 5.012 inches to 11.85 feet, 4.950 inches from 11.85 to 376 feet.

Static water level was 11.68 feet below land surface on 08-20-80 prior to this testing phase.

Total amount of fluid bailed was 1,150 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: From 0847 to 1209 ran 102 bailing trips. Collected fluid sample from last bailer. Recovery not monitored.

Table 18. Density profile for well WIPP-29

Date run: 07-13-80
Perforated interval: 216-250 feet
Well total depth: 373 feet

Sample number	Depth collected	Time collected	Density (grams per cubic centimeter)
1	30	0935	1.0715
2	115	0945	1.0720
3	200	0950	1.0720
4	285	1000	1.1285
5	368	1010	1.1290

Table 19. Water-level records for well WIPP-29

[Water-bearing zone: C, Culebra Dolomite Member of the Rustler Formation; R/S, Rustler Formation-Salado Formation contact zone]

Water-bearing zone	Date	Time	Water level, in feet below land surface
C	10-08-80	1330	7.86
C	11-03-80	1240	9.08
C	12-01-80	1040	8.45
C	03-04-81	0945	9.43
C	05-07-81	1340	8.19
C	10-06-81	0830	10.02
C	01-19-82	1315	10.18
C	05-18-82	1143	10.39
C	07-19-82	1350	10.19
C	09-08-82	1348	10.86
C	11-19-82	1500	10.73
C	01-12-83	1330	9.78
C	07-18-83	0945	11.06
C	08-25-83	0733	10.38
C	09-29-83	0725	10.22
C	11-21-83	1435	9.64
C	01-24-84	0902	9.80
C	10-20-84	0755	9.76
R/S	03-11-80	0715	20.48
R/S	03-14-80	0740	19.06
R/S	04-15-80	1200	19.23
R/S	05-07-80	0755	19.20
R/S	06-09-80	1440	17.00
R/S	06-30-80	1215	17.56
R/S	08-25-83	0725	38.98
R/S	09-29-83	0720	38.41
R/S	11-21-83	1430	37.09
R/S	01-24-84	0900	36.37
R/S	10-20-84	0750	31.10

Well WIPP-30

Testing was conducted at well WIPP-30 from March 12 to October 10, 1980. All three water-bearing zones were penetrated by this well. Table 20 shows that a feed-through packer was used for testing all three zones. Simultaneous long-term monitoring of fluid levels in the Magenta Dolomite and Culebra Dolomite Members was made possible through the use of a production-injection packer placed between the two members.

Table 20. Testing chronology for well WIPP-30

[Depths are below land surface, except as indicated. Packer depths are to top of inflation element]

Date	Procedure
10-02-78	Hole completed with 4.950-inch inside diameter casing set from 1.3 feet above land surface to 912 feet.
03-12-80 to 03-13-80	Perforated Rustler Formation-Salado Formation contact zone from 731 to 753 feet. Ran bailing test 1 with yield of 280 gallons.
03-19-80 to 03-20-80	Ran bailing test 2 with yield of 230 gallons.
07-03-80	Ran density profile.
07-09-80 to 07-10-80	Ran bailing test 3 with yield of 230 gallons. Placed feed-through packer above Rustler Formation-Salado Formation contact zone at 652.4 feet. Ran shut-in test 1 and slug test 1.
07-11-80	Removed feed-through packer.
07-22-80	Placed bridge-plug packer below Culebra Dolomite Member at 216.5 feet.
07-30-80	Perforated Culebra Dolomite Member from 631 to 654 feet.
08-05-80	Ran bailing test 1 after perforating with yield of 230 gallons.

Table 20. Testing chronology for well WIPP-30 - Concluded

[Depths are below land surface, except as indicated. Packer depths are to top of inflation element]

Date	Procedure
08-13-80 to 08-15-80	Ran bailing test 2 with yield of 160 gallons. Collected sample. Placed feed-through packer above Culebra Dolomite Member at 522.7 feet. Ran shut-in test 1 and slug test 1.
08-16-80	Removed feed-through packer.
08-27-80	Placed bridge-plug packer at 696.1 feet, on top of one placed 07-22-80.
09-12-80	Removed two bridge-plug packers. Placed two bridge-plug packers, one below Culebra Dolomite Member at 688.5 feet, the other below Magenta Dolomite Member at 590.68 feet.
09-13-80	Perforated Magenta Dolomite Member from 510 to 540 feet. Ran bailing test 1 after perforation with yield of 430 gallons.
09-24-80	Ran bailing test 2 with yield of 11 gallons. Collected sample. Placed feed-through packer above Magenta Dolomite Member at 418.0 feet.
09-24-80 to 10-02-80	Ran shut-in test 1 on Magenta Dolomite Member.
10-02-80 to 10-10-80	Ran slug test 1 on Magenta Dolomite Member. Removed feed-through packer.
08-02-83	Removed bridge-plug packer below Magenta Dolomite Member, placed production-injection packer at 570.01 feet to separate Magenta Dolomite Member from Culebra Dolomite Member and enable long-term water-level monitoring of both members.

Table 21. Hydrologic-test data for well WIPP-30

Rustler Formation-Salado Formation Contact Zone - Bailing Test 1

Starting date: 03-12-80

Well depth: 909 feet

Perforated interval tested: 731-753 feet

Inside diameter of tested interval: 4.950 inches

Water levels were measured with a pressure transducer.

Measuring point for the recovery from bailing was the pressure transducer which was 908.5 feet below land surface.

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 280 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforation.

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks	Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-12-80							
1156	1	--	Bailing	1305	23	--	
1159	2	--		1308	24	--	
1202	3	--		1313	25	--	Bailer empty
1207	4	--		1341	26	--	End of bailing
1210	5	--		1415	--	0.4	Recovery
1213	6	--		1430	--	1.0	
1216	7	--		1445	--	1.5	
1219	8	--		1500	--	2.1	
1222	9	--		1515	--	2.6	
1225	10	--		1530	--	3.2	
1228	11	--		1545	--	3.7	
1231	12	--		1600	--	4.3	
1234	13	--		1615	--	4.8	
1237	14	--		1630	--	5.3	
1241	15	--		1645	--	5.9	
1243	16	--		1700	--	6.4	
1246	17	--		1715	--	6.9	
1249	18	--		1730	--	7.4	
1253	19	--		1745	--	7.9	
1257	20	--		1800	--	8.5	
1300	21	--		1815	--	9.1	
1303	22	--		1830	--	9.7	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 1 - Continued

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-12-80			
1845	--	10.2	
1900	--	10.8	
1915	--	11.3	
1930	--	11.8	
1945	--	12.4	
2000	--	12.9	
2015	--	13.4	
2030	--	13.9	
2045	--	14.4	
2100	--	15.0	
2115	--	15.5	
2130	--	16.1	
2145	--	16.6	
2200	--	17.1	
2215	--	17.6	
2230	--	18.2	
2245	--	18.8	
2300	--	19.3	
2315	--	19.8	
2330	--	20.3	
2345	--	20.9	
2400	--	21.4	
Date: 03-13-80			
0015	--	22.0	
0030	--	22.5	
0045	--	23.1	
0100	--	23.6	
0115	--	24.2	
0130	--	24.7	
0145	--	25.2	
0200	--	25.8	
0215	--	26.3	
0230	--	26.8	
0245	--	27.4	
0300	--	27.9	
0315	--	28.5	
0330	--	29.1	
0345	--	29.8	
0400	--	30.3	
0415	--	30.9	
0430	--	31.4	
0445	--	31.9	
0500	--	32.4	
0515	--	33.0	
0530	--	33.6	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 1 - Concluded

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks	Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-13-80							
0545	--	34.2		1115	--	51.1	
0600	--	34.8		1130	--	51.9	
0615	--	35.3		1145	--	52.6	
0630	--	35.9		1200	--	53.4	
0645	--	36.5		1215	--	54.2	
0700	--	37.1		1230	--	55.0	
0715	--	37.6		1245	--	55.8	
0730	--	38.5		1300	--	56.6	
0745	--	39.4		1315	--	57.4	End of test
0800	--	40.3					
0815	--	41.2					
0830	--	42.0					
0845	--	42.7					
0900	--	43.5					
0915	--	44.4					
0930	--	45.3					
0945	--	46.1					
1000	--	47.0					
1015	--	47.8					
1030	--	48.6					
1045	--	49.4					
1100	--	50.2					

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 2

Starting date: 03-19-80

Well depth: 909 feet

Perforated interval tested: 731-753 feet

Inside diameter of tested interval: 4.950 inches

Water levels were measured with a pressure transducer.

Measuring point for the recovery from bailing was the pressure transducer which was 910 feet below land surface.

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 230 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Collected fluid sample from bailers 20 and 21.

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks	Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-19-80							
0911	1	--	Bailing	1030	--	3.9	Recovery
0930	2	--	Bailer empty	1035	--	4.2	
0932	3	--		1040	--	4.5	
0934	4	--		1045	--	4.8	
0936	5	--		1050	--	5.2	
0938	6	--		1055	--	5.5	
0940	7	--		1100	--	5.8	
0942	8	--		1115	--	6.6	
0944	9	--		1130	--	7.3	
0946	10	--		1145	--	8.1	
0948	11	--		1200	--	8.9	
0949	12	--		1215	--	9.6	
0951	13	--		1230	--	10.3	
0953	14	--		1245	--	11.1	
0955	15	--		1300	--	11.8	
0957	16	--		1315	--	12.5	
0959	17	--		1330	--	13.2	
1001	18	--		1345	--	13.9	
1004	19	--		1400	--	14.6	
1006	20	--		1415	--	15.2	
1008	21	--	End of bailing	1430	--	15.9	
				1445	--	16.6	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 2 - Concluded

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 03-19-80			
1500	--	17.3	
1515	--	17.9	
1600	--	19.9	
1700	--	22.2	
1800	--	24.7	
1900	--	27.1	
2000	--	29.3	
2100	--	31.5	
2200	--	33.7	
2300	--	35.9	
2400	--	38.0	
Date: 03-20-80			
0100	--	40.0	
0200	--	41.9	
0300	--	43.8	
0400	--	45.7	
0500	--	47.5	End of test

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 3

Starting date: 07-09-80

Well depth: 909 feet

Perforated interval tested: 731-753 feet

Inside diameter of tested interval: 4.950 inches

Water levels were measured with a pressure transducer.

Measuring point for the recovery from bailing was the pressure transducer which was 700 feet below land surface.

Static water level was 473.25 feet below land surface on 06-30-80 prior to this testing phase.

Total amount of fluid bailed was 230 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: One bailer was empty.

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks	Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 07-09-80							
1000	1	--	Bailing	1056:45	--	12.9	
1008	4	--		1057:00	--	12.9	
1010	5	--		1058	--	13.0	
1012	6	--		1059	--	13.1	
1015	7	--		1100	--	13.2	
1017	8	--		1101	--	13.2	
1019	9	--		1102	--	13.3	
1021	10	--		1103	--	13.4	
1023	11	--		1104	--	13.5	
1025	12	--		1106	--	13.9	
1027	13	--		1108	--	14.0	
1030	14	--		1110	--	14.2	
1032	15	--		1112	--	14.3	
1035	16	--		1114	--	14.4	
1038	17	--		1116	--	14.6	
1040	18	--		1118	--	14.7	
1043	19	--		1120	--	14.8	
1046	20	--		1122	--	14.9	
1049	21	--	End of bailing	1124	--	15.1	
1056:00	--	12.9	Recovery	1126	--	15.2	
:15	--	12.9		1128	--	15.3	
:30	--	12.9		1130	--	15.5	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Rustler Formation-Salado Formation Contact Zone - Bailing Test 3 - Concluded

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 07-09-80			
1132	--	15.6	
1134	--	15.7	
1136	--	15.8	
1138	--	15.9	
1140	--	16.1	
1145	--	16.4	
1150	--	16.7	
1155	--	17.0	
1200	--	17.3	
1205	--	17.6	
1210	--	17.9	End of test

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Rustler Formation-Salado Formation Contact Zone - Shut-in Test 1

Starting date: 07-09-80

Well depth: 909 feet

Shut in after: Bailing

Perforated interval tested: 731-753 feet

Inside diameter of tested interval: 4.950 inches

Type of packer: Production-injection packer with feed-through tubing.

Packer was set at 652.4 feet below land surface.

Measuring point was transducer tube below packer which was 658.6 feet below land surface.

Static water level was 473.25 feet below land surface on 06-30-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-09-80					
1453:07	--	Well shut in	1455:37	22.6	
:19	13.2		:47	22.6	
:27	13.9		:57	23.2	
:32	14.2		1456:07	23.9	
:37	14.6		:17	24.5	
:42	14.9		:27	25.0	
:47	15.3		:37	25.5	
:52	15.7		:47	26.0	
:57	16.2		:57	26.5	
1454:02	16.7		1457:07	26.8	
:07	17.0		:17	27.3	
:12	17.5		:27	27.7	
:17	18.1		:47	28.5	
:22	18.6		1458:07	29.4	
:27	18.9		:27	30.5	
:32	19.1		:47	31.6	
:37	19.2		1459:07	32.4	
:47	19.7		:27	33.1	
:55	20.1		:47	33.8	
1455:07	20.7		1500:07	34.6	
:17	21.6		:27	35.2	
:27	22.1		:47	35.9	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Rustler Formation-Salado Formation Contact Zone - Shut-in Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-09-80								
1501:07	36.5		1517:00	55.2		1845:00	89.0	
:37	37.4		1519:00	56.8		1900:00	89.3	
1502:00	38.1		1521:00	58.2		1915:00	89.4	
:07	38.3		1523:00	59.5		1930:00	89.5	
:37	39.2		1525:00	60.8		2000:00	89.7	
1503:07	40.0		1527:00	61.9		2100:00	90.1	
:37	40.8		1529:00	63.1		2200:00	90.3	
1504:07	41.5		1531:00	64.1		2300:00	90.4	
:37	42.2		1535:00	66.1		2400:00	90.4	
1505:07	42.9		1540:00	68.4				
1506:07	44.2		1545:00	70.4		Date: 07-10-80		
1507:07	45.5		1600:00	75.3				
1508:07	46.6		1615:00	78.8		0100:00	90.4	
1509:07	47.8		1630:00	81.5		0200:00	90.5	
1510:07	49.0		1645:00	83.5		0300:00	90.4	
1511:07	50.0		1700:00	84.9		0400:00	90.4	
1512:07	51.0		1715:00	86.1		0500:00	90.5	
1513:28	52.3		1730:00	87.1		0600:00	90.5	
:30	52.3		1745:00	87.7		0700:00	90.5	
1514:00	52.8		1800:00	88.1		0800:00	90.5	End of test
:30	53.2		1815:00	88.6				
1515:00	53.6		1830:00	88.7				

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1

Starting date: 07-10-80

Type of test: Injection

Well depth: 909 feet

Perforated interval tested: 731-753 feet

Inside diameter of tested interval: 4.950 inches

Inside diameter of tubing: 2 inches

Packer type: Production-injection packer with feed-through tubing.

Packer diameter: 4.5 inches

Packer was set at 652.4 feet below land surface.

Measuring point was transducer tubing below the packer which was 658.6 feet below land surface.

Static water level was 473.25 feet below land surface on 06-30-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-10-80					
0800:00	90.5		0807:40	324.6	
0806:40	--	Start test	:45	324.1	
:43	312.9		:50	323.8	
:46	328.2		:55	323.3	
:50	330.0		0808:00	322.9	
:52	330.3		:05	322.5	
:55	329.6		:10	321.9	
:57	329.3		:15	321.6	
0807:00	329.7		:20	321.2	
:02	328.4		:25	320.8	
:05	328.2		:30	320.5	
:07	327.8		:35	320.1	
:10	327.7		:40	319.7	
:12	327.4		:45	319.4	
:15	327.0		:50	319.0	
:18	326.8		:55	318.7	
:22	326.3		0809:00	318.3	
:25	326.0		:05	317.9	
:27	325.8		:10	317.7	
:30	325.6		:15	317.3	
:32	325.3		:20	317.0	
:35	325.0		:25	316.7	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Rustler Formation-Salado Formation Contact Zone - Slug Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 07-10-80								
0809:30	316.4		0819:10	293.0		0905:00	237.2	
:40	315.8		0820:00	291.6		0913:20	229.4	
:50	315.2		0820:50	290.3		0921:40	222.2	
0810:00	314.6		0821:40	289.0		0930:00	215.3	
:10	314.0		0822:30	287.7		0938:20	208.9	
:20	313.5		0823:20	286.5		0946:40	202.8	
:30	312.9		0825:00	284.0		0955:00	197.2	
:40	312.5		0826:40	281.6		1003:20	191.9	
:50	311.9		0828:20	279.4		1020:00	182.3	
0811:00	311.4		0830:00	277.1		1036:40	173.9	
:10	311.0		0831:40	274.9		1053:20	166.2	
:30	310.0		0833:20	272.7		1110:00	159.2	
0812:00	308.6		0835:00	270.6		1126:40	152.9	
:20	307.7		0836:40	268.6		1143:20	147.1	
:40	306.8		0838:20	266.5		1200:00	141.9	
0813:30	304.7		0840:00	264.5		1216:40	137.2	
0814:10	303.2		0841:40	262.5		1233:20	133.0	
0815:00	301.2		0843:20	260.4		1250:00	129.2	
:50	299.4		0845:00	258.4		1306:40	125.7	
0816:40	297.7		0846:40	256.5		1323:20	122.5	End of test
0817:30	296.0		0848:20	254.5				
0818:20	294.5		0856:40	245.3				

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Culebra Dolomite Member - Bailing Test 1

Starting date: 08-05-80

Well depth: 909 feet

Perforated interval tested: 631-654 feet

Inside diameter of tested interval: 4.950 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 230 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforation. Ran 20 bailing trips from 1443 to 1550. Recovery not monitored.

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Culebra Dolomite Member - Bailing Test 2

Starting date: 08-13-80

Well depth: 909 feet

Perforated interval tested: 631-654 feet

Inside diameter of tested interval: 4.950 inches

Water levels were measured with a pressure transducer.

Measuring point for the recovery from bailing was the pressure transducer which was 600 feet below land surface.

Static water level was 421 feet below land surface on 08-13-80 prior to this testing phase.

Total amount of fluid bailed was 160 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks	Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 08-13-80							
0956	1	--	Bailing	1046	--	21.3	
0958	2	--		1047	--	21.4	
1002	3	--		1048	--	21.3	
1004	4	--		1049	--	21.5	
1005	5	--	Empty	1050	--	21.6	
1007	6	--		1051	--	21.8	
1010	7	--		1052	--	21.9	
1012	8	--		1053	--	21.9	
1018	9	--		1054	--	22.1	
1020	10	--		1055	--	22.3	
1023	11	--		1056	--	22.3	
1026	12	--		1057	--	22.5	
1028	13	--		1058	--	22.6	
1030	14	--	End of bailing	1059	--	22.7	
1038	--	20.2	Recovery	1100	--	22.8	
1039	--	20.3		1101	--	22.9	
1040	--	20.6		1102	--	23.0	
1041	--	20.7		1103	--	23.2	
1042	--	20.8		1104	--	23.3	
1043	--	20.8		1105	--	23.4	
1044	--	21.0		1106	--	23.5	
1045	--	21.1		1107	--	23.6	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Culebra Dolomite Member - Bailing Test 2 - Concluded

Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks	Clock time	Bailer number	Water pressure (pounds per square inch)	Remarks
Date: 08-13-80							
1108	--	23.7		1130	--	26.0	
1109	--	23.9		1132	--	26.2	
1110	--	24.0		1134	--	26.5	
1111	--	24.1		1136	--	26.6	
1112	--	24.2		1138	--	26.8	
1114	--	24.4		1140	--	27.1	
1116	--	24.6		1142	--	27.2	
1118	--	24.8		1144	--	27.4	
1120	--	25.0		1146	--	27.6	
1122	--	25.2		1148	--	27.8	
1124	--	-		1150	--	28.0	
1126	--	25.6		1152	--	28.2	
1128	--	25.8		1154	--	28.4	
				1156	--	28.5	End of test

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Culebra Dolomite Member - Shut-in Test 1

Starting date: 08-13-80

Well depth: 909 feet

Shut in after: Bailing

Perforated interval tested: 631-654 feet

Inside diameter of tested interval: 4.950 inches

Type of packer: Production-injection packer with feed-through tubing.

Packer was set at 522.7 feet below land surface.

Measuring point was transducer tube below packer which was 528.5 feet below land surface.

Static water level was 421 feet below land surface on 08-13-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-13-80					
1400:00	13.2		1408:00	32.0	
1401:00	13.2		1409:00	32.9	
:14	17.6		1410:00	33.6	
:20	20.1		1411:00	34.2	
:30	20.5		1412:00	34.8	
:40	21.2		1413:00	35.5	
:50	21.8		1414:00	36.0	
1402:00	22.9		1415:00	36.5	
:10	23.6		1416:00	37.1	
:20	24.6		1418:00	37.8	
:30	27.2		1420:00	38.6	
:40	25.6		1422:00	39.3	
:50	25.8		1425:00	40.0	
1403:00	26.0		1430:00	41.3	
:20	26.5		1435:00	42.3	
:40	27.1		1440:00	43.1	
1404:00	27.4		1445:00	43.7	
:20	27.9		1450:00	44.2	
:40	28.4		1455:00	44.7	
1405:00	28.8		1500:00	45.1	
1406:00	30.0		1505:00	45.4	
1407:00	31.1		1510:00	45.7	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Culebra Dolomite Member - Shut-in Test 1 - Continued

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-13-80					
1515:00	45.9		1830:00	48.5	
1520:00	46.2		1845:00	48.7	
1525:00	46.3		1900:00	48.7	
1530:00	46.6		1915:00	48.7	
1535:00	46.7		1930:00	48.7	
1540:00	46.9		1945:00	48.7	
1545:00	47.0		2000:00	48.7	
1550:00	47.1		2015:00	48.8	
1555:00	47.3		2030:00	48.9	
1600:00	47.4		2045:00	48.9	
1605:00	47.4		2100:00	48.9	
1610:00	47.6		2115:00	49.0	
1615:00	47.6		2130:00	49.1	
1620:00	47.6		2145:00	49.0	
1630:00	47.8		2200:00	49.0	
1645:00	48.0		2215:00	49.0	
1700:00	48.2		2230:00	49.2	
1715:00	48.2		2245:00	49.2	
1730:00	48.3		2300:00	49.3	
1745:00	48.3		2315:00	49.3	
1800:00	48.4		2330:00	49.3	
1815:00	48.5		2345:00	49.4	
			2400:00	49.4	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Culebra Dolomite Member - Shut-in Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-14-80					
0015:00	49.4		0545:00	49.5	
0030:00	49.5		0600:00	49.5	
0045:00	49.4		0615:00	55.8	
0100:00	49.4		0630:00	57.2	
0115:00	49.4		0645:00	56.8	
0130:00	49.4		0700:00	57.0	
0145:00	49.4		0715:00	57.2	
0200:00	49.4		0730:00	57.1	
0215:00	49.3		0745:00	56.2	
0230:00	49.4		0800:00	56.1	
0245:00	49.5		0900:00	54.2	
0300:00	49.4		1000:00	53.0	
0315:00	49.4		1100:00	50.9	
0330:00	49.4		1200:00	49.8	
0345:00	49.4		1300:00	49.5	
0400:00	49.4		1400:00	49.6	End of test
0415:00	49.4				
0430:00	49.4				
0445:00	49.4				
0500:00	49.5				
0515:00	49.5				
0530:00	49.4				

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Culebra Dolomite Member - Slug Test 1

Starting date: 08-14-80

Type of test: Injection

Well depth: 909 feet

Perforated interval tested: 631-654 feet

Inside diameter of tested interval: 4.950 inches

Packer type: Production-injection packer with feed-through tubing.

Packer was set at 522.7 feet below land surface.

Measuring point was transducer tubing below the packer which was 528.5 feet below land surface.

Static water level was 421 feet below land surface on 08-13-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-14-80					
1502:00	49.4		1503:12	237.1	
:30	49.5		:14	236.9	
:32	49.5		:16	236.7	
:34	339.2		:18	236.5	
:36	267.7		:20	236.3	
:38	250.3		:22	236.1	
:40	244.1		:24	236.0	
:42	241.8		:26	235.8	
:44	240.8		:28	235.6	
:46	240.0		:30	235.5	
:48	240.0		:32	235.2	
:50	239.7		:34	235.0	
:52	239.4		:36	234.8	
:54	239.1		:38	234.7	
:56	238.9		:40	234.5	
:58	238.4		:43	234.3	
1503:00	238.3		:46	234.0	
:02	238.1		:50	233.7	
:04	237.9		:55	233.3	
:06	237.7		1504:00	232.9	
:08	237.5		:05	232.5	
:10	237.3		:10	232.2	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Culebra Dolomite Member - Slug Test 1 - Continued

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-14-80					
1504:15	231.9		1509:00	215.8	
:20	231.5		:30	214.4	
:25	231.1		1510:00	213.0	
:30	230.8		:30	211.6	
:40	230.0		1511:00	210.3	
:54	229.1		:30	209.0	
1505:00	228.8		1512:00	207.6	
:10	228.2		1513:00	205.1	
:20	227.6		1514:00	202.6	
:30	226.9		1515:00	200.3	
:40	226.3		1516:00	197.9	
:50	225.8		1517:00	195.7	
1506:00	225.2		1518:00	193.5	
:10	224.6		1519:00	191.4	
:20	224.1		1520:00	189.3	
:30	223.5		1525:00	179.6	
:40	222.9		1530:00	171.0	
1507:00	221.9		1535:00	163.2	
:20	220.8		1540:00	156.0	
:40	219.7		1545:00	149.4	
1508:00	218.8		1550:00	143.3	
:30	217.2		1555:00	137.7	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Culebra Dolomite Member - Slug Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 08-14-80		
1600:00	132.4	
1605:00	127.5	
1610:00	123.0	
1615:00	118.8	
1620:00	114.7	
1625:00	111.0	
1630:00	107.5	
1635:00	104.3	
1640:00	101.3	
1645:00	98.3	
1650:00	95.7	
1655:00	93.1	
1700:00	90.6	
1705:00	88.4	
1710:00	86.2	
1715:00	84.2	
1720:00	82.4	
1725:00	80.6	
1730:00	78.9	
1735:00	77.3	
1740:00	75.8	
1745:00	74.3	
1800:00	70.5	
1815:00	67.2	
1830:00	64.5	
1845:00	62.2	
1900:00	60.1	
1915:00	58.5	
1930:00	57.0	
1945:00	55.8	
2000:00	54.8	
2015:00	53.9	
2030:00	53.1	
2045:00	52.5	
2100:00	51.9	
2115:00	51.5	
2130:00	51.0	
2145:00	50.7	
2200:00	50.5	
2215:00	50.2	
2230:00	50.0	
2245:00	49.8	
2300:00	49.7	
2315:00	49.5	
2330:00	49.4	
2345:00	49.3	
2400:00	49.3	
Date: 08-15-80		
0015:00	49.1	
0030:00	49.1	
0045:00	49.2	
0100:00	49.2	End of test

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Magenta Dolomite Member - Bailing Test 1

Starting date: 09-13-80

Well depth: 909 feet

Perforated interval tested: 510-540 feet

Inside diameter of tested interval: 4.950 inches

Static water level was unknown prior to this testing phase.

Total amount of fluid bailed was 430 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Bailing after perforation. From 1247 to 1440 ran 38 bailing trips. Bailer 37 was half full. On 09-14-80 at 0820 and 09-15-80 at 0800 there was no fluid at 498.3 feet below land surface. No other recovery data.

Magenta Dolomite Member - Bailing Test 2

Starting date: 09-24-80

Well depth: 909 feet

Perforated interval tested: 510-540 feet

Inside diameter of tested interval: 4.950 inches

Static water level was 400.85 feet below land surface on 09-24-80 prior to this testing phase.

Total amount of fluid bailed was 11 gallons.

Type of bailer: Dart valve Capacity: 11.3 gallons

Remarks: Ran one bailing trip for fluid sample at 0845. Recovery not monitored.

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Magenta Dolomite Member - Shut-in Test 1

Starting date: 09-24-80

Well depth: 909 feet

Shut in after: Bailing

Perforated interval tested: 510-540 feet

Inside diameter of tested interval: 4.950 inches

Type of packer: Production-injection packer with feed-through tubing.

Diameter of packer: 4.25 inches

Packer was set at 418.0 feet below land surface.

Measuring point was transducer tube below packer which was 423.3 feet below land surface.

Static water level was 400.85 feet below land surface on 09-24-80 prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 09-24-80					
1154:55	10.5		1157:40	32.6	
1155:53	11.7		:51	30.3	
1155:58	10.6		:59	29.0	
1156:01	10.6		1158:10	27.4	
:05	10.6		:20	26.2	
:08	10.6		:30	25.1	
:11	10.6		:40	24.2	
:12	--	Well shut in	:50	23.4	
:15	45.3		1159:00	22.7	
:20	69.9		:20	21.6	
:25	67.0		:40	20.7	
:30	60.7		1200:00	20.0	
:35	55.9		:20	19.0	
:37	57.3		:40	19.4	
:40	57.5		1201:00	18.6	
:42	60.2		:20	18.3	
:45	61.2		:40	17.7	
:50	58.2		1202:00	17.3	
:55	53.9		:30	16.7	
1157:00	50.1		1203:00	16.5	
:20	38.4		1204:00	16.2	
:30	35.0		1205:00	16.1	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Magenta Dolomite Member - Shut-in Test 1 - Continued

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 09-24-80		
1206:00	16.1	
1207:00	16.0	
1208:00	16.0	
1209:00	16.0	
1210:00	16.1	
1211:00	16.1	
1212:00	16.1	
1213:00	16.1	
1214:00	16.2	
1215:00	16.1	
1220:00	16.4	
1225:00	16.6	
1230:00	16.8	
1235:00	17.0	
1240:00	17.2	
1250:00	17.6	
1300:00	17.9	
1310:00	18.3	
1320:00	18.7	
1330:00	18.9	
1400:00	19.8	
1430:00	20.6	
1500:00	21.3	
1600:00	22.4	
1700:00	23.5	
1800:00	24.4	
1900:00	25.2	
2000:00	26.0	
2100:00	26.7	
2200:00	27.3	
2300:00	27.8	
2400:00	28.3	
Date: 09-25-80		
0100:00	28.8	
0200:00	29.3	
0300:00	29.7	
0400:00	30.1	
0500:00	30.5	
0600:00	30.9	
0700:00	31.3	
0800:00	31.7	
0900:00	32.2	
1000:00	32.5	
1100:00	32.7	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Magenta Dolomite Member - Shut-in Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 09-25-80		
1200:00	32.9	
1300:00	33.2	
1400:00	33.5	
1500:00	33.6	
1600:00	33.9	
1700:00	34.7	
1800:00	--	Equipment malfunction
Date: 09-26-80		
0900:00	40.3	
1000:00	40.5	
1100:00	40.6	
1200:00	40.8	
1400:00	41.1	
1600:00	41.3	
1800:00	41.6	
2100:00	41.9	
2400:00	42.3	
Date: 09-27-80		
0600:00	42.8	
1200:00	43.4	
1800:00	43.8	
2400:00	44.2	
Date: 09-28-80		
0600:00	44.5	
1200:00	45.0	
1800:00	45.4	
2400:00	45.7	
Date: 09-29-80		
0600:00	46.0	
1200:00	46.2	
1800:00	46.9	
2400:00	46.9	
Date: 09-30-80		
0600:00	47.0	
1200:00	47.2	
1800:00	47.7	
2400:00	47.7	
Date: 10-01-80		
0600:00	47.7	
1200:00	47.9	
1800:00	48.4	
2400:00	48.2	
Date: 10-02-80		
0200:00	48.2	
0400:00	48.2	
0600:00	48.1	
0800:00	48.1	
0915:00	47.9	
0930:00	47.9	End of test

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Magenta Dolomite Member - Slug Test 1

Starting date: 10-02-80

Type of test: Injection

Well depth: 909 feet

Perforated interval tested: 510-540 feet

Inside diameter of tested interval: 4.950 inches

Inside diameter of tubing: 1.995 inches

Packer type: Production-injection packer with feed-through tubing.

Packer diameter: 4.25 inches

Packer was set at 418.0 feet below land surface.

Measuring point was transducer tubing below the packer which was 423.3 feet below land surface.

Static water level was unknown prior to this testing phase.

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 10-02-80					
0930:00	47.9		0931:00	190.1	
:10	47.9		:02	190.1	
:20	47.9		:04	190.0	
:22	106.1		:06	190.0	
:24	103.8		:08	189.9	
:26	127.0		:10	189.8	
:28	143.6		:12	189.7	
:30	153.5		:14	189.7	
:32	161.3		:16	189.7	
:34	169.0		:18	189.7	
:36	174.7		:20	189.6	
:38	178.9		:30	189.5	
:40	182.5		:40	189.5	
:42	185.0		:50	189.4	
:44	186.8		0932:00	189.3	
:46	188.1		:10	189.3	
:48	188.9		:20	189.3	
:50	189.5		:30	189.2	
:52	189.9		:40	189.1	
:54	190.0		:50	189.0	
:56	190.2		0933:05	189.0	
:58	190.2		:20	188.9	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Magenta Dolomite Member - Slug Test 1 - Continued

Clock time	Water pressure (pounds per square inch)	Remarks	Clock time	Water pressure (pounds per square inch)	Remarks
Date: 10-02-80					
0933:40	188.8		0954:00	183.9	
0934:00	188.7		0956:00	183.4	
:20	188.6		1000:00	182.6	
:40	188.4		1005:00	181.6	
0935:00	188.4		1010:00	180.7	
:30	188.2		1015:00	179.8	
0936:03	188.1		1020:00	178.9	
:30	187.9		1025:00	178.0	
0937:00	187.8		1030:00	177.1	
:30	187.7		1035:00	176.3	
0938:00	187.5		1040:00	175.5	
0939:00	187.3		1045:00	174.7	
0940:00	187.1		1050:00	173.9	
0941:00	186.8		1055:00	173.2	
0942:00	186.5		1100:00	172.5	
0943:00	186.3		1115:00	170.3	
0944:00	186.1		1130:00	168.3	
0945:00	185.8		1145:00	166.5	
0946:00	185.6		1200:00	164.7	
0948:00	185.1		1215:00	163.0	
0950:00	184.7		1230:00	161.4	
0952:00	184.3		1245:00	159.7	

Table 21. Hydrologic-test data for well WIPP-30 - Continued

Magenta Dolomite Member - Slug Test 1 - Continued

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 10-02-80		
1300:00	158.2	
1315:00	156.7	
1330:00	155.3	
1345:00	153.9	
1400:00	152.6	
1430:00	150.1	
1500:00	147.8	
1530:00	145.6	
1600:00	143.5	
1630:00	141.6	
1700:00	139.8	
1730:00	138.1	
1800:00	136.3	
1830:00	134.7	
1900:00	133.2	
1930:00	131.8	
2000:00	130.5	
2100:00	127.8	
2200:00	125.2	
2300:00	122.8	
2400:00	120.6	
Date: 10-03-80		
0100:00	118.5	
0200:00	116.6	
0300:00	114.7	
0400:00	112.9	
0500:00	111.3	
0600:00	109.7	
0700:00	108.2	
0800:00	106.7	
0900:00	105.3	
1000:00	104.0	
1100:00	102.6	
1200:00	101.3	
1300:00	100.0	
1400:00	98.9	
1500:00	97.8	
1600:00	96.7	
1700:00	95.8	
1800:00	94.7	
1900:00	93.7	
2000:00	92.8	
2100:00	91.9	
2200:00	91.0	
2300:00	90.2	
2400:00	89.4	
Date: 10-04-80		
0100:00	88.5	
0200:00	87.7	
0400:00	86.2	
0600:00	84.8	
0800:00	83.5	
1000:00	82.2	
1200:00	81.0	
1400:00	79.8	
1600:00	78.8	
1800:00	77.7	
2000:00	76.9	
2200:00	76.0	
2400:00	75.2	

Table 21. Hydrologic-test data for well WIPP-30 - Concluded

Magenta Dolomite Member - Slug Test 1 - Concluded

Clock time	Water pressure (pounds per square inch)	Remarks
Date: 10-05-80		
0200:00	74.3	
0400:00	73.5	
0600:00	72.7	
1200:00	70.6	
1800:00	68.8	
2400:00	67.4	
Date: 10-06-80		
0600:00	66.0	
1200:00	64.7	
1800:00	63.6	
2400:00	62.8	
Date: 10-07-80		
0600:00	--	
1200:00	61.0	
1800:00	60.3	
2400:00	59.7	
Date: 10-08-80		
0600:00	59.0	
1200:00	58.5	
1800:00	58.0	
2400:00	57.7	
Date: 10-09-80		
0600:00	57.2	
1200:00	56.8	
1800:00	56.5	
2400:00	56.3	End of test

Table 22. Density profile for well WIPP-30

Date run: 07-03-80
Perforated interval: 731-753 feet
Well total depth: 909 feet

Sample number	Depth collected	Time collected	Density (grams per cubic centimeter)	Temperature (°Celsius)
1	500	0855	1.2020	23.5
2	600	0905	1.2015	24.0
3	700	0915	1.2010	24.5
4	800	0925	1.2040	24.5
5	900	0940	1.2040	24.5

Table 23. Water-level records for well WIPP-30

[Water-bearing zone: M, Magenta Dolomite Member of the Rustler Formation; C, Culebra Dolomite Member of the Rustler Formation; R/S, Rustler Formation-Salado Formation contact zone]

Water-bearing zone	Date	Time	Water level, in feet below land surface
M	09-22-80	1100	418.5
M	09-23-80	0900	410.5
M	09-24-80	0820	402.5
M	12-01-80	0900	303.72
M	05-07-81	1235	316.0
M	10-07-81	1010	307.5
M	01-19-82	1150	306.2
M	05-19-82	1125	304.04
M	07-19-82	1210	303.92
M	09-08-82	1025	303.89
M	11-19-82	1100	303.57
M	01-12-83	1000	303.37

Table 23. Water-level records for well WIPP-30 - Concluded

Water-bearing zone	Date	Time	Water level, in feet below land surface
M	07-21-83	1240	302.89
M	08-23-83	1251	336.68
M	09-29-83	1140	335.64
M	11-21-83	1045	335.31
M	01-23-84	1125	335.14
M	10-18-84	0755	333.36
C	08-23-83	1240	401.48
C	09-29-83	1130	400.33
C	11-21-83	1030	398.72
C	01-23-84	1120	396.97
C	10-18-84	0745	386.89
R/S	04-15-80	0945	474
R/S	05-07-80	1020	474
R/S	06-09-80	1055	473
R/S	06-16-80	0940	473.23
R/S	06-19-80	1225	473.20
R/S	06-24-80	0905	473.25
R/S	06-30-80	1050	473.25

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