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Brine Sampling and Evaluation Program
Phase II Report

Waste Isolation Pilot Plant

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BRINE SAMPLING AND EVALUATION PROGRAM
PHASE II REPORT

DOE-WIPP-87-010

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BRINE SAMPLING AND EVALUATION PROGRAM PHASE II REPORT

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EXECUTIVE SUMMARY

The Brine Sampling and Evaluation Program (BSEP) Phase II Report is an interim report which updates the data released in the BSEP Phase I Report (Deal and Case, 1987). Direct measurements and observations of the brine that seeps into the WIPP repository excavations were continued through the period between August 1986 and July 1987. That data is included in Appendix A, which extends the observation period for some locations to approximately 900 days. Brine observations at 87 locations are presented in this report.

Although WIPP underground workings are considered "dry", small amounts of brine are present. Part of that brine migrates into the repository in response to pressure gradients at essentially isothermal conditions. The data presented in this report is a continuation of moisture content studies of the WIPP facility horizon that were initiated in 1982, as soon as underground drifts began to be excavated. Brine seepages are manifested by salt efflorescences, moist areas, and fluid accumulations in drillholes.

Very small volumes of brine have been observed to "weep" from surfaces in the WIPP underground excavations. Weep data acquired during this reporting period confirm the previous observations that: 1) weeps are pervasive throughout the underground workings at WIPP, 2) they occur on the surfaces of all exposed lithologic units, and 3) more brine seeps through the ribs (walls) than through the back (roof) of the workings where there are no drillholes. Weeps appear to develop more quickly on units containing clay, but clear halite and clear polyhalitic halite units also produce weeps. The initial development of weeps on clay-poor units takes place more slowly than it does on clay-rich units. Preliminary observations suggest, however, that more brine may actually seep from clear halite than from argillaceous (clayey) halite units in some locations over sufficiently long periods of time.

Deal and Case (1987) described situations in which closely-spaced drillholes (notably the MIIT holes in Room J and holes DH42 and 42A in Room G) displayed dramatically differing brine accumulation data. This led them to caution that "the great variation in inflow characteristics between locations only a short distance (a few meters, or in some instances, less than a meter) apart make the discussion of 'averages' or 'typical occurrences' difficult or misleading." Observation of 13 downholes in Room L1, during this reporting period, also documents the striking local variation in brine accumulation between closely-spaced holes (most of the holes are 0.6 meters apart). Holes that remained dry in Room L1 were next to or between holes that produced brine.

Measurements of the amount of brine seeping into and accumulating within downholes drilled from the WIPP facility excavations confirm many of the preliminary observations made by Deal and Case (1987). Sufficient data exists from 34 downholes to observe general accumulation trends as of July 1987. Of those 34 holes, the trends in July 1987 were: 15 increasing, 5 steady, 12 decreasing, and 2 dry. For those downholes observed for a more than 800 days,

six that had steady or increasing accumulation trends in August 1986 now have slightly decreasing accumulation trends.

Observations of upholes drilled from the WIPP excavations also confirm the preliminary data presented by Deal and Case (1987). Generally, the upholes produce much less brine than the downholes. Even though difficulties in instrumentation may have allowed the loss of some brine from the upholes by dispersion from the hole collar, evaporation into the repository atmosphere, and leaks in the collecting systems, the data collected during this reporting period confirm that the upholes typically produce less brine than do the downholes. Sufficient data exists for 17 upholes to observe general accumulation trends as of July 1987. The trends were: 3 increasing, 2 decreasing, and 12 dry.

One location in the approximately 14 kilometers of WIPP workings excavated by the end of July 1987, has sufficient inflow of brine to spontaneously seep into a drift and moisten the floor. This location has been monitored since November 1985 and, as of the end of this reporting period, is producing approximately 0.5 liters of brine per day.

The BSEP Phase I Report (Deal and Case, 1987) identified the need to better define the stratigraphic variations in the amount of brine that seeps into the workings and drillholes. A series of 12 nearly horizontal holes were drilled in the north wall of the S1950 drift at E100. The data from these horizontal sideholes document that brine seepage correlates with the stratigraphy of the Salado Formation at least in part. For those units exposed in the facility level drifts, the most brine seeped from the units near the horizon of the "orange band", a slightly polyhalitic halite used as a reference horizon during excavation.

A drillhole video camera was used to observe suspected damp areas or zones of salt encrustation due to evaporation on the sides of six downholes. It was not possible to distinguish with certainty zones that were wet due to the presence of moisture from zones that appeared "shiny" as a result of the camera lights being reflected from crystal faces. In those instances where evaporation occurred and salt deposits formed, the salt buildups were distinguishable. Such occurrences were observed where drillholes penetrated anhydrite MB-139 and anhydrite "c". Salt knobs and crusts were also seen at other stratigraphic horizons and, in one case, were associated with a fracture that had been identified in the core when the hole was drilled. The video survey of drillholes was suspended due to failure of the camera, and will be continued when a substitute or repaired camera is available.

Some of the BSEP brine samples were collected for chemical analysis, although, the chemical data may not always be representative of formation brine. In addition to the difficulties inherent in working with saturated, high-ionic strength brines, it has not been easy to obtain samples that are clearly chemically representative of naturally occurring Salado Formation brines. The introduction of fresh water, brines of other composition (drilling fluids and Rustler Formation brines), and soluble materials (a variety of grouting compounds and materials involved with many types of instrumentation) has occurred both intentionally and unintentionally as part of construction and experimental activities. Ten samples from four locations removed from such

activities appear to be uncontaminated, however. They are saturated, magnesium-rich sodium chloride brines that have a specific gravity in excess of 1.2 grams per cubic centimeter.

Moisture content measurements were made of samples from the stratigraphic units exposed in the WIPP excavations and from drillholes in the workings. Previous data has been reviewed, and data on an additional 101 samples is presented in this report. Sixty of these were collected from ribs using a hand-held core drill. Cores were about 4 centimeters in diameter and 15 centimeters long. They show a distinct correlation between moisture content and stratigraphy. The investigation concentrated on determining the "easily moved" moisture available, and, therefore, measurements of the amount of moisture driven off at 95°C were made. Measurements were also made of the amount of moisture driven off at 150°C, and the results indicated that only 0 to 20 percent additional moisture was driven off at that temperature. This is probably an indication that water was being driven off as a result of the dehydration of the clay minerals present.

The moisture content of the facility-horizon rocks was determined by the weight lost when they were heated to 95°C. The loss ranged from 0.03 to 2.53 percent by weight. Samples from clay-rich stratigraphic horizons were more moist than those from clear halite horizons and also were more variable in moisture content from location to location within a given horizon. Specimens from the "orange band" were consistently the least moist.

Preliminary data from cores taken from vertical drillholes also indicate that some stratigraphic horizons are more moist than others. Only a few samples exist from some horizons, so caution should be used in drawing any conclusions from the data until additional samples can be tested. Preliminary data indicate, however, that there are zones within the salt that contain more moisture than the anhydrite interbeds. This contrasts with the observation that in many places more moisture appears to seep from the anhydrite beds than from the salt. In this case, the most moist (greater porosity) and most productive (greater permeability) stratigraphic horizons are not the same.

For samples comprised predominantly of halite, the measured moisture content was approximately 0.5 percent by weight or less. Rocks with a higher clay content had a greater tendency for large, less predictable ranges and were generally more moist. Additional moisture content measurements are presently being made, and it will be possible to better define the variation in moisture content in a later report.

The BSEP evaluated a variety of "off-the-shelf", nondestructive, geophysical techniques that might be able to provide rapid and cost-effective estimations of in situ moisture content of the host rock during excavation of the repository storage panels. Radar, electromagnetics, resistivity, and nuclear-source techniques were evaluated.

Ground-penetrating radar techniques obtain a continuous high-resolution electromagnetic profile of the subsurface. Boundaries between bodies of rock that have contrasting electrical properties reflect wave energy back to the receiving antenna. Description of field tests from the literature indicate that existing techniques are successful in locating areas with a strong contrast to

the host rock, such as steel waste containers buried in clear salt. The presence of clay and void spaces limit penetration and attempts to distinguish between open drillholes and brine-filled drillholes were unsuccessful. Gradational variations in moisture content do not appear to be easily recognizable in the field. Radar methods are judged to have limited applicability in the WIPP BSEP investigations at this time.

Electromagnetic (EM) techniques have been successfully used in exploration for metallic minerals and fresh groundwater. EM techniques measure the electric current induced in a conductor (the rock under investigation) by a magnetic field generated from a portable source. The induced currents vary as a result of variations in conductance within a rock. Since variation in brine content within a rock strongly affect conductance, the EM method should have application to the WIPP brine studies. The depth of penetration can be varied by changing the spacing between the transmitting and receiving coils. Several field tests were made using EM techniques. Cultural interference (cables, pipes, transformers, etc.) was a problem in many locations. Although it was not possible to completely eliminate cultural effects, the EM method gave promise as providing an index to relative moisture content of the rocks near the facility horizon.

The electrical resistivity of rocks can be measured by applying a direct current between two electrodes and measuring the resulting potential between two other electrodes. The electrical resistivity of the material can be determined by varying the electrode spacing, configuration, and current level. Since the presence of brine reduces the resistivity of a material, relative variations in moisture content should be able to be determined. An experimental direct current resistivity technique offers some promise, although field tests to measure the resistivity of the rocks at and near the WIPP facility horizon also encountered serious errors caused by the cultural effects mentioned above in the discussion of EM techniques. Neither the equipment nor the data analysis techniques are "off-the-shelf," therefore, it is not deemed appropriate for use by the BSEP at this time.

Neutron-absorption techniques are routinely used to determine soil moisture content for a variety of engineering and construction purposes. The technique attempts to measure directly the amount of hydrogen present by taking advantage of the fact that the hydrogen nuclei slow down high-energy neutrons. As the neutrons are slowed down, they are captured by various nuclei present in the rock. Gamma rays are emitted when the neutrons are captured. Neutron-absorption techniques use a device that emits high-energy neutrons and then measures either slowed neutrons or the resulting gamma rays. In practice, some other elements (i.e., potassium) can also slow down the neutrons, but if the instrument is calibrated by comparing the response of the instrument to the actual moisture content of samples, in theory, the technique should be able to distinguish between the relative amounts of hydrogen present from place to place. A standard instrument was used underground at WIPP, and although calibrated and operated by a manufacturer-trained operator, it produced readings with errors that were large enough to cast doubts on the applicability of a standard, off-the-shelf, nuclear moisture-density gauge to make accurate moisture determinations in the salt environment at WIPP.

It is concluded that as far as geophysical techniques are concerned, electromagnetic or resistivity surveys are the most applicable for the BSEP. The advantage of these techniques is that they provide data that is averaged over a volume of rock and can, in effect, "look" different distances into the surroundings using a nondestructive technique. Geophysical techniques require, however, that they be calibrated by taking in situ moisture content measurements, and do not seem to offer any adequate substitute for taking those measurements. As far as the immediate needs of the BSEP are concerned, it appears appropriate to obtain those moisture content measurements directly.

The following activities are continuing as part of the BSEP:

- Measurement of brine seepage accumulations and rates
- Chemical analyses of WIPP underground brines
- Moisture content of Salado Formation rocks
- Photographic documentation of slow changes related to brine seepage that take place at selected locations in the WIPP excavations

That data will be presented in later BSEP reports.

1.0 INTRODUCTION

The Waste Isolation Pilot Plant (WIPP) project is a Department of Energy (DOE) research and development facility constructed to demonstrate the safe disposal of radioactive wastes derived from the defense activities of the United States. The WIPP Project's mission consists of two parts. The first is to demonstrate the safe handling and disposal of transuranic (TRU) waste in bedded salt. The second is to create a research facility for in situ examination of the technical issues related to the emplacement of defense-related radioactive waste in bedded salt.

The WIPP facility is located approximately 42 kilometers east of Carlsbad, New Mexico, in an area known as Los Medanos (Figure 1-1). The underground portion of the facility is located at a depth of approximately 655 meters in the bedded salt deposits of the Salado Formation, part of an evaporite sequence over 1000 meters thick (Figure 1-2). An extensive program of site characterization and validation has been conducted for the past eleven years (1976-1987). The results of these studies are summarized in the WIPP "Geological Site Characterization Report" (Powers et al., 1978), the WIPP "Safety Analysis Report" (U.S. DOE, 1986), the WIPP "Preliminary Design Validation Report" (Bechtel National, Inc., 1983), the WIPP "Design Validation Final Report" (Bechtel National, Inc., 1986b), and the WIPP "Results of Site Validation Experiments" (Black et al., 1983). Additional site investigations are being conducted as part of an ongoing program to further refine the understanding of the site-specific geology. The hydrogeological activities of the Brine Sampling and Evaluation Program (BSEP), as outlined in the Brine Testing Program Plan (Morse and Hassinger, 1985), are part of these investigations. Phase I of the BSEP activities were reported by Deal and Case (1987).

The purpose of the BSEP is to investigate the origin, hydraulic characteristics, extent, and composition of brine occurrences in the excavations for the WIPP repository in the Salado Formation. Although considered dry workings, brine is observed to weep from exposed surfaces in the repository horizon and seep into drill holes in the underground excavations.

These brine occurrences become visible shortly after excavation or drilling. The more noticeable occurrences that have been observed for more than three years produced brine at the rate of a few tenths or a few hundredths of a liter per day.

Although individual occurrences are small and not particularly noticeable on a day-to-day basis, they are pervasive throughout the repository (Deal and Case, 1987). Over a period of months and years they may contribute enough moisture to merit consideration from the standpoint of long-term repository performance. During present operations, virtually all of the moisture entering the workings from the host rock is evaporated and removed in the air that is circulated by the underground ventilation system. The assessment and understanding of the brine occurrences becomes especially important when considering what their long-term impacts might be on operations during the demonstration and retrieval period and the rates of resaturation and repressurization of the excavations after closure of the facility.

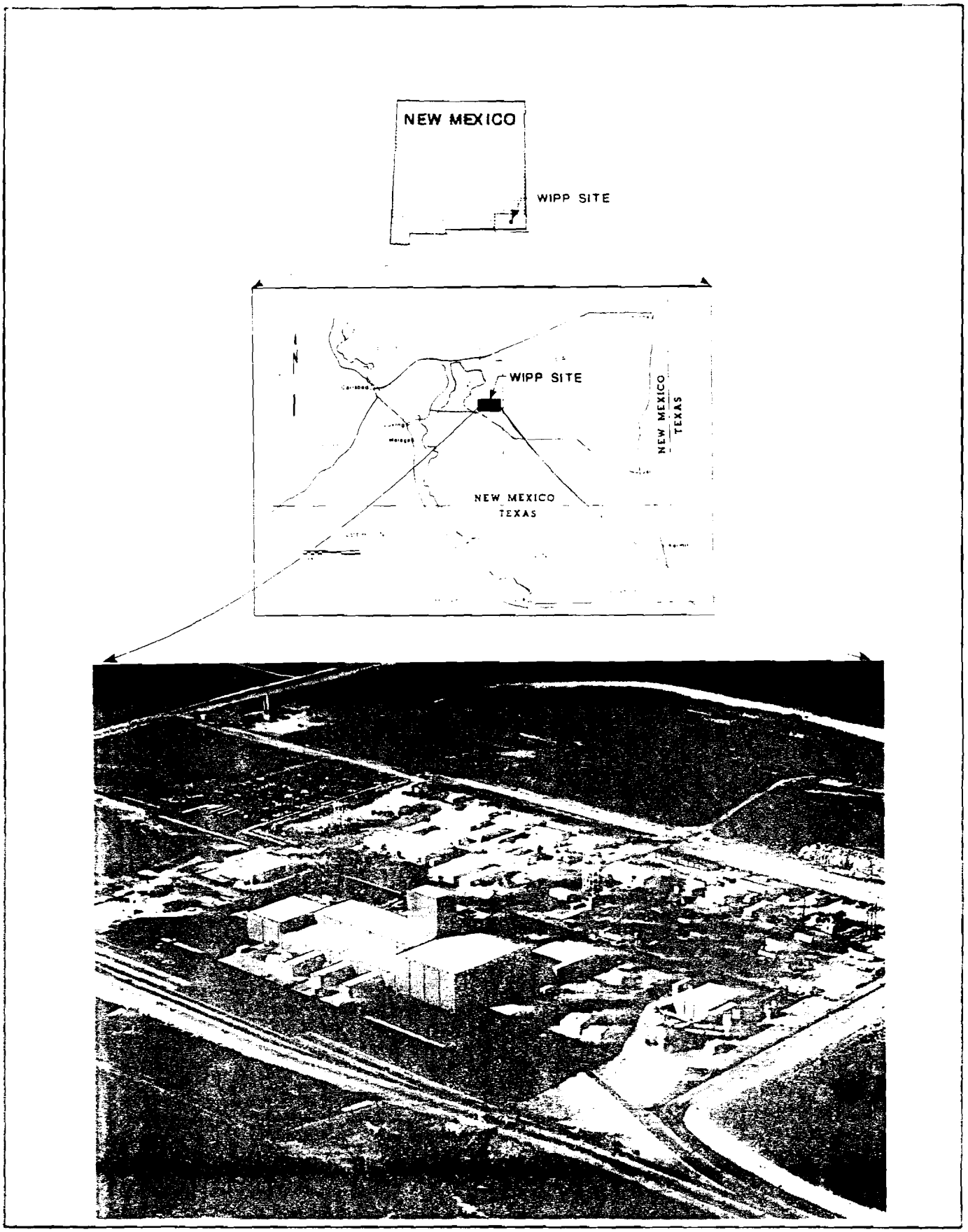


Figure 1-1.

WIPP Location Map

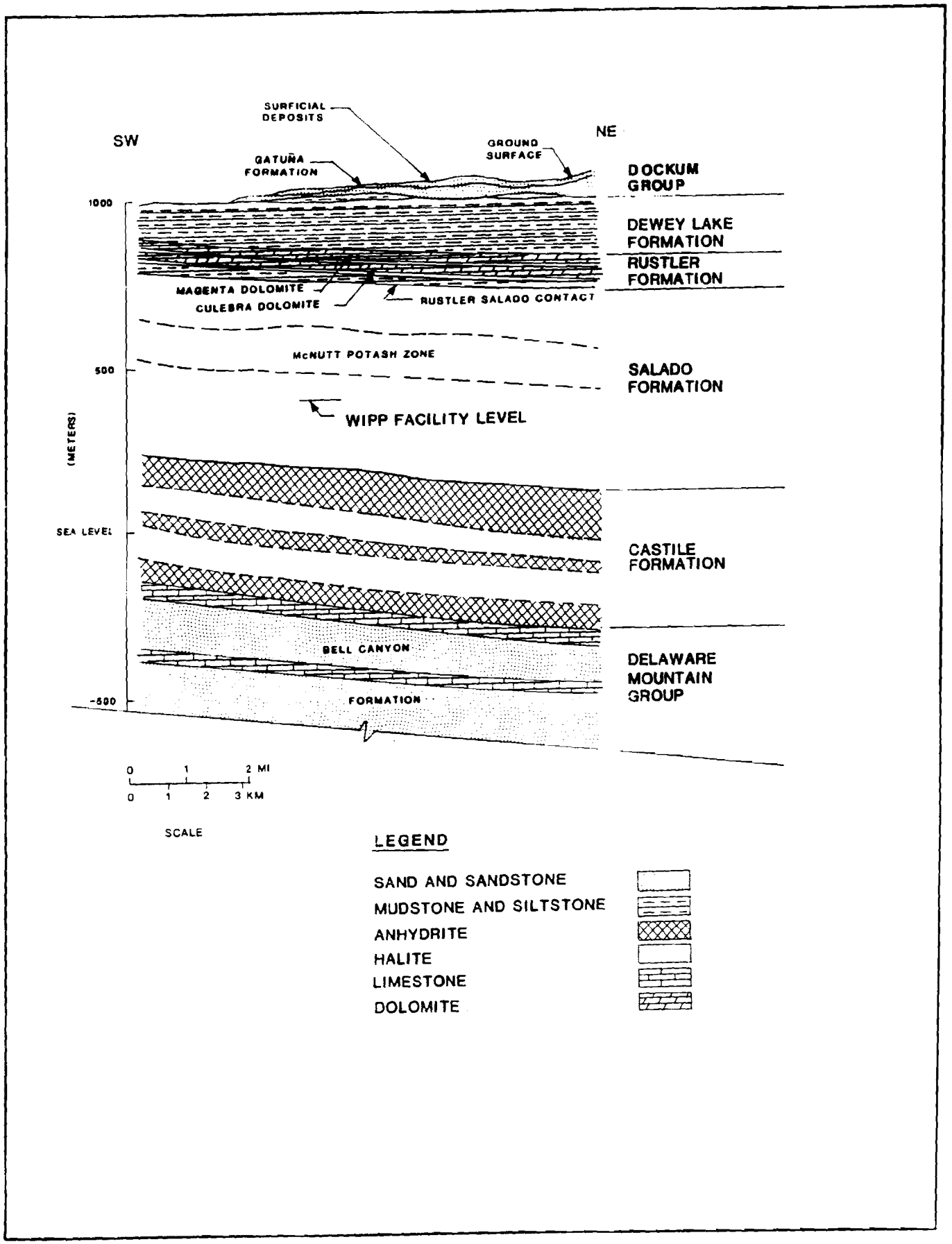


Figure 1-2.

Generalized Stratigraphic Cross Section

The data presented in this report are a continuation and update of studies that began in 1983 (Black, et al., 1983; TSC-D'Appolonia, Part II, 1983; and Alcorn, 1983), formalized by Morse and Hassinger (1985), and previously reported in the Brine Sampling and Evaluation Phase I Report (Deal and Case, 1987). Users should consult Deal and Case (1987) for background information, detailed descriptions of the data gathering and analysis procedures, and the cautions that should be exercised when using the data presented herein.

2.0 BRINE OCCURRENCES

2.1 INTRODUCTION

The preliminary observations made during Phase I of the BSEP began informally as an extension of the weep observations in 1983 and include data acquired through July 1986. That data was presented and discussed at length in the BSEP Phase I Report (Deal and Case, 1987). This report extends that earlier document by including data acquired from August 1986 through July 1987. Brine accumulation data is presented in Appendix A. Smoothed curves (eleven-point moving averages) of that data is presented in Appendix B.

2.2 WEEPS

The documentation and study of brine "weeps" on newly excavated surfaces and the resulting salt accumulations in the form of encrustations, mounds, and knobs continued during the time period covered by this interim report (August 1986 through July 1987).

Deal and Case (1987) observed that weeps are pervasive throughout the underground workings at WIPP and occur on the surfaces of all exposed lithologic units. They went on to state that the weeps "appear to develop more quickly and occur more frequently on the units containing clay." Observations made during this reporting period confirm that statement. However, Deal and Case (1987) also noted that weeps and large, very noticeable salt efflorescences do develop on clear halite. Observations made during this reporting period confirm that although salt accumulations may develop more quickly on argillaceous halite, such accumulations are not limited to units containing clay. In some locations, over sufficiently long periods of time, it appears that more brine may actually seep from clear halite than from argillaceous halite.

This observation is supported by core recovered during the drilling of hole BX01, in the north end of Room B (Figure 2-1), in January 1985. Approximately one-half meter of core, consisting of coarsely-crystalline clear halite and slightly polyhalitic halite was wet when it was removed from the core barrel (Deal, 1985; and Gallerani, 1985). The core was wet to the touch and moisture dripped from it when it was removed from the core barrel. This wet interval was encountered between 10.6 and 11.1 meters below the collar. This section of the core is located below anhydrite bed MB-139 (Figures 2-2 and 2-3), which was penetrated in the interval between 7.1 and 7.9 meters below the collar of the hole. It was also located below clay D, which was described as a discontinuous clay/anhydrite and gray clay parting at 10.4 meters below the collar (Gallerani, 1985).

Deal and Case (1987) also noted that:

> "Weeps occur much more commonly and are more persistent on the ribs (walls) than on the back, indicating that lateral brine flow may be greater than vertical flow."

BSEP II

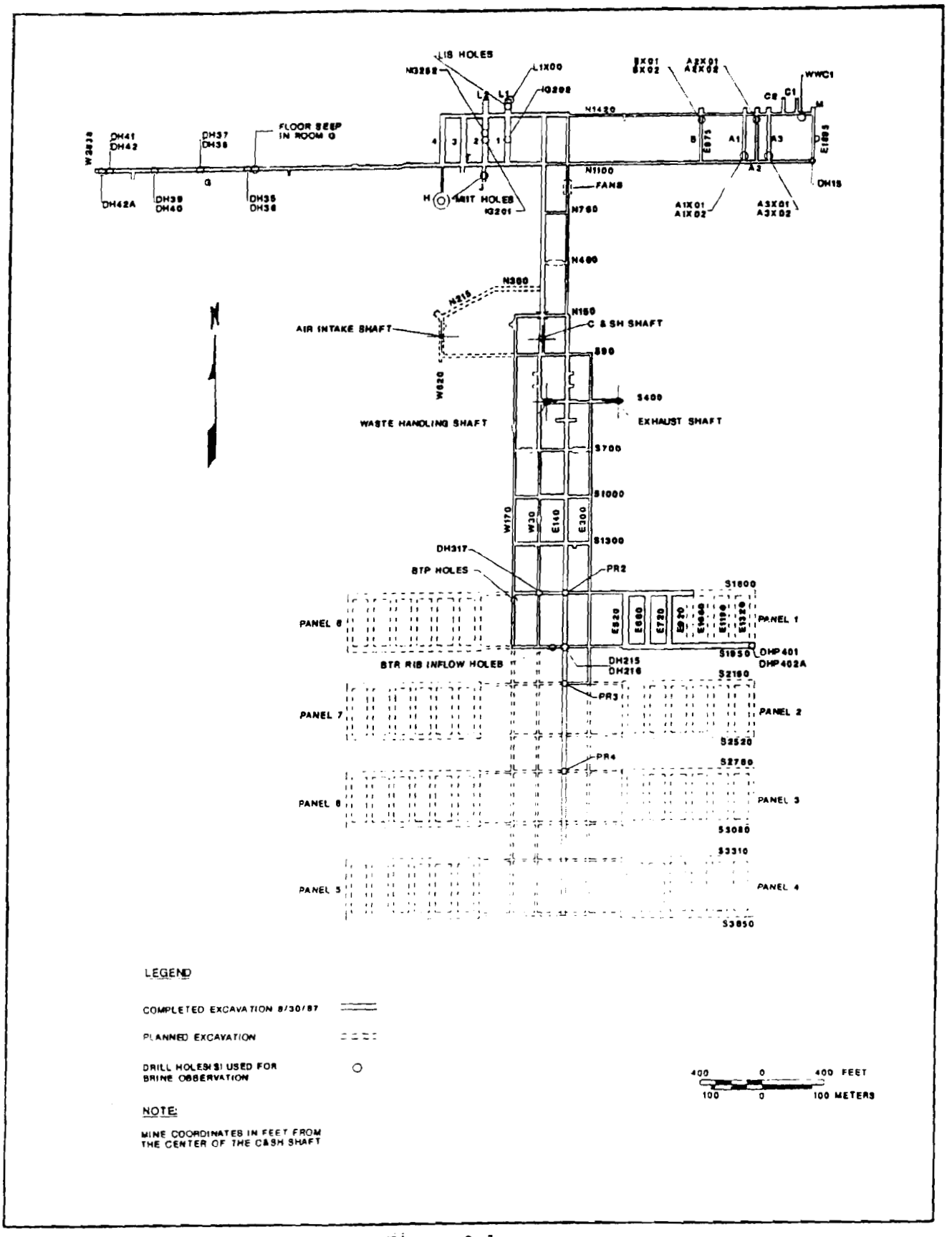
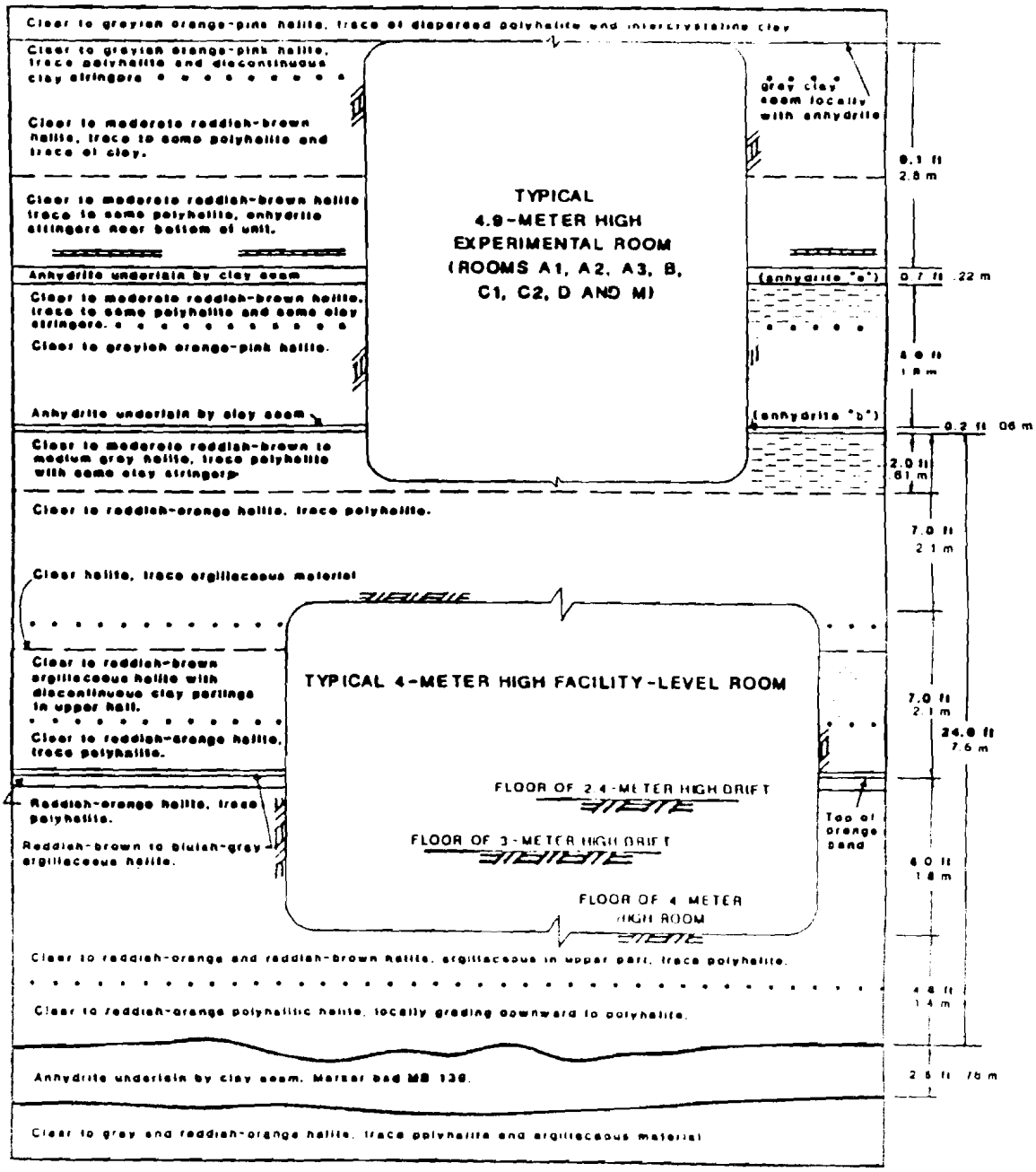


Figure 2-1.

Map of the WIPP Underground Workings
Showing BSEP Observation Locations
(Approximately 14 Kilometers of Drifts
Had Been Excavated By July 31, 1987)



NOTES

1. Dimensions and lithologic descriptions are derived primarily from corehole and geologic mapping data from the four test rooms and experimental area supplemented by geologic information from the remaining SPDV excavation.
2. Unit thicknesses are approximate and vary slightly.
3. Room dimensions have changed with time due to salt-creep closure

Figure 2-2.

Geologic Cross Section of the Facility and Experimental Level in the Vicinity of the SPDV Test Rooms and the Experimental Rooms

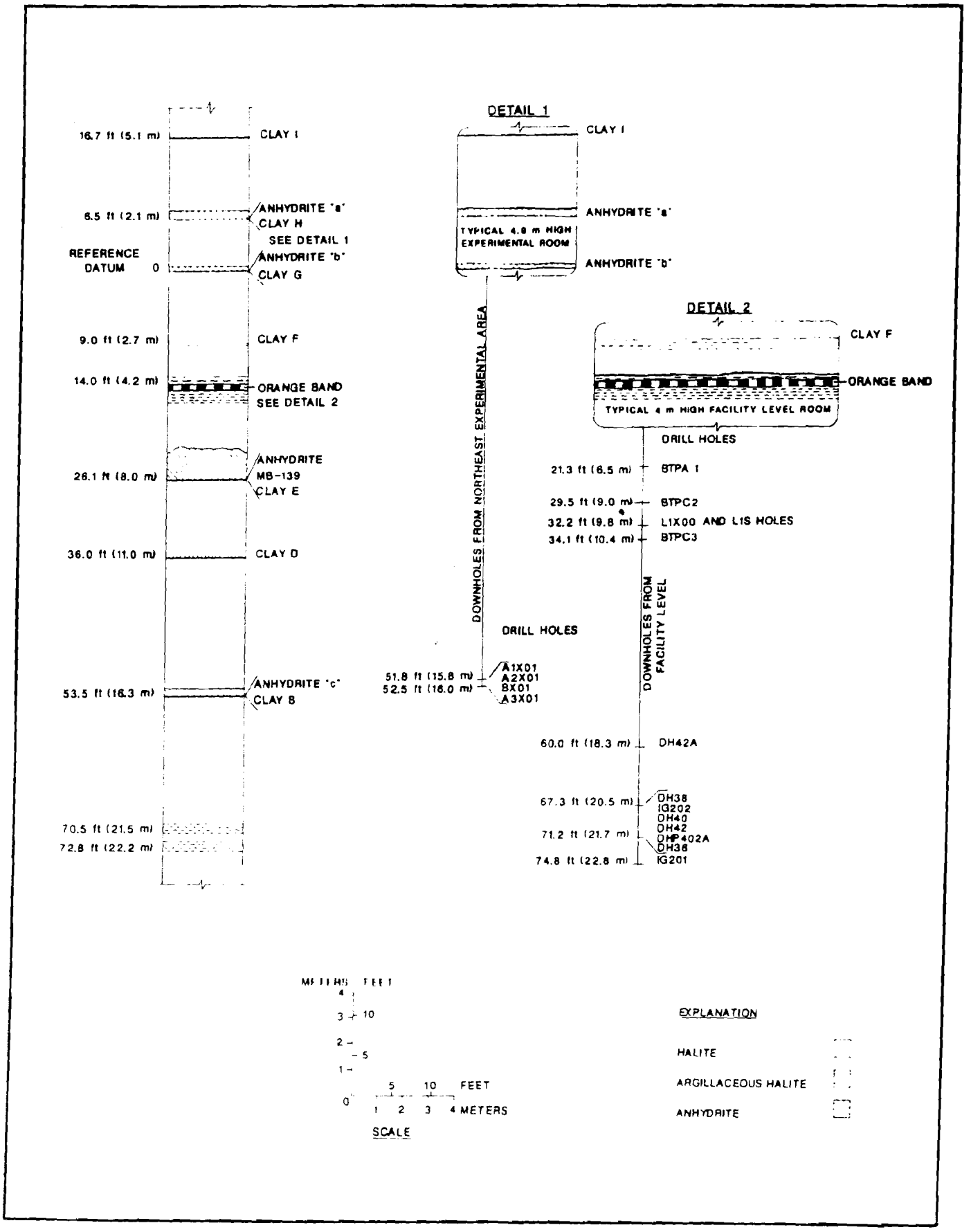


Figure 2-3.

Correlation of the Stratigraphy with Downholes
Northern Part of the Facility

Observations made during this reporting period support that conclusion. Many more encrustations and weeps were observed on ribs (walls) than on the back (roof) of the workings. It is rare to observe moist areas or salt accumulations on the back that are not associated with drillholes that penetrate overlying strata. We conclude that lateral movement of brine parallel to bedding planes occurs more easily than does movement across bedding planes into the surfaces of the workings. This may be due to anisotropic permeabilities or to more rapid development of horizontal partings in the back which may intercept the flow driven by formation pressures.

An additional BSEP activity during this reporting period was to repeatedly photograph certain locations in the WIPP underground. The objective was to document the slow changes that take place on exposed surfaces. The results of these observations will be described in more detail in a later BSEP report.

2.3 BRINE IN DRILLHOLES

More than 1500 holes (excluding roof bolt and gas relief holes) have been drilled from the WIPP underground excavations. They extend in all directions, and most are 15 meters or less in length. The majority are 15 centimeters or less in diameter, although holes almost a meter in diameter and six meters long have been drilled (Deal and Case, 1987).

Encrustations of halite on the sides and at the collars of the holes indicate that small amounts of brine have seeped into nearly all of them. Noticeable amounts of brine have accumulated in some holes (Deal and Case, 1987). The locations of the drillholes that are mentioned in this report are listed in Table 2-1 and shown in Figure 2-1.

The stratigraphy of the Salado Formation units that are exposed in the WIPP excavations is shown in Figure 2-2. Typically, excavation is controlled by the location of the "orange band", a marker bed of reddish-orange halite containing a trace of polyhalite. The back (roof) is usually cut 2.1 meters above the top of the orange band. The floor is then cut to whatever depth is necessary to achieve an opening of the desired height. Although there are some exceptions to this, most of the facility level excavations have a back that is cut at approximately the same stratigraphic level, but floors that are at slightly different stratigraphic levels. The northeastern part of the workings, in the vicinity of experimental rooms A1, A2, A3, B, C1, C2, D, and M, has been ramped up to a stratigraphic level approximately 5 meters higher than the facility level. In addition, these experimental rooms were cut to a height of 4.9 meters. The net result is that upholes and downholes drilled to the same length may penetrate different stratigraphic horizons, depending on the location of the collar of a given drillhole. Figures 2-3 and 2-4 show these relationships and the approximate stratigraphic location of the end of most of the drillholes discussed in this report. For precise stratigraphic information on any given drillhole, reference should be made to the drilling log or core description for that hole.

PRELIMINARY DRAFT

TABLE 2-1
LIST OF UNDERGROUND LOCATIONS WHERE BRINE OCCURRENCES
WERE OBSERVED AND MONITORED THROUGH JULY, 1987
AS PART OF THE BRINE SAMPLING AND EVALUATION PROGRAM AT WIPP

Hole Number	Room or Location	Survey Accuracy S=Surveyed A=Approximate	North-South Coordinates	East-West Coordinates	Elevation	Dia. (in)	Depth (ft)	Direction	Angle	References	Remarks
A1X01	A1	S	N1147.02	E1254.40	1313.26	4	49.75	D	90	B, D, E	Monitored as part of the BSEP since it was drilled in 3/85.
A1X02	A1	S	N1146.88	E1254.24	1311.29	4	59.0	U	90	B, D, E	Monitored as part of the BSEP since it was drilled in 3/85.
A2X01	A2	S	N1393.72	E1338.88	1311.20	4	50.15	D	90	B, D, E	Monitored as part of the BSEP since it was drilled in 2/85.
A2X02	A2	S	N1393.65	E1338.89	1328.86	4	52.75	U	90	B, D, E	Monitored as part of the BSEP since it was drilled in 2/85. At the present no brine is collected because of insufficient inflow.
A3X01	A3	S	N1137.94	E1406.84	1309.78	4	50.5	D	90	B, D, E	Monitored as part of the BSEP since it was drilled in 1/85. Drillers did not report any moisture while drilling. hole started producing brine a few weeks later.
A3X02	A3	S	N1138.00	E1406.89	1327.93	4	50.75	U	90	B, D, E	Monitored as part of the BSEP since it was drilled 1/85. Drillers did not encounter moisture while drilling. Hole started producing brine few weeks later. At the present no brine is collected because of insufficient inflow.
BTPA1	S1620/W170	A	S1638	W162	1258	3	5.1	D	90	B	Open from 0 to 5.1 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPA2	S1620/W170	A	S1638	W166	1258	3	9.1	D	90	B	Cased from 0 to 5.4 ft. Open from 5.4 to 9.1 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPA3	S1620/W170	A	S1638	W170	1258	3	14.0	D	90	B	Cased from 0 to 10.3 ft. Open from 10.3 to 14.0 ft. Drilled for BSEP study//86 and monitored since drilled.
BTPA4	S1620/W170	A	S1638	W166	1271	3	4.6	U	90	B	Open from 0 to 4.6 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPA5	S1620/W170	A	S1638	W170	1271	3	5.3	U	90	B	Open from 0 to 5.3 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPB1	S1620/W170	A	S1636	W162	1258	3	5.1	D	90	B	Open from 0 to 5.1 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPB2	S1620/W170	A	S1636	W166	1258	3	9.6	D	90	B	Cased 0 to 5.9 ft. Open from 5.9 to 9.6 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPB3	S1620/W170	A	S1636	W170	1258	3	13.3	D	90	B	Cased 0 to 10.0 ft. Open from 10.0 to 13.3 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPB4	S1620/W170	A	S1636	W166	1271	3	9.75	U	90	B	Cased 0 to 6.8 ft. Open from 6.8 to 9.75 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPB5	S1620/W170	A	S1636	W170	1271	3	10.3	U	90	B	Cased 0 to 6.3 ft. Open from 6.3 to 10.3 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPC1	S1620/W170	A	S1634	W162	1258	3	5.0	D	90	B	Open from 0 to 5.0 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPC2	S1620/W170	A	S1634	W166	1258	3	9.8	D	90	B	Cased from 0 to 5.5 ft. Open from 5.9 to 9.8 ft. Drilled for BSEP study 8/86 and monitored since drilled.
BTPC3	S1620/W170	A	S1634	W170	1258	3	14.4	D	90	B	Cased from 0 to 10.0 ft. Open from 10.0 to 14.4 ft. Drilled for BSEP study 8/86 and monitored since drilled.
BTPC4	S1620/W170	A	S1634	W166	1271	3	17.6	U	90	B	Cased from 0 to 13.9 ft. Open from 13.9 to 17.6 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPC5	S1620/W170	A	S1634	W170	1271	3	18.2	U	90	B	Cased from 0 to 14.0 ft. Open from 14.0 to 18.2 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTR1	S1950/E100	A	S1942	E98	1269.5	3.25	1.0	~~N~~ H	5	B	Hole slightly declined below horizontal. Collar above upper clay seam, about 1 ft. below back. Drilled 6/86 and monitored since drilled.
BTR2	S1950/E100	A	S1942	E100	1269.5	3.25	3.2	~~N~~ H	5	B	Hole slightly declined below horizontal. Collar above upper clay seam, about 1 ft below back. Drilled 6/86 and monitored since drilled.
BTR3	S1950/E100	A	S1942	E101	1269.5	3.25	3.3	~~N~~ H	5	B	Hole slightly declined below horizontal. Collar above upper clay seam, about 1 ft below back. Drilled 6/86 and monitored since drilled.
BTR4	S1950/E100	A	S1942	E98	1267.5	3.25	0.95	~~N~~ H	5	B	Hole slightly declined below horizontal. Collar in halite about 3.5 ft.below back. Drilled 6/86 and monitored since drilled.
BTR5	S1950/E100	A	S1942	E100	1267.5	3.25	3.0	~~N~~ H	5	B	Hole slightly declined below horizontal. Collar in halite about 3.5 ft.below back. Drilled 6/86 and monitored since drilled.
BTR6	S1950/E100	A	S1942	E101	1267.5	3.25	3.0	~~N~~ H	5	B	Hole slightly declined below horizontal. Collar in halite about 3.5 ft.below back. Drilled 6/86 and monitored since drilled.

PRELIMINARY DRAFT

TABLE 2-1 (Continued)
LIST OF UNDERGROUND LOCATIONS WHERE BRINE OCCURRENCES
WERE OBSERVED AND MONITORED THROUGH JULY, 1987
AS PART OF THE BRINE SAMPLING AND EVALUATION PROGRAM AT WIPP

Hole Number	Room or Location	Survey Accuracy S=Surveyed A=Approximate	North-South Coordinates	East-West Coordinates	Elevation	Dia. (in)	Depth (ft)	Direction	Angle	References	Remarks
BTR7	S1950/E100	A	S1942	E98	1264.7	3.25	1.1	~~X~~ H	5	B	Hole slightly declined below horizontal. Collar just above orange band. Drilled 6/86 and monitored since drilled.
BTR8	S1950/E100	A	S1942	E100	1264.7	3.25	3.1	~~X~~ H	5	B	Hole slightly declined below horizontal. Collar just above orange band. Drilled 6/86 and monitored since drilled.
BTR9	S1950/E100	A	S1942	E101	1264.7	3.25	3.1	~~X~~ H	5	B	Hole slightly declined below horizontal. Collar just above orange band. Drilled 6/86 and monitored since drilled.
BTR10	S1950/E100	A	S1942	E98	1262.2	3.25	1.2	~~X~~ H	5	B	Hole slightly declined below horizontal. Collar about 2.5 ft. above floor. Drilled 6/86 and monitored since drilled.
BTR11	S1950/E100	A	S1942	E100	1262.2	3.25	3.05	~~X~~ H	5	B	Hole slightly declined below horizontal. Collar about 2.5 ft. above floor. Drilled 6/86 and monitored since drilled.
BTR12	S1950/E100	A	S1942	E101	1262.2	3.25	3.05	~~X~~ H	5	B	Hole slightly declined below horizontal. Collar about 2.5 ft. above floor. Drilled 6/86 and monitored since drilled.
BX01	B	S	N1384.68	E0982.33	1317.44	4	50.15	D	90	B, E	Monitored as part of the BSEP since it was drilled in 1/85. Core moist from 10.6 to 11.1 meters in coarsely crystalline clear halite. MB139 at 7.1 to 7.9 meters.
BX02	B	S	N1384.44	E0982.87	1335.47	4	49.25	U	90	B, E	Monitored as part of the BSEP since it was drilled in 1/85. At the present no brine is collected because of insufficient inflow.
DH15	N1140/E1689	A	N11~~40~~ 34	E1688.5	1319.9	3	51	U	90	B	Moisture noticed at collar in 4/86. Collecting device installed 5/86 and monitored as part of the BSEP since then.
DH35	G	A	N1102	W1882	1294.4	3.5	52.0	U	90	A3, B	Monitored as part of BSEP since 2/85. At present no brine is collected because of insufficient inflow.
DH36	G	A	N1102	W1882	1284.6	3.5	51.5	D	90	A3, B	Monitored as part of BSEP since 1/85.
DH37	G	S	N1101	W2182	1297.4	3.5	51.5	U	90	A3, B	Monitored as part of BSEP since 1/85. At the present no brine is collected because of insufficient inflow.
DH38	G	S	N1101	W2182	1287.0	3.5	47.5	D	90	A3, B	Monitored as part of BSEP since 1/85.
DH39	G	S	N1101	W2482	1296.0	3.5	50.7	U	90	A3, B	Monitored as part of BTP since FEB. 1985. At the present no brine is collected because of insufficient inflow.
DH40	G	S	N1101	W2482	1286.1	3.5	51.0	D	90	A3, B	Monitored as part of BSEP since 1/85.
DH41	G	S	N1101	W2782	1295.8	3.5	49.9	U	90	A3, B	Monitored as part of BSEP since 2/85. At the present no brine is collected because of insufficient inflow.
DH42	G	S	N1101	W2782	1285.9	3.5	51.2	D	90	A3, B	Monitored as part of the BSEP since 2/85.
DH42A	G	S	N1101	W2789	1285.7	3.5	40.5	D	90	A3, B	Monitored as part of the BSEP since 2/85.
DH215	S1960/E153	S	S1960	E0153	1272.0	3	52.0	U	90	A1, B	Gas releases had been observed in this hole. Monitored as part of the BSEP since 1/85.
DH216	S1960/E153	S	S1960	E0153	1262.6	3	54.2	D	90	A1, B	Gas releases had been observed in this hole. Monitored as part of the BSEP from 1/85 to 6/85 when collar was destroyed and hole plugged by mining.
DH317	S1600/W33	S	S1600	W0033	1271.3	3	50.1	U	90	A2, B	Stalactite growth monitored as part of BSEP from 5/85 to 2/86.
DH317A	S1600/W30	S	S1600	W0030	1271.2	3	5.0	U	90	A2, B	Stalactite growth monitored as part of BSEP from 5/85 to 2/86.
DH317B	S1600/W30	S	S1597	W0030	1271.2	3.5	51.0	U	90	A2, B	Gas pocket at 45.91. Brine seeped from hole after drill rods were broken at end of run at depth of 16.3 ft. Probable source was anhydrite "a". Stalactite growth monitored as part of BSEP from 5/85 to 2/86.
DHP401	S1950/E1330	A	S1950	E1330	1268.0	4	49.5	U	90	B	Drilled 1/87, observed as part of BSEP since 3/87.
DHP402A	S1950/E1330	A	S1950	E1330	1255.8	4	49.8	D	90	B	Drilled 12/86, observed as part of BSEP since 12/86. Hole offset at 45 ft.
G Seep	G	A	N1095	W1837	1284	16	4.0	D	90	B	Damp area on the floor of Room G, near south rib, approximately 45 ft east of DH35. Seep noticed 8/85. Damp area larger in 11/85. Monitored as part of BSEP since 11/85.
1G201	2	S	N1275.54	W0379.51	1294.97	2.875	53.83	D	90	A3,B, H, J	Monitored as part of BSEP since 11/84.
1G202	1	S	N1264.79	W0246.11	1296.49	2.875	48.16	D	90	A3, B, H, J	Monitored as part of BSEP from 11/84 to 7/87 when shear closure pinched hole shut so that sampler would not go to bottom. Last BSEP brine data collected in 3/87.
JV8	J	S	N1067	W0374	1290	36	8.1	D	90	D, F, G	Drilled 8/08/85, drillers reported water at 7 ft 10 inches.
JV9	J	S	N1067	W0378	1290.4	36	8.1	D	90	D, G	Brine in bottom of pilot hole on 8/20/85.
L1S25	L1	A	N1524	W0218	1312	4	11.90	D	90	B, H	Monitored as part of BSEP since 8/85.

PRELIMINARY DRAFT

TABLE 2-1 (Continued)
LIST OF UNDERGROUND LOCATIONS WHERE BRINE OCCURRENCES
WERE OBSERVED AND MONITORED THROUGH JULY, 1987
AS PART OF THE BRINE SAMPLING AND EVALUATION PROGRAM AT WIPP

Hole Number	Room or Location	Survey Accuracy S-Surveyed A-Approximate	North-South Coordinates	East-West Coordinates	Elevation	Dia. (in)	Depth (ft)	Direction	Angle	References	Remarks
L1S26	L1	A	N1524	W0220	1312	4	11.72	D	90	B, H	Monitored as part of BSEP since 8/85.
L1S27	L1	A	N1524	W0222	1312	4	11.93	D	90	B, H	Monitored as part of BSEP since 8/85.
L1S29	L1	A	N1524	W0226	1312	4	12.03	D	90	B, H	Monitored as part of BSEP since 8/85.
L1S30	L1	A	N1524	W0228	1312	4	12.18	D	90	B, H	Monitored as part of BSEP since 8/85.
L1S32	L1	A	N1524	W0237	1312	4	11.95	D	90	B, H	Monitored as part of BSEP since 8/85.
L1S33	L1	A	N1524	W0239	1312	4	11.98	D	90	B, H	Monitored as part of BSEP since 8/85.
L1S36	L1	A	N1524	W0245	1312	4	12.22	D	90	B, H	Monitored as part of BSEP since 8/85.
L1X00	L1	A	N1538.5	W0225	1312	4	12.45	D	90	B, H	Drillers reported "found water in hole at 10 ft, 5/13/84", monitored as part of the BSEP since 10/84.
L2C25	L1	A	N1510	W0365	1312	5	11.36	D	90	B, H	Monitored irregularly as part of BSEP since 12/85.
M11T2	J	S	N1088.03	W0377.02	1290.81	3.25	2.9	D	90	B, D, G	Brine since drilled, monitored from 10/26/85 to 4/23/85.
M11T4	J	S	N1086.05	W0377.13	1290.82	3.25	3.775	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
M11T6	J	S	N1084.16	W0377.15	1290.55	3.25	3.125	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
M11T8	J	S	N1082.08	W0377.24	1290.48	3.25	3.05	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 to 4/23/85.
M11T10	J	S	N1079.98	W0377.23	1290.38	3.25	3.075	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
M11T12	J	S	N1078.11	W0377.21	1290.20	3.25	3.05	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
M11T14	J	S	N1076.18	W0377.30	1289.85	3	3.05	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
M11T16	J	S	N1074.17	W0377.18	1289.2	3	2.975	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
M11T17	J	S	N1072.03	W0379.10	1290.31	3	3.250	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85, Sandia filled hole with Brine A 4/30/85 and plugged with rubber cork.
M11T18	J	S	N1071.91	W0377.18	1290.25	3	3.925	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85, Sandia experiment filled hole with Brine A 04/20/85 and plugged h ole with rubber cork.
M11T20	J	S	N1069.84	W0377.22	1290.34	3	5.975	D	90	B, D, G	Brine noted 10/26/84, monitored from 10/26/84 through 4/23/85.
M11T22	J	S	N1067.93	W0377.23	1290.44	3	5.825	D	90	B, D, G	Brine noted 10/26/84. monitored from 10/26/84 through 4/23/85.
M11T24	J	S	N1065.79	W0377.21	1290.74	3	5.975	D	90	B, D, G	Brine noted 10/26/84, monitored 10/26/84 through 4/23/85, Sandia experiment added Brine A to hole 4/30/85 and plugged with rubber cork.
M11TP	J	A	N1067	W0378	1290.8	1.5	8.8	D	90	B, F	Brine since drilled, pilot hole for 36-inch diameter hole that was never completed. Monitored from 4/02/85 through 4/23/85.
NG252	2	S	N1275.86	W0381.05	1294.89	1.5	7.54	D	90	A3, B, H, J	Monitored as part of the BSEP since 11/84. This hole continues to produce gas, first time noticed before 10/84.
PR2	S1600/E140	A	S1600	E0140	1271.2	2	20	U	90	B, C	Stalactite growth monitored as part of the BSEP from 5/85 to 2/86.
PR3	S1282/E140	A	S2182	E0140	1263	2	20	U	90	B, C	Stalactite growth monitored as part of the BSEP from 5/85 to 2/86.
PR4	S2748/E140	A	S2748	E0140	1250	2	20	U	90	B, C	Stalactite growth monitored as part of the BSEP from 5/85 to 2/86.
WWC1	N1420/Room C1	A				36	16	SOUTH	0	B	Large horizontal hole on south rib of N1420 drift, across from Room C1. Photographically monitored for salt buildup.

References:
A1 TSC-D'Appolonia, 1983a (WIPP-DOE-163)
A2 Bechtel National, 1984 (WIPP-DOE-202)
A3 Bechtel National, 1985 (WIPP-DOE-213)
B Brine Sampling and Evaluation Program File
C Records of special Drill Holes, 9/12/83: BSEP Files
D As-Built Survey Calculation Sheets: BSEP Files
E Field Notes, J. Gallerani, Bechtel National: BSEP Files
F Field Notes, D. Deal, IT Corp.: BSEP Files
G Room 1 Brine Survey: BSEP Files
H Room L1 and L2 Field Notes: BSEP Files
J Geotechnical Instrument List, 11/02/83: BSEP Files

TABLE 2-1
LISI OF UNDERGROUND LOCATIONS WHERE BRINE OCCURRENCES
WERE OBSERVED AND MONITORED THROUGH JULY, 1987
AS PART OF THE BRINE SAMPLING AND EVALUATION PROGRAM AT WIPP

Hole Number	Room or Location	Survey Accuracy S=Surveyed A=Approximate	North-South Coordinates	East-West Coordinates	Elevation	Dia. (in)	Depth (ft)	Direction	Angle	References	Remarks
L1S26	L1	A	N1524	W0220	1312	4	11.72	D	90	B, H	Monitored as part of BSEP since 8/20/85.
L1S27	L1	A	N1524	W0222	1312	4	11.93	D	90	B, H	Monitored as part of BSEP since 8/20/85.
L1S29	L1	A	N1524	W0226	1312	4	12.03	D	90	B, H	Monitored as part of BSEP since 8/20/85.
L1S30	L1	A	N1524	W0228	1312	4	12.18	D	90	B, H	Monitored as part of BSEP since 8/20/85.
L1S32	L1	A	N1524	W0237	1312	4	11.95	D	90	B, H	Monitored as part of BSEP since 8/20/85.
L1S33	L1	A	N1524	W0239	1312	4	11.98	D	90	B, H	Monitored as part of BSEP since 8/20/85.
L1S36	L1	A	N1524	W0245	1312	4	12.22	D	90	B, H	Monitored as part of BSEP since 8/20/85.
L1X00	L1	A	N1538.5	W0225	1312	4	12.45	D	90	B, H	Drillers reported "found water in hole at 10 ft, 5 1/2 S-", monitored as part of the BSEP since 10/84.
L2C25	L1	A	N1510	W0365	1312	5	11.36	D	90	B, H	Monitored irregularly as part of BSEP since 12/85.
M1IT2	J	S	N1088.03	W0377.02	1290.81	3.25	2.9	D	90	B, D, G	Brine since drilled, monitored from 10/26/85 through 4/23/85.
M1IT4	J	S	N1086.05	W0377.13	1290.82	3.25	3.275	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
M1IT6	J	S	N1084.16	W0377.15	1290.55	3.25	3.125	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
M1IT8	J	S	N1082.08	W0377.24	1290.48	3.25	3.05	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
MIIT10	J	S	N1079.98	W0377.23	1290.38	3.25	3.075	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
MIIT12	J	S	N1078.11	W0377.21	1290.20	3.25	3.05	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
MIIT14	J	S	N1076.18	W0377.30	1289.85	3	3.05	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
MIIT16	J	S	N1074.17	W0377.18	1289.2	3	2.975	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85.
MIIT17	J	S	N1072.03	W0379.10	1290.31	3	3.250	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85, Sandia filled hole with Brine A 4/30/85 and plugged with rubber cork.
MIIT18	J	S	N1071.91	W0377.18	1290.25	3	3.925	D	90	B, D, G	Brine since drilled, monitored from 10/26/84 through 4/23/85, Sandia experiment filled hole with Brine A 04/20/85 and plugged hole with rubber cork.
MIIT20	J	S	N1069.84	W0377.22	1290.34	3	5.975	D	90	B, D, G	Brine noted 10/26/84, monitored from 10/26/84 through 4/23/85.
MIIT22	J	S	N1067.93	W0377.23	1290.44	3	5.825	D	90	B, D, G	Brine noted 10/26/84. monitored from 10/26/84 through 4/23/85.
MIIT24	J	S	N1065.79	W0377.21	1290.74	3	5.975	D	90	B, D, G	Brine noted 10/26/84, monitored 10/26/84 through 4/23/85, Sandia experiment added Brine A to hole 4/30/85 and plugged with rubber cork.
MIITP	J	A	N1067	W0378	1290.8	1.5	8.8	D	90	B, F	Brine since drilled, pilot hole for 36-inch diameter hole that was never completed. Monitored from 4/02/85 through 4/23/85.
NG252	2	S	N1275.86	W0381.05	1294.89	1.5	7.54	D	90	A3, B, H, J	Monitored as part of the BSEP since 11/84. This hole continues to produce gas, first time noticed before 10/84.
PR2	S1600/E140	A	S1600	E0140	1271.2	2	20	U	90	B, C	Stalactite growth monitored as part of the BSEP from 5/85 to 2/86.
PR3	S1282/E140	A	S1282	E0140	1263	2	20	U	90	B, C	Stalactite growth monitored as part of the BSEP from 5/85 to 2/86.
PR4	S2748/E140	A	S2748	E0140	1250	2	20	U	90	B, C	Stalactite growth monitored as part of the BSEP from 5/85 to 2/86.
WWC1	N1420/RoomC1	A				36	16	SOUTH	0	B	Large horizontal hole on south rib of N1420 drift, across from Room C1. Photographically monitored for salt buildup.

References:
A1 TSC-D'Appolonia, 1983a (WIPP-DOE-163)
A2 Bechtel National, 1984 (WIPP-DOE-202)
A3 Bechtel National, 1985 (WIPP-DOE-213)
B Brine Sampling and Evaluation Program File
C Records of special Drill Holes, 9/12/83: BSEP Files
D As-Built Survey Calculation Sheets: BSEP Files
E Field Notes, J. Gallerani, Bechtel National: BSEP Files
F Field Notes, D. Deal, IT Corp.: BSEP Files
G Room J Brine Survey: BSEP Files
H Room L1 and L2 Field Notes: BSEP Files
J Geotechnical Instrument List, 11/02/83: BSEP Files

TABLE 2-1
LIST OF UNDERGROUND LOCATIONS WHERE BRINE OCCURRENCES
WERE OBSERVED AND MONITORED THROUGH JULY, 1987
AS PART OF THE BRINE SAMPLING AND EVALUATION PROGRAM AT WIPP

Hole Number	Room or Location	Survey Accuracy S=Surveyed A=Approximate	North-South Coordinates	East-West Coordinates	Elevation	Dia. (in)	Depth (ft)	Direction	Angle	References	Remarks
A1X01	A1	S	N1147.02	E1254.40	1313.26	4	59.75	D	90	B, D, E	Monitored as part of the BSEP since it was drilled in 3/85.
A1X02	A1	S	N1146.88	E1254.24	1331.79	4	59.0	U	90	B, D, E	Monitored as part of the BSEP since it was drilled in 3/85.
A2X01	A2	S	N1393.72	E1338.88	1311.20	4	50.15	D	90	B, D, E	Monitored as part of the BSEP since it was drilled in 2/85.
A2X02	A2	S	N1393.65	E1338.89	1328.86	4	52.75	U	90	B, D, E	Monitored as part of the BSEP since it was drilled in 2/85. At the present no brine is collected because of insufficient inflow.
A3X01	A3	S	N1137.94	E1406.84	1309.78	4	50.5	D	90	B, D, E	Monitored as part of the BSEP since it was drilled in 1/85. Drillers did not report any moisture while drilling. hole started producing brine a few weeks later.
A3X02	A3	S	N1138.00	E1406.89	1327.93	4	50.75	U	90	B, D, E	Monitored as part of the BSEP since it was drilled 1/85. Drillers did not encounter moisture while drilling. Hole started producing brine few weeks later. At the present no brine is collected because of insufficient inflow.
BTPA1	S1620/W170	A	S1638	W162	1258	3	5.1	D	90	B	Open from 0 to 5.1 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPA2	S1620/W170	A	S1638	W166	1258	3	9.1	D	90	B	Cased from 0 to 5.4 ft. Open from 5.4 to 9.1 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPA3	S1620/W170	A	S1638	W170	1258	3	14.0	D	90	B	Cased from 0 to 10.3 ft. Open from 10.3 to 14.0 ft. Drilled for BSEP study7/86 and monitored since drilled.
BTPA4	S1620/W170	A	S1638	W166	1271	3	4.6	U	90	B	Open from 0 to 4.6 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPA5	S1620/W170	A	S1638	W170	1271	3	5.3	U	90	B	Open from 0 to 5.3 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPB1	S1620/W170	A	S1636	W162	1258	3	5.1	D	90	B	Open from 0 to 5.1 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPB2	S1620/W170	A	S1636	W166	1258	3	9.6	D	90	B	Cased 0 to 5.9 ft. Open from 5.9 to 9.6 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPB3	S1620/W170	A	S1636	W170	1258	3	13.3	D	90	B	Cased 0 to 10.0 ft. Open from 10.0 to 13.3 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPB4	S1620/W170	A	S1636	W166	1271	3	9.75	U	90	B	Cased 0 to 6.8 ft. Open from 6.8 to 9.75 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPB5	S1620/W170	A	S1636	W170	1271	3	10.3	U	90	B	Cased 0 to 6.3 ft. Open from 6.3 to 10.3 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPC1	S1620/W170	A	S1634	W162	1258	3	5.0	D	90	B	Open from 0 to 5.0 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPC2	S1620/W170	A	S1634	W166	1258	3	9.8	D	90	B	Cased from 0 to 5.5 ft. Open from 5.9 to 9.8 ft. Drilled for BSEP study 8/86 and monitored since drilled.
BTPC3	S1620/W170	A	S1634	W170	1258	3	14.4	D	90	B	Cased from 0 to 10.0 ft. Open from 10.0 to 14.4 ft. Drilled for BSEP study 8/86 and monitored since drilled.
BTPC4	S1620/W170	A	S1634	W166	1271	3	17.6	U	90	B	Cased from 0 to 13.9 ft. Open from 13.9 to 17.6 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTPC5	S1620/W170	A	S1634	W170	1271	3	18.2	U	90	B	Cased from 0 to 14.0 ft. Open from 14.0 to 18.2 ft. Drilled for BSEP study 7/86 and monitored since drilled.
BTR1	S1950/E100	A	S1942	E98	1269.5	3.25	1.0	H	5	B	Hole slightly declined below horizontal. Collar above upper clay seam, about 1 ft. below back. Drilled 6/86 and monitored since drilled.
BTR2	S1950/E100	A	S1942	E100	1269.5	3.25	3.2	H	5	B	Hole slightly declined below horizontal. Collar above upper clay seam, about 1 ft below back. Drilled 6/86 and monitored since drilled.
BTR3	S1950/E100	A	S1942	E101	1269.5	3.25	3.3	H	5	B	Hole slightly declined below horizontal. Collar above upper clay seam, about 1 ft below back. Drilled 6/86 and monitored since drilled.
BTR4	S1950/E100	A	S1942	E98	1267.5	3.25	0.95	H	5	B	Hole slightly declined below horizontal. Collar in halite about 3.5 ft.below back. Drilled 6/86 and monitored since drilled.
BTR5	S1950/E100	A	S1942	E100	1267.5	3.25	3.0	H	5	B	Hole slightly declined below horizontal. Collar in halite about 3.5 ft.below back. Drilled 6/86 and monitored since drilled.
BTR6	S1950/E100	A	S1942	E101	1267.5	3.25	3.0	H	5	B	Hole slightly declined below horizontal. Collar in halite about 3.5 ft.below back. Drilled 6/86 and monitored since drilled.

TABLE 2-1
LIST OF UNDERGROUND LOCATIONS WHERE BRINE OCCURRENCES
WERE OBSERVED AND MONITORED THROUGH JULY, 1987
AS PART OF THE BRINE SAMPLING AND EVALUATION PROGRAM AT WIPP

Hole Number	Room or Location	Survey Accuracy S=Surveyed A=Approximate	North-South Coordinates	East-West Coordinates	Elevation	Dia. (in)	Depth (ft)	Direction	Angle	References	Remarks
BTR7	S1950/E100	A	S1942	E98	1264.7	3.25	1.1	H	5	B	Hole slightly declined below horizontal. Collar just above orange band. Drilled 6/86 and monitored since drilled.
BTR8	S1950/E100	A	S1942	E100	1264.7	3.25	3.1	H	5	B	Hole slightly declined below horizontal. Collar just above orange band. Drilled 6/86 and monitored since drilled.
BTR9	S1950/E100	A	S1942	E101	1264.7	3.25	3.1	H	5	B	Hole slightly declined below horizontal. Collar just above orange band. Drilled 6/86 and monitored since drilled.
BTR10	S1950/E100	A	S1942	E98	1262.2	3.25	1.2	H	5	B	Hole slightly declined below horizontal. Collar about 2.5 ft. above floor. Drilled 6/86 and monitored since drilled.
BTR11	S1950/E100	A	S1942	E100	1262.2	3.25	3.05	H	5	B	Hole slightly declined below horizontal. Collar about 2.5 ft. above floor. Drilled 6/86 and monitored since drilled.
BTR12	S1950/E100	A	S1942	E101	1262.2	3.25	3.05	H	5	B	Hole slightly declined below horizontal. Collar about 2.5 ft. above floor. Drilled 6/86 and monitored since drilled.
BX01	B	S	N1384.68	E0982.33	1317.44	4	50.15	D	90	B, E	Monitored as part of the BSEP since it was drilled in 1/85. Core moist from 10.6 to 11.1 meters in coarsely crystalline clear halite. MB139 at 7.1 to 7.9 meters.
BX02	B	S	N1384.44	E0982.87	1335.47	4	49.25	U	90	B, E	Monitored as part of the BSEP since it was drilled in 1/85. At the present no brine is collected because of insufficient inflow.
DH15	N1100/E1689	A	N1104	E1688.5	1319.9	3	51	U	90	B	Moisture noticed at collar in 4/86. Collecting device installed 5/86 and monitored as part of the BSEP since then.
DH35	G	A	N1102	W1882	1294.4	3.5	52.0	U	90	A3, B	Monitored as part of BSEP since 2/85. At present no brine is collected because of insufficient inflow.
DH36	G	A	N1102	W1882	1284.6	3.5	51.5	D	90	A3, B	Monitored as part of BSEP since 1/85.
DH37	G	S	N1101	W2182	1297.4	3.5	51.5	U	90	A3, B	Monitored as part of BSEP since 1/85. At the present no brine is collected because of insufficient inflow.
DH38	G	S	N1101	W2182	1287.0	3.5	47.5	D	90	A3, B	Monitored as part of BSEP since 1/85.
DH39	G	S	N1101	W2482	1296.0	3.5	50.7	U	90	A3, B	Monitored as part of BTP since FEB. 1985. At the present no brine is collected because of insufficient inflow.
DH40	G	S	N1101	W2482	1286.1	3.5	51.0	D	90	A3, B	Monitored as part of BSEP since 1/85.
DH41	G	S	N1101	W2782	1295.8	3.5	49.9	U	90	A3, B	Monitored as part of BSEP since 2/85. At the present no brine is collected because of insufficient inflow.
DH42	G	S	N1101	W2782	1285.9	3.5	51.2	D	90	A3, B	Monitored as part of the BSEP since 2/85.
DH42A	G	S	N1101	W2789	1285.7	3.5	40.5	D	90	A3, B	Monitored as part of the BSEP since 2/85.
DH215	S1960/E153	S	S1960	E0153	1272.0	3	52.0	U	90	A1, B	Gas releases had been observed in this hole. Monitored as part of the BSEP since 1/85.
DH216	S1960/E153	S	S1960	E0153	1262.6	3	54.2	D	90	A1, B	Gas releases had been observed in this hole. Monitored as part of the BSEP from 1/85 to 6/85 when collar was destroyed and hole plugged by mining.
DH317	S1600/W33	S	S1600	W0033	1271.3	3	50.1	U	90	A2, B	Stalactite growth monitored as part of BSEP from 5/85 to 2/86.
DH317A	S1600/W30	S	S1600	W0030	1271.2	3	5.0	U	90	A2, B	Stalactite growth monitored as part of BSEP from 5/85 to 2/86.
DH317B	S1600/W30	S	S1597	W0030	1271.2	3.5	51.0	U	90	A2, B	Gas pocket at 45.91. Brine seeped from hole after drill rods were broken at end of run at depth of 16.3 ft. Probable source was anhydrite "a". Stalactite growth monitored as part of BSEP from 5/85 to 2/86.
DHP401	S1950/E1330	A	S1950	E1330	1268.0	4	49.5	U	90	B	Drilled 1/87, observed as part of BSEP since 3/87.
DHP402A	S1950/E1330	A	S1950	E1330	1255.8	4	49.8	D	90	B	Drilled 12/86, observed as part of BSEP since 12/86. Hole offset at 45 ft.
G Seep	G	A	N1095	W1837	1284	16	4.0	D	90	B	Damp area on the floor of Room G, near south rib, approximately 45 ft east of DH35. Seep noticed 8/85. Damp area larger in 11/85. Monitored as part of BSEP since 11/85.
IG201	2	S	N1275.54	W0379.51	1294.97	2.875	53.83	D	90	A3,B, H, J	Monitored as part of BSEP since 11/84.
IG202	1	S	N1264.79	W0246.11	1296.49	2.875	48.16	D	90	A3, B, H, J	Monitored as part of BSEP from 11/84 to 7/87 when shear closure pinched hole shut so that sampler would not go to bottom. Last BSEP brine data collected in 3/87.
JV8	J	S	N1067	W0374	1290	36	8.1	D	90	D, F, G	Drilled 8/08/85, drillers reported water at 7 ft 10 inches.
JV9	J	S	N1067	W0378	1290.4	36	8.1	D	90	D, G	Brine in bottom of pilot hole on 8/20/85.
L1S25	L1	A	N1524	W0218	1312	4	11.90	D	90	B, H	Monitored as part of BSEP since 8/85.

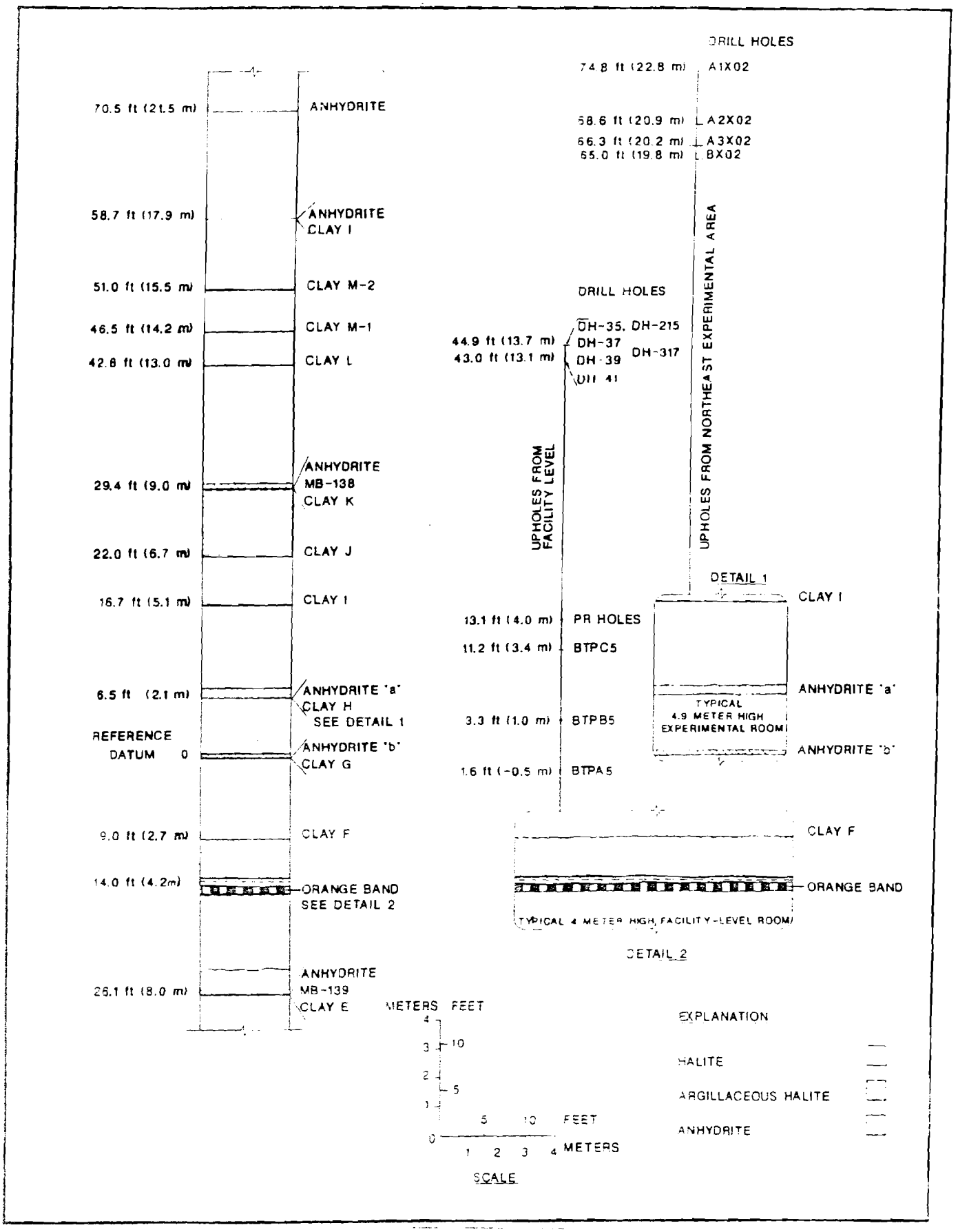


Figure 2-4.

Correlation of Stratigraphy with Upholes
Northern Part of the Facility

2.3.1 DOWNHOLES

Fluid was collected from a number of vertical downholes drilled in the floor of the underground workings. The collection of brine that has seeped into those downholes and the analysis of that data was described by Deal and Case (1987) in accordance with Procedure WP 07-410 (WIPP BSEP: Brine Collection and Inflow Measurements). The data presented here is part of an ongoing project and updates that previous report.

Plugs inserted below the collar of many of the holes created a restricted environment, reducing the amount of moisture lost by evaporation. As a result, the observations made in plugged downholes may be more representative of inflow conditions in general than those made in upholes or horizontal holes.

Table 2-2 summarizes the most important data obtained to date from the downholes. Additional information on the holes is contained in Table 2-1. For those holes discussed in Deal and Case (1987; Table 3-1), it was noted that six of those holes (BX01, DH38, DH40, DH42A, IG202, L1X00) which had shown steady or increasing accumulation trends, now show slightly decreasing trends. Three sets of holes, including one set at the east end of the S1950 drift, one set at S1620 and W170, and one set in Room L1, were not described in detail in Deal and Case (1987), but are included in this report and discussed in detail below.

2.3.1.1 Downhole DHP402A at the East End of S1950 Drift

A pair of 15-meter long stratigraphic observation holes (one up, one down) were drilled in the east end of the S1950 drift, at the southeast corner of Waste Storage Panel 1. The drift was excavated October 29, 1986, and the downhole, DHP402A, was completed on December 5, 1986. Difficulty was encountered in accurately bailing brine from the hole because of an offset at a depth of about 13.7 meters which caused the bailer to become wedged in the hole.

Approximately 33 liters of brine had been removed from this hole by the end of this reporting period. Most of that brine, however, originated as spilled drilling fluid during the drilling of a horizontal probe hole northward along the center of Waste Storage Room 7. As a result, inflow rates and trends are indicated as "unknown" or "not applicable" on Table 2-2.

2.3.1.2 BTP Downholes at S1620/W170

In September 1985, an alcove was mined to the south at the junction of the S1600 and W170 drifts. Nine downholes were drilled in the alcove in July and August 1986, for the express purpose of better defining stratigraphic variations in brine seepage. The holes were labeled "BTP" holes and consist of three sets of three holes each. Each set of holes is open in a different stratigraphic interval (Table 2-1).

TABLE 2-2

BRINE ACCUMULATION SUMMARY FOR DOWNHOLES
(Data Summarized and Rounded from Appendices A and B)

Hole	Room or Location	Date Room Excavated	Date Hole Drilled	Date First Observed	Approx. Maximum Inflow (l/day)	Approx. Inflow 7/87 (l/day)	Inflow Trend 7/87 (I,S,D)*	Approx. Total Vol. Removed By 7/87 (l)
A1X01	A1	10/84	2/85	3/85	0.05	0.025	S	24
A2X01	A2	7/84	2/85	2/85	0.12	0.027	S	27
A3X01	A3	11/84	1/85	2/85	0.03	0.022	S	21
BTPA1	S1620/W170	9/85	7/86	7/86	0.005	0.005	I	1
BTPA2	S1620/W170	9/85	7/86	7/86	0.01	0.002	I	1
BTPA3	S1620/W170	9/85	7/86	7/86	0.01	0.003	I	1
BTPB1	S1620/W170	9/85	7/86	7/86	0.002	0.002	I	0.4
BTPB2	S1620/W170	9/85	7/86	7/86	0.02	0.002	I	1
BTPB3	S1620/W170	9/85	8/86	8/86	0.003	0.001	I	0.4
BTPC1	S1620/W170	9/85	7/86	7/86	0.001	0.001	I	0.3
BTPC2	S1620/W170	9/85	8/86	8/86	0.008	0.002	I	0.7
BTPC3	S1620/W170	9/85	8/86	8/86	0.003	0.001	I	0.4
BX01	B	6/84	1/85	1/85	0.12	0.05	D	41
DH36	G	12/84	1/85	1/85	0.28	0.19	S	203
DH38	G	12/84	1/85	1/85	0.18	0.05	D	55
DH40	G	12/84	1/85	1/85	0.04	0.002	D	6
DH42	G	12/84	1/85	1/85	0.05	0.024	S	28
DH42A	G	12/84	1/85	1/85	0.2	0.08	D	109
DHP402A	S1950/E1330	10/86	12/86	12/86	0.001	Unknown	Unknown	33
IG201	2	3/83	3/83	11/84	0.05	0.01	D	86
IG202	1	4/83	4/83	11/84	0.08	0.01	D	78
L1S25	L1	4/84	6/85	8/85	0.02	0.01	D	11
L1S26	L1	4/84	6/85	8/85	0.004	0.002	I	1
L1S27	L1	4/84	7/85	8/85	0.007	0.004	I	3
L1S28	L1	4/84	7/85	8/85	0.001	0.001	I	0.2
L1S29	L1	4/84	7/85	8/85	0.8	0.3	D	119

TABLE 2-2
(continued)

BRINE ACCUMULATION SUMMARY FOR DOWNHOLES

Hole	Room or Location	Date Room Excavated	Date Hole Drilled	Date First Observed	Approx. Maximum Inflow (l/day)	Approx. Inflow 7/87 (l/day)	Inflow Trend 7/87 (I,S,D)*	Approx. Total Vol. Removed By 7/87 (l)
L1S30	L1	4/84	7/85	8/85	0.8	0.1	D	62
L1S31	L1	4/84	7/85	8/85	0.08	0.01	D	4
L1S32	L1	4/84	7/85	8/85	0.18	0.15	I	32
L1S33	L1	4/84	7/85	8/85	0.1	0.05	I	19
L1S34	L1	4/84	7/85	8/85	0	0	DRY	0
L1S35	L1	4/84	7/85	8/85	0	0	DRY	0.1
L1S36	L1	4/84	7/85	8/85	0.01	0.005	I	4
L1X00	L1	4/84	5/84	5/85	0.03	0.017	D	42
NG252	2	3/83	3/83	12/84	0.5	0.25	D	316

Data summarized and rounded from Appendices A and B.

* I = Increasing
S = Steady
D = Decreasing

The shallowest holes (BTPA1, BTPB1, and BTPC1) are open from the surface (floor of the drift) to their total depth of about 1.5 meters. This interval is immediately above, but not in contact with, the anhydrite marker bed MB139 (Figure 2-3). The next set of holes (BTPA2, BTPB2, and BTPC2) are cased and grouted through the shallow interval and are open through MB139, from a depth of approximately 1.7 through 3 meters. The deepest set of holes (BTPA3, BTPB3, and BTPC3) are cased and grouted through MB139 and open below it, from a depth of approximately 3 through 4.3 meters.

Excavation-induced stress redistributions result in the opening of fractures around the drifts, and these effects are exacerbated in the more brittle anhydrite beds close to the workings (Deal and Case, 1987; Bechtel National, Inc., 1986a). It was, therefore, expected that the interval open through MB139 would produce more brine, especially as time went on and the fractures continued to open. The data for the BTP holes for the time period before December 1986 tend to confirm this (Appendix A).

The shallow holes (BTPA1, BTPB1, and BTPC1) were all dry. As a group, the holes open through the MB139 marker bed (BTPA2, BTPB2, and BTPC2) produced the most brine (0.36, 0.42, and 0.26 liters, respectively), although individual holes open below MB139 (BTPA3, BTPB3, and BTPC3) produced nearly as much or more brine (0.38, 0.19, and 0.21 liters, respectively).

Brine sampling was suspended between early November 1986 and June 1987 as a result of mining activities that extended the W170 drift southward across this location. The collars of the observation holes were destroyed when the floor of the drift was lowered. In June 1987, when the holes were opened in preparation for resumption of sampling as part of the BSEP, brine was found in the holes. Part or all of that brine may be derived from construction-related water spread on the drift floor to control dust.

2.3.1.3 L1S Downholes in Room L1

An east-west row of twelve downholes numbered L1S25 through L1S36, each about 3.6 meters deep, were drilled near the north end of Room L1 (Figure 2-5) in June and July 1985. This line of holes is about 4.4 meters south of drillhole L1X00 (monitored as part of the BSEP since October 26, 1984). Individual holes are spaced approximately 0.6 meters apart in two groups of six (Figure 2-5). Deal and Case (1987) described situations in which closely-spaced drillholes (notably the MIIT holes in Room J and holes DH42 and 42A in Room G) displayed dramatically differing brine accumulation data which lead them to caution that "the great variation in inflow characteristics between locations only a short distance (a few meters, or in some instances, less than a meter) apart make the discussion of 'averages' or 'typical occurrences' difficult or misleading."

The L1S holes have been monitored as part of the BSEP since August 20, 1985 and show striking local variations in brine seepage between closely-spaced locations. Figure 2-5-D shows the liters of brine that were removed from each of these holes on December 10, 1985. Hole L1X00 is also shown on this figure for reference purposes, but the "liters removed" figure is not comparable to those obtained from the L1S holes because brine had been collected seven days earlier from L1X00 and the hole completely evacuated, whereas the L1S holes

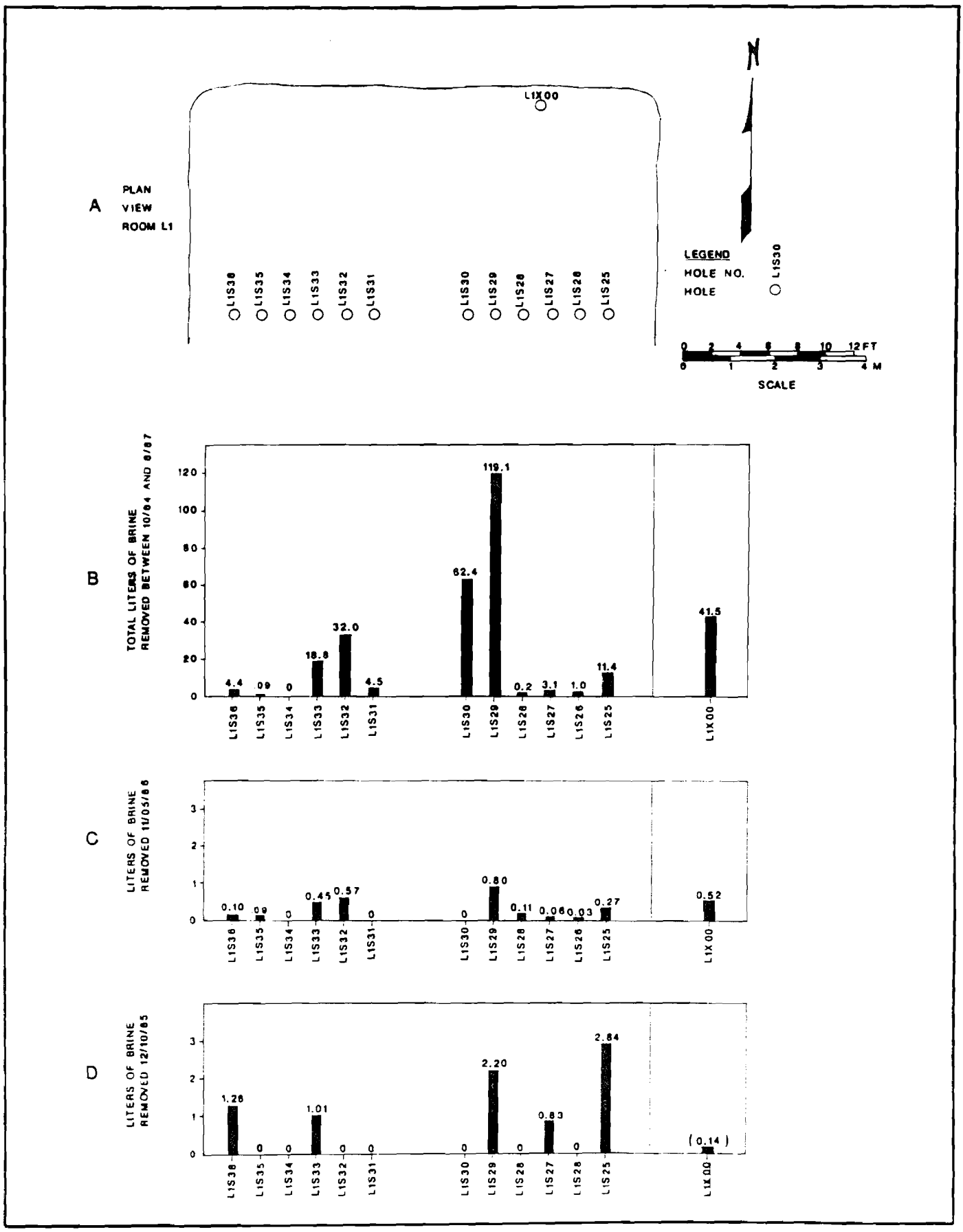


Figure 2-5.

Drillholes in the North End of Room L1

had not been previously evacuated and brine had been accumulating in them for a longer period of time. Comparing the amount of brine removed from the L1S holes on December 10, 1985 (Figure 2-5-D), it is apparent that dry holes are interspersed with holes that contained nearly 3 liters of brine.

Figure 2-5-C shows the volume of brine removed from these holes on November 5, 1986. The relative wetness or dryness is different than that shown in Figure 2-5-D, but again the variation between holes less than a meter apart and penetrating the same stratigraphic units is striking. Hole L1X00 is shown for reference purposes even though the volume figures may not be strictly comparable to those from the L1S holes.

Figure 2-5-B shows the total amount of brine removed from these holes during the BSEP monitoring through this reporting period. Two holes (L1S34 and L1S35) have not produced enough to measure using the standard BSEP techniques, while nearby holes have produced up to 119 liters (L1S29). Holes L1S28 and L1S30, which are 0.6 meters on either side of L1S29, have produced 0.2 and 62.4 liters, respectively.

It is unlikely that these variations are the result of unknown water or brine spills near the holes. Wet areas have not been noticed in this vicinity during monitoring activities. Additionally, some of these holes (Table 2-2 and Appendix A) have shown increasing accumulation trends during the later part of this reporting period, adding confidence that these figures reflect actual increased seepage rates of brine into these holes. The fact that the holes with the higher production figures and greater increases in accumulation rate tend to be near the center of the room, suggest that increased permeability (perhaps opening of fractures in anhydrite MB139) similar to that documented elsewhere at WIPP (Deal and Case, 1987; Bechtel National, Inc., 1986a) are playing an important role. Such increased permeability is expected to develop both more quickly and to a greater extent near the center of the room. Room L1 was excavated in April 1984. Increased seepage rates began to be noticed about 2.5 years later, in August and September 1986.

2.3.2 UPHOLES

If the brine seepage into upholes is sufficient to flow down the sides of the hole, moist areas may form on the back (roof). Highly visible salt crust buildups and salt stalactites can also form at the collar of the hole (Deal and Case, 1987).

Many of the upholes are now inaccessible, usually because they contain installed instruments, and it is not possible to determine the extent of salt buildup within them. If there is enough brine entering the upholes to run down the sides, it will usually flow around the instruments and be evident at the collar. Moisture entering open upholes tends to evaporate readily. Deal and Case (1987) discuss the collection and data analysis techniques used for the upholes, and although a variety of techniques have been used to eliminate the circulation of drying air into the holes, none have been completely successful. Although some of the irregularity and lower seepage rates measured for the upholes (Table 2-3; Appendices A and B) reflect the loss of moisture by dispersion from the hole collar, evaporation into the repository

TABLE 2-3

BRINE ACCUMULATION SUMMARY FOR UPHOLES

Hole	Room or Location	Date Room Excavated	Date Hole Drilled	Date First Observed	Approx. Maximum Inflow (l/day)	Approx. Inflow 7/87 (l/day)	Inflow Trend 7/87 (I,S,D)*	Approx. Total Vol. Removed By 7/87 (l)
A1X02	A1	10/84	3/85	3/85	0.04	0.03	I	14
A2X02	A2	7/84	2/85	2/85	0.04	0.001	DRY	5
A3X02	A3	11/84	1/85	2/85	0.02	0	DRY	4
BTPA4	S1620/W170	9/85	7/86	7/86	0	0	DRY	0
BTPA5	S1620/W170	9/85	7/86	7/86	0	0	DRY	0
BTPB4	S1620/W170	9/85	7/86	7/86	0	0	DRY	0
BTPB5	S1620/W170	9/85	7/86	7/86	0	0	DRY	0
BTPC4	S1620/W170	9/85	8/86	8/86	0.03	0.006	D	4
BTPC5	S1620/W170	9/85	8/86	8/86	0	0	DRY	0
BX02	B	6/84	2/85	2/85	0.02	0	DRY	2
DH15	N1104/E1688	3/84	3/84	5/86	0.009	0.003	D	3
DH35	G	12/84	1/85	2/85	0.02	0	DRY	4
DH37	G	12/84	1/85	2/85	0.01	0	DRY	1
DH39	G	12/84	1/85	2/85	Trace	0	DRY	0
DH41	G	12/84	1/85	2/85	Trace	0	DRY	0
DH215	S1960/E153	1/83	2/83	4/84	0.09	0.007	I	18
DHP401	S1950/E1330	10/86	1/87	3/87	0.008	0.006	I	1

Data summarized and rounded from Appendices A and B.

* I = Increasing
S = Steady
D = Decreasing

atmosphere, and temporary blockage of the brine collecting systems, the data collected through this reporting period indicate that the upholes typically produce less brine than do the downholes.

Most of the upholes monitored are dry, but three (A1X02, DH215, and DHP401) have increasing seepage rates. Although most of these holes have been discussed in detail by Deal and Case (1987), several have been added to the BSEP monitoring program since the period discussed in that report.

2.3.2.1 Uphole DHP401 at the East End of S1950 Drift

This uphole is a 15-meter-long observation hole drilled in the southeastern corner of Waste Storage Panel 1, above previously-described downhole DHP402A. This hole was completed in January 1987. Data continues to be obtained and the seepage into this hole will be discussed more fully in a later BSEP report.

2.3.2.2 BTP Upholes at S1620/W170

In addition to the nine downholes drilled in 1986 (described in Section 2.2.1.2 of this report), six upholes were drilled at the same time in the same alcove (Tables 2-1 and 2-3). They were also designed to evaluate relative variations in brine seepage from different stratigraphic horizons and were drilled as two sets of three holes. The shallow holes (BTPA4 and BTPA5) are open for the first 1.4 to 1.6 meters above the back and penetrate the halite units below, but not including, anhydrite "b" and clay G. Two holes with intermediate lengths (BTPB4 and BTPB5) are cased and grouted to about 2 meters and are open from there to about 3 meters, through the zone that contains anhydrite "b" and clay G. The deepest holes (BTPC4 and BTPC5) are cased and grouted through the anhydrite and clay zone and are open from about 4.2 to 5.5 meters in the clear halite between anhydrites "a" and "b". All of the holes, except for one of the two longest (BTPC5), are dry. These holes were sealed at the collar, and it is unlikely that evaporation into the repository atmosphere was significant in reducing apparent brine volumes accumulated by the collecting system.

2.3.2.3 Uphole DH15 in N1100 at the South End of Room D

Uphole DH15 was drilled in March 1985. In May 1986, it was noticed that this hole was producing small amounts of brine. It is located near, but not in, the heated experimental rooms. It does not contain any instrumentation and has not been grouted. This is, therefore, a desirable location for the collection of brine for chemical analysis. A collecting device was installed to facilitate sampling, and the hole was added to those routinely monitored as part of the BSEP.

2.3.3 HORIZONTAL HOLES

An array of horizontal holes were drilled into the north rib of the S1950 drift at about E100. The holes were drilled as part of the BSEP to investigate any easily-observed variability in seepage from the different stratigraphic horizons exposed in the facility-level excavations. Figure 2-6 is a sketch showing the location of the holes and their relationship to the stratigraphy. The detailed stratigraphy of the facility level is shown in Figure 2-2. The

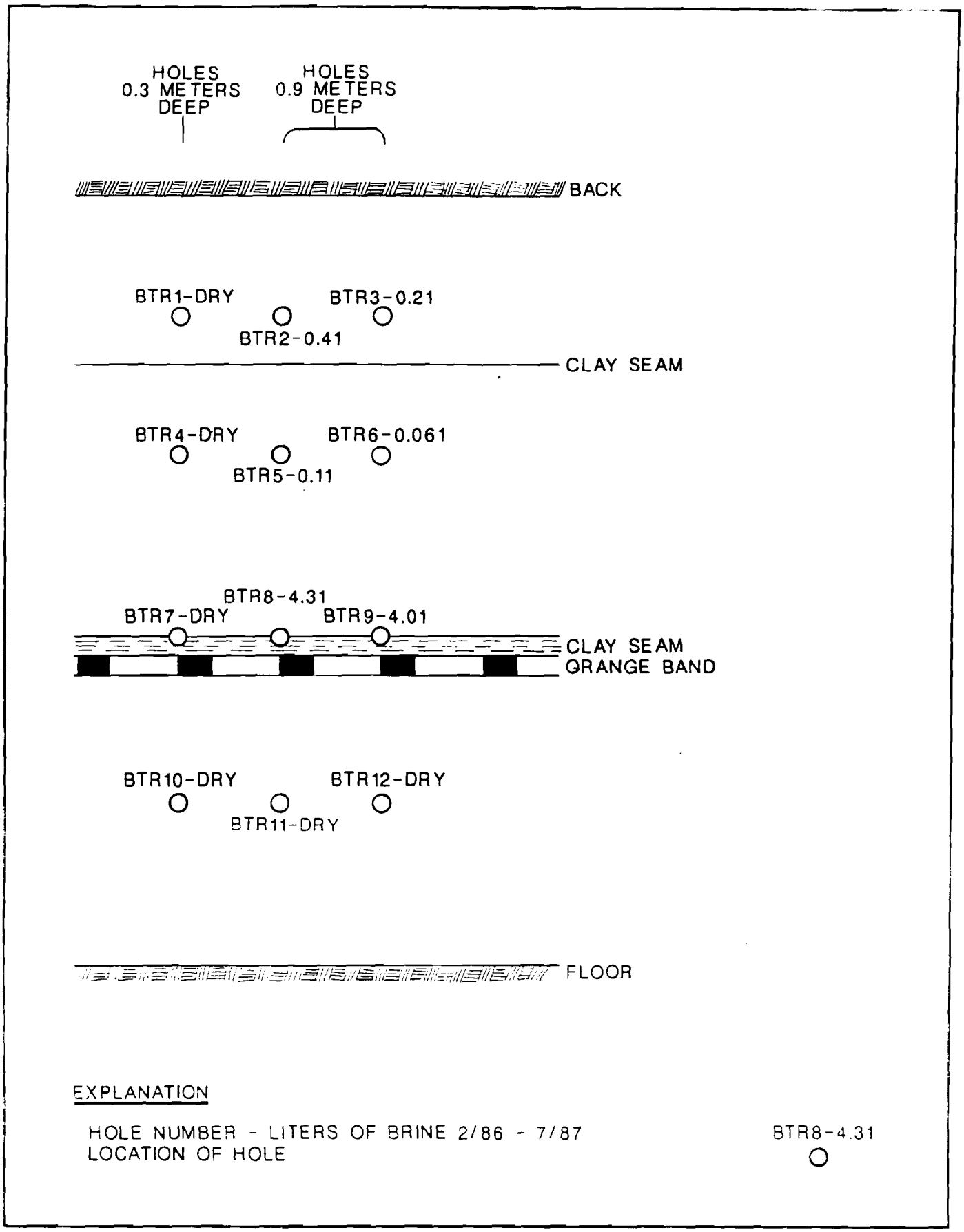


Figure 2-6.

Sketch of the North Rib at S1950/E100
Showing the Location of the BTR Holes

holes, numbered BTR1 through BTR12, are inclined slightly below horizontal so that the end of the hole is lower than the collar, and are drilled to either 0.3 or 0.9 meter depths.

The holes were instrumented with suction soil moisture collecting devices (Deal and Case, 1987), and the opening of the holes were sealed to prevent evaporation and loss of brine. Summary data is presented in both Figure 2-6 and Table 2-4. All of the shallow holes remained dry and did not produce measurable quantities of brine. The amount of brine seeping into the deeper holes appears to be related to the stratigraphy. Holes BTR8 and BTR9 both produce much more brine than any of the other holes, and both penetrate the orange marker band and the clay seam above it. The sketch shown as Figure 2-6 shows the collar of these holes as located above the orange band. This is correct, but since the holes are slightly tilted, the length of the holes penetrate the orange band as well as the clay seam. The next largest brine production is from holes that are drilled in the argillaceous halite near the back. The clear halite above the orange band produces much less brine, and the holes drilled near the floor are essentially dry.

A 36-inch diameter horizontal hole, WWC1, located on the south side of the N1420 drift, across from Room C1 at the experimental room level, was photographically monitored to document the development of salt crusts. Observations made at WWC1 will be reported in a later BSEP document.

2.4 DAMP OR WET AREAS ON FLOORS

Moist areas have been observed on the floor of the WIPP workings and have previously been discussed by Deal and Case (1987). Presently, the WIPP excavations exceed 14 kilometers in length (Figure 2-1), but a sizeable, persistent, moist area has been observed in only one location.

Room G was excavated in November 1984. In August 1985, a small area of damp muck along N1100 was noticed on the floor at approximately E1140, adjacent to the south rib. In November 1985, the damp area had expanded in size to about 5 meters east-west and 4 meters north-south on the floor of the drift. The bedrock salt floor at this location is covered with several inches of partially-consolidated salt muck, which had become saturated with brine. The brine was evaporating into the repository atmosphere, forming a salt crust, and cementing the muck. On November 26, 1985, a small pit was excavated by hand through the salt muck, down to the level of the bedrock. Brine inflow measurements were made by evacuating this small sump and resulted in only partial dewatering of the saturated muck on the floor of the drift. The resulting numbers calculated for inflow in terms of liters per day (Appendix A) are quite irregular as a result of incomplete and inconsistent dewatering of the muck, but do provide minimum figures for the seepage at this location. It appears that the total seepage into the drift at this location is on the order of 0.5 liters per day.

TABLE 2-4

BRINE ACCUMULATION SUMMARY FOR
HORIZONTAL HOLES AT S1950/E100

DRIFT EXCAVATED: 1/86
HOLES DRILLED: 2/86
HOLES FIRST OBSERVED: 3/86

Hole	Approx. Maximum Inflow (l/day)	Approx. Inflow 7/87 (l/day)	Inflow Trend 7/87 (I,S,D)*	Approx. Total Vol. Removed By 7/87 (liters)
BTR1	0	0	DRY	0
BTR2	0.015	0.0002	S	0.35
BTR3	0.001	0.0005	S	0.19
BTR4	0	0	DRY	0
BTR5	0.001	0.0005	S	0.12
BTR6	0.001	0.0002	S	0.06
BTR7	0	0	DRY	0
BTR8	0.04	0.008	D	3.78
BTR9	0.02	0.003	D	3.75
BTR10	0	0	DRY	0
BTR11	0.001	0	DRY	0.1
BTR12	0.0004	0	DRY	0.01

Data summarized and rounded from Appendix A.
Hole locations shown in Figure 2-6.

* I = Increasing
S = Steady
D = Decreasing

3.0 PRELIMINARY GEOCHEMICAL ANALYSES OF WIPP UNDERGROUND BRINES

The following discussion of the chemistry of the WIPP brines and the geochemical implications of that chemistry is preliminary in nature. There are difficulties inherent in working with saturated, high-ionic strength brines. Additionally, it has not been easy to obtain samples that are clearly chemically representative of naturally occurring Salado Formation brines. The introduction of fresh water, brines of other composition (as drilling fluids and from the overlying Rustler Formation), and soluble materials (a variety of grouting compounds and materials involved with many types of instrumentation) has occurred both intentionally and unintentionally as part of construction and experimental activities (Deal and Case, 1987).

Most of the previous geochemical work pertinent to the WIPP brines have concentrated on fluid inclusions in the halite (summarized in Deal and Case, 1987, Section 4.1.2). Stein and Krumhansl (1986) have previously investigated some non-inclusion WIPP brines.

Some of the brine occurrences monitored as part of the BSEP studies have been repeatedly bailed over a sufficiently long period of time so that any contamination resulting from compounds introduced during drilling is considered minimal. Some of these locations remain open holes and have never had instrumentation or grout introduced into them. Additionally, some locations have remained free from construction and experimental activities that are likely to have introduced other foreign materials or fluids into the collecting locations. We think that the brines collected as part of the BSEP from these locations reasonably represent the brines that occur in the Salado Formation in the near-field environment of the WIPP facility excavations. In most instances, the brines collected from drillholes (most less than 15 meters in length) are the result of mixing brine from discrete sources (i.e., the brine collected from the bottom of a 15-meter drillhole may have come from several different stratigraphic horizons). They are likely to be representative of the composition of brine that might come in contact with waste emplaced in the facility. The locations considered to be chemically representative of such brines include the upholes and downholes monitored during the BSEP in Rooms A1, A2, A3, B, and G.

Brine from other locations, such as drillhole DH215, have been monitored as part of the BSEP but may have unrepresentative chemical compositions because they have instruments (such as sonic-probe extensometers) installed in them which may be a source of contamination, especially of iron. Grout is a major source of actual and potential contamination, clearly affecting the chemistry of the brines accumulating in inclinometer holes IG201 and IG202 (see the detailed discussion of the history of those holes in Deal and Case, 1987, Appendix D).

Some brine samples were collected previously as part of the BSEP. They were only analyzed for major constituents and have not been reported. The data that is presented in Table 3-1 are for samples collected in April and June 1987, that were analyzed both for major elements and some trace elements. This data represents the first of several planned data releases. Sample collection, analysis, and interpretation are on-going activities that will be presented in

subsequent reports and data releases. Planned activities will initially focus on defining processes that are controlling brine composition, and the identification and interpretation of spatial trends in the data.

TABLE 3-1

CHEMICAL ANALYSES OF BRINE SAMPLES COLLECTED 4/87 AND 6/87

HOLE	pH	S.G. g/cc	HCO3 mg/L	TDS mg/L	Br mg/L	Cl mg/L	F mg/L	SO4 mg/L	Al mg/L	As mg/L	Ba mg/L	Ca mg/L	Fe mg/L	Mg mg/L	Mn mg/L	K mg/L	Si mg/L	Na mg/L	Sr mg/L	%CHARGE BALANCE
DH-36	6.20	1.215	664	379,000	2,146	195,610	6.1	16,100	0.039	0.009	<0.07	325	<0.42	19,100	0.96	18,200	2.19	84,300	1.36	-1.37
DH-36	6.10	1.222	668	372,000	1,895	191,700	5.4	15,600	0.087	0.011	<0.07	320	<0.42	19,300	1.00	18,300	2.12	84,300	1.41	-0.14
DH-38	6.20	1.219	702	378,000	2,706	189,430	10.3	15,500	0.148	0.004	<0.07	322	<0.42	18,600	0.95	18,200	2.28	84,300	0.87	-0.19
DH-42A	6.25	1.222	672	376,000	2,274	195,610	10.8	15,600	0.107	0.003	<0.07	324	<0.42	18,900	0.98	19,100	2.29	85,600	0.91	-0.75
DH-42A	6.05	1.221	693	377,000	2,163	193,120	5.6	15,500	0.182	0.003	<0.07	334	<0.42	18,400	0.96	18,200	2.14	84,300	0.87	-1.17
NG252		1.224	640	377,000	1,154	195,000		16,800				302		21,000		16,900	<2.0	82,400	1.67	-0.89
NG252		1.223	546	377,000	871	197,000		16,200				302		20,600		16,900	<2.0	82,400	1.78	-1.50
NG252		1.222	650	377,000	1,137	197,000		17,300				302		20,900		16,900	<2.0	81,800	1.72	-1.75
NG252	6.20	1.220	613	379,000	2,019	193,120	7.5	16,100	0.582	<0.001	<0.07	299	17.6	20,400	1.39	16,800	<1.1	79,400	1.65	-2.01
NG252	6.10	1.220	734	376,000	2,093	190,070	7.0	16,700	<0.03	<0.001	<0.07	307	49.2	20,000	1.37	16,900	<1.1	79,400	1.65	-1.67

4.0 PRELIMINARY EVALUATION OF MOISTURE CONTENT OF ROCKS EXPOSED IN THE WIPP FACILITY EXCAVATIONS

Moisture does occur in the Salado Formation at the WIPP site. Deal and Case (1987) discuss those occurrences and conclude that moisture is present in the WIPP facility horizon rocks principally in:

- Hydrous minerals (mostly gypsum and clays)
- Fluid inclusions in bedded salt
- Intergranular porosity
- Open fractures

The focus of the BSEP is on the moisture that migrates into the underground openings (excavations and drillholes), which are at atmospheric pressure and approximately 27°C. Deal and Case (1987) cited previous studies and used the figures of 0.1 to 0.5 weight percent as the approximate range of values for the moisture content of the Salado Formation at WIPP. Most of these previous studies involved heating samples to elevated temperatures and measuring the resultant weight loss.

The present study was undertaken to refine those numbers and to determine what measurable variations there are in the moisture content of the Salado in and near the WIPP excavations. Issues raised during Phase I of the BSEP (Deal and Case, 1987) include:

- What is the aerial and stratigraphic variation in moisture content?

- Are there distinct locations of some brine sources and are they correlated with the stratigraphy of the Salado Formation?

Characterizing the moisture content of the rocks exposed in and near the WIPP excavations is ongoing and may provide answers to these questions. Samples taken from the facility may be subject to moisture changes due to dilation and airflow during drilling and mining. Moisture loss after sampling, during the present study, was minimized by careful handling procedures.

4.1 PREVIOUS WORK

The Geological Characterization Study (Powers et al., 1978) and the Site Validation Program [(SVP) Black et al., 1983] activities of the Site and Preliminary Design Validation (SPDV) program were the preliminary studies evaluating the moisture content of the WIPP facility host rock. They have investigated the brine content in the facility interval strata by addressing the WIPP site qualification criteria (Black et al., 1983). Samples for these studies were collected at the facility horizon from both surface and subsurface exploration core holes.

4.1.1 GEOLOGICAL CHARACTERIZATION

The Geological Characterization Studies (Powers et al., 1978) included differential thermal analyses (DTA) and thermogravimetric analyses of samples ground to smaller than 100 mesh. DTA is a method used to define the temperature at which thermal reactions take place in a material when it is heated

continuously to an elevated temperature (Grim, 1978). Clay materials will show endothermic reactions due to dehydration and to loss of crystal structure, and exothermic reactions due to new-phase development. The results are usually plotted in the form of a continuous curve, with the thermal reaction, in this case, resulting in weight loss, presented as a function of temperature.

Thermogravimetric analysis is a method of determining the differential weight loss as a sample is heated at a uniformly increasing temperature. The heat is increased at a predetermined rate over time. Discrete ranges of sample weight reactions may be observed. It is less sensitive than the DTA method, but is generally felt to be more reproducible (Grim, 1978).

Powers et al. (1978) described a number of different responses to heating by samples from coreholes AEC No. 7 and No. 8. Depending on sample constituents, moisture loss at 70°C ranged from zero to 1.9 percent by weight, with values typically in the 0.20 to 0.30 percent range. The range of weight loss at 102° ±5°C was from zero to 3.5 percent, with the majority of samples showing less than 0.5 percent weight loss. Heating to 70°C was designed to measure absorbed water, recognizing that gypsum dehydrates at this temperature (Powers et al., 1978). Most samples showed very little water loss between 200 and 300°C.

Thermogravimetric analyses were conducted on 35 selected samples from corehole ERDA No. 9. Figure 4-1 illustrates the weight losses experienced for these samples. Approximately half the specimens are represented by Curve A (0.5 percent weight loss). Two samples are represented by Curve C. The range of moisture content in percent by weight was 0.1 to 1.7 percent with an average of 0.36 percent (Powers, et al., 1978) as calculated from fluid inclusion volume determinations using petrographic analyses. A certain bias may be expected in these analyses due to substantial and unpreventable loss of fluid in the coring and disking process. In addition, petrographic techniques are insensitive to thin layers of intergranular brines.

4.1.2 SITE VALIDATION PROGRAM

The SVP was initiated, in part, to address the WIPP site qualification criteria of: 1) the host rock having a relatively low brine content determined to an adequate level of satisfaction for heat-producing waste experiments; and 2) verifying that the disposal stratum did not contain more than 3 percent moisture. The measurement of moisture content in the facility interval strata was specified in the program plan guidelines (U.S. DOE, 1982). To address these criteria, sampling and testing was conducted on the rock salt in the facility exploratory and ventilation shafts, and the access and exploratory drifts.

In November and December 1982, and January 1983, a total of 24 samples were collected from the facility horizon (Figure 4-2). A wide spatial distribution of samples were obtained in the underground from the mined faces and horizontal coreholes. The objective of the analyses of these samples was to provide the baseline brine content data for the facility horizon host rock and to satisfy the site criteria (Black et al., 1983).

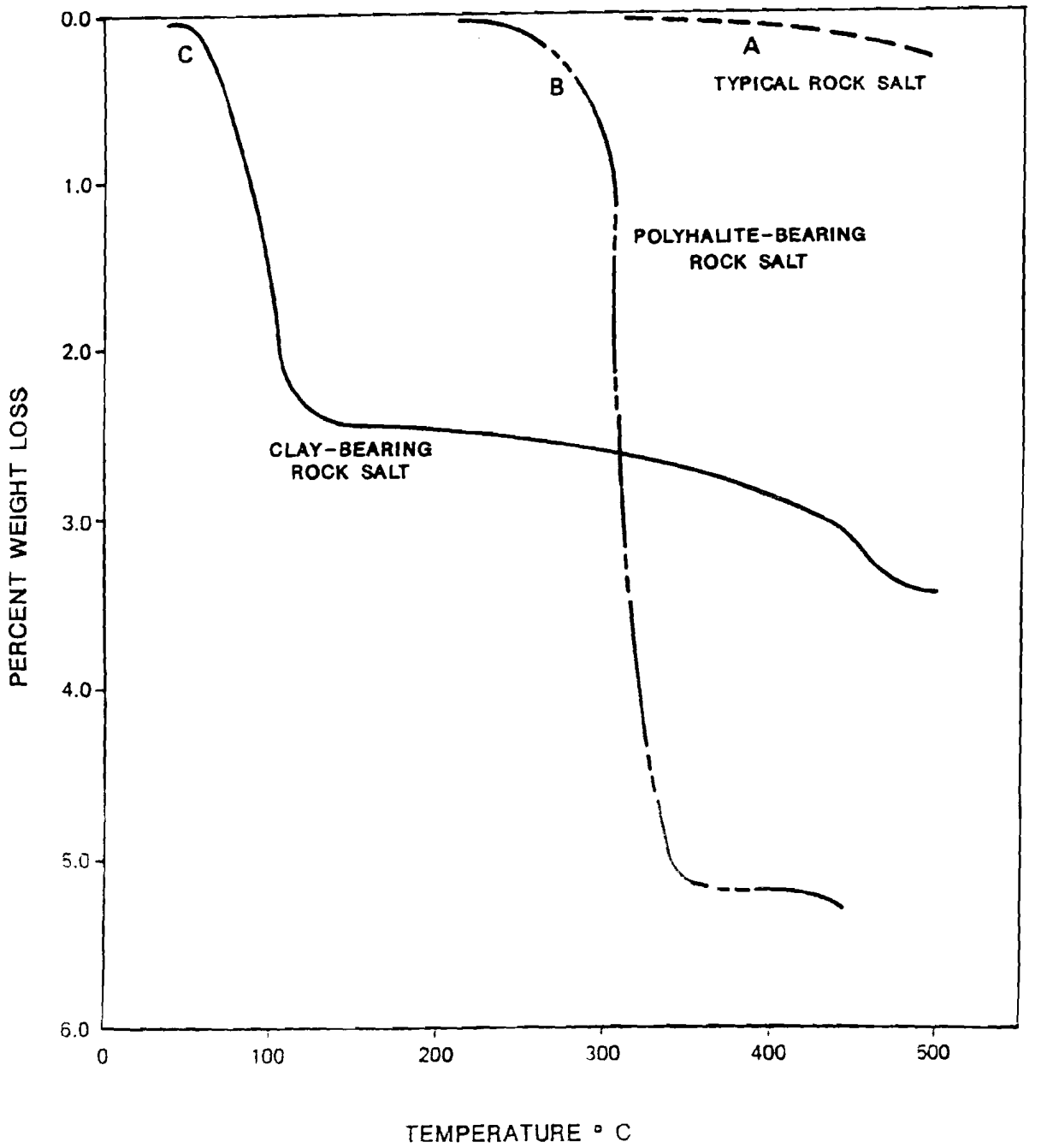


Figure 4-1.

Typical Weight Loss Curves for ERDA #9

(From Powers et al., 1978)

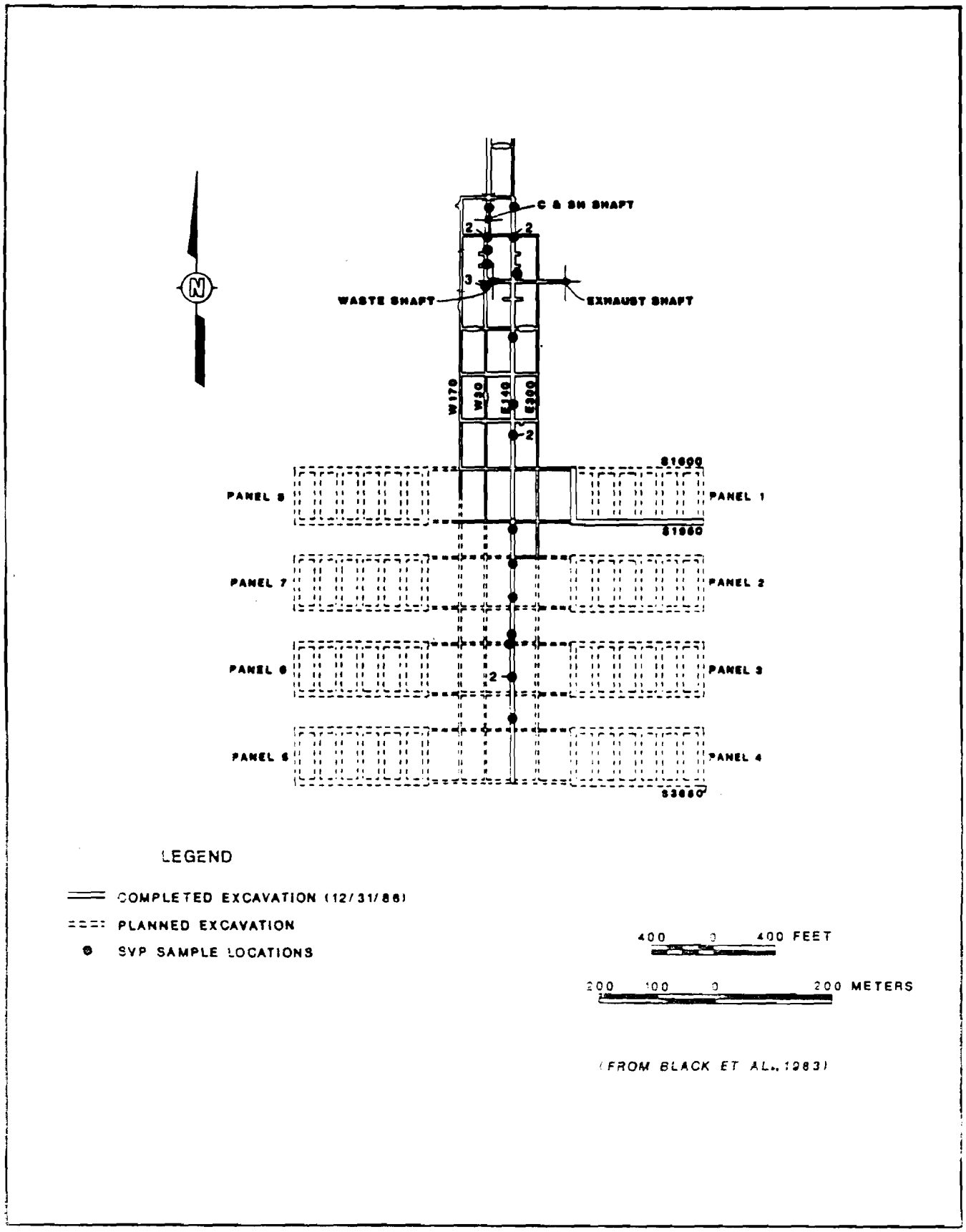


Figure 4-2.

Site Validation Programs Sample Locations
Twenty-Six Samples Collected 11/82, 12/82, and 1/83

(From Black et al., 1983)

The principal analytical method for brine content determination was by thermogravimetric analysis (TGA). The primary limitations of the TGA were felt to be (Black et al., 1983):

- The reported relative mass loss represents discrete volatilization events in the specimen and may not be used directly to indicate free moisture content.
- The sensitivity of the thermogravimetric balance is approximately 1 microgram. Reproducibility of results is 10 micrograms. The hardware for these low limits is designed to accommodate samples no greater than a few tens of milligrams.
- The larger grain sizes can lead to omission of one or more volatile phases in discrete grains. However, the omission is generally of phases containing bound water and not water in free solution in the specimen.
- Rupturing of fluid inclusions may blow solid material off the scale pan during decrepitation, biasing the mass loss values.
- Preparing granulated samples may account for a loss of some intergranular and intragranular free aqueous solution depending on the fraction size of the crushed specimen.

The thermogravimetric analyses in the SVP studies have indicated most of the free water is liberated from the rock salt in the range of 25 to 250°C (Black et al., 1983). Table 4-1 summarizes the results for the 26 specimens tested. Rupture of the intragranular fluid inclusions occurs in the range of 250 to 400°C. Dehydration of illite and of the smectites also occurs between 25 and 250°C.

Water releases by the dehydration of polyhalite and illite in the range of 250 to 400°C, as well as rupturing of fluid inclusions, was considered as part of the free water content in this analysis. It was felt that any experimental heating of the rock salt during in situ testing would likely mobilize water from the clay minerals and polyhalite and should be considered in the baseline data. The average mass loss for each of the temperature ranges evaluated follows (Black et al., 1983):

25 to 250°C	0.10%
250 to 400°C	0.12%
400 to 600°C	0.34%

4.1.3 OTHER ANALYSES

Hohlfelder (1981) took samples from the Upper Salado Formation (McNutt Potash Zone) with the objective of heating larger specimens in the range of 250 to 425°C. The samples were approximately 400 grams and were comprised predominantly of halite, kainite, polyhalite, and sylvite. The average percentage weight loss for the nine specimens to 424°C was determined to be 0.51 percent. These results are similar to the range experienced for 20-gram samples heated above 240°C in a study also conducted by Hohlfelder (1979). Both

TABLE 4-1

RELATIVE WEIGHT LOSS IN DISCRETE TEMPERATURE INTERVALS
(From Black et al., 1983, Supporting Documentation, Table 2)

	Percentage Mass Loss		
Specimen No.	25°C to 250°C	250°C to 400°C	400°C to 600°C
WIPP-FH-1	nil	0.17 dec.*	0.11
WIPP-FH-4	0.02	0.18	0.08
WIPP-FH-6A	0.04	0.33	0.08
WIPP-FH-6B	0.19	nil	0.97
WIPP-FH-6B2	0.03	0.03	0.05
WIPP-FH-10	0.04	0.03	0.40 dec.
WIPP-FH-11	0.08	nil	0.21
WIPP-FH-14	nil	0.11 dec.	0.08
WIPP-FH-16	0.03	nil	0.32
WIPP-FH-20	0.15	0.08	0.45
WIPP-FH-24	0.02	0.09	1.40 dec.
WIPP-FH-26	0.01	0.02	0.05
WIPP-FH-27	0.04	0.19	0.15
WIPP-FH-28	0.22	0.27	0.33
WIPP-FH-31	0.13	0.53	0.12
WIPP-FH-32	0.22	0.09	0.53
WIPP-FH-33	0.22 dec.	0.08	0.28
WIPP-FH-34	0.08	0.06	0.18
WIPP-FH-35	0.01	nil	0.04
WIPP-FH-36	0.07	0.05	0.06
WIPP-FH-37	0.26	0.11 dec.	0.39
WIPP-FH-40	0.04	0.13 dec.	0.28 dec.
WIPP-FH-43	nil	0.37	0.49
WIPP-FH-45	0.27	0.11	1.08
WIPP-FH-48	0.11	0.14 dec.	0.19 dec.
WIPP-FH-49	0.20	0.05	0.60

*dec. = decrepitation

studies indicated a weight loss of less than 0.08 percent for temperatures below 230°C; however, the larger samples lost much less than the smaller samples for the same temperature range.

Sandia National Laboratories, in their ongoing heated room experiments, continues to make in situ brine observations and conduct laboratory analyses of moisture content on samples collected in and near the repository horizon. Recent laboratory analyses of samples collected from experimental room A-1 indicate a free water content in the range of 0.1 to 3.0 percent by weight. Water content was reported to be directly related to the clay minerals in the specimens and the total insoluble residue (Progress Report, April 30, 1987; SNL report in progress).

4.2 BSEP MOISTURE CONTENT ANALYSES

The Brine Sampling and Evaluation Program (BSEP) initiated a study in June 1986 (expanded in January 1987) that, in some respects, is a continuation of the previously described brine content evaluations. The physical sample collection plan is an attempt to quantify whether a stratigraphic and/or lateral variation exists in the in situ salt moisture, and to document, to a reasonable degree of certainty, the moisture content at various locations in the waste panel area of the WIPP underground.

The moisture content measurements of the host rock salt are based on the easily moved fluid content in the low range of temperatures (25 to 250°C) defined in the previous studies (Powers et al., 1978; Black et al., 1983). The "easily moved" fluid, defined as "that fluid contained in the rock which can flow through interconnected pore spaces and existing fractures," is not bound as intragranular inclusions, is easily driven off by heat, and is not chemically bound in the specimen. It is this easily moved fluid that is likely to flow toward the excavation under mining-induced, transient pressure gradients.

This section provides the method of analysis and a preliminary evaluation of the on-going sampling.

4.2.1 METHODOLOGY

Initial core samples were collected from vertical holes drilled from the facility horizon in June and July 1986. In January, February, and April 1987, ten sets of six samples each were collected at shallow depths (15 cm) from the excavation at the facility horizon in the waste panel areas. Figure 4-3 shows the locations of these samples. Sample locations for horizontal coreholes at the facility horizon were placed so as to obtain representative samples of the rocks exposed in the vicinity of the facility waste panels. Figure 4-4 shows the relationship of individual samples to the stratigraphy for each of the moisture content rib (MCR) locations.

Samples from the rib coreholes were obtained by dry drilling with a single thin-walled diamond core barrel. The cores were 4.13 cm in diameter, and approximately 15 cm long. Specimens were placed in moisture-tight containers until the analyses were conducted, as per WIPP Procedure WP 07-411 "Rock Sample Collection at the WIPP Facility."

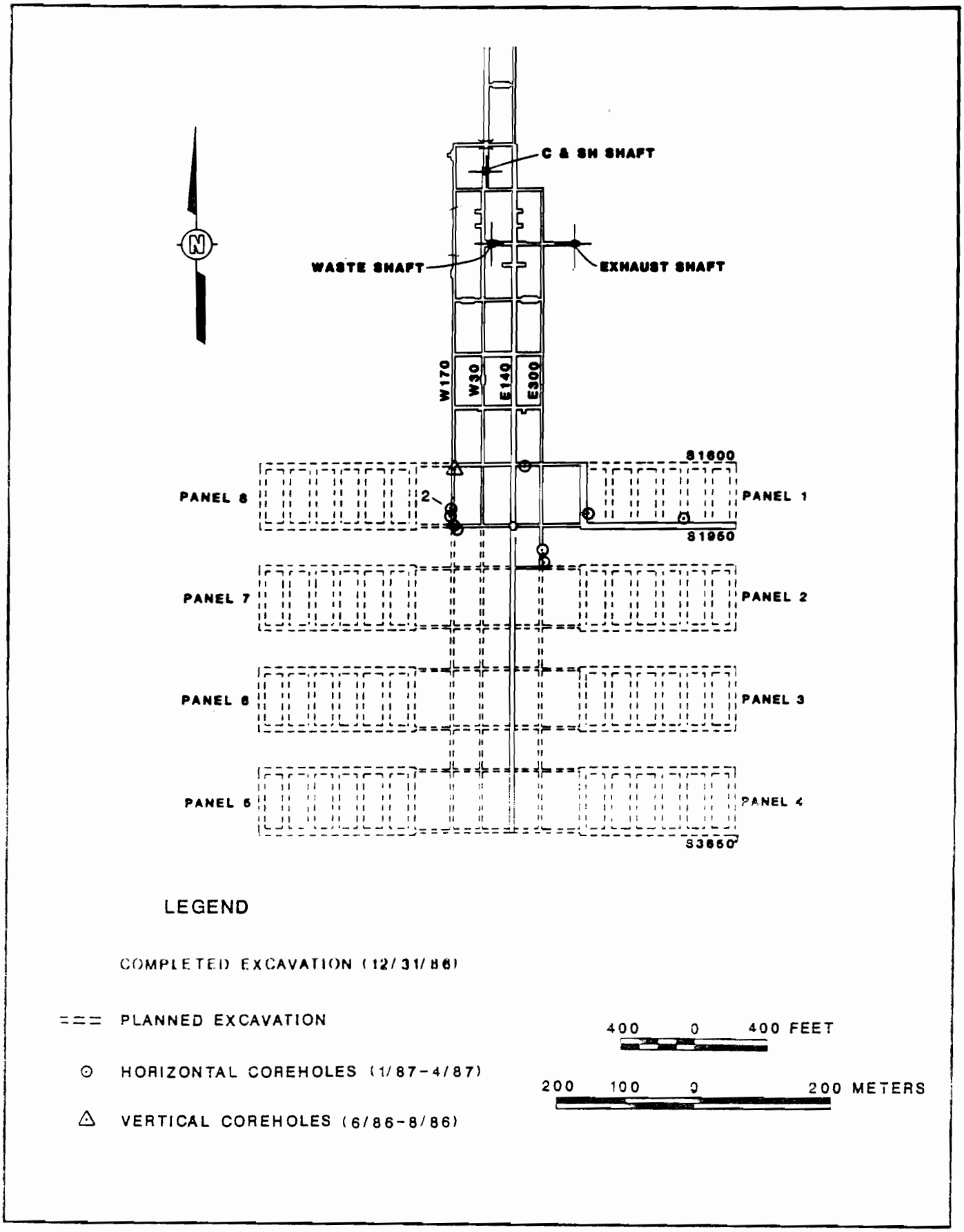


Figure 4-3.

BSEP Moisture Sample Locations
June 1986 through April 1987

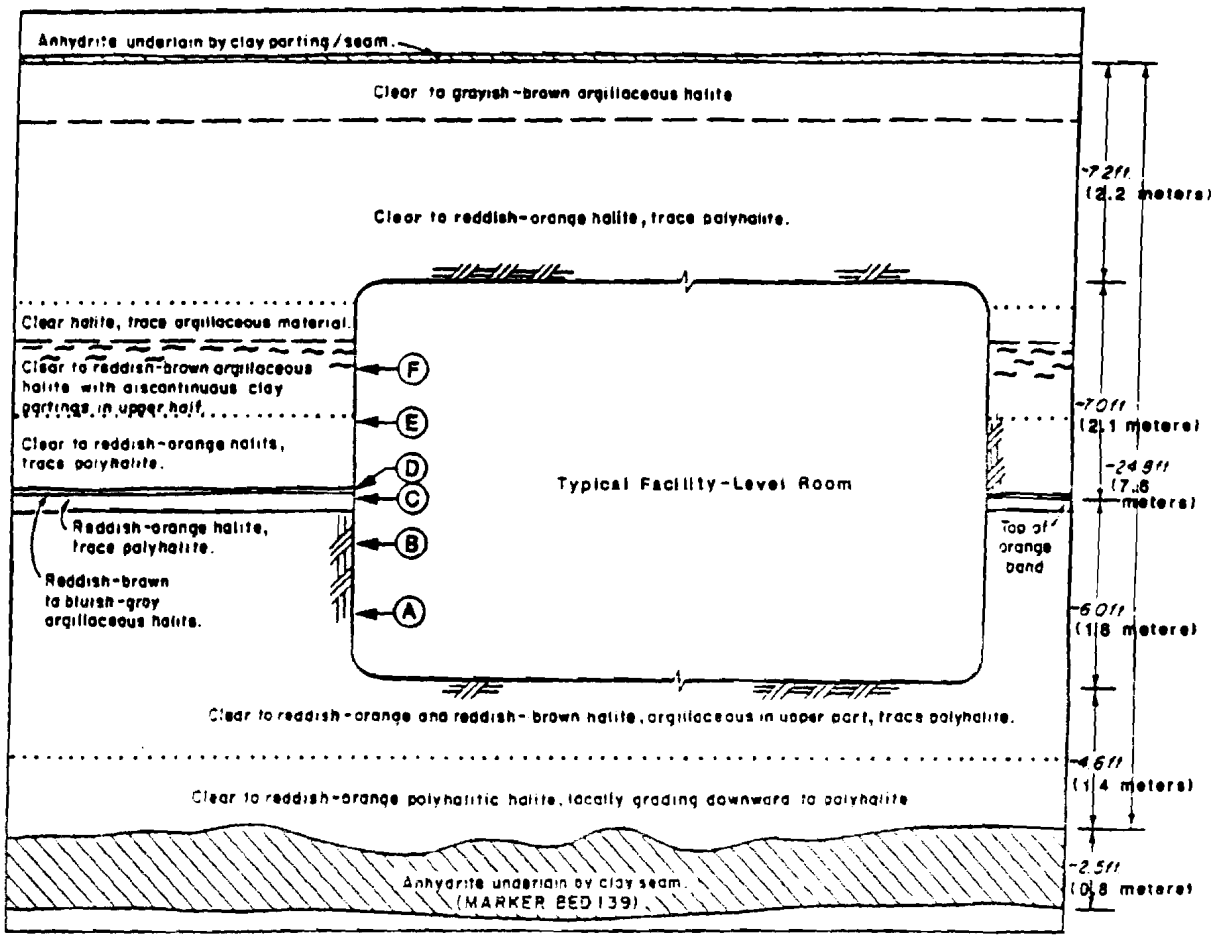


Figure 4-4.

Relationship of Sample Location and Stratigraphy

Moisture determinations to-date have been conducted on samples that are as intact as possible, as obtained from the coring process. They have been heated to 95 and 150°C, as per WIPP Procedure WP 07-412 "Measurement of Fluid Content in Samples Taken from the WIPP Facility Level Rocks." As shown from the previous studies, this temperature range was considered to be within the range from which most intergranular free water is liberated, but well below the temperature necessary to cause decrepitation of the sample and rupture of intragranular fluid inclusions.

A rock containing free and bound water will loose water at discrete temperatures depending on how tightly bound the water is in the specimen. Thus, free interstitial water will be lost at low temperatures; water of hydration will be lost at higher temperatures. Specific hydrous minerals, such as clays and gypsum, will have characteristic dehydration temperatures. In this instance, we are attempting to measure "easily moved" moisture, not to drive off water of hydration or to identify unknown minerals.

The complication encountered in applying this method to specimens containing fluid inclusions is that water loss is observed over a wide range of temperatures depending on sample preparation techniques (i.e., fraction size of sample). Thus, it may not be possible to accurately separate the effects of weight loss due to free water, and weight loss due to bound water. However, in the temperature range selected (95 to 150°C) we believe the measured weight loss is representative of the free water that is lost.

4.2.2 RESULTS

In the current BSEP investigation, 101 samples were analyzed. Sixty of these samples came from rib locations, the remainder from vertical coreholes drilled from the facility excavation. As was shown in Figure 4-4, rib samples were selected to represent correlated lithologies at various facility locations. For example, the sample designated "C" always represented the "orange marker band" at mid-height in the excavation and "D" the argillaceous halite interval just above the marker band. It was expected that samples most likely to vary in moisture content were A, B, and F due to the more variable nature of the upper and lower stratigraphic boundaries and because the moisture content may be directly related to the occurrence of clay in the sample.

Table 4-2 summarizes the percent weight moisture content for the sixty rib samples that were analyzed. The variation expected in specimens A, B, and F can be seen in both Table 4-2 and Figure 4-5. A portion of specimen MCR-6C intercepted the thin clay seam above the orange marker band, which accounts for the order of magnitude higher moisture content shown. Finally, Table 4-2 indicates that additional heating to 150°C results in a 0 to 20 percent increase in the measured weight loss above the moisture lost when the samples were heated to 95°C. This may be an indication that the clay minerals were dehydrating.

Figure 4-6 shows the range of the moisture content determined for each lithology sampled (A through F). The upper limits are typically skewed by single samples, as indicated by the low average for each range. If the clay-rich sample MCR-6C is ignored, there is a very narrow moisture-content range for C samples. This suggests a high confidence in predicting moisture for the

TABLE 4-2.

MOISTURE CONTENT OF SIXTY RIB SAMPLES
COLLECTED IN JANUARY, FEBRUARY, AND APRIL 1987
(CUMULATIVE PERCENT WEIGHT LOSS)

		MCR 1	MCR 2	MCR 3	MCR 4	MCR 5	MCR 6	MCR 7	MCR 8	MCR 9	MCR 10
A	95°	0.28	1.10	0.41	0.12	0.37	0.65	0.99	0.35	0.67	2.15
	150°	0.33	1.20	0.45	0.12	0.48	0.71	1.00	0.38	0.74	2.30
B	95°	0.25	1.20	0.63	0.54	0.34	0.26	0.31	2.36	0.68	0.35
	150°	0.29	1.20	0.70	0.57	0.38	0.26	0.32	2.53	0.74	0.40
C	95°	0.03	0.05	0.09	0.18	0.19	1.70	0.17	0.13	0.11	0.18
	150°	0.03	0.07	0.12	0.21	0.25	1.80	0.22	0.15	0.13	0.20
D	95°	1.20	0.24	0.20	0.34	0.24	0.13	0.16	0.60	0.23	0.51
	150°	1.20	0.28	0.24	0.38	0.29	0.14	0.17	0.64	0.27	0.56
E	95°	0.01	0.04	0.06	0.04	0.14	0.12	0.39	0.15	0.34	0.20
	150°	0.04	0.04	0.10	0.06	0.17	0.14	0.42	0.18	0.40	0.22
F	95°	0.25	0.56	1.60	0.42	2.00	0.54	1.70	0.36	0.35	1.21
	150°	0.29	0.66	1.70	0.49	2.10	0.55	1.70	0.39	0.41	1.30

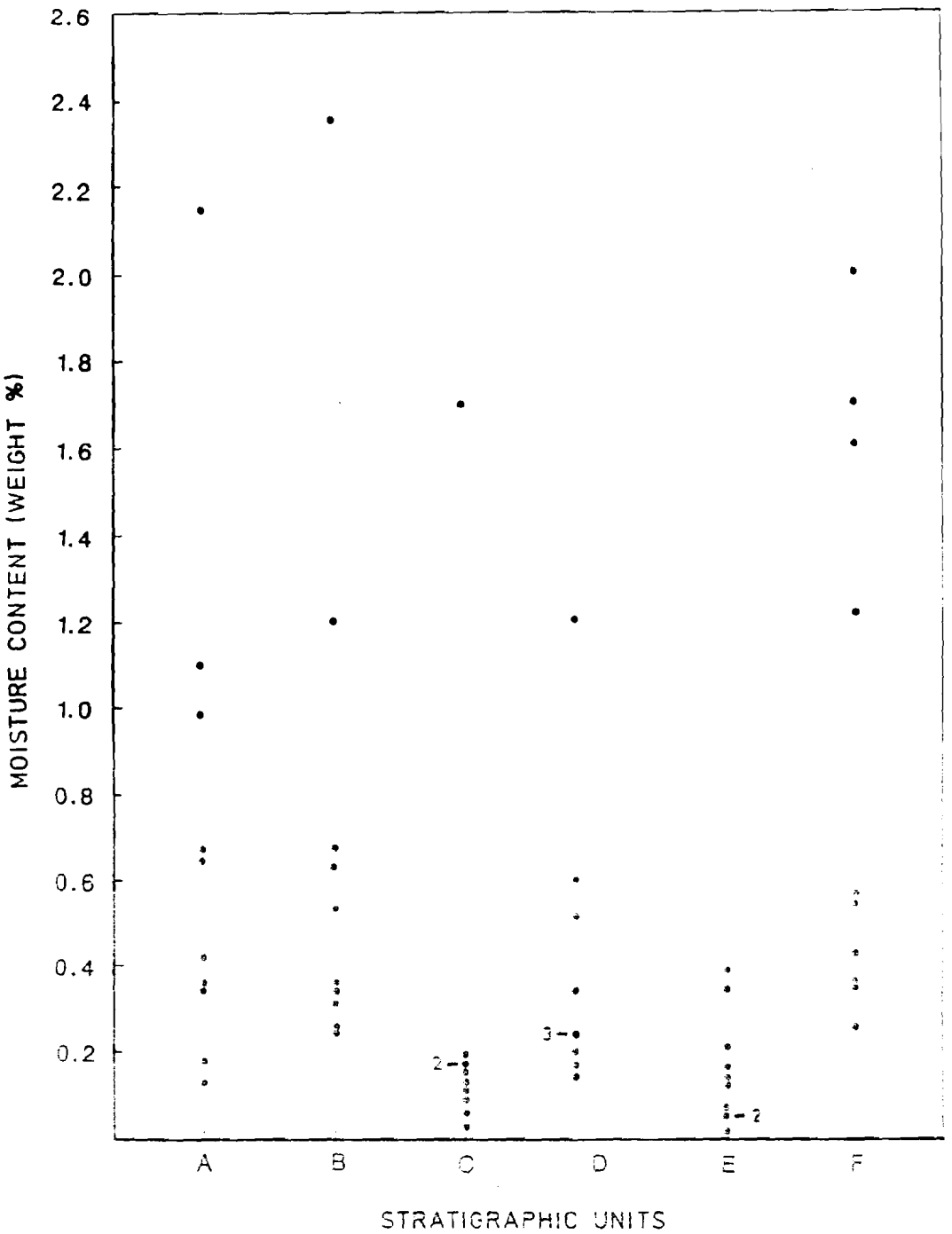


Figure 4-5.

Moisture Content Distribution for
Sixty MCR Samples Heated to 95°C

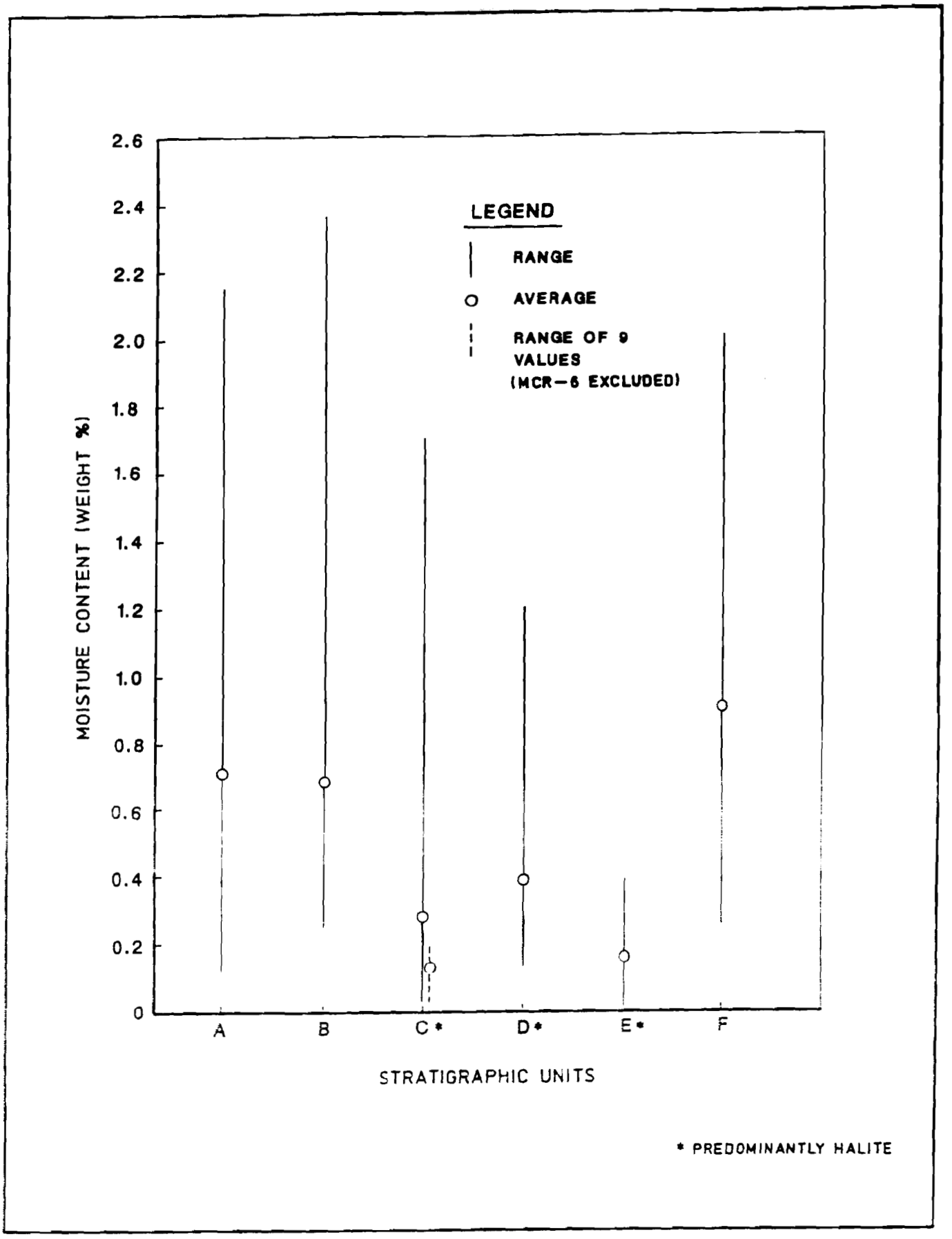


Figure 4-6.

Range of Moisture Content for
Sixty MCR Samples Heated to 95°C

orange marker band. However, the lithologic inconsistencies mentioned above do not allow similar correlations for all stratigraphic units (Figure 4-5). Stratigraphic levels A, B, and F show the greatest scatter over the largest range, most likely due to the more variable clay content. Specimens C, D, and E are predominantly halite and show the most consistency. In addition to the original in situ moisture content, other influences that might affect the pre-sampling moisture content of the samples may be the excavation exposure time (the time interval) between mining and sampling, and whether the sampling location has been exposed dominantly to intake or exhaust ventilation.

Several vertical coreholes drilled from the facility excavation have been sampled and analyzed for moisture content as part of the BSEP. Table 4-3 summarizes the results of analysis for the 41 such samples that are designated by BTP sample numbers. The results are also shown in Figures 4-7 and 4-8. Figure 4-7 shows a zone corresponding in two downholes at a depth of approximately 3 meters with a moisture content of approximately 1.5 percent. Both specimens are below Marker Bed 139 and are comprised of argillaceous halite. The single uphole (Figure 4-8) shows two zones with a moisture content greater than 0.5 percent. One is an argillaceous halite at a depth of 6 feet and the second is anhydrite bed "a" at 15 feet of depth. Caution must be exercised in interpreting this limited, preliminary data until additional information can be collected. It does, however, appear that there are zones within the salt that contain more moisture than do the anhydrite interbeds.

4.2.3 FUTURE ACTIVITIES

Future BSEP activities to determine the moisture content of Salado Formation rocks exposed in and near the WIPP excavations are planned to include:

- Continued rib sampling of facility excavations to develop an adequate statistical base of moisture content distribution. Moisture variations will be compared to the age of an excavated cut.
- Conducting moisture determinations on crushed samples to evaluate the contribution from intragranular brine inclusions.
- Sampling ribs to depth (3 meters) in selected locations to evaluate the moisture variation at a location removed from the influence of the excavated room and ventilation system.
- Sample drift areas in conjunction with geophysical surveys conducted by IT or others to provide ground-truth in evaluating the geophysical response.

4.3 SUMMARY AND CONCLUSIONS

The data presented here suggest strongly that the clay content of a given specimen has a significant influence on the analyzed moisture content. For samples of nearly pure halite, the moisture variations were small and the overall average moisture content was approximately 0.5 percent or less. Rocks with a higher clay content had a greater tendency for large, less predictable ranges and were generally more moist (up to 3.0 percent by weight).

TABLE 4-3.

MOISTURE CONTENT OF 41 UPHOLE AND DOWNHOLE SAMPLES
COLLECTED IN JUNE, JULY, AND AUGUST 1986 AT S1620/W170

Hole	Sample Number	Direction and Distance (Meters)	Date Sampled	Percent Weight Lost @ 95°C	Cumulative Percent Weight Lost @ 150°C
BTPA3	BTP 18	Down 0.09	07/15/86	0.25	0.26
BTPA3	BTP 19	Down 0.27	07/15/86	0.24	0.25
BTPA3	BTP 20	Down 0.55	07/15/86	0.50	0.51
BTPA3	BTP 21	Down 0.88	07/15/86	1.14	1.20
BTPA3	BTP 22	Down 0.98	07/15/86	0.22	0.23
BTPA3	BTP 23	Down 1.34	07/15/86	0.09	0.10
BTPA3	BTP 24	Down 1.68	07/16/86	0.20	0.20
BTPA3	BTP 25	Down 1.92	07/16/86	0.09	0.11
BTPA3	BTP 26	Down 2.19	07/16/86	0.21	0.24
BTPA3	BTP 27	Down 2.26	07/16/86	0.08	0.12
BTPA3	BTP 28	Down 2.71	07/16/86	1.61	1.66
BTPA3	BTP 29	Down 3.05	07/16/86	0.70	0.71
BTPA3	BTP 39	Down 3.51	07/30/86	0.24	0.27
BTPA3	BTP 40	Down 3.57	07/30/86	0.13	0.13
BTPA3	BTP 41	Down 4.02	07/30/86	0.10	0.11
BTPA3	BTP 42	Down 4.11	07/30/86	0.10	0.10
BTPC3	BTP 30	Down 0.21	07/17/86	0.26	0.27
BTPC3	BTP 31	Down 0.52	07/18/86	0.12	0.13
BTPC3	BTP 32	Down 0.91	07/18/86	0.12	0.16
BTPC3	BTP 33	Down 1.28	07/18/86	0.06	0.15
BTPC3	BTP 34	Down 1.43	07/18/86	0.12	0.19
BTPC3	BTP 35	Down 1.95	07/18/86	0.14	0.16
BTPC3	BTP 36	Down 2.35	07/18/86	0.18	0.18
BTPC3	BTP 37	Down 2.56	07/18/86	0.32	0.34
BTPC3	BTP 38	Down 2.87	07/18/86	1.54	1.57
BTPC3	BTP 43	Down 3.41	07/30/86	0.62	0.62
BTPC3	BTP 44	Down 3.66	07/30/86	0.13	0.13
BTPC5	BTP 01	Up 0.34	06/30/86	0.05	0.07
BTPC5	BTP 02	Up 0.67	06/30/86	0.05	0.07
BTPC5	BTP 03	Up 1.13	06/30/86	0.03	0.04
BTPC5	BTP 04	Up 1.83	07/01/86	1.14	1.23
BTPC5	BTP 05	Up 2.07	07/01/86	0.40	0.44
BTPC5	BTP 09	Up 2.13	07/01/86	0.43	0.46
BTPC5	BTP 06	Up 2.38	07/01/86	0.38	0.42
BTPC5	BTP 07	Up 2.56	07/01/86	0.28	0.32
BTPC5	BTP 08	Up 2.83	07/01/86	0.03	0.03
BTPC5	BTP 10	Up 3.20	07/01/86	0.06	0.07
BTPC5	BTP 11	Up 3.41	07/01/86	0.06	0.07
BTPC5	BTP 13	Up 3.96	07/01/86	0.04	0.05
BTPC5	BTP 45	Up 4.66	08/05/86	0.00	0.61
BTPC5	BTP 46	Up 4.88	08/05/86	0.00	0.12

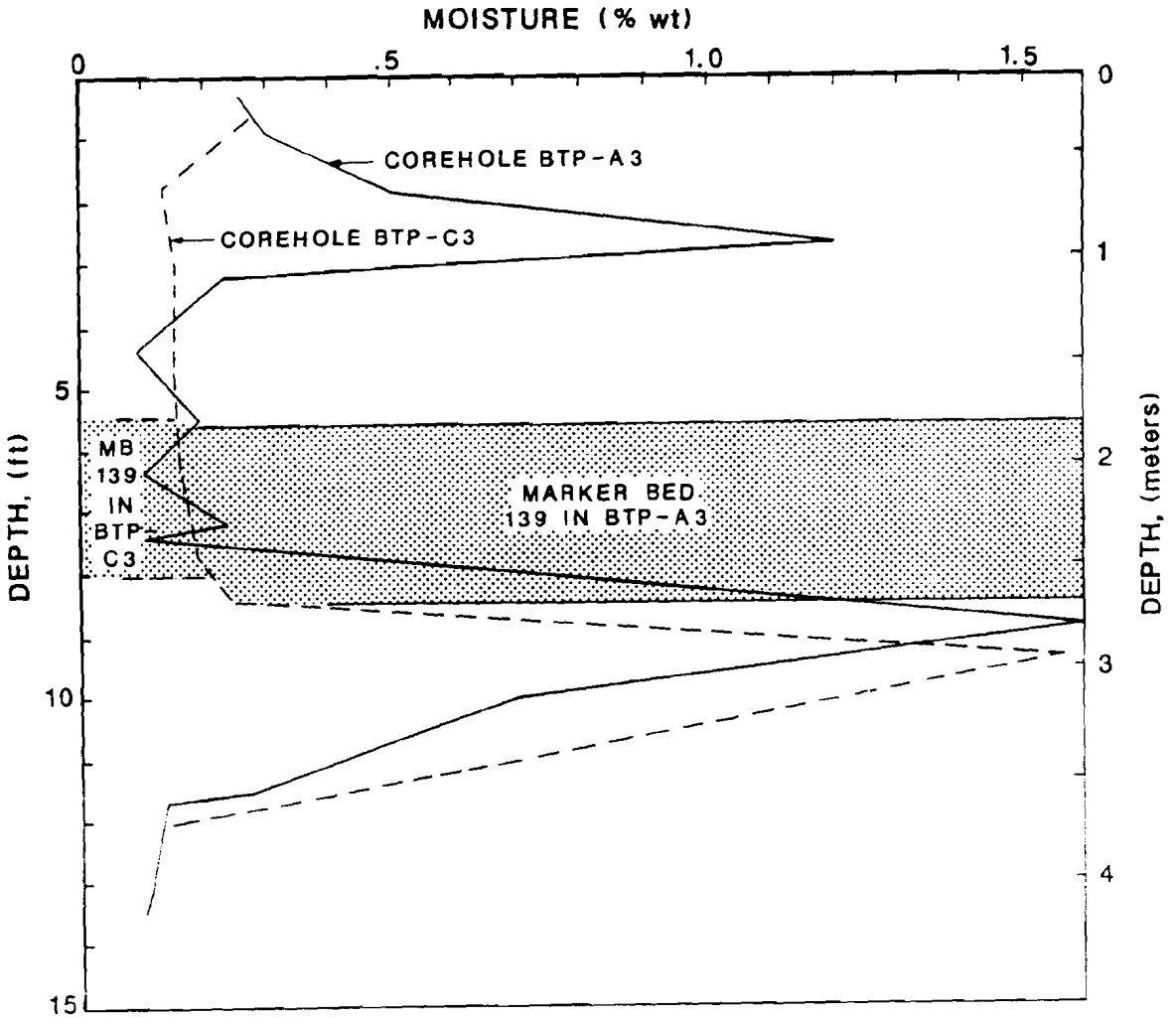


Figure 4-7.

Moisture Content of Floor Corehole Samples

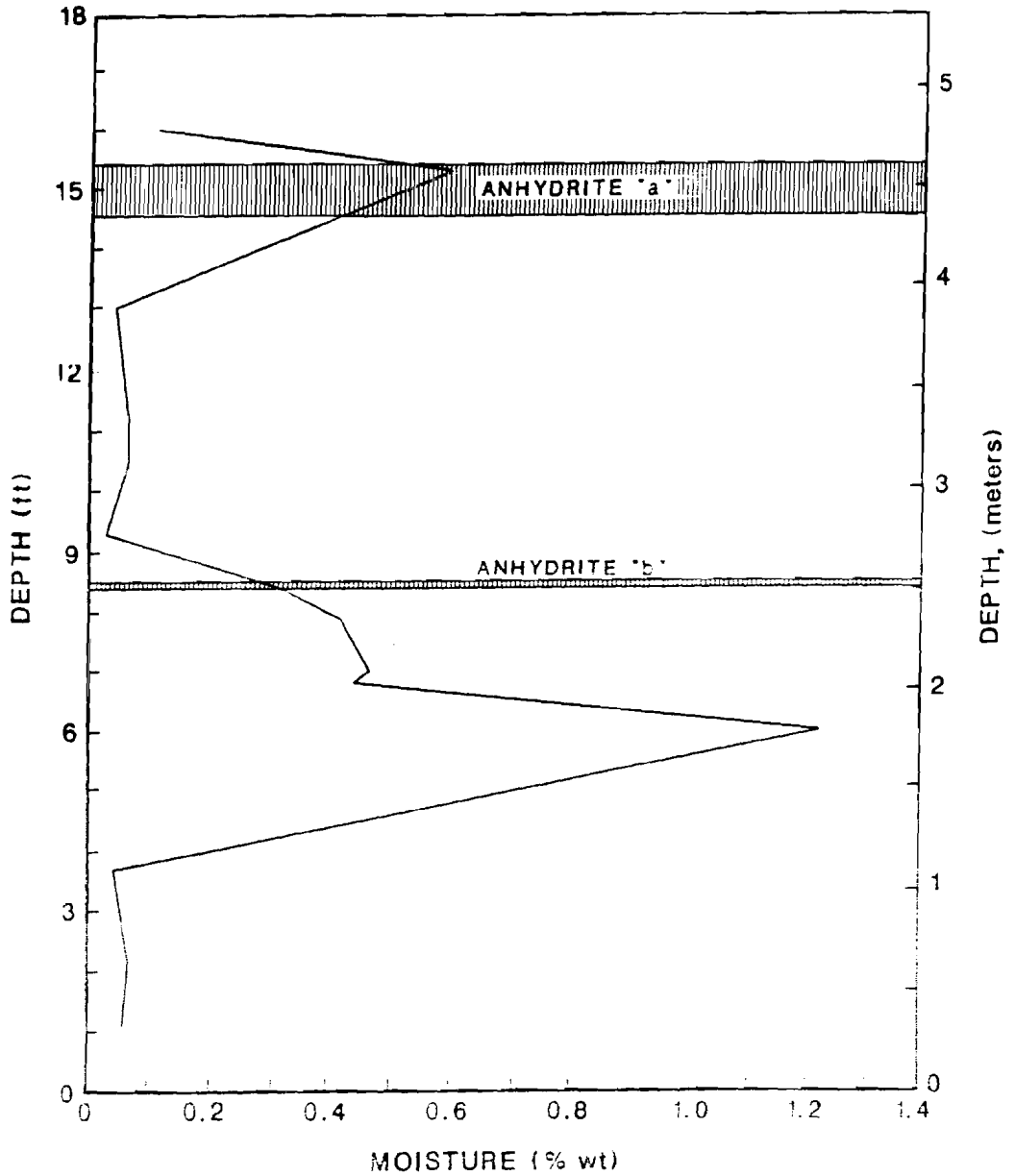


Figure 4-8.

Moisture Content of Roof Corehole Samples

It appears that most of the free water present in the samples will be liberated from the rock salt below 250°C. While this range may encompass one episode of the dehydration of illite and of the smectites, it is still considered to most represent the easily moved fluids present in a specimen. Any heating of the rock salt is likely to mobilize some of the water in these clay minerals and should be considered in the baseline data.

The data available for evaluating the areal variation of moisture is limited. Complicating factors such as the age of cut and relation to the ventilating system are still unknown variables. Given the lithologic considerations of the drift excavation, it may be assumed the upper and lower sections will contribute the majority of moisture in a given volume of rock. Concentrating analyses in these areas is expected to improve the moisture content interpretations, which will be presented in a later BSEP report.

5.0 EVALUATION OF GEOPHYSICAL METHODS OF ASSESSING THE MOISTURE CONTENT OF ROCKS EXPOSED IN THE WIPP FACILITY EXCAVATIONS

This section presents an evaluation of the application of geophysical methods to measure brine content of rocks adjacent to the WIPP facility excavations. The objective of the evaluation was to review existing geophysical methods suitable for detecting the relative moisture content in the evaporite rocks exposed in the WIPP underground facility, summarize previous measurements and future planned work, determine the application of these methods to the WIPP BSEP, and determine how geophysical measurements could be used to characterize brine content underground in conjunction with direct physical moisture measurements. This section focuses on the usability of proven, documented, "off-the-shelf", non-destructive techniques that might be able to provide rapid and cost-effective estimations of in situ moisture content of the host rock during the excavation of the repository storage panels. Experimental approaches that seem to offer merit are mentioned. Section 5-1 reviews lateral survey methods that may have application. Section 5-2 reviews recent experience in conducting electromagnetic and DC resistivity surveys at WIPP by the Colorado School of Mines (CSM) and IT Corporation. Section 5-3 presents conclusions and recommendations in the application of geophysics.

5.1 LATERAL SURVEY METHODS

The methods evaluated for lateral geophysical surveys include radar, electromagnetics, resistivity, and nuclear-source techniques. The primary focus has been on electrical techniques such as resistivity, since these methods are well-established and are known to be successful in detecting brine in groundwater studies (Todd, 1980, p. 420). Electrical prospecting is based on a variety of techniques, each measuring a different electrical property of the geologic material. All of the methods discussed are capable of providing a complete survey of the repository horizon within one to two weeks.

5.1.1 GROUND PENETRATING RADAR

Ground-penetrating radar techniques produce a continuous, high-resolution electromagnetic profile of reflections from subsurface (Kelsall et al., 1982). The depth of penetration is a function of the electrical properties of the materials, the frequency used, and the radar antenna design. Boundaries, between bodies of rock that have contrasting electrical properties, will reflect wave energy back to the receiving antenna. Thus, radar may be a promising technique for characterizations of the disturbed zone that develops adjacent to the repository excavations (Deal and Case, 1987).

The transmitter typically emits a short pulse of electromagnetic energy which is coupled to the formations being investigated through the antenna (Fowler, 1983). Discontinuities in the electrical properties of the formation cause portions of the energy to reflect back to the receiver, which converts the high-frequency electromagnetic energy into a low-frequency signal. A controller provides the timing signal to both the transmitter and receiver.

Fowler (1983), reviewed the application of ground-penetrating radar to potash mines, a geological environment very similar to that at WIPP. Fowler concluded that accurate reflection maps of shallow geologic features in potash or salt mines could be obtained from the mine horizons. Features that produce high resolution include large brine- or air-filled cavities or cracks that might pose a production or safety problem. The use of impulse radar in scanning underground salt deposits for possible application at WIPP was reported by Unterberger (1981) and Cook (1980), who conducted surveys in potash mines near Carlsbad, New Mexico, and at the Avery Island salt mine near Lafayette, Louisiana. The surveys had several objectives; these included an attempt to outline a breccia pipe that penetrates the Salado Formation salt and is partially exposed in the workings at the Mississippi Chemical potash mine, an attempt to locate a simulated waste canister at Avery Island, and the detection of brine in three-inch diameter drillholes at Avery Island.

Unterberger (1981) found that reverberations in the electromagnetic reflections in the Mississippi Chemical Company potash mine, due to high reflection coefficients, reduced the ability to image shallow reflections. Cook concluded that clay seams and other absorptive materials made it impossible to obtain sufficient penetration to define the flanks of the breccia pipe. In the simulated waste canister experiments, there was some success in obtaining sufficient floor penetration to outline waste canisters. In the brine target experiments, the test targets included a dry hole, a hole containing a short piece of drillrod, and holes with varying amounts of brine. The attempts at locating the brine-filled holes did not give clear results, probably because of large surface reflections. Cook concluded that the location of steel canisters after long periods of burial is possible and that adequate penetration can be obtained in clean bedded salt, but that clay seams and other conductive inclusions limit penetration.

5.1.2 ELECTROMAGNETICS

Electromagnetic (EM) techniques have been used successfully in exploration for metallic minerals and have also been applied to exploration for fresh groundwater as well as contaminant plumes. EM techniques measure the resulting magnetic field from an electric current induced in a conductor (the rock under investigation) by a magnetic field generated from a portable source. The induced currents vary as a result of variations in conductance within the rock. Since variations in brine content within the rock strongly affect conductance, the EM method should have application to the WIPP studies. Based upon experience in the exploration for metallic minerals, successful use of the EM method requires that the metallic target zone be electrically interconnected such that the entire ore body acts as a conductive unit (Klein and LaJoie, 1980). EM techniques therefore appear to be well suited for the lateral mapping of continuous saturated zones. Such interconnections may not always be necessary for successful use of EM techniques. McNeill (1980) states that in the case of the small brine inclusions isolated in salt, intercavity connections are not necessary and an appreciable EM response may come from the fluid in each separate cavity.

A major difference between electromagnetic and conventional resistivity techniques is that for the latter, it is easier to calculate the apparent conductivity for layering through vertical sounding techniques (McNeill,

1983). For EM surveys, the local current is determined primarily by the local conductivity; changes in any given layer usually do not appreciably affect the current flow in other layers. It is thus possible to generate "response" curves with depth (McNeill, 1983). These curves may then be used to generate a cumulative sensitivity to ground depth as shown in Figure 5-1 that may be used in conjunction with the following equation for a three-layer model:

$$\sigma_a = \sigma_1[1 - R(Z_1] + \sigma_2[R(Z_1 - R(Z_2)] + \sigma_3 R(Z_2)$$

where

$\sigma_1, \sigma_2, \sigma_3$ = Conductivities of layers 1, 2, and 3, respectively; and

$R(Z_1), R(Z_2), R(Z_3)$ = Cumulative sensitivity at layer boundary points Z_1, Z_2, and Z_3, respectively.

Calculation of the layered earth response allows determination of the conductivities of individual layers, assuming layer depths are known, layer thicknesses are consistent, and conductivity response is linearly related to moisture content.

The operational advantage of electromagnetic conductivity measurement are (McNeill, 1983):

- The current concentration in the ground is highest near the transmitter coil, suggesting probable sensitivity to nearby inhomogeneities. The high amplitude current loops have small radii and their effect on the distant receiver is negligible. The result is a system insensitive to small, local variations in conductivity but accurate in the measurement of bulk conductivity.

- A highly resistive upper layer does not preclude applying the EM technique.

- Depth of exploration is theoretically 1.5 intercoil spacings without large amounts of wire on the ground.

- Lightweight and portable equipment.

The instrumental disadvantages of electromagnetic conductivity measurements are (McNeill, 1983):

- At conductivities below 1 mmhos/m there is not enough response to obtain accurate measurements.

- At high conductivities the "low inductive number" approximation breaks down and the response becomes nonlinear.

- The instrument zeroing is affected by all conductive material (including the earth). It is difficult to establish and maintain zero to better than a few tenths of a mmhos/m over the range of temperatures, humidity, and mechanical shock to which the equipment is exposed.

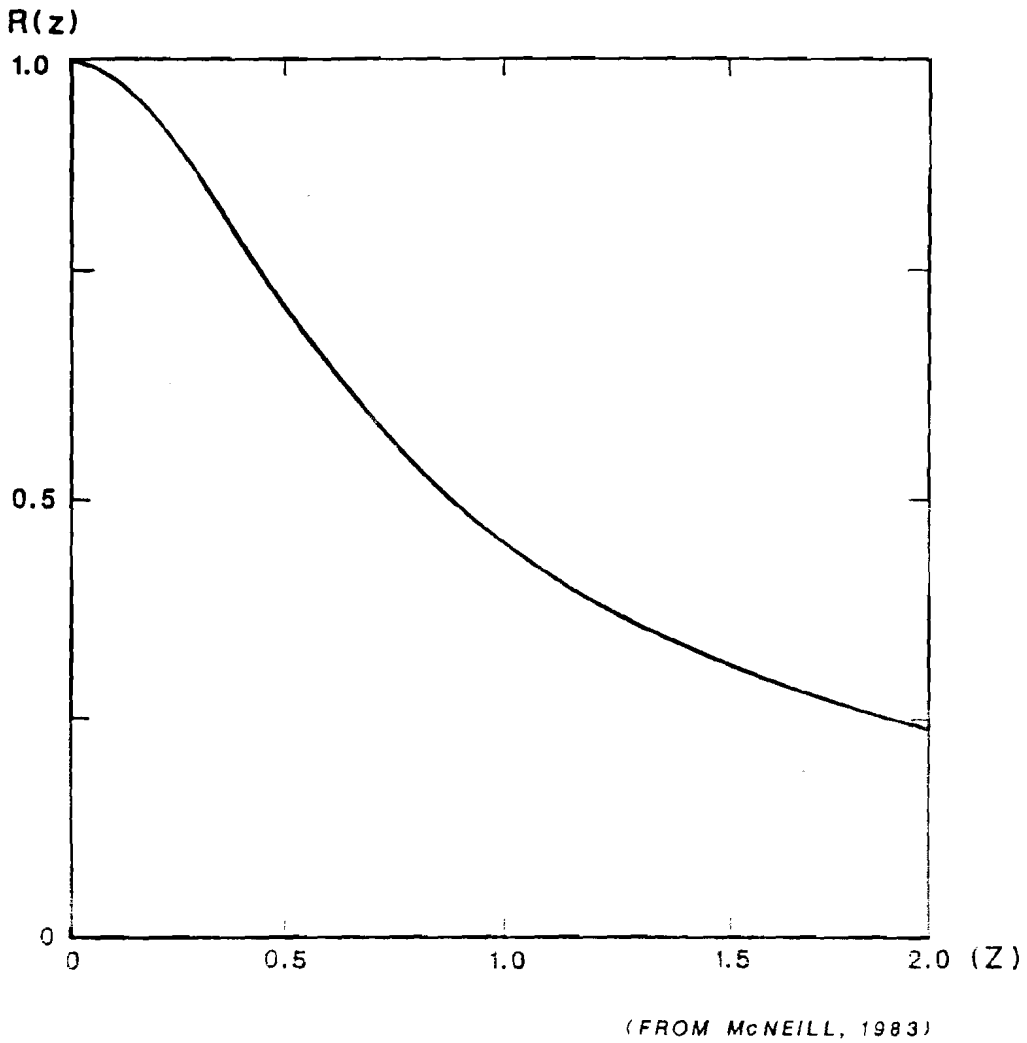


Figure 5-1.

Cumulative Sensitivity to Ground
at Various Depths in Electromagnetic Surveys

(From McNeill, 1983)

- Conductivity sounding with depth can be carried out using a method analogous to conventional resistivity, however, the depths are restricted to the switch-selectable spacings.

Additionally, the presence of highly conductive materials or other sources of magnetic fields (wires, power cables, or high-voltage transformers) may dominate the responses measured by the EM equipment and render the results unusable for the assessment of relative brine content of near-by rocks.

5.1.3 RESISTIVITY

In the resistivity technique, a direct current or low-frequency alternating current is applied to the material through two electrodes and the developed potential is measured across two other electrodes. By varying the electrode spacing and configuration, the vertical profile of the electrical resistivity and its lateral variations in the material can be determined. Since electrical resistivity is reduced in the presence of brine, relative variations in moisture content throughout the repository can, in principle, be determined. Kessels and others (1985) have used a DC electromagnetic method to determine the water content of domal salt in a diapir at the ASSE Mine in Germany, but the water content of that salt is appreciably lower than the WIPP salts.

The success of the technique is dependent on the natural variability of formation resistivities throughout the repository. It is likely that changes in resistivity due to the presence of brine are significant in comparison to the natural variation of formation resistivity, and that resistivity is a sensitive indicator. Mapping the anhydrite bed where it is saturated should also be possible. However, satisfactory results may be difficult in areas of electrical interference (i.e., the experimental and heavily instrumented areas).

Resistivity, like some of the other electrical methods, is likely to detect brine in clay interbeds and fracture zones within the anhydrite marker beds. The apparent resistivity will primarily be a function of the interconnected pore fracture space and the presence of brine. Small isolated inclusions may not be recognizable if the resistivity is dominated by dry rock salt.

5.1.4 NUCLEAR METHODS

A variation of a borehole technique is the nuclear densometer (ASTM D2922-81, 1982), typically used in soil density/moisture determinations. This nuclear-gauge device operates on the same principle as the downhole neutron-absorption device, but with a much smaller nuclear source. The smaller source limits the penetration to something on the order of 15 centimeters.

The neutron-absorption technique responds primarily to the amount of hydrogen in the formation. The device continuously emits high-energy neutrons from a radioactive source. As the neutrons collide with hydrogen nuclei, they slow down to thermal velocities. They diffuse randomly until they are captured by various nuclei, chlorine being the most important. During capture, they emit a high energy gamma ray. Depending on the specific technique, either the gamma rays emitted during capture or the neutrons themselves are counted.

This method does not distinguish either the source of the hydrogen or the relative interconnection of pore spaces. Hydrogen in any form, whether present in interstitial water or chemically bound in some mineral (i.e., polyhalite), results in the same response. Only the total amount of hydrogen present is important. The instrument is calibrated based on counts measured versus the actual moisture determined from oven drying samples. In theory, if the other constituents can be assumed to be constant, the counts measured may then be related to percent moisture present in the rock. Calibration of the tool may be difficult in the salt environment, because other elements than hydrogen may slow the neutrons and the high content of chlorine ensures the very rapid capture of the slowed neutrons (Bateman, 1985).

5.2 USE OF APPLICABLE GEOPHYSICAL TECHNIQUES AT WIPP

Various geophysical techniques have been attempted at WIPP for different programs and purposes. These include ground-penetrating radar, nuclear densometers, electromagnetic techniques, and resistivity surveys. Many of these efforts were undertaken by other organizations and subcontractors and are described briefly here only in the context of approximating the practicality of using similar techniques for the purposes of the BSEP.

5.2.1 GROUND-PENETRATING RADAR

Attempts have been made to use ground-penetrating radar to map fracture zones at WIPP. The unpublished results indicate that the clay interbeds attenuated the signal rapidly. Void spaces were also found to attenuate signals rapidly. This effect could prove to be an advantage in detecting large void spaces full of brine near the repository. However, the existing evidence obtained from the BSEP (Deal and Case, 1987) does not support the likelihood that large voids exist in the immediate vicinity of the WIPP excavations. Since gradational variations in moisture content may not be recognizable, the radar method is judged to have limited applications although it may be possible to apply the method if large fractures develop.

5.2.2 NUCLEAR MOISTURE-DENSITY GAUGE

A Seaman Model C-200 nuclear moisture-density gauge was previously utilized at the WIPP site to determine the compacted density and moisture content of a crushed salt foundation pad in an underground construction project (VandeKraats,1986). The nuclear moisture-density gauge consistently indicated low (below 1%) or zero moisture content, even when the pad felt damp to the touch. Samples were collected and were determined in the lab to have a moisture content that ranged between 2.5 to 5 percent by weight. This error is large in comparison to the quantity being measured. Consequently, on the usability of a standard, off-the-shelf, nuclear moisture-density gauge to make accurate moisture determinations in the salt environment at WIPP is probably not appropriate.

5.2.3 ELECTROMAGNETIC TECHNIQUES

On February 18 and 19, 1987, IT Corporation used a Geonics EM-31 electromagnetic probe to conduct a survey through several parts of the WIPP excavations (Figure 5-2). The EM-31 instrument consists of transmitter and receiver coils

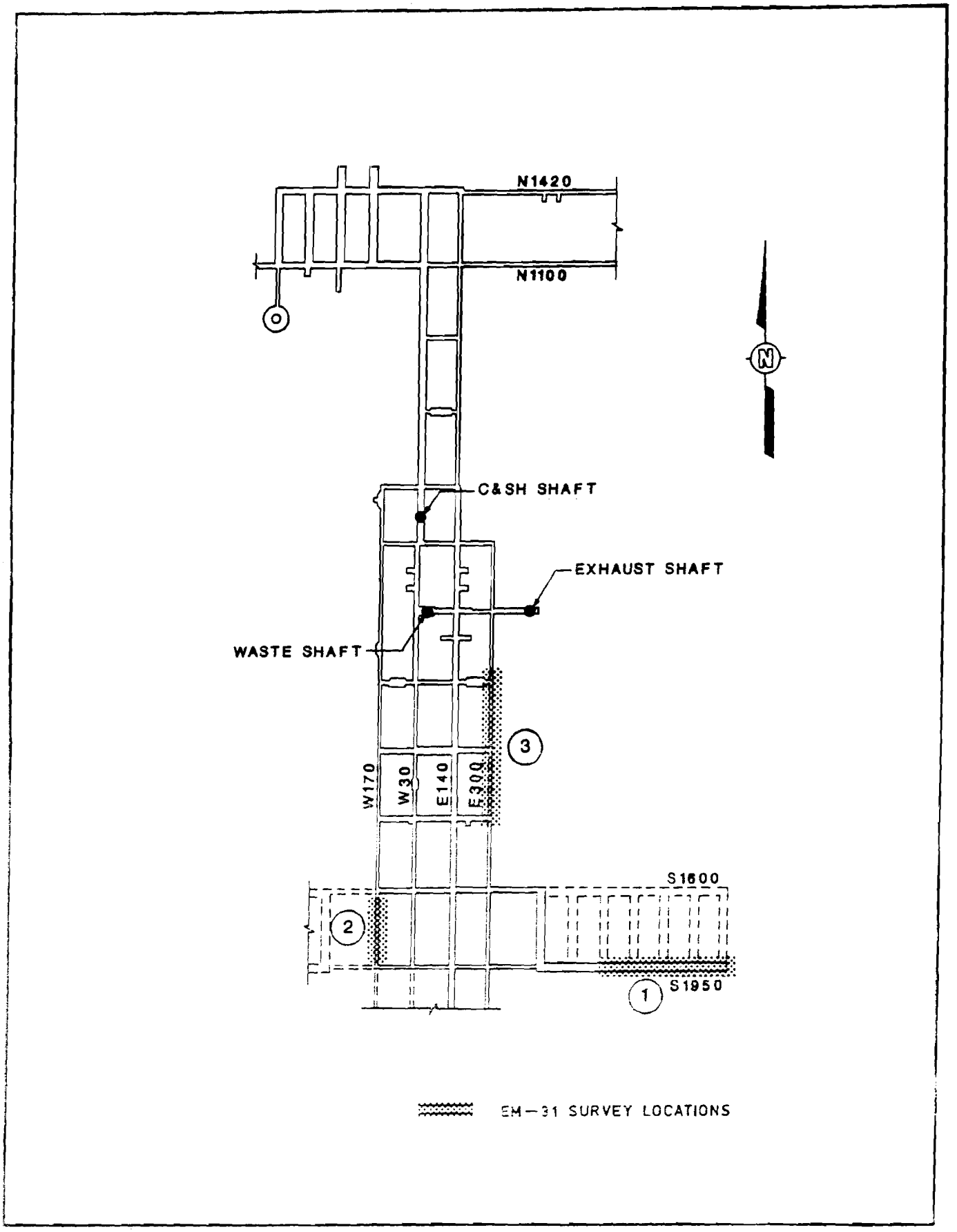


Figure 5-2.

Map of the WIPP Underground Workings
and EM-31 Survey Locations, February 1987

at a fixed distance of about 3.6 meters. The transmitter coil induces eddy current loops in the ground. The instrument is designed so that the magnitude of any one of these current loops is directly proportional to the conductivity of the terrain in the vicinity of that loop. Each of the loops generates a magnetic field which is proportional to the current flowing in the loop. Part of the magnetic field from each loop is intercepted by the receiver coil and induces a current in that coil. The voltage of the induced current is linearly related to the conductivity of the terrain (Geonics, 1979). The instrument measures the induced voltage and returns a value for the ground conductivity in mmho/m.

The volume of rock influenced and the depth to which conductivity is measured is roughly equal to the coil spacing (3.7 meters in this preliminary survey). The fact that the coils are at fixed distances constrains the usefulness of this particular instrument. Variable depths could be investigated with detachable coil models such as the Geonics EM-34.

The initial test was designed to survey the ribs (walls) of the excavations. The factors considered to potentially influence the survey results included the end effects of the excavation (the position and relationship of the roof, floor, and cross-drifts) and the cultural features of the mining operation (power supplies, cables, piping networks, and lighting). Several initial tests were performed with the instrument to evaluate the influence of the end effects and cultural features. It was determined that a mid-point on the rib roughly 1.5 to 2 meters above the floor minimized the roof and floor interaction. The effects of cross-drifts and the drift face (end of the excavation) had an influence to distances of approximately 3 to 5 meters, but were not large enough to pose a problem.

The influence of cultural features was related to the degree that they dominated the electrical regime of the excavation. High-voltage cables created interference across the entire drift wherever they occurred, whereas metal signs or mine-phone lines affected readings only when the instrument was in close proximity to them. A more subtle interference was that of tools and equipment worn by the operators themselves. We found that if a survey member (other than the actual operator) wearing a mine lamp and tool belt was closer than about 5 meters to the instrument, there would be an increase in the apparent conductivity at that location. Interference by the operator himself was minimized by removing all extraneous equipment during the survey and by the operator standing in a consistent relative position for all the measurements. Once recognized, most of these influences were avoided or compensated for and are not felt to have compromised measurements taken during the survey.

A horizontal dipole survey was conducted as recommended by the instrument manufacturer, Geonics, Ltd. To accomplish this, the instrument is held with the meter face parallel to the rib face. This particular configuration allows for the greatest depth of penetration.

Three traverses were made in lengths ranging from about 75 to 180 meters, as indicated in Figure 5-2. The areas, which were selected to be as free of cultural interference as possible, represent recent excavations (survey 1) and older excavations (survey 3), and include some of the near-surface physical moisture sample locations (section 4, Figure 4-3, survey 2). The

second traverse was rerun on a subsequent day to evaluate reproducibility of measurements. It was found that values could be reproduced very closely for the same instrument locations and that variability did not exceed the operator error inherent in reading the instrument meter.

The range of conductivity for the three traverses was three to five millisiemens/m (mmhos/m) (Figure 5-3). This is considerably less than what might be expected for a brine-bearing rock, but is in fact reasonable for a very resistive rock type such as rock salt (Kessels, et al., 1985). Within this range, the instrument is very sensitive, and a variation of several mmhos/m may not hold particular significance for measurements of brine content. The variations observed in the survey plots (Figure 5-3) may reflect a response to localized conductivity variations caused by variations in mineralogy as well as by moisture increases.

Preliminary correlations with existing near-surface physical samples were limited. One sample location (designated MCR-2) on the second traverse appears to correlate to a general rise in conductivity. The samples in this location, however, did not indicate a particularly moist zone (Table 4-2). Additional moisture content measurements are being made and will be reported at a later date.

Electromagnetic surveys have also been conducted by the Colorado School of Mines under contract with Sandia National Laboratories (Pfeifer, 1987). The two instruments used include the Geonics, Ltd., EM-31 and EM-34. The EM-31 had a fixed intercoil spacing of 3.7 meters. The EM-34 had a variable coil separation of up to 40 meters and was used with a 20-meter separation. In performing surveys, station separations of 6.1 meters and 7.6 meters were utilized for the EM-31 and 20 meters for the EM-34. The depth of investigation was on the order of 1 to 2 meters for the EM-31 and 10 to 20 meters for the EM-34.

The results of an EM-31 survey in drift N1100 are illustrated in Figure 5-4. The results exhibit scatter between two and five mmhos/m and indicate a general decrease with distance to the east. Pfeifer indicated two potential reasons for the observed behavior; it may be due to the ramping up to the higher horizon in this area and measurement of a different stratigraphic interval, or it may also be due to a reduction in moisture content due to evaporation of water by the heating in Rooms A1 through A3.

Similar results were obtain using the EM-34 probe (Figure 5-5). However, it is interesting to note that values ranged from 7.0 to 10.0 mmhos/m and showed an increase with distance to the east. The results may also show less scatter than in the EM-31 survey. Thus the scatter may relate to differences in sampling volume. As sampling volume increases (as in the EM-34 survey), there is a reduction in variability of the conductivity measurements.

Pfeifer (1987) reports on a relationship of resistivity versus moisture content as derived from Archie's Law for the rock salt (Kessels, et al., 1985). Archie's Law states that the ratio of the formation resistivity to the brine resistivity is inversely related to the porosity raised to the power of a constant (Archie, 1942). Kessels et al. (1985) used a DC resistivity technique in salt in the ASSE mine in Germany. Using an empirical technique,

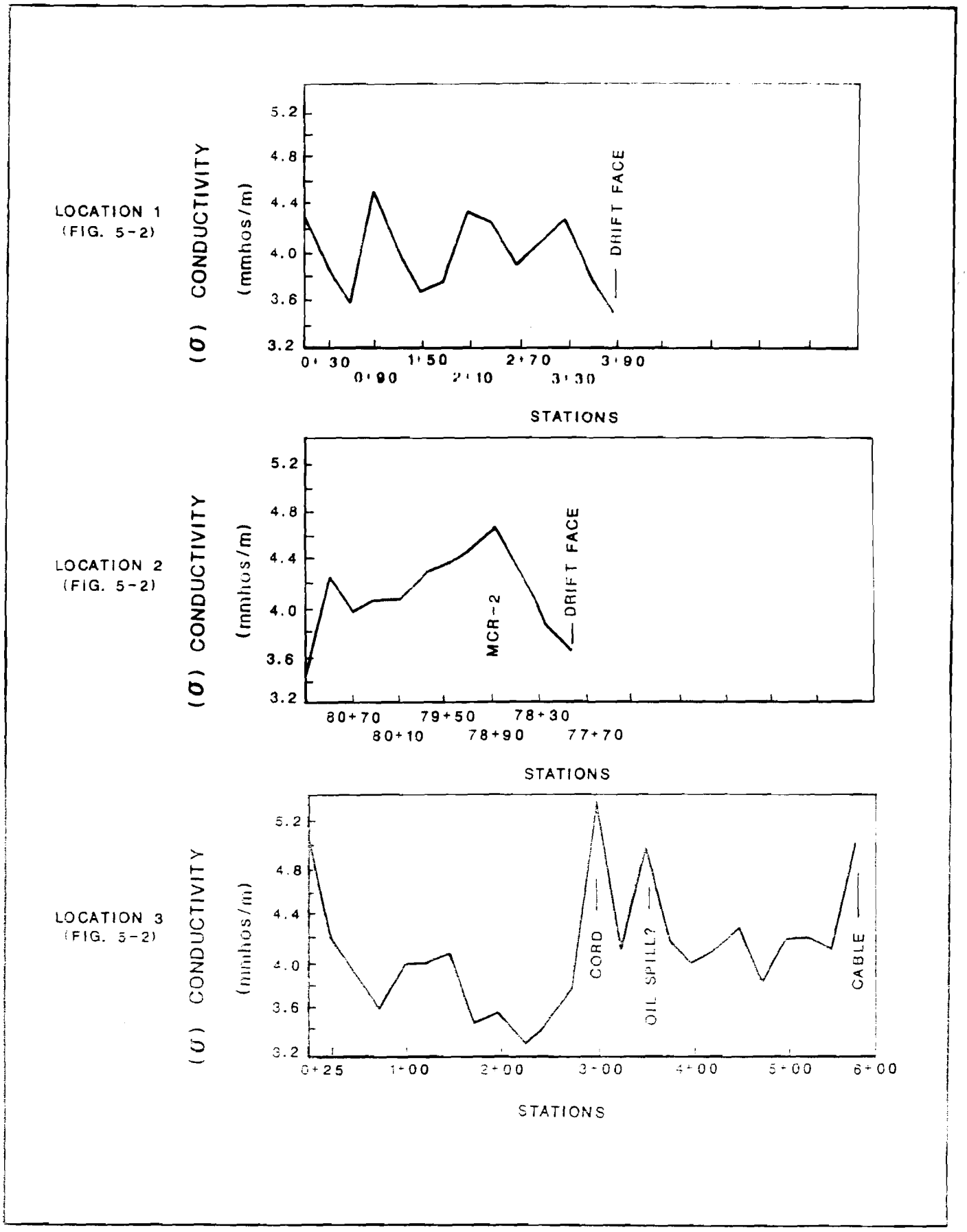
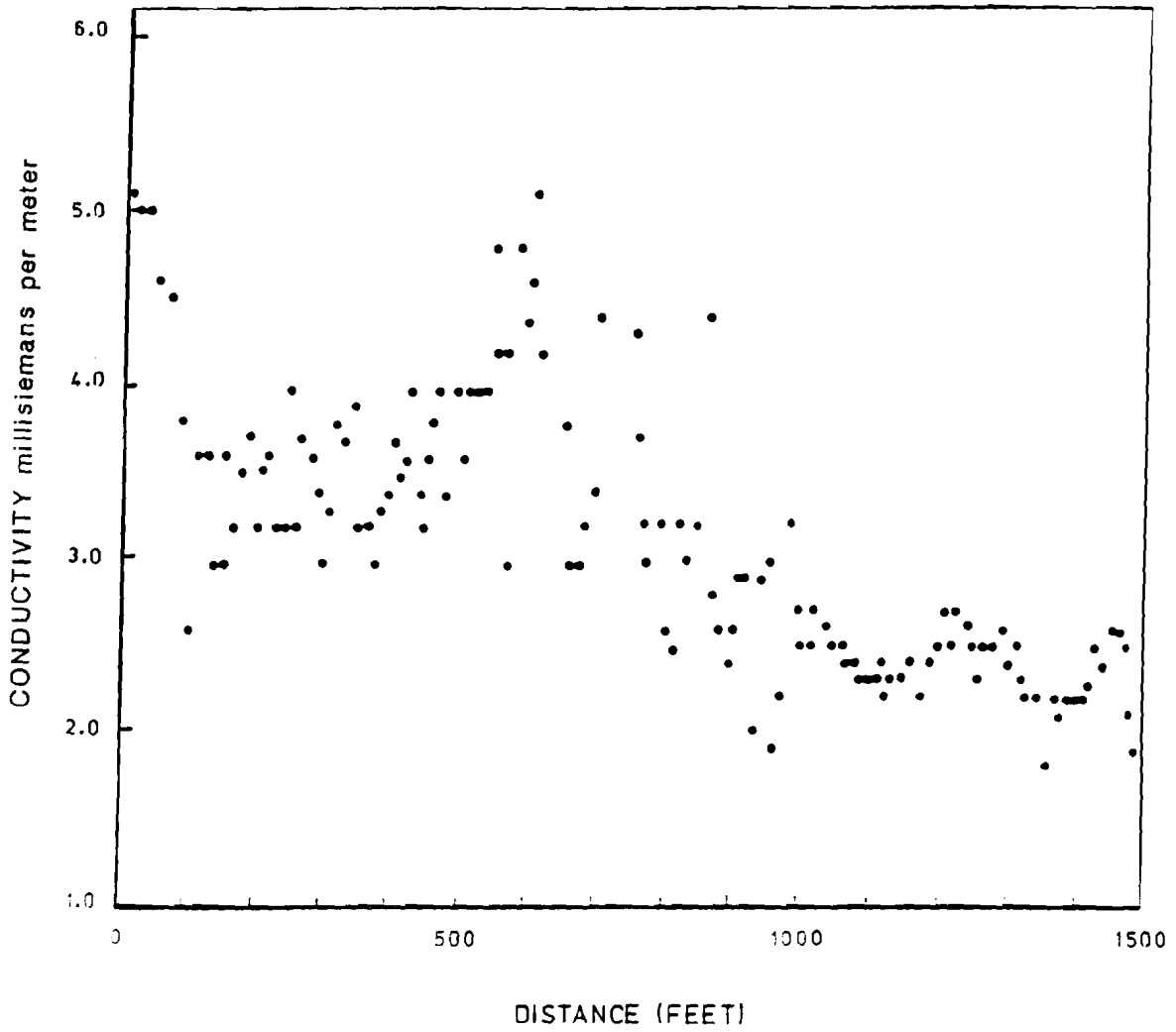


Figure 5-3.

Variation in Conductivity Measurements Along Three Traverses with an EM-31 Electromagnetic Probe

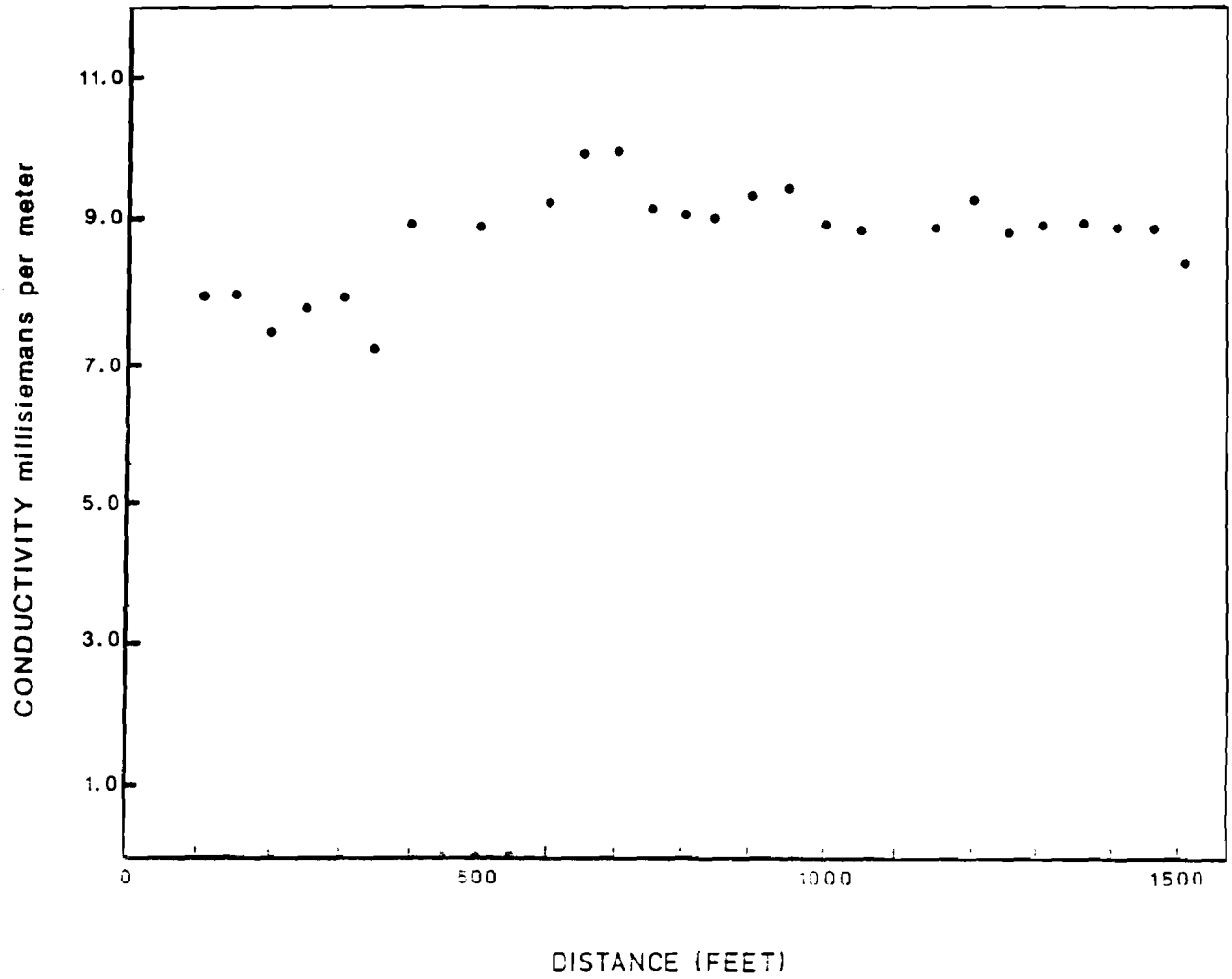


(FROM PFEIFER, 1987, FIGURE 4)

Figure 5-4.

Plot of Conductivity vs. Distance for the EM-31 in Drift N1100 Between E140 and E1540 (South of the Heated Experimental Rooms)

(From Pfeifer, 1987, Figure 4)



(FROM PFEIFER, 1987, FIGURE 8)

Figure 5-5.

Plot of Conductivity vs. Distance for the EM-34 in Drift N1100 Between E140 and E1540 (South of the Heated Experimental Rooms)

(From Pfeifer, 1987, Figure 8)

they reached the conclusion that Archie's Law applied to the salt beds in the ASSE mine and water content could be estimated based upon formation and formation brine resistivity. Pfeifer (1987), (Figure 5-6), used that relationship with her resistivity data from WIPP to estimate the water content in the immediate vicinity of the east part of the N1100 drift (the exhaust air drift south of the heated experimental rooms). She estimated that within 1 to 2 meters (from Figure 5-4) the water content was on the order of 0.8 to 1.0 percent by weight and that at distances of 10 to 20 meters (from Figure 5-5) the water content was on the order of 2.0 percent by weight. These values fall within the range of actual moisture measurements made at WIPP (Section 4, this report; Deal and Case, 1987).

An innovative DC resistivity survey and analysis was also conducted by the Colorado School of Mines (Pfeifer, 1987). Two water wells each containing about 300 meters of steel casing and spaced 1.8 km apart were connected to create a fixed dipole source. The dipole was energized with a current of approximately 200 amperes at 300 V DC. The resulting potential difference was measured between closely-spaced points at various locations in the WIPP excavations (Figure 5-7) and apparent resistivities were calculated using a three-layer model.

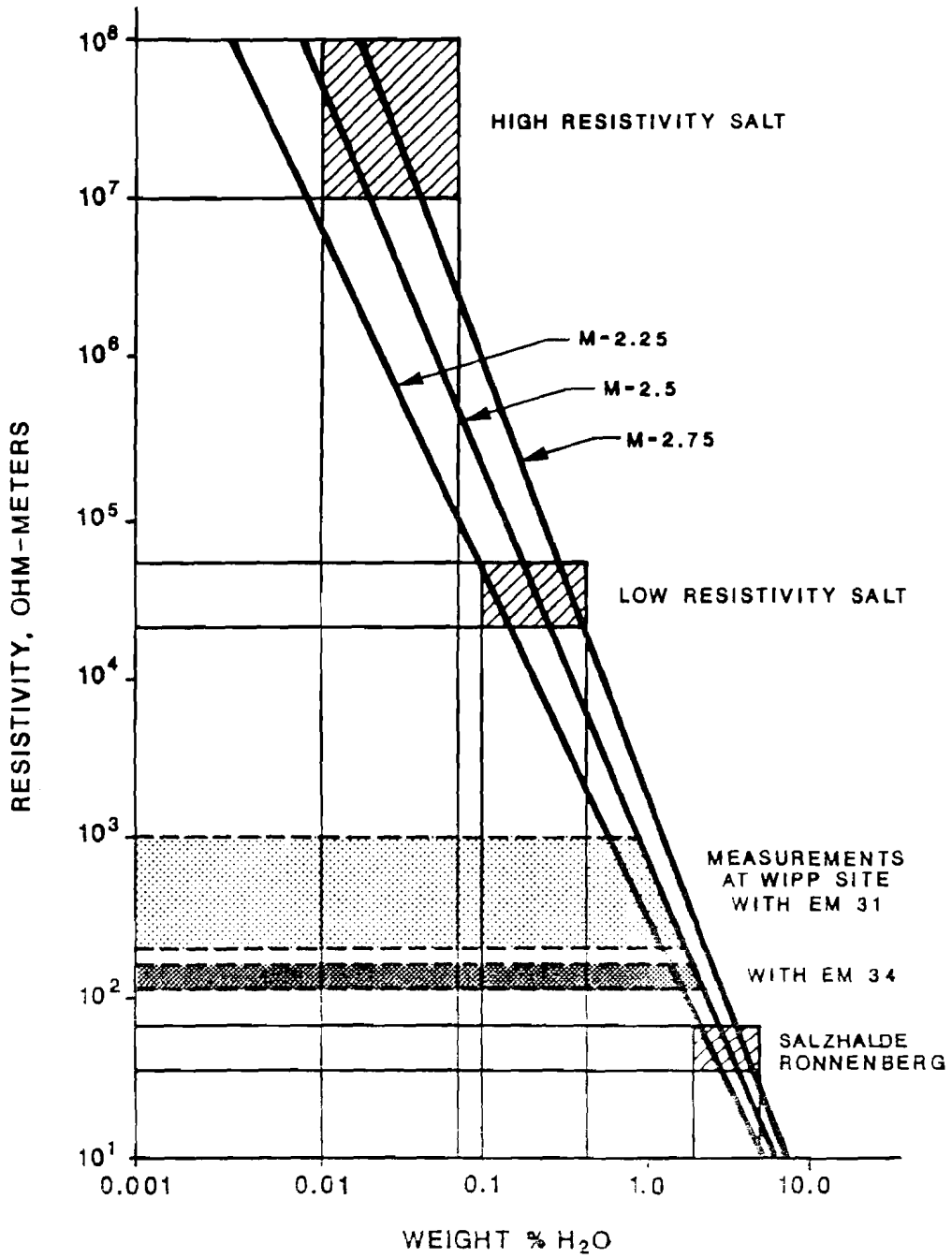
It was found that resistivity surveys could be performed successfully in a high noise environment at small receiver spacings provided a unique current signature was applied and signal stacking procedures utilized. It was also found that the usual uniform-earth model was not adequate in calculating apparent resistivities. This half-space model requires that the current entering the salt layer (second layer) must be equal to the current entering the uniform earth. With a highly resistive salt, this is not the case. The current density in the salt is very low. However, the three-layer model did provide meaningful results. The electric field and potential at the surface is the same as at the top of the second layer if the resistivity of the second layer is greater than the first. Assuming that the potential at the bottom of the salt is approximately zero because of the low conductivity of the salt, a linear potential decay can be assumed and the electric field magnitude predicted. Electric field curves are computed and integrated to determine the potential at the surface. From these curves, an apparent resistivity was computed which was in general agreement with EM-31 results (Pfeifer, 1987).

5.3 CONCLUSIONS AND RECOMMENDATIONS

The review of lateral survey methods and recent WIPP experience provides a basis for assessing the applicability of geophysical methods to the BSEP. Previous work indicates that conductivity measurements would correlate with moisture content measurements, but they are not viewed as a substitute for direct moisture content measurements. The major conclusions are:

- The most applicable methods are electromagnetic or resistivity surveys since moisture content can be directly related to conductivity.

- Radar is not applicable because the brine occurrences do not involve void spaces.



(FROM KESSELS ET AL., 1985
WIPP DATA ADDED BY PFEIFER, 1987)

Figure 5-6.

Relationship Between Apparent Resistivity and
Water Content (Kesseis and Others, 1985)
With WIPP Data Added By Pfeifer (1987)

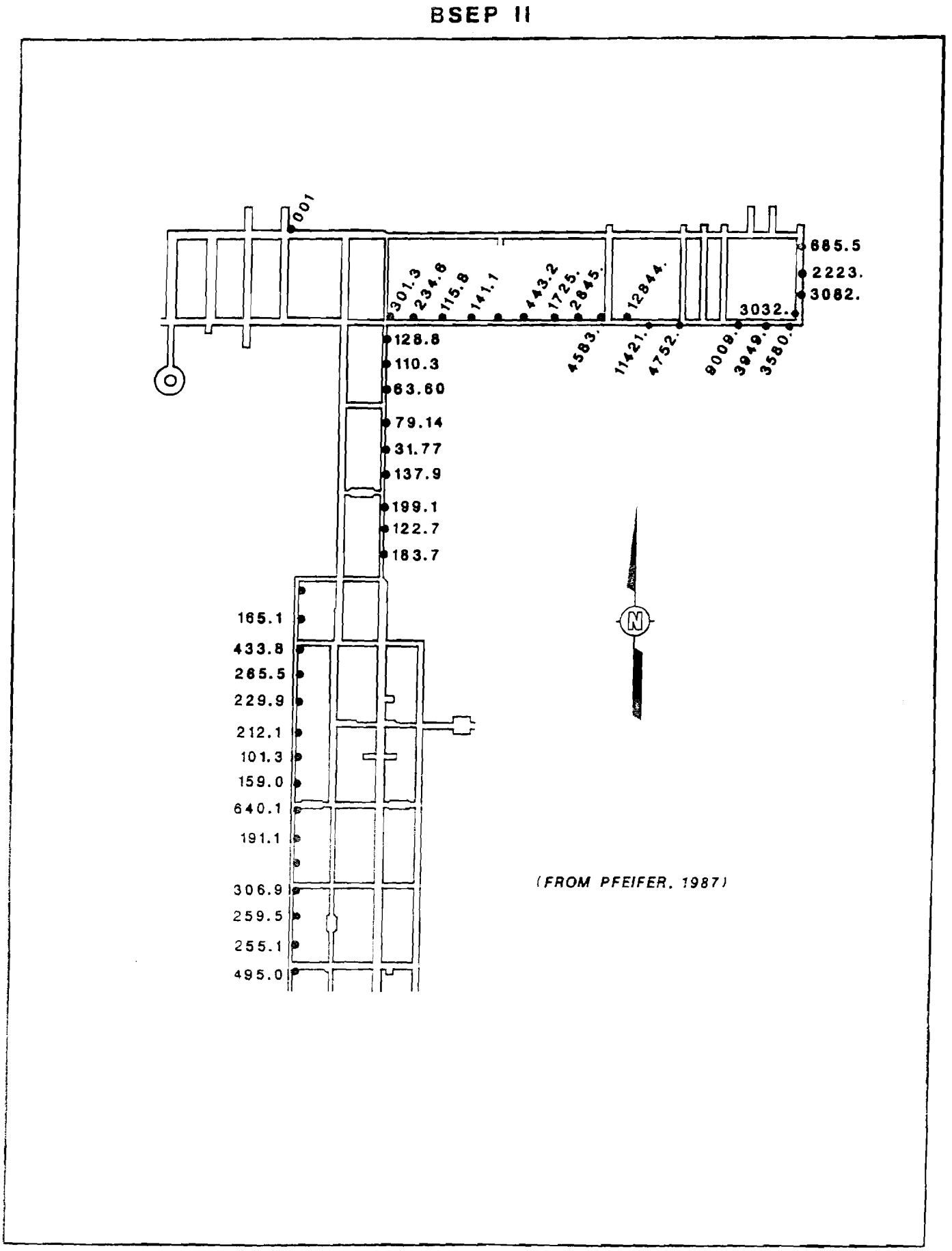


Figure 5-7.

Location of Resistivity Measurements

(From Pfeifer, 1987)

- The nuclear methods using moisture-density gauges are restricted to a thin layer at the excavation surface. Calibration of the instrument appears to be difficult.

- In comparing the EM surveys performed by the Colorado School of Mines, there are important differences between the Geonics EM-31 and EM-34 survey results which reflect differences in the volume sampled and moisture content gradients in the rock. This suggests that the media must be modeled as nonhomogeneous.

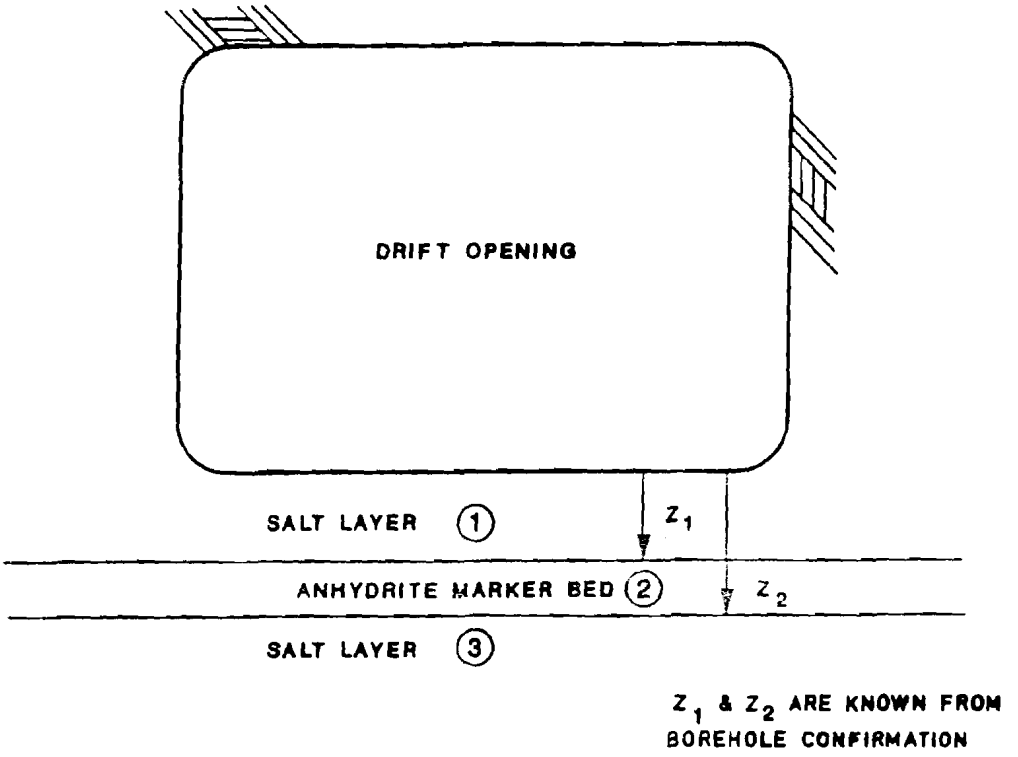
- The assumption of a nonhomogeneous media is further substantiated by comparing the fit of a semi-infinite layer and a three-layer earth model with the large-scale DC resistivity survey. A three-layer model was required to adequately model the data.

- Cultural effects are additional complications in conducting EM or resistivity surveys. It is not possible to completely eliminate these effects and to zero out the instrument. Thus the conductivity results from EM or resistivity surveys should be viewed as an index to moisture incidence in the underground facility.

It is recommended that electromagnetic geophysical surveys with variable spacing of dipoles be performed to aid in determining the lateral extent of brine occurrences at periodic intervals (one year) and in areas where cultural effects are minimal. In performing the surveys and reducing the conductivity data, it is recommended that the experimental design utilize a variable spacing of the dipoles to solve for conductivities in three layers as illustrated in Figure 5-8.

The results of the repository surveys may indicate that there is no systematic variation of conductivity throughout the underground facility. The effects of drying at the repository surface may in fact be the most significant phenomena and may be ubiquitous throughout the underground. On the other hand, the prospecting results may indicate a systematic variation and the need to intensify physical sampling efforts in selected areas of the underground facility.

The advantages of geophysical techniques include: 1) they provide data that is averaged over a volume of rock and 2) they receive their response from different distances into the rock using non-destructive techniques. Although geophysical methods are not subject to the moisture loss which may occur during the collection of physical samples due to dilation during coring or after mining, the overall conclusion is that geophysical methods do not seem to offer any adequate substitute for in situ moisture content measurements. Such measurements are necessary to calibrate the geophysical data. The averaging inherent in the geophysical techniques may be useful in determining general trends toward more moist or less moist areas in new excavations, but we have not made any analyses to determine the relative cost-effectiveness of geophysical techniques over multiple moisture-content measurements made of samples obtained from the excavations.



USE EQUATION

$$\sigma_a = \sigma_1 (1-R(Z_1)) + \sigma_2 (R(Z_1)-R(Z_2)) + \sigma_3 R(Z_2)$$

BY VARYING THE SPACING, THREE EQUATIONS IN THREE UNKNOWNS MAY BE WRITTEN AND SOLVED FOR AT EACH STATION POINT. NOTE THAT THE LATERAL CUMULATIVE SENSITIVITY MAY HAVE TO BE CONSIDERED.

Figure 5-8.

Three-Layer Model for Electromagnetic Vertical Sounding Survey

6.0 PRELIMINARY RESULTS OF A DRILLHOLE VIDEO-CAMERA SURVEY

One of the questions raised during Phase I of the BSEP concerned the exact stratigraphic source of the brine inflows into the WIPP underground drillholes. A drillhole video-camera survey was undertaken in an attempt to help answer that question. The primary objective was to determine if it was possible to observe the location of wet areas or salt encrustations on the walls of drillholes that might indicate points of brine inflow. A secondary objective was to determine the usefulness of the existing drillhole camera in discerning lithologic and structural features.

Twenty-one holes were selected for observation from those used in the BSEP (Deal and Case, 1987, Appendix B). Eleven of these were downholes and ten upholes. Six of these were logged prior to a malfunctioning of the drillhole camera and the observations made are reported here (Table 6-1). The other fifteen holes will be examined at a later date (Table 6-2). Most of the holes are located in Room G and the heated A Rooms (Figure 2-1).

6.1 EQUIPMENT

The first part of this survey was conducted in February and March 1987 using a Circon color drillhole camera fitted with a wide-angle lens which looked at right-angles to the axis of the drillhole. Snap-together aluminum rods 1.8 meters long were attached to the back of the camera and were used to manipulate the camera in the drillholes. The camera was attached to a Circon color video control unit by a cable 15.2 meters long. The cable for this particular camera could not be lengthened without also redesigning the circuitry. This limited the usefulness of the camera as this configuration only allowed the camera to be lowered 13.4 meters into a drillhole. As a result, the bottom part of most holes could not be observed with this equipment.

The control unit was connected to a video recorder and TV monitor (Figure 6-1). The unit is powered by 120V AC current or a 12V DC battery pack. The battery pack was not used during this survey. A Solinst electric sounding tape was used to check the depth to the top of the brine in the boreholes.

6.2 METHOD

Only downholes were examined in this first part of the survey. A few days prior to the survey, the drillholes had been evacuated as part of routine BSEP sampling. Although only small amounts of brine had accumulated since that sampling, the holes were sounded with the Solinst tape to determine the level of the brine prior to the insertion of the camera. This was to ensure that the camera was not inadvertently immersed in brine. Once the level of the brine was determined, the camera was slowly lowered into the hole by a technician using the aluminum rods while the other member of the team watched the TV monitor. The depth of the camera was determined by adding the length of the camera and the length of the aluminum rods attached to it. If an exact depth was needed to record a particular feature, the distance from the top of the rod sticking out of the hole to the collar of the hole was measured and that distance was subtracted from the total length of the rods and the camera. Interesting zones noted on the monitor were examined on all sides of the hole by turning the camera a full 360 degrees. The camera was lowered to

TABLE 6-1

DRILLHOLES INVESTIGATED WITH A VIDEO CAMERA
IN FEBRUARY AND APRIL 1987 AS PART OF THE BSEP

Hole	Room	Location (Mine Coordinates)		Direction	Date Investigated	Depth (Meters)
L1X00	L1	N1538.5	W225.0	DOWN	02/12/87	3.8
DH-38	G	N1101.0	W2182.0	DOWN	02/12/87	14.5
DH-40	G	N1101.0	W2482.0	DOWN	02/12/87	15.5
DH-42	G	N1101.0	W2782.0	DOWN	02/12/87	15.6
DH-42A	G	N1101.0	W2789.0	DOWN	02/12/87	12.3
A2X01	A2	N1393.7	E1338.9	DOWN	04/28/87	15.3

TABLE 6-2

DRILLHOLES TO BE INVESTIGATED AT A FUTURE DATE
WITH A VIDEO CAMERA AS PART OF THE BSEP

Hole	Room	Location (Mine Coordinates)		Direction	Depth (Meters)
BX01	B	N1384.6	E982.3	DOWN	15.3
A1X01	A1	N1147.0	E1254.4	DOWN	15.1
A3X01	A3	N1125.0	E1408.0	DOWN	15.4
DH-36	G	N1102.0	W1882.0	DOWN	15.7
DHP-402A*	Panel 1	S1950	E1320	DOWN	15.2
BX02	B	N1384.4	E982.9	UP	15.0
A1X02	A1	N1146.9	E1254.2	UP	17.0
A2X02	A2	N1393.6	E1338.9	UP	16.1
A3X02	A3	N1125.0	E1408.0	UP	15.5
DH-15	D	N1104.0	E1688.5	UP	15.5
DH-35	G	N1102.0	W1882.0	UP	15.8
DH-37	G	N1101.0	W2182.0	UP	15.7
DH-39	G	N1101.0	W2482.0	UP	15.5
DH-41	G	N1101.0	W2782.0	UP	15.2
DHP-401*	Panel 1	S1950	E1320	UP	15.0

*Locations are approximate.

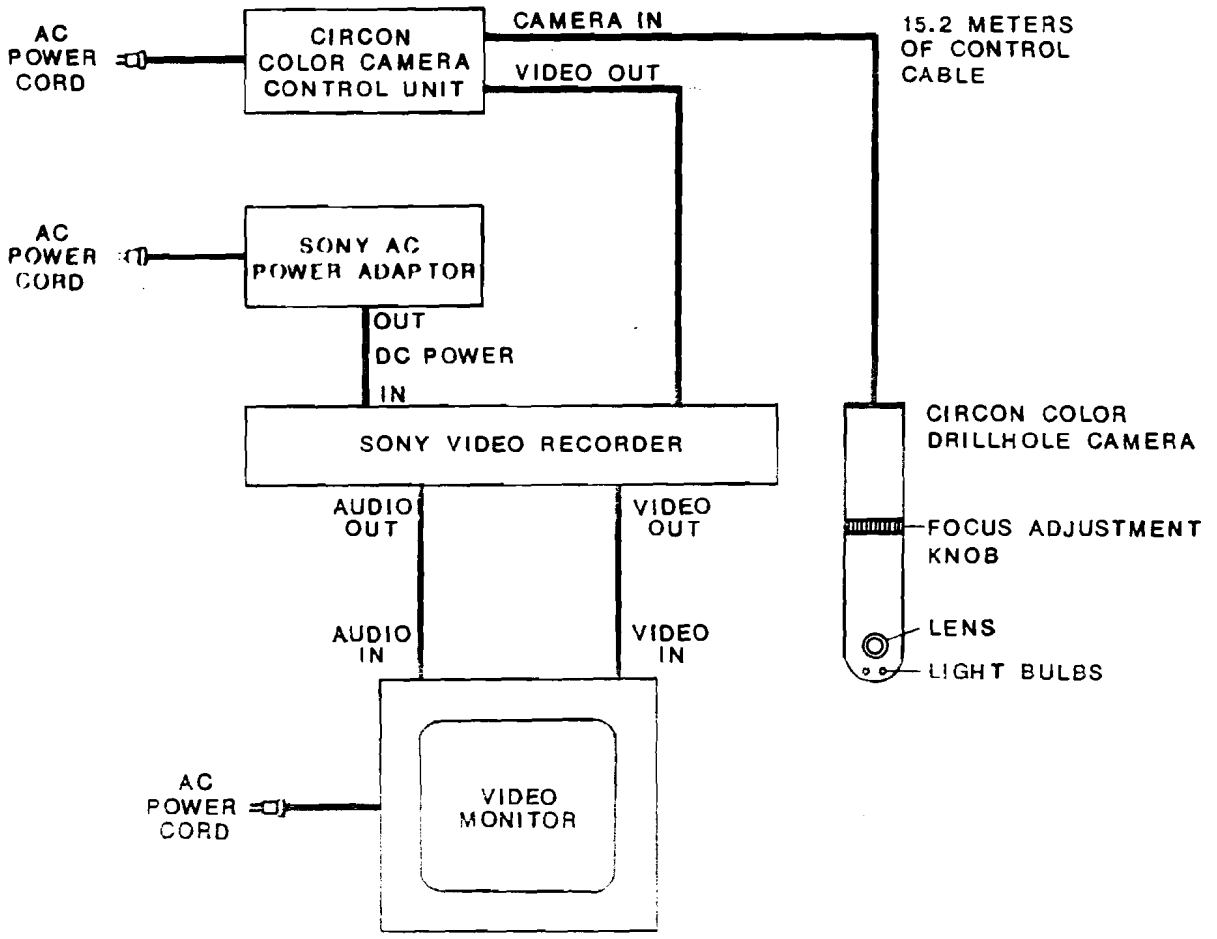


Figure 6-1.

Drillhole Video Camera

within 15 cm of the brine level or to the end of the cable, whichever was shorter. The camera was then retrieved from the hole. All observations and camera depths were recorded on borehole video survey logs.

During this phase of the survey, six drillholes were examined in Room G, Room A2, and Room L1 (Table 6-1). The four holes examined in Room G and one in Room L1 were examined on February 12, 1987, as a trial run to see if the camera would be an effective tool for determining locations of brine inflow. Following this trial run, the data was analyzed and a second trial run was conducted on April 28, 1987 to see if a difference could be observed between a wet borehole wall and one that was reflecting the camera light from dry crystal faces. Water was poured down the wall of a 36 inch borehole that was dry and the camera was moved back and forth from the dry area to the wet area. We thought that we could observe a slight difference between the wet and dry areas. Hole A2X01 in Room A2 was then examined to see if the difference could be detected in a hole where the wet and the dry zones were not side by side. After looking at Hole A2X01, it was determined that the difference between wet areas and areas where dry halite was reflecting the camera lights was not distinctly discernable and could not be defined sufficiently to be used in logging drillholes with this drillhole camera.

6.3 RESULTS

Even though wet and dry areas could not be defined with certainty using the drillhole video camera, we were able to identify other features (Table 6-3). Salt crusts and knobs were observed in all of the holes except DH-38 and an anhydrite bed was identifiable in Holes DH-38, DH-40, and DH-42. In all of the downholes which have a salt crust buildup, the solid 360 degree buildup starts either at the top of or within the polyhalitic anhydrite of MB-139 (Figure 2-3) and ends near the bottom of the unit. Even in Hole A2X01 where the top of MB-139 is 6.9 meters below the collar of the hole, there is a salt crust buildup at the top of the unit. The anhydrite encountered in the three holes in Room G is anhydrite C and in all three holes, it appeared to be wet. Additionally, in one of the three holes, DH-40, a buildup of salt knobs and crusts is formed at the top of the unit and extends 5 to 10 centimeters below the bottom of the unit. Salt knobs and crusts are seen at other stratigraphic horizons but they are not usually as big or as continuous as those associated with MB-139.

6.4 CONCLUSIONS

The buildup of salt crust around MB-139 indicates that it is a source for some of the brines in the drillholes. Anhydrite C, located approximately 10.6 meters below MB-139, is another possible source for brine, as evidenced by the wet appearance of the unit and the buildup of salt crust around it. Another source of brine may be fractures in the rocks as evidenced by the salt buildups between 2.0 and 2.2 meters in Hole A2X01 which occur just below a fracture which was identified in the core when the hole was drilled (Gallerani, 1985).

TABLE 6-3

FEATURES OBSERVED WITH THE VIDEO CAMERA
CORRELATED WITH THE DRILL LOG FOR SELECTED DRILLHOLES

Hole No. Location	Video Log (This Report)		Drill Log (From Gallerani, 1985)	
L1X00	1.7 m	Salt Buildup Starts	1.7 m	----
	2.0 m	Looks Wet	2.3 m	MB-139
Room L1	3.5 m	End of Hole Salt Crust Extends to Bottom	3.7 m	End of Hole
DH-38	10.48 m	Top of Anhydrite C	2.3 m	----
	10.55 m	Bottom of Anhydrite C		MB-139
Room G	13.4 m	End of Survey	2.9 m	----
			10.45 m	----
				Anhydrite C
			10.55 m	
DH-40	1.9 m	Small Salt Knobs	1.6 m	----
	2.7 m	Salt Crust Begins		Polyhalitic Halite
Room G	3.1 m	End Salt Crust	2.1 m	----
	3.3 m	Begin Salt Crust		MB-139
	3.7 m	End Salt Crust	3.3 m	----
	4.3 m	Salt Knobs Built Up		Halite
	10.4 m	Top of Anhydrite	4.6 m	----
	10.5 m	Bottom of Anhydrite	10.7 m	----
		Salt Knobs 3 to 6 cm		Anhydrite C
		Below Anhydrite	10.8 m	----
	13.4 m	End of Survey		
DH-42	2.7 m	Solid Salt Crust Starts	2.2 m	----
	3.0 m	Solid Salt Crust Ends		MB-139
Room G	10.7 m	Top of Anhydrite	3.1 m	----
	10.8 m	Bottom of Anhydrite	8.6 m	Unable to Log/See
	1.3 m	End of Survey	12.1 m	Log for DH-42A
DH-42A	0.9 m	Salt Crust Starts, No Sharp End, Gone By	0	Not Logged/See Log for DH-42
Room G		1.1 m	6.1 m	----
	2.4 m	Salt Crust Starts	10.7 m	Anhydrite C
	2.7 m	Salt Crust Ends	10.9 m	----
	11.9 m	End of Hole		
A2X01	1.6 m	Salt Knobs on West and Northwest Sides	1.4 m	----
				Halite, Crack at
Room A2	2.0 m	Salt Knobs - Appears	2.8 m	6.55 Ft.
		Wet - Crust Not	6.8 m	----
	2.2 m	Continuous All Around		MB-139
	6.7 m	Salt Crust Starts - No Abrupt End, Just Fades Out By 8.0 m	7.6 m	----
	13.4 m	End of Survey		

6.5 CONTINUING WORK

The drillhole survey work was suspended due to failure of the camera. A substitute device is presently being acquired, and we plan to survey the additional five downholes and ten upholes listed on Table 6-2. The results will be released in a future BSEP report.

7.0 SUMMARY

This is an interim report which updates the data released in the BSEP Phase I Report (Deal and Case, 1987). The data contained herein extends those observations through the period from August 1986 through July 1987, which, for some locations, cover periods on the order of 900 days in length. Brine observations at 87 locations are listed in this report.

The data confirm the previous observations that weeps are pervasive throughout the underground workings at WIPP, that they occur on the surfaces of all exposed lithologic units, and that where there are no drillholes, more brine seeps through the ribs (walls) than through the back (roof) of the workings. Weeps develop more quickly on units containing clay, but clear halite and clear polyhalitic halite units also produce weeps, although the initial development of weeps on clay-poor units takes place more slowly. Preliminary observations suggest that more brine may actually seep from clear halite than from argillaceous halite units in some locations over sufficiently long periods of time.

Enough observations have been made as of July 1987 of the amount of brine seeping into and accumulating within 34 downholes to be able to indicate the general accumulation trends as of that date. For those downholes that have been observed for a period of time in excess of 800 days, six that had shown steady or increasing accumulation trends in August 1986 now show slightly decreasing accumulation trends. At the end of July 1987, the trends exhibited by 34 observed downholes were: 15 increasing, 5 steady, 12 decreasing, and 2 dry.

Deal and Case (1987) described situations in which closely-spaced drillholes (notably the MIIT holes in Room J and holes DH42 and 42A in Room G) displayed dramatically differing brine accumulation data which lead them to caution that "the great variation in inflow characteristics between locations only a short distance (a few meters, or in some instances, less than a meter) apart make the discussion of 'averages' or 'typical occurrences' difficult or misleading." Observations during this reporting period of 13 downholes in Room L1 also show striking local variations in brine seepage between closely-spaced locations (most 0.6 meters apart) additionally documenting that caution.

Observations of upholes drilled from the WIPP excavations also confirm the preliminary data presented by Deal and Case (1987). Generally, the upholes produce much less brine than do the downholes. Despite difficulties in instrumentation which may have allowed the loss of some brine from the upholes by lateral movement of brine away from the hole collar, evaporation into the repository atmosphere, and leaks in the collecting systems, the data collected during this reporting period indicate that the upholes typically produce less brine than do the downholes. Sufficient data exists for 17 upholes to observe general accumulation trends as of July 1987. The trends were (Table 2-3): 3 increasing, 2 decreasing, and 12 dry. In contrast, of the 35 downholes (Table 2-2), only 2 are dry.

At one location in the approximately 14 kilometers of WIPP workings excavated by the end of July 1987 sufficient brine spontaneously seeps into a drift to moisten the floor. This location in Room G has been monitored since November 1985 and is producing approximately 0.5 liters of brine per day at the end of this reporting period.

A major objective identified by the preliminary data (Deal and Case, 1987) was the need to better define the relationship between the stratigraphy and the amount of brine that seeps into the workings and drillholes. A series of 12 nearly horizontal drillholes were made in the north wall of the S1950 drift at E100. The data from these holes document that brine seepage, at least in part, correlates with the stratigraphy of the Salado Formation. For those units exposed at the facility level, most brine seeped from the units near the horizon of the "orange band", a slightly polyhalitic halite used as a reference horizon during excavation.

A drillhole video camera was also used to observe suspected damp areas or zones of salt accumulation on the sides of six drillholes. It was not possible to distinguish with certainty those zones that were wet due to the presence of moisture from those zones that appeared "shiny" through the video camera as a result of the camera lights being reflected from crystal surfaces. If, however, evaporation had occurred and salt deposits formed, those salt buildups could be observed. Such occurrences were observed where drillholes penetrated anhydrite MB139 and anhydrite "c". Salt knobs and crusts were also seen at other stratigraphic horizons and, in one case, were associated with a fracture that had been identified in the core when the hole was drilled. The video survey of drillholes was suspended due to failure of the camera and will be continued when a substitute or repaired device is available.

Ten brine samples collected as part of the BSEP, from four locations, have been chemically analyzed to date. They are all saturated, magnesium-rich sodium chloride brines with a specific gravity in excess of 1.2 grams per cubic centimeter.

Moisture content measurements have been made of samples of the rocks exposed in the WIPP excavations and drillholes made from the workings. Data on 106 samples is presented in this report. Sixty of these are from ribs and show a distinct correlation between moisture content and stratigraphy. This investi- gation concentrated on determining the "easily moved" moisture available, and, therefore, measurements of the amount of moisture driven off at 95°C were made. Measurements were also made of the amount of moisture driven off at 150°C, and the results indicated that only 0 to 20 percent additional moisture was driven off at the higher temperature.

Moisture content of facility-horizon rocks measured by the weight lost when heated to 95°C ranged between 0.03 and 2.53 percent by weight. Samples from clay-rich stratigraphic horizons were more moist than clear halite horizons and were also more variable in moisture content from location to location within a given horizon. Specimens from the "orange band" were consistently the least moist.

Preliminary data from cores taken from drillholes also indicate that some stratigraphic horizons are more moist than others. Only a few samples exist from some horizons, so caution should be used in drawing any conclusions from the data included in this report. It does, however, appear that there are zones within the salt that contain more moisture than do the anhydrite interbeds. This contrasts with the observation that in many places more moisture appears to seep from the anhydrite beds than from the salt. Additional moisture content measurements are presently being made, and it will be possible to better define the variation in moisture content in a later report.

For samples comprised predominantly of halite, the analyzed moisture content was approximately 0.5 percent by weight or less. Rocks with a higher clay content had a greater tendency for large, less predictable ranges and were generally more moist. Some samples were almost 3.0 percent by weight water.

The BSEP evaluated a variety of "off-the-shelf", nondestructive, geophysical techniques that might be able to provide rapid and cost-effective estimations of in situ moisture content of the host rock during the excavation of the repository storage panels. Radar, electromagnetics, resistivity, and nuclear-source techniques were evaluated.

The ground-penetrating radar techniques obtain a continuous high-resolution electromagnetic profile of the subsurface. Boundaries between bodies of rock that have contrasting electrical properties will reflect wave energy back to the receiving antenna. Field tests, at other sites, indicated that existing techniques are successful in locating areas that strongly contrast to the host rock, such as steel waste containers buried in clear salt. The presence of clay and void spaces limit penetration and attempts to distinguish between open drillholes and brine-filled drillholes were unsuccessful. Gradational variations in moisture content do not appear to be easily recognizable in the field. Radar methods are judged to have limited applicability in the WIPP BSEP investigations at this time.

Electromagnetic (EM) techniques measure the resulting magnetic field from an electric current induced in a conductor (the rock under investigation) by a magnetic field generated by a portable source. Several field tests, at the WIPP site, were made using EM techniques. Cultural interference (cables, pipes, transformers, etc.) was a problem at many locations, and although it was not possible to completely eliminate those effects, the EM method gave promise as providing an index to relative moisture content of the rocks near the facility horizon.

The electrical resistivity of rocks can be measured by applying a direct current between two electrodes and measuring the resulting potential between two other electrodes. An experimental direct current resistivity technique offers some promise, but neither the equipment nor the data analysis techniques are "off-the-shelf." It is, therefore, not deemed appropriate for use by the BSEP at this time.

Neutron-absorption techniques are routinely used to determine soil moisture content for a variety of engineering and construction purposes. A standard instrument was used underground at WIPP, and although calibrated and operated by manufacturer-trained personnel, it produced readings with errors that were

large enough to cast doubts on the applicability of a standard, off-the-shelf, nuclear moisture-density gauge to make accurate moisture determinations in the salt environment at WIPP.

It is concluded that as far as geophysical techniques are concerned, electromagnetic or resistivity surveys are the most applicable for the BSEP. The advantage of these techniques is that they provide data that is averaged over a volume of rock and receive their response from different distances into the surroundings using a nondestructive technique. Geophysical techniques require, however, that they be calibrated by taking in situ moisture content measurements, and do not seem to offer any adequate substitute for taking those measurements. As far as the immediate needs of the BSEP are concerned, it appears appropriate to obtain those moisture content measurements directly.

The following activities are continuing as part of the BSEP:

- Measurement of brine seepage accumulations and rates
- Chemical analyses of WIPP underground brines
- Measurement of moisture content of Salado Formation rocks
- Photographic documentation of slow changes related to brine seepage that take place at selected locations in the WIPP excavations

That data will be presented in later BSEP reports.

8.0 REFERENCES

Alcorn, S. R., 1983, Occurrence of Brine "Weeps" in the WIPP Facility: Memo to D. K. Shukla, October 3, 1983, WD:83:02910 1.02.00, transmitted to J. M. McGough, U.S. Department of Energy from D'Appolonia, Albuquerque, NM, October 23, 1983, 17 pps.

Archie, G. E., 1942, Electrical Resistivity as an Aid in Core Analysis Interpretation: Transactions of the American Institute of Mining Engineers, v. 146, p. 54.

ASTM, 1982, "Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)," American Society of Testing and Materials, Philadelphia, Pennsylvania, Standard Method D2922-81.

Bateman, R. M., 1985, Open-Hole Log Analysis and Formation Evaluation, International Human Resources Development Corp., Boston, Massachusetts, 647 pps.

Bechtel National, Inc., 1983, Waste Isolation Pilot Plant Preliminary Design Validation Report: prepared for the U.S. Department of Energy by Bechtel National, Inc., San Francisco, CA, 315 pps.

Bechtel National, Inc., 1986a, Interm Geotechnical Field Data Report, DOE-WIPP 86-012, prepared for U.S. Department of Energy by Bechtel National, Inc., San Francisco, CA.

Bechtel National, Inc., 1986b, Waste Isolation Pilot Plant Design Validation Final Report, DOE-WIPP 86-010, prepared for the U.S. Department of Energy by Bechtel National, Inc., San Francisco, CA.

Black, S. R., R. S. Newton, and D. K. Shukla (eds.), 1983, Results of Site Validation Experiments, Waste Isolation Pilot Plant: DOE-TME-3177, prepared for the U.S. Department of Energy by D'Appolonia Consulting Engineers, Albuquerque, NM.

Cook, C. W., 1980, Impulse Radar Scanning of Intact Salt of the Avery Island Mine, SAND 80-0632, Sandia National Laboratories, Albuquerque, NM.

Deal, D. E., 1985, Unpublished Field Notes; IT Corporation, WIPP BSEP Data Files.

Deal, D. E., and J. B. Case, 1987, Brine Sampling and Evaluation Program Phase I Report, DOE-WIPP 87-008, Prepared for the U.S. Department of Energy by Westinghouse Electric Corp. and International Technology Corp., 169 pps.

Fowler, J. C., 1983, "Ground Penetrating Radar - A New High Resolution Geophysical Instrument," Potash Technology: Mining, Processing, Maintenance, Transportation, Occupational Health and Safety, Environment, R. M. Mckercher, Editor, Pergamon Press, New York, 887 pp.

Gallerani, John G., 1985, Unpublished Field Notes and Drill Log of Core from Holes A2X01 and BX01; Bechtel National, Inc., WIPP Data Files.

Geonics, Ltd., 1979, "Operating Manual for EM-31 Non-Contacting Terrain Conductivity Meter," Geonics, Ltd., Mississauga, Ontario.

Grim, R. E., 1978, Clay Mineralogy, 2nd Edition, McGraw-Hill Book Co., New York, 596 pp.

Hohlfelder, J. J., 1981, "Volatile Content of Rock Salt," SAND 79-2349, April 1981, Sandia National Laboratories, Albuquerque, New Mexico.

Hohlfelder, J. J., 1979, "Measurement of Water Lost from Heated Geologic Salt," SAND 79-0462, July 1979, Sandia National Laboratories, Albuquerque, New Mexico.

Jackson, K. J. and Wolery, T. J., Extension of the EQ3/6 Computer Codes to Geochemical Modeling of Brines, UCRL-91121, Lawrence Livermore National Laboratory, Livermore, CA, (1984).

Kelsall, P. C., J. B. Case, and C. R. Chabannes, 1982, "A Preliminary Evaluation of the Rock Mass Disturbance Resulting from Shaft, Tunnel, or Borehole Excavation," ONWI-411, prepared by D'Appolonia Consulting Engineers for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus, Ohio.

Kessels, W., Flentge, I., and Kolditz, H., 1985, DC Geoelectric Sounding to Determine Water Content in the Salt Mine ASSE (FRG): Geophysical Prospecting, Vol. 33, No 3, p. 436-446.

Klein, J., and J. J. LaJoie, 1980, Electromagnetic Prospecting for Minerals, Practical Geophysics for the Exploration Geologist, compiled by Richard Van Blaircom, Northwest Mining Association, Spokane, WA.

McNeill, J. D., 1980, "Electrical Conductivity of Soils and Rocks," Technical Note TN-5, Geonics Ltd., Mississauga, Ontario.

McNeill, J. D., 1983, "Electromagnetic Measurement of Rock Conductivity," Potash Technology: Mining, Processing, Maintenance, Transportation, Occupational Health and Safety, Environment, R. M. Mckercher, editor, Pergamon Press, New York, 887 pp.

Morse, J. G. and B. W. Hassinger, 1985, Brine Testing Program Plan: Waste Isolation Pilot Plant (WIPP) Project, Carlsbad, New Mexico, Revision 2: Internal Document WD:85:01214; Transmitted as a Letter from W. R. Cooper to R. H. Neill, WIPP:AEH 85:086, April 11, 1985.

Pfeifer, M. C., 1987, "Multi-Component Underground DC Resistivity Study at the WIPP Site, S.E. New Mexico: M.S. Thesis, Colorado School of Mines, T-3372.

Powers, D. W., S. J. Lambert, S. Shaffer, L. R. Hill, W. D. Weart, editors, 1978, "Geological Characterization Report, Waste Isolation Pilot Plant (WIPP) Site Southeastern New Mexico," Vol. II, SAND 78-1596, December 1978, Albuquerque, New Mexico.

Sandia National Laboratory, 1987, Technical Progress Report for Month Ending April 30, 1987, Sandia National Laboratories, Waste Management Technical Department, May 1987, Albuquerque, New Mexico.

Stein, C. L. and J. L. Krumhansl, 1986, Chemistry of Brines in Salt from the Waste Isolation Pilot Plant (WIPP), Southeastern New Mexico: A Preliminary Investigation, SAND 85-0897, Sandia National Laboratories, Albuquerque, NM, 38 pps.

Todd, D. K., 1980, Groundwater Hydrology, John Wiley & Sons, Inc., New York, 535 pp.

TSC-D'Appolonia, 1983, Quarterly Geotechnical Field Data Report - July 1983: WIPP-DOE-163, Compiled for the U.S. Department of Energy by TSC-D'Appolonia, Albuquerque, NM.

U.S. Department of Energy, 1982, "Site Validation Program, Waste Isolation Pilot Plant," WIPP-DOE-116, Rev 1, October 1982, 21 pp.

U.S. Department of Energy, 1986, Waste Isolation Pilot Plant Safety Analysis Report, Amendment 9: Waste Isolation Pilot Plant, Carlsbad, NM, 2 vols.

Unterberger, R. R., 1981, "Subsurface Radar Application in the Delaware Basin," SAND 81-7153, October, 1981, Sandia National Laboratories, Albuquerque, NM.

VandeKraats, J., 1986, Testing of Reconstituted Salt Backfill for Suitability as a Base for the RH TRU Mock Demonstration at the Waste Isolation Pilot Plant, Carlsbad, NM, IT Corporation Letter Report to Westinghouse Electric Corporation, WIPP Project Correspondence Reference Number EA:86:0787.

Wolery, T. J., EQ3NR, A Computer Program for Geochemical Aqueous Speciation--Solubility Calculations: User's Guide and Documentation, Lawrence Livermore National Laboratory, Livermore, CA, UCRL-53414, (1983).

BRINE ACCUMULATION DATA TABLES

This appendix contains copies of the brine accumulation data collected by the WIPP Brine Sampling and Evaluation Program through August 12, 1987. The brine measurements were made in accordance with WIPP Procedure WP 07-410. Sampling methodology, data handling, and calculations have been discussed by Deal and Case (1987), and reference is made to that document for a thorough discussion of the data.

BSEP DATA FOR HOLE A1X01

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
A1X01	10/10/84	00:00	NA	0.000	0.000	0.00	0.000	Room A1 completed.
A1X01	02/26/85	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 2/21/85 to 2/26/85.
A1X01	03/12/85	12:20	00.08	70.514	1.000	0.08	0.000	First time collected.
A1X01	03/20/85	13:30	00.38	78.562	8.048	0.46	0.047	Brine plus some muck.
A1X01	03/26/85	11:25	00.23	84.476	5.914	0.69	0.039	Muck in hole, valved leaked, some brine drained back down hole.
A1X01	04/02/85	12:15	00.39	91.510	7.034	1.08	0.055	
A1X01	04/10/85	12:20	00.33	99.514	8.004	1.41	0.041	
A1X01	04/17/85	11:30	00.28	106.479	6.965	1.69	0.040	
A1X01	04/23/85	10:50	00.23	112.451	5.972	1.92	0.039	
A1X01	04/30/85	13:26	00.26	119.560	7.109	2.18	0.037	
A1X01	05/07/85	09:10	00.25	126.382	6.822	2.43	0.037	
A1X01	05/14/85	10:06	00.24	133.421	7.039	2.67	0.034	
A1X01	05/21/85	11:40	00.26	140.486	7.065	2.93	0.037	
A1X01	05/29/85	10:00	00.27	148.417	7.931	3.20	0.034	
A1X01	06/04/85	10:20	00.20	154.431	6.014	3.40	0.033	
A1X01	06/11/85	09:40	00.23	161.403	6.972	3.63	0.033	
A1X01	06/18/85	09:34	00.23	168.399	6.996	3.86	0.033	
A1X01	06/25/85	09:40	00.22	175.403	7.004	4.08	0.031	
A1X01	07/02/85	11:00	00.23	182.458	7.055	4.31	0.033	
A1X01	07/09/85	10:00	00.23	189.417	6.959	4.54	0.033	
A1X01	07/16/85	10:55	00.23	196.455	7.038	4.77	0.033	
A1X01	07/24/85	10:00	00.25	204.417	7.962	5.02	0.031	
A1X01	07/30/85	09:32	00.19	210.397	5.980	5.21	0.032	
A1X01	08/06/85	09:37	00.21	217.401	7.004	5.42	0.030	
A1X01	08/14/85	09:48	00.23	225.408	8.007	5.65	0.029	
A1X01	08/20/85	10:18	00.19	231.429	6.021	5.84	0.032	
A1X01	08/28/85	09:13	00.23	239.384	7.955	6.07	0.029	
A1X01	09/04/85	09:46	00.19	246.407	7.023	6.26	0.027	
A1X01	09/10/85	09:30	00.18	252.396	5.989	6.44	0.030	
A1X01	09/17/85	09:10	00.19	259.382	6.986	6.63	0.027	
A1X01	09/24/85	09:11	00.21	266.383	7.001	6.84	0.030	
A1X01	10/01/85	09:23	00.21	273.391	7.008	7.05	0.030	
A1X01	10/08/85	12:24	00.20	280.517	7.126	7.25	0.028	Room A1 heaters turned on 10/02/85.
A1X01	10/15/85	09:43	00.19	287.405	6.888	7.44	0.028	
A1X01	10/23/85	09:55	00.20	295.413	8.008	7.64	0.025	
A1X01	10/29/85	11:05	00.17	301.462	6.049	7.81	0.028	
A1X01	11/05/85	08:50	00.19	308.368	6.906	8.00	0.028	
A1X01	11/13/85	09:15	00.22	316.385	8.017	8.22	0.027	
A1X01	11/21/85	10:40	00.21	324.444	8.059	8.43	0.026	
A1X01	11/26/85	10:10	00.14	329.424	4.980	8.57	0.028	
A1X01	12/04/85	14:13	00.20	337.592	8.168	8.77	0.024	
A1X01	12/10/85	10:40	00.15	343.444	5.852	8.92	0.026	
A1X01	12/17/85	13:59	00.19	350.583	7.139	9.11	0.027	
A1X01	01/03/86	09:40	00.41	367.403	16.820	9.52	0.024	
A1X01	01/08/86	10:20	00.09	372.431	5.028	9.61	0.018	
A1X01	01/16/86	09:50	00.25	380.410	7.979	9.86	0.031	
A1X01	01/23/86	10:10	00.18	387.424	7.014	10.04	0.026	
A1X01	01/31/86	11:05	00.21	395.462	8.038	10.25	0.026	
A1X01	02/12/86	10:10	00.30	407.424	11.962	10.55	0.025	
A1X01	02/19/86	10:55	00.18	414.455	7.031	10.73	0.026	
A1X01	02/28/86	14:05	00.23	423.587	9.132	10.96	0.025	
A1X01	03/06/86	10:00	00.15	429.417	5.830	11.11	0.026	
A1X01	03/13/86	09:30	00.18	436.396	6.979	11.29	0.026	
A1X01	03/26/86	09:20	00.33	449.389	12.993	11.62	0.025	
A1X01	04/02/86	09:00	00.18	456.375	6.986	11.80	0.026	
A1X01	04/08/86	09:09	00.15	462.381	6.006	11.95	0.025	
A1X01	04/16/86	11:30	00.20	470.479	8.098	12.15	0.025	
A1X01	04/24/86	09:35	00.20	478.399	7.920	12.35	0.025	
A1X01	04/30/86	10:13	00.15	484.426	6.027	12.50	0.025	
A1X01	05/06/86	09:40	00.12	490.403	5.977	12.62	0.020	
A1X01	05/13/86	09:25	00.19	497.392	6.989	12.81	0.027	
A1X01	05/20/86	10:16	00.18	504.428	7.036	12.99	0.026	
A1X01	05/27/86	15:05	00.18	511.628	7.200	13.17	0.025	
A1X01	06/03/86	09:28	00.17	518.394	6.766	13.34	0.025	
A1X01	06/10/86	10:50	00.15	525.451	7.057	13.49	0.021	
A1X01	06/17/86	09:59	00.19	532.416	6.965	13.68	0.027	
A1X01	06/24/86	10:10	00.18	539.424	7.008	13.86	0.026	
A1X01	07/01/86	12:46	00.19	546.532	7.108	14.05	0.027	
A1X01	07/08/86	10:05	00.16	553.420	6.888	14.21	0.023	

BSEP DATA FOR HOLE A1X01

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
A1X01	07/16/86	09:57	00.20	561.415	7.995	14.41	0.025	
A1X01	07/22/86	09:26	00.16	567.393	5.978	14.57	0.027	
A1X01	07/29/86	10:05	00.17	574.420	7.027	14.74	0.024	
A1X01	08/05/86	10:21	00.19	581.431	7.011	14.93	0.027	
A1X01	08/12/86	09:58	00.18	588.415	6.984	15.11	0.026	
A1X01	08/19/86	10:40	00.18	595.444	7.029	15.29	0.026	
A1X01	08/26/86	10:07	00.18	602.422	6.978	15.47	0.026	
A1X01	09/04/86	10:02	00.20	611.418	8.996	15.67	0.022	
A1X01	09/09/86	10:30	00.15	616.438	5.020	15.82	0.030	
A1X01	09/16/86	09:36	00.18	623.400	6.962	16.00	0.026	
A1X01	09/23/86	09:41	00.18	630.403	7.003	16.18	0.026	
A1X01	10/01/86	11:40	00.19	638.486	8.083	16.37	0.024	
A1X01	10/08/86	10:34	00.17	645.440	6.954	16.54	0.024	
A1X01	10/14/86	10:57	00.15	651.456	6.016	16.69	0.025	
A1X01	11/05/86	10:30	0.55	673.438	21.982	17.24	0.025	
A1X01	11/20/86	11:45	00.38	688.490	15.052	17.62	0.025	
A1X01	12/31/86	12:05	00.96	729.503	41.013	18.58	0.023	
A1X01	02/03/87	12:15	00.80	763.510	34.007	19.38	0.024	
A1X01	03/06/87	11:55	0.79	794.497	30.987	20.17	0.025	
A1X01	03/30/87	11:58	0.59	818.499	24.002	20.76	0.025	
A1X01	05/07/87	10:50	0.98	856.451	37.952	21.74	0.026	
A1X01	06/17/87	11:40	1.04	897.486	41.035	22.78	0.025	
A1X01	07/28/87	11:45	1.17	938.490	41.004	23.95	0.029	

BSEP DATA FOR HOLE A1X02

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
A1X02	10/10/84	00:00	NA	0.000	0.000	0.00	0.000	Room A1 completed.
A1X02	03/07/85	09:30	NA	65.396	1.000	0.00	0.000	Uphole drilled 2/27/85 to 3/07/85. Hit brine at ft. on 2/27/85.
A1X02	03/12/85	12:00	NA	70.500	6.104	0.00	0.000	Trace brine, deepened hole to clay seam. Moisture on back 1 ft radius.
A1X02	03/20/85	13:00	NA	78.542	14.146	0.00	0.000	Trace brine, drip missing funnel.
A1X02	03/26/85	11:25	NA	84.476	20.080	0.00	0.000	Repositioned funnel, collected one cup of salt crystals with trace of brine.
A1X02	04/02/85	12:15	00.21	91.510	27.114	0.21	0.008	Some drips missing funnel.
A1X02	04/10/85	12:20	00.22	99.514	8.004	0.43	0.027	Collecting container had leak.
A1X02	04/17/85	11:30	00.12	106.479	6.965	0.55	0.017	Some drips missing funnel.
A1X02	04/23/85	10:50	00.12	112.451	5.972	0.67	0.020	Some drips missing funnel.
A1X02	04/30/85	13:16	00.12	119.553	7.102	0.79	0.017	Some drips missing funnel.
A1X02	05/07/85	09:05	00.16	126.378	6.825	0.95	0.023	
A1X02	05/14/85	10:04	00.19	133.419	7.041	1.14	0.027	
A1X02	05/21/85	11:35	00.13	140.483	7.064	1.27	0.018	Some drips missing funnel.
A1X02	05/29/85	10:00	00.21	148.417	7.934	1.48	0.026	
A1X02	06/04/85	10:25	00.17	154.434	6.017	1.65	0.028	
A1X02	06/11/85	09:40	00.05	161.403	6.969	1.70	0.007	
A1X02	06/18/85	09:30	00.08	168.396	6.993	1.78	0.011	Some drips missing funnel, big stalactite formed
A1X02	06/25/85	09:45	00.16	175.406	7.010	1.94	0.023	
A1X02	07/02/85	11:00	00.10	182.458	7.052	2.04	0.014	
A1X02	07/09/85	09:58	00.15	189.415	6.957	2.19	0.022	
A1X02	07/16/85	10:53	00.24	196.453	7.038	2.43	0.034	
A1X02	07/24/85	09:49	00.24	204.409	7.956	2.67	0.030	
A1X02	07/30/85	09:30	00.15	210.396	5.987	2.82	0.025	
A1X02	08/06/85	09:35	00.14	217.399	7.003	2.96	0.020	
A1X02	08/14/85	09:26	00.05	225.393	7.994	3.01	0.006	
A1X02	08/20/85	10:13	00.09	231.426	6.033	3.10	0.015	
A1X02	08/28/85	09:08	00.06	239.381	7.955	3.16	0.008	
A1X02	09/04/85	09:44	00.07	246.406	7.025	3.23	0.010	
A1X02	09/10/85	09:24	00.12	252.392	5.986	3.35	0.020	
A1X02	09/17/85	09:08	00.13	259.381	6.989	3.48	0.019	Some drips missing funnel.
A1X02	09/24/85	09:07	00.17	266.380	6.999	3.65	0.024	
A1X02	10/01/85	09:21	00.14	273.390	7.010	3.79	0.020	
A1X02	10/08/85	12:19	00.16	280.513	7.123	3.95	0.022	Room A1 heaters turned on 10/02/85.
A1X02	10/15/85	09:41	00.12	287.403	6.890	4.07	0.017	
A1X02	10/23/85	09:43	00.19	295.405	8.002	4.26	0.024	
A1X02	10/29/85	11:02	00.12	301.460	6.055	4.38	0.020	
A1X02	11/05/85	08:46	00.12	308.365	6.905	4.50	0.017	
A1X02	11/13/85	09:16	00.13	316.386	8.021	4.63	0.016	Some drips missing funnel.
A1X02	11/21/85	10:45	00.13	324.448	8.062	4.76	0.016	Some drips missing funnel.
A1X02	12/04/85	14:07	00.14	337.588	13.140	4.90	0.011	
A1X02	12/10/85	10:31	00.08	343.438	5.850	4.98	0.014	
A1X02	12/17/85	13:56	00.03	350.581	7.143	5.01	0.004	
A1X02	01/03/86	09:40	00.01	367.403	16.822	5.02	0.001	Some drips missing funnel.
A1X02	01/23/86	10:10	00.06	387.424	20.021	5.08	0.003	New, larger funnel since 01/17.
A1X02	01/31/86	11:05	00.23	395.462	8.038	5.31	0.029	
A1X02	02/12/86	10:10	00.22	407.424	11.962	5.53	0.018	
A1X02	02/19/86	10:50	00.07	414.451	7.027	5.60	0.010	
A1X02	02/28/86	14:00	00.02	423.583	9.132	5.62	0.002	
A1X02	03/13/86	09:30	00.05	436.396	12.813	5.67	0.004	
A1X02	03/26/86	09:20	00.05	449.389	12.993	5.72	0.004	
A1X02	04/02/86	09:00	00.08	456.375	6.986	5.80	0.011	
A1X02	04/16/86	11:30	00.10	470.479	14.104	5.90	0.007	
A1X02	04/24/86	09:35	00.05	478.399	7.920	5.95	0.006	
A1X02	04/30/86	10:10	00.07	484.424	6.025	6.02	0.012	
A1X02	05/06/86	09:40	00.16	490.403	5.979	6.18	0.027	
A1X02	05/13/86	09:25	00.02	497.392	6.989	6.20	0.003	
A1X02	05/20/86	10:16	00.04	504.428	7.036	6.24	0.006	
A1X02	05/27/86	15:05	00.15	511.628	7.200	6.39	0.021	
A1X02	06/03/86	09:28	00.13	518.394	6.766	6.52	0.019	
A1X02	06/10/86	10:50	00.10	525.451	7.057	6.62	0.014	
A1X02	06/17/86	09:59	00.12	532.416	6.965	6.74	0.017	
A1X02	06/24/86	10:10	00.25	539.424	7.008	6.99	0.036	
A1X02	07/01/86	12:44	00.23	546.531	7.107	7.22	0.032	
A1X02	07/08/86	10:05	00.11	553.420	6.889	7.33	0.016	
A1X02	07/16/86	09:54	00.25	561.413	7.993	7.58	0.031	
A1X02	07/22/86	09:26	00.16	567.393	5.980	7.74	0.027	
A1X02	07/29/86	10:05	00.26	574.420	7.027	8.00	0.037	

BSEP DATA FOR HOLE A1X02

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
A1X02	08/05/86	10:19	00.22	581.430	7.010	8.22	0.031	
A1X02	08/12/86	09:58	00.28	588.415	6.985	8.50	0.040	
A1X02	08/19/86	10:38	00.26	595.443	7.028	8.76	0.037	
A1X02	08/26/86	10:07	00.24	602.422	6.979	9.00	0.034	
A1X02	09/04/86	10:01	00.35	611.417	8.995	9.35	0.039	
A1X02	09/09/86	10:25	00.17	616.434	5.017	9.52	0.034	
A1X02	09/16/86	09:35	00.27	623.399	6.965	9.79	0.039	
A1X02	09/23/86	09:39	00.26	630.402	7.003	10.05	0.037	
A1X02	10/01/86	11:39	00.24	638.485	8.083	10.29	0.030	
A1X02	10/08/86	10:32	00.17	645.439	6.954	10.46	0.024	
A1X02	10/14/86	10:53	00.13	651.453	6.014	10.59	0.022	
A1X02	11/05/86	10:30	0.30	673.438	21.985	10.89	0.014	
A1X02	11/20/86	11:43	00.11	688.488	15.050	11.00	0.007	
A1X02	12/31/86	12:10	00.14	729.507	41.019	11.14	0.003	Low readings from 11/20/86 to 6/20/87 may be due to blockage in collecting system.
A1X02	02/03/87	12:16	NA	763.000	33.493	11.14	0.000	
A1X02	03/06/87	11:55	0.05	794.497	64.990	11.19	0.001	
A1X02	03/30/87	11:55	0.01	818.497	24.000	11.20	0.000	Tubing plugged, unable to open.
A1X02	05/07/87	10:45	0.01	856.448	1.000	11.21	0.000	Tubing plugged, unable to open.
A1X02	06/30/87	12:00	1.58	910.500	92.003	12.79	0.017	Removed metal funnel, which was plugged. Most of the brine collected was in the funnel. Installed a large plastic funnel.
A1X02	07/28/87	11:45	0.85	938.490	27.990	13.64	0.030	

BSEP DATA FOR HOLE A2X01

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
A2X01	07/25/84	00:00	NA	0.000	0.000	0.00	0.000	Room A2 completed.
A2X01	02/09/85	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 2/04/85 to 2/09/85.
A2X01	02/19/85	13:20	NA	49.556	1.000	0.00	0.000	Moist muck. First entry.
A2X01	03/07/85	09:30	00.29	65.396	16.840	0.29	0.017	Lots of muck, some oil.
A2X01	03/12/85	11:30	00.62	70.479	5.083	0.91	0.122	Brine and muck.
A2X01	03/20/85	13:04	00.52	78.544	8.065	1.43	0.064	
A2X01	03/26/85	11:02	00.38	84.460	5.916	1.81	0.064	
A2X01	04/02/85	11:58	00.36	91.499	7.039	2.17	0.051	
A2X01	04/10/85	11:53	00.36	99.495	7.996	2.53	0.045	Some muck included.
A2X01	04/17/85	11:10	00.27	106.465	6.970	2.80	0.039	
A2X01	04/23/85	10:30	00.24	112.438	5.973	3.04	0.040	
A2X01	04/30/85	13:50	00.29	119.576	7.138	3.33	0.041	
A2X01	05/07/85	08:45	00.25	126.365	6.789	3.58	0.037	
A2X01	05/14/85	09:40	00.24	133.403	7.038	3.82	0.034	
A2X01	05/21/85	12:08	00.24	140.506	7.103	4.06	0.034	
A2X01	05/29/85	09:00	00.26	148.375	7.869	4.32	0.033	
A2X01	06/04/85	09:35	00.20	154.399	6.024	4.52	0.033	
A2X01	06/11/85	09:15	00.23	161.385	6.986	4.75	0.033	
A2X01	06/18/85	09:15	00.23	168.385	7.000	4.98	0.033	
A2X01	06/25/85	09:15	00.23	175.385	7.000	5.21	0.033	
A2X01	07/02/85	11:00	00.23	182.458	7.073	5.44	0.033	
A2X01	07/09/85	09:29	00.22	189.395	6.937	5.66	0.032	
A2X01	07/16/85	10:30	00.23	196.438	7.043	5.89	0.033	Brine effervesces.
A2X01	07/24/85	09:39	00.24	204.402	7.964	6.13	0.030	
A2X01	07/30/85	08:55	00.19	210.372	5.970	6.32	0.032	
A2X01	08/06/85	09:21	00.21	217.390	7.018	6.53	0.030	
A2X01	08/14/85	09:05	00.25	225.378	7.988	6.78	0.031	
A2X01	08/20/85	09:50	00.19	231.410	6.032	6.97	0.031	
A2X01	08/28/85	08:45	00.21	239.365	7.955	7.18	0.026	Valved leaked, some brine drained back down no
A2X01	09/04/85	09:21	00.25	246.390	7.025	7.43	0.036	
A2X01	09/10/85	09:09	00.18	252.381	5.991	7.61	0.030	
A2X01	09/17/85	08:50	00.21	259.368	6.987	7.82	0.030	
A2X01	09/24/85	08:48	00.21	266.367	6.999	8.03	0.030	
A2X01	10/01/85	09:12	00.21	273.383	7.016	8.24	0.030	
A2X01	10/08/85	12:57	00.21	280.540	7.157	8.45	0.029	Room A2 heaters turned on 10/02/85.
A2X01	10/15/85	09:20	00.20	287.389	6.849	8.65	0.029	
A2X01	10/23/85	09:32	00.22	295.397	8.008	8.87	0.027	
A2X01	10/29/85	11:20	00.15	301.472	6.075	9.02	0.025	
A2X01	11/05/85	08:28	00.21	308.353	6.881	9.23	0.031	
A2X01	11/13/85	09:00	00.23	316.375	8.022	9.46	0.029	
A2X01	11/21/85	10:15	00.23	324.427	8.052	9.69	0.029	
A2X01	11/26/85	09:40	00.14	329.403	4.976	9.83	0.028	
A2X01	12/04/85	13:45	00.20	337.573	8.170	10.03	0.024	
A2X01	12/10/85	10:56	00.16	343.456	5.883	10.19	0.027	
A2X01	12/17/85	13:39	00.21	350.569	7.113	10.40	0.030	
A2X01	01/03/86	09:30	00.47	367.396	16.827	10.87	0.028	
A2X01	01/08/86	09:50	00.15	372.410	5.014	11.02	0.030	
A2X01	01/16/86	09:20	00.22	380.389	7.979	11.24	0.028	
A2X01	01/23/86	09:40	00.19	387.403	7.014	11.43	0.027	
A2X01	01/31/86	10:45	00.25	395.448	8.045	11.68	0.031	
A2X01	02/12/86	09:40	00.34	407.403	11.955	12.02	0.028	
A2X01	02/19/86	14:20	00.12	414.597	7.194	12.14	0.017	Suction soil probe was used, some fluid was le in hole.
A2X01	02/28/86	14:30	00.20	423.604	9.007	12.34	0.022	Soil suction probe was used, some fluid left i hole.
A2X01	03/04/86	09:00	00.15	427.375	3.771	12.49	0.040	
A2X01	03/06/86	09:30	00.07	429.396	2.021	12.56	0.035	Two days accumulation.
A2X01	03/13/86	09:00	00.15	436.375	6.979	12.71	0.021	
A2X01	03/26/86	09:05	00.15	449.378	13.003	12.76	0.011	Partial evacuation, brine left in hole.
A2X01	04/02/86	08:40	00.32	456.361	6.983	13.08	0.046	
A2X01	04/08/86	08:50	00.19	462.368	6.007	13.27	0.032	
A2X01	04/16/86	10:45	00.15	470.448	8.080	13.42	0.019	
A2X01	04/24/86	09:20	00.24	478.389	7.941	13.66	0.030	Removed suction probe.
A2X01	04/30/86	09:55	00.20	484.413	6.024	13.86	0.033	Resumed sampling with bailer.
A2X01	05/06/86	09:25	00.13	490.392	5.979	13.99	0.022	
A2X01	05/13/86	09:10	00.20	497.382	6.990	14.19	0.029	
A2X01	05/20/86	09:45	00.20	504.406	7.024	14.39	0.028	
A2X01	05/27/86	14:45	00.20	511.615	7.209	14.59	0.028	
A2X01	06/03/86	09:10	00.19	518.382	6.767	14.78	0.028	
A2X01	06/10/86	10:34	00.19	525.440	7.058	14.97	0.027	

BSEP DATA FOR HOLE A2X01

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
A2X01	06/17/86	09:38	00.19	532.401	6.961	15.16	0.027	
A2X01	06/24/86	09:55	00.18	539.413	7.012	15.34	0.026	
A2X01	07/01/86	12:17	00.19	546.512	7.099	15.53	0.027	
A2X01	07/08/86	09:37	00.19	553.401	6.889	15.72	0.028	
A2X01	07/16/86	09:37	00.18	561.401	8.000	15.90	0.022	
A2X01	07/22/86	09:10	00.18	567.382	5.981	16.08	0.030	
A2X01	07/29/86	09:50	00.18	574.410	7.028	16.26	0.026	
A2X01	08/05/86	10:03	00.13	581.419	7.009	16.39	0.019	
A2X01	08/12/86	09:40	00.18	588.403	6.984	16.57	0.026	
A2X01	08/19/86	10:20	00.18	595.431	7.028	16.75	0.026	
A2X01	08/26/86	09:51	00.17	602.410	6.979	16.92	0.024	
A2X01	09/04/86	09:41	00.15	611.403	8.993	17.07	0.017	
A2X01	09/09/86	10:50	00.16	616.451	5.048	17.23	0.032	
A2X01	09/16/86	09:17	00.22	623.387	6.936	17.45	0.032	
A2X01	09/23/86	09:25	00.17	630.392	7.005	17.62	0.024	
A2X01	10/01/86	11:21	00.32	638.473	8.081	17.94	0.040	
A2X01	10/08/86	10:10	00.17	645.424	6.951	18.11	0.024	
A2X01	10/14/86	10:36	00.17	651.442	6.018	18.28	0.028	
A2X01	11/05/86	10:10	0.51	673.424	21.982	18.79	0.023	
A2X01	11/20/86	11:05	00.29	688.462	15.038	19.08	0.019	
A2X01	12/31/86	11:25	00.96	729.476	41.014	20.04	0.023	
A2X01	02/03/87	11:30	00.80	763.479	34.003	20.84	0.024	
A2X01	03/06/87	11:50	0.77	794.493	31.014	21.61	0.025	
A2X01	03/30/87	11:55	0.62	818.503	24.010	22.23	0.026	
A2X01	05/07/87	10:06	0.90	856.421	37.918	23.13	0.024	
A2X01	06/17/87	11:15	1.05	897.469	41.048	24.18	0.026	
A2X01	07/28/87	12:15	1.10	938.510	41.041	25.28	0.027	

BSEP DATA FOR HOLE A2X02

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
A2X02	07/25/84	00:00	NA	0.000	0.000	0.00	0.000	Room A2 completed.
A2X02	02/19/85	13:20	NA	49.556	1.000	0.00	0.000	Uphole drilled 2/11/85 to 2/20/85, installed collecting device.
A2X02	03/07/85	09:30	00.34	65.396	16.840	0.34	0.020	Moist area 1.5 ft. around the collar.
A2X02	03/12/85	11:30	00.21	70.479	5.083	0.55	0.041	Back wet, 5 ft diameter.
A2X02	03/20/85	13:04	00.31	78.544	8.065	0.86	0.038	
A2X02	03/26/85	11:02	00.14	84.460	5.916	1.00	0.024	
A2X02	04/02/85	11:58	00.12	91.499	7.039	1.12	0.017	Significant salt buildup. 4' dia. wet spot on back.
A2X02	04/10/85	11:53	00.11	99.495	7.996	1.23	0.014	Reset collecting device.
A2X02	04/23/85	10:30	00.01	112.438	12.943	1.24	0.001	
A2X02	05/07/85	08:41	NA	126.362	13.924	1.24	0.000	Some drips missing funnel.
A2X02	05/14/85	09:40	NA	133.403	20.965	1.24	0.000	Some drips missing funnel.
A2X02	07/09/85	09:25	00.05	189.392	76.954	1.29	0.001	
A2X02	07/16/85	10:23	00.06	196.433	7.041	1.35	0.009	
A2X02	07/24/85	09:33	00.02	204.398	7.965	1.37	0.003	
A2X02	08/06/85	09:22	00.01	217.390	12.992	1.38	0.001	
A2X02	08/28/85	08:35	00.01	239.358	21.968	1.39	0.000	Some drips missing funnel.
A2X02	09/04/85	09:18	00.08	246.387	7.029	1.47	0.011	
A2X02	09/10/85	09:04	00.02	252.378	5.991	1.49	0.003	
A2X02	09/17/85	08:55	00.02	259.372	6.994	1.51	0.003	
A2X02	10/15/85	09:17	00.02	287.387	28.015	1.53	0.001	Room A2 heaters turned on 10/02/85.
A2X02	01/31/86	10:40	00.05	395.444	108.057	1.58	0.000	
A2X02	02/12/86	09:40	00.02	407.403	11.959	1.60	0.002	
A2X02	03/13/86	09:00	00.01	436.375	28.972	1.61	0.000	
A2X02	03/26/86	09:05	00.07	449.378	13.003	1.68	0.005	
A2X02	04/02/86	08:40	00.10	456.361	6.983	1.78	0.014	High reading probably due to unplugging temporary blockage in collecting tube on 3/26/86.
A2X02	04/16/86	10:45	00.09	470.448	14.087	1.87	0.006	
A2X02	04/24/86	09:20	00.02	478.389	7.941	1.89	0.003	
A2X02	04/30/86	09:55	00.02	484.413	6.024	1.91	0.003	
A2X02	05/06/86	09:25	00.02	490.392	5.979	1.93	0.003	
A2X02	05/13/86	09:10	NA	497.382	6.990	1.93	0.000	Trace collected.
A2X02	05/20/86	09:45	NA	504.406	7.024	1.93	0.000	Trace collected.
A2X02	06/03/86	09:10	NA	518.382	21.000	1.93	0.000	Trace collected.
A2X02	06/10/86	10:34	NA	525.440	28.058	1.93	0.000	Trace collected.
A2X02	06/17/86	09:38	00.01	532.401	35.019	1.94	0.000	
A2X02	06/24/86	09:50	00.35	539.410	7.009	2.29	0.050	Very humid air. High reading probably due to unplugging of temporary blockage in collecting tube on 6/17/86.
A2X02	07/01/86	12:15	00.28	546.510	7.100	2.57	0.039	
A2X02	07/08/86	09:27	00.17	553.394	6.884	2.74	0.025	
A2X02	07/16/86	09:33	00.14	561.398	8.004	2.88	0.017	
A2X02	07/22/86	09:09	00.05	567.381	5.983	2.93	0.008	
A2X02	07/29/86	09:50	00.12	574.410	7.029	3.05	0.017	
A2X02	08/05/86	09:59	00.07	581.416	7.006	3.12	0.010	
A2X02	08/12/86	09:40	00.12	588.403	6.987	3.24	0.017	
A2X02	08/19/86	10:20	00.11	595.431	7.028	3.35	0.016	
A2X02	08/26/86	09:50	00.07	602.410	6.979	3.42	0.010	
A2X02	09/04/86	09:40	00.11	611.403	8.993	3.53	0.012	
A2X02	09/09/86	10:48	00.06	616.450	5.047	3.59	0.012	
A2X02	09/16/86	09:15	00.08	623.385	6.935	3.67	0.012	
A2X02	09/23/86	09:23	00.07	630.391	7.006	3.74	0.010	
A2X02	10/01/86	11:10	00.09	638.465	8.074	3.83	0.011	
A2X02	10/08/86	10:08	00.05	645.422	6.957	3.88	0.007	
A2X02	10/14/86	10:35	00.03	651.441	6.019	3.91	0.005	
A2X02	11/05/86	10:08	0.10	673.422	21.981	4.01	0.005	
A2X02	11/20/86	11:03	00.10	688.460	15.038	4.11	0.007	
A2X02	12/31/86	11:20	00.40	729.472	41.012	4.51	0.010	
A2X02	02/03/87	11:25	00.11	763.476	34.004	4.62	0.003	
A2X02	03/06/87	11:50	0.05	794.493	31.017	4.67	0.002	
A2X02	03/30/87	12:02	0.03	818.501	24.008	4.70	0.001	
A2X02	05/07/87	10:04	0.50	856.419	37.918	5.20	0.013	
A2X02	07/28/87	12:15	0.12	938.510	82.091	5.32	0.001	

BSEP DATA FOR HOLE A3X01

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
A3X01	11/06/84	00:00	NA	0.000	0.000	0.00	0.000	Room A3 completed.
A3X01	01/14/85	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 12/20/85 to 1/14/85.
A3X01	02/05/85	11:10	NA	35.465	1.000	0.00	0.000	Hoist muck at the bottom.
A3X01	02/19/85	13:40	00.30	49.569	15.104	0.30	0.020	Some oil. First time collected.
A3X01	02/26/85	13:20	00.23	56.556	6.987	0.53	0.033	Brine and oil.
A3X01	03/07/85	09:45	00.26	65.406	8.850	0.79	0.029	
A3X01	03/12/85	11:45	00.17	70.490	5.084	0.96	0.033	
A3X01	03/20/85	13:14	00.19	78.551	8.061	1.15	0.024	Valved leaked, some brine drained back down hole.
A3X01	03/26/85	11:12	00.22	84.467	5.916	1.37	0.037	
A3X01	04/02/85	12:00	00.21	91.500	7.033	1.58	0.030	
A3X01	04/10/85	12:00	00.23	99.500	8.000	1.81	0.029	
A3X01	04/17/85	11:20	00.20	106.472	6.972	2.01	0.029	
A3X01	04/23/85	10:41	00.16	112.445	5.973	2.17	0.027	
A3X01	04/30/85	13:35	00.20	119.566	7.121	2.37	0.028	
A3X01	05/07/85	08:55	00.20	126.372	6.806	2.57	0.029	
A3X01	05/14/85	09:56	00.17	133.414	7.042	2.74	0.024	
A3X01	05/21/85	12:00	00.20	140.500	7.086	2.94	0.028	
A3X01	05/29/85	09:25	00.21	148.392	7.892	3.15	0.027	
A3X01	06/04/85	09:55	00.16	154.413	6.021	3.31	0.027	
A3X01	06/11/85	09:25	00.18	161.392	6.979	3.49	0.026	
A3X01	06/18/85	09:27	00.18	168.394	7.002	3.67	0.026	
A3X01	06/25/85	09:30	00.19	175.396	7.002	3.86	0.027	
A3X01	07/02/85	11:00	00.19	182.458	7.062	4.05	0.027	
A3X01	07/09/85	09:50	00.17	189.410	6.952	4.22	0.024	
A3X01	07/16/85	10:50	00.18	196.451	7.041	4.40	0.026	Brine effervesces.
A3X01	07/24/85	09:47	00.21	204.408	7.957	4.61	0.026	
A3X01	07/30/85	09:30	00.15	210.396	5.988	4.76	0.025	
A3X01	08/06/85	09:30	00.17	217.396	7.000	4.93	0.024	
A3X01	08/14/85	09:21	00.20	225.390	7.994	5.13	0.025	
A3X01	08/20/85	10:08	00.16	231.422	6.032	5.29	0.027	
A3X01	08/28/85	09:05	00.21	239.378	7.956	5.50	0.026	
A3X01	09/04/85	09:29	00.17	246.395	7.017	5.67	0.024	
A3X01	09/10/85	09:20	00.15	252.389	5.994	5.82	0.025	
A3X01	09/17/85	09:06	00.16	259.379	6.990	5.98	0.023	
A3X01	09/24/85	09:03	00.17	266.377	6.998	6.15	0.024	
A3X01	10/01/85	09:18	00.18	273.387	7.010	6.33	0.026	
A3X01	10/08/85	12:35	00.18	280.524	7.137	6.51	0.025	Room A3 heaters turned on 10/02/85.
A3X01	10/15/85	09:35	00.16	287.399	6.875	6.67	0.023	
A3X01	10/23/85	09:40	00.19	295.403	8.004	6.86	0.024	
A3X01	10/29/85	11:11	00.14	301.466	6.063	7.00	0.023	
A3X01	11/05/85	08:42	00.16	308.362	6.896	7.16	0.023	
A3X01	11/13/85	09:30	00.19	316.396	8.034	7.35	0.024	
A3X01	11/21/85	10:30	00.19	324.438	8.042	7.54	0.024	
A3X01	11/26/85	09:55	00.10	329.413	4.975	7.64	0.020	
A3X01	12/04/85	14:03	00.18	337.585	8.172	7.82	0.022	
A3X01	12/10/85	10:46	00.14	343.449	5.864	7.96	0.024	
A3X01	12/17/85	13:55	00.14	350.580	7.131	8.10	0.020	
A3X01	01/03/86	10:00	00.39	367.417	16.837	8.49	0.023	
A3X01	01/08/86	10:10	00.11	372.424	5.007	8.60	0.022	
A3X01	01/16/86	09:35	00.18	380.399	7.975	8.78	0.023	
A3X01	01/23/86	10:00	00.15	387.417	7.018	8.93	0.021	
A3X01	01/31/86	10:55	00.18	395.455	8.038	9.11	0.022	
A3X01	02/12/86	10:00	00.27	407.417	11.962	9.38	0.023	
A3X01	02/19/86	10:40	00.15	414.444	7.027	9.53	0.021	
A3X01	02/28/86	14:20	00.22	423.597	9.153	9.75	0.024	
A3X01	03/06/86	09:50	00.14	429.410	5.813	9.89	0.024	
A3X01	03/13/86	09:20	00.15	436.389	6.979	10.04	0.021	
A3X01	03/26/86	09:15	00.30	449.385	12.996	10.34	0.023	
A3X01	04/02/86	08:50	00.16	456.368	6.983	10.50	0.023	
A3X01	04/08/86	09:05	00.14	462.378	6.010	10.64	0.023	
A3X01	04/16/86	11:25	00.18	470.476	8.098	10.82	0.022	
A3X01	04/24/86	09:30	00.18	478.396	7.920	11.00	0.023	
A3X01	04/30/86	10:00	00.14	484.417	6.021	11.14	0.023	
A3X01	05/06/86	09:35	00.14	490.399	5.982	11.28	0.023	
A3X01	05/13/86	09:20	00.15	497.389	6.990	11.43	0.021	
A3X01	05/20/86	10:10	00.15	504.424	7.035	11.58	0.021	
A3X01	05/27/86	15:00	00.16	511.625	7.201	11.74	0.022	
A3X01	06/03/86	09:20	00.15	518.389	6.764	11.89	0.022	
A3X01	06/10/86	10:42	00.16	525.446	7.057	12.05	0.023	
A3X01	06/17/86	09:51	00.12	532.410	6.964	12.17	0.017	

BSEP DATA FOR HOLE A3X01

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
A3X01	06/24/86	10:05	00.16	539.420	7.010	12.33	0.023	
A3X01	07/01/86	12:35	00.16	546.524	7.104	12.49	0.023	
A3X01	07/08/86	09:57	00.15	553.415	6.891	12.64	0.022	
A3X01	07/16/86	09:47	00.19	561.408	7.993	12.83	0.024	
A3X01	07/22/86	09:23	00.14	567.391	5.983	12.97	0.023	
A3X01	07/29/86	10:00	00.14	574.417	7.026	13.11	0.020	
A3X01	08/05/86	10:15	00.18	581.427	7.010	13.29	0.026	
A3X01	08/12/86	09:50	00.16	588.410	6.983	13.45	0.023	
A3X01	08/19/86	10:35	00.16	595.441	7.031	13.61	0.023	
A3X01	08/26/86	10:00	00.15	602.417	6.976	13.76	0.022	
A3X01	09/04/86	09:52	00.20	611.411	8.994	13.96	0.022	
A3X01	09/09/86	10:35	00.12	616.441	5.030	14.08	0.024	
A3X01	09/16/86	09:29	00.14	623.395	6.954	14.22	0.020	
A3X01	09/23/86	09:36	00.18	630.400	7.005	14.40	0.026	
A3X01	10/01/86	11:30	00.19	638.479	8.079	14.59	0.024	
A3X01	10/08/86	10:24	00.14	645.433	6.954	14.73	0.020	
A3X01	10/14/86	10:47	00.12	651.449	6.016	14.85	0.020	
A3X01	11/05/86	10:20	0.52	673.431	21.982	15.37	0.024	
A3X01	11/20/86	11:33	00.33	688.481	15.050	15.70	0.022	
A3X01	12/31/86	11:45	00.88	729.490	41.009	16.58	0.021	
A3X01	02/03/87	12:00	00.73	763.500	34.010	17.31	0.021	
A3X01	03/06/87	11:45	0.68	794.490	30.990	17.99	0.022	
A3X01	03/30/87	12:00	0.55	818.500	24.010	18.54	0.023	
A3X01	05/07/87	10:39	0.80	856.444	1.000	19.34	0.800	
A3X01	06/17/87	11:25	0.89	897.476	78.976	20.23	0.011	
A3X01	07/28/87	12:02	0.92	938.501	41.025	21.15	0.022	

BSEP DATA FOR HOLE A3X02

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
A3X02	11/06/84	00:00	NA	0.000	0.000	0.00	0.000	Room A3 completed.
A3X02	01/22/85	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled 1/15/85 to 1/22/85.
A3X02	02/05/85	11:10	NA	35.465	1.000	0.00	0.000	No drips noticed.
A3X02	02/19/85	13:40	00.11	49.569	15.104	0.11	0.007	First time collected.
A3X02	02/26/85	13:20	00.11	56.556	6.987	0.22	0.016	Wet spot within 1.5 ft. radius.
A3X02	03/07/85	09:45	00.21	65.406	8.850	0.43	0.024	Moist area on back, approximately 1 ft radius.
A3X02	03/12/85	11:45	00.11	70.490	5.084	0.54	0.022	Wet spot on back 3 ft diameter.
A3X02	03/20/85	13:14	00.01	78.551	8.061	0.55	0.001	
A3X02	03/26/85	11:12	00.28	84.467	5.916	0.83	0.047	Tube found plugged. Brine in tubing.
A3X02	04/02/85	12:00	00.08	91.500	7.033	0.91	0.011	
A3X02	04/10/85	12:02	00.05	99.501	8.001	0.96	0.006	Tube plugged.
A3X02	04/17/85	11:20	00.11	106.472	6.971	1.07	0.016	
A3X02	04/23/85	10:40	00.09	112.444	5.972	1.16	0.015	
A3X02	04/30/85	13:29	00.12	119.562	7.118	1.28	0.017	
A3X02	05/07/85	08:50	00.13	126.368	6.806	1.41	0.019	
A3X02	05/14/85	09:53	00.13	133.412	7.044	1.54	0.018	
A3X02	05/21/85	11:55	00.13	140.497	7.085	1.67	0.018	
A3X02	05/29/85	09:20	00.14	148.389	7.892	1.81	0.018	
A3X02	06/04/85	09:50	00.10	154.410	6.021	1.91	0.017	
A3X02	06/11/85	09:20	00.13	161.389	6.979	2.04	0.019	
A3X02	06/18/85	09:25	00.12	168.392	7.003	2.16	0.017	
A3X02	06/25/85	09:25	00.13	175.392	7.000	2.29	0.019	
A3X02	07/02/85	11:00	00.10	182.458	7.066	2.39	0.014	
A3X02	07/09/85	09:44	00.02	189.406	6.948	2.41	0.003	
A3X02	07/16/85	10:46	00.02	196.449	7.043	2.43	0.003	
A3X02	07/24/85	09:45	00.19	204.406	7.957	2.62	0.024	High volume probably due to unplugging temporary blockage in collecting tube on 7/16/85.
A3X02	07/30/85	09:25	00.08	210.392	5.986	2.70	0.013	
A3X02	08/06/85	09:28	00.08	217.394	7.002	2.78	0.011	
A3X02	08/14/85	09:10	00.10	225.382	7.988	2.88	0.013	
A3X02	08/20/85	10:00	00.08	231.417	6.035	2.96	0.013	
A3X02	08/28/85	08:58	00.09	239.374	7.957	3.05	0.011	
A3X02	09/04/85	09:26	00.09	246.393	7.019	3.14	0.013	
A3X02	09/10/85	09:14	00.08	252.385	5.992	3.22	0.013	
A3X02	09/17/85	09:05	00.09	259.378	6.993	3.31	0.013	
A3X02	09/24/85	09:03	00.08	266.377	6.999	3.39	0.011	
A3X02	10/01/85	09:15	00.07	273.385	7.008	3.46	0.010	
A3X02	10/08/85	12:33	00.09	280.523	7.138	3.55	0.013	Room A3 heaters turned on 10/02/85.
A3X02	10/15/85	09:31	00.06	287.397	6.874	3.61	0.009	
A3X02	10/23/85	09:37	00.07	295.401	8.004	3.68	0.009	
A3X02	10/29/85	11:09	00.08	301.465	6.064	3.76	0.013	
A3X02	11/05/85	08:39	00.04	308.360	6.895	3.80	0.006	
A3X02	11/13/85	09:28	00.08	316.394	8.034	3.88	0.010	
A3X02	11/21/85	10:25	00.05	324.434	8.040	3.93	0.006	
A3X02	12/04/85	13:56	00.10	337.581	13.147	4.03	0.008	
A3X02	12/10/85	10:42	00.05	343.446	5.865	4.08	0.009	
A3X02	12/17/85	13:50	00.03	350.576	7.130	4.11	0.004	
A3X02	01/03/86	10:20	00.13	367.417	16.841	4.24	0.008	
A3X02	01/08/86	10:10	00.03	372.424	5.007	4.27	0.006	
A3X02	01/16/86	09:35	00.05	380.399	7.975	4.32	0.006	
A3X02	01/31/86	10:55	00.01	395.455	15.056	4.33	0.001	Trace <00.01 liters of brine.
A3X02	04/24/86	09:30	00.01	478.396	82.941	4.34	0.000	
A3X02	05/06/86	09:35	00.02	490.399	12.003	4.36	0.002	
A3X02	05/27/86	15:00	NA	511.625	21.226	4.36	0.000	Trace.
A3X02	06/03/86	09:20	00.03	518.389	27.990	4.39	0.001	
A3X02	06/10/86	10:42	NA	525.446	7.057	4.39	0.000	Trace.
A3X02	06/17/86	09:51	NA	532.410	14.021	4.39	0.000	Trace.
A3X02	07/01/86	12:32	00.03	546.522	28.133	4.42	0.001	
A3X02	07/08/86	09:57	00.01	553.415	6.893	4.43	0.001	
A3X02	07/29/86	10:00	NA	574.417	21.002	4.43	0.000	Trace.
A3X02	08/12/86	09:50	NA	588.410	34.995	4.43	0.000	Dry.
A3X02	08/19/86	10:33	NA	595.440	42.025	4.43	0.000	Dry.
A3X02	09/04/86	09:50	NA	611.410	57.995	4.43	0.000	Trace.
A3X02	09/23/86	09:33	00.00	630.398	76.983	4.43	0.000	Dry.
A3X02	10/01/86	11:28	NA	638.478	8.080	4.43	0.000	Dry.
A3X02	10/08/86	10:22	NA	645.432	6.954	4.43	0.000	Dry.
A3X02	10/14/86	10:44	00.00	651.447	6.015	4.43	0.000	Dry.
A3X02	11/05/86	10:25	NA	673.431	27.999	4.43	0.000	Dry.
A3X02	11/20/86	11:30	NA	688.479	43.047	4.43	0.000	Dry.
A3X02	12/31/86	11:45	NA	729.490	84.058	4.43	0.000	Dry.

BSEP DATA FOR HOLE A3X02

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
A3X02	02/03/87	12:02	NA	763.000	117.568	4.43	0.000	Dry.
A3X02	03/06/87	11:45	NA	794.490	149.058	4.43	0.000	Dry.
A3X02	03/30/87	12:00	0.00	818.500	24.010	4.43	0.000	Dry.
A3X02	05/07/87	10:39	0.00	856.444	61.954	4.43	0.000	Dry.
A3X02	07/28/87	12:02	0.00	938.501	144.011	4.43	0.000	Dry.

BSEP DATA FOR HOLE BTPA1

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPA1	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPA1	07/16/86	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled, open from 0 to 5.1 ft.
BTPA1	08/12/86	12:00	NA	588.500	1.000	0.00	0.000	Dry.
BTPA1	08/19/86	12:12	NA	595.508	8.008	0.00	0.000	Dry.
BTPA1	08/26/86	11:27	NA	602.477	14.977	0.00	0.000	Dry.
BTPA1	09/04/86	11:33	NA	611.481	23.981	0.00	0.000	Dry.
BTPA1	09/09/86	13:22	NA	616.557	29.057	0.00	0.000	Dry.
BTPA1	09/16/86	11:01	NA	623.459	35.959	0.00	0.000	Dry.
BTPA1	09/23/86	11:06	NA	630.463	42.963	0.00	0.000	Dry.
BTPA1	10/01/86	08:49	NA	638.367	50.867	0.00	0.000	Dry.
BTPA1	10/08/86	13:26	NA	645.560	58.060	0.00	0.000	Dry.
BTPA1	10/14/86	13:05	NA	651.545	64.045	0.00	0.000	Dry.
BTPA1	11/05/86	12:30	NA	673.521	86.021	0.00	0.000	Probe removed, not sampled.
BTPA1	11/20/86	NA:	NA	688.000	100.500	0.00	0.000	
BTPA1	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPA1	12/30/86	NA:	NA	728.000	140.500	0.00	0.000	
BTPA1	03/06/87	10:10	NA	794.424	206.924	0.00	0.000	Covered with muck, not able to sample.
BTPA1	06/18/87	09:45	1.33	898.406	246.861	1.33	0.005	Floor may have been watered for dust control.

BSEP DATA FOR HOLE BTPA2

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPA2	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPA2	07/29/86	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 7/16/86 to 7/29/86, open from 5.4 to 9.1 ft.
BTPA2	08/12/86	12:00	00.01	588.500	1.000	0.01	0.000	First time collected. Probe did not keep vacuum, brine remained in hole.
BTPA2	08/19/86	12:12	00.10	595.508	7.008	0.11	0.014	
BTPA2	08/26/86	11:28	00.04	602.478	6.970	0.15	0.006	
BTPA2	09/04/86	11:35	00.04	611.483	9.005	0.19	0.004	
BTPA2	09/09/86	13:23	00.03	616.558	5.075	0.22	0.006	
BTPA2	09/16/86	11:00	00.03	623.458	6.900	0.25	0.004	
BTPA2	09/23/86	11:07	00.03	630.463	7.005	0.28	0.004	
BTPA2	10/01/86	08:50	00.03	638.368	7.905	0.31	0.004	
BTPA2	10/08/86	13:27	00.02	645.560	7.192	0.33	0.003	
BTPA2	10/14/86	13:12	00.03	651.550	5.990	0.36	0.005	
BTPA2	11/05/86	12:30	NA	673.521	21.971	0.36	0.000	Probe removed, not sampled.
BTPA2	11/20/86	NA:	NA	688.000	36.450	0.36	0.000	
BTPA2	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPA2	12/30/86	NA:	NA	728.000	76.450	0.36	0.000	
BTPA2	03/06/87	10:10	NA	794.424	142.874	0.36	0.000	Covered with muck, not able to sample.
BTPA2	06/18/87	09:30	0.43	898.396	246.846	0.79	0.002	Floor may have been watered for dust control. Hole contaminated with PVC pieces.

BSEP DATA FOR HOLE BTPA3

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPA3	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPA3	07/30/86	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 7/15/86 to 7/30/86, open from 10.3 to 14.0 ft.
BTPA3	08/12/86	12:05	NA	588.503	1.000	0.00	0.000	Dry.
BTPA3	08/19/86	12:12	Trace	595.508	8.005	0.00	0.000	Lysimeter installed 8/20/86.
BTPA3	08/26/86	11:29	00.03	602.478	14.975	0.03	0.000	First time collected, some fluid left in hole.
BTPA3	09/04/86	11:35	00.13	611.483	9.005	0.16	0.014	
BTPA3	09/09/86	13:24	00.03	616.558	5.075	0.19	0.006	
BTPA3	09/16/86	11:01	00.04	623.459	6.901	0.23	0.006	
BTPA3	09/23/86	11:08	00.04	630.464	7.005	0.27	0.006	
BTPA3	10/01/86	08:53	00.05	638.370	7.906	0.32	0.006	
BTPA3	10/08/86	13:29	00.02	645.562	7.192	0.34	0.003	
BTPA3	10/14/86	13:14	00.04	651.551	5.989	0.38	0.007	
BTPA3	11/05/86	12:30	NA	673.521	21.970	0.38	0.000	Probe removed, not sampled.
BTPA3	11/20/86	NA:	NA	688.000	36.449	0.38	0.000	
BTPA3	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPA3	12/30/86	NA:	NA	728.000	76.449	0.38	0.000	
BTPA3	03/06/87	10:10	NA	794.424	142.873	0.38	0.000	Covered with muck, not able to sample.
BTPA3	06/18/87	09:15	0.62	898.385	246.834	1.00	0.003	Floor may have been watered for dust control. Hole commmmntaminated with PVC pieces.

BSEP DATA FOR HOLE BTPA4

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPA4	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPA4	07/03/86	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled, open from 0 to 4.6 ft.
BTPA4	08/12/86	12:05	NA	588.503	1.000	0.00	0.000	Dry.
BTPA4	08/19/86	12:11	NA	595.508	8.005	0.00	0.000	Dry.
BTPA4	08/26/86	11:25	NA	602.476	14.973	0.00	0.000	Dry.
BTPA4	09/04/86	11:31	NA	611.480	23.977	0.00	0.000	Dry.
BTPA4	09/09/86	13:25	NA	616.559	29.056	0.00	0.000	Dry.
BTPA4	09/16/86	10:59	NA	623.458	35.955	0.00	0.000	Dry.
BTPA4	09/23/86	10:59	NA	630.458	42.955	0.00	0.000	Dry.
BTPA4	10/01/86	08:38	NA	638.360	50.857	0.00	0.000	Dry.
BTPA4	10/08/86	13:20	NA	645.556	58.053	0.00	0.000	Dry.
BTPA4	10/14/86	13:00	NA	651.542	64.039	0.00	0.000	Dry.
BTPA4	11/05/86	12:41	NA	673.528	86.025	0.00	0.000	Dry.
BTPA4	11/20/86	NA:	NA	688.000	100.497	0.00	0.000	
BTPA4	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPA4	12/30/86	NA:	NA	728.000	140.497	0.00	0.000	
BTPA4	03/06/87	10:15	NA	794.427	206.924	0.00	0.000	Dry.
BTPA4	03/30/87	10:35	0.00	818.441	90.441	0.00	0.000	Dry.
BTPA4	05/07/87	12:46	0.00	856.532	128.532	0.00	0.000	Dry.
BTPA4	06/17/87	09:30	0.00	897.396	169.396	0.00	0.000	Dry.
BTPA4	07/28/87	09:39	0.00	938.402	210.402	0.00	0.000	Dry.

BSEP DATA FOR HOLE BTPA5

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPA5	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPA5	07/03/86	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled, open from 0 to 5.3 ft.
BTPA5	08/12/86	12:05	NA	588.503	1.000	0.00	0.000	Dry.
BTPA5	08/19/86	12:11	NA	595.508	8.005	0.00	0.000	Dry.
BTPA5	08/26/86	11:25	NA	602.476	14.973	0.00	0.000	Dry.
BTPA5	09/04/86	11:31	NA	611.480	23.977	0.00	0.000	Dry.
BTPA5	09/09/86	13:26	NA	616.560	29.057	0.00	0.000	Dry.
BTPA5	09/16/86	10:59	NA	623.458	35.955	0.00	0.000	Dry.
BTPA5	09/23/86	11:00	NA	630.458	42.955	0.00	0.000	Dry.
BTPA5	10/01/86	08:39	NA	638.360	50.857	0.00	0.000	Dry.
BTPA5	10/08/86	13:20	NA	645.556	58.053	0.00	0.000	Dry.
BTPA5	10/14/86	13:00	NA	651.542	64.039	0.00	0.000	Dry.
BTPA5	11/05/86	12:41	NA	673.528	86.025	0.00	0.000	Dry.
BTPA5	11/20/86	NA:	NA	688.000	100.497	0.00	0.000	
BTPA5	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPA5	12/30/86	NA:	NA	728.000	140.497	0.00	0.000	
BTPA5	03/06/87	10:15	NA	794.427	206.924	0.00	0.000	Looks dry.
BTPA5	03/30/87	10:35	0.00	818.441	90.441	0.00	0.000	Dry.
BTPA5	05/07/87	12:47	0.00	856.533	128.533	0.00	0.000	Dry.
BTPA5	06/17/87	09:31	0.00	897.397	169.397	0.00	0.000	Dry.
BTPA5	07/28/87	09:39	0.00	938.402	210.402	0.00	0.000	Dry.

BSEP DATA FOR HOLE BTPB1

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPB1	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPB1	07/17/86	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 7/17/86, open from 0 to 5.1 ft.
BTPB1	08/12/86	12:10	NA	588.507	1.000	0.00	0.000	Dry.
BTPB1	08/19/86	12:16	NA	595.511	8.004	0.00	0.000	Dry.
BTPB1	08/26/86	11:27	NA	602.477	14.970	0.00	0.000	Dry.
BTPB1	09/04/86	11:33	NA	611.481	23.974	0.00	0.000	Dry.
BTPB1	09/09/86	13:27	NA	616.560	29.053	0.00	0.000	Dry.
BTPB1	09/16/86	11:01	NA	623.459	35.952	0.00	0.000	Dry.
BTPB1	09/23/86	11:06	NA	630.463	42.956	0.00	0.000	Dry.
BTPB1	10/01/86	08:48	NA	638.367	50.860	0.00	0.000	Dry.
BTPB1	10/08/86	13:26	NA	645.560	58.053	0.00	0.000	Dry.
BTPB1	10/14/86	13:05	NA	651.545	64.038	0.00	0.000	Dry.
BTPB1	11/05/86	12:42	NA	673.529	86.022	0.00	0.000	Probe removed, not sampled.
BTPB1	11/20/86	NA:	NA	688.000	100.493	0.00	0.000	
BTPB1	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPB1	12/30/86	NA:	NA	728.000	140.493	0.00	0.000	
BTPB1	03/06/87	10:15	NA	794.427	206.920	0.00	0.000	Covered with muck, not able to sample.
BTPB1	06/18/87	10:00	0.42	898.417	246.872	0.42	0.002	Floor may have been watered for dust control.

BSEP DATA FOR HOLE BTPB2

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPB2	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPB2	07/30/86	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 7/18/86 to 7/30/86, open from 5.9 to 9.6 ft.
BTPB2	08/12/86	12:10	Trace	588.507	1.000	0.00	0.000	Not evacuated, installed lysimeter.
BTPB2	08/19/86	12:16	00.03	595.511	8.004	0.03	0.000	First time collected, some brine left in hole.
BTPB2	08/26/86	11:25	00.13	602.476	6.965	0.16	0.019	
BTPB2	09/04/86	11:45	00.01	611.490	9.014	0.17	0.001	Some brine left in hole.
BTPB2	09/09/86	13:28	00.01	616.561	5.071	0.18	0.002	
BTPB2	09/16/86	11:02	00.08	623.460	6.899	0.26	0.012	
BTPB2	09/23/86	11:13	00.01	630.467	7.007	0.27	0.001	Some brine left in hole.
BTPB2	10/01/86	09:03	00.02	638.377	7.910	0.29	0.003	
BTPB2	10/08/86	13:36	00.10	645.567	7.190	0.39	0.014	
BTPB2	10/14/86	13:15	00.03	651.552	5.985	0.42	0.005	
BTPB2	11/05/86	12:42	NA	673.529	21.977	0.42	0.000	Probe removed, not sampled.
BTPB2	11/20/86	NA:	NA	688.000	36.448	0.42	0.000	
BTPB2	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPB2	12/30/86	NA:	NA	728.000	76.448	0.42	0.000	
BTPB2	03/06/87	10:15	NA	794.427	142.875	0.42	0.000	Covered with muck, not able to sample.
BTPB2	06/18/87	09:00	0.56	898.375	246.823	0.98	0.002	Floor may have been watered for dust control. Hole is contaminated with PVC pieces.

BSEP DATA FOR HOLE BTPB3

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPB3	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPB3	08/01/86	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 7/17/86 to 8/01/86, open from 10.0 to 13.3 ft.
BTPB3	08/12/86	12:15	NA	588.510	1.000	0.00	0.000	Dry.
BTPB3	08/19/86	12:10	Trace	595.507	7.997	0.00	0.000	
BTPB3	08/26/86	11:25	NA	602.476	14.966	0.00	0.000	Could not keep vacuum, brine present and left in hole.
BTPB3	09/04/86	11:40	00.09	611.486	23.976	0.09	0.000	
BTPB3	09/09/86	13:31	00.01	616.563	5.077	0.10	0.002	
BTPB3	09/16/86	11:05	00.02	623.462	6.899	0.12	0.003	
BTPB3	09/23/86	11:16	00.02	630.469	7.007	0.14	0.003	
BTPB3	10/01/86	09:00	00.01	638.375	7.906	0.15	0.001	
BTPB3	10/08/86	13:32	00.02	645.564	7.189	0.17	0.003	
BTPB3	10/14/86	13:17	00.02	651.553	5.989	0.19	0.003	
BTPB3	11/05/86	12:42	NA	673.529	21.976	0.19	0.000	Probe removed, not sampled.
BTPB3	11/20/86	NA:	NA	688.000	36.447	0.19	0.000	Not sampled.
BTPB3	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPB3	12/30/86	NA:	NA	728.000	76.447	0.19	0.000	Not sampled.
BTPB3	03/06/87	10:15	NA	794.427	142.874	0.19	0.000	Covered with muck, not sampled.
BTPB3	06/18/87	08:50	0.22	898.368	246.815	0.41	0.001	Floor may have been watered for dust control. Hole is contaminated with PVC pieces.

BSEP DATA FOR HOLE BTPB4

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPB4	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPB4	08/05/86	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled 7/02/86 to 8/05/86, open from 6.8 to 9.75 ft.
BTPB4	08/12/86	12:15	NA	588.510	1.000	0.00	0.000	Dry.
BTPB4	08/19/86	12:10	NA	595.507	7.997	0.00	0.000	Salt crystals forming, dry.
BTPB4	08/26/86	11:25	NA	602.476	14.966	0.00	0.000	Dry.
BTPB4	09/04/86	11:32	NA	611.481	23.971	0.00	0.000	Some droplets at collar.
BTPB4	09/09/86	13:17	NA	616.553	29.043	0.00	0.000	Dry.
BTPB4	09/16/86	10:59	NA	623.458	35.948	0.00	0.000	Dry.
BTPB4	09/23/86	11:01	NA	630.459	42.949	0.00	0.000	Dry.
BTPB4	10/01/86	08:41	NA	638.362	50.852	0.00	0.000	Dry.
BTPB4	10/08/86	13:21	NA	645.556	58.046	0.00	0.000	
BTPB4	10/14/86	13:00	NA	651.542	64.032	0.00	0.000	Dry.
BTPB4	11/05/86	12:43	NA	673.530	86.020	0.00	0.000	Dry.
BTPB4	11/20/86	NA:	NA	688.000	100.490	0.00	0.000	
BTPB4	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPB4	12/30/86	NA:	NA	728.000	140.490	0.00	0.000	
BTPB4	03/06/87	10:15	NA	794.427	206.917	0.00	0.000	Dry.
BTPB4	03/30/87	10:35	0.00	818.441	24.014	0.00	0.000	Dry, moisture in casing.
BTPB4	05/07/87	12:48	0.00	856.533	62.106	0.00	0.000	Dry.
BTPB4	06/17/87	09:32	0.00	897.397	102.970	0.00	0.000	Damp.
BTPB4	07/28/87	09:35	0.00	938.399	143.972	0.00	0.000	Trace, not collected.

BSEP DATA FOR HOLE BTPB5

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPB5	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPB5	08/05/86	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled 7/02/86 to 8/05/86, open from 6.3 to 10.3 ft.
BTPB5	08/12/86	12:15	NA	588.510	1.000	0.00	0.000	Dry.
BTPB5	08/19/86	12:10	NA	595.507	7.997	0.00	0.000	Dry.
BTPB5	08/26/86	11:25	NA	602.476	14.966	0.00	0.000	Dry.
BTPB5	09/04/86	11:32	NA	611.481	23.971	0.00	0.000	Dry.
BTPB5	09/09/86	13:18	NA	616.554	29.044	0.00	0.000	Dry.
BTPB5	09/16/86	10:59	NA	623.458	35.948	0.00	0.000	Dry.
BTPB5	09/23/86	11:02	NA	630.460	42.950	0.00	0.000	Dry.
BTPB5	10/01/86	08:42	NA	638.363	50.853	0.00	0.000	Dry.
BTPB5	10/08/86	13:21	NA	645.556	58.046	0.00	0.000	
BTPB5	10/14/86	13:00	NA	651.542	64.032	0.00	0.000	Dry.
BTPB5	11/05/86	12:42	NA	673.529	86.019	0.00	0.000	Dry.
BTPB5	11/20/86	NA:	NA	688.000	100.490	0.00	0.000	
BTPB5	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPB5	12/30/86	NA:	NA	728.000	140.490	0.00	0.000	
BTPB5	03/06/87	10:15	NA	794.427	206.917	0.00	0.000	Damp, salt stalactite on collar.
BTPB5	03/30/87	10:30	0.00	818.438	24.011	0.00	0.000	Dry, moisture in casing.
BTPB5	05/07/87	12:49	0.00	856.534	62.107	0.00	0.000	Damp.
BTPB5	06/17/87	09:33	0.00	897.398	102.971	0.00	0.000	Dry.
BTPB5	07/28/87	09:33	0.00	938.398	143.971	0.00	0.000	Trace, not collected. 14" stalactite formed from collar.

BSEP DATA FOR HOLE BTPC1

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPC1	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPC1	07/18/86	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 7/18/86, open from 0 to 5.0 ft.
BTPC1	08/12/86	12:20	NA	588.514	1.000	0.00	0.000	Dry.
BTPC1	08/19/86	12:10	NA	595.507	7.993	0.00	0.000	Dry.
BTPC1	08/26/86	11:27	NA	602.477	14.963	0.00	0.000	Dry.
BTPC1	09/04/86	11:33	NA	611.481	23.967	0.00	0.000	Dry.
BTPC1	09/09/86	13:19	NA	616.555	29.041	0.00	0.000	Dry.
BTPC1	09/16/86	11:01	NA	623.459	35.945	0.00	0.000	Dry.
BTPC1	09/23/86	11:07	NA	630.463	42.949	0.00	0.000	Dry.
BTPC1	10/01/86	08:42	NA	638.363	50.849	0.00	0.000	Dry.
BTPC1	10/08/86	13:26	NA	645.560	58.046	0.00	0.000	
BTPC1	10/14/86	13:05	NA	651.545	64.031	0.00	0.000	Dry.
BTPC1	11/05/86	12:45	NA	673.531	86.017	0.00	0.000	Probe removed, not collected.
BTPC1	11/20/86	NA:	NA	688.000	100.486	0.00	0.000	Not collected.
BTPC1	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPC1	12/30/86	NA:	NA	728.000	140.486	0.00	0.000	Not collected.
BTPC1	03/06/87	10:10	NA	794.424	206.910	0.00	0.000	Covered with muck, not collected.
BTPC1	06/18/87	10:15	0.28	898.427	246.882	0.28	0.001	Floor may have been watered for dust control.

BSEP DATA FOR HOLE BTPC2

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPC2	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPC2	08/01/86	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 7/18/86 to 8/01/86, open from 5.5 to 9.8 ft.
BTPC2	08/12/86	12:20	Trace	588.514	1.000	0.00	0.000	Not evacuated, installed lysimeter.
BTPC2	08/19/86	12:10	NA	595.507	7.993	0.00	0.000	Lysimeter did not hold vacuum, some brine left in hole.
BTPC2	08/26/86	11:29	00.09	602.478	14.964	0.09	0.000	First time sampled.
BTPC2	09/04/86	11:33	00.01	611.481	9.003	0.10	0.001	Some fluid left in hole.
BTPC2	09/09/86	13:35	00.04	616.566	5.085	0.14	0.008	
BTPC2	09/16/86	11:08	00.04	623.464	6.898	0.18	0.006	
BTPC2	09/23/86	11:18	00.03	630.471	7.007	0.21	0.004	
BTPC2	10/01/86	09:04	00.02	638.378	7.907	0.23	0.003	
BTPC2	10/08/86	13:36	00.01	645.567	7.189	0.24	0.001	
BTPC2	10/14/86	13:20	00.02	651.556	5.989	0.26	0.003	
BTPC2	11/05/86	12:45	NA	673.531	21.975	0.26	0.000	Probe removed, not collected.
BTPC2	11/20/86	NA:	NA	688.000	36.444	0.26	0.000	Not collected.
BTPC2	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPC2	12/30/86	NA:	NA	728.000	76.444	0.26	0.000	Not collected.
BTPC2	03/06/87	10:10	NA	794.424	142.868	0.26	0.000	Covered with muck, not collected.
BTPC2	06/18/87	08:40	0.42	898.361	246.805	0.68	0.002	Floor may have been watered for dust control. Hole is contaminated with PVC pieces.

BSEP DATA FOR HOLE BTPC3

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPC3	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPC3	08/01/86	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 7/18/86 to 8/01/86, open from 10.0 to 14.4 ft.
BTPC3	08/12/86	12:20	NA	588.514	1.000	0.00	0.000	Dry.
BTPC3	08/19/86	12:10	Trace	595.507	7.993	0.00	0.000	
BTPC3	08/26/86	11:27	NA	602.477	14.963	0.00	0.000	Installed suction probe.
BTPC3	09/04/86	11:30	NA	611.479	23.965	0.00	0.000	No vacuum, some brine left in hole.
BTPC3	09/09/86	13:38	NA	616.568	29.054	0.00	0.000	Dry.
BTPC3	09/16/86	11:10	NA	623.465	35.951	0.00	0.000	Dry.
BTPC3	09/23/86	11:25	00.18	630.476	42.962	0.18	0.000	First time collected.
BTPC3	10/01/86	09:06	Trace	638.379	7.903	0.18	0.000	
BTPC3	10/08/86	13:38	00.01	645.568	15.092	0.19	0.001	
BTPC3	10/14/86	13:21	00.02	651.556	5.988	0.21	0.003	
BTPC3	11/05/86	12:45	NA	673.531	21.975	0.21	0.000	Probe removed, not collected.
BTPC3	11/20/86	NA:	NA	688.000	36.444	0.21	0.000	Not collected.
BTPC3	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPC3	12/30/86	NA:	NA	728.000	76.444	0.21	0.000	Not collected.
BTPC3	03/06/87	10:10	NA	794.424	142.868	0.21	0.000	Covered with muck, not collected.
BTPC3	06/18/87	08:30	0.15	898.354	246.798	0.36	0.001	Floor may have been watered for dust control. Hole contaminated with PVC pieces.

BSEP DATA FOR HOLE BTPC4

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPC4	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPC4	08/05/86	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled 7/02/86 to 8/05/86, open from 13.9 to 17.6 ft.
BTPC4	08/12/86	12:25	00.01	588.517	1.000	0.01	0.000	Installed funnel.
BTPC4	08/19/86	12:09	00.20	595.506	6.989	0.21	0.029	
BTPC4	08/26/86	11:25	00.11	602.476	6.970	0.32	0.016	
BTPC4	09/04/86	11:29	00.15	611.478	9.002	0.47	0.017	
BTPC4	09/09/86	13:20	00.07	616.556	5.078	0.54	0.014	
BTPC4	09/16/86	10:57	00.07	623.456	6.900	0.61	0.010	
BTPC4	09/23/86	10:57	00.08	630.456	7.000	0.69	0.011	
BTPC4	10/01/86	08:46	00.09	638.365	7.909	0.78	0.011	
BTPC4	10/08/86	13:24	00.10	645.558	7.193	0.88	0.014	
BTPC4	10/14/86	13:00	00.08	651.542	5.984	0.96	0.013	
BTPC4	11/05/86	12:45	0.22	673.531	21.989	1.18	0.010	
BTPC4	11/20/86	NA:	NA	688.000	14.469	1.18	0.000	
BTPC4	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPC4	12/30/86	10:07	00.55	728.422	54.891	1.73	0.010	Many salt crystals in sample.
BTPC4	02/04/87	10:15	00.20	764.427	36.005	1.93	0.006	
BTPC4	03/06/87	10:15	0.41	794.427	30.000	2.34	0.014	
BTPC4	03/30/87	10:30	0.14	818.438	24.011	2.48	0.006	
BTPC4	05/07/87	12:50	0.29	856.535	38.097	2.77	0.008	
BTPC4	06/17/87	09:34	0.35	897.399	40.864	3.12	0.009	
BTPC4	07/01/87	11:20	0.12	911.472	14.073	3.24	0.009	
BTPC4	07/28/87	09:35	0.15	938.399	26.927	3.39	0.006	

BSEP DATA FOR HOLE BTPC5

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTPC5	09/04/85	00:00	NA	0.000	0.000	0.00	0.000	Alcove at S1620/W170 excavated.
BTPC5	08/05/86	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled 6/30/86 to 8/05/86, open from 14.0 to 18.2 ft.
BTPC5	08/12/86	12:25	NA	588.517	1.000	0.00	0.000	Dry.
BTPC5	08/19/86	12:10	NA	595.507	7.990	0.00	0.000	Dry.
BTPC5	08/26/86	11:25	NA	602.476	14.959	0.00	0.000	Dry.
BTPC5	09/04/86	11:30	NA	611.479	23.962	0.00	0.000	Hole is dripping.
BTPC5	09/09/86	13:21	NA	616.556	29.039	0.00	0.000	Dry.
BTPC5	09/16/86	10:58	Trace	623.457	35.940	0.00	0.000	
BTPC5	09/23/86	10:58	NA	630.457	42.940	0.00	0.000	Drops missing cup.
BTPC5	10/01/86	08:45	Trace	638.365	50.848	0.00	0.000	4" stalactite on SE corner of collar - from outside casing.
BTPC5	10/08/86	13:22	NA	645.557	58.040	0.00	0.000	Stalactite on outside of casing, damp inside of casing.
BTPC5	10/14/86	13:00	Trace	651.542	64.025	0.00	0.000	Two 1/4 mm drops.
BTPC5	11/05/86	12:41	Trace	673.528	86.011	0.00	0.000	Few drops in cup. Stalactite on cup bottom.
BTPC5	11/20/86	NA:	NA	688.000	100.483	0.00	0.000	
BTPC5	12/12/86	00:00	NA	0.000	0.000	0.00	0.000	W170 drift extended southward from this alcove on 12/12/86. Drift completed to S1950 on 1/10/87.
BTPC5	12/30/86	NA:	NA	728.000	140.483	0.00	0.000	
BTPC5	03/06/87	10:15	NA	794.427	206.910	0.00	0.000	Dry, salt buildup outside cup.
BTPC5	03/30/87	10:30	0.00	818.438	24.011	0.00	0.000	Dry, moisture in casing.
BTPC5	05/07/87	12:51	0.00	856.535	62.108	0.00	0.000	Damp.
BTPC5	06/17/87	09:35	0.00	897.399	102.972	0.00	0.000	Damp.
BTPC5	07/28/87	09:31	0.00	938.397	143.970	0.00	0.000	Trace, not collected.

BSEP DATA FOR HOLE BTR01

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR01	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR01	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 1 ft deep, above clay seam near back.
BTR01	02/28/86	00:00	NA	0.000	0.000	0.00	0.000	Installed suction probe and sealed opening.
BTR01	03/04/86	09:35	NA	427.399	1.000	0.00	0.000	Dry.
BTR01	03/06/86	11:40	NA	429.486	3.087	0.00	0.000	Slightly wet.
BTR01	03/13/86	11:00	NA	436.458	10.059	0.00	0.000	Wet.
BTR01	03/26/86	11:15	NA	449.469	23.070	0.00	0.000	Wet.
BTR01	04/02/86	10:35	NA	456.441	30.042	0.00	0.000	Slightly wet.
BTR01	04/08/86	10:45	NA	462.448	36.049	0.00	0.000	Dry.
BTR01	04/16/86	13:00	NA	470.542	44.143	0.00	0.000	
BTR01	04/24/86	11:05	NA	478.462	52.063	0.00	0.000	
BTR01	04/30/86	11:40	NA	484.486	58.087	0.00	0.000	Dry.
BTR01	05/06/86	11:00	NA	490.458	64.059	0.00	0.000	Dry.
BTR01	05/13/86	10:20	NA	497.431	71.032	0.00	0.000	Dry.
BTR01	05/20/86	11:30	NA	504.479	78.080	0.00	0.000	Dry.
BTR01	05/27/86	12:15	NA	511.510	85.111	0.00	0.000	Salt crust developing in bottom of hole.
BTR01	06/03/86	11:05	NA	518.462	92.063	0.00	0.000	Damp.
BTR01	06/10/86	12:15	NA	525.510	99.111	0.00	0.000	Dry.
BTR01	06/17/86	11:25	NA	532.476	106.077	0.00	0.000	Dry.
BTR01	06/24/86	11:50	NA	539.493	113.094	0.00	0.000	Moist.
BTR01	07/01/86	11:30	NA	546.479	120.080	0.00	0.000	Dry.
BTR01	07/08/86	11:30	NA	553.479	127.080	0.00	0.000	Wet clay in hole.
BTR01	07/16/86	11:48	Trace	561.492	135.093	0.00	0.000	
BTR01	07/22/86	11:00	NA	567.458	141.059	0.00	0.000	Damp.
BTR01	07/29/86	11:30	NA	574.479	148.080	0.00	0.000	Dry.
BTR01	08/05/86	12:01	NA	581.501	155.102	0.00	0.000	Dry.
BTR01	08/12/86	09:00	NA	588.375	161.976	0.00	0.000	Dry.
BTR01	08/19/86	12:27	NA	595.519	169.120	0.00	0.000	Dry.
BTR01	08/26/86	12:00	NA	602.500	176.101	0.00	0.000	Dry.
BTR01	09/04/86	12:08	NA	611.506	185.107	0.00	0.000	Damp.
BTR01	09/09/86	12:30	NA	616.521	190.122	0.00	0.000	Dry.
BTR01	09/16/86	11:16	NA	623.469	197.070	0.00	0.000	Dry.
BTR01	09/23/86	11:35	NA	630.483	204.084	0.00	0.000	Dry.
BTR01	10/01/86	08:25	NA	638.351	211.952	0.00	0.000	Dry.
BTR01	10/08/86	13:47	NA	645.574	219.175	0.00	0.000	Not pumped last week.
BTR01	10/14/86	10:00	NA	651.417	225.018	0.00	0.000	Pumped only, no collection.
BTR01	11/05/86	12:55	NA	673.538	247.139	0.00	0.000	Dry.
BTR01	11/20/86	14:49	NA	658.617	262.218	0.00	0.000	Dry.
BTR01	12/30/86	09:38	NA	728.401	302.002	0.00	0.000	Dry, no vacuum.
BTR01	03/06/87	09:45	NA	794.406	368.007	0.00	0.000	Dry, salt buildup outside cup. No vacuum.
BTR01	03/30/87	10:00	0.00	818.417	24.011	0.00	0.000	Dry.
BTR01	06/17/87	09:00	0.00	897.375	102.969	0.00	0.000	Dry.
BTR01	07/28/87	09:47	0.00	938.408	144.002	0.00	0.000	Dry.

BSEP DATA FOR HOLE BTR02

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR02	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR02	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 3.2 ft deep, above clay seam near back.
BTR02	02/28/86	00:00	NA	0.000	0.000	0.00	0.000	Installed suction probe and sealed opening.
BTR02	03/04/86	09:35	NA	427.399	1.000	0.00	0.000	Wet at bottom.
BTR02	03/06/86	11:40	NA	429.486	3.087	0.00	0.000	Slight brine accumulation.
BTR02	03/13/86	11:00	00.01	436.458	10.059	0.01	0.001	Clay squeezing into hole.
BTR02	03/26/86	11:30	00.05	449.479	13.021	0.06	0.004	Lots of clay squeezing into hole.
BTR02	04/02/86	10:35	00.01	456.441	6.962	0.07	0.001	Clay squeezing into hole.
BTR02	04/08/86	10:45	00.09	462.448	6.007	0.16	0.015	
BTR02	04/16/86	13:00	00.01	470.542	8.094	0.17	0.001	
BTR02	04/24/86	11:05	00.01	478.462	7.920	0.18	0.001	
BTR02	04/30/86	11:40	Trace	484.486	6.024	0.18	0.000	
BTR02	05/06/86	11:00	Trace	490.458	11.996	0.18	0.000	
BTR02	05/13/86	10:20	Trace	497.431	18.969	0.18	0.000	Approximate 0.005 liters.
BTR02	05/20/86	11:30	Trace	504.479	26.017	0.18	0.000	
BTR02	05/27/86	12:15	00.01	511.510	33.048	0.19	0.000	Clay squeezing into hole.
BTR02	06/03/86	11:05	Trace	518.462	6.952	0.19	0.000	
BTR02	06/10/86	12:15	Trace	525.510	14.000	0.19	0.000	
BTR02	06/17/86	11:25	Trace	532.476	20.966	0.19	0.000	
BTR02	06/24/86	11:50	NA	539.493	27.983	0.19	0.000	Approximate 0.05 liters.
BTR02	07/01/86	11:30	00.01	546.479	34.969	0.20	0.000	
BTR02	07/08/86	11:32	00.01	553.481	7.002	0.21	0.001	Wet clay.
BTR02	07/16/86	11:49	00.01	561.492	8.011	0.22	0.001	
BTR02	07/22/86	11:00	00.01	567.458	5.966	0.23	0.002	
BTR02	07/29/86	11:31	00.01	574.480	7.022	0.24	0.001	
BTR02	08/05/86	12:02	00.01	581.501	7.021	0.25	0.001	
BTR02	08/12/86	09:00	Trace	588.375	6.874	0.25	0.000	
BTR02	08/19/86	12:28	00.01	595.519	14.018	0.26	0.001	
BTR02	08/26/86	12:01	00.01	602.501	6.982	0.27	0.001	
BTR02	09/04/86	12:08	Trace	611.506	9.005	0.27	0.000	0.005 liters, lots of clay.
BTR02	09/09/86	12:30	00.01	616.521	14.020	0.28	0.001	
BTR02	09/16/86	11:17	Trace	623.470	6.949	0.28	0.000	Clay.
BTR02	09/23/86	11:36	Trace	630.483	13.962	0.28	0.000	Up to 0.005 liters.
BTR02	10/01/86	08:26	00.01	638.351	21.830	0.29	0.000	
BTR02	10/08/86	13:47	Trace	645.574	7.223	0.29	0.000	Small amount of brine poured out.
BTR02	10/14/86	10:00	NA	651.417	13.066	0.29	0.000	Pumped only, no collection.
BTR02	11/05/86	12:56	0.01	673.539	35.188	0.30	0.000	Blocked by vent pipe, not sampled.
BTR02	11/20/86	14:29	NA	688.603	15.064	0.30	0.000	Blocked by vent pipe, not sampled.
BTR02	12/30/86	09:39	00.02	728.402	54.863	0.32	0.000	Vacuum.
BTR02	03/06/87	09:45	0.01	794.406	66.004	0.33	0.000	
BTR02	03/30/87	10:01	0.00	818.417	24.011	0.33	0.000	Trace.
BTR02	06/17/87	09:01	0.01	897.376	102.970	0.34	0.000	
BTR02	07/28/87	09:50	0.01	938.410	41.034	0.35	0.000	

BSEP DATA FOR HOLE BTR03

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR03	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR03	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 3.3 ft deep, above clay seam near back.
BTR03	03/04/86	09:35	NA	427.399	1.000	0.00	0.000	Brine accumulation at the bottom.
BTR03	03/06/86	11:40	NA	429.486	3.087	0.00	0.000	Brine accumulation.
BTR03	03/13/86	11:00	NA	436.458	10.059	0.00	0.000	Brine and clay.
BTR03	03/26/86	11:30	NA	449.479	23.080	0.00	0.000	Brine and clay in hole.
BTR03	04/02/86	10:35	NA	456.441	30.042	0.00	0.000	Brine left in hole.
BTR03	04/08/86	10:45	NA	462.448	36.049	0.00	0.000	Trace.
BTR03	04/16/86	13:00	NA	470.542	44.143	0.00	0.000	Installed suction probe.
BTR03	04/24/86	11:05	NA	478.462	52.063	0.00	0.000	No vacuum.
BTR03	04/30/86	11:40	Trace	484.486	58.087	0.00	0.000	
BTR03	05/06/86	11:00	Trace	490.458	64.059	0.00	0.000	
BTR03	05/13/86	10:20	Trace	497.431	71.032	0.00	0.000	Approximate 0.005 liters.
BTR03	05/20/86	11:30	NA	504.479	78.080	0.00	0.000	Dry.
BTR03	05/27/86	12:15	00.02	511.510	85.111	0.02	0.000	
BTR03	06/03/86	11:10	00.05	518.465	6.955	0.07	0.007	
BTR03	06/10/86	12:15	Trace	525.510	7.045	0.07	0.000	
BTR03	06/17/86	11:30	Trace	532.479	14.014	0.07	0.000	
BTR03	06/24/86	11:55	Trace	539.497	21.032	0.07	0.000	A few drops.
BTR03	07/01/86	11:30	Trace	546.479	28.014	0.07	0.000	
BTR03	07/08/86	11:34	00.01	553.482	7.003	0.08	0.001	
BTR03	07/16/86	11:50	00.01	561.493	8.011	0.09	0.001	
BTR03	07/22/86	11:00	Trace	567.458	5.965	0.09	0.000	
BTR03	07/29/86	11:32	NA	574.481	12.988	0.09	0.000	A few drops.
BTR03	08/05/86	12:03	00.01	581.502	20.009	0.10	0.000	
BTR03	08/12/86	09:00	Trace	588.375	6.873	0.10	0.000	A few drops.
BTR03	08/19/86	12:29	Trace	595.520	14.018	0.10	0.000	
BTR03	08/26/86	12:02	Trace	602.501	20.999	0.10	0.000	
BTR03	09/04/86	12:09	Trace	611.506	30.004	0.10	0.000	A few drops.
BTR03	09/09/86	12:30	Trace	616.521	35.019	0.10	0.000	
BTR03	09/16/86	11:18	Trace	623.471	41.969	0.10	0.000	Clay squeezed into hole.
BTR03	09/23/86	11:37	Trace	630.484	48.982	0.10	0.000	
BTR03	10/01/86	08:26	00.01	638.351	56.849	0.11	0.000	
BTR03	10/08/86	13:48	Trace	645.575	7.224	0.11	0.000	Inside of tube is damp.
BTR03	10/14/86	10:00	NA	651.417	13.066	0.11	0.000	Pumped only, no collection.
BTR03	10/14/86	10:00	NA	651.417	13.066	0.11	0.000	Pumped only, no collection.
BTR03	11/05/86	12:57	NA	673.540	35.189	0.11	0.000	Damp, blocked by vent pipe, not sampled.
BTR03	11/20/86	13:29	NA	688.562	50.211	0.11	0.000	Blocked by vent pipe, not sampled.
BTR03	12/30/86	09:40	NA	728.403	90.052	0.11	0.000	Damp, vacuum. Hole appears dry, clay squeezing into it.
BTR03	03/06/87	09:45	0.03	794.406	156.055	0.14	0.000	
BTR03	03/30/87	10:02	0.01	818.418	24.012	0.15	0.000	
BTR03	06/17/87	09:02	0.02	897.376	78.958	0.17	0.000	
BTR03	07/28/87	09:50	0.02	938.410	41.034	0.19	0.000	

BSEP DATA FOR HOLE BTR04

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR04	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR04	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 0.95 ft deep, in halite in upper third of rib.
BTR04	02/28/86	00:00	NA	0.000	0.000	0.00	0.000	Installed suction probe and sealed opening.
BTR04	03/04/86	09:35	NA	427.399	1.000	0.00	0.000	Dry.
BTR04	03/06/86	11:40	NA	429.486	3.087	0.00	0.000	Dry.
BTR04	03/13/86	11:00	NA	436.458	10.059	0.00	0.000	Dry, salt incrustations forming.
BTR04	03/26/86	11:30	NA	449.479	23.080	0.00	0.000	Dry.
BTR04	04/02/86	10:35	NA	456.441	30.042	0.00	0.000	Dry.
BTR04	04/08/86	10:45	NA	462.448	36.049	0.00	0.000	Dry.
BTR04	04/16/86	13:00	NA	470.542	44.143	0.00	0.000	Dry.
BTR04	04/24/86	11:05	NA	478.462	52.063	0.00	0.000	
BTR04	04/30/86	11:40	NA	484.486	58.087	0.00	0.000	
BTR04	05/06/86	11:00	NA	490.458	64.059	0.00	0.000	Dry.
BTR04	05/13/86	10:25	NA	497.434	71.035	0.00	0.000	Dry.
BTR04	05/20/86	11:30	NA	504.479	78.080	0.00	0.000	Dry.
BTR04	05/27/86	12:15	NA	511.510	85.111	0.00	0.000	Damp inside of lysimeter.
BTR04	06/03/86	11:15	NA	518.469	92.070	0.00	0.000	Dry.
BTR04	06/10/86	12:20	NA	525.514	99.115	0.00	0.000	Dry.
BTR04	06/17/86	11:30	NA	532.479	106.080	0.00	0.000	
BTR04	06/24/86	12:00	NA	539.500	113.101	0.00	0.000	
BTR04	07/01/86	11:30	NA	546.479	120.080	0.00	0.000	Damp.
BTR04	07/08/86	11:36	NA	553.483	127.084	0.00	0.000	Dry.
BTR04	07/16/86	11:53	NA	561.495	135.096	0.00	0.000	Dry.
BTR04	07/22/86	11:00	NA	567.458	141.059	0.00	0.000	Dry.
BTR04	07/29/86	11:33	NA	574.481	148.082	0.00	0.000	Dry.
BTR04	08/05/86	12:04	NA	581.503	155.104	0.00	0.000	
BTR04	08/12/86	09:00	NA	588.375	161.976	0.00	0.000	
BTR04	08/19/86	12:30	NA	595.521	169.122	0.00	0.000	Dry.
BTR04	08/26/86	12:03	NA	602.502	176.103	0.00	0.000	Dry.
BTR04	09/04/86	12:09	NA	611.506	185.107	0.00	0.000	Dry.
BTR04	09/09/86	12:30	NA	616.521	190.122	0.00	0.000	Dry.
BTR04	09/16/86	11:16	NA	623.469	197.070	0.00	0.000	Dry.
BTR04	09/23/86	11:38	NA	630.485	204.086	0.00	0.000	Dry.
BTR04	10/01/86	08:26	NA	638.351	211.952	0.00	0.000	Dry.
BTR04	10/08/86	13:48	NA	645.575	219.176	0.00	0.000	Not pumed last week.
BTR04	11/05/86	12:58	NA	673.540	247.141	0.00	0.000	No clamp.
BTR04	11/20/86	14:29	NA	688.603	262.204	0.00	0.000	No clamp, installed new clamp today.
BTR04	12/30/86	07:41	NA	728.320	301.921	0.00	0.000	Dry, no vacuum.
BTR04	03/06/87	09:50	NA	794.410	368.011	0.00	0.000	Dry, no vacuum.
BTR04	03/30/87	10:03	0.00	818.419	24.009	0.00	0.000	Dry.
BTR04	06/17/87	09:03	0.00	897.377	102.967	0.00	0.000	Dry.
BTR04	07/28/87	09:45	0.00	938.406	143.996	0.00	0.000	Dry.

BSEP DATA FOR HOLE BTR05

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR05	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR05	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 3.0 ft deep, in halite in upper third of rib.
BTR05	03/04/86	09:35	NA	427.399	1.000	0.00	0.000	Salt knobs forming 1.6' from collar, slightly wet.
BTR05	03/06/86	11:40	NA	429.486	3.087	0.00	0.000	Dry.
BTR05	03/13/86	11:00	NA	436.458	10.059	0.00	0.000	Dry.
BTR05	03/26/86	11:30	NA	449.479	23.080	0.00	0.000	Dry.
BTR05	04/02/86	10:35	NA	456.441	30.042	0.00	0.000	Salt knobs.
BTR05	04/08/86	10:45	NA	462.448	36.049	0.00	0.000	Little accumulation.
BTR05	04/16/86	13:00	NA	470.542	44.143	0.00	0.000	Installed suction probe.
BTR05	04/24/86	11:05	NA	478.462	52.063	0.00	0.000	
BTR05	04/30/86	11:40	Trace	484.486	58.087	0.00	0.000	
BTR05	05/06/86	11:00	Trace	490.458	64.059	0.00	0.000	
BTR05	05/13/86	10:25	Trace	497.434	71.035	0.00	0.000	A few drops.
BTR05	05/20/86	11:30	Trace	504.479	78.080	0.00	0.000	
BTR05	05/27/86	12:15	Trace	511.510	85.111	0.00	0.000	
BTR05	06/03/86	11:20	Trace	518.472	92.073	0.00	0.000	
BTR05	06/10/86	12:20	Trace	525.514	99.115	0.00	0.000	
BTR05	06/17/86	11:30	Trace	532.479	106.080	0.00	0.000	
BTR05	06/24/86	12:00	Trace	539.500	113.101	0.00	0.000	
BTR05	07/01/86	11:30	00.01	546.479	6.979	0.01	0.001	
BTR05	07/08/86	11:38	Trace	553.485	7.006	0.01	0.000	
BTR05	07/16/86	11:54	00.01	561.496	15.017	0.02	0.001	
BTR05	07/22/86	11:00	Trace	567.458	5.962	0.02	0.000	
BTR05	07/29/86	11:34	00.01	574.482	12.986	0.03	0.001	
BTR05	08/05/86	12:05	Trace	581.503	7.021	0.03	0.000	
BTR05	08/12/86	09:00	Trace	588.375	13.893	0.03	0.000	A few drops.
BTR05	08/19/86	12:31	Trace	595.522	21.040	0.03	0.000	A few drops.
BTR05	08/26/86	12:04	Trace	602.503	28.021	0.03	0.000	A few drops.
BTR05	09/04/86	12:09	Trace	611.506	37.024	0.03	0.000	
BTR05	09/09/86	12:30	Trace	616.521	42.039	0.03	0.000	
BTR05	09/16/86	11:19	Trace	623.472	48.990	0.03	0.000	
BTR05	09/23/86	11:38	Trace	630.485	56.003	0.03	0.000	
BTR05	10/01/86	08:27	Trace	638.352	63.870	0.03	0.000	
BTR05	10/08/86	13:49	Trace	645.576	71.094	0.03	0.000	Inside tube slightly damp.
BTR05	10/14/86	10:00	NA	651.417	76.935	0.03	0.000	Pumped only, no collection.
BTR05	11/05/86	12:59	0.02	673.541	99.059	0.05	0.000	
BTR05	11/20/86	14:30	NA	688.604	114.122	0.03	0.000	Trace.
BTR05	12/30/86	09:42	00.01	728.404	54.863	0.06	0.000	No vacuum.
BTR05	03/06/87	09:50	0.01	794.410	66.006	0.07	0.000	
BTR05	03/30/87	10:04	0.00	818.419	24.009	0.07	0.000	Trace.
BTR05	06/17/87	09:04	0.01	897.378	102.968	0.08	0.000	
BTR05	07/28/87	09:51	0.02	938.410	41.032	0.10	0.000	

BSEP DATA FOR HOLE BTR06

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR06	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR06	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 3.0 ft deep, in halite in upper third of rib.
BTR06	03/04/86	09:35	NA	427.399	1.000	0.00	0.000	Salt incrustation forming 0.6'from collar.
BTR06	03/06/86	11:40	NA	429.486	3.087	0.00	0.000	Wet at the bottom.
BTR06	03/13/86	11:00	NA	436.458	10.059	0.00	0.000	Brine, installed suction probe.
BTR06	03/26/86	11:30	00.01	449.479	23.080	0.01	0.000	Trace.
BTR06	04/02/86	10:45	NA	456.448	6.969	0.01	0.000	Trace, estimated 0.005 liter.
BTR06	04/08/86	10:45	00.01	462.448	12.969	0.02	0.001	Trace.
BTR06	04/16/86	13:00	Trace	470.542	8.094	0.02	0.000	
BTR06	04/24/86	11:05	Trace	478.462	16.014	0.02	0.000	
BTR06	04/30/86	11:40	Trace	484.486	22.038	0.02	0.000	
BTR06	05/06/86	11:00	Trace	490.458	28.010	0.02	0.000	
BTR06	05/13/86	10:25	Trace	497.434	34.986	0.02	0.000	A few drops.
BTR06	05/20/86	11:30	Trace	504.479	42.031	0.02	0.000	
BTR06	05/27/86	12:15	Trace	511.510	49.062	0.02	0.000	Salt knobs on side of hole.
BTR06	06/03/86	11:20	Trace	518.472	56.024	0.02	0.000	A few drops.
BTR06	06/10/86	12:20	Trace	525.514	63.066	0.02	0.000	
BTR06	06/17/86	11:35	Trace	532.483	70.035	0.02	0.000	
BTR06	06/24/86	12:05	Trace	539.503	77.055	0.02	0.000	A few droplets.
BTR06	07/01/86	11:30	Trace	546.479	84.031	0.02	0.000	
BTR06	07/08/86	11:40	Trace	553.486	91.038	0.02	0.000	A few drops.
BTR06	07/16/86	11:55	Trace	561.497	99.049	0.02	0.000	
BTR06	07/22/86	11:00	Trace	567.458	105.010	0.02	0.000	
BTR06	07/29/86	11:35	00.01	574.483	112.035	0.03	0.000	
BTR06	08/05/86	12:06	00.01	581.504	7.021	0.04	0.001	
BTR06	08/12/86	09:00	Trace	588.375	6.871	0.04	0.000	
BTR06	08/19/86	12:32	Trace	595.522	14.018	0.04	0.000	A few drops.
BTR06	08/26/86	12:05	Trace	602.503	20.999	0.04	0.000	
BTR06	09/04/86	12:09	Trace	611.506	30.002	0.04	0.000	
BTR06	09/09/86	12:30	Trace	616.521	35.017	0.04	0.000	A few drops.
BTR06	09/16/86	11:20	Trace	623.472	41.968	0.04	0.000	
BTR06	09/23/86	11:39	Trace	630.485	48.981	0.04	0.000	
BTR06	10/01/86	08:28	Trace	638.353	56.849	0.04	0.000	
BTR06	10/08/86	13:50	Trace	645.576	64.072	0.04	0.000	Small amount poured out.
BTR06	10/14/86	10:00	NA	651.417	69.913	0.04	0.000	Pumped only, no collection.
BTR06	11/05/86	13:00	0.01	673.542	92.038	0.05	0.000	
BTR06	11/20/86	14:30	NA	688.604	15.062	0.05	0.000	Trace.
BTR06	12/30/86	09:43	Trace	728.405	54.863	0.05	0.000	No vacuum.
BTR06	03/06/87	09:50	Trace	794.410	120.868	0.05	0.000	
BTR06	03/30/87	10:05	0.00	818.420	24.010	0.05	0.000	Inside of tube wet.
BTR06	06/17/87	09:05	0.00	897.378	102.968	0.05	0.000	Trace in tube.
BTR06	07/28/87	09:52	0.01	938.411	144.001	0.06	0.000	

BSEP DATA FOR HOLE BTR07

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR07	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR07	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 1.1 ft deep, just above the orange band.
BTR07	02/28/86	00:00	NA	0.000	0.000	0.00	0.000	Installed suction probe and sealed opening.
BTR07	03/04/86	09:35	NA	427.399	1.000	0.00	0.000	Wet.
BTR07	03/06/86	11:40	NA	429.486	3.087	0.00	0.000	Wet, some brine at the bottom.
BTR07	03/13/86	11:00	NA	436.458	10.059	0.00	0.000	Brine at the end of hole.
BTR07	03/26/86	11:30	NA	449.479	23.080	0.00	0.000	Brine in small hole in end.
BTR07	04/02/86	10:45	NA	456.448	30.049	0.00	0.000	Trace in hole.
BTR07	04/08/86	10:45	NA	462.448	36.049	0.00	0.000	Salt knobs.
BTR07	04/16/86	13:00	NA	470.542	44.143	0.00	0.000	Wet.
BTR07	04/24/86	11:05	NA	478.462	52.063	0.00	0.000	Wet.
BTR07	04/30/86	11:40	NA	484.486	58.087	0.00	0.000	Wet, lots of salt knobs.
BTR07	05/06/86	11:00	NA	490.458	64.059	0.00	0.000	Wet.
BTR07	05/13/86	10:30	NA	497.438	71.039	0.00	0.000	Moist.
BTR07	05/20/86	11:30	NA	504.479	78.080	0.00	0.000	Moist.
BTR07	05/27/86	12:15	NA	511.510	85.111	0.00	0.000	Damp inside of lysimeter.
BTR07	06/03/86	11:25	NA	518.476	92.077	0.00	0.000	Salt knobs.
BTR07	06/10/86	12:25	NA	525.517	99.118	0.00	0.000	Dry.
BTR07	06/17/86	11:35	NA	532.483	106.084	0.00	0.000	Damp.
BTR07	06/24/86	12:05	NA	539.503	113.104	0.00	0.000	
BTR07	07/01/86	11:30	NA	546.479	120.080	0.00	0.000	Damp.
BTR07	07/08/86	11:42	Trace	553.488	127.089	0.00	0.000	Two drops in probe.
BTR07	07/16/86	11:58	NA	561.499	135.100	0.00	0.000	Trace.
BTR07	07/22/86	11:00	NA	567.458	141.059	0.00	0.000	Damp.
BTR07	07/29/86	11:40	NA	574.486	148.087	0.00	0.000	Moist inside probe.
BTR07	08/05/86	12:07	NA	581.505	155.106	0.00	0.000	
BTR07	08/12/86	09:30	NA	588.396	161.997	0.00	0.000	Dry.
BTR07	08/19/86	12:33	NA	595.523	169.124	0.00	0.000	Dry.
BTR07	08/26/86	12:06	NA	602.504	176.105	0.00	0.000	Dry.
BTR07	09/04/86	12:09	NA	611.506	185.107	0.00	0.000	Dry.
BTR07	09/09/86	12:30	Trace	616.521	190.122	0.00	0.000	A few drops.
BTR07	09/16/86	11:25	Trace	623.476	197.077	0.00	0.000	
BTR07	09/23/86	11:44	NA	630.489	204.090	0.00	0.000	Moisture in lysimeter.
BTR07	10/01/86	08:29	NA	638.353	211.954	0.00	0.000	Damp.
BTR07	10/08/86	13:54	NA	645.579	219.180	0.00	0.000	Damp, nothing pours out.
BTR07	10/14/86	10:00	NA	651.417	225.018	0.00	0.000	Pumped only, no collection.
BTR07	11/05/86	13:01	NA	673.542	247.143	0.00	0.000	Damp.
BTR07	11/20/86	14:35	NA	688.608	262.209	0.00	0.000	Damp.
BTR07	12/30/86	09:44	NA	728.406	302.007	0.00	0.000	Dry, no vacuum.
BTR07	03/06/87	09:50	NA	794.410	368.011	0.00	0.000	Dry.
BTR07	03/30/87	10:06	0.00	818.421	24.011	0.00	0.000	Dry.
BTR07	06/17/87	09:06	0.00	897.379	102.969	0.00	0.000	Dry.
BTR07	07/28/87	09:44	0.00	938.406	143.996	0.00	0.000	Damp, none collected.

BSEP DATA FOR HOLE BTR08

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR08	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR08	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 3.1 ft deep, just above the orange band.
BTR08	02/28/86	00:00	NA	0.000	0.000	0.00	0.000	Installed suction probe and sealed opening.
BTR08	03/04/86	09:35	NA	427.399	1.000	0.00	0.000	Trace removed.
BTR08	03/06/86	11:40	00.12	429.486	3.087	0.12	0.039	
BTR08	03/13/86	11:00	00.04	436.458	6.972	0.16	0.006	
BTR08	03/26/86	11:30	00.05	449.479	13.021	0.21	0.004	
BTR08	04/02/86	10:45	00.02	456.448	6.969	0.23	0.003	
BTR08	04/08/86	10:53	00.02	462.453	6.005	0.25	0.003	
BTR08	04/16/86	13:00	Trace	470.542	8.089	0.25	0.000	Estimated 0.022 liters.
BTR08	04/24/86	11:05	00.02	478.462	16.009	0.27	0.001	
BTR08	04/30/86	12:20	00.01	484.514	6.052	0.28	0.002	
BTR08	05/06/86	11:00	00.01	490.458	5.944	0.29	0.002	
BTR08	05/13/86	10:35	00.01	497.441	6.983	0.30	0.001	
BTR08	05/20/86	11:30	00.01	504.479	7.038	0.31	0.001	
BTR08	05/27/86	12:15	00.03	511.510	7.031	0.34	0.004	
BTR08	06/03/86	11:25	00.01	518.476	6.966	0.35	0.001	
BTR08	06/10/86	12:25	00.02	525.517	7.041	0.37	0.003	
BTR08	06/17/86	11:35	00.03	532.483	6.966	0.40	0.004	
BTR08	06/24/86	12:05	00.03	539.503	7.020	0.43	0.004	
BTR08	07/01/86	11:30	00.02	546.479	6.976	0.45	0.003	
BTR08	07/08/86	11:44	00.02	553.489	7.010	0.47	0.003	
BTR08	07/16/86	11:59	00.03	561.499	8.010	0.50	0.004	
BTR08	07/22/86	11:00	00.03	567.458	5.959	0.53	0.005	
BTR08	07/29/86	11:41	00.03	574.487	7.029	0.56	0.004	
BTR08	08/05/86	12:08	00.03	581.506	7.019	0.59	0.004	
BTR08	08/12/86	09:30	00.03	588.396	6.890	0.62	0.004	
BTR08	08/19/86	12:34	00.04	595.524	7.128	0.66	0.006	
BTR08	08/26/86	12:07	00.06	602.505	6.981	0.72	0.009	
BTR08	09/04/86	12:05	00.14	611.503	8.998	0.86	0.016	
BTR08	09/09/86	12:30	00.10	616.521	5.018	0.96	0.020	
BTR08	09/16/86	11:26	00.11	623.476	6.955	1.07	0.016	
BTR08	09/23/86	11:45	00.11	630.490	7.014	1.18	0.016	
BTR08	10/01/86	08:30	00.11	638.354	7.864	1.29	0.014	
BTR08	10/08/86	13:55	00.08	645.580	7.226	1.37	0.011	
BTR08	10/14/86	10:00	NA	651.417	5.837	1.37	0.000	Pumped only, no collection.
BTR08	11/05/86	13:02	0.32	673.543	27.963	1.69	0.011	
BTR08	11/20/86	14:35	00.15	688.608	15.065	1.84	0.010	
BTR08	12/30/86	09:45	00.39	728.406	39.798	2.23	0.010	
BTR08	02/03/87	10:26	00.34	763.435	35.029	2.57	0.010	
BTR08	03/06/87	10:00	0.25	794.417	30.982	2.82	0.008	
BTR08	03/30/87	10:07	0.21	818.422	24.005	3.03	0.008	
BTR08	06/17/87	09:07	0.43	897.380	78.958	3.46	0.005	
BTR08	07/28/87	10:03	0.32	938.419	41.039	3.78	0.008	

BSEP DATA FOR HOLE BTR09

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR09	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR09	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 3.1 ft deep, just above the orange band.
BTR09	02/28/86	00:00	NA	0.000	0.000	0.00	0.000	Installed suction probe and sealed opening.
BTR09	03/04/86	09:35	00.01	427.399	1.000	0.01	0.000	First time sampled. Some brine left in hole.
BTR09	03/06/86	11:40	00.02	429.486	2.087	0.03	0.010	Salt crusts, some brine left in hole.
BTR09	03/13/86	11:00	00.08	436.458	6.972	0.11	0.011	Some brine left in hole.
BTR09	03/26/86	11:30	00.19	449.479	13.021	0.30	0.015	
BTR09	04/02/86	10:45	00.07	456.448	6.969	0.37	0.010	
BTR09	04/08/86	10:53	00.06	462.453	6.005	0.43	0.010	
BTR09	04/16/86	13:00	00.08	470.542	8.089	0.51	0.010	Some brine left in hole.
BTR09	04/24/86	11:30	00.08	478.479	7.937	0.59	0.010	
BTR09	04/30/86	12:20	00.07	484.514	6.035	0.66	0.012	
BTR09	05/06/86	11:37	00.07	490.484	5.970	0.73	0.012	
BTR09	05/13/86	10:45	00.06	497.448	6.964	0.79	0.009	
BTR09	05/20/86	11:30	00.05	504.479	7.031	0.84	0.007	
BTR09	05/27/86	12:15	00.06	511.510	7.031	0.90	0.009	
BTR09	06/03/86	11:30	00.05	518.479	6.969	0.95	0.007	
BTR09	06/10/86	12:25	00.07	525.517	7.038	1.02	0.010	
BTR09	06/17/86	11:40	00.07	532.486	6.969	1.09	0.010	
BTR09	06/24/86	12:10	00.07	539.507	7.021	1.16	0.010	
BTR09	07/01/86	11:40	00.08	546.486	6.979	1.24	0.011	
BTR09	07/08/86	11:46	00.07	553.490	7.004	1.31	0.010	
BTR09	07/16/86	12:00	00.08	561.500	8.010	1.39	0.010	
BTR09	07/22/86	11:00	00.06	567.458	5.958	1.45	0.010	
BTR09	07/29/86	11:42	00.07	574.488	7.030	1.52	0.010	
BTR09	08/05/86	12:09	00.08	581.506	7.018	1.60	0.011	
BTR09	08/12/86	09:30	00.07	588.396	6.890	1.67	0.010	
BTR09	08/19/86	12:35	Trace	595.524	7.128	1.67	0.000	Brine left in hole.
BTR09	08/26/86	12:08	00.13	602.506	14.110	1.80	0.009	One weeks collection.
BTR09	09/04/86	12:00	00.01	611.500	8.994	1.81	0.001	Brine left in hole.
BTR09	09/09/86	12:30	00.09	616.521	5.021	1.90	0.018	
BTR09	09/16/86	11:27	00.13	623.477	6.956	2.03	0.019	
BTR09	09/23/86	11:46	00.08	630.490	7.013	2.11	0.011	
BTR09	10/01/86	08:31	00.08	638.355	7.865	2.19	0.010	
BTR09	10/08/86	13:56	00.07	645.581	7.226	2.26	0.010	
BTR09	10/14/86	10:00	NA	651.417	5.836	2.26	0.000	Pumped only, no collection.
BTR09	11/05/86	13:03	0.25	673.544	27.963	2.51	0.009	
BTR09	11/20/86	14:35	00.11	688.608	15.064	2.62	0.007	
BTR09	12/30/86	09:46	00.27	728.407	39.799	2.89	0.007	
BTR09	02/03/87	10:25	00.21	763.434	35.027	3.10	0.006	
BTR09	03/06/87	10:00	0.15	794.417	30.983	3.25	0.005	
BTR09	03/30/87	10:08	0.12	818.422	24.025	3.37	0.005	
BTR09	06/17/87	09:08	0.28	897.381	78.939	3.65	0.004	
BTR09	07/28/87	10:02	0.11	938.418	41.037	3.76	0.003	

BSEP DATA FOR HOLE BTR10

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR10	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR10	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 1.2 ft deep, approximately 2.5 ft above floor.
BTR10	02/28/86	00:00	NA	0.000	0.000	0.00	0.000	Installed suction probe and sealed opening.
BTR10	03/04/86	09:35	NA	427.399	1.000	0.00	0.000	Dry.
BTR10	03/06/86	11:40	NA	429.486	3.087	0.00	0.000	Damp.
BTR10	03/13/86	11:00	NA	436.458	10.059	0.00	0.000	Dry.
BTR10	03/26/86	11:30	NA	449.479	23.080	0.00	0.000	Dry.
BTR10	04/02/86	11:00	NA	456.458	30.059	0.00	0.000	
BTR10	04/08/86	10:53	NA	462.453	36.054	0.00	0.000	Dry.
BTR10	04/16/86	13:00	NA	470.542	44.143	0.00	0.000	Wet.
BTR10	04/24/86	11:30	NA	478.479	52.080	0.00	0.000	
BTR10	04/30/86	12:20	NA	484.514	58.115	0.00	0.000	Dry.
BTR10	05/06/86	11:37	NA	490.484	64.085	0.00	0.000	Dry.
BTR10	05/13/86	10:45	NA	497.448	71.049	0.00	0.000	Dry.
BTR10	05/20/86	11:30	NA	504.479	78.080	0.00	0.000	Dry
BTR10	05/27/86	12:15	NA	511.510	85.111	0.00	0.000	Dry.
BTR10	06/03/86	11:30	NA	518.479	92.080	0.00	0.000	Dry.
BTR10	06/10/86	12:30	NA	525.521	99.122	0.00	0.000	Dry.
BTR10	06/17/86	11:40	NA	532.486	106.087	0.00	0.000	
BTR10	06/24/86	12:10	NA	539.507	113.108	0.00	0.000	
BTR10	07/01/86	11:40	NA	546.486	6.979	0.00	0.000	Dry.
BTR10	07/08/86	11:48	NA	553.492	13.985	0.00	0.000	Dry.
BTR10	07/16/86	12:01	NA	561.501	21.994	0.00	0.000	Trace.
BTR10	07/22/86	11:00	NA	567.458	27.951	0.00	0.000	Dry.
BTR10	07/29/86	11:43	NA	574.488	34.981	0.00	0.000	Dry.
BTR10	08/05/86	12:10	NA	581.507	42.000	0.00	0.000	
BTR10	08/12/86	09:30	NA	588.396	48.889	0.00	0.000	Dry.
BTR10	08/19/86	12:36	NA	595.525	56.018	0.00	0.000	Dry.
BTR10	08/26/86	12:09	NA	602.506	62.999	0.00	0.000	Dry.
BTR10	09/04/86	12:05	NA	611.503	71.996	0.00	0.000	Dry.
BTR10	09/09/86	12:30	NA	616.521	77.014	0.00	0.000	Dry.
BTR10	09/16/86	11:27	NA	623.477	83.970	0.00	0.000	Dry.
BTR10	09/23/86	11:47	NA	630.491	90.984	0.00	0.000	Dry.
BTR10	10/01/86	08:32	NA	638.356	98.849	0.00	0.000	Dry.
BTR10	10/08/86	13:57	Dry.	645.581	106.074	0.00	0.000	Inside tube dry.
BTR10	10/14/86	10:00	NA	651.417	111.910	0.00	0.000	Pumped only, no collection.
BTR10	11/05/86	13:04	NA	673.544	134.037	0.00	0.000	Dry.
BTR10	11/20/86	14:36	NA	688.608	149.101	0.00	0.000	Dry.
BTR10	12/30/86	09:47	NA	728.408	188.901	0.00	0.000	Dry, no vacuum.
BTR10	03/06/87	09:55	NA	794.413	254.906	0.00	0.000	Dry, no vacuum.
BTR10	03/30/87	10:09	0.00	818.423	24.010	0.00	0.000	Dry.
BTR10	06/17/87	09:09	0.00	897.381	102.968	0.00	0.000	Dry.
BTR10	07/28/87	09:44	0.00	938.406	143.993	0.00	0.000	Dry.

BSEP DATA FOR HOLE BTR11

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR11	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR11	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 3.05 ft deep, approximately 2.5 ft above floor.
BTR11	02/28/86	00:00	NA	0.000	0.000	0.00	0.000	Installed suction probe and sealed opening.
BTR11	03/04/86	09:35	NA	427.399	1.000	0.00	0.000	Some brine accumulation at bottom.
BTR11	03/06/86	11:40	NA	429.486	3.087	0.00	0.000	Trace, estimated 0.005 liters.
BTR11	03/13/86	11:00	00.01	436.458	10.059	0.01	0.001	First time sampled.
BTR11	03/26/86	11:30	00.01	449.479	13.021	0.02	0.001	Trace.
BTR11	04/02/86	11:00	NA	456.458	6.979	0.02	0.000	Small accumulation of brine at bottom.
BTR11	04/08/86	10:59	00.01	462.458	12.979	0.03	0.001	
BTR11	04/16/86	13:00	Trace	470.542	8.084	0.03	0.000	
BTR11	04/24/86	11:30	Trace	478.479	16.021	0.03	0.000	
BTR11	04/30/86	12:20	NA	484.514	22.056	0.03	0.000	
BTR11	05/06/86	11:37	Trace	490.484	28.026	0.03	0.000	
BTR11	05/13/86	10:40	Trace	497.444	34.986	0.03	0.000	A few drops.
BTR11	05/20/86	11:30	Trace	504.479	42.021	0.03	0.000	
BTR11	05/27/86	12:15	00.05	511.510	49.052	0.08	0.001	
BTR11	06/03/86	11:35	Trace	518.483	6.973	0.08	0.000	
BTR11	06/10/86	12:30	Trace	525.521	14.011	0.08	0.000	
BTR11	06/17/86	11:40	Trace	532.486	20.976	0.08	0.000	
BTR11	06/24/86	12:10	Trace	539.507	27.997	0.08	0.000	A few drops.
BTR11	07/01/86	11:40	Trace	546.486	34.976	0.08	0.000	
BTR11	07/08/86	11:50	NA	553.493	41.983	0.08	0.000	Plug missing from collecting device.
BTR11	07/16/86	12:02	Trace	561.501	49.991	0.08	0.000	
BTR11	07/22/86	11:00	Trace	567.458	55.948	0.08	0.000	
BTR11	07/29/86	11:44	00.01	574.489	62.979	0.09	0.000	
BTR11	08/05/86	12:11	Trace	581.508	7.019	0.09	0.000	
BTR11	08/12/86	09:30	Trace	588.396	13.907	0.09	0.000	
BTR11	08/19/86	12:37	Trace	595.526	21.037	0.09	0.000	
BTR11	08/26/86	12:10	Trace	602.507	28.018	0.09	0.000	
BTR11	09/04/86	12:05	00.01	611.503	37.014	0.10	0.000	Trace.
BTR11	09/09/86	12:30	Trace	616.521	5.018	0.10	0.000	
BTR11	09/16/86	11:28	Trace	623.478	11.975	0.10	0.000	
BTR11	09/23/86	11:48	Trace	630.492	18.989	0.10	0.000	A few drops.
BTR11	10/01/86	08:33	Trace	638.356	26.853	0.10	0.000	
BTR11	10/08/86	13:58	Trace	645.582	34.079	0.10	0.000	Inside tube is damp.
BTR11	10/14/86	10:00	NA	651.417	39.914	0.10	0.000	Pumped only, no collection.
BTR11	11/05/86	13:05	Trace	673.545	62.042	0.10	0.000	Estimated 0.005 liters.
BTR11	11/20/86	14:37	NA	688.609	77.106	0.10	0.000	Trace.
BTR11	12/30/86	09:48	NA	728.408	116.905	0.10	0.000	Damp, no vacuum.
BTR11	03/06/87	09:55	NA	794.413	182.910	0.10	0.000	Dry, no vacuum.
BTR11	03/30/87	10:10	0.00	818.424	24.011	0.10	0.000	Dry.
BTR11	06/17/87	09:10	0.00	897.382	102.969	0.10	0.000	Dry.
BTR11	07/28/87	10:00	0.00	938.417	144.004	0.10	0.000	Dry.

BSEP DATA FOR HOLE BTR12

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BTR12	01/31/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated.
BTR12	02/27/86	00:00	NA	0.000	0.000	0.00	0.000	Hole drilled in north rib, 3.05 ft deep, approximately 2.5 ft above floor.
BTR12	02/28/86	00:00	NA	0.000	0.000	0.00	0.000	Installed suction probe and sealed opening.
BTR12	03/04/86	10:30	NA	427.438	1.000	0.00	0.000	Some brine accumulation at bottom of hole.
BTR12	03/06/86	11:40	NA	429.486	3.048	0.00	0.000	Some brine accumulation.
BTR12	03/13/86	11:30	NA	436.479	10.041	0.00	0.000	Suction probe installed and sealed opening. Some brine in bottom of hole.
BTR12	03/26/86	11:30	00.01	449.479	23.041	0.01	0.000	First time sampled. Trace.
BTR12	04/02/86	11:00	NA	456.458	6.979	0.01	0.000	Small accumulation at bottom.
BTR12	04/08/86	10:53	NA	462.453	12.974	0.01	0.000	Brine at the bottom.
BTR12	04/16/86	13:35	NA	470.566	21.087	0.01	0.000	Left brine in hole.
BTR12	04/24/86	11:30	NA	478.479	29.000	0.01	0.000	
BTR12	04/30/86	12:20	NA	484.514	35.035	0.01	0.000	Wet.
BTR12	05/06/86	11:20	Trace	490.472	40.993	0.01	0.000	
BTR12	05/13/86	10:40	Trace	497.444	47.965	0.01	0.000	Three droplets only.
BTR12	05/20/86	11:30	Trace	504.479	55.000	0.01	0.000	
BTR12	05/27/86	12:15	Trace	511.510	62.031	0.01	0.000	
BTR12	06/03/86	11:35	Trace	518.483	69.004	0.01	0.000	A few drops.
BTR12	06/10/86	12:30	NA	525.521	76.042	0.01	0.000	Dry, plug had been removed.
BTR12	06/17/86	11:40	Trace	532.486	83.007	0.01	0.000	
BTR12	06/24/86	12:10	Trace	539.507	90.028	0.01	0.000	A few drops.
BTR12	07/01/86	11:40	NA	546.486	97.007	0.01	0.000	Dry.
BTR12	07/08/86	11:52	NA	553.494	104.015	0.01	0.000	Wet.
BTR12	07/16/86	12:03	Trace	561.502	112.023	0.01	0.000	Small pool at end of hole.
BTR12	07/22/86	11:00	NA	567.458	117.979	0.01	0.000	Damp.
BTR12	07/29/86	11:45	NA	574.490	125.011	0.01	0.000	Small pool at back.
BTR12	08/05/86	12:12	NA	581.508	132.029	0.01	0.000	Small pool at back.
BTR12	08/12/86	09:30	NA	588.396	138.917	0.01	0.000	Dry, not sealed.
BTR12	08/19/86	12:38	NA	595.526	146.047	0.01	0.000	Dry, no vacuum.
BTR12	08/26/86	12:11	NA	602.508	153.029	0.01	0.000	Not sealed, dry.
BTR12	09/04/86	12:05	Trace	611.503	162.024	0.01	0.000	A few drops.
BTR12	09/09/86	12:30	Trace	616.521	167.042	0.01	0.000	
BTR12	09/16/86	11:29	Trace	623.478	173.999	0.01	0.000	
BTR12	09/23/86	11:48	Trace	630.492	181.013	0.01	0.000	A few drops.
BTR12	10/01/86	08:34	Trace	638.357	188.878	0.01	0.000	
BTR12	10/08/86	13:59	Trace	645.583	196.104	0.01	0.000	Inside of tube is damp.
BTR12	10/14/86	10:00	NA	651.417	201.938	0.01	0.000	Pumped only, no collection.
BTR12	11/05/86	13:06	Trace	673.546	224.067	0.01	0.000	Estimated 0.001 liters.
BTR12	11/20/86	14:38	00.00	688.610	239.131	0.01	0.000	Trace.
BTR12	12/30/86	09:47	NA	728.408	39.798	0.01	0.000	Damp, no vacuum.
BTR12	03/06/87	10:00	NA	794.417	105.807	0.01	0.000	Dry, no vacuum.
BTR12	03/30/87	10:11	0.00	818.424	24.007	0.01	0.000	Dry.
BTR12	06/17/87	09:11	0.00	897.383	102.966	0.01	0.000	Dry.
BTR12	07/28/87	10:01	0.00	938.417	144.000	0.01	0.000	Dry.

BSEP DATA FOR HOLE BX01

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BX01	06/02/84	00:00	NA	0.000	0.000	0.00	0.000	Room B completed.
BX01	01/27/85	00:00	NA	0.000	1.000	0.00	0.000	Downhole drilled 1/24/85 to 1/27/85. Wet core and brine encountered 1/26/85 at 35 to 36.5 feet.
BX01	02/05/85	11:00	00.39	35.458	11.041	0.39	0.035	First time collected.
BX01	02/11/85	12:00	00.72	41.500	6.042	1.11	0.119	
BX01	02/19/85	13:00	00.70	49.542	8.042	1.81	0.087	
BX01	02/26/85	12:45	00.61	56.531	6.989	2.42	0.087	
BX01	03/07/85	09:15	00.70	65.385	8.854	3.12	0.079	
BX01	03/12/85	11:45	00.41	70.490	5.105	3.53	0.080	
BX01	03/20/85	12:50	00.61	78.535	8.045	4.14	0.076	
BX01	03/26/85	10:45	00.45	84.448	5.913	4.59	0.076	
BX01	04/02/85	11:44	00.51	91.489	7.041	5.10	0.072	
BX01	04/10/85	11:38	00.55	99.485	7.996	5.65	0.069	
BX01	04/17/85	11:00	00.45	106.458	6.973	6.10	0.065	
BX01	04/23/85	10:05	00.38	112.420	5.962	6.48	0.064	Room B heaters turned on 4/23/85.
BX01	05/01/85	11:40	00.46	120.486	8.066	6.94	0.057	
BX01	06/04/85	09:30	02.00	154.396	33.910	8.94	0.059	First check in several weeks.
BX01	07/16/85	10:15	02.34	196.427	42.031	11.28	0.056	Brine effervesces.
BX01	08/26/85	13:56	02.38	237.581	41.154	13.66	0.058	Room temp. 98 degrees F. at collar, 103 F. in center of room.
BX01	10/08/85	12:00	02.27	280.500	42.919	15.93	0.053	
BX01	11/21/85	10:05	02.42	324.420	43.920	18.35	0.055	
BX01	12/04/85	13:35	00.69	337.566	13.146	19.04	0.052	
BX01	01/31/86	10:25	02.95	395.434	57.868	21.99	0.051	
BX01	02/12/86	09:30	00.80	407.396	11.962	22.79	0.067	
BX01	04/16/86	11:00	03.45	470.458	63.062	26.24	0.055	
BX01	04/30/86	09:45	00.73	484.406	13.948	26.97	0.052	
BX01	05/06/86	09:18	00.30	490.387	5.981	27.27	0.050	
BX01	06/10/86	10:20	01.85	525.431	35.044	29.12	0.053	
BX01	08/19/86	10:50	03.21	595.451	70.020	32.33	0.046	
BX01	09/09/86	11:00	01.30	616.458	21.007	33.63	0.062	
BX01	10/01/86	11:08	01.16	638.464	22.006	34.79	0.053	
BX01	11/05/86	10:00	NA	673.417	34.953	34.79	0.000	Not collected.
BX01	11/20/86	10:39	02.40	688.444	49.980	37.19	0.048	
BX01	12/30/86	14:10	01.75	728.590	40.146	38.94	0.044	
BX01	02/03/87	11:00	01.67	763.458	34.868	40.61	0.048	
BX01	03/06/87	11:50	NA	794.493	31.035	40.61	0.000	Room closed, bad back, not sampled.

BSEP DATA FOR HOLE BX02

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
BX02	06/02/84	00:00	NA	0.000	0.000	0.00	0.000	Room B completed.
BX02	02/01/85	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled 1/29/85 to 2/01/85.
BX02	02/05/85	11:00	NA	35.458	1.000	0.00	0.000	No drips noticed.
BX02	02/19/85	13:00	NA	49.542	15.084	0.00	0.000	Tubing plugged.
BX02	03/12/85	11:45	NA	70.490	36.032	0.00	0.000	Trace, few drops in jug.
BX02	03/20/85	12:50	00.10	78.535	44.077	0.10	0.002	
BX02	03/26/85	10:45	00.12	84.448	5.913	0.22	0.020	
BX02	04/02/85	11:44	00.10	91.489	7.041	0.32	0.014	
BX02	04/10/85	11:38	00.21	99.485	7.996	0.53	0.026	
BX02	04/17/85	11:00	00.13	106.458	6.973	0.66	0.019	
BX02	04/23/85	10:05	00.01	112.420	5.962	0.67	0.002	Room B heaters turned on 4/23/85. Low reading probably due to partial blockage of collecting tube.
BX02	05/01/85	11:31	00.12	120.480	8.060	0.79	0.015	
BX02	06/04/85	09:25	00.50	154.392	33.912	1.29	0.015	First check in several weeks.
BX02	07/16/85	10:00	00.16	196.417	42.025	1.45	0.004	Changed funnel.
BX02	10/08/85	12:00	00.04	280.500	84.083	1.49	0.000	
BX02	01/17/86	09:00	00.26	381.375	100.875	1.75	0.003	Changed funnel.
BX02	01/31/86	10:15	NA	395.427	14.052	1.75	0.000	
BX02	04/16/86	11:00	NA	470.458	89.083	1.75	0.000	Trace in plastic tube, salt buildup in tube and container.
BX02	08/19/86	10:50	NA	595.451	214.076	1.75	0.000	Dry.
BX02	10/01/86	11:05	00.00	638.462	257.087	1.75	0.000	Dry.
BX02	11/05/86	10:00	NA	673.417	34.955	1.75	0.000	Dry.
BX02	11/20/86	10:37	NA	688.442	49.980	1.75	0.000	Dry.
BX02	12/30/86	14:05	NA	728.587	90.125	1.75	0.000	Dry.
BX02	02/03/87	NA:	NA	763.000	125.538	1.75	0.000	
BX02	03/06/87	11:50	NA	794.493	156.031	1.75	0.000	Room closed, bad back, not sampled.

BSEP DATA FOR HOLE DH15

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH15	03/13/84	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated at N1104/E1688.5.
DH15	03/21/84	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled 3/20/84 to 3/21/84.
DH15	05/20/86	00:00	NA	0.000	0.000	0.00	0.000	Collecting funnel and container installed.
DH15	05/27/86	15:00	NA	511.625	1.000	0.00	0.000	Trace of brine. First time collected.
DH15	06/03/86	09:15	00.02	518.385	7.760	0.02	0.003	
DH15	06/10/86	10:40	00.04	525.444	7.059	0.06	0.006	
DH15	06/17/86	09:45	00.03	532.406	6.962	0.09	0.004	
DH15	06/24/86	10:00	00.05	539.417	7.011	0.14	0.007	Lots of clay has fallen down hole and accumulated in collecting container.
DH15	07/01/86	12:30	00.05	546.521	7.104	0.19	0.007	
DH15	07/08/86	09:50	00.05	553.410	6.889	0.24	0.007	
DH15	07/16/86	09:40	00.06	561.403	7.993	0.30	0.008	
DH15	07/22/86	09:15	00.05	567.385	5.982	0.35	0.008	Clay in collecting container.
DH15	07/29/86	09:55	00.05	574.413	7.028	0.40	0.007	
DH15	08/05/86	10:20	00.05	581.431	7.018	0.45	0.007	
DH15	08/12/86	09:45	00.05	588.406	6.975	0.50	0.007	
DH15	08/19/86	10:20	00.05	595.431	7.025	0.55	0.007	
DH15	08/26/86	10:00	00.05	602.417	6.986	0.60	0.007	
DH15	09/04/86	09:50	00.06	611.410	8.993	0.66	0.007	
DH15	09/09/86	11:00	00.03	616.458	5.048	0.69	0.006	
DH15	09/16/86	09:25	00.05	623.392	6.934	0.74	0.007	
DH15	09/23/86	09:30	00.06	630.396	7.004	0.80	0.009	
DH15	10/01/86	11:29	00.06	638.478	8.082	0.86	0.007	
DH15	11/05/86	10:15	0.22	673.427	34.949	1.08	0.006	
DH15	11/20/86	11:28	00.07	688.478	15.051	1.15	0.005	
DH15	12/31/86	11:37	00.18	729.484	41.006	1.33	0.004	
DH15	03/30/87	12:02	0.41	818.501	89.017	1.74	0.005	
DH15	05/07/87	10:22	0.17	856.432	37.931	1.91	0.004	
DH15	06/17/87	11:20	0.21	897.472	41.040	2.12	0.005	
DH15	07/28/87	12:07	0.14	938.505	41.033	2.26	0.003	

BSEP DATA FOR HOLE DH35

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH35	11/21/84	00:00	NA	0.000	0.000	0.00	0.000	Approximate date this part of Room G was excavated.
DH35	01/27/85	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled 1/26/85 to 1/27/85.
DH35	02/05/85	11:15	NA	35.469	1.000	0.00	0.000	Started to drip.
DH35	03/05/85	10:00	00.19	63.417	28.948	0.19	0.007	Salt crystals in container. First time collected.
DH35	03/12/85	10:00	00.17	70.417	7.000	0.36	0.024	Salt crystals in container.
DH35	03/20/85	10:26	00.19	78.435	8.018	0.55	0.024	
DH35	03/26/85	09:45	00.13	84.406	5.971	0.68	0.022	
DH35	04/02/85	10:15	00.15	91.427	7.021	0.83	0.021	Salt crystals in container.
DH35	04/10/85	10:14	00.19	99.426	7.999	1.02	0.024	
DH35	04/23/85	11:46	00.12	112.490	13.064	1.14	0.009	
DH35	04/30/85	11:09	00.16	119.465	6.975	1.30	0.023	Clay in container.
DH35	05/07/85	09:53	00.14	126.412	6.947	1.44	0.020	
DH35	05/14/85	10:48	00.16	133.450	7.038	1.60	0.023	
DH35	05/21/85	10:42	00.15	140.446	6.996	1.75	0.021	
DH35	05/29/85	10:00	00.15	148.417	7.971	1.90	0.019	
DH35	06/11/85	10:10	00.02	161.424	13.007	1.92	0.002	
DH35	07/09/85	11:10	00.06	189.465	28.041	1.98	0.002	
DH35	07/16/85	11:48	00.13	196.492	7.027	2.11	0.019	
DH35	07/24/85	10:37	00.12	204.442	7.950	2.23	0.015	
DH35	07/30/85	10:17	00.08	210.428	5.986	2.31	0.013	Clay in container.
DH35	08/06/85	10:37	00.08	217.442	7.014	2.39	0.011	Clay chunks in container.
DH35	08/14/85	10:53	00.11	225.453	8.011	2.50	0.014	
DH35	08/20/85	11:05	00.09	231.462	6.009	2.59	0.015	
DH35	08/28/85	10:00	00.14	239.417	7.955	2.73	0.018	
DH35	09/04/85	10:30	00.11	246.438	7.021	2.84	0.016	
DH35	09/10/85	10:38	00.11	252.443	6.005	2.95	0.018	
DH35	09/17/85	09:40	00.12	259.403	6.960	3.07	0.017	
DH35	09/24/85	09:48	00.07	266.408	7.005	3.14	0.010	
DH35	10/08/85	10:44	00.08	280.447	14.039	3.22	0.006	
DH35	10/15/85	10:17	00.06	287.428	6.981	3.28	0.009	
DH35	10/29/85	09:42	00.06	301.404	13.976	3.34	0.004	
DH35	11/05/85	09:24	00.08	308.392	6.988	3.42	0.011	
DH35	11/13/85	10:06	00.11	316.421	8.029	3.53	0.014	
DH35	11/21/85	11:32	00.07	324.481	8.060	3.60	0.009	
DH35	11/26/85	11:25	00.05	329.476	4.995	3.65	0.010	Changed collecting container.
DH35	01/23/86	10:40	00.06	387.444	57.968	3.71	0.001	Clay in collecting container. Entry has been restricted since 12/10/85 due to mining activities.
DH35	01/31/86	12:16	00.06	395.511	8.067	3.77	0.007	
DH35	02/12/86	10:55	00.09	407.455	11.944	3.86	0.008	
DH35	02/19/86	11:45	00.07	414.490	7.035	3.93	0.010	
DH35	02/28/86	13:20	00.06	423.556	9.066	3.99	0.007	
DH35	03/06/86	10:45	00.03	429.448	5.892	4.02	0.005	
DH35	03/13/86	10:10	00.07	436.424	6.976	4.09	0.010	
DH35	03/26/86	10:20	NA	449.431	13.007	4.09	0.000	Funnel broken, 5 inch stalactite formed from collar.
DH35	04/02/86	09:40	NA	456.403	19.979	4.09	0.000	Installed new funnel.
DH35	05/27/86	15:45	NA	511.656	75.232	4.09	0.000	Trace of brine.
DH35	06/03/86	10:08	00.01	518.422	81.998	4.10	0.000	
DH35	06/10/86	11:35	00.02	525.483	7.061	4.12	0.003	
DH35	06/17/86	10:58	00.01	532.457	6.974	4.13	0.001	
DH35	06/24/86	10:57	00.02	539.456	6.999	4.15	0.003	
DH35	07/01/86	14:03	00.02	546.585	7.129	4.17	0.003	
DH35	07/08/86	10:37	00.02	553.442	6.857	4.19	0.003	
DH35	07/16/86	10:36	00.03	561.442	8.000	4.22	0.004	
DH35	07/22/86	10:05	NA	567.420	5.978	4.22	0.000	Trace of brine. Cleaned soft clay out of funnel.
DH35	07/29/86	10:35	00.01	574.441	12.999	4.23	0.001	
DH35	08/05/86	11:13	00.03	581.467	7.026	4.26	0.004	
DH35	08/12/86	10:35	00.03	588.441	6.974	4.29	0.004	
DH35	08/19/86	11:35	00.01	595.483	7.042	4.30	0.001	
DH35	08/26/86	10:38	NA	602.443	6.960	4.30	0.000	Trace collected.
DH35	09/04/86	10:40	00.01	611.444	15.961	4.31	0.001	
DH35	09/09/86	10:10	NA	616.424	4.980	4.31	0.000	Trace collected.
DH35	09/16/86	10:13	NA	623.426	11.982	4.31	0.000	Trace collected.
DH35	09/23/86	10:11	NA	630.424	18.980	4.31	0.000	Trace.
DH35	10/01/86	12:16	00.00	638.511	27.067	4.31	0.000	Trace, none collected.
DH35	10/08/86	11:08	NA	645.464	6.953	4.31	0.000	Small amount not collected.
DH35	11/05/86	11:28	NA	673.478	28.014	4.31	0.000	Damp, not collected.
DH35	11/20/86	NA:	NA	688.000	42.536	4.31	0.000	Not sampled, looked dry.

BSEP DATA FOR HOLE DH35

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH35	12/30/86	12:15	NA	728.510	83.046	4.31	0.000	
DH35	02/03/87	NA:	NA	763.000	117.536	4.31	0.000	
DH35	03/06/87	11:25	NA	794.476	149.012	4.31	0.000	Dry.
DH35	03/30/87	11:20	0.00	818.472	23.996	4.31	0.000	Dry.
DH35	05/07/87	11:35	0.00	856.483	62.007	4.31	0.000	Dry.
DH35	06/18/87	12:10	0.00	898.507	104.031	4.31	0.000	Dry.
DH35	07/28/87	11:15	0.00	938.469	143.993	4.31	0.000	Dry.

BSEP DATA FOR HOLE DH36

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH36	11/21/84	00:00	NA	0.000	0.000	0.00	0.000	Approximate date this part of Room G excavated.
DH36	01/26/85	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 1/26/85.
DH36	01/28/85	09:00	NA	27.375	1.000	0.00	0.000	Moist muck at the bottom.
DH36	02/05/85	11:15	02.50	35.469	9.094	2.50	0.275	About 1 ft. muck, brine and hydraulic fluid. First time bailed.
DH36	02/11/85	11:00	01.51	41.458	5.989	4.01	0.252	Brine, muck, hydraulic fluid.
DH36	02/19/85	12:10	01.78	49.507	8.049	5.79	0.221	Some muck.
DH36	02/26/85	10:45	01.48	56.448	6.941	7.27	0.213	Brine and muck.
DH36	03/05/85	10:00	01.76	63.417	6.969	9.03	0.253	
DH36	03/12/85	10:00	01.55	70.417	7.000	10.58	0.221	
DH36	03/20/85	10:26	01.59	78.435	8.018	12.17	0.198	
DH36	03/26/85	09:45	01.35	84.406	5.971	13.52	0.226	
DH36	04/02/85	10:15	01.58	91.427	7.021	15.10	0.225	
DH36	04/10/85	10:25	01.71	99.434	8.007	16.81	0.214	
DH36	04/17/85	13:30	01.49	106.562	7.128	18.30	0.209	
DH36	04/23/85	11:46	01.45	112.490	5.928	19.75	0.245	
DH36	04/30/85	11:21	01.49	119.473	6.983	21.24	0.213	
DH36	05/07/85	09:58	01.55	126.415	6.942	22.79	0.223	
DH36	05/14/85	10:54	01.77	133.454	7.039	24.56	0.251	
DH36	05/21/85	10:45	01.61	140.448	6.994	26.17	0.230	
DH36	05/29/85	10:00	01.50	148.417	7.969	27.67	0.188	
DH36	06/04/85	11:33	01.40	154.481	6.064	29.07	0.231	
DH36	06/11/85	11:15	01.55	161.469	6.988	30.62	0.222	
DH36	06/18/85	10:17	01.58	168.428	6.959	32.20	0.227	
DH36	06/25/85	10:40	01.43	175.444	7.016	33.63	0.204	
DH36	07/02/85	11:00	01.59	182.458	7.014	35.22	0.227	
DH36	07/09/85	11:15	01.54	189.469	7.011	36.76	0.220	
DH36	07/16/85	11:50	01.58	196.493	7.024	38.34	0.225	Brine effervesces.
DH36	07/24/85	10:46	01.78	204.449	7.956	40.12	0.224	
DH36	07/30/85	10:20	01.39	210.431	5.982	41.51	0.232	
DH36	08/06/85	10:43	01.70	217.447	7.016	43.21	0.242	
DH36	08/14/85	11:02	01.58	225.460	8.013	44.79	0.197	Valve leaked, some brine drained back down hole.
DH36	08/20/85	11:11	01.42	231.466	6.006	46.21	0.236	
DH36	08/28/85	10:00	01.94	239.417	7.951	48.15	0.244	
DH36	09/04/85	10:32	01.69	246.439	7.022	49.84	0.241	
DH36	09/10/85	10:35	01.41	252.441	6.002	51.25	0.235	
DH36	09/17/85	09:42	01.53	259.404	6.963	52.78	0.220	
DH36	09/24/85	09:50	01.53	266.410	7.006	54.31	0.218	
DH36	10/01/85	09:55	01.58	273.413	7.003	55.89	0.226	
DH36	10/08/85	10:52	01.63	280.453	7.040	57.52	0.232	
DH36	10/15/85	10:30	01.58	287.438	6.985	59.10	0.226	
DH36	10/23/85	10:23	01.82	295.433	7.995	60.92	0.228	
DH36	10/29/85	09:51	01.36	301.410	5.977	62.28	0.228	
DH36	11/05/85	09:27	01.63	308.394	6.984	63.91	0.233	
DH36	11/13/85	10:14	01.79	316.426	8.032	65.70	0.223	
DH36	11/21/85	11:36	01.91	324.483	8.057	67.61	0.237	
DH36	11/26/85	11:30	01.01	329.479	4.996	68.62	0.202	
DH36	12/03/85	13:35	01.50	336.566	7.087	70.12	0.212	
DH36	12/10/85	12:15	01.52	343.510	6.944	71.64	0.219	
DH36	01/23/86	11:00	09.30	387.458	43.948	80.94	0.212	Entry restricted since 12/10/85 due to mining activities.
DH36	01/31/86	12:20	01.38	395.514	8.056	82.32	0.171	
DH36	02/12/86	11:00	03.02	407.458	11.944	85.34	0.253	
DH36	02/19/86	11:45	01.55	414.490	7.032	86.89	0.220	
DH36	02/28/86	13:20	01.85	423.556	9.066	88.74	0.204	
DH36	03/06/86	10:45	01.30	429.448	5.892	90.04	0.221	Volume was estimated.
DH36	03/13/86	10:10	01.50	436.424	6.976	91.54	0.215	
DH36	03/26/86	10:20	02.56	449.431	13.007	94.10	0.197	
DH36	04/02/86	09:40	01.75	456.403	6.972	95.85	0.251	
DH36	04/08/86	09:45	00.97	462.406	6.003	96.82	0.162	
DH36	04/16/86	12:25	01.65	470.517	8.111	98.47	0.203	
DH36	04/24/86	10:20	02.00	478.431	7.914	100.47	0.253	
DH36	04/30/86	10:55	01.21	484.455	6.024	101.68	0.201	
DH36	05/06/86	10:14	01.20	490.426	5.971	102.88	0.201	
DH36	05/13/86	11:13	01.42	497.467	7.041	104.30	0.202	
DH36	05/20/86	11:10	01.50	504.465	6.998	105.80	0.214	
DH36	05/27/86	15:45	01.40	511.656	7.191	107.20	0.195	
DH36	06/03/86	10:10	01.38	518.424	6.768	108.58	0.204	
DH36	06/10/86	11:35	01.24	525.483	7.059	109.82	0.176	Valve leaked, some brine drained back down hole.
DH36	06/17/86	11:00	01.65	532.458	6.975	111.47	0.237	

BSEP DATA FOR HOLE DH36

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used for Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH36	06/24/86	11:00	01.45	539.458	7.000	112.92	0.207	
DH36	07/01/86	14:05	01.55	546.587	7.129	114.47	0.217	
DH36	07/08/86	10:45	01.40	553.448	6.861	115.87	0.204	
DH36	07/16/86	10:45	01.76	561.448	8.000	117.63	0.220	
DH36	07/22/86	10:07	01.29	567.422	5.974	118.92	0.216	
DH36	07/29/86	10:40	01.45	574.444	7.022	120.37	0.206	
DH36	08/05/86	11:20	01.46	581.472	7.028	121.83	0.208	
DH36	08/12/86	10:37	01.50	588.442	6.970	123.33	0.215	
DH36	08/19/86	11:35	01.38	595.483	7.041	124.71	0.196	
DH36	08/26/86	10:38	01.49	602.443	6.960	126.20	0.214	Static level not measured.
DH36	09/04/86	10:41	01.70	611.445	9.002	127.90	0.189	
DH36	09/09/86	10:15	01.20	616.427	4.982	129.10	0.241	
DH36	09/16/86	10:20	01.37	623.431	7.004	130.47	0.196	
DH36	09/23/86	10:18	01.40	630.429	6.998	131.87	0.200	
DH36	10/01/86	12:18	01.76	638.513	8.084	133.63	0.218	
DH36	10/08/86	11:10	01.44	645.465	6.952	135.07	0.207	Brine effervecs as it is poured into beaker.
DH36	10/14/86	11:57	01.21	651.498	6.033	136.28	0.201	Static level not measured.
DH36	11/05/86	11:38	4.28	673.485	21.987	140.56	0.195	
DH36	11/20/86	12:35	03.12	688.524	15.039	143.68	0.207	
DH36	12/30/86	12:25	01.72	728.517	0.000	143.68	0.000	Partial evacuation. No calculation. Do not plot or use zero value.
DH36	12/31/86	12:38	6.54	729.526	41.002	151.94	0.201	Calculated using 8.26 liters in 41.002 days (1.72 l. 12/30/86 plus 6.54 l. 12/31/86).
DH36	02/03/87	13:35	06.84	763.566	34.040	158.78	0.201	
DH36	03/06/87	11:20	5.84	794.472	30.906	164.62	0.189	
DH36	03/30/87	11:27	4.95	818.477	24.005	175.41	0.198	
DH36	05/07/87	11:33	6.62	856.481	38.004	182.03	0.174	
DH36	06/17/87	10:45	7.25	897.448	0.000	189.28	0.000	Some brine left in hole, no calculation.
DH36	06/18/87	12:10	0.49	898.507	42.026	189.77	0.184	Original l/day calculation too high due to residual brine left in hole. Recalculated using 7.74 l (7.25 l 6/17/87 plus 0.49 l 6/18/87).
DH36	07/28/87	11:27	7.76	938.477	39.970	197.53	0.194	

BSEP DATA FOR HOLE DH37

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH37	12/05/84	00:00	NA	0.000	0.000	0.00	0.000	Approximate date this part of Room G excavated.
DH37	01/26/85	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled 1/25/85 to 1/26/85.
DH37	02/05/85	11:15	NA	35.469	1.000	0.00	0.000	Started to drip.
DH37	03/05/85	10:10	00.06	63.424	28.955	0.06	0.002	Stalactite in collecting container.
DH37	03/12/85	10:00	00.06	70.417	6.993	0.12	0.009	Salt crystals in collecting container.
DH37	03/26/85	09:50	NA	84.410	13.993	0.12	0.000	Trace, none collected.
DH37	04/17/85	13:30	00.06	106.562	36.145	0.18	0.002	
DH37	04/23/85	11:41	00.04	112.487	5.925	0.22	0.007	
DH37	04/30/85	10:50	00.03	119.451	6.964	0.25	0.004	
DH37	05/07/85	09:45	00.06	126.406	6.955	0.31	0.009	
DH37	05/14/85	10:37	00.07	133.442	7.036	0.38	0.010	
DH37	05/21/85	10:31	00.06	140.438	6.996	0.44	0.009	
DH37	05/29/85	10:00	00.06	148.417	7.979	0.50	0.008	
DH37	06/04/85	11:22	00.05	154.474	6.057	0.55	0.008	
DH37	06/11/85	10:32	00.05	161.439	6.965	0.60	0.007	
DH37	06/18/85	10:05	00.08	168.420	6.981	0.68	0.011	Stalactites in collecting container.
DH37	06/25/85	10:44	00.05	175.447	7.027	0.73	0.007	
DH37	07/02/85	11:00	00.04	182.458	7.011	0.77	0.006	
DH37	07/09/85	11:00	00.03	189.458	7.000	0.80	0.004	
DH37	07/16/85	11:40	00.06	196.486	7.028	0.86	0.009	
DH37	07/24/85	10:33	00.06	204.440	7.954	0.92	0.008	
DH37	07/30/85	10:11	00.02	210.424	5.984	0.94	0.003	
DH37	08/06/85	10:32	00.01	217.439	7.015	0.95	0.001	
DH37	08/14/85	10:49	00.02	225.451	8.012	0.97	0.002	
DH37	08/20/85	10:56	00.03	231.456	6.005	1.00	0.005	
DH37	08/28/85	09:55	00.04	239.413	7.957	1.04	0.005	
DH37	09/04/85	10:21	00.02	246.431	7.018	1.06	0.003	
DH37	09/10/85	10:14	00.03	252.426	5.995	1.09	0.005	
DH37	09/17/85	09:35	00.02	259.399	6.973	1.11	0.003	
DH37	09/24/85	09:45	00.02	266.406	7.007	1.13	0.003	
DH37	10/01/85	09:50	00.01	273.410	7.004	1.14	0.001	
DH37	10/15/85	10:10	00.01	287.424	14.014	1.15	0.001	
DH37	10/23/85	10:17	00.02	295.428	8.004	1.17	0.002	
DH37	10/29/85	09:35	00.02	301.399	5.971	1.19	0.003	
DH37	07/01/86	14:00	00.02	546.583	245.184	1.21	0.000	
DH37	11/05/86	11:22	NA	673.474	126.891	1.21	0.000	Dry.
DH37	11/20/86	12:25	NA	688.517	141.934	1.21	0.000	Dry, not collected.
DH37	12/30/86	12:00	NA	728.500	181.917	1.21	0.000	
DH37	02/03/87	NA:	NA	763.000	216.417	1.21	0.000	
DH37	03/06/87	11:05	NA	794.462	247.879	1.21	0.000	Dry.
DH37	03/30/87	11:10	0.00	818.465	24.003	1.21	0.000	Dry.
DH37	05/07/87	11:27	0.00	856.477	62.015	1.21	0.000	Dry.
DH37	06/18/87	12:05	0.00	898.503	104.041	1.21	0.000	Dry.
DH37	07/28/87	10:53	0.00	938.453	143.991	1.21	0.000	Dry.

BSEP DATA FOR HOLE DH38

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH38	12/05/84	00:00	NA	0.000	0.000	0.00	0.000	Approximate date this part of Room G excavated.
DH38	01/26/85	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 1/25/85 to 1/26/85.
DH38	01/28/85	09:00	NA	27.375	1.000	0.00	0.000	Dry.
DH38	02/05/85	11:15	NA	35.469	9.094	0.00	0.000	Wet at bottom.
DH38	02/19/85	12:10	00.80	49.507	23.132	0.80	0.035	Brine and fine muck.
DH38	02/26/85	10:45	01.26	56.448	6.941	2.06	0.182	Brine and fine muck.
DH38	03/05/85	10:00	00.45	63.417	6.969	2.51	0.065	
DH38	03/12/85	10:00	00.39	70.417	7.000	2.90	0.056	
DH38	03/20/85	10:37	00.45	78.442	8.025	3.35	0.056	
DH38	03/26/85	09:50	00.36	84.410	5.968	3.71	0.060	
DH38	04/02/85	10:25	00.41	91.434	7.024	4.12	0.058	Some muck.
DH38	04/10/85	10:31	00.44	99.438	8.004	4.56	0.055	
DH38	04/17/85	13:30	00.41	106.562	7.124	4.97	0.058	
DH38	04/23/85	11:41	00.34	112.487	5.925	5.31	0.057	
DH38	04/30/85	11:05	00.39	119.462	6.975	5.70	0.056	
DH38	05/07/85	09:50	00.42	126.410	6.948	6.12	0.060	
DH38	05/14/85	10:45	00.41	133.448	7.038	6.53	0.058	
DH38	05/21/85	10:35	00.41	140.441	6.993	6.94	0.059	
DH38	05/29/85	11:35	00.47	148.483	8.042	7.41	0.058	
DH38	06/04/85	11:25	00.35	154.476	5.993	7.76	0.058	
DH38	06/11/85	10:35	00.40	161.441	6.965	8.16	0.057	
DH38	06/18/85	10:09	00.39	168.423	6.982	8.55	0.056	
DH38	06/25/85	10:50	00.42	175.451	7.028	8.97	0.060	
DH38	07/02/85	11:00	00.44	182.458	7.007	9.41	0.063	
DH38	07/09/85	11:05	00.43	189.462	7.004	9.84	0.061	
DH38	07/16/85	11:45	00.43	196.490	7.028	10.27	0.061	Brine effervesces.
DH38	07/24/85	10:35	00.49	204.441	7.951	10.76	0.062	
DH38	07/30/85	10:14	00.38	210.426	5.985	11.14	0.063	
DH38	08/06/85	10:34	00.42	217.440	7.014	11.56	0.060	
DH38	08/14/85	10:51	00.49	225.452	8.012	12.05	0.061	
DH38	08/20/85	11:02	00.37	231.460	6.008	12.42	0.062	
DH38	08/28/85	10:00	00.51	239.417	7.957	12.93	0.064	
DH38	09/04/85	10:23	00.44	246.433	7.016	13.37	0.063	
DH38	09/10/85	10:19	00.39	252.430	5.997	13.76	0.065	
DH38	09/17/85	09:37	00.44	259.401	6.971	14.20	0.063	
DH38	09/24/85	09:45	00.44	266.406	7.005	14.64	0.063	
DH38	10/01/85	09:53	00.44	273.412	7.006	15.08	0.063	
DH38	10/08/85	10:38	00.46	280.443	7.031	15.54	0.065	
DH38	10/15/85	10:15	00.44	287.427	6.984	15.98	0.063	
DH38	10/23/85	10:20	00.49	295.431	8.004	16.47	0.061	
DH38	10/29/85	09:40	00.39	301.403	5.972	16.86	0.065	
DH38	11/05/85	09:14	00.43	308.385	6.982	17.29	0.062	
DH38	11/13/85	10:00	00.52	316.417	8.032	17.81	0.065	
DH38	11/21/85	11:29	00.47	324.478	8.061	18.28	0.058	
DH38	11/26/85	11:20	00.33	329.472	4.994	18.61	0.066	
DH38	12/03/85	13:30	00.42	336.562	7.090	19.03	0.059	
DH38	12/10/85	12:30	00.41	343.521	6.959	19.44	0.059	
DH38	01/23/86	11:20	02.70	387.472	43.951	22.14	0.061	Entry restricted since 12/10/85 due to mining activities.
DH38	01/31/86	12:10	00.53	395.507	8.035	22.67	0.066	
DH38	02/12/86	10:50	00.75	407.451	11.944	23.42	0.063	
DH38	02/19/86	11:40	00.43	414.486	7.035	23.85	0.061	
DH38	02/28/86	13:15	00.37	423.552	9.066	24.02	0.019	Lost substantial volume due to break in suction line. Brine flowed back down into hole.
DH38	03/06/86	10:35	00.45	429.441	5.889	24.67	0.110	
DH38	03/13/86	10:05	00.43	436.420	6.979	25.10	0.062	
DH38	03/26/86	10:10	00.59	449.424	13.004	25.69	0.045	
DH38	04/02/86	09:35	00.58	456.399	6.975	26.27	0.083	
DH38	04/08/86	09:40	00.35	462.403	6.004	26.62	0.058	
DH38	04/16/86	12:10	00.50	470.507	8.104	27.12	0.062	
DH38	04/24/86	10:12	00.47	478.425	7.918	27.59	0.059	
DH38	04/30/86	10:50	00.35	484.451	6.026	27.94	0.058	
DH38	05/06/86	10:14	00.31	490.426	5.975	28.25	0.052	
DH38	05/13/86	11:05	00.41	497.462	7.036	28.66	0.058	
DH38	05/20/86	11:05	00.40	504.462	7.000	29.06	0.057	
DH38	05/27/86	15:40	00.38	511.653	7.191	29.44	0.053	
DH38	06/03/86	10:05	00.44	518.420	6.767	29.88	0.065	
DH38	06/10/86	11:22	00.43	525.474	7.054	30.31	0.061	
DH38	06/17/86	10:50	00.37	532.451	6.977	30.68	0.053	
DH38	06/24/86	10:52	00.50	539.453	7.002	31.18	0.071	

BSEP DATA FOR HOLE DH38

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH38	07/01/86	14:01	00.40	546.584	7.131	31.58	0.056	
DH38	07/08/86	10:30	00.38	553.438	6.854	31.96	0.055	
DH38	07/16/86	10:34	00.43	561.440	8.002	32.39	0.054	
DH38	07/22/86	09:58	00.35	567.415	5.975	32.74	0.059	
DH38	07/29/86	10:40	00.38	574.444	7.029	33.12	0.054	
DH38	08/05/86	11:10	00.39	581.465	7.021	33.51	0.056	
DH38	08/12/86	10:30	00.40	588.438	6.973	33.91	0.057	
DH38	08/19/86	11:30	00.41	595.479	7.041	34.32	0.058	
DH38	08/26/86	10:32	00.36	602.439	6.960	34.68	0.052	
DH38	09/04/86	10:35	00.49	611.441	9.002	35.17	0.054	
DH38	09/09/86	10:00	00.30	616.417	4.976	35.47	0.060	
DH38	09/16/86	10:11	00.38	623.424	7.007	35.85	0.054	
DH38	09/23/86	10:10	00.37	630.424	7.000	36.22	0.053	
DH38	10/01/86	12:07	00.43	638.505	8.081	36.65	0.053	
DH38	10/08/86	11:30	00.36	645.479	6.974	37.01	0.052	
DH38	10/14/86	11:45	00.35	651.490	6.011	37.36	0.058	
DH38	11/05/86	11:26	1.10	673.476	21.986	38.46	0.051	
DH38	11/20/86	12:27	00.82	688.519	15.043	39.28	0.055	
DH38	12/30/86	12:15	01.87	728.510	39.991	41.15	0.047	
DH38	02/03/87	13:15	01.72	763.552	35.042	42.87	0.049	
DH38	03/06/87	11:05	1.58	794.462	30.910	44.45	0.051	
DH38	03/30/87	11:13	1.17	818.467	24.005	45.62	0.047	
DH38	05/07/87	11:20	1.89	856.472	38.005	47.51	0.050	
DH38	06/17/87	10:45	1.91	897.448	0.000	49.42	0.000	Some brine left in hole, no calculation.
DH38	06/18/87	12:05	0.16	898.503	42.031	49.58	0.049	Calculated using 2.07 liters (1.91 l. 6/17/87 plus 0.16 l. 6/18/87).
DH38	07/28/87	10:53	1.88	938.453	39.950	51.46	0.047	

BSEP DATA FOR HOLE DH39

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH39	12/13/84	00:00	NA	0.000	0.000	0.00	0.000	Approximate date that part of Room G was excavated.
DH39	01/24/85	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled.
DH39	02/05/85	11:15	NA	35.469	1.000	0.00	0.000	Moist, no stalactites.
DH39	02/26/85	10:25	NA	56.434	21.965	0.00	0.000	Wet, none collected, back wet in 1.5 ft circle.
DH39	03/12/85	10:00	NA	70.417	35.948	0.00	0.000	Trace, salt crystals in container.
DH39	03/26/85	09:55	NA	84.413	49.944	0.00	0.000	Trace, none collected.
DH39	05/07/85	09:37	00.01	126.401	91.932	0.01	0.000	
DH39	05/29/85	11:30	00.03	148.479	22.078	0.04	0.001	Stalactites in sample.
DH39	11/05/86	11:10	NA	673.465	524.986	0.04	0.000	Dry.
DH39	11/20/86	NA:	NA	688.000	539.521	0.04	0.000	Dry, not collected.
DH39	12/30/86	11:45	NA	728.490	580.011	0.04	0.000	
DH39	02/03/87	NA:	NA	763.000	614.521	0.04	0.000	
DH39	03/06/87	11:00	NA	794.458	645.979	0.04	0.000	Dry.
DH39	03/30/87	11:05	0.00	818.462	24.004	0.04	0.000	Dry.
DH39	05/07/87	11:20	0.00	856.472	62.014	0.04	0.000	Dry.
DH39	06/18/87	12:00	0.00	898.500	104.042	0.04	0.000	Dry.
DH39	07/28/87	11:03	0.00	938.460	144.002	0.04	0.000	Dry.

BSEP DATA FOR HOLE DH40

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH40	12/13/84	00:00	NA	0.000	0.000	0.00	0.000	Approximate date this part of Room G excavated.
DH40	01/25/85	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 1/24/85 to 1/25/85.
DH40	01/28/85	09:00	NA	27.375	1.000	0.00	0.000	Dry.
DH40	02/05/85	11:15	NA	35.469	9.094	0.00	0.000	Moist at bottom.
DH40	03/12/85	10:10	NA	70.424	44.049	0.00	0.000	Moist muck.
DH40	03/26/85	09:55	NA	84.413	58.038	0.00	0.000	Moist muck.
DH40	04/17/85	13:30	00.98	106.562	80.187	0.98	0.012	Brine, muck, and oil.
DH40	04/23/85	11:33	00.26	112.481	5.919	1.24	0.044	Brine and muck.
DH40	04/30/85	10:49	00.11	119.451	6.970	1.35	0.016	Feel something spongy in bottom of hole.
DH40	05/07/85	09:42	00.10	126.404	6.953	1.45	0.014	
DH40	05/14/85	10:40	00.09	133.444	7.040	1.54	0.013	
DH40	05/21/85	10:26	00.07	140.435	6.991	1.61	0.010	
DH40	05/29/85	11:30	00.08	148.479	8.044	1.69	0.010	
DH40	06/04/85	11:15	00.10	154.469	5.990	1.79	0.017	Contained a lot of salt muck.
DH40	06/11/85	10:30	00.05	161.438	6.969	1.84	0.007	
DH40	06/18/85	10:01	00.09	168.417	6.979	1.93	0.013	
DH40	06/25/85	11:00	00.08	175.458	7.041	2.01	0.011	
DH40	07/02/85	11:00	00.09	182.458	7.000	2.10	0.013	
DH40	07/09/85	10:45	00.12	189.448	6.990	2.22	0.017	
DH40	07/16/85	11:38	00.09	196.485	7.037	2.31	0.013	
DH40	07/24/85	10:31	00.07	204.438	7.953	2.38	0.009	
DH40	07/30/85	10:08	00.07	210.422	5.984	2.45	0.012	
DH40	08/06/85	10:20	00.06	217.431	7.009	2.51	0.009	
DH40	08/14/85	10:43	00.07	225.447	8.016	2.58	0.009	
DH40	08/20/85	10:50	00.05	231.451	6.004	2.63	0.008	
DH40	08/28/85	09:53	00.08	239.412	7.961	2.71	0.010	
DH40	09/04/85	10:18	00.03	246.429	7.017	2.74	0.004	
DH40	09/10/85	10:11	00.04	252.424	5.995	2.78	0.007	
DH40	09/17/85	09:31	00.03	259.397	6.973	2.81	0.004	
DH40	09/24/85	09:40	00.06	266.403	7.006	2.87	0.009	
DH40	10/01/85	09:47	00.06	273.408	7.005	2.93	0.009	
DH40	10/08/85	10:32	00.04	280.439	7.031	2.97	0.006	
DH40	10/15/85	10:05	00.09	287.420	6.981	3.06	0.013	
DH40	10/23/85	10:13	00.04	295.426	8.006	3.10	0.005	
DH40	10/29/85	09:32	00.07	301.397	5.971	3.17	0.012	
DH40	11/05/85	09:10	00.04	308.382	6.985	3.21	0.006	
DH40	11/13/85	09:55	00.07	316.413	8.031	3.28	0.009	
DH40	11/21/85	11:24	00.02	324.475	8.062	3.30	0.002	
DH40	12/03/85	13:20	00.08	336.556	12.081	3.38	0.007	
DH40	12/10/85	12:40	00.04	343.528	6.972	3.42	0.006	
DH40	01/23/86	11:25	00.24	387.476	43.948	3.66	0.005	Entry restricted since 12/10/85 due to mining activities.
DH40	01/31/86	12:10	00.02	395.507	8.031	3.68	0.002	
DH40	02/19/86	11:20	00.14	414.472	18.965	3.82	0.007	
DH40	02/28/86	13:10	00.05	423.549	9.077	3.87	0.006	
DH40	03/13/86	10:00	00.02	436.417	12.868	3.89	0.002	
DH40	04/24/86	10:05	00.13	478.420	42.003	4.02	0.003	
DH40	05/20/86	11:05	00.10	504.462	26.042	4.12	0.004	
DH40	06/03/86	09:58	00.20	518.415	13.953	4.32	0.014	
DH40	09/16/86	10:05	00.34	623.420	105.005	4.66	0.003	Did not collect for several months.
DH40	11/05/86	11:18	0.27	673.471	50.051	4.93	0.005	
DH40	11/20/86	NA:	NA	688.000	14.529	4.93	0.000	Not sampled.
DH40	12/30/86	12:00	00.25	728.500	55.029	5.18	0.005	
DH40	02/03/87	13:00	00.13	763.542	35.042	5.31	0.004	
DH40	03/06/87	10:55	0.09	794.455	30.913	5.40	0.003	
DH40	03/30/87	11:05	0.10	818.462	24.007	5.50	0.004	
DH40	06/18/87	12:00	0.19	898.500	80.038	5.69	0.002	

BSEP DATA FOR HOLE DH41

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH41	12/30/84	00:00	NA	0.000	0.000	0.00	0.000	Approximate date this part of Room G excavated.
DH41	01/24/85	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled 1/23/85 to 1/24/85.
DH41	02/05/85	11:15	NA	35.469	1.000	0.00	0.000	Moist, no stalactites.
DH41	03/26/85	10:05	NA	84.420	49.951	0.00	0.000	Trace, none collected.
DH41	05/07/85	09:21	00.01	126.390	91.921	0.01	0.000	
DH41	05/29/85	10:00	00.01	148.417	22.027	0.02	0.000	Trace.
DH41	07/24/85	10:13	00.01	204.426	56.009	0.03	0.000	
DH41	08/20/85	12:00	00.01	231.500	27.074	0.04	0.000	Trace.
DH41	08/28/85	09:35	00.02	239.399	7.899	0.06	0.003	
DH41	09/17/85	09:20	00.01	259.389	19.990	0.07	0.001	
DH41	02/19/86	11:20	00.05	414.472	155.083	0.12	0.000	Lots of salt crystals and lumps of clay in container.
DH41	11/05/86	11:00	NA	673.458	258.986	0.12	0.000	Dry. Funnel has been removed, salt crust on collar.
DH41	11/20/86	12:07	NA	688.505	274.033	0.12	0.000	Dry.
DH41	12/30/86	12:50	NA	728.535	314.063	0.12	0.000	
DH41	02/03/87	NA:	NA	763.000	348.528	0.12	0.000	
DH41	03/05/87	10:55	NA	793.455	378.983	0.12	0.000	Crusty.
DH41	03/30/87	11:00	0.00	818.458	25.003	0.12	0.000	Dry.
DH41	05/07/87	11:09	0.00	856.465	63.010	0.12	0.000	Dry.
DH41	06/18/87	11:56	0.00	898.497	105.042	0.12	0.000	Dry.
DH41	07/28/87	11:03	0.00	938.460	145.005	0.12	0.000	Dry.

BSEP DATA FOR HOLE DH42

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH42	12/30/84	00:00	NA	0.000	0.000	0.00	0.000	Approximate date this part of Room G excavated.
DH42	01/23/85	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled.
DH42	01/28/85	09:00	NA	27.375	1.000	0.00	0.000	Moist muck at the bottom.
DH42	02/05/85	11:15	00.27	35.469	9.094	0.27	0.030	First time collected.
DH42	02/11/85	11:00	00.30	41.458	5.989	0.57	0.050	
DH42	02/19/85	13:10	00.33	49.549	8.091	0.90	0.041	
DH42	02/26/85	10:45	00.26	56.448	6.899	1.16	0.038	
DH42	03/05/85	10:00	00.28	63.417	6.969	1.44	0.040	
DH42	03/12/85	10:20	00.25	70.431	7.014	1.69	0.036	
DH42	03/20/85	10:54	00.25	78.454	8.023	1.94	0.031	Valve leaked, some brine drained back down hole.
DH42	03/26/85	10:06	00.28	84.421	5.967	2.22	0.047	
DH42	04/02/85	10:45	00.26	91.448	7.027	2.48	0.037	
DH42	04/10/85	10:45	00.29	99.448	8.000	2.77	0.036	
DH42	04/17/85	13:30	00.24	106.562	7.114	3.01	0.034	
DH42	04/23/85	13:23	00.04	112.558	5.996	3.05	0.007	Significant volume of brine drained back down hole.
DH42	04/30/85	10:31	00.38	119.438	6.880	3.43	0.055	
DH42	05/07/85	09:25	00.33	126.392	6.954	3.76	0.047	
DH42	05/14/85	10:30	00.25	133.438	7.046	4.01	0.035	
DH42	05/21/85	10:17	00.26	140.428	6.990	4.27	0.037	
DH42	05/29/85	10:10	00.30	148.424	7.996	4.57	0.038	
DH42	06/04/85	10:45	00.22	154.448	6.024	4.79	0.037	
DH42	06/11/85	10:10	00.25	161.424	6.976	5.04	0.036	
DH42	06/18/85	09:53	00.25	168.412	6.988	5.29	0.036	
DH42	06/25/85	11:15	00.25	175.469	7.057	5.54	0.035	
DH42	07/02/85	11:00	00.24	182.458	6.989	5.78	0.034	
DH42	07/09/85	10:30	00.25	189.438	6.980	6.03	0.036	
DH42	07/16/85	11:08	00.25	196.464	7.026	6.28	0.036	Brine effervesces.
DH42	07/24/85	10:19	00.28	204.430	7.966	6.56	0.035	
DH42	07/30/85	09:57	00.22	210.415	5.985	6.78	0.037	
DH42	08/06/85	10:13	00.26	217.426	7.011	7.04	0.037	
DH42	08/14/85	10:59	00.27	225.458	8.032	7.31	0.034	
DH42	08/20/85	10:45	00.21	231.448	5.990	7.52	0.035	
DH42	08/28/85	09:45	00.29	239.406	7.958	7.81	0.036	
DH42	09/04/85	10:12	00.25	246.425	7.019	8.06	0.036	
DH42	09/10/85	09:56	00.21	252.414	5.989	8.27	0.035	
DH42	09/17/85	09:26	00.28	259.393	6.979	8.55	0.040	
DH42	09/24/85	09:37	00.24	266.401	7.008	8.79	0.034	
DH42	10/01/85	09:44	00.24	273.406	7.005	9.03	0.034	
DH42	10/08/85	10:25	00.23	280.434	7.028	9.26	0.033	
DH42	10/15/85	10:00	00.23	287.417	6.983	9.49	0.033	
DH42	10/23/85	10:07	00.26	295.422	8.005	9.75	0.032	
DH42	10/29/85	09:16	00.24	301.386	5.964	9.99	0.040	
DH42	11/05/85	09:05	00.22	308.378	6.992	10.21	0.031	
DH42	11/13/85	09:46	00.26	316.407	8.029	10.47	0.032	
DH42	11/21/85	10:53	00.26	324.453	8.046	10.73	0.032	
DH42	11/26/85	10:59	00.16	329.458	5.005	10.89	0.032	
DH42	12/03/85	13:10	00.20	336.549	7.091	11.09	0.028	
DH42	12/10/85	12:50	00.22	343.535	6.986	11.31	0.031	
DH42	01/23/86	11:30	01.32	387.479	43.944	12.63	0.030	Entry restricted since 12/10/85 due to mining activities.
DH42	01/31/86	12:05	00.30	395.503	8.024	12.93	0.037	
DH42	02/12/86	10:35	00.38	407.441	11.938	13.31	0.032	
DH42	02/19/86	11:10	00.22	414.465	7.024	13.53	0.031	
DH42	02/28/86	13:00	00.31	423.542	9.077	13.84	0.034	
DH42	03/06/86	10:30	00.17	429.438	5.896	14.01	0.029	
DH42	03/13/86	09:53	00.21	436.412	6.974	14.22	0.030	
DH42	03/26/86	10:00	00.39	449.417	13.005	14.61	0.030	
DH42	04/02/86	09:25	00.20	456.392	6.975	14.81	0.029	
DH42	04/08/86	09:30	00.20	462.396	6.004	15.01	0.033	
DH42	04/16/86	11:55	00.24	470.497	8.101	15.25	0.030	
DH42	04/24/86	09:55	00.21	478.413	7.916	15.46	0.027	
DH42	04/30/86	10:41	00.17	484.445	6.032	15.63	0.028	
DH42	05/06/86	10:10	00.19	490.424	5.979	15.82	0.032	
DH42	05/13/86	10:00	00.20	497.417	6.993	16.02	0.029	
DH42	05/20/86	11:00	00.20	504.458	7.041	16.22	0.028	
DH42	05/27/86	15:35	00.20	511.649	7.191	16.42	0.028	
DH42	06/03/86	09:50	00.20	518.410	6.761	16.62	0.030	
DH42	06/10/86	11:13	00.17	525.467	7.057	16.79	0.024	
DH42	06/17/86	10:40	00.20	532.444	6.977	16.99	0.029	

BSEP DATA FOR HOLE DH42

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH42	06/24/86	10:40	00.18	539.444	7.000	17.17	0.026	
DH42	07/01/86	13:45	00.20	546.573	7.129	17.37	0.028	
DH42	07/08/86	10:22	00.20	553.432	6.859	17.57	0.029	
DH42	07/16/86	10:15	00.30	561.427	7.995	17.87	0.038	
DH42	07/22/86	09:50	00.16	567.410	5.983	18.03	0.027	
DH42	07/29/86	10:25	00.20	574.434	7.024	18.23	0.028	
DH42	08/05/86	11:00	00.22	581.458	7.024	18.45	0.031	
DH42	08/12/86	10:20	00.20	588.431	6.973	18.65	0.029	
DH42	08/19/86	11:20	00.18	595.472	7.041	18.83	0.026	
DH42	08/26/86	10:25	00.20	602.434	6.962	19.03	0.029	
DH42	09/04/86	10:20	00.25	611.431	8.997	19.28	0.028	
DH42	09/09/86	09:46	00.14	616.407	4.976	19.42	0.028	
DH42	09/16/86	09:52	00.20	623.411	7.004	19.62	0.029	
DH42	09/23/86	09:58	00.15	630.415	7.004	19.77	0.021	
DH42	10/01/86	12:03	00.36	638.502	8.087	20.13	0.045	
DH42	10/08/86	10:55	00.15	645.455	6.953	20.28	0.022	
DH42	10/14/86	11:19	00.15	651.472	6.017	20.43	0.025	
DH42	11/05/86	11:07	0.52	673.463	21.991	20.95	0.024	
DH42	11/20/86	12:10	00.33	688.507	15.044	21.28	0.022	
DH42	12/30/86	11:45	00.78	728.490	39.983	22.06	0.020	
DH42	02/03/87	12:50	00.85	763.535	35.045	22.91	0.024	
DH42	03/06/87	10:45	0.68	794.448	30.913	23.59	0.022	
DH42	03/30/87	11:00	0.53	818.458	24.010	24.12	0.021	
DH42	05/07/87	11:15	0.90	856.469	38.011	25.02	0.024	Brine effervesces.
DH42	06/17/87	10:35	0.91	897.441	0.000	25.93	0.000	Wood fragments in hole. Some brine left in hole, no calculation.
DH42	06/18/87	11:56	0.10	898.497	42.028	26.03	0.024	Calculated using 1.01 liters (0.91 l. 6/17/87 plus 0.10 l. 6/18/87).
DH42	07/28/87	11:10	0.94	938.465	39.968	26.97	0.024	

BSEP DATA FOR HOLE DH42A

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH42A	12/30/84	00:00	NA	0.000	0.000	0.00	0.000	Approximate date this part of Room G excavated.
DH42A	01/25/85	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled (re-drill of DH42) to recover core from 20 to 40 ft.
DH42A	01/28/85	09:00	NA	27.375	1.000	0.00	0.000	Brine in hole.
DH42A	02/05/85	11:15	00.85	35.469	9.094	0.85	0.093	First time collected.
DH42A	02/11/85	11:00	00.99	41.458	5.989	1.84	0.165	
DH42A	02/19/85	12:10	01.45	49.507	8.049	3.29	0.180	
DH42A	02/26/85	10:45	01.18	56.448	6.941	4.47	0.170	
DH42A	03/05/85	10:00	01.24	63.417	6.969	5.71	0.178	
DH42A	03/12/85	10:20	01.29	70.431	7.014	7.00	0.184	
DH42A	03/20/85	11:00	01.45	78.458	8.027	8.45	0.181	
DH42A	03/26/85	10:10	01.07	84.424	5.966	9.52	0.179	
DH42A	04/02/85	10:45	01.15	91.448	7.024	10.67	0.164	
DH42A	04/10/85	10:45	01.45	99.448	8.000	12.12	0.181	
DH42A	04/17/85	13:30	01.32	106.562	7.114	13.44	0.186	
DH42A	04/23/85	13:23	01.07	112.558	5.996	14.51	0.178	
DH42A	04/30/85	10:23	01.35	119.433	6.875	15.86	0.196	
DH42A	05/07/85	09:23	01.39	126.391	6.958	17.25	0.200	
DH42A	05/14/85	10:25	01.34	133.434	7.043	18.59	0.190	
DH42A	05/21/85	10:14	01.29	140.426	6.992	19.88	0.184	
DH42A	05/29/85	10:30	01.28	148.438	8.012	21.16	0.160	
DH42A	06/04/85	10:50	01.03	154.451	6.013	22.19	0.171	
DH42A	06/11/85	10:15	01.19	161.427	6.976	23.38	0.171	
DH42A	06/18/85	09:51	01.18	168.410	6.983	24.56	0.169	
DH42A	06/25/85	11:05	01.16	175.462	7.052	25.72	0.164	
DH42A	07/02/85	11:00	01.12	182.458	6.996	26.84	0.160	
DH42A	07/09/85	10:25	01.12	189.434	6.976	27.96	0.161	Gas effervescing from sample.
DH42A	07/16/85	11:10	01.11	196.465	7.031	29.07	0.158	Brine effervesces.
DH42A	07/24/85	10:25	01.23	204.434	7.969	30.30	0.154	
DH42A	07/30/85	09:54	00.94	210.412	5.978	31.24	0.157	
DH42A	08/06/85	10:10	01.05	217.424	7.012	32.29	0.150	
DH42A	08/14/85	10:33	01.11	225.440	8.016	33.40	0.138	
DH42A	08/20/85	10:14	00.92	231.426	5.986	34.32	0.154	
DH42A	08/28/85	09:40	01.17	239.403	7.977	35.49	0.147	
DH42A	09/04/85	10:10	00.99	246.424	7.021	36.48	0.141	
DH42A	09/10/85	09:55	00.83	252.413	5.989	37.31	0.139	
DH42A	09/17/85	09:25	00.92	259.392	6.979	38.23	0.132	
DH42A	09/24/85	09:25	00.94	266.392	7.000	39.17	0.134	
DH42A	10/01/85	09:40	00.93	273.403	7.011	40.10	0.133	
DH42A	10/08/85	10:24	00.96	280.433	7.030	41.06	0.137	
DH42A	10/15/85	10:15	00.81	287.427	6.994	41.87	0.116	
DH42A	10/23/85	10:10	01.02	295.424	7.997	42.89	0.128	
DH42A	10/29/85	09:20	00.75	301.389	5.965	43.64	0.126	
DH42A	11/05/85	09:00	00.86	308.375	6.986	44.50	0.123	
DH42A	11/13/85	09:44	01.03	316.406	8.031	45.53	0.128	
DH42A	11/21/85	10:50	00.94	324.451	8.045	46.47	0.117	
DH42A	11/26/85	10:55	00.61	329.455	5.004	47.08	0.122	
DH42A	12/03/85	13:05	00.78	336.545	7.090	47.86	0.110	
DH42A	12/10/85	12:50	00.86	343.535	6.990	48.72	0.123	
DH42A	01/23/86	11:40	05.13	387.486	43.951	53.85	0.117	Entry restricted since 12/10/85 due to mining activities.
DH42A	01/31/86	12:00	00.92	395.500	8.014	54.77	0.115	
DH42A	02/12/86	10:40	01.36	407.444	11.944	56.13	0.114	
DH42A	02/19/86	11:15	00.80	414.469	7.025	56.93	0.114	
DH42A	02/28/86	12:55	00.90	423.538	9.069	57.83	0.099	
DH42A	03/06/86	10:25	00.70	429.434	5.896	58.53	0.119	
DH42A	03/13/86	09:48	00.73	436.408	6.974	59.26	0.105	
DH42A	03/26/86	09:40	01.39	449.403	12.995	60.65	0.107	
DH42A	04/02/86	09:20	00.80	456.389	6.986	61.45	0.115	
DH42A	04/08/86	09:28	00.63	462.394	6.005	62.08	0.105	
DH42A	04/16/86	11:50	00.89	470.493	8.099	62.97	0.110	
DH42A	04/24/86	09:50	00.67	478.410	7.917	63.64	0.085	
DH42A	04/30/86	10:36	00.76	484.442	6.032	64.40	0.126	
DH42A	05/06/86	10:00	00.55	490.417	5.975	64.95	0.092	
DH42A	05/13/86	10:00	00.73	497.417	7.000	65.68	0.104	
DH42A	05/20/86	11:00	00.70	504.458	7.041	66.38	0.099	
DH42A	05/27/86	15:35	00.65	511.649	7.191	67.03	0.090	
DH42A	06/03/86	09:50	00.66	518.410	6.761	67.69	0.098	
DH42A	06/10/86	11:15	00.54	525.469	7.059	68.23	0.076	
DH42A	06/17/86	10:31	00.65	532.438	6.969	68.88	0.093	

BSEP DATA FOR HOLE DH42A

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH42A	06/24/86	10:45	00.63	539.448	7.010	69.51	0.090	
DH42A	07/01/86	13:50	00.71	546.576	7.128	70.22	0.100	
DH42A	07/08/86	10:25	00.63	553.434	6.858	70.85	0.092	
DH42A	07/16/86	10:00	00.66	561.417	7.983	71.51	0.083	
DH42A	07/22/86	09:48	00.61	567.408	5.991	72.12	0.102	
DH42A	07/29/86	10:25	00.71	574.434	7.026	72.83	0.101	
DH42A	08/05/86	10:55	00.66	581.455	7.021	73.49	0.094	
DH42A	08/12/86	10:23	00.63	588.433	6.978	74.12	0.090	
DH42A	08/19/86	11:22	00.68	595.474	7.041	74.80	0.097	
DH42A	08/26/86	10:28	00.68	602.436	6.962	75.48	0.098	Static level not measured.
DH42A	09/04/86	10:25	00.71	611.434	8.998	76.19	0.079	Valve broke off and left in hole after collecting most of brine. Some brine left in hole.
DH42A	09/09/86	09:40	00.07	616.403	4.969	76.26	0.014	Bottom obstructed by object in hole.
DH42A	09/16/86	09:59	00.95	623.416	7.013	77.21	0.135	
DH42A	09/23/86	10:02	00.60	630.418	7.002	77.81	0.086	
DH42A	10/01/86	11:57	00.43	638.498	8.080	78.24	0.053	
DH42A	10/08/86	10:55	00.81	645.455	6.957	79.05	0.116	
DH42A	10/14/86	11:24	00.56	651.475	6.020	79.61	0.093	
DH42A	11/05/86	11:04	1.94	673.461	21.986	81.55	0.088	
DH42A	11/20/86	12:08	01.40	688.506	15.045	82.95	0.093	
DH42A	12/31/86	11:30	02.91	729.479	40.973	85.86	0.071	
DH42A	02/03/87	12:35	03.15	763.524	34.045	89.01	0.093	
DH42A	03/06/87	10:45	2.61	794.448	30.924	91.62	0.084	
DH42A	03/30/87	10:56	2.52	818.456	24.008	94.14	0.101	
DH42A	05/07/87	11:10	3.17	856.465	38.009	97.31	0.083	
DH42A	06/17/87	10:30	2.94	897.438	0.000	100.25	0.000	Approx. 0.01 liter spilled. Some brine left in hole, no calc.
DH42A	06/18/87	11:54	0.11	898.496	42.031	100.36	0.072	Calculated using 3.05 liters (2.94 l. 6/17/87 plus 0.11 l. 6/18/87).
DH42A	07/28/87	11:03	3.07	938.460	39.964	103.43	0.077	

BSEP DATA FOR HOLE DH215

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH215	01/02/83	00:00	NA	0.000	0.000	0.00	0.000	Approximate date E140 drift was excavated at S1950.
DH215	01/06/83	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilled 1/05/83 to 1/06/83.
DH215	04/20/84	00:00	NA	0.000	0.000	0.00	0.000	Experimental brine collection device installed.
DH215	01/15/85	11:00	00.05	14.458	1.000	0.05	0.000	First data entry in BSEP Phase I collecting program.
DH215	01/22/85	12:00	00.08	21.500	7.042	0.13	0.011	
DH215	01/29/85	12:00	00.08	28.500	7.000	0.21	0.011	
DH215	02/05/85	12:00	00.04	35.500	7.000	0.25	0.006	
DH215	02/11/85	13:00	00.06	41.542	6.042	0.31	0.010	
DH215	02/14/85	11:00	00.03	44.458	2.916	0.34	0.010	Replaced collecting device.
DH215	02/19/85	10:35	00.07	49.441	4.983	0.41	0.014	
DH215	02/26/85	12:10	00.09	56.507	7.066	0.50	0.013	
DH215	03/07/85	10:30	00.12	65.438	8.931	0.62	0.013	
DH215	03/12/85	12:30	00.10	70.521	5.083	0.72	0.020	
DH215	03/20/85	14:00	00.11	78.583	8.062	0.83	0.014	
DH215	03/26/85	11:30	00.05	84.479	5.896	0.88	0.008	
DH215	04/02/85	13:00	00.05	91.542	7.063	0.93	0.007	
DH215	04/10/85	13:00	00.09	99.542	8.000	1.02	0.011	
DH215	04/17/85	14:00	00.03	106.583	7.041	1.05	0.004	Drip missing funnel.
DH215	04/23/85	14:30	00.10	112.604	6.021	1.15	0.017	
DH215	04/30/85	09:09	00.08	119.381	6.777	1.23	0.012	
DH215	05/07/85	10:50	00.09	126.451	7.070	1.32	0.013	Salt crystals in container.
DH215	05/14/85	13:06	00.11	133.546	7.095	1.43	0.016	
DH215	05/21/85	12:15	00.08	140.510	6.964	1.51	0.011	
DH215	05/29/85	11:00	00.09	148.458	7.948	1.60	0.011	
DH215	06/04/85	13:15	00.09	154.552	6.094	1.69	0.015	Salt crystals in container.
DH215	06/11/85	13:10	00.13	161.549	6.997	1.82	0.019	
DH215	06/18/85	11:22	00.13	168.474	6.925	1.95	0.019	
DH215	06/25/85	12:55	00.12	175.538	7.064	2.07	0.017	
DH215	07/02/85	11:00	00.10	182.458	6.920	2.17	0.014	
DH215	07/09/85	12:39	00.09	189.527	7.069	2.26	0.013	
DH215	07/16/85	12:37	00.11	196.526	6.999	2.37	0.016	Salt crystals in container.
DH215	07/24/85	12:39	00.14	204.527	8.001	2.51	0.017	
DH215	07/30/85	11:09	00.10	210.465	5.938	2.61	0.017	
DH215	08/06/85	11:20	00.11	217.472	7.007	2.72	0.016	
DH215	08/14/85	13:17	00.17	225.553	8.081	2.89	0.021	
DH215	08/20/85	12:57	00.10	231.540	5.987	2.99	0.017	
DH215	08/26/85	14:36	00.12	237.608	6.068	3.11	0.020	
DH215	09/04/85	11:35	00.14	246.483	8.875	3.25	0.016	
DH215	09/10/85	12:05	00.09	252.503	6.020	3.34	0.015	
DH215	09/17/85	10:00	00.12	259.417	6.914	3.46	0.017	
DH215	09/24/85	11:11	00.13	266.466	7.049	3.59	0.018	
DH215	10/01/85	10:55	00.12	273.455	6.989	3.71	0.017	Salt crystals in container.
DH215	10/08/85	12:00	00.10	280.500	7.045	3.81	0.014	
DH215	10/15/85	11:31	00.20	287.480	6.980	4.01	0.029	
DH215	10/23/85	11:54	00.33	295.496	8.016	4.34	0.041	
DH215	10/29/85	11:54	00.12	301.496	6.000	4.46	0.020	
DH215	11/13/85	11:18	00.18	316.471	14.975	4.64	0.012	Floor lowered in E140 north of this location.
DH215	11/19/85	00:00	NA	0.000	0.000	0.00	0.000	Floor of E140 drift excavated, collar of downhole DH216 destroyed.
DH215	11/20/85	00:00	NA	0.000	0.000	0.00	0.000	Crosscrift excavation at S1950 initiated toward east.
DH215	12/04/85	15:00	00.35	337.625	21.154	4.99	0.017	
DH215	12/10/85	13:05	00.11	343.545	5.920	5.10	0.019	
DH215	12/17/85	14:20	00.40	350.597	7.052	5.50	0.057	
DH215	01/03/86	11:00	01.00	367.458	16.861	6.50	0.059	Brine overflowing container, unknown amount not collected.
DH215	01/08/86	11:25	00.36	372.476	5.018	6.86	0.072	
DH215	01/16/86	11:00	00.70	380.458	7.982	7.56	0.088	
DH215	01/23/86	12:00	00.63	387.500	7.042	8.19	0.089	
DH215	01/29/86	00:00	NA	0.000	0.000	0.00	0.000	Crosscrift excavation at S1950 initiated toward west.
DH215	01/31/86	13:50	00.45	395.576	8.076	8.64	0.056	
DH215	02/12/86	12:25	00.27	407.517	11.941	8.91	0.023	Stalactites removed from container.
DH215	02/19/86	13:15	00.26	414.552	7.035	9.17	0.037	
DH215	02/28/86	00:00	NA	0.000	0.000	0.00	0.000	Floor lowered in E140 south of this location.
DH215	03/06/86	12:20	00.96	429.514	14.962	10.13	0.064	
DH215	03/13/86	11:30	00.40	436.479	6.965	10.53	0.057	
DH215	03/26/86	11:15	00.72	449.469	12.990	11.25	0.055	

BSEP DATA FOR HOLE DH215

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH215	04/02/86	10:30	00.30	456.438	6.969	11.55	0.043	
DH215	04/08/86	11:00	00.15	462.458	6.020	11.70	0.025	
DH215	04/16/86	13:00	00.40	470.542	8.084	12.10	0.049	
DH215	04/24/86	11:00	00.26	478.458	7.916	12.36	0.033	
DH215	04/30/86	11:35	00.16	484.483	6.025	12.52	0.027	
DH215	05/06/86	11:05	00.21	490.462	5.979	12.73	0.035	
DH215	05/13/86	10:10	00.29	497.424	6.962	13.02	0.042	
DH215	05/20/86	11:45	00.20	504.490	7.066	13.22	0.028	
DH215	05/27/86	16:00	00.20	511.667	7.177	13.42	0.028	
DH215	06/03/86	11:05	00.27	518.462	6.795	13.69	0.040	
DH215	06/10/86	12:10	00.33	525.507	7.045	14.02	0.047	
DH215	06/17/86	11:47	00.23	532.491	6.984	14.25	0.033	
DH215	06/24/86	11:50	00.10	539.493	7.002	14.35	0.014	
DH215	07/01/86	14:32	00.15	546.606	7.113	14.50	0.021	
DH215	07/08/86	11:30	00.14	553.479	6.873	14.64	0.020	About 1 lb. of salt encrustation removed from funnel on 1/07/86.
DH215	07/16/86	11:45	00.10	561.490	8.011	14.74	0.012	
DH215	07/22/86	10:31	00.06	567.438	5.948	14.80	0.010	
DH215	07/29/86	11:27	00.13	574.477	7.039	14.93	0.018	
DH215	08/05/86	11:59	00.14	581.499	7.022	15.07	0.020	
DH215	08/12/86	11:40	00.13	588.486	6.987	15.20	0.019	
DH215	08/19/86	12:00	00.04	595.500	7.014	15.24	0.006	
DH215	08/26/86	11:55	00.02	602.497	6.997	15.26	0.003	
DH215	09/04/86	11:55	NA	611.497	9.000	15.26	0.000	Trace of brine.
DH215	09/23/86	11:35	00.00	630.483	18.986	15.26	0.000	Dry.
DH215	10/01/86	08:23	00.02	638.349	7.866	15.28	0.003	
DH215	10/08/86	13:41	NA	645.570	7.221	15.28	0.000	Trace, none collected.
DH215	10/14/86	13:47	00.00	651.574	13.225	15.28	0.000	Dry.
DH215	11/05/86	12:50	0.16	673.535	35.186	15.44	0.005	
DH215	11/20/86	NA:	NA	688.000	14.465	15.44	0.000	
DH215	12/30/86	09:51	00.14	728.410	54.875	15.58	0.003	About 1/2 of this volume was a mixture of salt crystals and sun-flower seeds.
DH215	02/04/87	10:06	00.50	764.421	36.011	16.08	0.014	
DH215	03/06/87	09:42	0.29	794.404	29.983	16.37	0.010	
DH215	03/30/87	09:45	0.33	818.406	24.002	16.70	0.013	
DH215	05/07/87	13:10	0.09	856.549	38.143	16.79	0.002	
DH215	06/17/87	09:15	0.18	897.385	40.836	16.97	0.004	
DH215	07/28/87	10:11	0.28	938.424	41.039	17.25	0.007	

BSEP DATA FOR HOLE DH216

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DH216	01/02/83	00:00	NA	0.000	0.000	0.00	0.000	Approximate date E140 drift was excavated at S1950.
DH216	01/10/83	00:00	NA	0.000	0.000	0.00	0.000	Downhole drilled 1/08/83 to 1/10/83.
DH216	01/15/85	11:00	00.06	14.458	1.000	0.06	0.000	Brine completely filled the 54.2 ft deep hole and covered the top of the instrument head. Brine above instrument bailed and measured.
DH216	01/22/85	12:00	00.07	21.500	7.042	0.13	0.010	
DH216	01/29/85	12:00	00.05	28.500	7.000	0.18	0.007	
DH216	02/26/85	12:10	00.01	56.507	28.007	0.19	0.000	
DH216	03/26/85	11:30	NA	84.479	27.972	0.19	0.000	Dry.
DH216	04/30/85	09:14	00.03	119.385	62.878	0.22	0.000	Gas bubbling around instrument head.
DH216	05/07/85	10:52	00.04	126.453	7.068	0.26	0.006	Gas bubbling around instrument head.
DH216	05/14/85	13:15	00.02	133.552	7.099	0.28	0.003	
DH216	05/21/85	12:55	00.01	140.538	6.986	0.29	0.001	Trace of brine above instrument head.
DH216	05/29/85	12:00	00.06	148.500	7.962	0.35	0.008	
DH216	06/04/85	13:15	00.04	154.552	6.052	0.39	0.007	
DH216	06/11/85	13:12	00.06	161.550	6.998	0.45	0.009	
DH216	06/18/85	11:25	00.09	168.476	6.926	0.54	0.013	
DH216	06/25/85	12:55	00.14	175.538	7.062	0.68	0.020	
DH216	07/02/85	11:00	00.11	182.458	6.920	0.79	0.016	Collar mined out 11/19/85. Hole pluged with muck.

BSEP DATA FOR HOLE DHP401

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DHP401	10/29/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated at S1950/E1320.
DHP401	01/06/87	00:00	NA	0.000	0.000	0.00	0.000	Uphole drilling initiated 12/08/86, stopped on 12/09/86 at 27.9 ft. Drilling resumed 1/02/87 and completed 1/06/87.
DHP401	03/06/87	09:15	0.12	794.385	1.000	0.12	0.000	First time collected.
DHP401	03/30/87	09:15	0.06	818.385	24.000	0.18	0.002	
DHP401	04/22/87	11:10	0.17	841.465	23.080	0.35	0.007	Stalactite growth beside funnel.
DHP401	06/11/87	10:00	0.38	891.417	49.952	0.73	0.008	
DHP401	07/28/87	10:15	0.27	938.427	47.010	1.00	0.006	Clay accumulation in container.

BSEP DATA FOR HOLE DHP402A

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
DHP402A	10/29/86	00:00	NA	0.000	0.000	0.00	0.000	Drift excavated at S1950/E1320.
DHP402A	12/05/86	00:00	NA	0.000	0.000	0.00	0.000	Downhole completed.
DHP402A	03/06/87	09:40	0.14	794.403	1.000	0.14	0.000	First time sampled.
DHP402A	03/30/87	09:15	0.00	818.385	23.982	0.14	0.000	
DHP402A	04/22/87	11:24	0.03	841.475	47.072	0.17	0.001	Bailer stuck in hole. Hole offset at the 45 foot level, can hear and see brine below the offset.
DHP402A	07/08/87	00:00	NA	0.000	0.000	0.00	0.000	Horizontal pilot hole for Room 7 of the first Waste Storage Panal started just north of this location, drilled with brine.
DHP402A	07/16/87	09:20	0.00	926.389	0.000	0.17	0.000	Hole entirely filled with brine from drilling the pilot /gas release hole for the last room of the first panel.
DHP402A	07/28/87	10:20	17.50	938.431	0.000	17.67	0.000	Removed 17.5 liters of brine from hole, mostly drilling fluid. No calculation.
DHP402A	07/29/87	09:10	15.00	939.382	0.000	32.67	0.000	Drilling brine removed from hole. Partial evacuation, brine left in hole, no calculation.
DHP402A	10/01/87	00:00	NA	0.000	0.000	0.00	0.000	Approximate date the salt muck stockpile was placed at the east end of S1950, covering the collar of this hole.

BSEP DATA FOR HOLE EES12B

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
EES12B	02/17/83	00:00	NA	-684.00	0.000	0.00	0.000	Approximate date drift at N1420/E140 excavated.
EES12B	06/05/86	00:00	NA	520.000	0.000	0.00	0.000	Excavation effects downhole drilled to 9.3 ft..
EES12B	06/12/86	09:44	10.0	527.406	527.406	10.00	0.019	
EES12B	06/12/86	10:20	1.5	527.431	0.025	11.50	60.000	High liters per day results from high initial inflow rate through fractures after bailing.
EES12B	07/10/86	11:16	10.5	555.469	28.038	22.00	0.374	
EES12B	07/10/86	11:29	1.6	555.478	0.009	23.60	177.80	See above, high liters per day.
EES12B	07/10/86	11:40	1.0	555.486	0.008	24.60	125.00	See above, high liters per day.
EES12B	07/10/86	11:48	0.5	555.492	0.006	25.10	83.330	See above, high liters per day.
EES12B	07/10/86	12:33	0.4	555.523	0.031	25.50	12.900	See above, high liters per day.
EES12B	07/29/86	09:40	9.75	574.403	18.880	35.25	0.516	
EES12B	08/05/86	10:30	07.17	581.438	7.035	42.42	1.019	
EES12B	08/12/86	09:30	06.00	588.396	6.958	48.42	0.862	
EES12B	08/19/86	10:15	05.40	595.427	7.031	53.82	0.768	Pumped to 8.0' level (total length of suction hose).
EES12B	08/26/86	09:40	04.84	602.403	6.976	58.66	0.694	
EES12B	09/04/86	09:25	05.39	611.392	8.989	64.05	0.600	
EES12B	09/09/86	12:30	04.50	616.521	5.129	68.55	0.877	
EES12B	09/16/86	09:08	04.33	623.381	6.860	72.88	0.631	
EES12B	09/23/86	09:12	04.58	630.383	7.002	77.46	0.654	
EES12B	10/01/86	10:47	07.90	638.449	8.066	85.36	0.979	Brine left in hole although more evacuated than usual. Brine level at 7.95, top of muck at 8.80.
EES12B	10/08/86	09:49	05.14	645.409	6.960	90.50	0.739	After total evcuation - rapid brine inflow with gas. Connects with holes 3.8' W and 4.3' E. Hole 8.9' deep. 0.64 L taken 5 min. later.
EES12B	10/08/86	09:54	00.64	645.413	0.004	91.14	160.00	High liters per day results from high initial inflow rate after bailing.
EES12B	10/08/86	14:46	01.31	645.615	0.202	92.45	6.485	See above.
EES12B	10/14/86	10:26	02.29	651.435	5.820	94.74	0.393	Complete evacuation.
EES12B	11/05/86	09:40	8.18	673.403	21.968	102.92	0.372	
EES12B	11/20/86	NA:	NA	688.000	14.597	102.92	0.000	
EES12B	12/31/86	10:22	NA	729.432	56.029	102.92	0.000	

BSEP DATA FOR HOLE EES21B

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
EES21B	07/26/85			0.000	0.000	0.00	0.000	Approximate date drift at S700/E66 excavated.
EES21B	07/09/86			554.000	554.000	0.00	0.000	Excavation effects downhole drilled 7/08/86 to 7/09/86.
EES21B	07/09/86	09:17	4.5	554.387	0.387	4.50	11.630	High liters per day results from high initial inflow through fractures after bailing.
EES21B	07/09/86	12:10	1.6	554.507	0.120	6.10	13.330	See above, high liters per day.
EES21B	07/16/86	11:17	4.6	561.470	6.963	10.70	0.661	
EES21B	07/16/86	12:24	0.55	561.517	0.047	11.25	11.700	See above, high liters per day.
EES21B	07/18/86	11:15	4.6	563.469	1.952	15.85	2.357	
EES21B	07/22/86	19:55	4.6	567.830	4.361	20.45	1.055	
EES21B	07/28/86	08:45	4.5	573.365	5.535	24.95	0.813	
EES21B	07/29/86	11:20	3.65	574.472	1.107	28.60	3.297	
EES21B	08/05/86	11:47	04.70	581.491	7.019	33.30	0.670	
EES21B	08/12/86	11:30	04.75	588.479	6.988	38.05	0.680	Pumped to 8' level (total length of suction hose).
EES21B	08/19/86	11:50	04.80	595.493	7.014	42.85	0.684	Bottom of muck.
EES21B	08/26/86	11:20	04.78	602.472	6.979	47.63	0.685	
EES21B	09/04/86	11:25	04.85	611.476	9.004	52.48	0.539	
EES21B	09/09/86	12:30	04.86	616.521	5.045	57.34	0.963	
EES21B	09/16/86	10:51	04.84	623.452	6.931	62.18	0.698	
EES21B	09/23/86	10:50	04.92	630.451	6.999	67.10	0.703	Full to bottom of muck.
EES21B	10/01/86	09:14	04.39	638.385	7.934	71.49	0.553	Full, moisture overflowing, bubbling violently at bottom. Approximately 1 ft. brine still in hole.
EES21B	10/08/86	12:52	05.49	645.536	7.151	76.98	0.768	Brine level right of salt-muck interface 0.20 feet below floor.
EES21B	10/08/86	14:34	00.36	645.607	0.071	77.34	5.070	
EES21B	10/14/86	12:55	04.94	651.538	5.931	82.28	0.833	
EES21B	11/05/86	12:28	4.98	673.519	21.981	87.26	0.227	
EES21B	11/20/86	NA:	NA	688.000	14.481	87.26	0.000	
EES21B	12/30/86	NA:	NA	728.000	54.481	87.26	0.000	

BSEP DATA FOR HOLE GSEEP

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
GSEEP	11/21/84			0.000	0.000	0.00	0.000	Approximate date this part of Room G excavated.
GSEEP	08/28/85			0.000	0.000	0.00	0.000	Noticed damp area on floor at this location.
GSEEP	11/12/85			0.000	0.000	0.00	0.000	Damp area on floor near S. rib approx. E1140 (45 ft. E. of DH35) and at E1149. Crusted moist area is about 4 ft. by 4 ft., has increased
GSEEP	11/12/85			0.000	0.000	0.00	0.000	noticeably in size over last two months. Damp area covers 16 ft. E-W, 13 ft. N-S across width of Room G.
GSEEP	11/12/85			0.000	0.000	0.00	0.000	Many weeps on lower 3 ft. of S. rib. Brine is seeping out of air pipe support hole.
GSEEP	11/26/85	12:00	03.00	329.500	1.000	3.00	0.000	First time collection. Dug out salt.
GSEEP	12/03/85	12:00	01.50	336.500	7.000	4.50	0.214	Partial removal.
GSEEP	12/04/85	12:00	01.13	337.500	1.000	5.63	1.130	
GSEEP	12/10/85	12:00	01.80	343.500	6.000	7.43	0.300	
GSEEP	01/23/86	12:00	00.50	387.500	44.000	7.93	0.011	Lots of salt in pool.
GSEEP	01/31/86	12:00	00.94	395.500	8.000	8.87	0.117	
GSEEP	02/12/86	12:00	02.23	407.500	12.000	11.10	0.186	Pumped twice.
GSEEP	02/19/86	12:00	02.14	414.500	7.000	13.24	0.306	
GSEEP	02/28/86	12:00	01.95	423.500	9.000	15.19	0.217	Partial removal. No pump, scooped with beaker.
GSEEP	03/04/86	11:20	02.62	427.472	3.972	17.81	0.660	
GSEEP	03/06/86	10:50	02.07	429.451	1.979	19.88	1.046	
GSEEP	03/13/86	11:46	03.23	436.490	7.039	23.11	0.459	Collected three times.
GSEEP	03/26/86	10:20	03.00	449.431	12.941	26.11	0.232	
GSEEP	04/02/86	10:00	02.68	456.417	6.986	28.79	0.384	
GSEEP	04/08/86	10:00	02.50	462.417	6.000	31.29	0.417	
GSEEP	04/16/86	12:00	02.24	470.500	8.083	33.53	0.277	
GSEEP	04/24/86	10:30	02.35	478.438	7.938	35.88	0.296	
GSEEP	04/30/86	11:00	02.40	484.458	6.020	38.28	0.399	
GSEEP	05/06/86	10:30	02.49	490.438	5.980	40.77	0.416	
GSEEP	05/13/86	11:20	02.66	497.472	7.034	43.43	0.378	
GSEEP	05/20/86	11:20	02.44	504.472	7.000	45.87	0.349	
GSEEP	05/27/86	15:30	03.11	511.646	7.174	48.98	0.434	
GSEEP	06/03/86	10:40	03.31	518.444	6.798	52.29	0.487	
GSEEP	06/10/86	11:38	03.21	525.485	7.041	55.50	0.456	
GSEEP	06/17/86	11:15	03.11	532.469	6.984	58.61	0.445	
GSEEP	06/24/86	11:00	04.60	539.458	6.989	63.21	0.658	Very humid air in workings.
GSEEP	07/01/86	14:00	05.43	546.583	7.125	68.64	0.762	Very humid last week, rain on surface.
GSEEP	07/08/86	10:50	04.14	553.451	6.868	72.78	0.603	
GSEEP	07/16/86	10:50	03.32	561.451	8.000	76.10	0.415	
GSEEP	07/22/86	10:15	02.29	567.427	5.976	78.39	0.383	
GSEEP	07/29/86	10:45	02.68	574.448	7.021	81.07	0.382	
GSEEP	08/05/86	11:20	02.60	581.472	7.024	83.67	0.370	
GSEEP	08/12/86	10:45	03.67	588.448	6.976	87.34	0.526	
GSEEP	08/19/86	11:40	03.90	595.486	7.038	91.24	0.554	
GSEEP	08/26/86	11:00	03.73	602.458	6.972	94.97	0.535	
GSEEP	09/04/86	10:55	05.15	611.455	8.997	100.12	0.572	Last week has been humid and rainy.
GSEEP	09/09/86	10:00	03.70	616.417	4.962	103.82	0.746	
GSEEP	09/16/86	10:25	03.82	623.434	7.017	107.64	0.544	
GSEEP	09/23/86	10:20	04.29	630.431	6.997	111.93	0.613	
GSEEP	10/01/86	12:24	03.70	638.517	8.086	115.63	0.458	
GSEEP	10/08/86	10:45	03.80	645.448	6.931	119.43	0.548	
GSEEP	10/08/86	14:57	01.87	645.623	0.175	121.30	10.690	Second collection for this day.
GSEEP	10/10/86	09:16	01.24	647.386	1.763	122.54	0.703	
GSEEP	10/14/86	11:10	02.19	651.465	4.079	124.73	0.537	
GSEEP	11/05/86	10:45	4.44	673.448	21.983	129.17	0.202	First time 3.74 liters, second time 0.70 liters.
GSEEP	11/20/86	12:02	03.34	688.501	15.053	133.01	0.255	
GSEEP	12/30/86	12:50	04.44	728.535	40.034	137.45	0.111	
GSEEP	02/03/87	13:45	03.45	763.573	35.038	140.90	0.098	
GSEEP	03/06/87	11:30	3.0	794.479	30.906	143.90	0.097	
GSEEP	03/30/87	11:34	2.51	818.482	24.003	146.41	0.100	
GSEEP	05/07/87	11:48	3.31	856.492	38.010	149.72	0.087	
GSEEP	06/30/87	10:00	12.24	910.417	53.925	161.96	0.227	
GSEEP	07/16/87	10:30	11.66	926.438	16.021	173.62	0.728	
GSEEP	07/23/87	09:20	3.87	933.389	6.951	177.49	0.557	
GSEEP	07/28/87	11:35	2.36	938.483	5.094	179.85	0.463	
GSEEP	08/07/87	09:15	5.33	948.385	9.902	185.18	0.538	
GSEEP	08/12/87	10:12	2.80	953.425	5.040	187.98	0.556	

BSEP DATA FOR HOLE IG201

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
IG201	03/16/83			0.000	0.000	0.00	0.000	Approximate date the west side of SPDV Test Room 2 excavated.
IG201	03/20/83			0.000	0.000	0.00	0.000	Approximate date hole drilled, inclinometer guide tube partially grouted into hole 3/28/83.
IG201	11/30/84	12:00	63.10	-31.500	1.000	63.10	0.000	First time collected, 63.10 liters removed.
IG201	01/08/85	12:00	01.52	7.500	39.000	64.62	0.000	Partialy evacuated, some brine left in hole.
IG201	01/09/85	10:00	02.48	8.417	0.917	67.10	2.704	Some fluid was lost. Should add 1.52 liters from partial evacuation day before to this volume for liters/day calculation. Volume high
IG201	01/15/85	09:10	00.33	14.382	5.965	67.43	0.055	for 1/09/85 because some brine was stored behind the liner and drained into hole after initial draining.
IG201	01/22/85	10:10	00.38	21.424	7.042	67.81	0.054	
IG201	01/29/85	10:44	00.25	28.447	7.023	68.06	0.036	
IG201	02/05/85	09:20	00.30	35.389	6.942	68.36	0.043	
IG201	02/11/85	09:45	00.24	41.406	6.017	68.60	0.040	
IG201	02/19/85	11:15	00.32	49.469	8.063	68.92	0.040	
IG201	02/26/85	09:45	00.26	56.406	6.937	69.18	0.037	
IG201	03/05/85	09:22	00.25	63.390	6.984	69.43	0.036	
IG201	03/12/85	09:00	00.25	70.375	6.985	69.68	0.036	
IG201	03/20/85	09:38	00.17	78.401	8.026	69.85	0.021	
IG201	03/26/85	09:10	00.27	84.382	5.981	70.12	0.045	
IG201	04/02/85	09:30	00.24	91.396	7.014	70.36	0.034	
IG201	04/10/85	09:30	00.26	99.396	8.000	70.62	0.033	
IG201	04/17/85	13:40	00.26	106.569	7.173	70.88	0.036	
IG201	04/23/85	12:00	00.23	112.500	5.931	71.11	0.039	
IG201	04/30/85	11:41	00.21	119.487	6.987	71.32	0.030	
IG201	05/07/85	10:30	00.23	126.438	6.951	71.55	0.033	
IG201	05/14/85	11:00	00.24	133.458	7.020	71.79	0.034	
IG201	05/21/85	11:09	00.23	140.465	7.007	72.02	0.033	
IG201	05/29/85	10:00	00.30	148.417	7.952	72.32	0.038	
IG201	06/04/85	11:45	00.16	154.490	6.073	72.48	0.026	
IG201	06/11/85	11:20	00.22	161.472	6.982	72.70	0.032	
IG201	06/18/85	10:42	00.21	168.446	6.974	72.91	0.030	
IG201	06/25/85	09:55	00.22	175.413	6.967	73.13	0.032	
IG201	07/02/85	11:00	00.23	182.458	7.045	73.36	0.033	
IG201	07/09/85	11:33	00.24	189.481	7.023	73.60	0.034	Brine effervesces.
IG201	07/16/85	12:00	00.27	196.500	7.019	73.87	0.038	Brine effervesces.
IG201	07/24/85	11:02	00.31	204.460	7.960	74.18	0.039	
IG201	07/30/85	10:40	00.24	210.444	5.984	74.42	0.040	
IG201	08/06/85	10:49	00.24	217.451	7.007	74.66	0.034	
IG201	08/14/85	12:04	00.28	225.503	8.052	74.94	0.035	
IG201	08/20/85	11:24	00.26	231.475	5.972	75.20	0.044	
IG201	08/28/85	10:00	00.21	239.417	7.942	75.41	0.026	
IG201	09/04/85	10:52	00.16	246.453	7.036	75.57	0.023	
IG201	09/10/85	11:16	00.12	252.469	6.016	75.69	0.020	
IG201	09/17/85	10:11	00.15	259.424	6.955	75.84	0.022	
IG201	09/24/85	10:08	00.16	266.422	6.998	76.00	0.023	
IG201	10/01/85	10:20	00.13	273.431	7.009	76.13	0.019	
IG201	10/08/85	11:09	00.18	280.465	7.034	76.31	0.026	
IG201	10/15/85	10:45	00.17	287.448	6.983	76.48	0.024	
IG201	10/23/85	10:52	00.19	295.453	8.005	76.67	0.024	
IG201	10/29/85	10:37	00.14	301.442	5.989	76.81	0.023	
IG201	11/05/85	09:38	00.19	308.401	6.959	77.00	0.027	
IG201	11/13/85	10:40	00.24	316.444	8.043	77.24	0.030	
IG201	11/21/85	11:48	00.25	324.492	8.048	77.49	0.031	
IG201	11/26/85	10:35	00.15	329.441	4.949	77.64	0.030	
IG201	12/10/85	11:10	00.35	343.465	14.024	77.99	0.025	Two weeks.
IG201	12/17/85	14:10	00.23	350.590	7.125	78.22	0.032	
IG201	01/03/86	10:20	00.42	367.431	16.841	78.64	0.025	
IG201	01/08/86	10:30	00.20	372.438	5.007	78.84	0.040	
IG201	01/16/86	10:10	00.16	380.424	7.986	79.00	0.020	
IG201	01/23/86	10:20	00.15	387.431	7.007	79.15	0.021	
IG201	01/31/86	12:38	00.17	395.526	8.095	79.32	0.021	
IG201	02/12/86	11:30	00.25	407.479	11.953	79.57	0.021	
IG201	02/19/86	12:00	00.17	414.500	7.021	79.74	0.024	

BSEP DATA FOR HOLE IG201

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
IG201	02/28/86	13:45	00.30	423.573	9.073	80.04	0.033	
IG201	03/06/86	11:00	00.19	429.458	5.885	80.23	0.032	
IG201	03/13/86	10:27	00.20	436.435	6.977	80.43	0.029	
IG201	03/26/86	10:25	00.31	449.434	12.999	80.74	0.024	
IG201	04/02/86	10:05	00.16	456.420	6.986	80.90	0.023	
IG201	04/08/86	10:15	00.13	462.427	6.007	81.03	0.022	
IG201	04/16/86	12:30	00.15	470.521	8.094	81.18	0.019	
IG201	04/24/86	10:35	00.13	478.441	7.920	81.31	0.016	
IG201	04/30/86	11:14	00.10	484.468	6.027	81.41	0.017	
IG201	05/06/86	10:40	NA	490.444	5.976	81.41	0.000	Not collected, sampler left in hole.
IG201	05/20/86	11:30	NA	504.479	20.011	81.41	0.000	
IG201	05/27/86	16:10	NA	511.674	27.206	81.41	0.000	
IG201	06/03/86	10:45	NA	518.448	33.980	81.41	0.000	
IG201	06/10/86	11:45	NA	525.490	41.022	81.41	0.000	
IG201	06/17/86	11:22	NA	532.474	48.006	81.41	0.000	
IG201	06/24/86	11:20	NA	539.472	55.004	81.41	0.000	
IG201	07/01/86	14:20	NA	546.597	62.129	81.41	0.000	
IG201	07/08/86	10:55	NA	553.455	68.987	81.41	0.000	
IG201	07/16/86	11:00	NA	561.458	76.990	81.41	0.000	
IG201	07/22/86	10:20	NA	567.431	82.963	81.41	0.000	
IG201	07/29/86	10:55	NA	574.455	89.987	81.41	0.000	
IG201	09/04/86	11:00	NA	611.458	126.990	81.41	0.000	
IG201	09/09/86	09:15	NA	616.385	131.917	81.41	0.000	
IG201	09/16/86	10:28	NA	623.436	138.968	81.41	0.000	
IG201	10/01/86	12:31	NA	638.522	154.054	81.41	0.000	
IG201	10/08/86	11:25	02.57	645.476	161.008	83.98	0.016	Solvent odor, fluid "frothy" in container. First evacuation in 161 days.
IG201	10/14/86	12:14	00.19	651.510	6.034	84.17	0.031	
IG201	11/05/86	11:55	NA	673.497	21.987	84.17	0.000	Wrong bailer, not collected.
IG201	11/20/86	NA:	NA	688.000	36.490	84.17	0.000	
IG201	12/30/86	01:13	00.53	728.051	76.541	84.70	0.007	
IG201	02/04/87	09:30	00.44	764.396	36.345	85.14	0.012	
IG201	03/06/87	13:00	0.37	794.542	30.146	85.51	0.012	

BSEP DATA FOR HOLE IG202

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
IG202	04/08/83			0.000	0.000	0.00	0.000	Approximate date west side of SPDV Test Room 1 excavated.
IG202	04/10/83			0.000	0.000	0.00	0.000	Approximate date hole drilled, inclinometer guide tube partially grouted into hole 4/21/83.
IG202	11/30/84	12:00	52.00	-31.500	1.000	52.00	0.000	First time collected.
IG202	01/08/85	12:00	12.58	7.500	39.000	64.58	0.323	Volume high because some brine was stored behind the liner and drained into hole after initial draining.
IG202	01/15/85	09:25	00.59	14.392	6.892	65.17	0.086	
IG202	01/22/85	12:00	00.34	21.500	7.108	65.51	0.048	
IG202	01/29/85	12:00	00.33	28.500	7.000	65.84	0.047	
IG202	02/05/85	10:17	00.41	35.428	6.928	66.25	0.059	
IG202	02/11/85	09:30	00.27	41.396	5.968	66.52	0.045	
IG202	02/19/85	12:00	00.32	49.500	8.104	66.84	0.039	
IG202	02/26/85	12:00	00.25	56.500	7.000	67.09	0.036	
IG202	03/05/85	09:03	00.20	63.377	6.877	67.29	0.029	
IG202	03/12/85	08:58	00.23	70.374	6.997	67.52	0.033	
IG202	03/20/85	09:16	00.25	78.386	8.012	67.77	0.031	
IG202	03/26/85	09:00	00.18	84.375	5.989	67.95	0.030	
IG202	04/02/85	09:10	00.19	91.382	7.007	68.14	0.027	
IG202	04/10/85	09:19	00.21	99.388	8.006	68.35	0.026	
IG202	04/17/85	13:56	00.18	106.581	7.193	68.53	0.025	
IG202	04/23/85	12:12	00.14	112.508	5.927	68.67	0.024	
IG202	04/30/85	13:00	00.15	119.542	7.034	68.82	0.021	
IG202	05/07/85	10:40	00.14	126.444	6.902	68.96	0.020	
IG202	05/14/85	11:16	00.14	133.469	7.025	69.10	0.020	
IG202	05/21/85	11:30	00.14	140.479	7.010	69.24	0.020	
IG202	05/29/85	10:00	00.15	148.417	7.938	69.39	0.019	
IG202	06/04/85	12:10	00.11	154.507	6.090	69.50	0.018	
IG202	06/11/85	11:40	00.12	161.486	6.979	69.62	0.017	Hole entry becoming tight due to shear closure of guide tube.
IG202	06/18/85	10:55	00.12	168.455	6.969	69.74	0.017	
IG202	06/25/85	09:50	00.11	175.410	6.955	69.85	0.016	
IG202	07/02/85	11:30	00.11	182.479	7.069	69.96	0.016	
IG202	07/09/85	11:15	00.09	189.469	6.990	70.05	0.013	Brine effervesces.
IG202	07/16/85	12:19	00.07	196.513	7.044	70.12	0.010	Brine effervesces.
IG202	07/24/85	11:15	00.11	204.469	7.956	70.23	0.014	
IG202	08/06/85	11:08	00.18	217.464	12.995	70.41	0.014	Not sampled last week.
IG202	08/14/85	12:17	00.09	225.512	8.048	70.50	0.011	
IG202	08/20/85	11:00	00.06	231.458	5.946	70.56	0.010	
IG202	08/28/85	10:00	00.13	239.417	7.959	70.69	0.016	
IG202	09/04/85	10:00	00.09	246.417	7.000	70.78	0.013	
IG202	09/10/85	11:35	00.09	252.483	6.066	70.87	0.015	
IG202	09/17/85	10:00	00.13	259.417	6.934	71.00	0.019	
IG202	09/24/85	10:00	00.10	266.417	7.000	71.10	0.014	
IG202	10/01/85	10:35	00.08	273.441	7.024	71.18	0.011	
IG202	10/08/85	11:15	00.10	280.469	7.028	71.28	0.014	
IG202	04/08/86	11:00	NA	462.458	181.989	71.28	0.000	Guide tube badly distorted, not collected.
IG202	04/24/86	10:50	NA	478.451	197.982	71.28	0.000	
IG202	05/06/86	11:00	NA	490.458	209.989	71.28	0.000	
IG202	05/20/86	11:30	NA	504.479	224.010	71.28	0.000	
IG202	06/03/86	10:55	NA	518.455	237.986	71.28	0.000	
IG202	06/17/86	11:38	NA	532.485	252.016	71.28	0.000	
IG202	07/29/86	11:06	NA	574.463	293.994	71.28	0.000	
IG202	09/04/86	11:50	NA	611.493	331.024	71.28	0.000	
IG202	10/01/86	12:45	NA	638.531	358.062	71.28	0.000	Not collected.
IG202	10/08/86	11:50	05.06	645.493	365.024	76.34	0.014	First time collected in a year.
IG202	10/14/86	12:23	00.17	651.516	6.023	76.51	0.028	
IG202	11/05/86	12:10	0.24	673.507	21.991	76.75	0.011	
IG202	11/20/86	NA:	NA	688.000	14.493	76.75	0.000	
IG202	12/30/86	NA:	NA	728.000	54.493	76.75	0.000	
IG202	02/04/87	09:45	00.99	764.406	90.899	77.74	0.011	Paint chips in brine, smelled like paint thinner.
IG202	03/06/87	13:10	0.36	794.549	30.143	78.10	0.012	
IG202	07/28/87	10:00	0.00	938.417	143.868	78.10	0.000	Hole pinched shut by shear closure. Unable to get sampler down hole.

BSEP DATA FOR HOLE JPILOT

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
JPILOT	04/14/84			0.000	0.000	0.00	0.000	Room J Excavated 4/11/84 to 4/14/84. N1100 drift north of Room J excavated 3/09/83. SPDV Test Room 2 excavated 3/10/83 to 3/20/83.
JPILOT	04/02/85	11:35	00.02	91.024	1.000	0.02	0.000	Pilot hole drilled for 36' dia. hole, first time collected.
JPILOT	04/10/85	11:30	00.02	99.479	8.455	0.04	0.002	
JPILOT	04/17/85	10:00	00.02	106.417	6.938	0.06	0.003	
JPILOT	04/23/85	13:05	00.05	112.545	6.128	0.11	0.008	

BSEP DATA FOR HOLE JROOMPIT

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
JROOMPIT	04/14/84			0.000	0.000	0.00	0.000	Room J Excavated 4/11/84 to 4/14/84. N1100 drift north of Room J excavated 3/09/83. SPDV Test Room 2 excavated 3/10/83 to 3/20/83.
JROOMPIT	11/29/84	10:00	75.00	-32.583	1.000	75.00	0.000	Over 20 gallons of brine and salt crystals shoveled out. Pit blown dry with air hose. First time bailed.

BSEP DATA FOR HOLE L1S25

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S25	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1S25	06/28/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S25	08/20/85			0.000	0.000	0.00	0.000	Wet.
L1S25	09/17/85			0.000	0.000	0.00	0.000	Wet.
L1S25	12/10/85	09:00	02.84	343.375	1.000	2.84	0.000	First time collected.
L1S25	12/17/85	09:00	00.18	350.375	7.000	3.02	0.026	
L1S25	01/03/86	09:00	00.25	367.375	17.000	3.27	0.015	
L1S25	01/08/86	09:00	00.10	372.375	5.000	3.37	0.020	
L1S25	01/16/86	09:00	00.13	380.375	8.000	3.50	0.016	
L1S25	01/23/86	09:00	00.11	387.375	7.000	3.61	0.016	
L1S25	01/31/86	09:00	00.13	395.375	8.000	3.74	0.016	
L1S25	02/12/86	09:00	00.19	407.375	12.000	3.93	0.016	
L1S25	02/19/86	09:00	00.12	414.375	7.000	4.05	0.017	
L1S25	02/28/86	09:00	00.15	423.375	9.000	4.20	0.017	
L1S25	03/06/86	09:15	00.10	429.385	6.010	4.30	0.017	
L1S25	03/13/86	08:35	00.10	436.358	6.973	4.40	0.014	
L1S25	03/26/86	08:40	00.20	449.361	13.003	4.60	0.015	
L1S25	04/02/86	08:20	00.11	456.347	6.986	4.71	0.016	
L1S25	04/08/86	08:30	00.09	462.354	6.007	4.80	0.015	
L1S25	04/16/86	10:25	00.10	470.434	8.080	4.90	0.012	
L1S25	04/24/86	08:55	00.13	478.372	7.938	5.03	0.016	
L1S25	04/30/86	09:25	00.10	484.392	6.020	5.13	0.017	Suction probe installed.
L1S25	05/06/86	09:05	00.09	490.378	5.986	5.22	0.015	
L1S25	05/13/86	09:00	00.10	497.375	6.997	5.32	0.014	
L1S25	05/20/86	09:20	00.10	504.389	7.014	5.42	0.014	
L1S25	05/27/86	14:20	00.10	511.597	7.208	5.52	0.014	
L1S25	06/03/86	08:55	00.10	518.372	6.775	5.62	0.015	
L1S25	06/10/86	09:33	00.10	525.398	7.026	5.72	0.014	
L1S25	06/17/86	09:24	00.10	532.392	6.994	5.82	0.014	
L1S25	06/24/86	09:33	00.10	539.398	7.006	5.92	0.014	
L1S25	07/01/86	12:08	00.10	546.506	7.108	6.02	0.014	
L1S25	07/08/86	09:15	00.10	553.385	6.879	6.12	0.015	
L1S25	07/16/86	09:24	00.12	561.392	8.007	6.24	0.015	
L1S25	07/22/86	08:59	00.09	567.374	5.982	6.33	0.015	
L1S25	07/29/86	09:27	00.10	574.394	7.020	6.43	0.014	
L1S25	08/05/86	09:51	00.09	581.410	7.016	6.52	0.013	
L1S25	08/12/86	09:20	00.10	588.389	6.979	6.62	0.014	
L1S25	08/19/86	10:03	00.10	595.419	7.030	6.72	0.014	
L1S25	08/26/86	09:36	00.10	602.400	6.981	6.82	0.014	
L1S25	09/04/86	09:15	00.12	611.385	8.985	6.94	0.013	
L1S25	09/09/86	11:38	00.08	616.485	5.100	7.02	0.016	
L1S25	09/16/86	09:02	00.09	623.376	6.891	7.11	0.013	
L1S25	09/23/86	09:08	00.10	630.381	7.005	7.21	0.014	
L1S25	10/01/86	09:58	00.10	638.415	8.034	7.31	0.012	
L1S25	10/08/86	09:24	00.10	645.392	6.977	7.41	0.014	
L1S25	10/14/86	10:09	00.07	651.423	6.031	7.48	0.012	
L1S25	11/05/86	09:32	0.27	673.397	21.974	7.75	0.012	
L1S25	11/20/86	10:13	00.18	688.426	15.029	7.93	0.012	
L1S25	12/31/86	10:42	00.41	729.446	41.020	8.34	0.010	Suction lysimeter removed.
L1S25	03/06/87	12:20	0.61	794.514	65.068	8.95	0.009	
L1S25	03/31/87	10:25	0.00	819.434	24.920	8.95	0.000	Dry.
L1S25	05/07/87	08:35	0.33	856.358	61.844	9.28	0.005	
L1S25	06/18/87	12:25	0.42	898.517	42.159	9.70	0.010	
L1S25	07/28/87	13:09	0.44	938.548	40.031	10.14	0.011	

BSEP DATA FOR HOLE L1S26

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S26	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1S26	06/28/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S26	08/20/85			0.000	0.000	0.00	0.000	Dry.
L1S26	09/17/85			0.000	0.000	0.00	0.000	Dry.
L1S26	12/10/85			0.000	0.000	0.00	0.000	Dry.
L1S26	12/17/85			0.000	0.000	0.00	0.000	Dry.
L1S26	04/02/86	08:20	00.09	456.347	1.000	0.09	0.000	First time collected.
L1S26	04/24/86	08:55	00.05	478.372	22.025	0.14	0.002	
L1S26	05/20/86	09:20	00.05	504.389	26.017	0.19	0.002	
L1S26	06/10/86	09:24	00.05	525.392	21.003	0.24	0.002	
L1S26	06/24/86	09:20	00.05	539.389	13.997	0.29	0.004	
L1S26	07/08/86	09:17	00.04	553.387	13.998	0.33	0.003	
L1S26	07/16/86	09:05	00.02	561.378	7.991	0.35	0.003	
L1S26	07/29/86	09:15	00.04	574.385	13.007	0.39	0.003	
L1S26	08/12/86	09:06	00.04	588.379	13.994	0.43	0.003	
L1S26	08/26/86	09:25	00.04	602.392	14.013	0.47	0.003	
L1S26	09/09/86	11:27	00.05	616.477	14.085	0.52	0.004	
L1S26	09/23/86	08:55	00.03	630.372	13.895	0.55	0.002	
L1S26	10/01/86	09:48	00.03	638.408	8.036	0.58	0.004	
L1S26	11/05/86	09:04	0.03	673.378	34.970	0.61	0.001	
L1S26	11/20/86	09:59	00.03	688.416	15.038	0.64	0.002	
L1S26	12/31/86	10:42	NA	729.446	41.030	0.64	0.000	Dry.
L1S26	03/06/87	12:25	0.05	794.517	106.101	0.69	0.000	
L1S26	03/31/87	10:28	0.00	819.436	24.919	0.69	0.000	Dry.
L1S26	05/07/87	08:37	0.02	856.359	61.842	0.71	0.000	
L1S26	06/18/87	12:27	0.07	898.519	42.160	0.78	0.002	
L1S26	07/28/87	13:13	0.10	938.551	40.032	0.88	0.002	

BSEP DATA FOR HOLE L1S27

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S27	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1S27	07/01/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S27	08/20/85			0.000	0.000	0.00	0.000	Wet.
L1S27	09/17/85			0.000	0.000	0.00	0.000	Wet.
L1S27	12/10/85	09:00	00.83	343.375	1.000	0.83	0.000	First time collected.
L1S27	12/17/85			0.000	0.000	0.00	0.000	Wet, partial pool in bottom, none collected.
L1S27	01/03/86	09:00	00.10	367.375	24.000	0.93	0.004	
L1S27	01/16/86	09:00	00.05	380.375	13.000	0.98	0.004	
L1S27	02/12/86	09:00	00.08	407.375	27.000	1.06	0.003	
L1S27	02/19/86	09:00	00.04	414.375	7.000	1.10	0.006	
L1S27	02/28/86	09:00	00.06	423.375	9.000	1.16	0.007	
L1S27	03/13/86	08:35	00.08	436.358	12.983	1.24	0.006	Two weeks collection.
L1S27	03/26/86	08:45	00.06	449.365	13.007	1.30	0.005	
L1S27	04/08/86	08:30	00.07	462.354	12.989	1.37	0.005	
L1S27	04/24/86	09:05	00.08	478.378	16.024	1.45	0.005	
L1S27	05/06/86	08:55	00.05	490.372	11.994	1.50	0.004	
L1S27	05/13/86	08:50	00.04	497.368	6.996	1.54	0.006	
L1S27	05/27/86	14:20	00.07	511.597	14.229	1.61	0.005	
L1S27	06/10/86	09:25	00.06	525.392	13.795	1.67	0.004	
L1S27	06/17/86	09:15	00.04	532.385	6.993	1.71	0.006	
L1S27	06/24/86	09:22	00.04	539.390	7.005	1.75	0.006	
L1S27	07/01/86	11:56	00.04	546.497	7.107	1.79	0.006	
L1S27	07/08/86	09:18	00.04	553.388	6.891	1.83	0.006	
L1S27	07/16/86	09:09	00.04	561.381	7.993	1.87	0.005	
L1S27	07/29/86	09:17	00.07	574.387	13.006	1.94	0.005	
L1S27	08/12/86	09:08	00.06	588.381	13.994	2.00	0.004	
L1S27	08/19/86	09:52	00.05	595.411	7.030	2.05	0.007	
L1S27	08/26/86	09:26	00.04	602.393	6.982	2.09	0.006	
L1S27	09/04/86	08:57	00.05	611.373	8.980	2.14	0.006	
L1S27	09/09/86	11:28	00.04	616.478	5.105	2.18	0.008	
L1S27	09/16/86	08:53	00.04	623.370	6.892	2.22	0.006	
L1S27	09/23/86	08:56	00.03	630.372	7.002	2.25	0.004	
L1S27	10/01/86	09:49	00.03	638.409	8.037	2.28	0.004	
L1S27	11/05/86	09:06	0.06	673.379	34.970	2.34	0.002	
L1S27	11/20/86	10:02	00.04	688.418	15.039	2.38	0.003	
L1S27	12/31/86	10:42	00.00	729.446	41.028	2.38	0.000	Wet, but not enough to remove.
L1S27	03/06/87	12:30	0.13	794.521	65.075	2.51	0.002	
L1S27	03/31/87	10:28	0.00	819.436	24.915	2.51	0.000	Dry.
L1S27	05/07/87	08:39	0.07	856.360	61.839	2.58	0.001	
L1S27	06/18/87	12:30	0.11	898.521	42.161	2.69	0.003	
L1S27	07/28/87	13:14	0.18	938.551	40.030	2.87	0.004	

BSEP DATA FOR HOLE L1S28

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S28	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1S28	07/12/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S28	08/20/85			0.000	0.000	0.00	0.000	Dry.
L1S28	09/17/85			0.000	0.000	0.00	0.000	Dry.
L1S28	12/10/85			0.000	0.000	0.00	0.000	Dry.
L1S28	12/17/85			0.000	0.000	0.00	0.000	Dry.
L1S28	11/05/86	09:08	0.11	673.381	1.000	0.11	0.000	
L1S28	11/20/86	NA:	NA	688.000	14.619	0.11	0.000	Dry.
L1S28	12/31/86	10:42	NA	729.446	41.011	0.11	0.000	Dry.
L1S28	03/06/87	12:30	NA	794.521	121.140	0.11	0.000	Dry.
L1S28	03/31/87	10:31	0.00	819.438	24.917	0.11	0.000	Dry.
L1S28	05/07/87	08:39	0.00	856.360	61.839	0.11	0.000	Dry.
L1S28	06/18/87	12:35	0.00	898.524	104.003	0.11	0.000	Dry.
L1S28	07/28/87	13:24	0.09	938.558	144.037	0.20	0.001	

BSEP DATA FOR HOLE L1S29

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S29	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1S29	07/15/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S29	08/20/85			0.000	0.000	0.00	0.000	Wet.
L1S29	09/17/85			0.000	0.000	0.00	0.000	Wet.
L1S29	12/10/85	09:00	02.20	343.375	1.000	2.20	0.000	First time collected.
L1S29	12/17/85	09:00	00.30	350.375	7.000	2.50	0.043	
L1S29	01/03/86	09:00	00.71	367.375	17.000	3.21	0.042	
L1S29	01/08/86	09:00	00.24	372.375	5.000	3.45	0.048	
L1S29	01/16/86	09:00	00.40	380.375	8.000	3.85	0.050	
L1S29	01/23/86	09:00	00.32	387.375	7.000	4.17	0.046	
L1S29	01/31/86	09:00	00.34	395.375	8.000	4.51	0.043	
L1S29	02/12/86	09:00	00.41	407.375	12.000	4.92	0.034	
L1S29	02/19/86	09:00	00.25	414.375	7.000	5.17	0.036	
L1S29	02/28/86	09:00	00.23	423.375	9.000	5.40	0.026	
L1S29	03/06/86	09:20	00.13	429.389	6.014	5.53	0.022	
L1S29	03/13/86	08:35	00.16	436.358	6.969	5.69	0.023	
L1S29	03/26/86	08:50	00.27	449.368	13.010	5.96	0.021	
L1S29	04/02/86	08:30	00.15	456.354	6.986	6.11	0.021	
L1S29	04/08/86	08:40	00.11	462.361	6.007	6.22	0.018	
L1S29	04/16/86	10:35	00.13	470.441	8.080	6.35	0.016	
L1S29	04/24/86	09:10	00.12	478.382	7.941	6.47	0.015	
L1S29	04/30/86	09:35	00.12	484.399	6.017	6.59	0.020	
L1S29	05/06/86	09:00	00.12	490.375	5.976	6.71	0.020	Suction probe installed.
L1S29	05/13/86	08:55	00.12	497.372	6.997	6.83	0.017	
L1S29	05/20/86	09:20	00.11	504.389	7.017	6.94	0.016	
L1S29	05/27/86	14:20	00.13	511.597	7.208	7.07	0.018	
L1S29	06/03/86	08:53	00.13	518.370	6.773	7.20	0.019	
L1S29	06/10/86	09:37	00.14	525.401	7.031	7.34	0.020	
L1S29	06/17/86	09:21	00.13	532.390	6.989	7.47	0.019	
L1S29	06/24/86	09:30	00.14	539.396	7.006	7.61	0.020	
L1S29	07/01/86	12:06	00.15	546.504	7.108	7.76	0.021	
L1S29	07/08/86	09:25	00.13	553.392	6.888	7.89	0.019	
L1S29	07/16/86	09:21	00.16	561.390	7.998	8.05	0.020	
L1S29	07/22/86	09:00	00.11	567.375	5.985	8.16	0.018	
L1S29	07/29/86	09:25	00.12	574.392	7.017	8.28	0.017	
L1S29	08/05/86	09:48	00.13	581.408	7.016	8.41	0.019	
L1S29	08/12/86	09:18	00.14	588.388	6.980	8.55	0.020	
L1S29	08/19/86	10:01	00.18	595.417	7.029	8.73	0.026	
L1S29	08/26/86	09:34	00.26	602.399	6.982	8.99	0.037	
L1S29	09/04/86	09:10	00.60	611.382	8.983	9.59	0.067	
L1S29	09/09/86	11:37	00.48	616.484	5.102	10.07	0.094	
L1S29	09/16/86	09:16	00.76	623.386	6.902	10.83	0.110	
L1S29	09/23/86	09:06	00.77	630.379	6.993	11.60	0.110	
L1S29	10/01/86	10:00	00.74	638.417	8.038	12.34	0.092	
L1S29	10/08/86	09:28	00.69	645.394	6.977	13.03	0.099	
L1S29	10/14/86	10:12	00.67	651.425	6.031	13.70	0.111	
L1S29	11/05/86	09:35	0.80	673.399	21.974	14.50	0.036	
L1S29	11/20/86	10:27	05.60	688.435	15.036	20.10	0.372	0.70 liters in probe. Opened hole and found suction tube floating on brine. Bailed hole dry.
L1S29	12/31/86	10:32	06.48	729.439	41.004	26.58	0.158	Suction lysimeter removed.
L1S29	03/06/87	12:40	10.32	794.528	65.089	36.90	0.159	
L1S29	03/31/87	10:30	4.19	819.438	24.910	41.09	0.162	
L1S29	05/07/87	08:45	18.82	856.365	36.927	59.91	0.510	
L1S29	05/08/87	08:45	13.35	857.365	0.000	73.26	0.000	Not pumped dry, brine left in hole, no calculation.
L1S29	06/17/87	14:10	16.31	897.590	0.000	89.59	0.000	Partial removal, no calculation.
L1S29	06/18/87	12:36	3.66	898.525	42.160	93.23	0.790	Used 33.32 liters in 42.16 days for calculation (5/08/87, 6/17/87, and 6/18/87).
L1S29	07/28/87	13:25	11.32	938.559	40.034	104.55	0.283	

BSEP DATA FOR HOLE L1S30

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S30	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1S30	07/15/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S30	08/20/85			0.000	0.000	0.00	0.000	Dry.
L1S30	09/17/85			0.000	0.000	0.00	0.000	Dry.
L1S30	12/10/85			0.000	0.000	0.00	0.000	Dry.
L1S30	12/17/85			0.000	0.000	0.00	0.000	Dry.
L1S30	01/23/86	09:00	00.07	387.375	1.000	0.07	0.000	First time collected.
L1S30	02/12/86	09:00	00.09	407.375	20.000	0.16	0.004	
L1S30	03/26/86	08:45	00.32	449.365	41.990	0.48	0.008	
L1S30	04/08/86	08:35	00.13	462.358	12.993	0.61	0.010	
L1S30	04/24/86	09:10	00.10	478.382	16.024	0.71	0.006	
L1S30	05/06/86	09:00	00.05	490.375	11.993	0.76	0.004	
L1S30	05/13/86	08:50	00.05	497.368	6.993	0.81	0.007	
L1S30	05/27/86	14:20	00.08	511.597	14.229	0.89	0.006	
L1S30	06/17/86	09:17	00.07	532.387	20.790	0.96	0.003	
L1S30	07/01/86	11:58	00.05	546.499	14.112	1.01	0.004	
L1S30	07/16/86	09:10	00.03	561.382	14.883	1.04	0.002	
L1S30	07/29/86	09:19	00.04	574.388	13.006	1.08	0.003	
L1S30	08/19/86	09:53	00.04	595.412	21.024	1.12	0.002	
L1S30	09/04/86	09:00	00.04	611.375	15.963	1.16	0.003	
L1S30	09/09/86	11:29	00.02	616.478	5.103	1.18	0.004	
L1S30	09/23/86	08:58	00.02	630.374	13.896	1.20	0.001	
L1S30	10/01/86	09:51	00.02	638.410	8.036	1.22	0.002	
L1S30	10/14/86	10:01	00.00	651.417	13.007	1.22	0.000	Dry.
L1S30	11/05/86	09:35	NA	673.399	34.989	1.22	0.000	Dry.
L1S30	11/20/86	NA:	NA	688.000	49.590	1.22	0.000	
L1S30	12/31/86	10:08	00.05	729.422	91.012	1.27	0.001	
L1S30	03/06/87	12:45	0.21	794.531	65.109	1.27	0.000	
L1S30	03/31/87	10:33	0.15	819.440	24.909	1.42	0.006	
L1S30	05/07/87	09:37	22.87	856.401	36.961	24.29	0.619	
L1S30	05/08/87	08:35	16.28	857.358	0.000	40.57	0.000	Brine left in hole, no calculation.
L1S30	06/17/87	14:35	17.42	897.608	0.000	57.99	0.000	Brine left in hole, no calculation.
L1S30	06/18/87	12:40	0.58	898.528	42.127	58.57	0.814	Used 34.38 liters in 42.127 days for calculation (5/08/87, 6/17/87, and 6/18/87).
L1S30	07/28/87	13:29	3.82	938.562	40.034	62.39	0.095	

BSEP DATA FOR HOLE L1S31

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S31	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84. Hole drilled before 12/85.
L1S31	07/24/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S31	08/20/85			0.000	0.000	0.00	0.000	Dry.
L1S31	09/17/85			0.000	0.000	0.00	0.000	Dry.
L1S31	12/10/85			0.000	0.000	0.00	0.000	Dry.
L1S31	12/17/85			0.000	0.000	0.00	0.000	Dry.
L1S31	11/05/86	09:35	NA	673.399	1.000	0.00	0.000	Dry.
L1S31	11/20/86	NA:	NA	688.000	15.601	0.00	0.000	Installed vacuum probe.
L1S31	12/31/86	10:08	NA	729.422	57.023	0.00	0.000	Dry.
L1S31	03/06/87	12:50	NA	794.535	122.136	0.00	0.000	Dry.
L1S31	03/31/87	10:33	0.00	819.440	24.905	0.00	0.000	Dry.
L1S31	05/07/87	09:41	0.73	856.403	61.868	0.73	0.012	
L1S31	06/18/87	12:42	3.39	898.529	42.126	4.12	0.080	
L1S31	07/28/87	13:32	0.37	938.564	40.035	4.49	0.009	

BSEP DATA FOR HOLE L1S32

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S32	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1S32	07/24/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S32	08/20/85			0.000	0.000	0.00	0.000	Dry.
L1S32	09/17/85			0.000	0.000	0.00	0.000	Moist.
L1S32	12/10/85			0.000	0.000	0.00	0.000	Dry.
L1S32	12/17/85			0.000	0.000	0.00	0.000	Dry.
L1S32	04/16/86	10:30	00.07	470.438	1.000	0.07	0.000	First collection.
L1S32	05/20/86	09:20	00.02	504.389	33.951	0.09	0.001	
L1S32	06/03/86	08:45	00.05	518.365	13.976	0.14	0.004	
L1S32	06/24/86	09:25	00.05	539.392	21.027	0.19	0.002	
L1S32	07/16/86	09:12	00.07	561.383	21.991	0.26	0.003	
L1S32	07/29/86	09:20	00.05	574.389	13.006	0.31	0.004	
L1S32	08/12/86	09:10	00.11	588.382	13.993	0.42	0.008	
L1S32	08/19/86	09:55	00.10	595.413	7.031	0.52	0.014	
L1S32	08/26/86	09:28	00.12	602.394	6.981	0.64	0.017	
L1S32	09/04/86	09:03	00.19	611.377	8.983	0.83	0.021	
L1S32	09/09/86	11:30	00.11	616.479	5.102	0.94	0.022	
L1S32	09/16/86	08:54	00.19	623.371	6.892	1.13	0.028	
L1S32	09/23/86	09:01	00.20	630.376	7.005	1.33	0.029	
L1S32	10/01/86	09:52	00.22	638.411	8.035	1.55	0.027	
L1S32	10/08/86	09:29	00.20	645.395	6.984	1.75	0.029	
L1S32	10/14/86	10:04	00.16	651.419	6.024	1.91	0.027	
L1S32	11/05/86	09:10	0.57	673.382	21.963	2.48	0.026	
L1S32	11/20/86	10:05	00.56	688.420	15.038	3.04	0.037	
L1S32	12/31/86	10:15	01.62	729.427	41.007	4.66	0.040	
L1S32	03/06/87	12:50	3.31	794.535	65.108	7.97	0.051	
L1S32	03/31/87	10:37	1.57	819.442	24.907	9.54	0.061	
L1S32	04/22/87	10:40	1.27	841.444	22.002	10.81	0.058	
L1S32	05/07/87	09:44	1.25	856.406	14.962	12.06	0.084	
L1S32	06/18/87	12:45	7.44	898.531	42.125	19.50	0.177	
L1S32	07/28/87	13:38	5.89	938.568	40.037	25.37	0.147	

BSEP DATA FOR HOLE L1S33

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S33	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1S33	07/23/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S33	08/20/85			0.000	0.000	0.00	0.000	Wet.
L1S33	09/17/85			0.000	0.000	0.00	0.000	Wet.
L1S33	12/10/85	09:00	01.01	343.375	1.000	1.01	0.000	First time collected.
L1S33	12/17/85	09:00	00.11	350.375	7.000	1.12	0.016	
L1S33	01/03/86	09:00	00.21	367.375	17.000	1.33	0.012	
L1S33	01/08/86	09:00	00.06	372.375	5.000	1.39	0.012	
L1S33	01/16/86	09:00	00.09	380.375	8.000	1.48	0.011	
L1S33	01/23/86	09:00	00.08	387.375	7.000	1.56	0.011	
L1S33	01/31/86	09:00	00.09	395.375	8.000	1.65	0.011	
L1S33	02/12/86	09:00	00.15	407.375	12.000	1.80	0.012	
L1S33	02/19/86	09:00	00.12	414.375	7.000	1.92	0.017	
L1S33	02/28/86	09:00	00.11	423.375	9.000	2.03	0.012	Estimated, lost some during collection.
L1S33	03/06/86	09:20	00.09	429.389	6.014	2.12	0.015	
L1S33	03/13/86	08:40	00.10	436.361	6.972	2.22	0.014	
L1S33	03/26/86	08:50	00.20	449.368	13.007	2.42	0.015	
L1S33	04/02/86	08:30	00.10	456.354	6.986	2.52	0.014	
L1S33	04/08/86	08:38	00.08	462.360	6.006	2.60	0.013	
L1S33	04/16/86	10:30	00.11	470.438	8.078	2.71	0.014	
L1S33	04/24/86	09:10	00.12	478.382	7.944	2.83	0.015	
L1S33	04/30/86	09:30	00.10	484.396	6.014	2.93	0.017	
L1S33	05/06/86	09:00	00.09	490.375	5.979	3.02	0.015	
L1S33	05/13/86	08:55	00.11	497.372	6.997	3.13	0.016	
L1S33	05/20/86	09:20	00.12	504.389	7.017	3.25	0.017	
L1S33	05/27/86	14:20	00.12	511.597	7.208	3.37	0.017	
L1S33	06/03/86	08:50	00.12	518.368	6.771	3.49	0.018	
L1S33	06/10/86	09:28	00.12	525.394	7.026	3.61	0.017	
L1S33	06/17/86	09:19	00.12	532.388	6.994	3.73	0.017	
L1S33	06/24/86	09:25	00.13	539.392	7.004	3.86	0.019	
L1S33	07/01/86	12:00	00.11	546.500	7.108	3.97	0.015	
L1S33	07/08/86	09:20	00.10	553.389	6.889	4.07	0.015	
L1S33	07/16/86	09:14	00.13	561.385	7.996	4.20	0.016	
L1S33	07/22/86	08:52	00.10	567.369	5.984	4.30	0.017	
L1S33	07/29/86	09:22	00.15	574.390	7.021	4.45	0.021	
L1S33	08/05/86	09:43	00.13	581.405	7.015	4.58	0.019	
L1S33	08/12/86	09:13	00.16	588.384	6.979	4.74	0.023	
L1S33	08/19/86	09:56	00.16	595.414	7.030	4.90	0.023	
L1S33	08/26/86	09:29	00.18	602.395	6.981	5.08	0.026	
L1S33	09/04/86	09:04	00.22	611.378	8.983	5.30	0.024	
L1S33	09/09/86	11:31	00.14	616.480	5.102	5.44	0.027	
L1S33	09/16/86	08:55	00.16	623.372	6.892	5.60	0.023	
L1S33	09/23/86	09:02	00.17	630.376	7.004	5.77	0.024	
L1S33	10/01/86	09:54	00.20	638.413	8.037	5.97	0.025	
L1S33	10/08/86	09:29	00.18	645.395	6.982	6.15	0.026	
L1S33	10/14/86	10:06	00.17	651.421	6.026	6.32	0.028	
L1S33	11/05/86	09:15	0.45	673.385	21.964	6.77	0.020	
L1S33	11/20/86	10:07	00.35	688.422	15.037	7.12	0.023	
L1S33	12/31/86	10:17	00.69	729.428	41.006	7.81	0.017	
L1S33	03/06/87	12:55	0.68	794.538	65.110	8.49	0.010	
L1S33	03/31/87	10:40	0.81	819.444	24.906	9.30	0.031	
L1S33	05/07/87	09:46	1.50	856.407	36.963	10.80	0.041	
L1S33	06/18/87	12:50	4.39	898.535	42.128	15.19	0.104	
L1S33	07/28/87	13:45	2.10	938.573	40.038	17.29	0.052	

BSEP DATA FOR HOLE L1S34

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S34	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1S34	07/18/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S34	08/20/85			0.000	0.000	0.00	0.000	Dry.
L1S34	09/17/85			0.000	0.000	0.00	0.000	Dry.
L1S34	12/10/85			0.000	0.000	0.00	0.000	Dry.
L1S34	12/17/85			0.000	0.000	0.00	0.000	Dry.
L1S34	11/05/86	09:15	NA	673.385	1.000	0.00	0.000	Dry.
L1S34	11/20/86	NA:	NA	688.000	15.615	0.00	0.000	
L1S34	12/31/86	10:17	NA	729.428	57.043	0.00	0.000	Dry.
L1S34	03/06/87	13:00	NA	794.542	122.157	0.00	0.000	Dry.
L1S34	03/31/87	10:40	0.00	819.444	24.902	0.00	0.000	Dry.
L1S34	05/07/87	09:46	0.00	856.407	61.865	0.00	0.000	Dry.
L1S34	06/18/87	12:51	0.00	898.535	103.993	0.00	0.000	Dry.
L1S34	07/28/87	13:38	0.00	938.568	144.026	0.00	0.000	Dry.

BSEP DATA FOR HOLE L1S35

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S35	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1S35	07/17/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S35	08/20/85			0.000	0.000	0.00	0.000	Dry.
L1S35	09/17/85			0.000	0.000	0.00	0.000	Dry.
L1S35	12/10/85			0.000	0.000	0.00	0.000	Dry.
L1S35	12/17/85			0.000	0.000	0.00	0.000	Dry.
L1S35	11/05/86	09:20	0.09	673.389	1.000	0.09	0.000	
L1S35	11/20/86	NA:	NA	688.000	14.611	0.09	0.000	
L1S35	12/31/86	10:17	NA	729.428	56.039	0.09	0.000	Dry.
L1S35	03/06/87	13:00	NA	794.542	121.153	0.09	0.000	Dry.
L1S35	03/31/87	10:40	0.00	819.444	24.902	0.09	0.000	Dry.
L1S35	05/07/87	09:46	0.00	856.407	61.865	0.09	0.000	Dry.
L1S35	06/18/87	12:52	0.00	898.536	103.994	0.09	0.000	Dry.
L1S35	07/28/87	13:38	0.00	938.568	144.026	0.09	0.000	Dry.

BSEP DATA FOR HOLE L1S36

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1S36	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1S36	07/22/85			0.000	0.000	0.00	0.000	Downhole drilled.
L1S36	08/20/85			0.000	0.000	0.00	0.000	Wet.
L1S36	09/17/85			0.000	0.000	0.00	0.000	Wet.
L1S36	12/10/85	09:00	01.28	343.375	1.000	1.28	0.000	First time collected.
L1S36	12/17/85	09:00	00.09	350.375	7.000	1.37	0.013	
L1S36	01/03/86	09:00	00.12	367.375	17.000	1.49	0.007	
L1S36	01/08/86	09:00	00.05	372.375	5.000	1.54	0.010	
L1S36	01/16/86	09:00	00.04	380.375	8.000	1.58	0.005	
L1S36	02/12/86	09:00	00.15	407.375	27.000	1.73	0.006	
L1S36	02/28/86	09:00	00.11	423.375	16.000	1.84	0.007	
L1S36	03/13/86	08:40	00.06	436.361	12.986	1.90	0.005	
L1S36	04/02/86	08:35	00.11	456.358	19.997	2.01	0.006	Yellow color.
L1S36	04/16/86	10:30	00.08	470.438	14.080	2.09	0.006	
L1S36	04/30/86	09:30	00.09	484.396	13.958	2.18	0.006	
L1S36	05/13/86	08:58	00.08	497.374	12.978	2.26	0.006	
L1S36	05/27/86	14:20	00.09	511.597	14.223	2.35	0.006	
L1S36	06/10/86	09:30	00.10	525.396	13.799	2.45	0.007	
L1S36	06/24/86	09:28	00.10	539.394	13.998	2.55	0.007	
L1S36	07/01/86	12:03	00.05	546.502	7.108	2.60	0.007	
L1S36	07/08/86	09:22	00.05	553.390	6.888	2.65	0.007	
L1S36	07/16/86	09:16	00.06	561.386	7.996	2.71	0.008	
L1S36	07/22/86	08:56	00.05	567.372	5.986	2.76	0.008	
L1S36	07/29/86	09:23	00.05	574.391	7.019	2.81	0.007	
L1S36	08/05/86	09:46	00.05	581.407	7.016	2.86	0.007	
L1S36	08/12/86	09:15	00.05	588.385	6.978	2.91	0.007	
L1S36	08/19/86	09:59	00.06	595.416	7.031	2.97	0.009	
L1S36	08/26/86	09:30	00.06	602.396	6.980	3.03	0.009	
L1S36	09/04/86	09:05	00.07	611.378	8.982	3.10	0.008	
L1S36	09/09/86	11:32	00.04	616.481	5.103	3.14	0.008	
L1S36	09/16/86	08:56	00.05	623.372	6.891	3.19	0.007	
L1S36	09/23/86	09:03	00.05	630.377	7.005	3.24	0.007	
L1S36	10/01/86	09:55	0.05	638.413	8.036	3.29	0.006	
L1S36	10/08/86	09:30	00.03	645.396	6.983	3.32	0.004	
L1S36	11/05/86	09:25	0.10	673.392	27.996	3.42	0.004	
L1S36	11/20/86	10:10	00.05	688.424	15.032	3.47	0.003	
L1S36	12/31/86	10:22	00.05	729.432	41.008	3.52	0.001	
L1S36	03/06/87	13:00	0.14	794.542	65.110	3.66	0.002	
L1S36	03/31/87	10:45	0.03	819.448	24.906	3.69	0.001	
L1S36	05/07/87	09:47	0.03	856.408	36.960	3.72	0.001	
L1S36	06/18/87	12:53	0.19	898.537	42.129	3.91	0.005	
L1S36	07/28/87	13:47	0.19	938.574	40.037	4.10	0.005	

BSEP DATA FOR HOLE L1X00

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1X00	04/21/84			0.000	0.000	0.00	0.000	Room L1 excavated 4/19/84 to 4/21/84.
L1X00	05/13/84			0.000	0.000	0.00	0.000	Downhole drilled 5/10/84 to 5/13/84. Brine entered hole over weekend during drilling.
L1X00	11/27/84	NA	11	-34.417	0.000	11.00	0.000	First time collected. Brine and salt muck.
L1X00	05/14/85	11:24	11.46	133.475	1.000	22.46	0.000	Hole looked dry due to floating salt dust on surface of brine. Salt muck removed with brine. Volume high due to near-hole storage.
L1X00	05/21/85	12:33	00.31	140.523	7.048	22.77	0.044	
L1X00	05/29/85	10:00	00.23	148.417	7.894	23.00	0.029	Removed 1 lb. of salt muck with brine.
L1X00	06/04/85	09:25	00.17	154.392	5.975	23.17	0.028	
L1X00	06/11/85	09:00	00.23	161.375	6.983	23.40	0.033	2 lbs. salt removed with brine during bailing.
L1X00	06/18/85	09:05	00.23	168.378	7.003	23.63	0.033	
L1X00	06/25/85	08:55	00.21	175.372	6.994	23.84	0.030	
L1X00	07/02/85	11:00	00.23	182.458	7.086	24.07	0.032	
L1X00	07/09/85	09:10	00.21	189.382	6.924	24.28	0.030	
L1X00	07/16/85	09:12	00.21	196.383	7.001	24.49	0.030	
L1X00	07/24/85	09:29	00.22	204.395	8.012	24.71	0.027	
L1X00	07/30/85	08:42	00.18	210.363	5.968	24.89	0.030	
L1X00	08/06/85	09:07	00.18	217.380	7.017	25.07	0.026	
L1X00	08/14/85	08:53	00.23	225.370	7.990	25.30	0.029	
L1X00	08/20/85	08:58	00.16	231.374	6.004	25.46	0.027	
L1X00	08/28/85	08:25	00.23	239.351	7.977	25.69	0.029	
L1X00	09/04/85	09:09	00.19	246.381	7.030	25.88	0.027	
L1X00	09/10/85	08:53	00.16	252.370	5.989	26.04	0.027	
L1X00	09/17/85	08:25	00.21	259.351	6.981	26.25	0.030	
L1X00	09/24/85	08:40	00.21	266.361	7.010	26.46	0.030	
L1X00	10/01/85	08:52	00.17	273.369	7.008	26.63	0.024	
L1X00	10/08/85	09:55	00.19	280.413	7.044	26.82	0.027	
L1X00	10/15/85	08:45	00.16	287.365	6.952	26.98	0.023	
L1X00	10/23/85	09:09	00.20	295.381	8.016	27.18	0.025	
L1X00	10/29/85	11:30	00.18	301.479	6.098	27.36	0.030	
L1X00	11/05/85	08:17	00.16	308.345	6.866	27.52	0.023	
L1X00	11/13/85	08:47	00.18	316.366	8.021	27.70	0.022	
L1X00	11/21/85	10:00	00.17	324.417	8.051	27.87	0.021	
L1X00	11/26/85	09:25	00.12	329.392	4.975	27.99	0.024	
L1X00	12/03/85	14:35	00.14	336.608	7.216	28.13	0.019	
L1X00	12/10/85	12:55	00.14	343.538	6.930	28.27	0.020	
L1X00	12/17/85	13:02	00.15	350.543	7.005	28.42	0.021	
L1X00	01/03/86	09:05	00.38	367.378	16.835	28.80	0.023	
L1X00	01/08/86	09:25	00.11	372.392	5.014	28.91	0.022	
L1X00	01/16/86	09:00	00.18	380.375	7.983	29.09	0.023	
L1X00	01/23/86	09:15	00.14	387.385	7.010	29.23	0.020	
L1X00	01/31/86	09:45	00.18	395.406	8.021	29.41	0.022	
L1X00	02/12/86	08:50	00.30	407.368	11.962	29.71	0.025	
L1X00	02/19/86	09:40	00.16	414.403	7.035	29.87	0.023	
L1X00	02/28/86	11:20	00.24	423.472	9.069	30.11	0.026	
L1X00	03/06/86	09:10	00.12	429.382	5.910	30.23	0.020	
L1X00	03/13/86	08:30	00.16	436.354	6.972	30.39	0.023	
L1X00	03/26/86	08:35	00.29	449.358	13.004	30.68	0.022	
L1X00	04/02/86	08:15	00.17	456.344	6.986	30.85	0.024	
L1X00	04/08/86	08:26	00.15	462.351	6.007	31.00	0.025	
L1X00	04/16/86	10:20	00.19	470.431	8.080	31.19	0.024	
L1X00	04/24/86	08:50	00.16	478.368	7.937	31.35	0.020	
L1X00	04/30/86	09:20	00.16	484.389	6.021	31.51	0.027	
L1X00	05/06/86	08:50	00.15	490.368	5.979	31.66	0.025	
L1X00	05/13/86	08:48	00.18	497.367	6.999	31.84	0.026	
L1X00	05/20/86	09:20	00.18	504.389	7.022	32.02	0.026	
L1X00	05/27/86	14:20	00.17	511.597	7.208	32.19	0.024	
L1X00	06/03/86	08:43	00.15	518.363	6.766	32.34	0.022	
L1X00	06/10/86	09:20	00.21	525.389	7.026	32.55	0.030	
L1X00	06/17/86	09:12	00.14	532.383	6.994	32.69	0.020	
L1X00	06/24/86	09:15	00.22	539.385	7.002	32.91	0.031	
L1X00	07/01/86	11:53	00.22	546.495	7.110	33.13	0.031	
L1X00	07/08/86	09:10	00.22	553.382	6.887	33.35	0.032	
L1X00	07/16/86	09:00	00.21	561.375	7.993	33.56	0.026	
L1X00	07/22/86	08:45	00.17	567.365	5.990	33.73	0.028	

BSEP DATA FOR HOLE L1X00

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L1X00	07/29/86	09:08	00.18	574.381	7.016	33.91	0.026	
L1X00	08/05/86	09:33	00.20	581.398	7.017	34.11	0.029	
L1X00	08/12/86	09:05	00.20	588.378	6.980	34.31	0.029	
L1X00	08/19/86	09:49	00.20	595.409	7.031	34.51	0.028	
L1X00	08/26/86	09:20	00.19	602.389	6.980	34.70	0.027	
L1X00	09/04/86	08:55	00.25	611.372	8.983	34.95	0.028	
L1X00	09/09/86	11:25	00.16	616.476	5.104	35.11	0.031	
L1X00	09/16/86	08:50	00.19	623.368	6.892	35.30	0.028	
L1X00	09/23/86	08:53	00.20	630.370	7.002	35.50	0.029	
L1X00	10/01/86	09:46	00.22	638.407	8.037	35.72	0.027	
L1X00	10/08/86	09:17	00.18	645.387	6.980	35.90	0.026	
L1X00	10/14/86	10:00	00.14	651.417	6.030	36.04	0.023	
L1X00	11/05/86	09:02	0.52	673.376	21.959	36.56	0.024	
L1X00	11/20/86	09:47	00.36	688.408	15.032	36.92	0.024	
L1X00	12/31/86	10:00	00.88	729.417	41.009	37.80	0.021	
L1X00	02/03/87	10:45	00.61	763.448	34.031	38.41	0.018	
L1X00	03/06/87	09:45	0.58	794.406	30.958	38.99	0.019	Hole looked dry due to floating salt dust on surface of brine.
L1X00	04/10/87	09:30	0.68	829.396	34.990	39.67	0.019	
L1X00	06/17/87	14:00	0.83	897.583	0.000	40.50	0.000	Brine left in hole, no calculation.
L1X00	07/28/87	13:07	1.09	938.547	1.000	41.50	0.018	Calculated using 1.92 liters in 109.151 days (6/17/87 and 7/28/87).

BSEP DATA FOR HOLE L2C03

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
L2C03	04/25/84			0.000	0.000	0.00	0.000	Room L2 excavated 4/22/84 to 4/25/84.
L2C03	03/26/85			0.000	0.000	0.00	0.000	Hole L2C25, a 5" overcore of a previously grouted hole, drilled at this location. Brine blew into hole L2C29, 4 ft. to the north.
L2C03	04/02/85			0.000	0.000	0.00	0.000	Approximate date hole L2C03 drilled, a 16" overcore of L2C25.
L2C03	12/17/85	12:39	05.15	350.527	1.000	5.15	0.000	First time collected. Brine enters through fracture, connects to L2C29, 4 ft. north.
L2C03	01/03/86	08:55	00.24	367.372	16.845	5.39	0.014	
L2C03	01/08/86	09:20	00.01	372.389	5.017	5.40	0.002	
L2C03	01/16/86	08:50	00.04	380.368	7.979	5.44	0.005	
L2C03	01/23/86	09:10	00.03	387.382	7.014	5.47	0.004	
L2C03	02/12/86	08:40	00.10	407.361	19.979	5.57	0.005	
L2C03	04/16/86	10:15	00.60	470.427	63.066	6.17	0.010	
L2C03	04/24/86	08:45	00.10	478.365	7.938	6.27	0.013	
L2C03	05/06/86	08:40	00.16	490.361	11.996	6.43	0.013	
L2C03	05/13/86	08:40	00.06	497.361	7.000	6.49	0.009	
L2C03	05/20/86	09:20	00.12	504.389	7.028	6.61	0.017	
L2C03	06/03/86	08:40	00.25	518.361	13.972	6.86	0.018	
L2C03	06/10/86	09:10	00.14	525.382	7.021	7.00	0.020	
L2C03	06/17/86	09:10	00.15	532.382	7.000	7.15	0.021	
L2C03	06/24/86	09:05	00.17	539.378	6.996	7.32	0.024	
L2C03	07/01/86	11:40	00.21	546.486	7.108	7.53	0.030	
L2C03	07/08/86	09:00	00.23	553.375	6.889	7.76	0.033	
L2C03	07/16/86	08:55	00.31	561.372	7.997	8.07	0.039	
L2C03	07/22/86	08:39	00.24	567.360	5.988	8.31	0.040	
L2C03	07/29/86	09:00	00.31	574.375	7.015	8.62	0.044	
L2C03	08/05/86	09:28	00.30	581.394	7.019	8.92	0.043	
L2C03	08/12/86	08:58	00.30	588.374	6.980	9.22	0.043	
L2C03	08/19/86	09:40	00.25	595.403	7.029	9.47	0.036	
L2C03	08/26/86	09:14	00.28	602.385	6.982	9.75	0.040	
L2C03	09/04/86	08:50	00.68	611.368	8.983	10.43	0.076	
L2C03	09/09/86	11:48	00.42	616.492	5.124	10.85	0.082	
L2C03	09/16/86	08:40	00.49	623.361	6.869	11.34	0.071	
L2C03	09/23/86	08:45	00.50	630.365	7.004	11.84	0.071	
L2C03	10/01/86	09:39	00.48	638.402	8.037	12.32	0.060	
L2C03	10/08/86	09:13	00.28	645.384	6.982	12.60	0.040	
L2C03	10/14/86	09:51	00.20	651.410	6.026	12.80	0.033	
L2C03	11/05/86	09:00	0.79	673.375	21.965	13.59	0.036	
L2C03	11/20/86	09:45	00.38	688.406	15.031	13.97	0.025	
L2C03	12/31/86	09:40	01.36	729.403	40.997	15.33	0.033	

BSEP DATA FOR HOLE NG252

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
NG252	03/16/83			0.000	0.000	0.00	0.000	West side of SPDV Test Room 2 excavated. (Room excavated 3/09/83 to 3/20/83).
NG252	03/20/83			0.000	0.000	0.00	0.000	Approximate date downhole drilled.
NG252	03/04/84			0.000	0.000	0.00	0.000	Overcored non-functional stress meter with 6" hole (to 1.5 ft.).
NG252	11/21/84			0.000	0.000	0.00	0.000	Brine 7" below west edge of collar. Cleaned hole.
NG252	11/30/84			0.000	0.000	0.00	0.000	Installed PVC casing for BSEP observations.
NG252	12/19/84	12:00	04.60	-12.500	1.000	4.60	0.000	Partial removal. First time collected.
NG252	12/20/84	09:00	04.35	-11.625	0.875	8.95	0.000	Pumped dry. Inflow rate about 2 cc/hr.
NG252	01/08/85	09:43	08.19	7.405	19.030	17.14	0.430	Pumped dry.
NG252	02/05/85	09:30	08.48	35.396	27.991	25.62	0.303	Gas bubbles observed rising through brine in hole.
NG252	02/14/85	10:33	04.14	44.440	9.044	29.76	0.458	
NG252	02/19/85	10:18	03.92	49.429	4.989	33.68	0.786	
NG252	03/07/85	10:57	03.83	65.456	16.027	37.51	0.239	
NG252	03/12/85	09:10	03.41	70.382	4.926	40.92	0.692	
NG252	03/20/85	10:00	03.71	78.417	8.035	44.63	0.462	
NG252	03/26/85	09:30	03.24	84.396	5.979	47.87	0.542	
NG252	04/02/85	10:00	03.38	91.417	7.021	51.25	0.481	
NG252	04/10/85	10:02	03.29	99.418	8.001	54.54	0.411	
NG252	04/17/85	13:50	03.57	106.576	7.158	58.11	0.499	
NG252	04/23/85	12:00	02.58	112.500	5.924	60.69	0.436	
NG252	04/30/85	11:39	03.28	119.485	6.985	63.97	0.470	
NG252	05/07/85	10:25	02.96	126.434	6.949	66.93	0.426	
NG252	05/14/85	11:05	02.83	133.462	7.028	69.76	0.403	
NG252	05/21/85	11:12	03.01	140.467	7.005	72.77	0.430	Brine degassing in collecting container.
NG252	05/29/85	10:00	03.45	148.417	7.950	76.22	0.434	
NG252	06/04/85	11:50	02.90	154.493	6.076	79.12	0.477	
NG252	06/11/85	11:35	03.06	161.483	6.990	82.18	0.438	
NG252	06/18/85	10:47	02.82	168.449	6.966	85.00	0.405	
NG252	06/25/85	10:00	03.34	175.417	6.968	88.34	0.479	
NG252	07/02/85	11:00	03.50	182.458	7.041	91.84	0.497	
NG252	07/09/85	11:30	03.46	189.479	7.021	95.30	0.493	Brine effervesces.
NG252	07/16/85	12:09	03.43	196.506	7.027	98.73	0.488	Brine effervesces.
NG252	07/24/85	11:10	03.83	204.465	7.959	102.56	0.481	
NG252	07/30/85	10:45	02.79	210.448	5.983	105.35	0.466	
NG252	08/06/85	10:58	03.05	217.457	7.009	108.40	0.435	
NG252	08/14/85	12:10	03.48	225.507	8.050	111.88	0.432	
NG252	08/20/85	11:31	03.15	231.480	5.973	115.03	0.527	
NG252	08/28/85	10:00	03.11	239.417	7.937	118.14	0.392	
NG252	09/04/85	10:58	03.17	246.457	7.040	121.31	0.450	
NG252	09/10/85	11:23	03.04	252.474	6.017	124.35	0.505	
NG252	09/17/85	10:16	02.68	259.428	6.954	127.03	0.385	
NG252	09/24/85	10:20	02.98	266.431	7.003	130.01	0.426	
NG252	10/01/85	10:25	03.19	273.434	7.003	133.20	0.456	
NG252	10/08/85	11:05	03.36	280.462	7.028	136.56	0.478	
NG252	10/15/85	10:46	02.64	287.449	6.987	139.20	0.378	
NG252	10/23/85	10:58	02.93	295.457	8.008	142.13	0.366	
NG252	10/29/85	10:45	02.64	301.448	5.991	144.77	0.441	
NG252	11/05/85	09:40	02.16	308.403	6.955	146.93	0.311	10 days after brine was removed from 36" hole in SPDV Test Room 3.
NG252	11/13/85	10:45	02.72	316.448	8.045	149.65	0.338	
NG252	11/21/85	11:50	02.88	324.493	8.045	152.53	0.358	
NG252	11/26/85	10:40	02.28	329.444	4.951	154.81	0.461	
NG252	12/03/85	14:15	02.45	336.594	7.150	157.26	0.343	
NG252	12/10/85	13:41	02.34	343.570	6.976	159.60	0.335	
NG252	12/17/85	14:15	02.73	350.594	7.024	162.33	0.389	
NG252	01/03/86	10:30	04.03	367.438	16.844	166.30	0.239	Partial removal only.
NG252	01/08/86	10:40	03.00	372.444	5.006	169.36	0.599	High volume of brine due to only partial removal on 1/03/86.
NG252	01/16/86	10:10	03.90	380.424	7.980	173.26	0.489	
NG252	01/23/86	10:20	02.84	387.431	7.007	176.10	0.405	
NG252	01/31/86	12:45	02.94	395.531	8.100	179.04	0.363	
NG252	02/12/86	11:30	02.87	407.479	11.948	181.91	0.240	
NG252	02/19/86	12:13	02.85	414.509	7.030	184.76	0.405	
NG252	03/06/86	11:00	04.10	429.458	14.949	188.86	0.274	
NG252	03/13/86	10:30	02.78	436.438	6.980	191.64	0.398	
NG252	03/26/86	10:25	03.50	449.434	12.996	195.14	0.269	
NG252	04/02/86	10:10	02.67	456.424	6.990	197.81	0.382	
NG252	04/08/86	10:15	02.00	462.427	6.003	199.81	0.333	
NG252	04/16/86	12:30	02.52	470.521	8.094	202.33	0.311	

BSEP DATA FOR HOLE NG252

WIPP BRINE SAMPLING AND EVALUATION PROGRAM

Data through August 12, 1987

Location	Date	Time	Liters Removed	Days Since 1/01/85	Days Used For Calc.	Cumulative Liters Collected	Liters per Day	Remarks
NG252	04/24/86	10:40	01.93	478.444	7.923	204.26	0.244	
NG252	04/30/86	11:20	02.10	484.472	6.028	206.36	0.348	
NG252	05/06/86	10:45	01.80	490.448	5.976	208.16	0.301	
NG252	05/13/86	11:35	01.33	497.483	7.035	209.49	0.189	
NG252	05/20/86	11:25	01.22	504.476	6.993	210.71	0.174	
NG252	05/27/86	16:10	01.60	511.674	7.198	212.31	0.222	
NG252	06/03/86	10:45	01.49	518.448	6.774	213.80	0.220	
NG252	06/10/86	11:45	02.18	525.490	7.042	215.98	0.310	
NG252	06/17/86	11:21	02.65	532.473	6.983	218.63	0.379	
NG252	06/24/86	11:15	01.77	539.469	6.996	220.40	0.253	
NG252	07/01/86	14:20	01.80	546.597	7.128	222.20	0.253	
NG252	07/08/86	10:55	01.50	553.455	6.858	223.70	0.219	
NG252	07/16/86	11:00	01.88	561.458	8.003	225.58	0.235	
NG252	07/22/86	10:22	01.94	567.432	5.974	227.52	0.325	
NG252	07/29/86	10:55	02.16	574.455	7.023	229.68	0.308	
NG252	08/05/86	11:33	01.92	581.481	7.026	231.60	0.273	
NG252	08/12/86	10:50	01.90	588.451	6.970	233.50	0.273	
NG252	08/19/86	11:45	01.82	595.490	7.039	235.32	0.259	
NG252	08/26/86	11:05	01.85	602.462	6.972	237.17	0.265	
NG252	09/04/86	11:00	02.15	611.458	8.996	239.32	0.239	
NG252	09/09/86	09:12	01.85	616.383	4.925	241.17	0.376	
NG252	09/16/86	10:27	01.81	623.435	7.052	242.98	0.257	
NG252	09/23/86	10:30	01.65	630.438	7.003	244.63	0.236	
NG252	10/01/86	12:30	02.67	638.521	8.083	247.30	0.330	
NG252	10/08/86	11:30	01.61	645.479	6.958	248.91	0.231	
NG252	10/14/86	12:10	01.72	651.507	6.028	250.63	0.285	
NG252	11/05/86	11:57	3.45	673.498	21.991	254.08	0.157	
NG252	11/20/86	12:40	03.93	688.528	15.030	258.01	0.261	
NG252	12/30/86	01:13	03.54	728.051	39.523	261.55	0.090	
NG252	01/06/87	13:00	02.38	735.542	7.491	263.93	0.318	
NG252	01/12/87	12:15	06.81	741.510	5.968	270.74	1.141	
NG252	02/03/87	09:15	03.93	763.385	21.875	274.67	0.180	
NG252	03/06/87	13:35	4.2	794.566	31.181	278.87	0.135	
NG252	04/22/87	09:17	4.83	841.387	46.821	283.70	0.101	
NG252	05/07/87	11:59	4.24	856.499	15.112	287.94	0.281	Low liters/day values for some periods between 11/05/86 and 6/16/87 may be the result in part of the long time between collections.
NG252	06/17/87	14:10	4.63	897.590	0.000	292.57	0.000	Some brine left in hole, no calc.
NG252	06/30/87	10:20	4.10	910.431	12.841	296.67	0.162	Calculation used 8.73 liters in 53.932 days (6/17/87 and 6/30/87).
NG252	07/16/87	10:50	3.77	926.451	16.020	300.44	0.235	
NG252	07/23/87	09:35	2.32	933.399	6.948	302.76	0.334	
NG252	07/29/87	09:54	2.07	939.413	6.014	304.83	0.344	
NG252	08/07/87	09:00	1.89	948.375	8.962	306.72	0.211	
NG252	08/12/87	10:00	1.28	953.417	5.042	308.00	0.254	

GRAPHS OF BRINE ACCUMULATION DATA

This appendix contains graphs of data presented in Appendix A for selected locations. As described in Deal and Case (1987), much of the variability in the quantity of brine collected resulted from limitations of the collecting techniques rather than variations in the actual inflow of brine from bedrock into the collecting locations. As a result, plotting of the inflow data from the data tables (Appendix A) results in an irregular plot which implies variations in inflow that, in fact, do not exist. The graphed data included in this report were processed and plotted by a standard software program (STSC Statgraphics) on an IBM XT microcomputer, using a simple moving average to smooth the curve. An eleven-point moving average was used for the graphs. The smoothed result reflects trends that are representative of the brine seepage rates while still showing variations that are probably the result of collecting techniques. Additional discussion of the collection and data handling is provided in Deal and Case (1987).

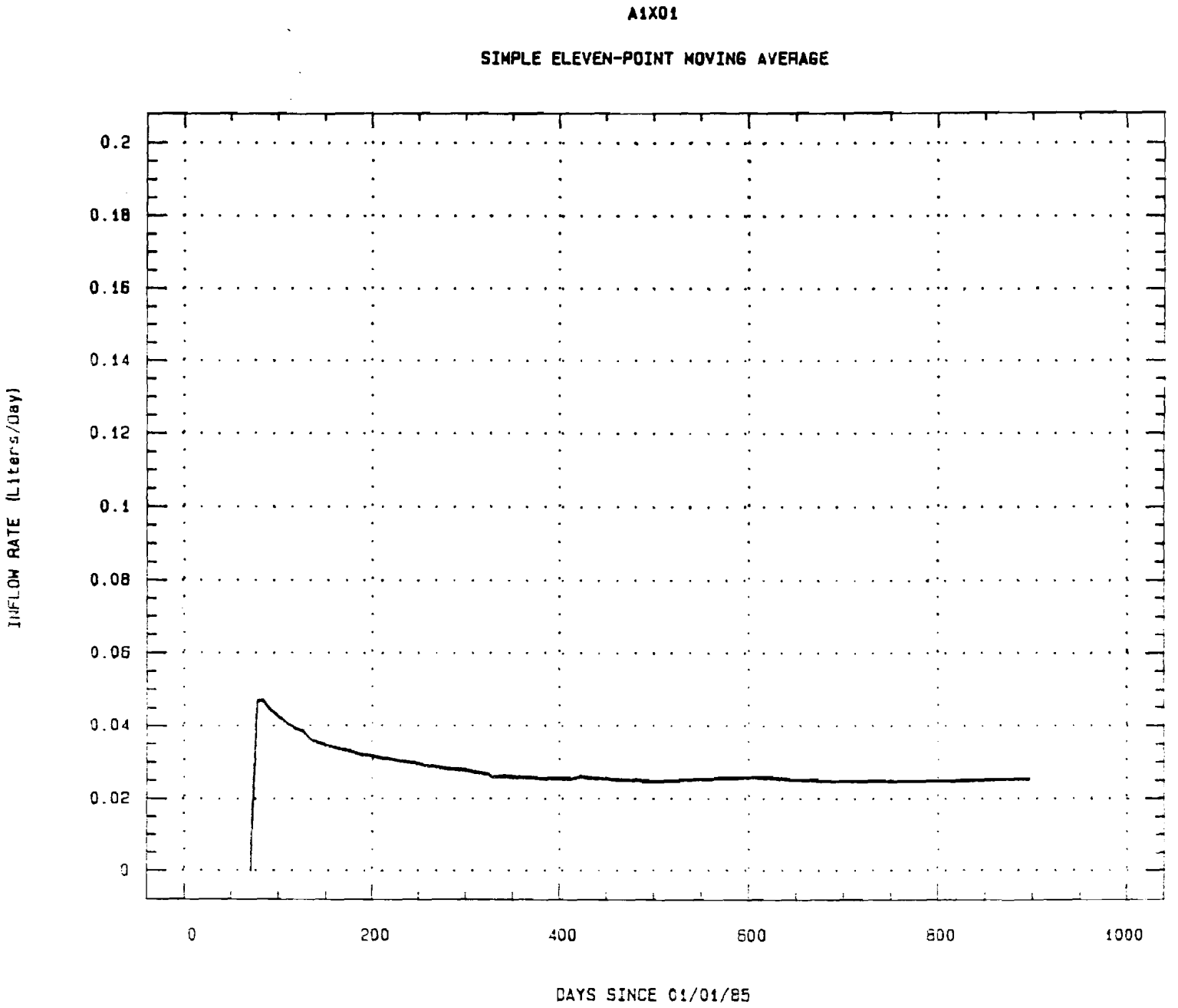


FIGURE B-1. A1X01 Inflow Rates

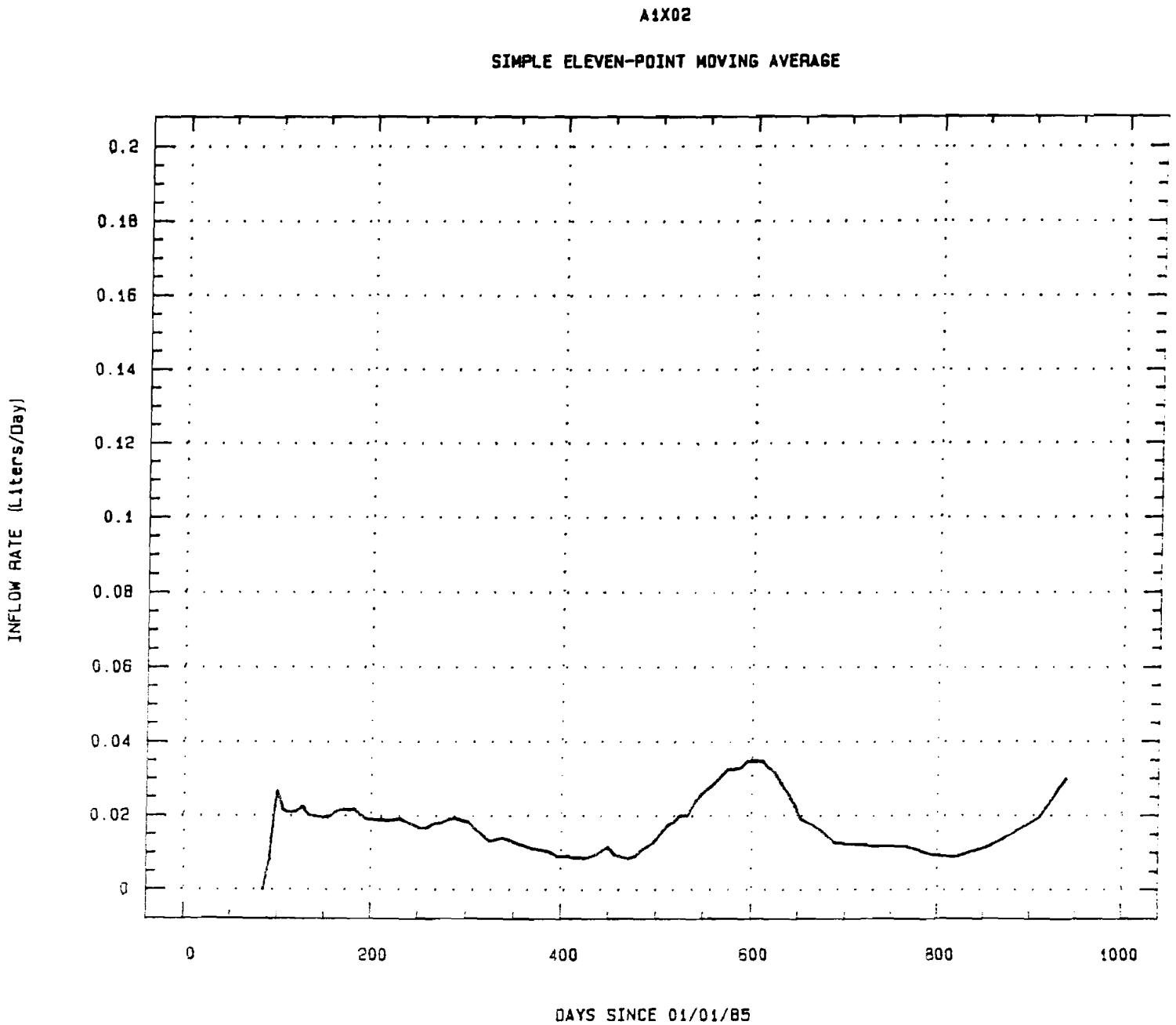


FIGURE B-2. A1X02 Inflow Rates

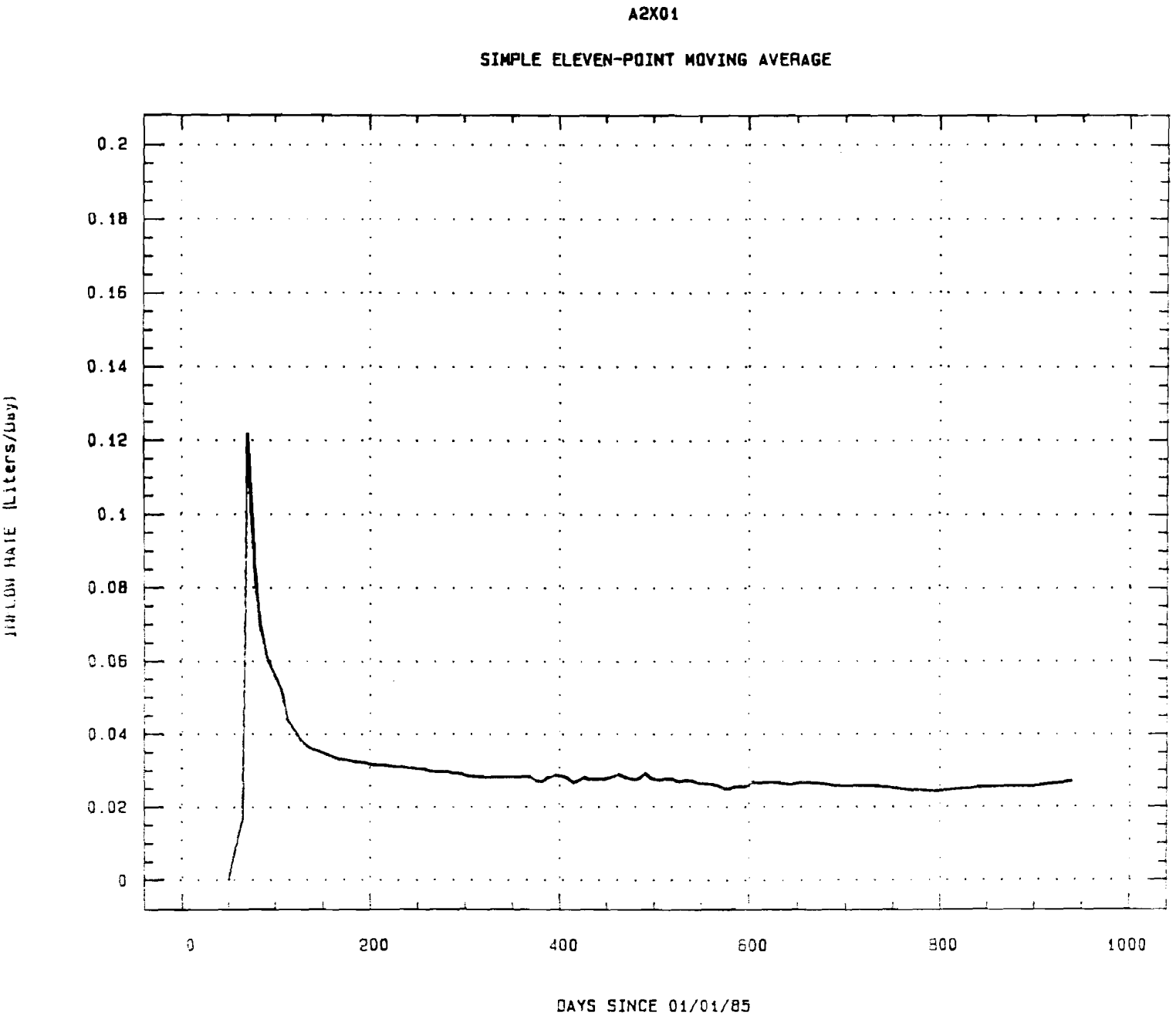


FIGURE B-3. A2X01 Inflow Rates

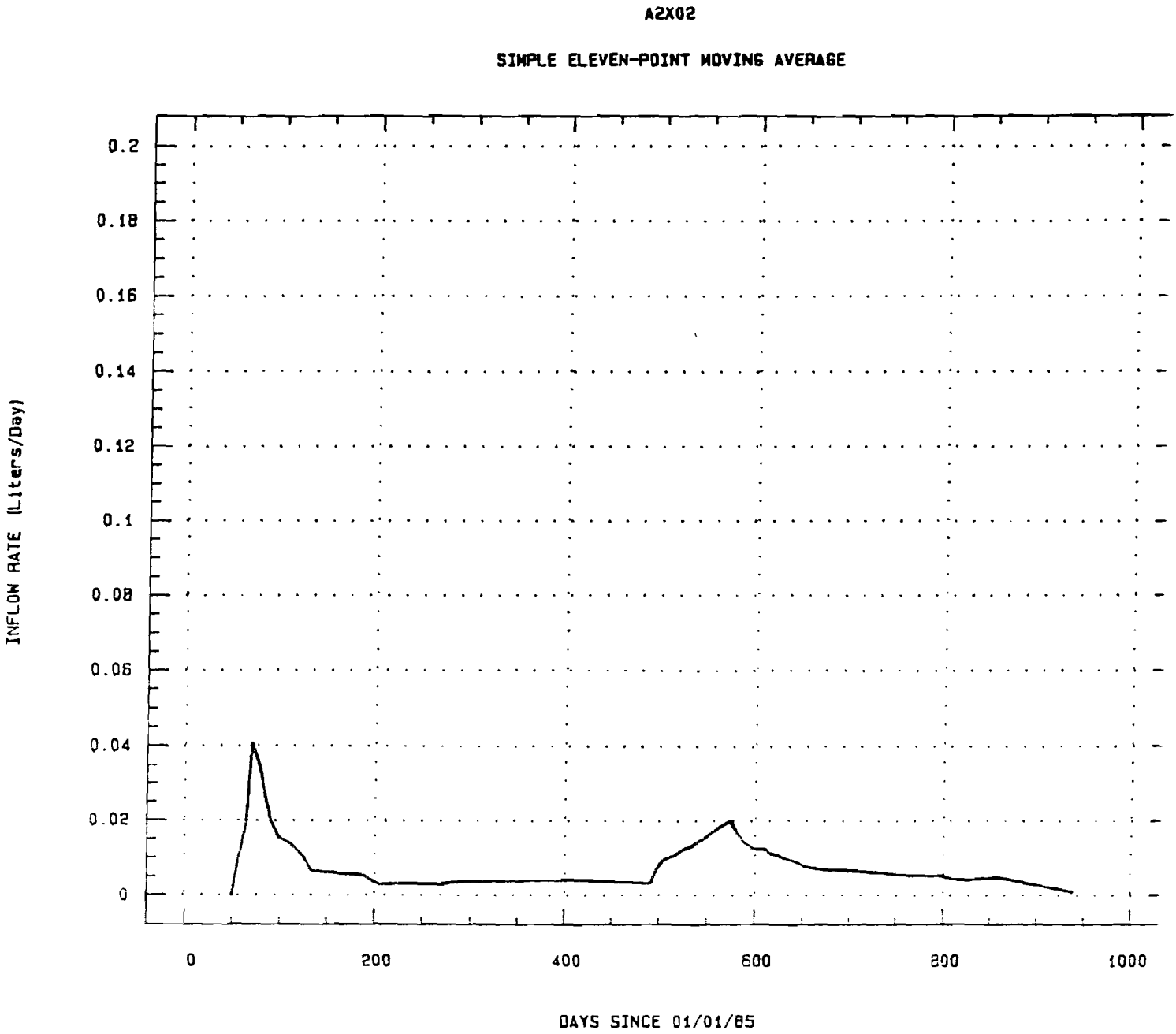


FIGURE B-4. A2X02 Inflow Rates

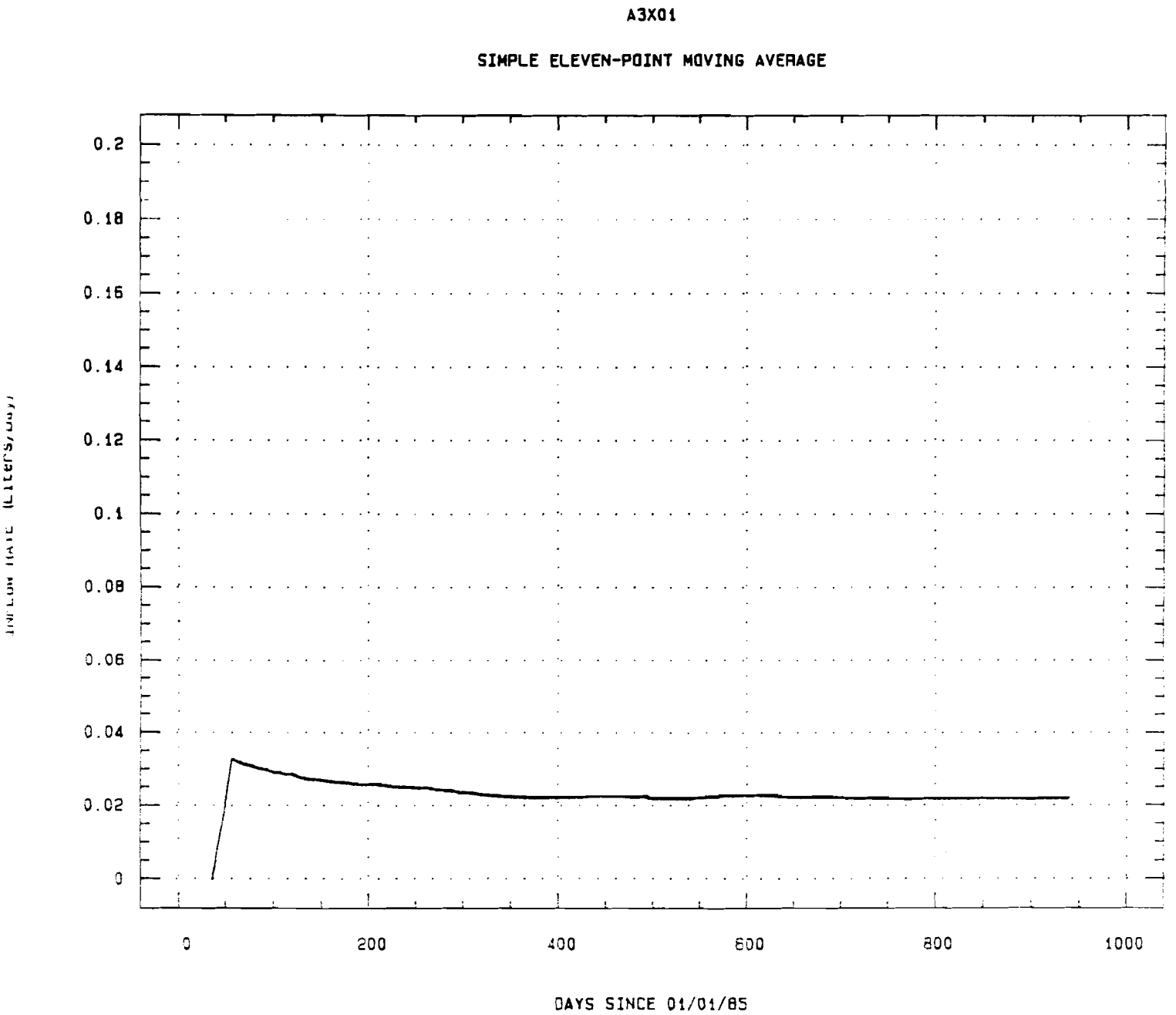


FIGURE B-5. A3X01 Inflow Rates

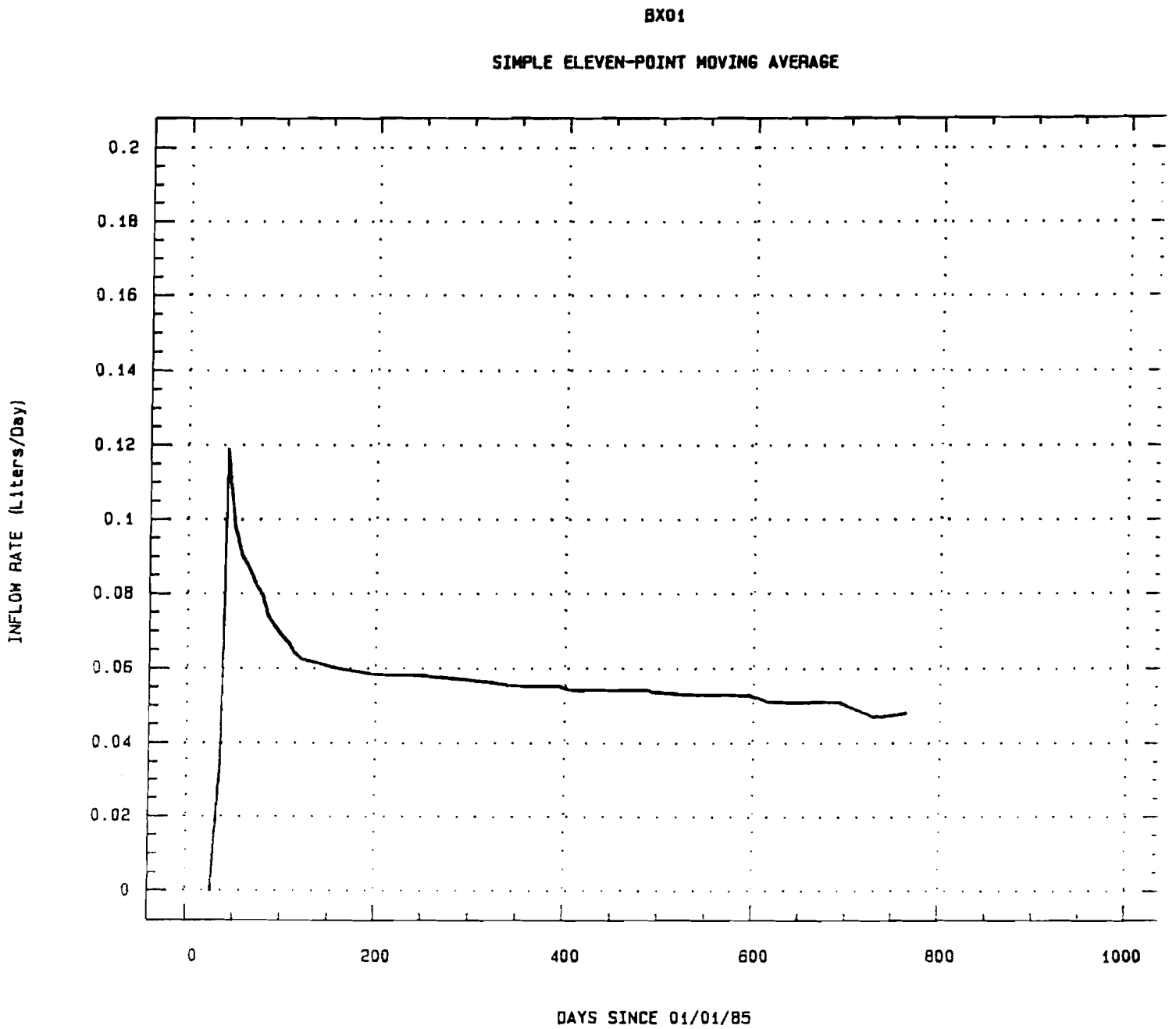


FIGURE B-6. BX01 Inflow Rates

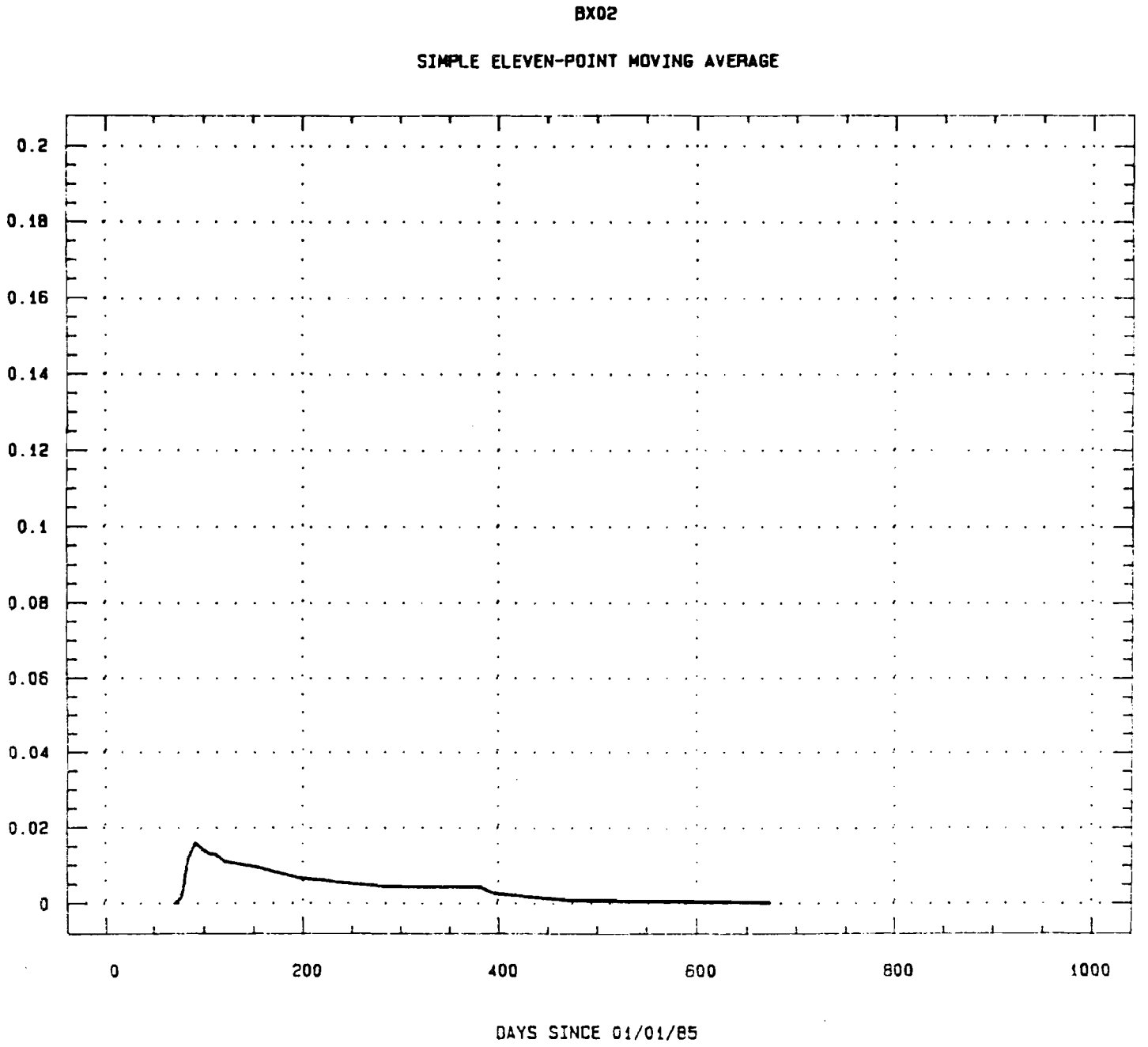


FIGURE B-7. BX02 Inflow Rates

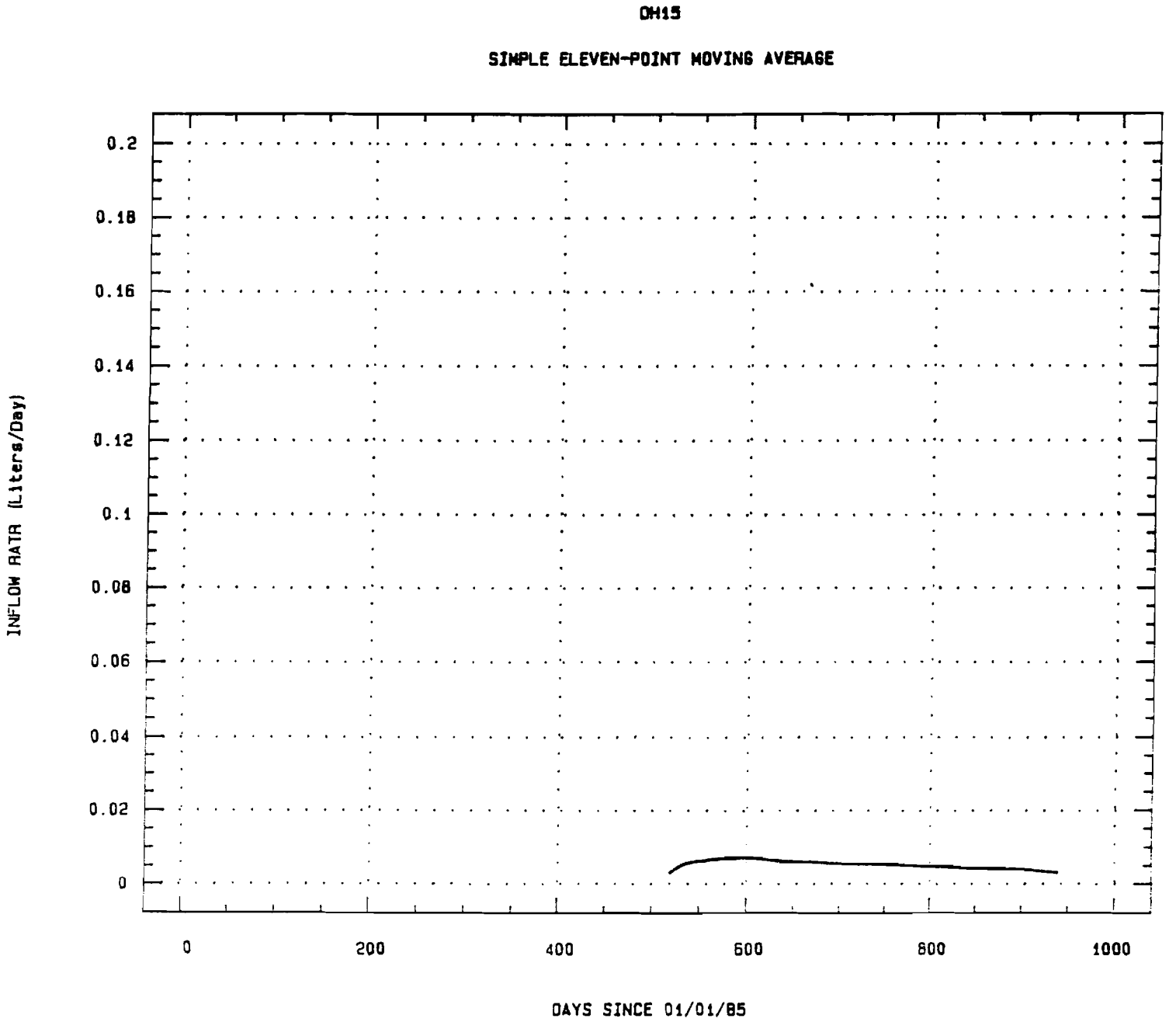


FIGURE B-8. DH15 Inflow Rates

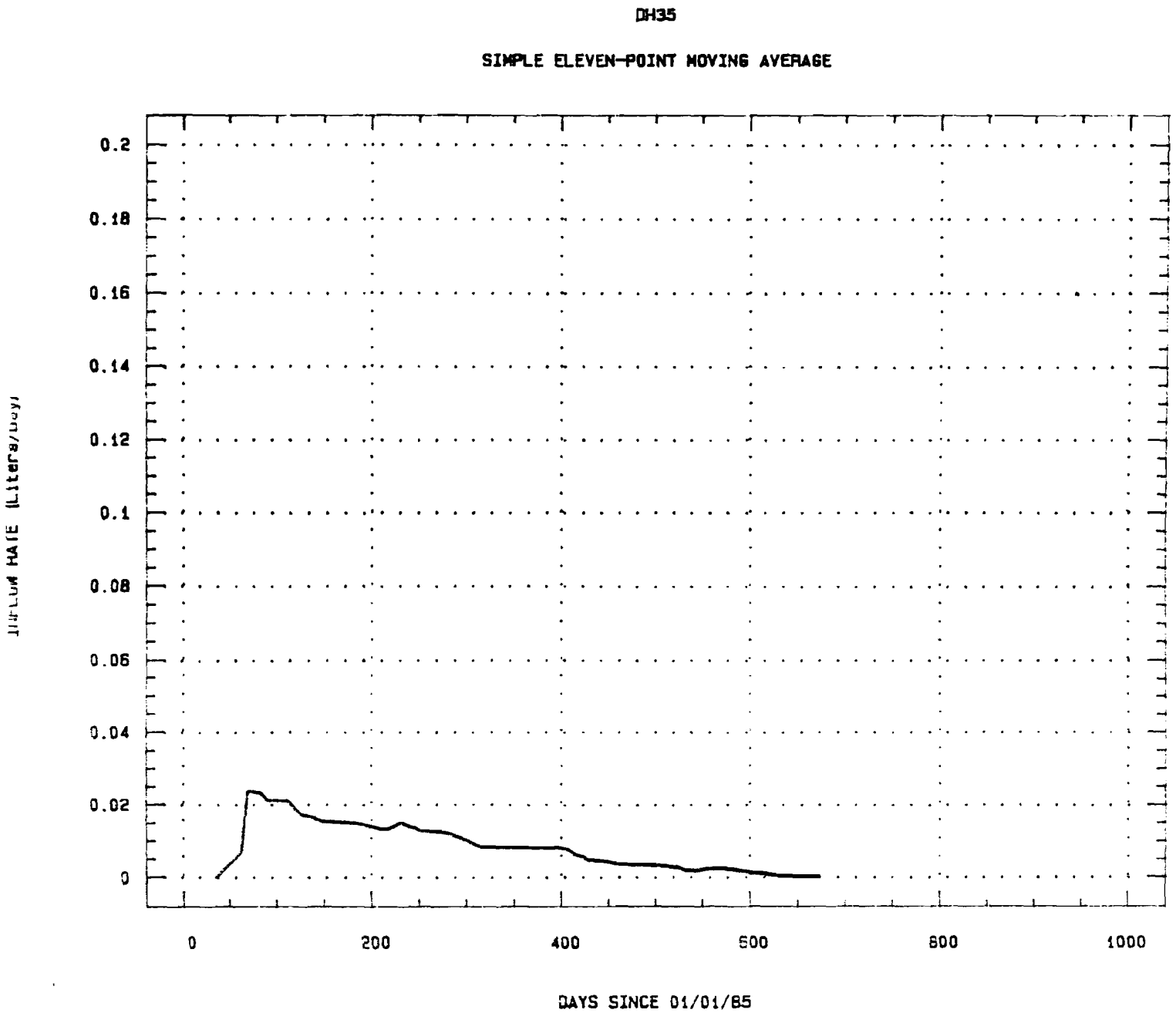


FIGURE B-9. DH35 Inflow Rates

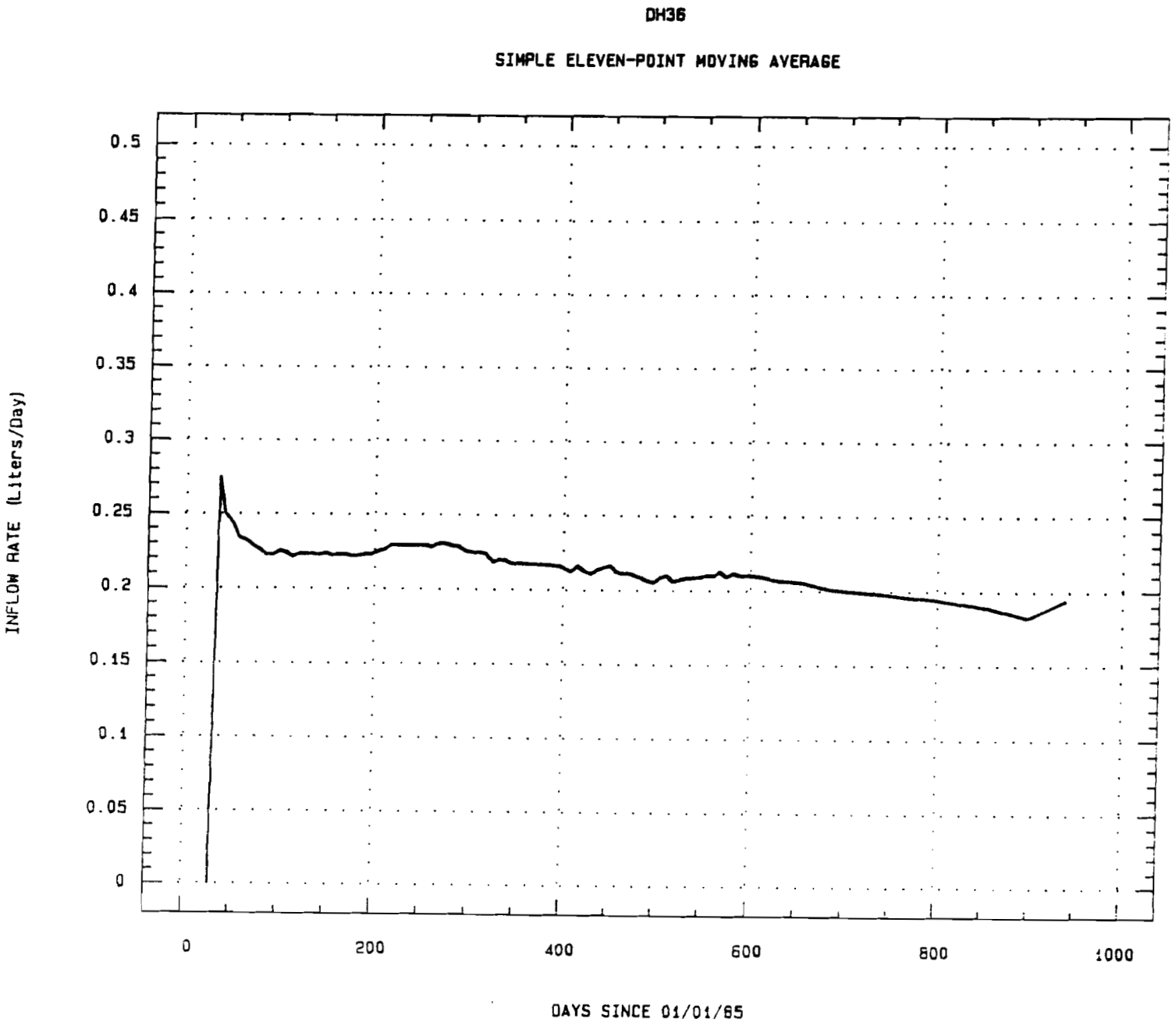


FIGURE B-10. DH36 Inflow Rates

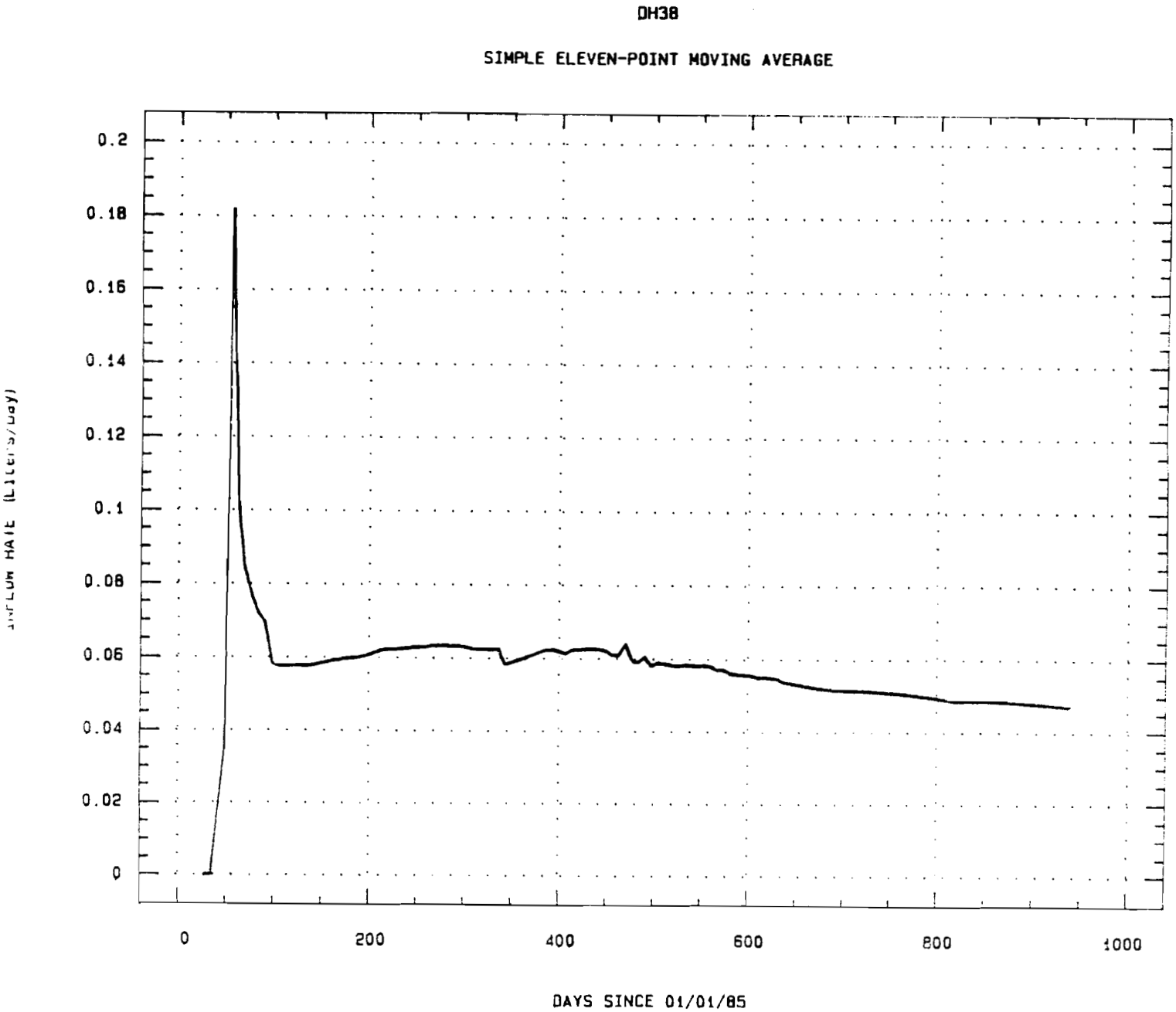


FIGURE B-11. DH38 Inflow Rates

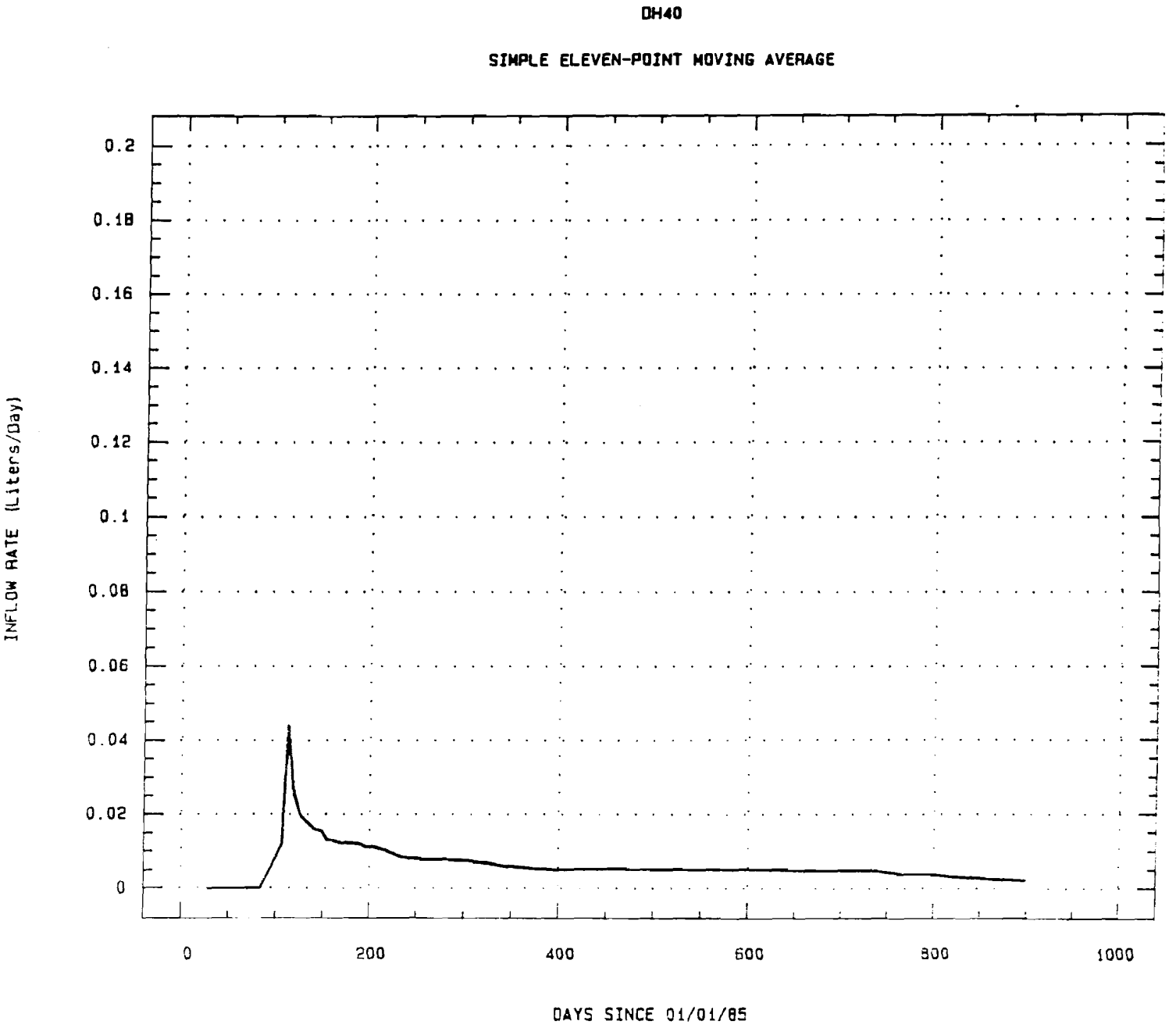


FIGURE B-12. DH40 Inflow Rates

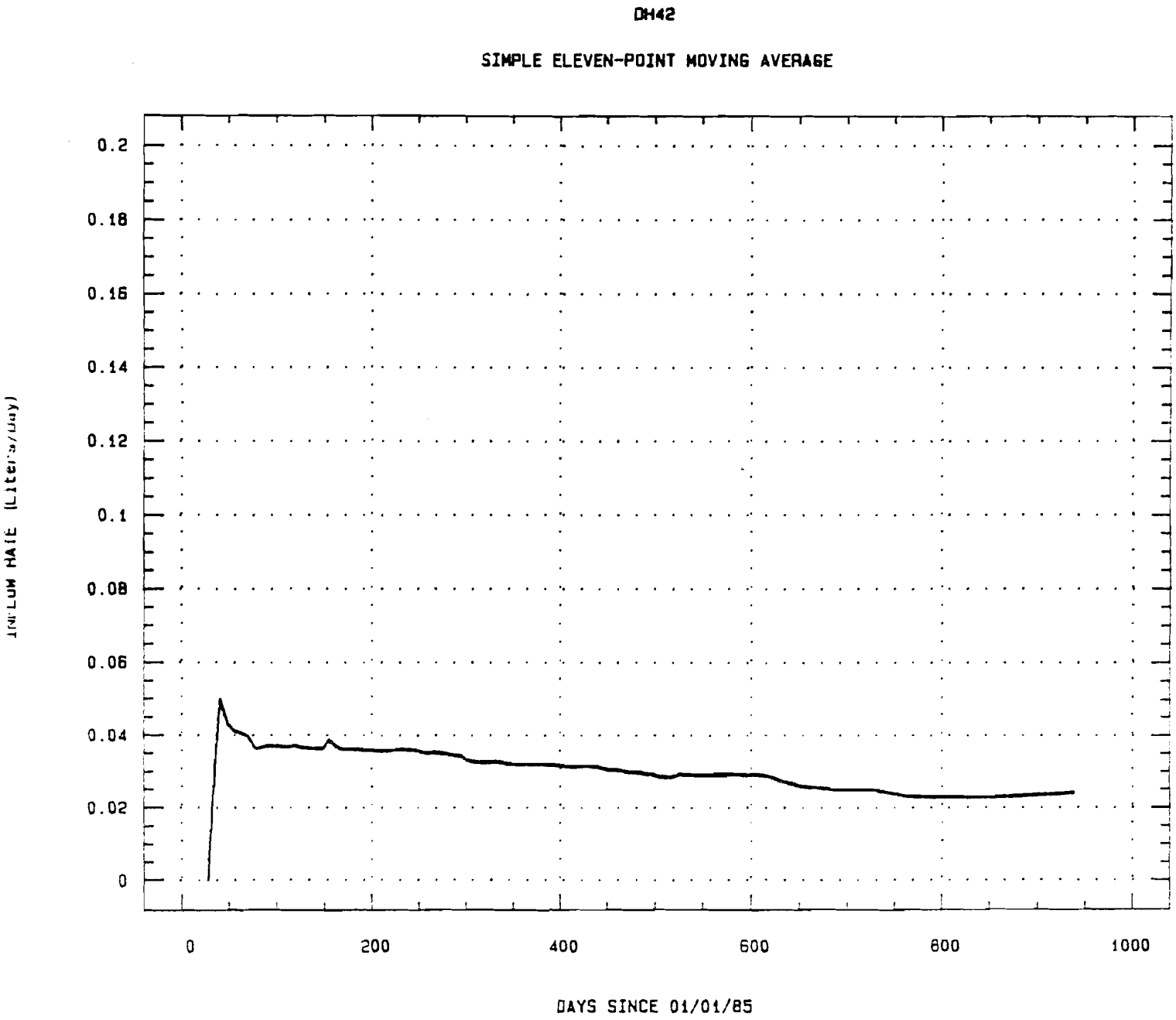


FIGURE B-13. DH42 Inflow Rates

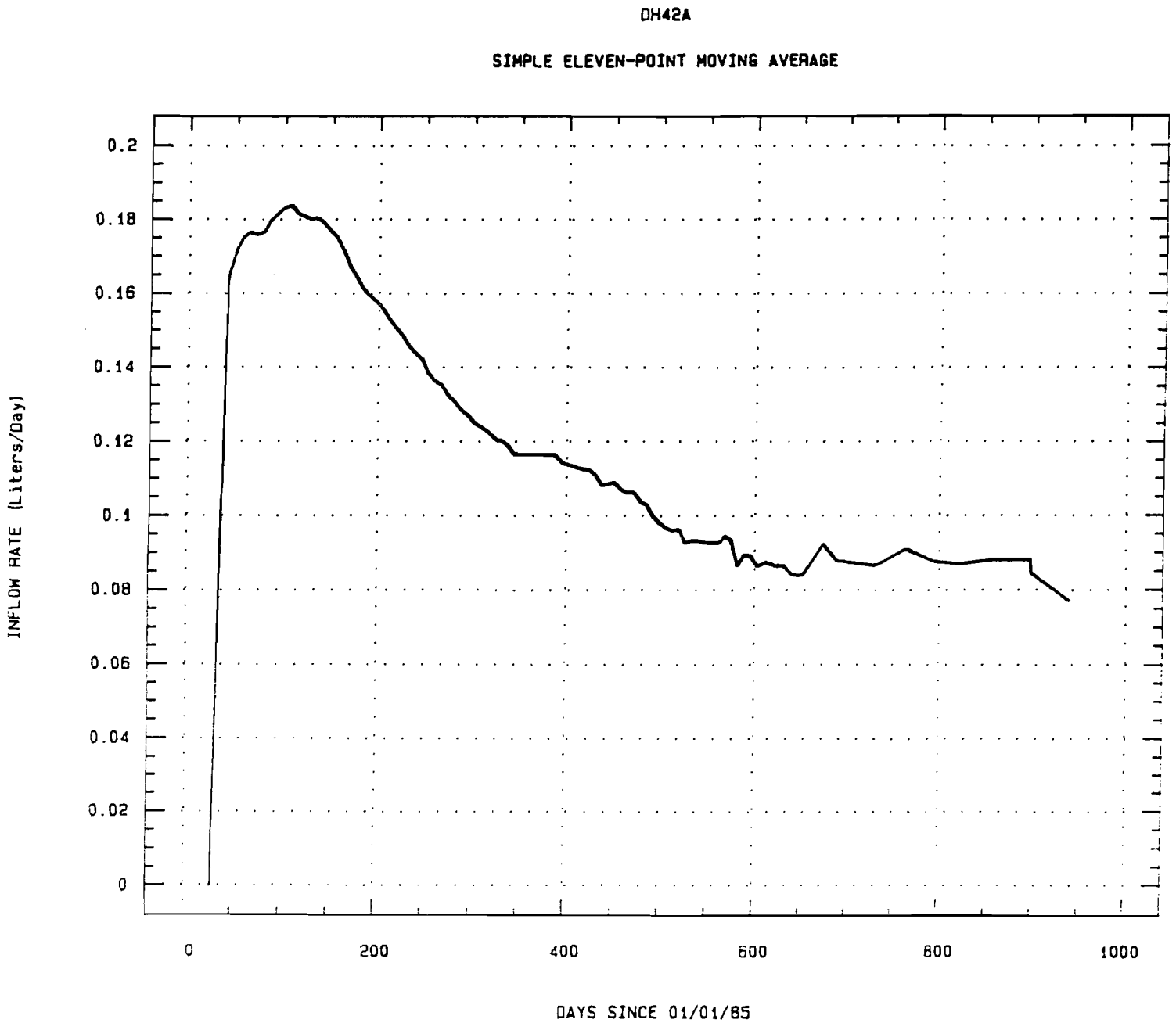


FIGURE B-14. DH42A Inflow Rates

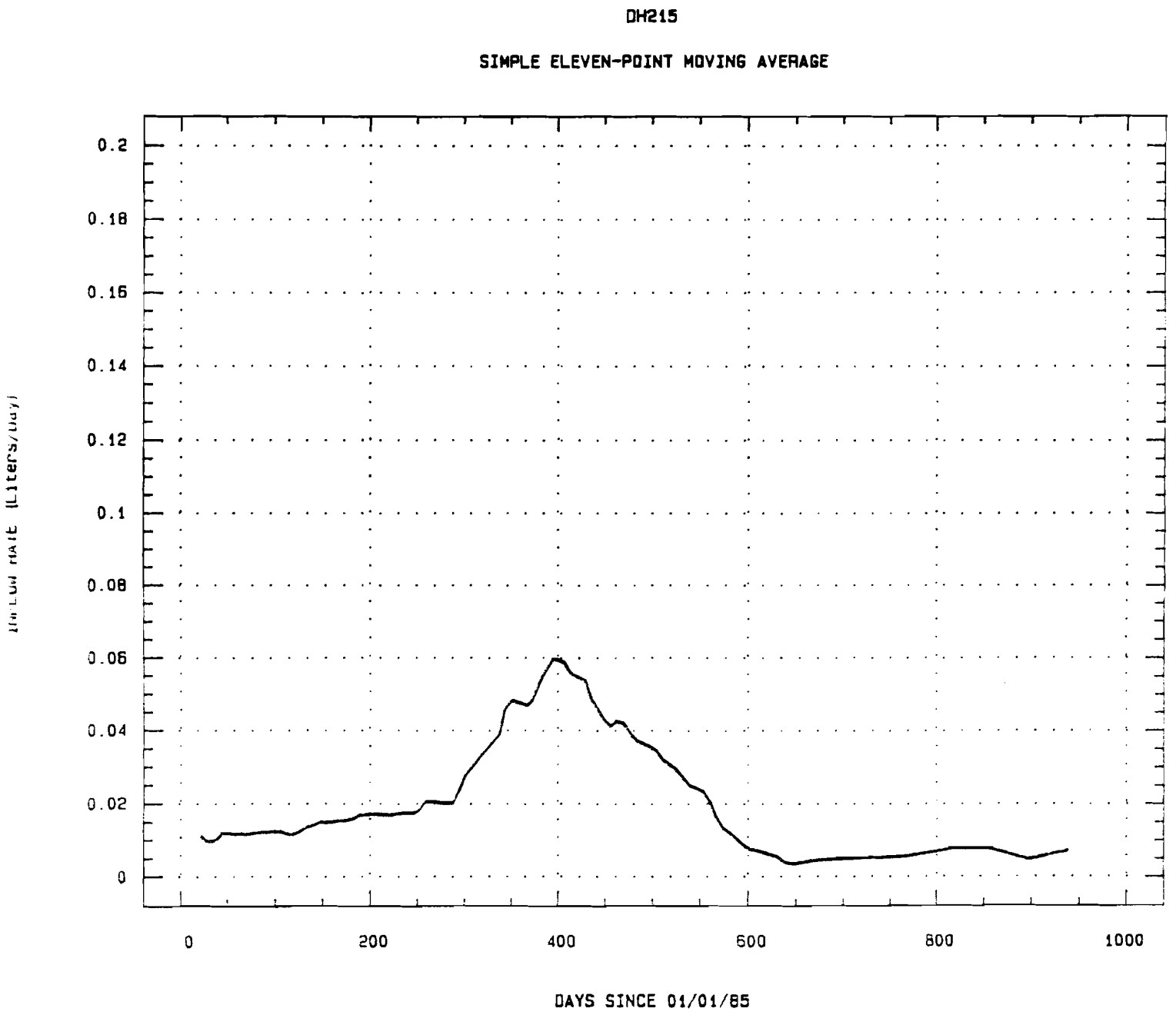


FIGURE B-15. DH215 Inflow Rates

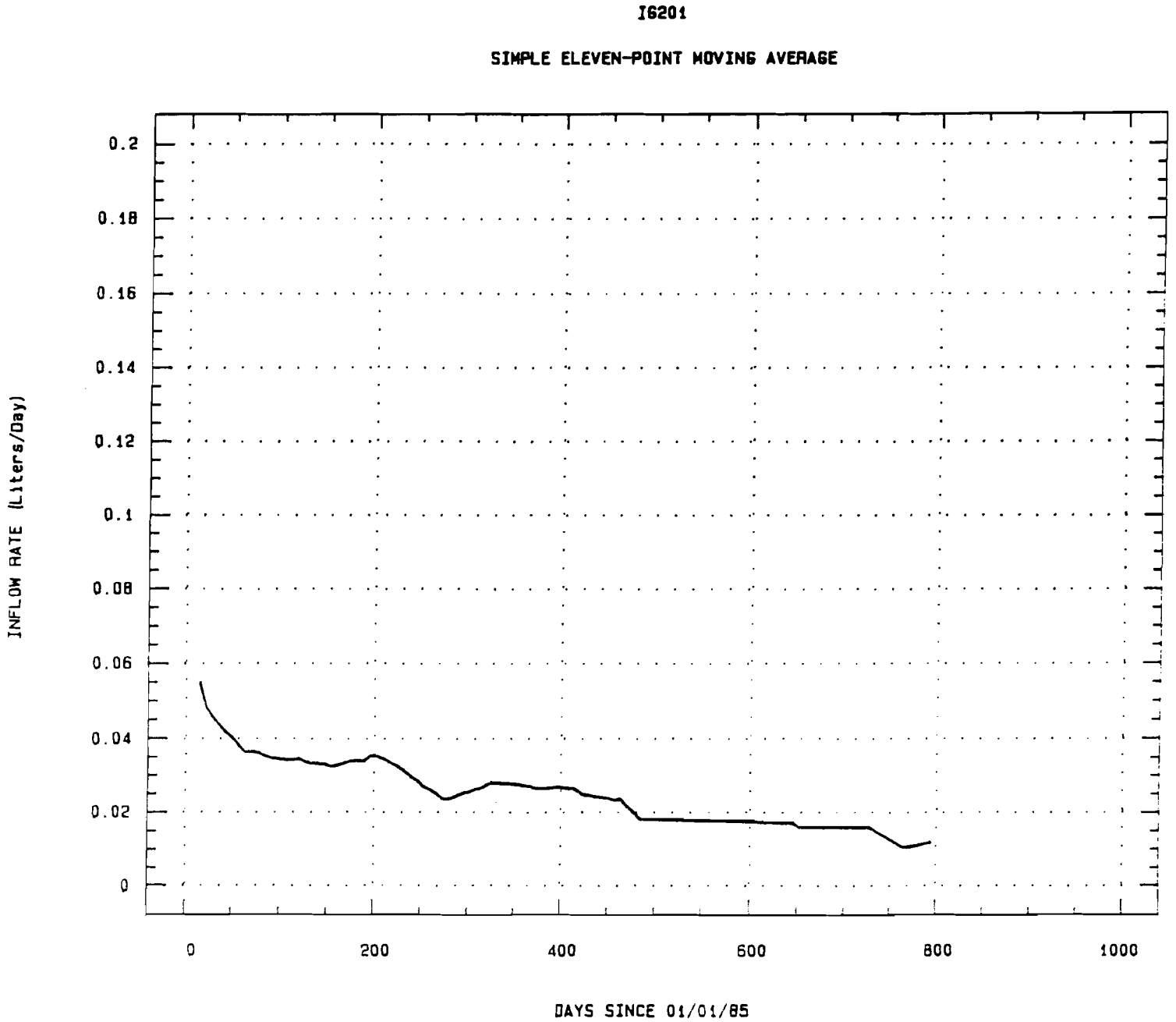


FIGURE B-16. IG201 Inflow Rates

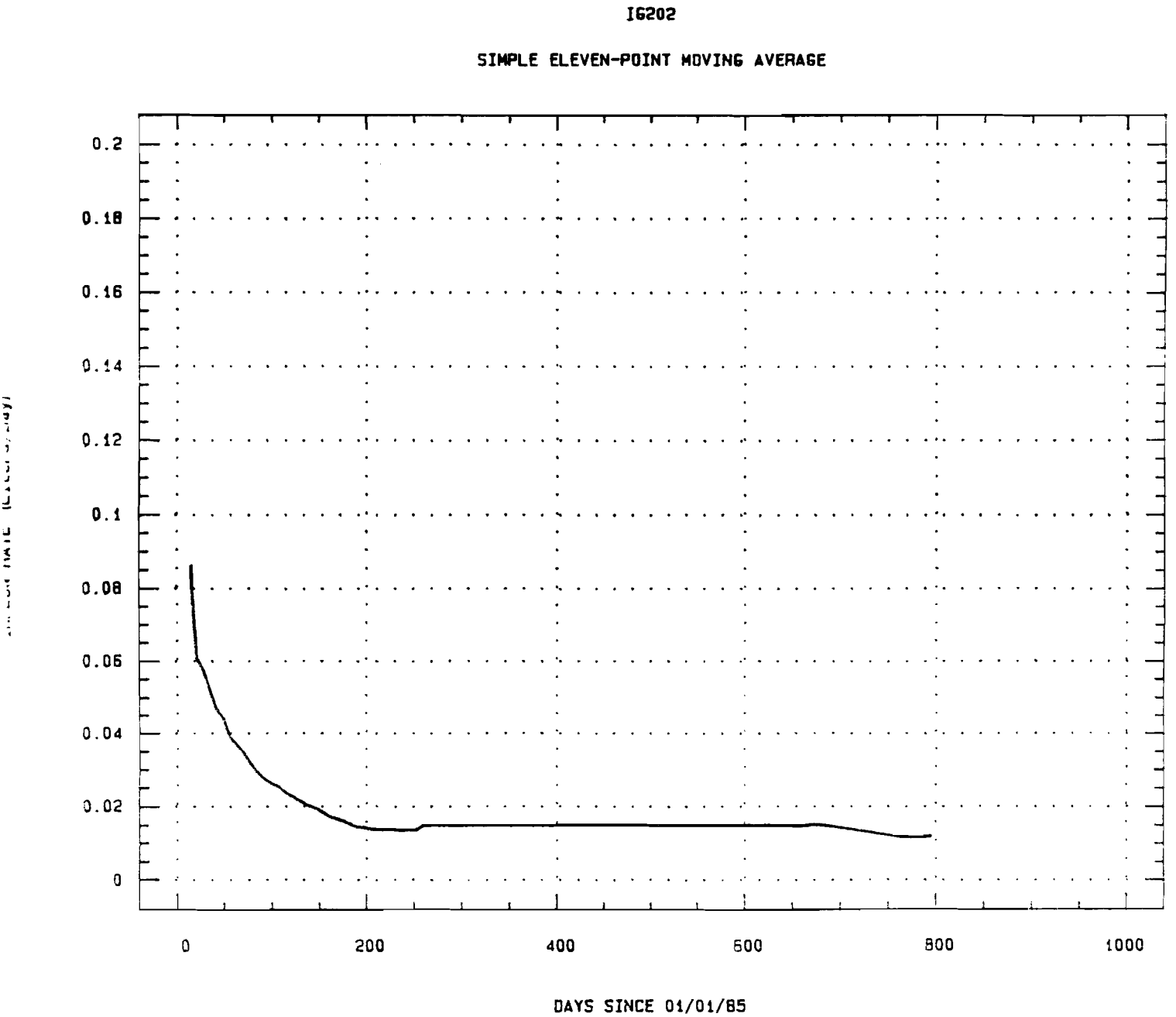


FIGURE B-17. IG202 Inflow Rates

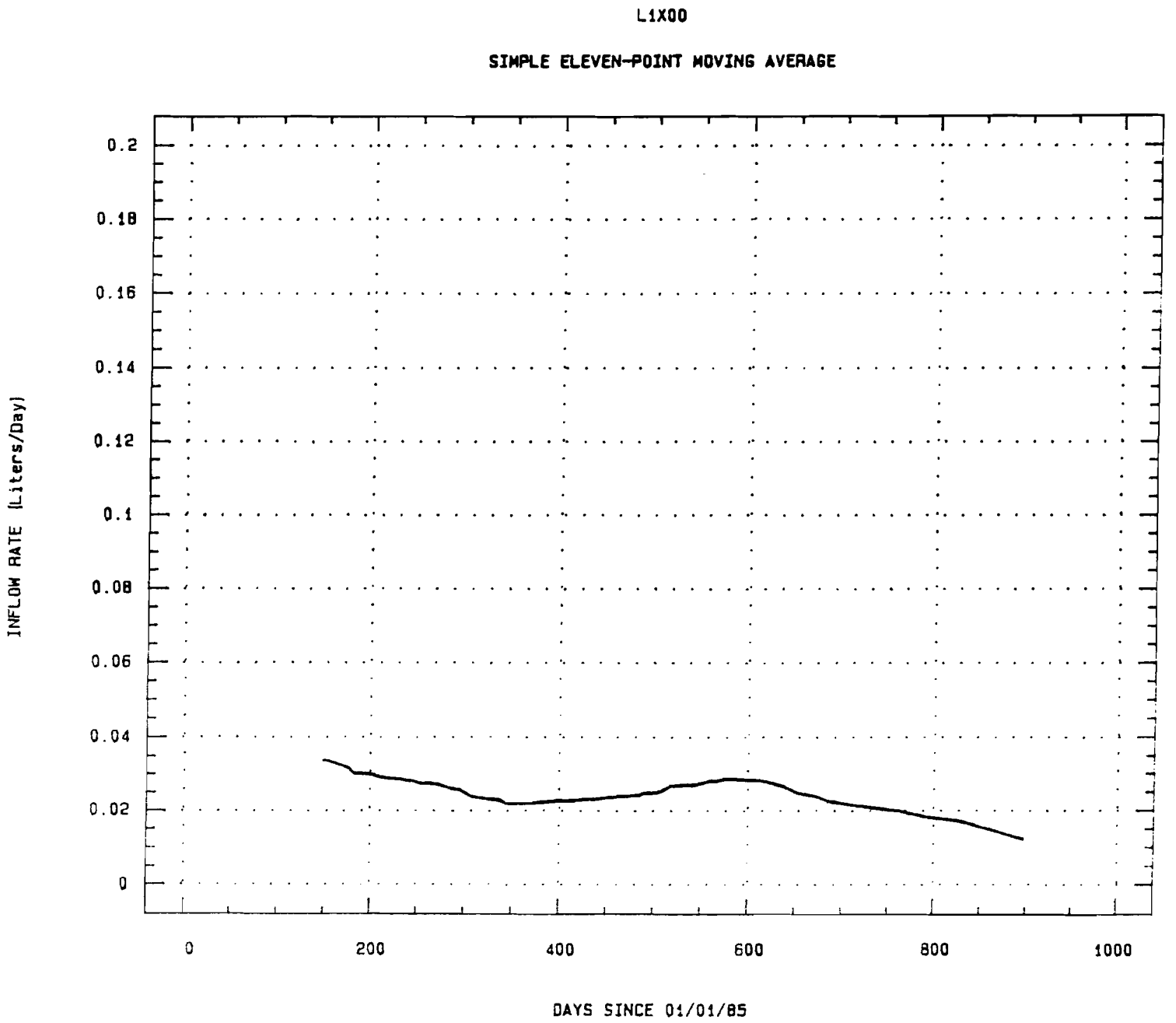


FIGURE B-18. L1X00 Inflow Rates

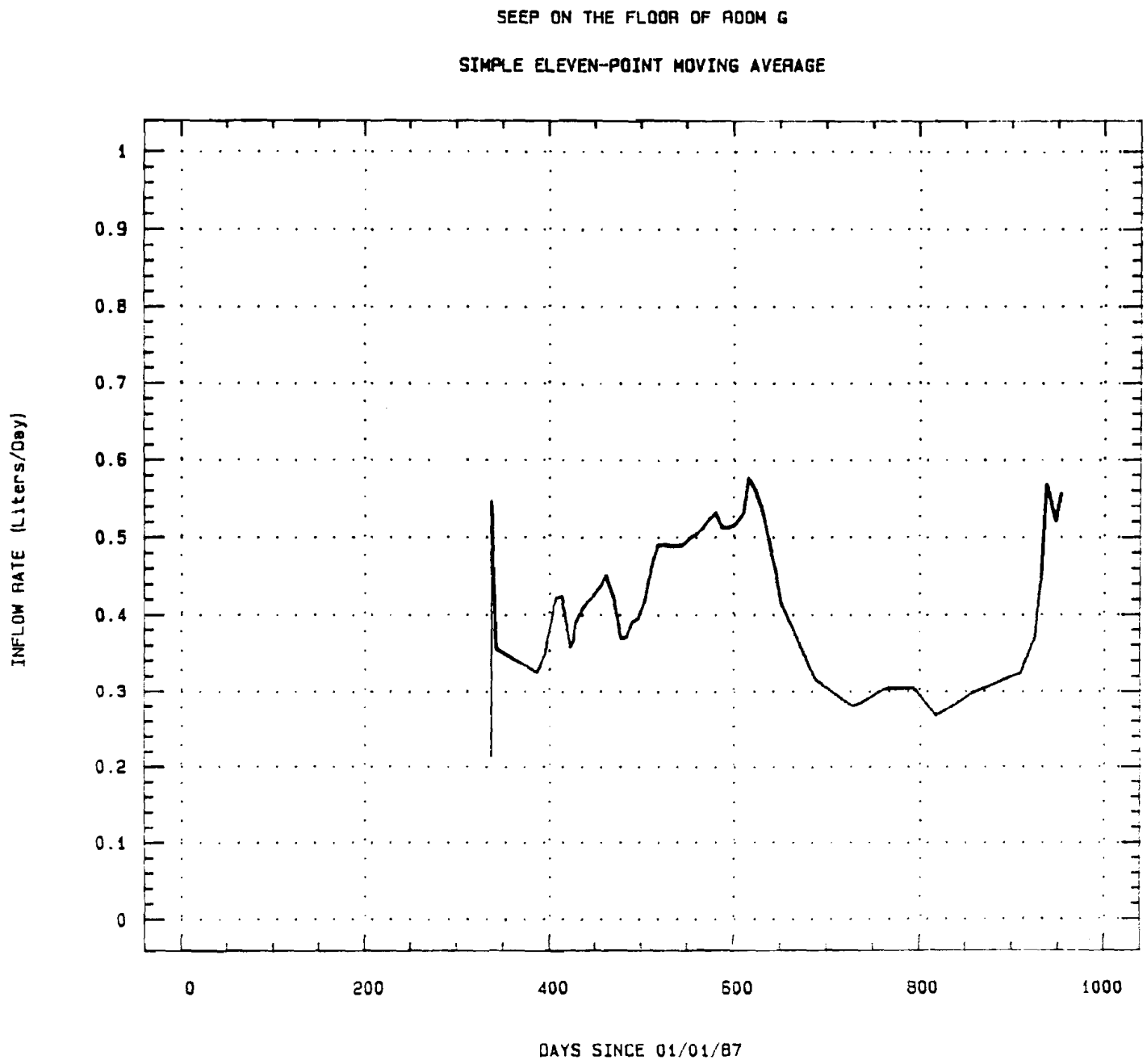


FIGURE B-19. Room G Floor Seep Inflow Rates

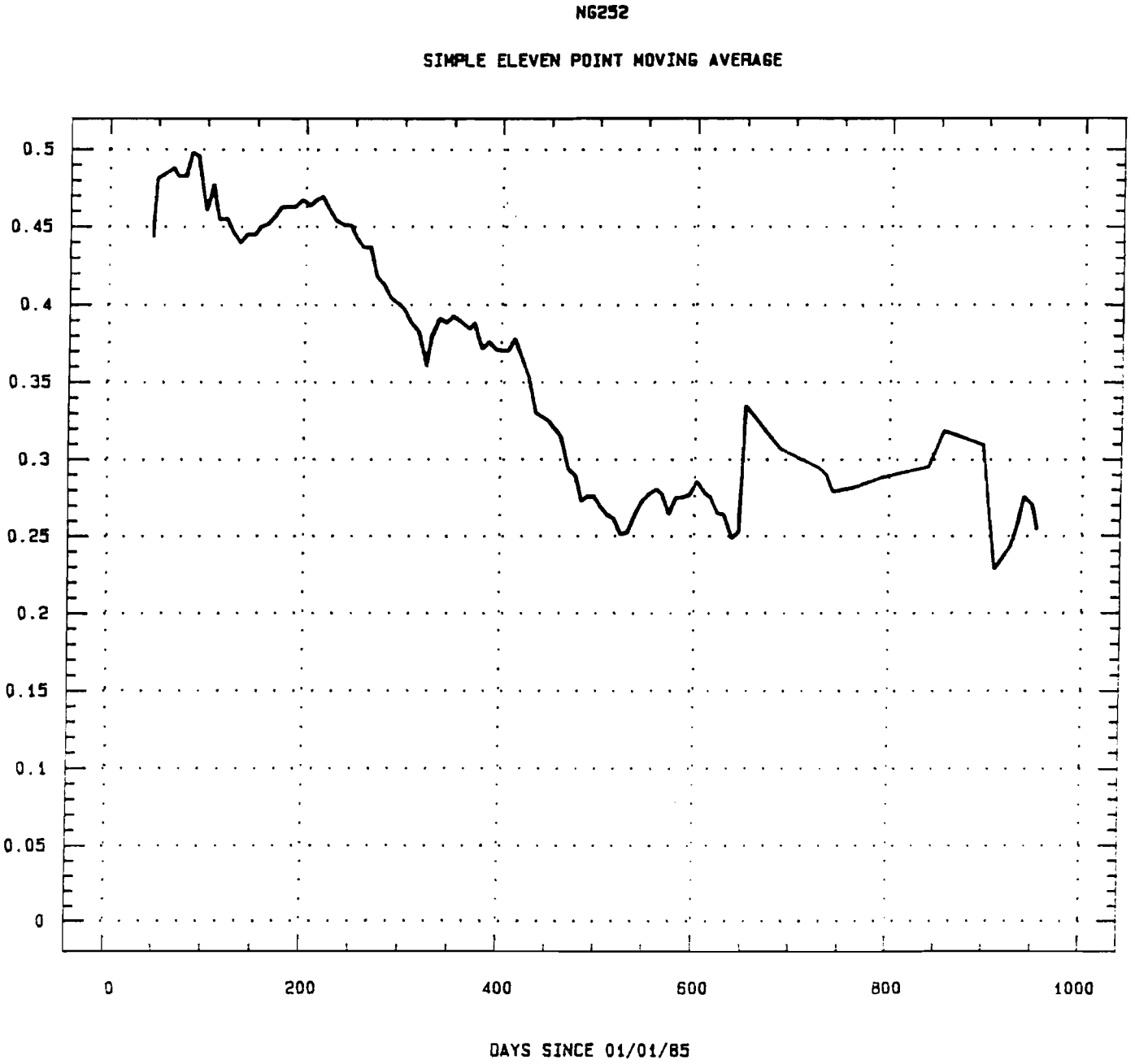


FIGURE B-20. NG252 Inflow Rates