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Report No. UT-12.18

I-15 RECONSTRUCTION LONG-TERM EMBANKMENT MONITORING STUDY – FINAL REPORT

Prepared For:

Utah Department of Transportation
Research Division

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May 2012

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TECHNICAL DOCUMENTATION PAGE

1. Report No. UT-12.18	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle I-15 RECONSTRUCTION LONG-TERM EMBANKMENT MONITORING STUDY – FINAL REPORT	5. Report Date May 2012 6. Performing Organization Code	
7. Author(s) Clifton B. Farnsworth, Steven F. Bartlett	8. Performing Organization Report No.	
9. Performing Organization Name and Address Department of Civil and Environmental Engineering University of Utah 110 Central Campus Drive, Suite 2000 Salt Lake City, Utah 84112	10. Work Unit No. 5H06615H 11. Contract No. 06-9156	
12. Sponsoring Agency Name and Address Utah Department of Transportation Research Division 4501 South 2700 West P.O. Box 148410 Salt Lake City, Utah 84114-8410	13. Type of Report and Period Covered Research from 1999 - 2011 14. Sponsoring Agency Code Project ID Code TB98.029a	

15. Supplementary Notes
Prepared in cooperation with the Utah Department of Transportation

16. Abstract
The I-15 Reconstruction Project in Salt Lake City, Utah required rapid embankment construction in an urban environment atop soft lacustrine soils. These soils are thick, highly compressible, have low shear strength and require significant time to complete primary consolidation settlement. Because of this, innovative embankment systems and foundation treatments were employed to complete construction within the approved budget and demanding schedule constraints. This final report completes a monitoring project that has provided a wealth of information about the behavior of these innovative geo-technologies for soft soil sites. It provides the final installation of a ten-year post construction monitoring project to evaluate the performance of the innovative embankment/foundation systems used on this project: (1) one-stage MSE wall over lime cement column treated foundation, (2) two-stage MSE wall with PV drain installation and surcharging, (3) expanded polystyrene (geofoam) embankment with tilt-up panel fascia walls, and (4) large earthen embankments, also with PV drain installation and surcharging. Long-term settlement monitoring has shown that the surcharging strategy used by the contractor has not always limited large MSE walls and earthen embankments to the 3 inches of post-construction settlement in a ten-year period. Some areas using these technologies have experienced about 6 inches of post-construction settlement. Geofoam embankments have met the internal creep strain tolerances established by the design. However, larger than anticipated foundation settlement measured at two locations shows that caution is warranted in both the design and construction of adjacent and overlying fill, so as not to induce unintentional settlement in the underlying foundation soil. The lime cement column technology has reduced the total settlement (i.e., construction and post-construction) to less than 10 inches in a 10-year period and the post-construction settlement to about 2.5 inches.

17. Key Words embankment settlement, lime cement columns, MSE walls, PV drains, expanded polystyrene, geofoam		18. Distribution Statement UDOT Research Division 4501 South 2700 West P.O. Box 148410 Salt Lake City, UT 84114-8410 www.udot.utah.gov/go/research		23. Registrant's Seal
19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. No. of Pages 207	22. Price	

UNIT CONVERSION FACTORS PAGE

1 ft = 0.3048 m	1 m = 39.37 in
1 lb / ft^2 = 47.88 Pa	1kPa = 20.89 lb / ft^2
1 lb / in^2 = 6.895 kPa	1 MPa = 145 lb / in^2

In most instances, the units reported within this report are in English. However, it should be noted that the I-15 Reconstruction Project was performed utilizing SI units, and some of the figures continue to be shown in their original format. It should also be noted that the instrumentation described within this report was obtained with a mixture of both SI and English as the principal units. For this reason, the units within the text of this report are typically listed as English (with SI immediately shown after in parenthesis). Common conversions necessary for units associated with this report are shown above.

ACKNOWLEDGMENTS

The authors would like to acknowledge and thank the UDOT Research Division for their long-term commitment and financial support to this research, the UDOT Geotechnical Group for their technical contributions as members of the technical advisory committee, and all others that have contributed in any manner throughout the duration of this project. This report represents the culmination of approximately 3 years of instrumentation installation and construction related monitoring and an additional 10 years of post-construction monitoring. Many individuals have helped with this project since its inception and it could have not been accomplished without the support and assistance of all who have continued to see this project through to the end.

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EXECUTIVE SUMMARY

The Utah Department of Transportation (UDOT), in conjunction with Wasatch Constructors, reconstructed a 17-mile segment of Interstate I-15 in Salt Lake Valley, Utah. As part of this $1.4 billion design-build project, several types of innovative foundation and embankment treatments were used to expedite construction of the roadway over the underlying soft clayey Lake Bonneville soils. To better understand the impacts of the innovative foundation and embankment treatments on the subsurface soils, the UDOT Research Division initiated a long-term monitoring project to evaluate the construction and post-construction settlement behavior. The four technologies evaluated during this study include two-stage mechanically stabilized earth (MSE) walls, lime cement column treated foundation soil, lightweight expanded polystyrene (geofoam) embankment, and the use of prefabricated vertical drains (PVD) and surcharging to minimize long-term creep settlement. The I-15 Reconstruction Project provides a good case history illustrating the challenges of constructing large embankments and MSE walls over soft soil sites in an urban setting. This report provides a summary of both the construction and 10-year post-construction results obtained during this monitoring project.

The long-term monitoring indicates that construction and post-construction settlement performance of each technology varied widely. Two-stage MSE walls with PV drains and surcharging created the most settlement impacts to adjacent facilities and produced the largest amount of post-construction settlement. Primary consolidation settlement during construction and surcharging at the face of a typical 2-stage MSE wall was approximately 3 ft (1 m) and the zone of significant settlement [i.e., 1 in (25 mm)] extended a distance of about 1.5 times the surcharged height of the wall (i.e., total height of wall including surcharge). Based on the ten-year monitoring results of post-construction settlements at 4 locales (1 MSE wall and 3 sloped embankments), the surcharging strategy used by the design-build team appears to have limited the 10-year post-construction settlement in the foundation soils to about 4 to 6 in (100 to 150 mm).

The lime cement column treated foundation system developed about 6 in (150 mm) of construction settlement due to the placement of the construction of the MSE wall, embankment and surcharge. An additional 2.5 in (64 mm) of post-construction settlement has been observed at the face of the MSE wall over the 10-year post construction monitoring period. Our monitoring shows that the south side of the adjacent building, which is located nearest to the MSE wall face, has undergone about 2.8 inches (71 mm) of construction and post-construction settlement in ten years resulting from the placement of the adjacent MSE wall. Survey points around this building show that the zone of significant settlement [i.e., 1 in (25 mm)] extends about 66 ft (20 m) from the wall face, or about 1.7 times the full height of the wall, including surcharge. Differential settlements across the adjacent building are about 2.6 inches (65 mm). Post-construction settlements remain within the design goal of no more than 3 inches (76 mm) of creep settlements over a 10-year post-construction period.

Geofoam embankments typically had the best overall settlement performance of the technologies monitored. Gap closure and deformation of the geofoam embankment due to placement of the load distribution slab and overlying roadway materials was about 1 percent of the embankment height, or about 3.1 in (80 mm) at our array locations. The trend of post-construction settlement suggests that geofoam embankments will most likely meet the 50-year post construction deformation limit of 1% axial strain. At the 3300 South Street geofoam array, the foundation soil settled about 0.6 in (15 mm) due to the placement of the embankment and overlying loads and the face of the embankment settled an additional 1.0 in (25 mm) in a 5-year period due to the placement of a 5 ft (1.5-m) toe berm at the toe of the fascia wall. At the other geofoam array (100 South Street), 7.5 inches (190 mm) of foundation movement has occurred over the monitoring period, a significant amount of foundation settlement with respect to the intent of using geofoam to greatly minimize foundation settlement. This site appears to have used an inaccurate estimate of the preconsolidation pressure during design leading to excessive post-construction settlement caused by the weight of borrow, base and pavement materials placed atop the geofoam at this locale.

The results of this project provide a practical comparison of the relative behavior of these three soft soil geotechnologies used in conjunction with highway embankment construction. When considering only time of construction, EPS geofoam provided a significant advantage by eliminating any of the time associated with subsurface consolidation settlement. When considering only relative cost of construction, EPS geofoam and LCC construction were approximately 1.2 and 1.6 times the cost of two-stage MSE wall construction, which in turn is more expensive than a standard side-sloped large-earthen embankment. Considering relative construction settlement, two-stage MSE walls exhibited an excess of 3 ft (1 m) of construction related settlement, while the LCC construction lessened this value to about 6 inches (150 mm) and the EPS geofoam virtually eliminated all construction related subsurface settlement. Post-construction settlement at the large earthen embankment and two-stage MSE wall locations exceeded the design goal of 3 inches over a ten-year post-construction period. This suggests that designers should carefully reevaluate the surcharging and settlement scheme used on the I-15 reconstruction in limiting post-construction settlement prior to using a similar scheme on future projects. Surprisingly, secondary settlement at the EPS geofoam locations has been larger than anticipated and suggests that designers be cautious in applying stress levels that approach the preconsolidation pressure of the soft subsurface material. The results of this project, in context of relative time of construction, cost, and associated construction and post-construction settlement behavior, should continue to be considered in the design and selection process of utilizing the different geotechnologies on future projects.

1.0 INTRODUCTION

1.1 Project Background

The Utah Department of Transportation (UDOT), in conjunction with Wasatch Constructors, reconstructed a 17-mile portion of Interstate I-15 in Salt Lake City, Utah. As part of this $1.4 billion design-build project, several types of innovative foundation and embankment treatments were used to expedite construction of the roadway over the underlying soft clayey Lake Bonneville soils. To better understand the impacts of the innovative foundation and embankment treatments on the subsurface soils, the UDOT Research Division initiated a long-term monitoring project to evaluate the construction and post-construction settlement behavior. The four technologies evaluated during this study include: (1) two-stage MSE walls with surcharging and prefabricated vertical drains (PVD) foundation treatment, (2) one-stage MSE wall with lime cement column treated foundation and surcharging, (3) lightweight expanded polystyrene (geofoam) embankment with no foundation treatment, (4) conventional sloped embankment with staged embankment construction, surcharging and PVD foundation treatment.

The monitoring study was initiated in the summer of 1998, essentially at the mid-point of the four-year reconstruction project and was done in conjunction with the I-15 National Test Bed Program funded, in part, by the Federal Highway Administration (FHWA). The reconstruction of a major interstate in an urban environment provided a unique opportunity to answer questions regarding the innovative processes, techniques, designs and materials relating to the new construction technologies (Musser, 1999). During construction, a total of twelve different instrumentation arrays were installed throughout the I-15 corridor by the UDOT Research Division. Monitoring of the instrumentation arrays commenced during construction and continued for an approximate ten-year post-construction time period, which was sponsored by UDOT and overseen by a research contract administered by the University of Utah. Additional information regarding the design and construction of the instrumentation arrays and monitoring procedures can be found in Bartlett and Farnsworth (2004). This document serves as the final summary report for the monitoring and evaluations and primarily summarizes the long-term data compilation efforts of this program.

1.2 Project Scope

Rapid construction of relatively high MSE walls and sloped embankments over soft foundation soils can be challenging in an urban setting because special care must be taken to ensure that primary consolidation and post-construction secondary settlements do not damage roadway, bridges, adjacent structures and underlying utilities. In many instances, this means that methods to minimize the amount of construction and post-construction settlement must be employed. This can be accomplished either by using a smaller loading condition via light-weight fill or by improving the foundation conditions to withstand the required load via soil improvement. In either case, the ultimate goal is to reduce the potential settlement to acceptable levels so that it does not impact the function of the interstate or nearby facilities. Furthermore, contracting and construction methods that accelerate the construction process are sought to reduce the total project construction time. The I-15 embankment monitoring program was established as a case-history to better understand the settlement behavior of the Lake Bonneville clay and underlying clayey soils resulting from the innovative embankment construction techniques utilized on the project.

The subsurface soils of concern for this project consisted of compressible, fine-grained, lacustrine soils deposited by Pleistocene-age Lake Bonneville and earlier Pleistocene lake cycles. These Lake Bonneville sediments are approximately 50 ft (15 m) thick (shown in Figure 1-1 from ~ 6 m to 21 m) and consist of inter-bedded silty clay and clayey silt (CL, ML), plastic clays and silts (CH, MH), and fine clayey and silty sands (SC, SM), which are lightly overconsolidated (OCR $\approx$ 1.5). Interbedded, subaqueous silts, fine sands and low plasticity clays are found in the middle of the Lake Bonneville sediments and separate the upper and lower Lake Bonneville silty clays (Figure 1-1). These upper and lower clay units are relatively compressible [compression ratio from about 0.1 to 0.35], have relatively low undrained shear strength [0.5 to 1.0 ksf (25 to 50 kPa)] and require substantial time to complete primary consolidation (1 to 3 years).

Settlement records from the initial construction of I-15 in the Salt Lake Valley during the 1960’s show that a typical 26 to 33 ft (8 to 10-m) high embankment underwent 3 to 5 ft (1 to 1.5 m) of primary consolidation settlement over a 2 to 3 year period. An example

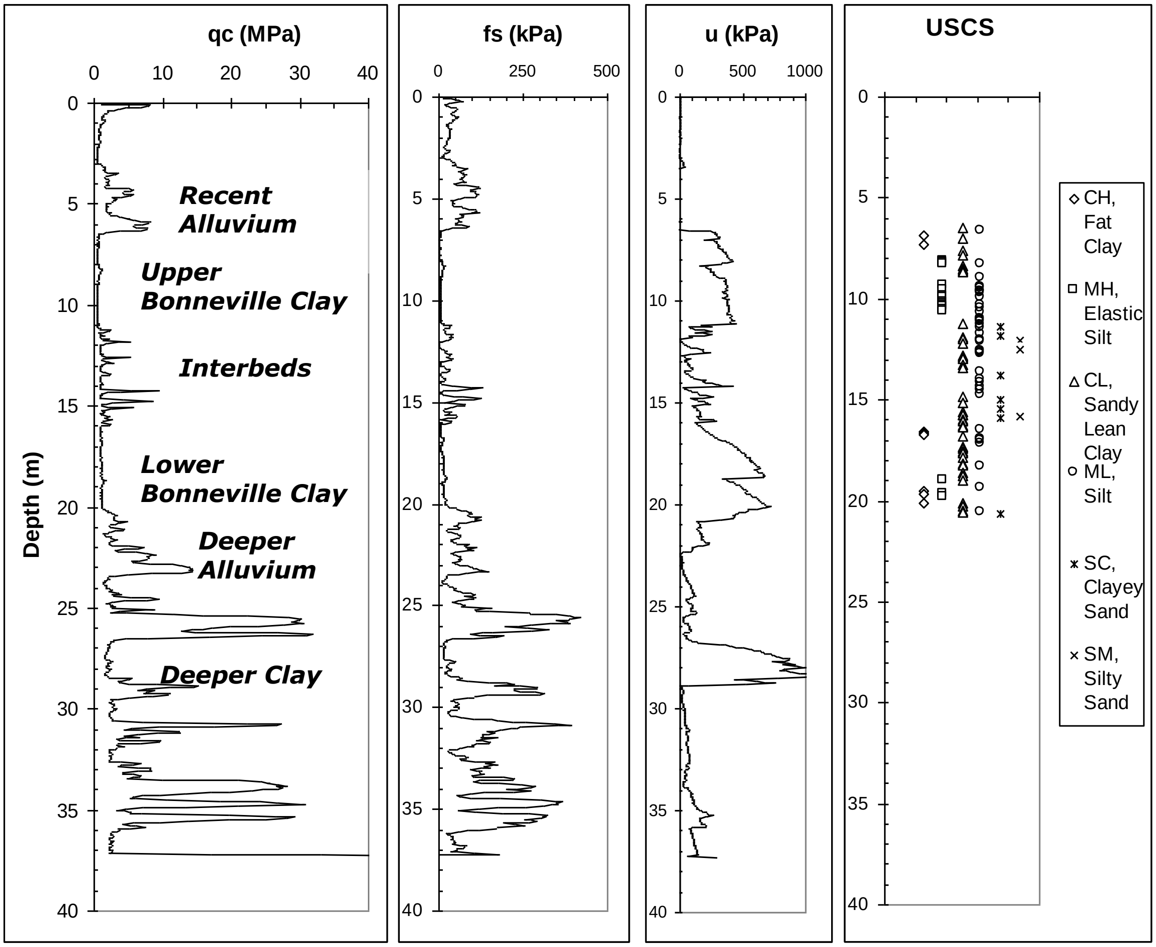

Figure 1-1. Typical cone penetrometer (CPT) log and soil descriptions for downtown segment of I-15 Reconstruction Project, Salt Lake City, Utah.

settlement record from the original 1960s construction of I-15 is shown in Figure 1-2, for an embankment constructed over the typical soil conditions represented in Figure 1-1. In this record fill placement was performed in multiple stages to reach the peak loading condition, and then the corresponding primary settlement occurred prior to removal of the surcharge. These large magnitudes of settlement and long consolidation settlement durations can be attributed to primary consolidation of the soft and relatively thick compressible Lake Bonneville sediments and underlying clay layers. Unfortunately, the fast-paced reconstruction of I-15 from 1998 through 2001 could not accommodate these rather lengthy primary consolidation settlement durations. Thus, innovative technologies and construction methods were needed to either minimize settlement (i.e. maintain the newly applied stresses within the recompression range) or to accelerate the time required

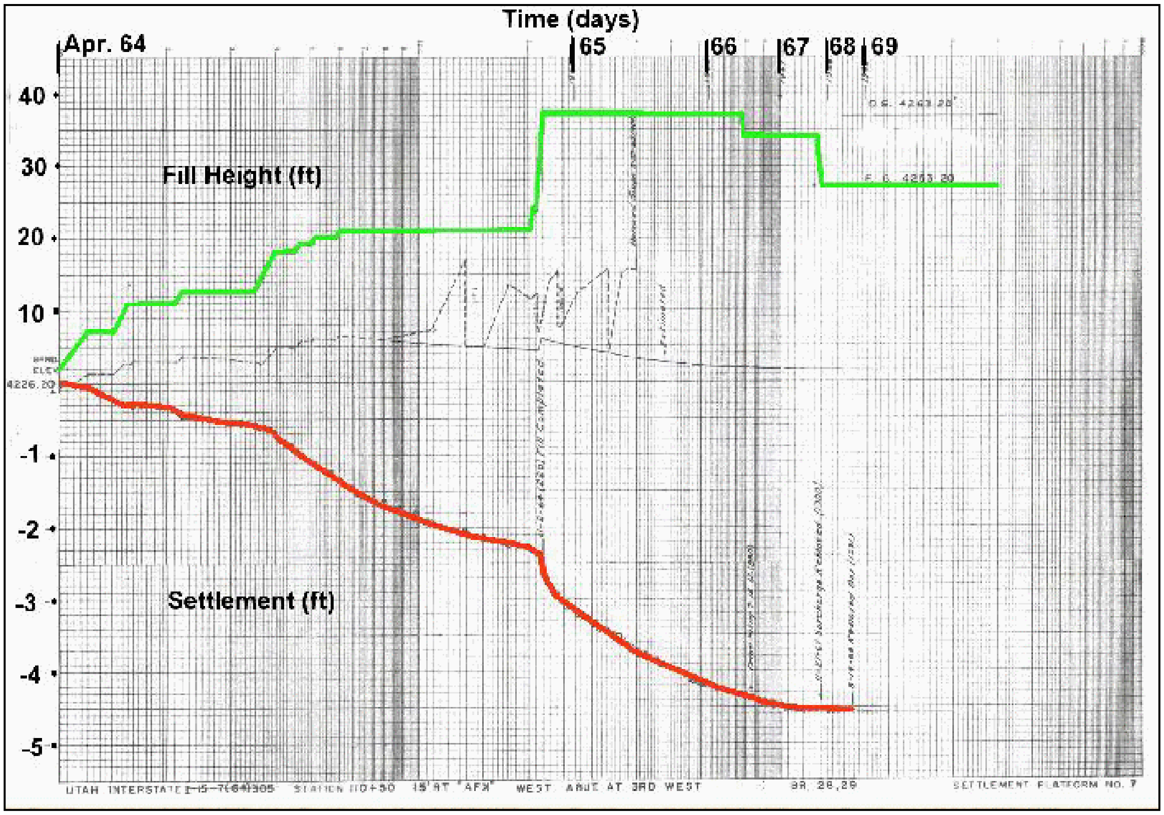

Figure 1-2. Typical settlement record from the 1960s construction of I-15 in the downtown area of Salt Lake City, Utah, 1300 South Street.

for primary consolidation so that it occurred within a 6 to 12 month time frame, so that bridge construction and paving operations could proceed on-schedule The embankment monitoring program was established to enhance UDOT's understanding of these innovative technologies associated with minimizing the impacts of time and magnitude of primary consolidation settlement and also in reducing the amount of long-term (i.e., creep) settlement behavior.

The I-15 Reconstruction Project utilized three basic approaches for addressing the anticipated magnitude of settlement resulting from the soft, compressible foundation soils that were prevalent beneath much of the project in the downtown area. The first and most widely utilized approach was to use surcharging in conjunction with two-staged mechanically stabilized earth (MSE) walls and/or earthen embankments where the foundation soils had been pre-treated with the installation of prefabricated vertical (PV) drain to depths of about 20 to 25 m. (A two-stage MSE wall consists of constructing the wall with a welded-wire face (first stage) followed by the attachment of concrete panel to the welded-wire face once primary consolidation is completed (second stage).) The second approach was to minimize any potential foundation settlement by using geofoam as an extremely light-weight fill, thus significantly reducing the loading condition imposed on the foundation soils by the embankment. The third approach involved improving the foundation soils by installing lime cement columns prior to placing a one-stage MSE wall, thus reducing the magnitude of settlement within the stiffened foundation soils. (A one-stage MSE wall consists of constructing the wall by connecting the horizontal reinforcing straps directly to concrete panels that form the finished face.)

1.3 Monitoring Program Objectives

The overall purpose of the program was to evaluate the construction and long-term (i.e., 10-year) settlement performance of different foundation treatment and embankment systems used on the I-15 reconstruction project. Four different “geo-technologies” are evaluated in this report:

1. Lime Cement Columns
2. Two-stage MSE walls with PV drains and surcharging
3. Geofoam embankment fill
4. Large earthen embankments with PV drains and surcharging

The data gathered during this study has been used to validate the geotechnical design and construction used for the I-15 Reconstruction Project and to improve the state-of-practice, as necessary. This information is beneficial for future projects constructed on similar lacustrine and soft clayey deposits along the Wasatch Front. The specific objectives for this program as described in this final report include:

1. Gathering field performance data during the construction and post-construction periods
2. Comparing the performance data against the design performance goals and/or design criteria
3. Assessing the adequacy of the design in meeting the design-build performance goals/criteria
4. Recommending to UDOT any modification of or enhancements to the design methods for use on other projects with similar conditions.

1.4 Summary of Program Publications

This final report is the last technical report of a number of publications related to this technology monitoring program. The following list summarizes the associated publications that have been generated throughout the duration of this long-term research project as a direct result of measurements and observation contained herein or as part of the contract deliverables associated with the research. The reference section contains a complete listing for each.

1.4.1 UDOT Research Reports

- Report No. UT-03.11. Instrumentation and Installation Scheme of a Mechanically Stabilized Earth Wall on I-15 with Results of Wall and Foundation Behavior. (Bay et. al.)

- Report No. UT-03.14. Factors Affecting Sample Disturbance in Bonneville Clays. (Bay et. al)

- Report No. UT-03.17. Geofoam Fill Performance Monitoring. (Negussey and Stuedlein)

- Report No. UT-03.20. Estimation of Preconsolidation Stress and Compression Ratio from Field and Laboratory Measurements from the I-15 Reconstruction Project, Salt Lake City, Utah. (Bartlett and Alcorn)

- Report No. UT-04.09. Analytical Modeling of MSE Wall at I-15 and 3600 South. (Bay et. al.)

- Report No. UT-04.18. Numerical Modeling of Settlement Behavior of Treated and Untreated Soils Underlying MSE Walls for the I-15 Reconstruction Project, Salt Lake City, Utah. (Cline and Bartlett)

- Report No. UT-04.19. Monitoring and Modeling of Innovative Foundation Treatment and Embankment Construction Used on the I-15 Reconstruction Project, Project Management Plan and Instrument Installation Report. (Bartlett and Farnsworth)

- Report No. UT-04.20. Estimation of Consolidation Properties from In-Situ and Laboratory Testing. (Bartlett and Ozer)

- Report No. UT-04.28. Estimation of Compression Properties of Clayey Soils, Salt Lake Valley, Utah. (Bartlett and Lee)

- Report No. UT-08.05. Evaluation of Rapid Construction and Settlement of Embankment Systems on Soft Foundation Soils. (Farnsworth and Bartlett)

- Report No. UT-08.11. Evaluation of Methods for Determining Horizontal Drainage Properties of Soft Clayey Soils. (Farnsworth and Bartlett)

- Report pending / in review. Design and Evaluation of Geofoam Embankments for the I-15 Reconstruction Project, Salt Lake City, Utah. (Bartlett et. al.)

- Report pending / in review. Estimation of Liquefaction-Induced Lateral Spread from Numerical Modeling and its Application. (Bartlett et. al.)

- Report pending / in review. Hyperbolic Model Parameters and Settlement Modeling for the I-15 Reconstruction Project. (Bartlett et. al.)

1.4.2 Journal Articles

- ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vol. 134, No. 3. Rapid Construction and Settlement Behavior of Innovative Embankment Systems on Soft Foundation Soils. (Farnsworth et. al.)

- ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vol. 136, No. 2. Numerical Modeling of Geofoam Embankments. (Newman et. al.)

- Transportation Research Record, 1808. Performance of Lime Cement Stabilized Soils for the I-15 Reconstruction Project, Salt Lake City, Utah. (Bartlett and Farnsworth)

1.4.3 Conference Papers

- Proceedings of the 3rd International Geofoam Conference. Instrumentation and Long-Term Monitoring of Geofoam Embankments, I-15 Reconstruction Project, Salt Lake City, Utah. (Bartlett et. al.)

- Proceedings of the 3rd International Geofoam Conference. Performance of a Geofoam Embankment at 100 South, I-15 Reconstruction Project, Salt Lake City, Utah. (Negussey et. al.)

- Proceedings of the 4th International Geofoam Conference. Construction and Long-Term Performance of Transportation Infrastructure Constructed Using EPS Geofoam on Soft Soil Sites in Salt Lake Valley, Utah. (Bartlett et. al.)

- Bartlett, S. F. and Lawton E. C., 2008, "Evaluating the Seismic Stability and Performance of Freestanding Geofoam Embankment," (Bartlett and Lawton)

- Proceedings of the TRB Annual Meetings. Long-Term Instrumentation Program to Monitor Various Geotechnologies Used on I-15 Reconstruction Project, Salt Lake City, Utah. (Farnsworth and Bartlett)

1.5 Content of Final Report

The following briefly explains how this report is organized:

Chapter 1 provides a brief introduction and explains the background, scope, and objectives of the monitoring program.

Chapter 2 includes an overview of the project instrumentation arrays and general considerations for running a long-term instrumentation program.

Chapter 3 identifies the data gathering methodologies, purpose for monitoring each of the different geo-technologies, and specific objectives of the instrumentation arrays. (Note that raw data and general data figures can be found in the appendix.)

Chapter 4 contains the interpreted data results for the long-term instrumentation for each of the different geo-technologies. Graphical results are the primary means of expressing this data.

Chapter 5 lists the primary conclusions that have been discovered during this research project. Recommendation for application of these geo-technologies is also provided.

Chapter 6 provides a quick summary of how the results of this project are expected to be implemented.

2.0 RESEARCH METHODS

2.1 Instrumentation Arrays

To properly evaluate the construction and long-term performance of the selected geo-technologies, twelve different locations were instrumented and monitored (See Table 2-1). For sites where accessibility and timing allowed, the instrumentation was installed during construction so construction behavior could be observed. However, all array locations were instrumented with the intention of monitoring the long-term behavior. The instrumentation arrays for this project consisted of various combinations of horizontal inclinometers, magnet extensometers, pressure cells, settlement manometers, and settlement points. For more detailed information about each of these types of instrumentation including the purpose, installation procedures, appropriate reading techniques, operation, common problems, and general care refer to the Project Installation Report (Bartlett and Farnsworth, 2004). Additional information pertaining to the construction related practices and procedures for each technology type can be found in the Project Installation Report and throughout the other referenced publications.

Table 2-1. Instrumentation arrays for the I-15 embankment monitoring project.

Technology Type	Array Name	Array No.
Lime Cement Columns	LCC	#1 (Fig. 2-2)
MSE Walls	2nd South	#2 (Fig. 2-1)
	35th South	#3 (Fig. 2-3)
Geofoam	1st South	#4 (Fig. 2-1)
	SS-07	#5 (Fig. 2-2)
	SS-05	#6 (Fig. 2-2)
	33rd South	#7 (Fig. 2-3)
Large Earthen Embankments	4th South	#8 (Fig. 2-1)
	9th West	#9 (Fig. 2-2)
	I-15 Mainline	#10 (Fig. 2-2)
	I-15 Merger	#11 (Fig. 2-2)
	Provo	#12 (Fig. 2-4)

Table 2-1 identifies the embankment monitoring instrumentation arrays installed for each of the four studied technologies. The array names shown in this table are simply the project reference names utilized by the research project team. Locations of the instrumentation arrays were selected based on accessibility, long-term security of the instrumentation, safety of the project team members while reading the arrays, geometry of interstate embankments, and representative soil conditions (see Project Installation Report (Bartlett and Farnsworth, 2004)). Figures 2-1 through 2-4 show the geographical locations for each array. It should be noted that most sites are found near the northern part of the I-15 Reconstruction Project (3500 South Street and northward) where softer, compressible soils prevail. However, an additional array was installed at the University Avenue interchange in Provo, Utah due to its similar soft soil characteristics. Although not part of the I-15 Reconstruction Project through Salt Lake Valley, this dataset was gathered as part of this program and is subsequently reported within this document. Plan sheets showing the layout and specific location of all array instrumentation can be found in Appendix C of the Project Installation Report (Bartlett and Farnsworth, 2004).

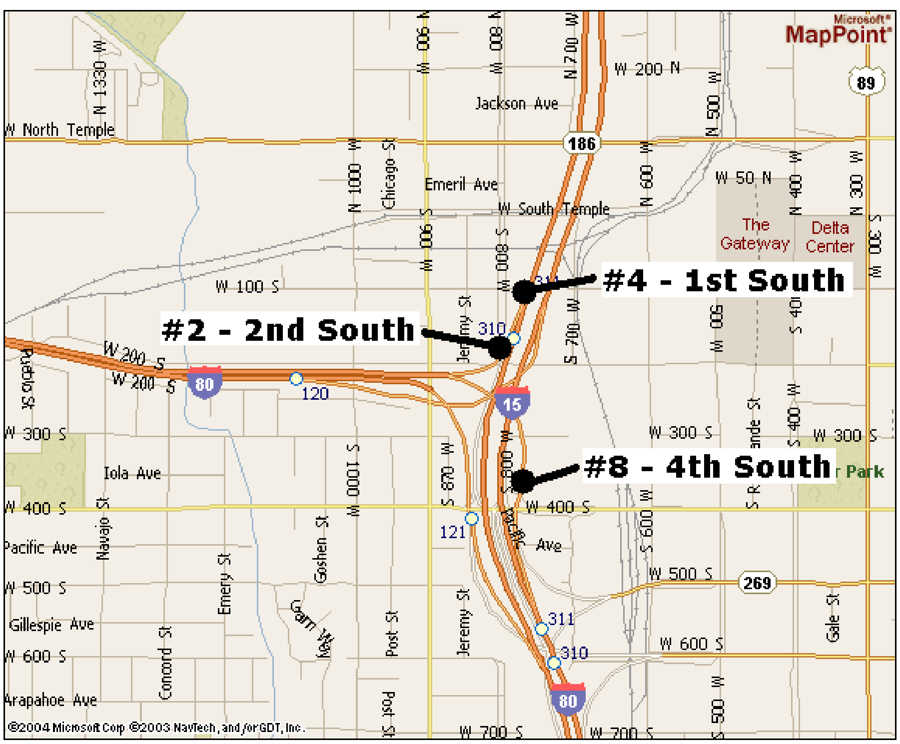

Figure 2-1. Northern Salt Lake City instrumentation arrays.

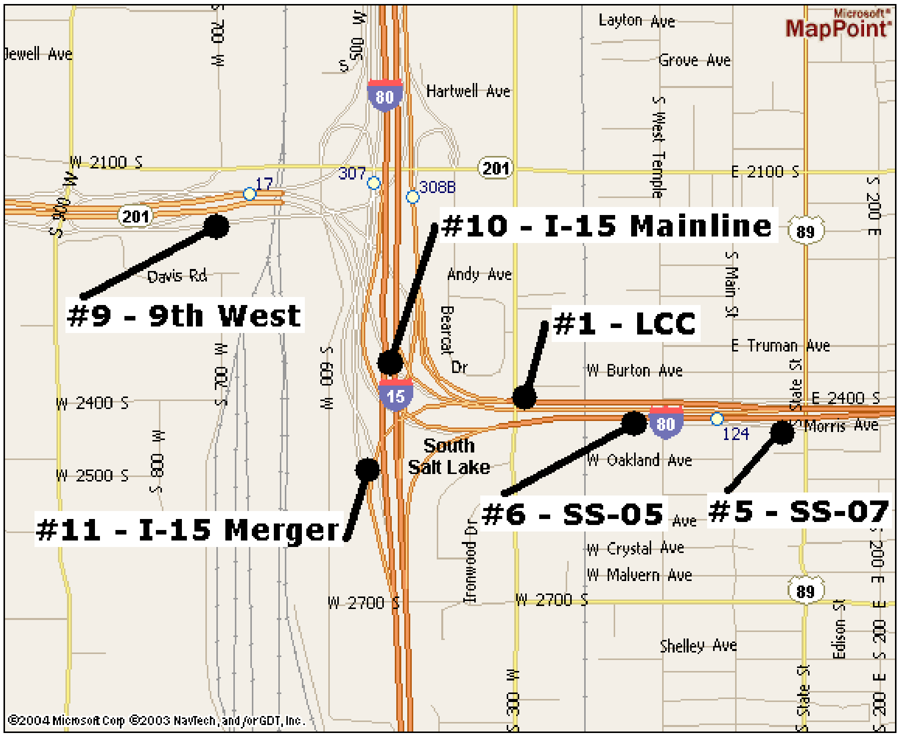

Figure 2-2. Central Salt Lake City instrumentation arrays.

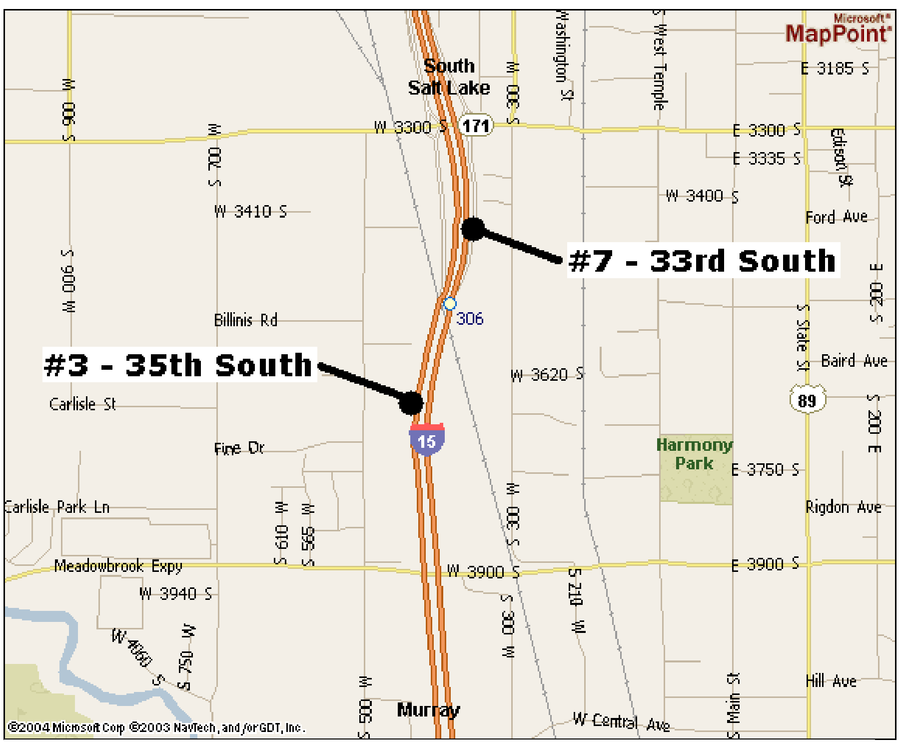

Figure 2-3. Southern Salt Lake City instrumentation arrays.

Figure 2-4. Provo instrumentation array.

2.2 Project Team

The embankment monitoring project originally began as an UDOT Research Division in-house study being performed by UDOT personnel. As the scope of work expanded, additional groups were brought in to perform various aspects of the research relating to their areas of expertise. Project management duties, including reading and interpretation of most of the arrays, was later contracted to the Civil and Environmental Engineering Department of the University of Utah, where management of the project has occurred since 2001. Other organizations had contractual obligations to fulfill associated tasks within the overall monitoring project. The Geofoam Research Center at Syracuse University assisted with the installation of initial instrumentation of the Geofoam arrays as well as interpretation and reporting of the associated construction related data. The Civil and Environmental Engineering Department from Utah State University also instrumented an MSE wall array and was involved with monitoring and interpreting that data early on during the project. Generally speaking, the project in its entirety has been managed and performed by the authors of this report. In addition to those listed above, a number of undergraduate and graduate students, UDOT personnel, and others have assisted with the gathering of data, interpretation of results, and presentation of publication materials during the duration of the program.

2.3 Considerations for Long-Term Instrumentation Program

There are many considerations that must be taken into account when beginning a long-term instrumentation program. Although the primary objective of the program was to evaluate the long-term behavior of innovative geo-technologies, the project also serves as a case history for performing a long-term monitoring project. This section is intended to capture some of the considerations that were addressed during the monitoring for potential utilization or reference for future, similar programs. Like any other general program, there must be a balance established between scope, schedule, and the budgeted resources.

The following are examples of the types of questions surrounding the project scope that should be addressed during the planning process of the project:

- What does one need to learn about the system and its performance?
- What types of instrumentation are available to provide this information?
- Will the selected instrumentation provide both the desired level of accuracy and precision?
- Is there a site or location where the selected instrumentation can be accommodated and effectively used?
- Will the instrumentation layout meet the overall monitoring objectives?

Of course, the program scope must be balanced with the budgeted resources. The following questions are examples of the types of issues surrounding the project budget that should be addressed during the planning process of the project:

- How much funding is available?
- Will it be available for multiple years?
- How much of the funding will be needed for installation; how much will be needed to be carried forward for reading and maintaining the arrays?

- What type of instrumentation can the program afford and what is its price?
- At which locations will the funding best be spent to achieve project objectives?
- Will certain types and amounts of instrumentation save the project money when installed and monitored during construction?

Additional considerations to be taken into account include:

- How will the instrumentation be protected from construction related activities once it is installed?
- Will the instrumentation be accessible once construction is complete?
- What precautions are needed to ensure that the field technician(s) remain safe from traffic during reading the arrays?
- How will the instrumentation be protected and maintained for long-term reading?

Finally, there are staffing considerations that have to be taken into account. These include:

- Who is going to collect the data?
- Who is going to maintain the data?
- Who is going to interpret and report the data?

2.4 Application of Embankment Monitoring Program

The embankment monitoring program was able to address the considerations identified above and the program was completed successfully. One of the early constraints placed upon the study, is that none of the research activities could impact the cost or the critical path schedule of the I-15 Reconstruction Project. With this in mind, all of the installation activities were therefore coordinated with the contractor. This meant that the installations had to work around the contractor’s schedule. In general, most of the coordination was done directly with field supervisors.

The first step in laying out each instrumentation array was to establish the purpose of the instrumentation and identify the appropriate objectives (i.e., by answering the questions listed previously). The next step involved locating a suitable location to place instrumentation (i.e., finding a site with the appropriate embankment geometry that would remain accessible and safe during the construction period and beyond). The contractor was then notified of planned instrumentation array. Coordination involved staying apprised of the contractor's construction schedule and keeping the contractor informed of the types and locations of the instruments. Installation often took place during construction while the contractor allowed a brief window of time for installation. In many cases, the installers had to wait for a window of time when they could perform the installation work without impacting the construction activities. The construction schedule was constantly being adjusted, so it became critical to regularly check the contractor's activities at the array site.

In a number of cases, the instrumentation involved connecting various items together (e.g., PVC pipe being extended up through a fill). After installation of the instrumentation at a pre-determined elevation, the contractor would continue construction activities until the next elevation was reached, and time was allowed for the subsequent installation to be completed. It was imperative to inform, remind, and in many cases re-remind, the contractor that the instrumentation was located at a particular spot and should not be damaged. The contractor was generally cordial enough to be careful with the instrumentation. To help protect the instrumentation from construction activities, all instrumentation that was left exposed was clearly marked either with bright paint or flagging. Unfortunately, incidents still happened where the instrumentation or its access was damaged, and it became imperative to check on the instrumentation regularly. When instrumentation was damaged, it could often be repaired, but this required the investigators to be prepared to find innovative solutions or repairs. Common repairs included: broken PVC access pipe having to be replaced and instrumentation cables having to be spliced together after it has been cut or severed by the contractor.

Generally it was advantageous to locate all types of instrumentation in groups, wherever possible. This made it more efficient and safe for the readers to gather readings, but also made it easier for the contractor to remember the instrumentation locations, thus reducing potential construction damage. Complimentary types of instruments were used within the arrays to capture key behavioral aspects of the site, thus providing a more global understanding of the wall or foundation. For example, when monitoring the settlement beneath the wall, it was also beneficial to then also measure the corresponding pressure that produced the settlement.

In most instances, multiple locations with similar instrumentation layouts were used to provide redundancy in gathering measurements. It was important that the selected sites were representative of general conditions throughout the project. Thus, the primary goal was to provide sufficient instrumentation to adequately represent each of the selected geo-technology types, yet still provide some redundancy in the data. Furthermore, the redundancy also allowed for the potential loss of instrumentation, whether caused by construction activities or through some other means.

Another important consideration was providing long-term accessibility and protection of the instrumentation. This generally included providing safe, secure covers for buried instrumentation to keep it safe from weather, maintenance activities, and vandals. In most cases the intention of the final protection was to keep the instrumentation as inconspicuous as possible, so as not to attract the attention of vandals.

A number of pieces of instrumentation were abandoned near the end of construction. Several of the horizontal inclinometers being used to monitor foundation movements beneath MSE walls during construction were buried beneath the slope work during final construction activities. It was determined that long-term movements could still be monitored at the wall face, and that it would be difficult for this type of instrumentation to obtain reliable differential secondary settlement, thus the inclinometers were abandoned. Additionally, all of the thermistor wires at a geofoam site were damaged during installation and could not be repaired, hence they were abandoned also. Unfortunately, when these thermistor wires were damaged a suitable location to replace this instrumentation could not be found and the ability to measure temperature differential within the pavement profile of a geofoam embankment was lost.

This program did have the good fortune of being able to maintain consistency amongst the principal investigators throughout the 10-year duration of the project, despite each of the investigators changing employment. The program was established in such a manner that, if needed, other persons could have managed the program with the assistance of the

Project Installation Report and Management Plan (Bartlett and Farnsworth, 2004). However, the UDOT Research Division was able to ensure that the project continued to be performed by the same individuals, despite project management turnover within the Division.

To ensure data protection, hard copies of field books were maintained throughout the project by those installing and reading the instruments. Every entry has included the date, time, and other pertinent information (i.e., fill height and changes in loading conditions of the embankment during construction, for example the surcharge being removed). Data has also been maintained digitally within spreadsheets with periodic backup copies being made. Data maintenance has been simply a matter of inputting the new data after readings were obtained.

The following general minimum reading schedule was followed:

- Weekly reading of the arrays during active fill placement, construction, or after any change in loading conditions occurred.
- Monthly readings during the first year, post-construction.
- Semi-annual readings during the second year, post-construction.
- Annual readings thereafter.

This reading schedule was adjusted in a number of instances due to various construction activities, project personnel changes, technician work schedules, inclement weather, or traffic and safety concerns. Readings were terminated at several different arrays because of the following: (1) damage to the instrumentation, (2) accessibility or safety concerns, (3) instrument malfunction producing questionable data, or (4) further gathering of readings would simply not add any benefit to understanding the long-term behavior (i.e., secondary settlement, or creep, had greatly diminished, or stopped, for all practical purposes).

In summary, this project has served as a practical case-history for performing a long-term embankment monitoring project with the following recommendations:

- Keep track of instrumentation during construction

- Keep instrumentation in groups, where possible
- Provide redundancies
- Have backup plans
- Provide protection for instrumentation
- Be prepared to find solutions to unexpected problems

3.0 DATA COLLECTION

3.1 Objectives for Data Collection

For this monitoring program, emphasis was placed upon behaviors relating to edge effects, transition zones, abutments, foundation behavior, wall behavior, and roadway surface behavior. Instrumentation was selected and installed to capture behavior relating to applicable areas for each of the different geo-technologies. Representative site locations were also selected to adequately capture construction and post-construction behavior. Each of the instrumentation arrays for the different geo-technologies had a slightly different variation in scope. The monitoring program utilized three primary types of instrumentation technologies for measuring settlement:

1. Settlement points with high-precision surveying.
2. Horizontal inclinometers.
3. Magnet extensometers.

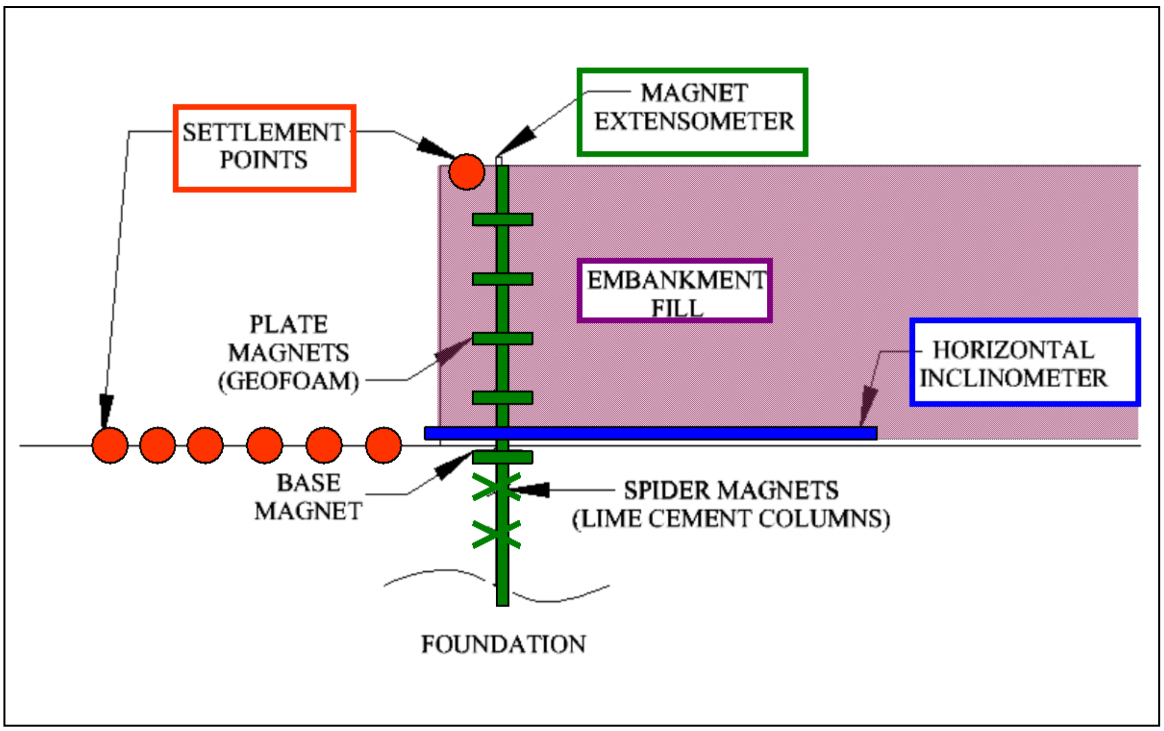

Figure 3-1. Typical instrumentation setup for construction and long-term settlement monitoring of a wall.

An example of typical instrumentation profile is shown in Figure 3-1. A typical wall array included settlement points placed within the footing and in the adjacent ground away from the base of the wall, and survey plugs placed in the pavement atop the wall. Horizontal inclinometers were installed, where possible, at the base of the wall to provide information on foundation movement beneath the wall. Finally, magnet extensometers were placed in either the foundation soils or within the embankment to monitor relative compressive movement. This section provides a brief description of each geo-technology type, the types of instrumentation used, and the primary objectives for the instrumentation installed. For more detailed information about each of the following technology types, refer to the reference materials identified in Section 1.4. Additional details for the specific instrumentation layout for each array can be found in the Project Installation Report (Bartlett and Farnsworth, 2004).

The intent of the settlement points was to provide in conjunction with a horizontal inclinometer a complete settlement profile cross-section through the embankment and of the adjacent ground located near the front of the wall. All settlement points and monuments were surveyed with a self-reading digital level with sub millimeter precision. The survey elevation circuits were closed on stable, off-site benchmark and adjusted so as to have a precision of 0.1 inch (3 mm), or better. In some cases, the precision was even higher in locales were survey circuits were not required and the points could be surveyed directly from the off-site benchmark. The ends of the magnet extensometer and inclinometer casing were also surveyed and the data were adjusted for their movements. Magnet extensometers were installed within the foundation soils in embankment areas, inside and outside of the lime cement column foundation treated area, and within the geofoam embankments. Plate magnets and/or spider magnets were placed at strategic levels within the foundation soils or the embankment. The locations of the magnets were targeted for boundary conditions (top and bottom of embankment and bottom of instrument) and changes within the subsurface layering such as the interface between clay and granular layers thus bracketing the soft compressible clay layers. Readings are taken by periodically measuring the location of the magnets with a probe to record the relative compression between magnets. The position of each magnet can be read with an accuracy of about 0.1 in (3 mm). Horizontal inclinometers were placed at the top of the foundation soils and within the geofoam embankment to provide a continuous settlement profile through the embankment. The horizontal inclinometer has a system accuracy of approximately 0.2 in (6 mm) per 82 ft (25-m) of length.

It should be noted that vibrating-wire total pressure cell plates were installed at many arrays, but there was limited success with the long-term stability of these instruments. The usable data from the pressure cells has been primarily utilized and given within the previous program publications (see Section 1.4), and although the raw results are found within the appendix of this report, these data will not be discussed herein. All instrumentation was placed at full height embankment areas away from transition zones (i.e. geofoam/MSE wall transitions or bridges) to avoid complex edge effects and at locations that provided accessibility, long-term protection of the instrumentation, and safety of those gathering the data. Further information about the installation techniques and reading procedures for the instrumentation used during this project can be found in the Project Installation Report (Bartlett and Farnsworth, 2004).

Additional settlement reference points and magnet extensometers were installed within relatively large earthen embankments to monitor post-construction settlements. These embankments were generally 26 to 33 ft (8 to 10 m) high after surcharge removal and were constructed with 2H:1V side slopes on PV drain treated foundation soils. The locations selected for this monitoring project typically included earthen embankments constructed in areas of new alignment or where a significant amount of pre-existing embankment had not preloaded the foundation soils. The long-term settlement results from these large earthen embankments are included within this final report.

3.1.1 Lime Cement Columns

Lime cement columns are a deep soil mixing technique used to treat and stiffen soft foundation soils. An auger is inserted to depth in the ground and lime and cement are injected into the ground as the auger is removed. The result is a column of lime, cement, and native soil, which is stiffer than the surrounding soils. Numerous columns can be placed at the design spacing to stiffen the foundation materials. The contractor for the reconstruction project initially intended to utilize this type of technology at many locations throughout the reconstruction project, but due to project time constraints only one location was actually installed. Thus, this location was the only lime cement column site (LCC Array) selected for instrumentation and monitoring. A large MSE wall was placed atop the treated foundation.

Instrumentation installed within the lime cement column array includes the following: horizontal inclinometers placed near the base of the MSE wall (i.e., directly above the lime cement column treated foundation); a magnet extensometer placed within the foundation soils; pressure cells placed directly on a column and in between columns at the surface of the treated foundation (i.e., directly below the MSE wall); and settlement points placed in the ground surface both parallel to and extending away from the wall.

The objectives of the instrumentation installed at the lime cement column array include:

- Measure the total and differential construction settlement in column panel areas and column transition zones during embankment loading using horizontal inclinometers.
- Determine the settlement versus depth in the soil profile using a magnet extensometer.
- Measure the differences in load transfer and settlement behavior in the treated and non-treated areas using vibrating wire pressure cells.
- Measure the construction and post-construction settlement (i.e., creep) of the embankment/wall system and the adjacent property near the face of the wall using survey points.
- Provide measurements and soil properties for numerical modeling of lime cement treated soil.

3.1.2 Two-Stage MSE Walls

Mechanically stabilized earth (MSE) walls were used extensively throughout the I-15 reconstruction project. There were two different types of welded wire and panel MSE walls used: one-stage walls, where the reinforcement was connected directly to the face panel, and two-stage walls, where the reinforcement was connected to welded wire faces and the exterior face panels were later attached after settlement had occurred. There were two different MSE wall instrumentation arrays established, both for two-stage MSE walls. Utah State University was primarily involved with the work to instrument and monitor the 35th South Array. This array was evaluated primarily during construction, with corresponding results reported within UDOT Research reports UT-03.11, UT-03.14, and UT-04.09. The instrumentation installed and monitored by USU included: horizontal extensometers and inclinometers, vertical extensometers and inclinometers, strain gages, and total pressure cells. Although listed within this document for completeness as a part of the embankment monitoring project, since the array was installed and maintained by a separate organization and the results have already been published, there are not any additional results for this location included within this report.

The 2nd South Array was installed by the authors of this report and the results for this location are included in the appendix. The instrumentation installed and monitored at this MSE wall location included a horizontal inclinometer in the base of the wall and settlement points placed in the ground surface both parallel to and extending away from the wall.

The objectives of the instrumentation installed at the 2nd South MSE wall array include:

- Measure the settlement profile that develops underneath the MSE wall during primary and secondary settlement using data from the horizontal inclinometers.
- Measure the settlement pattern that develops in front of the MSE wall during primary and secondary settlement using data from the survey points.
- Compare the gathered data with results obtained from conventional settlement analysis to determine the adequacy or inadequacy of such methods in predicting settlement.

3.1.3 Geofoam

Expanded polystyrene (EPS), or geofoam, was placed in several locales along the I-15 corridor, generally as an alternative to earthen fill. It was primarily used as a lightweight fill material at locations where settlements had to be virtually eliminated due to utilities or other sensitive infrastructure. The extensive use of geofoam on the I-15 reconstruction project has generated widespread interest in EPS as a lightweight fill. An extensive program of instrumentation and field observation of geofoam embankment was initiated at two sites: the 33rd South Array and the 1st South Array. Smaller arrays were also installed at the SS-05 Array and SS-07 Array.

The instrumentation installed within the geofoam arrays included: horizontal inclinometers both within the foundation directly beneath the geofoam wall and at the surface level of the geofoam wall; magnet extensometers with magnets placed at various levels between the geofoam blocks; total pressure cells placed both horizontally and vertically within the foundation and abutment area of the wall and at various levels between the geofoam blocks; and settlement points placed both in the roadway surface above the geofoam and along the face of the geofoam wall.

The objectives of the instrumentation installed at the geofoam arrays include:

- Monitor the construction and long-term settlements and compare the settlement performance of geofoam and earthen embankments using horizontal inclinometers, magnet extensometers, and settlement points.
- Measure the vertical stress distribution in a pavement section underlain by geofoam using pressure cells.
- Measure the vertical and horizontal stress distribution in an abutment area using pressure cells.

3.1.4 Large Earthen Embankments

Large earthen embankments were used in conjunction with pre-fabricated vertical drains (i.e., wick drains) and surcharging throughout the I-15 Reconstruction project. The contractor monitored these embankments during construction for stability related problems as well as determining the end of primary consolidation and therefore when to release the surcharges. Four arrays (4th South Array, 9th West Array, I-15 Mainline Array, and I-15 Merger Array) were installed to specifically monitor the rate and magnitude of secondary creep settlement. In addition, construction was concurrently taking place at the University Avenue Interchange in Provo, and since subsurface profiles at this site were similar, an array was installed at this location to monitor both the construction and post-construction related settlements. These locations were each selected as suitable locations based primarily on the height of the embankment and accessibility to install and read instrumentation.

The instrumentation installed within the large earth embankment arrays includes: a horizontal inclinometer extending from toe to toe beneath an embankment; magnet-reed extensometers placed through the embankment and into the subsurface soils; pressure cells beneath an embankment; settlement manometers placed within the base of an embankment; and settlement points placed both along the toe of the embankment and adjacent to the pavement at the surface of the embankment.

The objectives of the instrumentation installed at the large earthen embankments include:

- Measure the magnitude and rate of the primary settlement with the horizontal inclinometers and settlement points.
- Measure the associated pressure causing settlement to occur with the pressure cells.
- Measure the long-term settlement (i.e., secondary settlement) along the new I-15 alignment to determine the adequacy of the surcharge design in minimizing long-term settlement.

3.2 Embankment Monitoring Project Data

Tabulated and basic graphical results of the raw instrumentation data for each array can be found within the appendix of this final report. These results are included within this report as a means of capturing the complete project history. Interpreted results and accompanying explanations can be found within the Data Evaluation chapter (Section 4) of this final report.

4.0 DATA EVALUATION

4.1 Reconstruction Design Constraints

Project requirements and settlement performance goals played a vital role in selecting, designing and constructing each geo-technology. In general, the project settlement criteria and performance observations for earthen embankment and MSE wall construction included the following:

1. Potentially damaging settlement to adjacent structures and facilities should not extend beyond the UDOT right-of-way.
2. Existing utilities located within zones of significant settlement should either be relocated or protected in place.
3. The total post-construction settlement of the embankments, MSE walls and bridge approaches should be limited to a maximum 3 in (76 mm) during a 10-year post-construction period.

For the I-15 project, the post-construction period was defined to begin once the concrete pavement was placed. The bridge foundations were designed for 1 in (25 mm) of post-construction settlement and up to 2 in (50 mm) of differential settlement was to be accommodated with the long bridge approach slabs.

The loading criterion established for EPS geofoam allowed for construction settlements of up to 1% strain within the geofoam and post-construction settlements of up to 2% strain after a period of 50 years in the geofoam. Vertical deformations measured within the geofoam fill included elastic compression of the geofoam (i.e., true geofoam strain), gap closure between geofoam block layers, and seating of the instrumentation. These deformations resulted primarily from placement of the overlying load distribution slab, subbase and base materials, and pavement.

4.2 Settlement Performance of LCC Treated Soil

The single lime cement column site on the reconstruction project was selected for soil stabilization primarily because of the wall proximity to an adjacent commercial building (See Figure 4-1). At its closest point, the adjacent building is located about 26 ft (8 m) from the wall face and 20 ft (6 m) from the edge of the lime cement column treated zone.

Figure 4-1. LCC stabilized foundation site and adjacent building.

The instrumentation installed at the LCC Array was placed after lime cement column installation but prior to the overlying one-stage MSE wall construction. Figure 4-2 shows a general layout view of the instrumentation that was placed at this array. Two horizontal inclinometers were placed within the base of the MSE wall during construction, one approximately perpendicular and the other at a diagonal to the wall face. Note that both inclinometers penetrated the MSE wall to approximately the same depth – the extent of excavation in preparation for MSE wall construction. The initial magnet extensometer placed within the wall was lost during construction activities, and so a subsequent magnet extensometer for measuring long-term foundation settlement was placed outside of the wall. Settlement points were placed around the adjacent building, both parallel and perpendicular to the wall face. The settlement points and magnet extensometer that are no longer active due to being damaged at some point over the past twelve years are

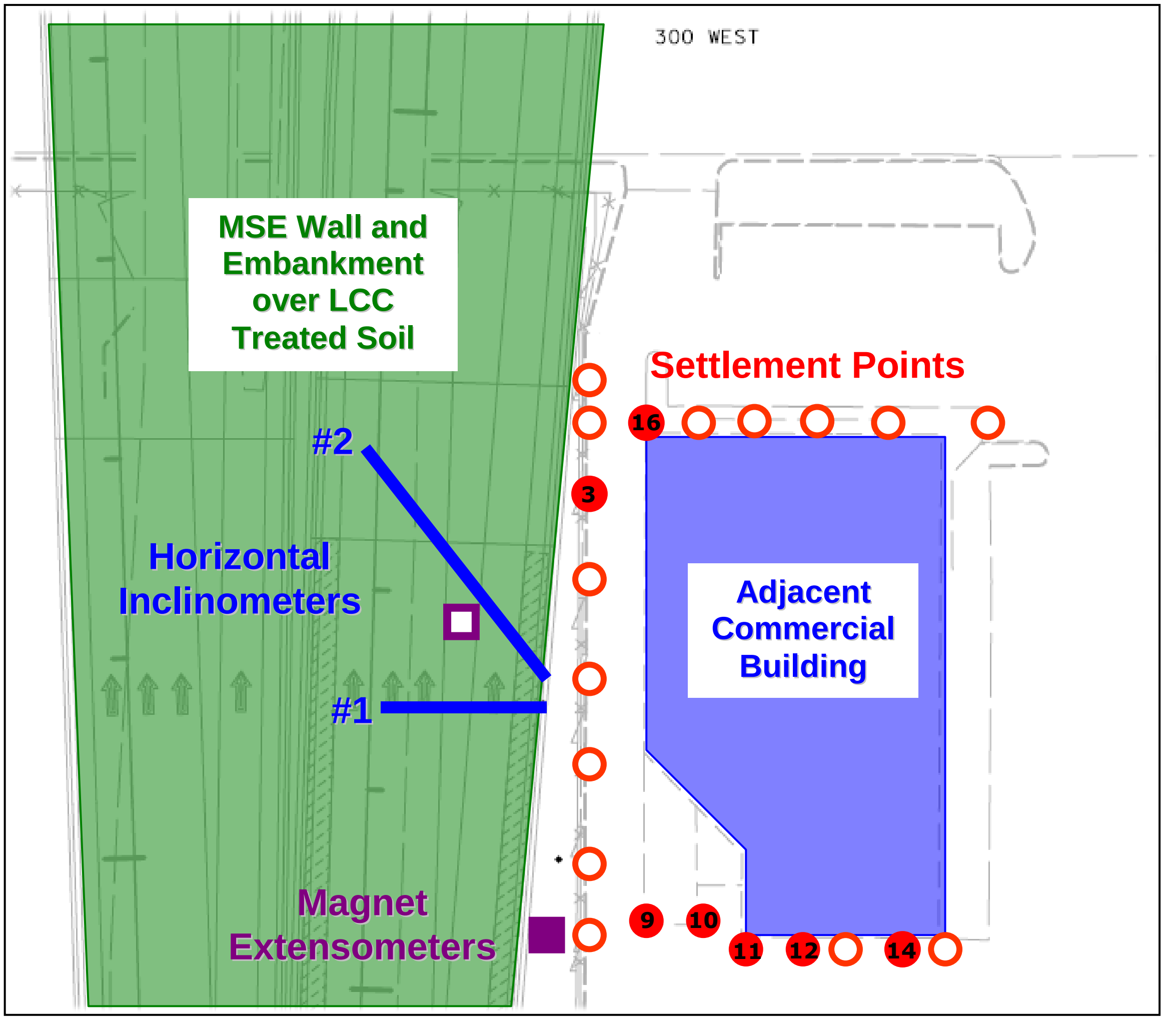

Figure 4-2. Instrumentation layout for the LCC array.

shaded white in Figure 4-2. Note that the majority of these cased rebar type settlement points have been lost during the long-term monitoring period, with those that have survived being placed in the pavement near the building.

Figure 4-3 shows the interpreted end-of-construction and ten year post-construction settlement profiles measured at the LCC Array using the settlement points placed around the building and the horizontal inclinometers that extended into the wall. Although the settlement points used in this figure were not located along a straight line perpendicular to the wall, this profile has been obtained by plotting the settlement for each point with the corresponding perpendicular distance to the wall face. Each point has been labeled and the corresponding location can be seen in Figure 4-2. The resultant profile is a

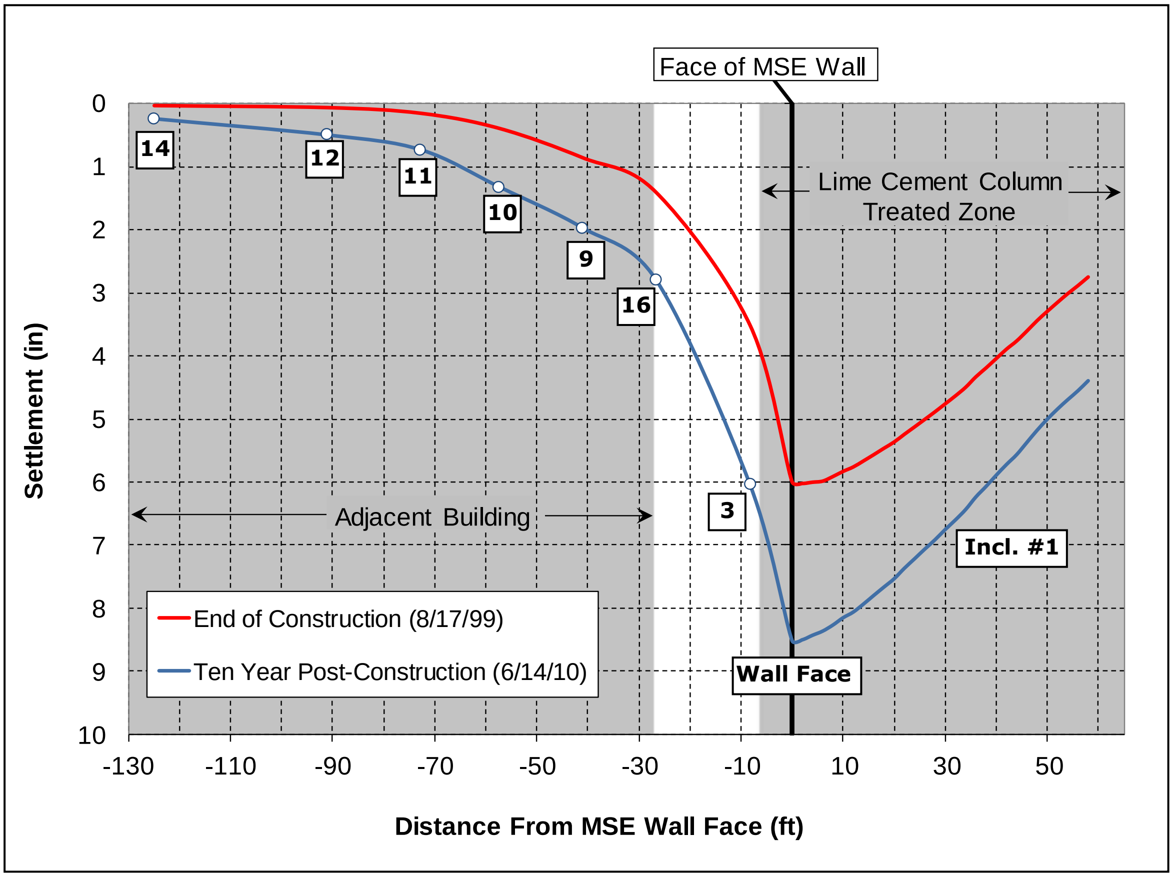

Figure 4-3. Construction and post-construction settlement profile for the lime cement column area.

combination of all the active settlement points and horizontal inclinometer #1. Although only one of the horizontal inclinometers is shown on the profile, the settlement profile within the wall was nearly identical for both for the corresponding depth within the wall. The largest settlement occurred at the MSE wall face, which was about 6 in (150 mm) at the end of the construction period. The amount of settlement measured by the horizontal inclinometer decreased with increasing distance into the wall because the foundation soils within this zone had already been preloaded by the pre-existing I-15 embankment.

Settlement measurements from the initial magnet extensometer placed in the MSE reinforced zone showed that approximately 50 percent of the construction settlement occurred from compression of the LCC treated zone and the remaining 50 percent occurred in the soils beneath the columns (Bartlett and Farnsworth, 2002). However, this extensometer was destroyed during paving operations and an additional magnet extensometer was placed in the foundation soils at the toe of the wall. This second magnet extensometer (see appendix for LCC magnet extensometer plot) has confirmed that about 50 percent of the post-construction settlement is occurring beneath the LCC treated zone (deeper than about 65 ft). In the ten year post-construction monitoring period, settlement points at the wall face show that the MSE footing has undergone about 2.5 in (64 mm measured) of additional settlement, resulting in a total of approximately 8.5 in (216 mm measured) of settlement at the wall face. This total settlement is still within the reconstruction design recommendation of using one-stage MSE walls where total settlements do not exceed 10 in (250 mm). However, the settlement at the wall face has caused minor cracking in some of the concrete facing panels.

The wall and non-reinforced embankment behind the wall has undergone some angular distortion, as shown in Figure 4-3. However, the surface fill was leveled after removal of the surcharge so that the pavement was placed at the appropriate elevation and drainage slope. Furthermore, the MSE wall reinforced zone extends only about 26 ft (8 m) behind the wall face with unreinforced embankment fill placed behind that. Therefore, the post-construction angular distortion is minimal and does not appear to have had any significant impact on the performance of the MSE wall or the surface pavement.

Figure 4-3 also shows that the zone of measurable settlements extends approximately 130 ft (40 m) from the wall face. Construction related settlement of the adjacent building was about 1.4 in (35 mm) at a distance of 26 ft (8 m) from the wall face, with minimal movement at the back of the building. During the ten year post-construction monitoring period, the settlement at the corner of the adjacent building increased an additional 1.4 in (36 mm) for a total of 2.8 in (71 mm) of settlement. Differential settlement across the building (from the front left to the back right corner) is therefore on the order of 2.6 in (65 mm). Such settlement is potentially damaging to sensitive structures and is more than was anticipated in the design.

Figure 4-4 presents a summary of post construction settlements measured at the lime cement column site. To ensure that the rates are shown appropriately, the creep settlement plots are shown with the settlement plotted against the elapsed time (in days)

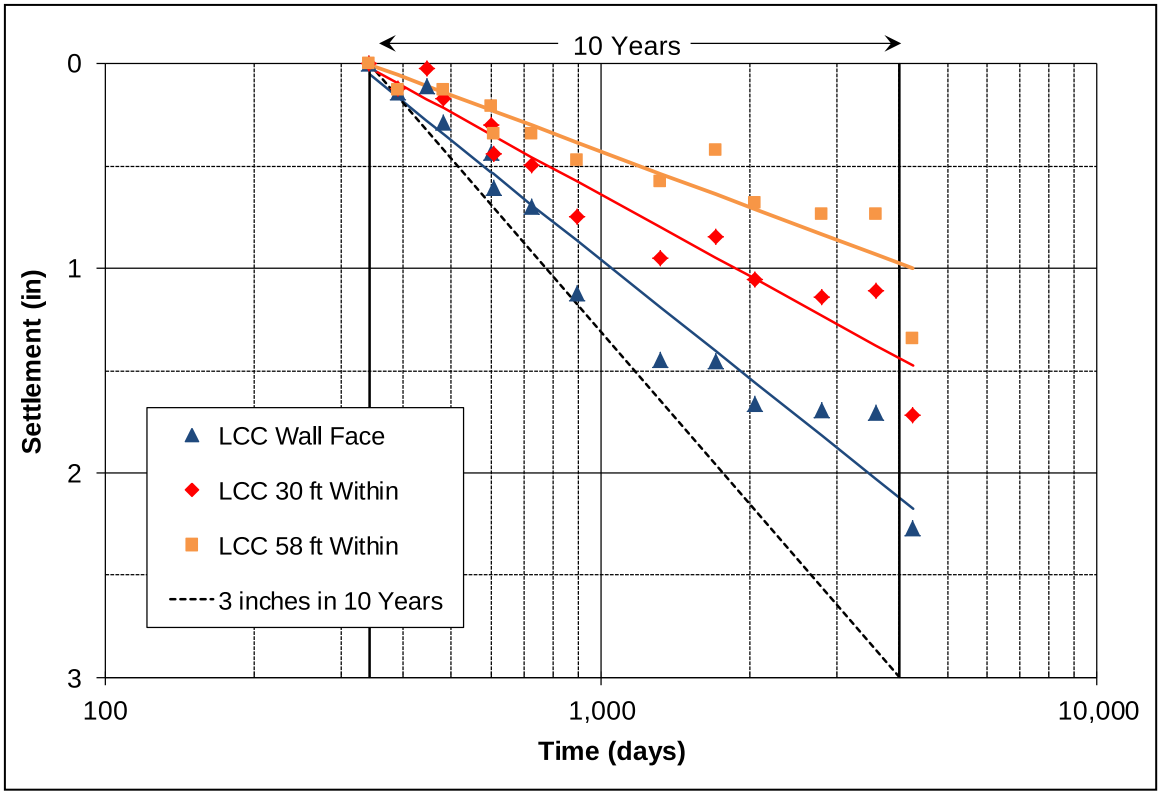

Figure 4-4. Rate of post-construction foundation creep for lime cement columns.

from the beginning of the fill placement. The figure shows the creep settlement at this location compared to the general settlement goal (not exceeding 3 in (76 mm) of post-construction settlement measured over a ten year post-construction period). Figure 4-4 shows the data for three different locations: the wall face, 30 ft and 58 ft within the wall, respectively. These data show that the LCC treated soil technology was able to meet the 10-year post-construction settlement goal.

4.3 Settlement Performance of Two-Stage MSE Walls with PV Drains and Surcharging

Construction related performance behavior for the 3500 South two-stage MSE wall was performed and reported by Utah State University (see UDOT Research reports UT-03.11, UT-03.14, and UT-04.09). Construction and post-construction settlement performance of a two-stage MSE wall was also monitored at 200 South Street. The instrumentation and performance of this embankment has previously been reported in UT-08.05 (Farnsworth and Bartlett, 2008), but a final update is included here within this final report. At the 200

Figure 4-5. Proximity of residential structure adjacent to the 200 South MSE wall.

South Street location a 26 ft (8-m) high wall and embankment was constructed and surcharged with an additional 13 ft (4 m) of temporary fill. PV drains were installed at this location at 4.9 ft (1.5-m) triangular spacing to a depth of 82 ft (25 m), to expedite primary consolidation settlement. Figure 4-5 shows the proximity of a residential structure adjacent to the 200 South MSE wall.

The instrumentation placed at the 200 South MSE wall is shown in Figure 4-6. A horizontal inclinometer was initially installed near the base of the MSE wall. However, this instrument only remained active during construction and was subsequently buried during backfilling of the toe of the wall. Six settlement points were placed in a straight line adjacent to the fence line of the nearby residential property (see Figure 4-5). The first two settlement points were also lost near the end of construction. The remaining four settlement points continued to be read during the initial post-construction years. However, the structure shown in Figure 4-5 was later destroyed in a house fire, and although the fence line was not moved, subsequent activities on the property have since damaged several of the other remaining settlement points.

The two-stage MSE wall and surcharge fill at 200 South Street induced more than 43 in (1,100 mm) of consolidation settlement at the wall face over the construction period (see

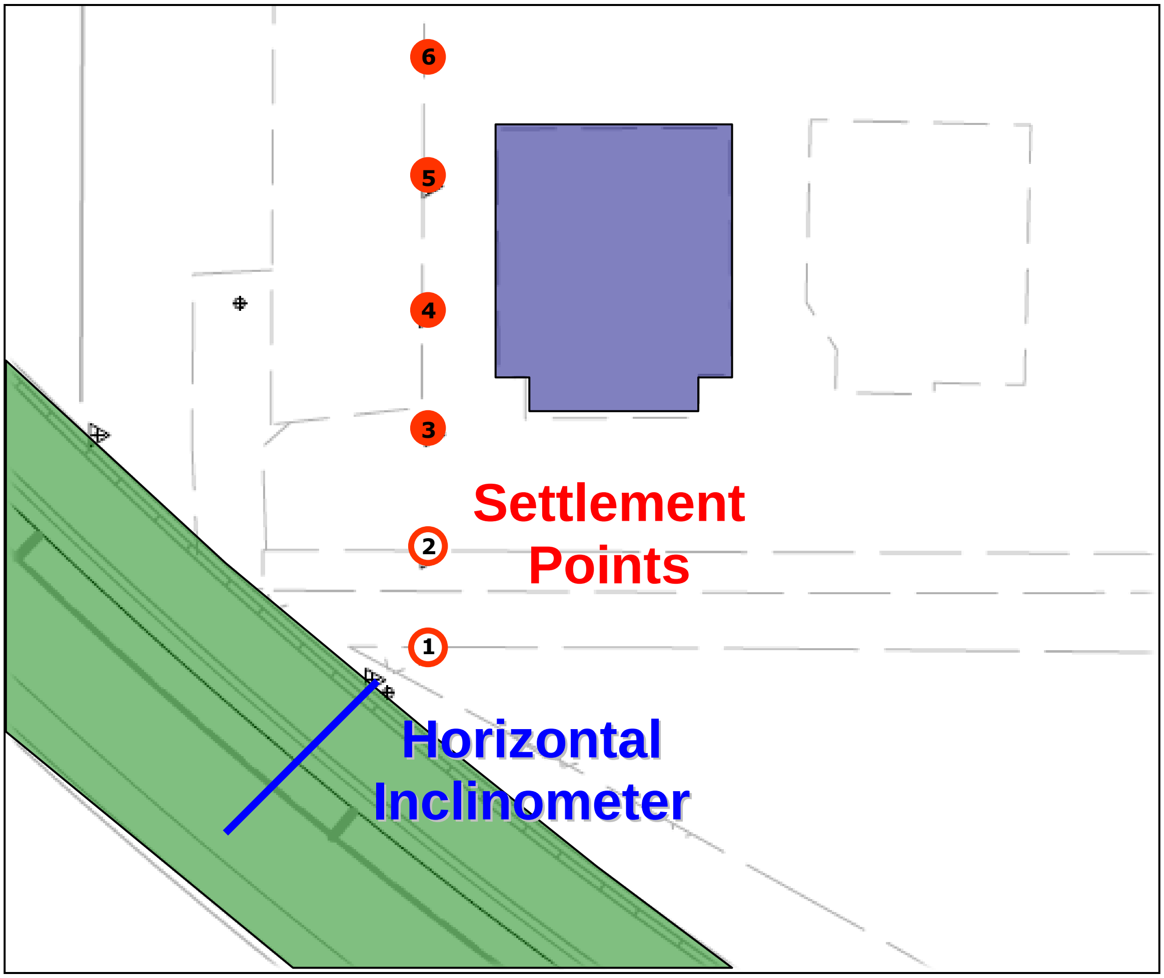

Figure 4-6. Instrumentation layout at the 200 South MSE wall.

Figure 4-7). This magnitude of consolidation settlement was typical for what the two-stage MSE walls over PV drain treated soil throughout much of the project experienced during the I-15 Reconstruction. These values also echo the settlement values of 3 to 5 ft (1 to 1.5 m) of primary consolidation settlement that was typical of embankment construction during the original I-15 Construction in the 1960s. The large magnitudes of settlement can be directly attributed to building large embankments over the soft thick Lake Bonneville clay layers. Furthermore, it should be noted that by using the PV drains, the settlement time was shortened considerably from about 2 to 3 years to about 8 months to construct the embankment/wall and allow for the majority of the consolidation settlement to occur.

The settlement profile for the 200 South Street MSE wall is shown in Figure 4-7. The instrumentation and corresponding settlement values have been plotted at the nearest perpendicular distance to the wall face. This figure shows that the amount of the consolidation settlement decreased with increasing distance into the wall, due to the influence of the existing embankment, similar to what occurred at the lime cement column array (Figure 4-3). This wall also exhibited some angular distortion due to the pre-existing embankment. As explained previously, upon completion of primary settlement, the surface was leveled after removal of the surcharge so that the surface pavement was placed at the appropriate elevation and drainage slope. Although the effect to the surface elevation is minor, the welded wire wall facing and reinforcement strips would be subjected to the full angular distortion. As reported in Report UT-08.05 (Farnsworth and Bartlett, 2008), MSE walls should have limiting differential settlements

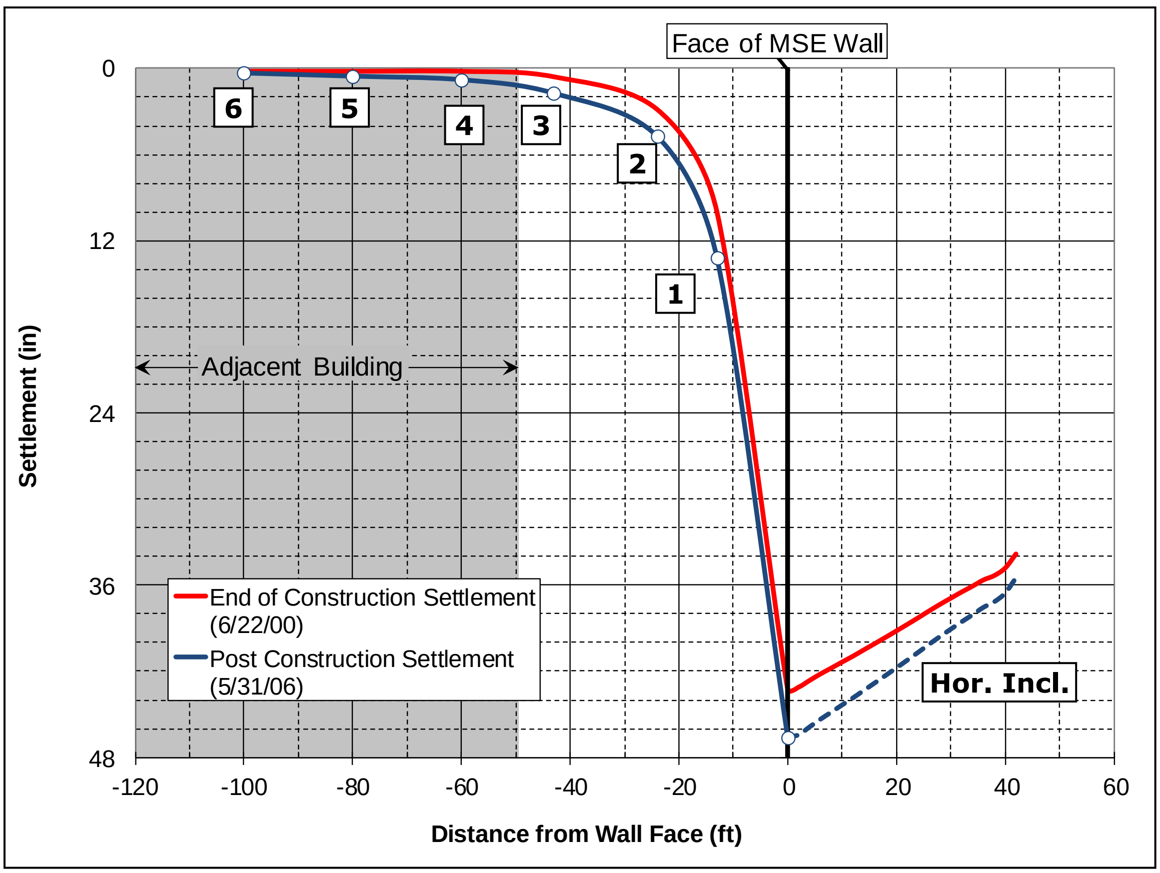

Figure 4-7. Construction and post-construction settlement profile for the 200 South MSE wall site.

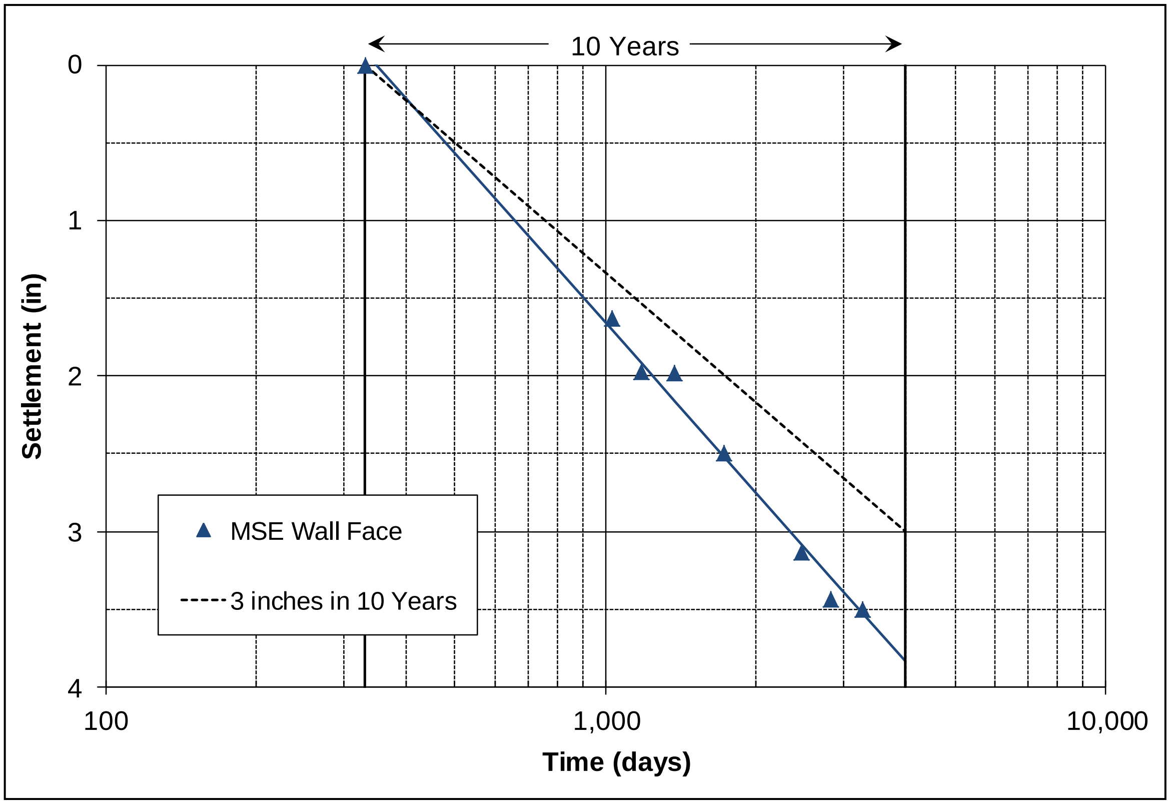

Figure 4-8. Rate of post-construction foundation creep for 200 South MSE wall.

of 1/50. The construction settlements for this wall essentially reached this target value, with the post-construction settlements slightly exceeding it. At this time, there are not any visible signs that the behavior of the wall is being negatively affected by this angular distortion.

Figure 4-7 indicates that the zone of measurable settlement extended about 100 ft (30 m) beyond the wall face toward the adjacent house. The nearest edge of the house was located approximately 51 ft (15.5 m) from the wall face. During the 6 years of post-construction monitoring shown in the figure, the MSE wall face and nearest edge of the house underwent approximately 2.8 and 0.8 in (70 and 20 mm) of additional settlement, respectively.

Figure 4-8 presents a summary of post construction settlements measured at the 200 South Street MSE wall array. The creep settlement plot is shown with the settlement plotted against the elapsed time (in days) from the beginning of the fill placement.

However, the construction related settlement has been subtracted out, showing only the post-construction settlement. The figure shows that the creep settlement at this location slightly exceeded the general settlement goal of 3 in (76 mm) of post-construction settlement measured over a ten year post-construction period. Approximately 3.5 inches of post-construction settlement was measured at the 8 year post-construction reading, with a final projected settlement value of about 3.8 inches of post-construction settlement. (This final value was not able to be verified due to instrumentation damage at this location.) Although there is only one point to indicate the post-construction behavior of MSE walls, the authors suspect that exceeding the post-construction design tolerance was fairly common for similar reconstruction project embankments. This conclusion will be further substantiated in the subsequent section on large earthen embankments.

4.4 Settlement Performance of Geofoam Walls/Embankment

Settlement arrays were installed at two large geofoam embankment/walls located at 3300 South and 100 South Streets in Salt Lake City. At 3300 South Street, the design-build contractor selected geofoam fill to expedite construction. Conversely, at 100 South Street the geofoam fill was selected to minimize settlements of existing buried utilities across the I-15 alignment. Both locations were instrumented with magnet extensometers about 8 ft (2.4 m) from the vertical wall face, to measure compression of the geofoam mass. The geofoam embankments at both locations were about 25 ft (7.5 m) in height but more material was placed above the load distribution slab at 100 South Street. The design required that the allowable pressure applied to the geofoam from the weight of the load distribution slab, subbase, base, pavement section and live traffic load remain below the 40% working stress criterion (Bartlett et al., 2011). This loading condition caused approximately 2.8 and 3.1 in (70 and 80 mm) of construction related compression of the geofoam fill, at 3300 and 100 South Streets, respectively. Figure 4-9 shows that the corresponding construction induced strain at 100 South was approximately 1%. Likewise the post-construction strains have remained below 1.5% total strain at the ten year post-construction mark and continue to project to be well within the 50-year 2% total strain tolerance. Similar results were obtained for the 3300 South Geofoam Array.

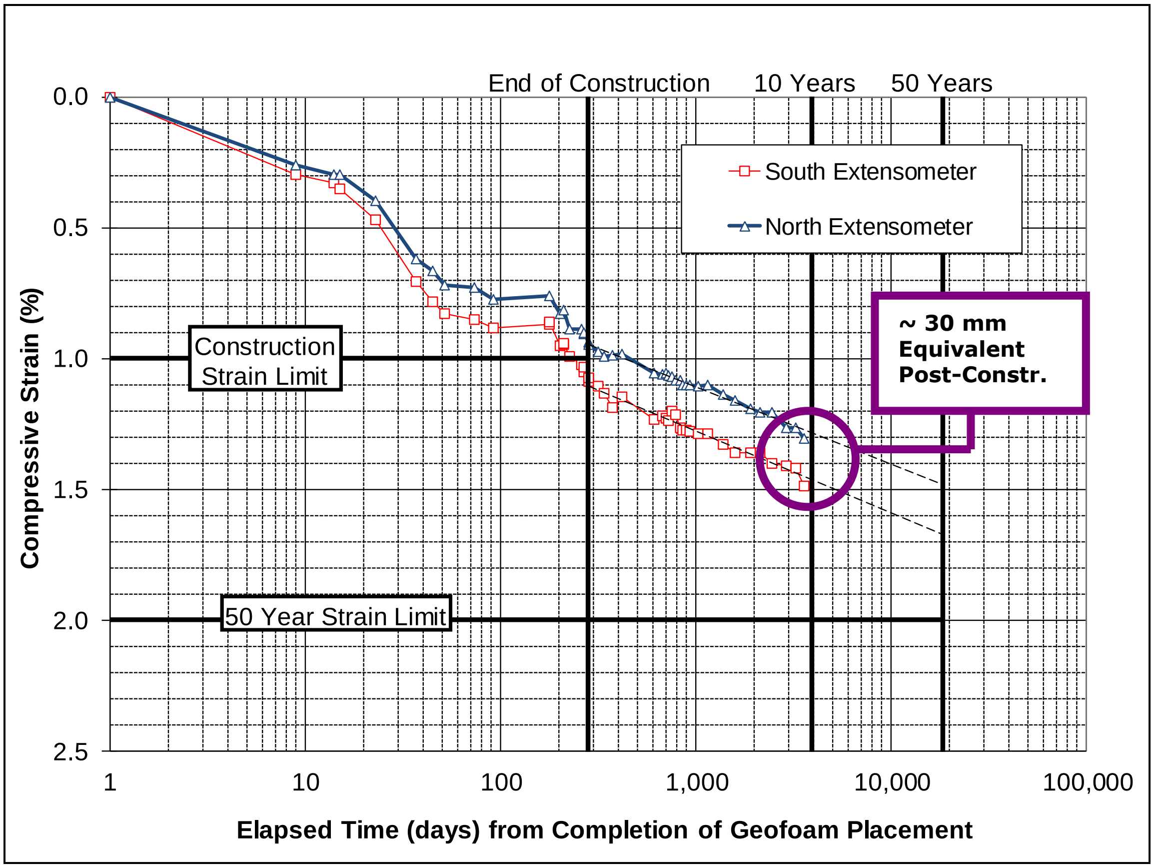

Figure 4-9. Compressive strain for magnet extensometers within the geofoam embankment at 100 South.

It should be noted that foundation settlement at the geofoam embankment locations was expected to be minimal because the lightweight fill was designed so as not to induce stresses at depth exceeding the preconsolidation stress of the Lake Bonneville Clays. In addition, to further reduce the net loading condition, about 3 ft (1 m) of the subgrade was excavated and replaced with geofoam.

Both the 100 South and 3300 South Street geofoam arrays experienced more foundation settlement than anticipated. The foundation settlement at the 3300 South Street has already been described and illustrated in UT-08.05 (Farnsworth and Bartlett, 2008). In summary, the geofoam embankment and pavement materials initially caused about 0.6 in (15 mm) of foundation movement over a one year time period. A 5-ft (1.5 m) toe berm that was placed at the base of the geofoam wall (See Figure 4-10) caused an additional 1 in (25 mm) of foundation settlement over the next five years. The total projected ten year

Figure 4-10. 3300 South geofoam embankment with toe berm.

post-construction settlement for this location is 1.8 in (45 mm). Without the toe berm at this location, it is estimated that the total ten-year post construction settlement would have only been about 0.8 in (20 mm). The actual ten–year settlement values were not able to be verified at this location due to accessibility issues and instrumentation damage. As noted in the previous report, the construction of large toe berms such as this was not typical for other I-15 geofoam walls. However, this location exhibits the sensitivity of the foundation soils to modest increases in load, thus the construction of such toe berms in settlement sensitive areas should be thoroughly evaluated by the design and construction teams.

The 100 South Street geofoam array (Figure 4-11) has also exhibited much more foundation settlement than was intended in the design. The construction details for this geofoam embankment and the corresponding construction related performance results

Figure 4-11. 100 South geofoam embankment.

have been documented in UT-03.17 (Negussey and Stuedlein, 2003). Figure 4-12 shows the cross-sectional profile of the geofoam embankment at this location. Two horizontal inclinometers were installed in the base of the geofoam embankment to monitor differential settlement developing beneath the geofoam profile (Figure 4-12). The length of these inclinometers was restricted by the existing embankment to 14 and 16 ft (4.3 and 4.9 m), for the north and south inclinometers, respectively. Additionally, a horizontal inclinometer was extended 100 ft (30 m) through the geofoam embankment into the scoria backfill, just beneath the upper half layer of geofoam embankment (Figure 4-12). The upper inclinometer was located directly above the south basal inclinometer. Unfortunately, the two horizontal inclinometers located in the base of the geofoam embankment have both become damaged over time, with final readings being taken in June, 2001 for the north inclinometer and May, 2004 for the south inclinometer. Up to that point, both inclinometers indicated a fairly uniform settlement profile immediately

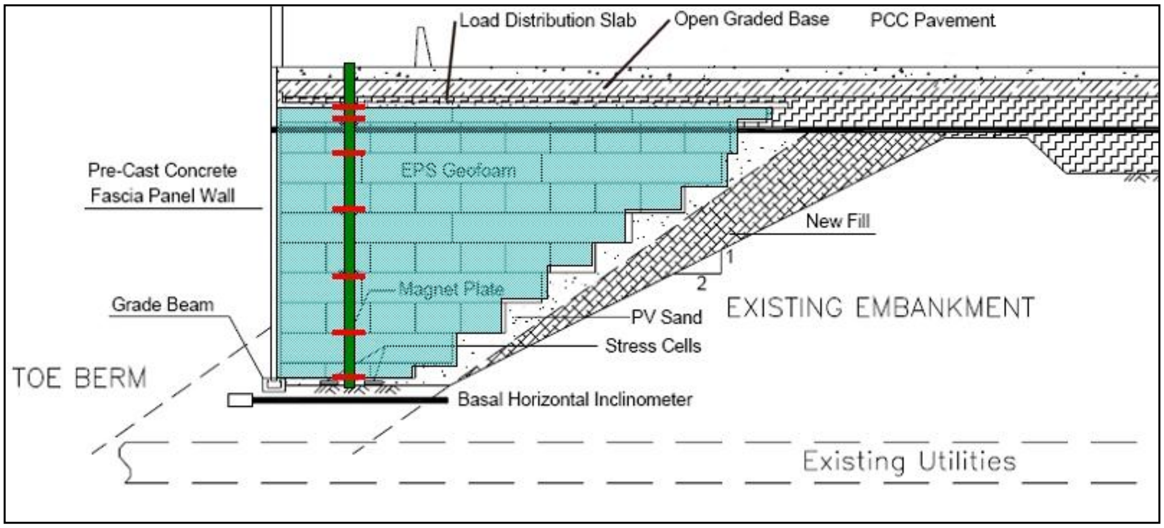

Figure 4-12. 100 South geofoam embankment profile with magnet extensometer.

beneath the full-height geofoam mass with a differential of only about 0.4 in (10 mm) from front to back across the length of the inclinometers. Although the inclinometers were damaged, the settlement at the base of the wall (i.e., the inclinometer casing) has continued to be monitored through the post-construction monitoring period. Assuming that the profile did not change dramatically over the final six years of monitoring, the projected settlement profile for the south inclinometer is shown in Figure 4-13. These results indicated that about 7.5 in (190 mm) of total foundation settlement has occurred at this location (see South Basal Inclinometer). It is clear that the loading condition applied by the scoria, base and pavement section at this location was in excess of the threshold for minimal foundation movement. (The authors suspect that overlying material placed atop the EPS may have caused the post-construction effective vertical stress in shallow clay layers to approach or slightly exceed the preconsolidation stress. This in turn has produced more long-term settlement than anticipated.) The top inclinometer total settlement profile is also shown in Figure 4-13. This figure also indicates that about 2 in (50 mm) of total compression has occurred within the full-height geofoam mass, accounting for both compressional strain of the geofoam and gap closure between the geofoam blocks. The geofoam embankment at the surface extends about 40 ft (12 m) into the profile and so the settlement beyond that point also represents primarily foundation settlement. Figure 4-13 indicates that between 4 and 6 in (100 and 150 mm) of foundation settlement has occurred in the rear portion of the embankment. Furthermore, this figure indicates that there has also been some angular distortion across this profile. The authors have not been able to identify any corresponding pavement surface cracking due to this differential settlement and are unaware of any drainage issues resulting from the corresponding angular distortion.

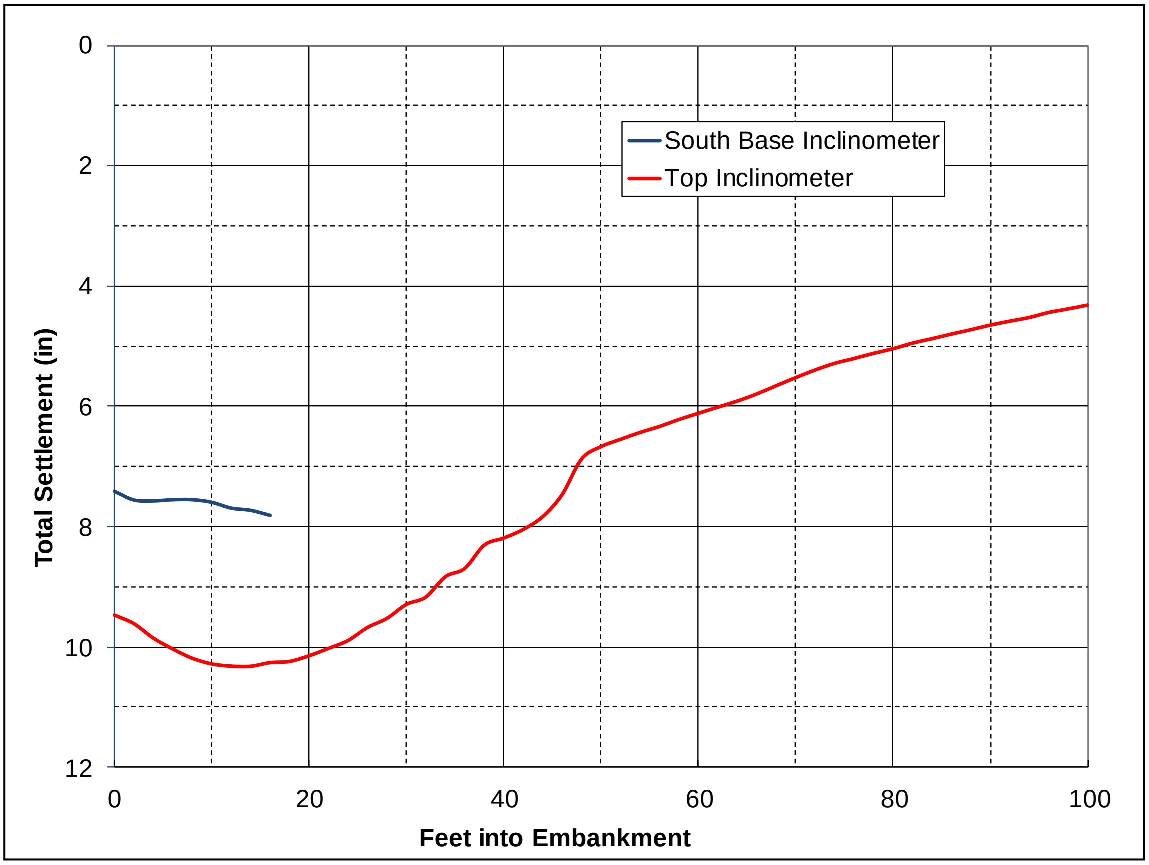

Figure 4-13. 100 South horizontal inclinometer total settlement results.

The rate of foundation settlement has been monitored by surveying the base of the geofoam embankment wall. Figure 4-14 shows a plot of the rate of post-construction foundation creep for the 100 South Street Geofoam Array. This figure also shows the post-construction creep in context of the total foundation settlement that has occurred at this location. This figure shows that the site has experienced approximately 6 inches (150 mm) of post-construction settlement over the 10-year post-construction monitoring period. Settlement monuments placed in the base of the tilt-up fascia panel walls along the length of the geofoam embankment and across the MSE wall transition, has verified the rate of creep settlement shown in the figure. Although these points were not placed until a later date, the rate of measured creep mimics that gathered with the horizontal inclinometer data. This magnitude of post-construction settlement was not anticipated and greatly exceeds the general 3 inches of allowable post-construction settlement over a ten-year post-construction period.

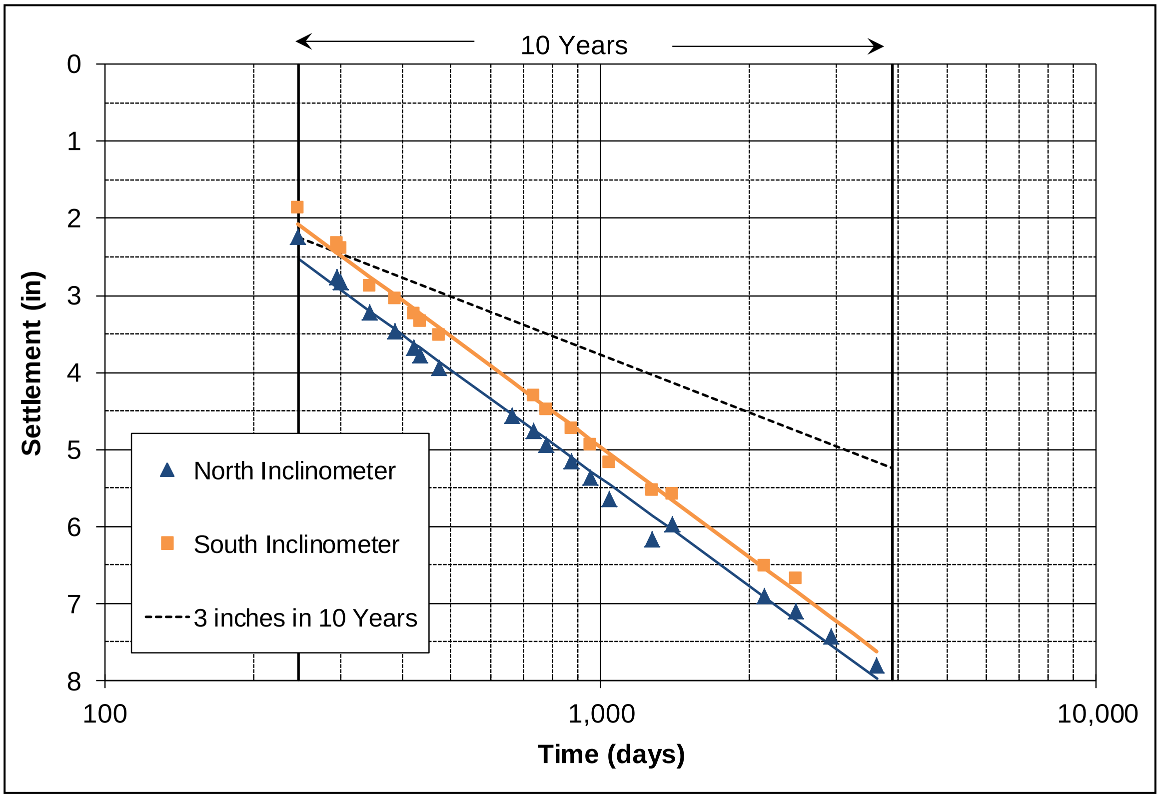

Figure 4-14. Rate of post-construction foundation creep for 100 South geofoam array.

However, the authors do not believe that the foundation movement experienced at the 100 South Street geofoam array is representative of geofoam embankments throughout the project. The unanticipated larger foundation movement experienced at both the 100 South and 3300 South Street geofoam arrays indicates the settlement sensitive nature of the foundation soils and the importance in selecting the design parameters (i.e., estimated pre-consolidation stress) utilized to determine the acceptable loading condition. It is important that the preconsolidation stress within the soil profile be accurately estimated and that care be taken in determining the allowable embankment/pavement loads which do not approach or exceed the allowable stress. Field personnel need to ensure that constructed system is within the limits established by the geotechnical design. The 100 South Street and 3300 South Street arrays show the consequences if such considerations are not fully evaluated and enforced during construction.

4.5 Settlement Performance of Large Earthen Embankments

For most of the monitoring arrays, the instrumentation was placed during construction and the end-of-construction was simply defined as the time when the clearance was given for pavement placement. For example, the end-of-construction period was defined for the two-stage MSE walls when the surcharge was removed. However, for most of the long-term instrumentation installed at the large earthen embankments, there was a gap in time between the release of the surcharge and the installation of the instrumentation. Thus, a backward-extrapolation technique was utilized to account for the settlement that occurred between the end-of-construction and beginning post-construction settlement monitoring. This method has been explained in the previous Research Report UT-08.05 (Farnsworth and Bartlett, 2008).

The Provo Array did include a complete set of construction and post-construction settlement data. Figure 4-15 shows the complete settlement history for this embankment from the south toe of the slope, extending beneath the embankment, through the north toe of the slope. It should be noted that the inclinometer cable was only 200 ft (61 m) in length, and so the horizontal inclinometer was read from both ends and therefore the data overlapped from about 70 to 200 ft (21 to 61 m). Due to inclinometer data drift, the two sets of readings did not overlap perfectly. However, the data in the figure has been averaged across the slight overlap zone. This large earth embankment was constructed over virgin ground, with the toe of either side of the embankment sloping at about a 2:1 slope bounding the full height of embankment between about 80 and 190 ft (24 and 58 m). It should be noted that this embankment was not designed by the I-15 Reconstruction Project team, so the surcharge design and design settlement goals are not known.

The maximum settlement was located within the middle of the embankment at approximately 110 feet (33.5 m) from the south end of the embankment toe. The

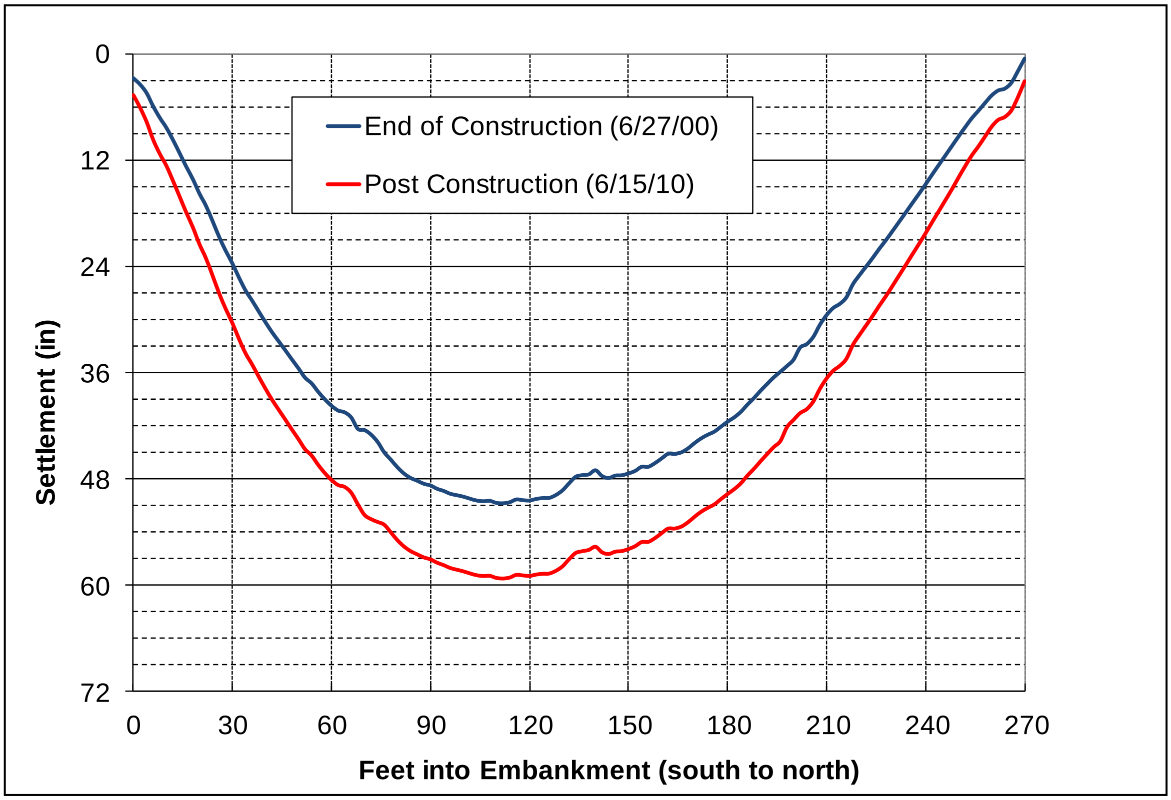

Figure 4-15. Construction and post-construction settlement profile for the Provo site.

magnitude of primary consolidation settlement was about 50.7 in (1290 mm) and a total settlement of about 59.2 in (1500 mm) after ten years of post-construction monitoring. This site exhibited a tremendous amount of both primary and secondary consolidation settlement. Even the south toe of the slope measured 2.7 and 4.6 in (68 and 116 mm) of construction and total settlement, respectively.

Figure 4-16 shows the time-rate of settlement curves for both the north and south toes of the slope (0 and 270 ft) and edges of the full height embankment (80 and 190 ft), as well as the point of maximum settlement (110 ft). These curves all exhibit the classic backwards "S" consolidation settlement shape, as well as the log-linear relationship through the creep settlement portion of the curve. These curves indicate that the rate of secondary creep settlement for the maximum settlement cases (i.e., full height) was approximately the same at all points and likewise for the two minimum settlement cases (i.e., toe of slope). All other points exhibited a rate of settlement somewhere in between these two cases. The creep settlement plots can be seen in Figure 4-17 compared with the

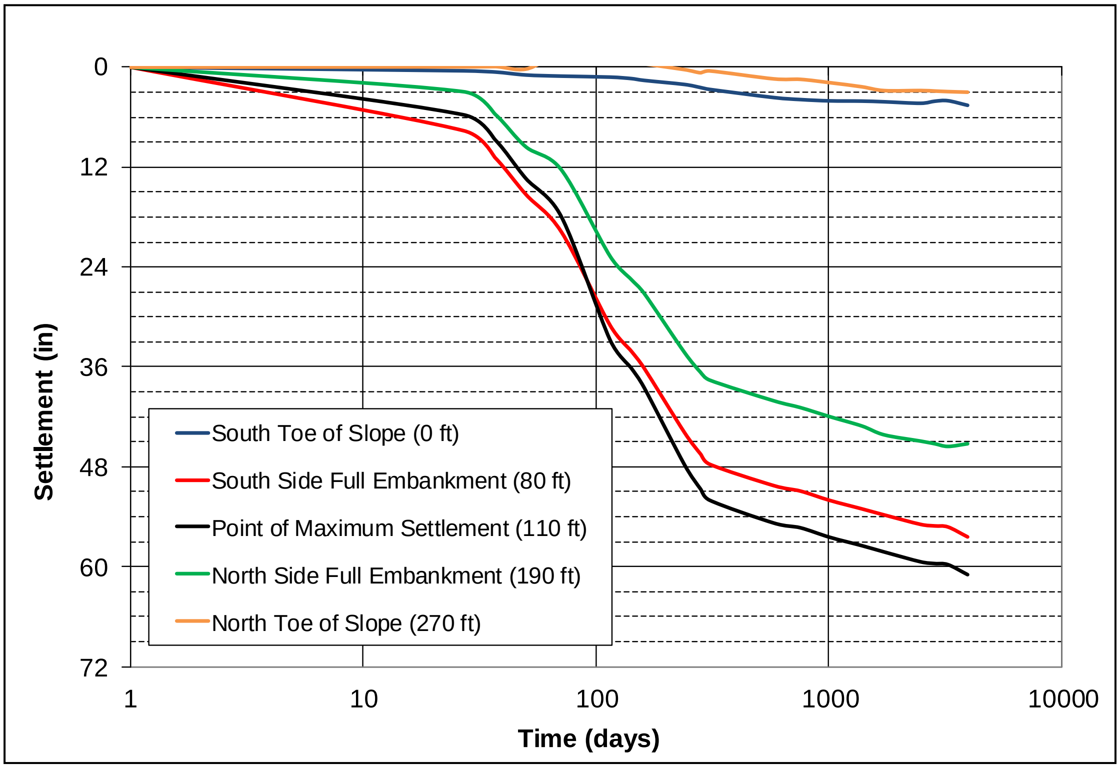

Figure 4-16. Complete time-rate of settlement plots for the Provo site.

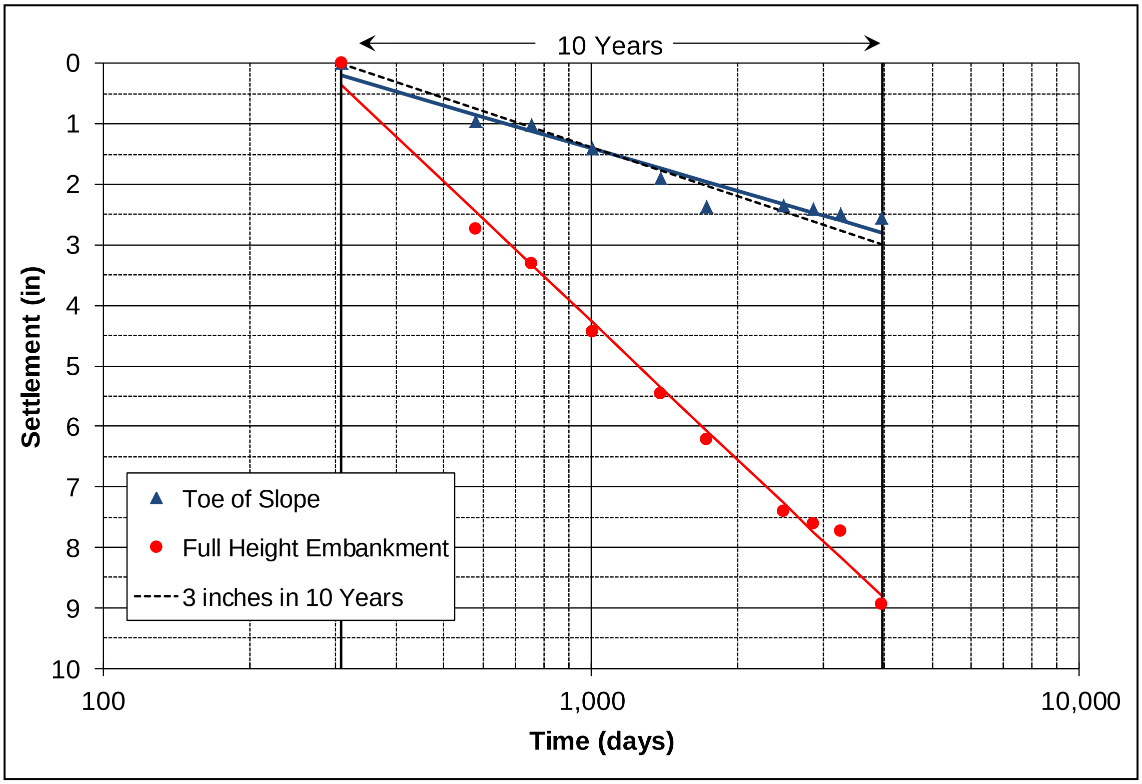

Figure 4-17. Rate of post-construction foundation creep for Provo site.

general post-construction design goal of no more than 3 inches (75 mm) of settlement over a ten year post-construction timeframe. The toe of the slope, where there was not any additional load placed, followed nearly perfectly the design rate for creep settlement. The full-height embankment exhibited behavior that was three times the design value.

Four other large earthen embankment locations were instrumented in Salt Lake Valley in conjunction with the I-15 Reconstruction Project. Of those four, one of the arrays (I-15 Median Array) had trouble with the benchmark and data has not provided enough reliability to report any results. The creep settlement results from the other arrays are included within this report. All four locations were selected because of the height and geometry of the embankments, availability for installing instrumentation, and accessibility for gathering long-term settlement readings. In most of the cases, these large embankments were also placed primarily in areas of new alignment or where the pre-existing embankment had not significantly preloaded the foundation soils. In addition,

Figure 4-18. 900 West large earth embankment.

Figure 4-19. I-15 Merger large earth embankment.

review of the I-15 Reconstruction projects records indicated that the 900 West Street embankment was essentially not surcharged. Therefore, the settlement results for this embankment show the creep behavior of the foundation soils for the normally consolidated case. This case will be useful for comparing the creep settlement rate of surcharged to non-surcharged embankments. Figure 4-18 shows the 900 West Street embankment at the bridge approach shortly after construction. Figure 4-19 shows the I-15 Merger embankment.

Figure 4-20 presents a summary of post-construction settlements at the three active large earthen embankment arrays. To ensure that the rates are shown appropriately, the creep settlement plots are shown with settlement plotted against the elapsed time (in days) from the beginning of the fill placement. The results of the three arrays are also compared with the general design goal of 3.0 in (76 mm) of post-construction settlement over a ten year time period. Post-construction settlement performance trends at the 4th South, 9th West, and I-15 Merger Arrays indicate that all of these large earthen embankments have exceeded the ten-year post-construction settlement goal. The 9th West embankment has produced the largest post-construction settlement at about 6.5 in (165 mm) followed closely by the 4th South embankment at about 5.5 in (140 mm). The I-15 Merger embankment has shown the least amount of post-construction settlement, 4.5 in (110 mm), yet still exceeding the design goal by more than about 30%. Since these embankments were primarily constructed in areas of new alignment or where pre-existing embankment had not significantly preloaded the foundation soils, locations over or adjacent to pre-existing embankment may not have experienced post-construction settlement rates of this magnitude.

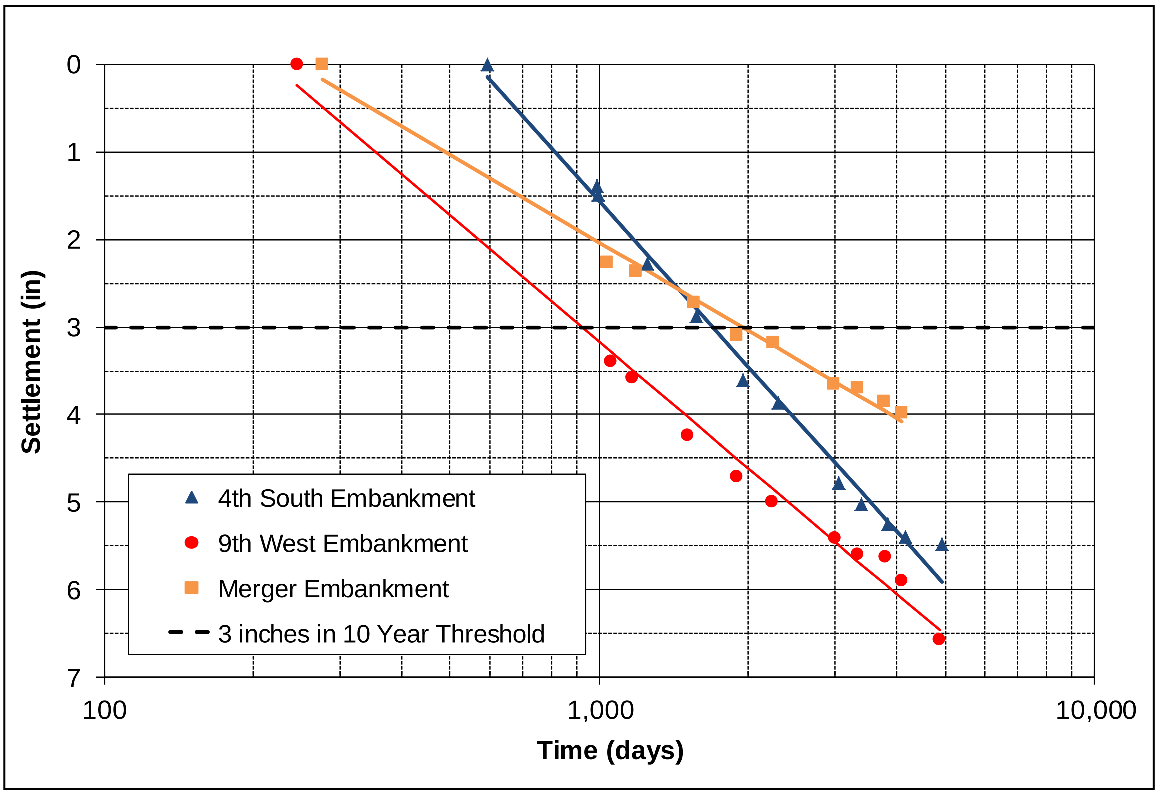

Figure 4-20. Rate of post-construction foundation creep for large earthen embankment sites.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The I-15 Reconstruction Project provides an excellent example of the challenges associated with rapid construction of large embankments and MSE walls over soft, compressible, foundation soil in an urban setting. The construction method utilized throughout much of the project for such locations consisted of constructing two-stage MSE walls over PV drain treated soils and surcharging such walls to minimize creep settlement. However, due to large primary consolidation settlements induced in the underlying Lake Bonneville clay deposits by such construction, other technologies were used at locations where utilities and/or adjacent structures could not tolerate such large settlements. These consisted of LCC foundation treatment and lightweight geofoam embankment. The technologies were designed to reduce both the primary consolidation and creep settlement to acceptable levels. The use of LCC foundations, geofoam embankments and two-stage walls with surcharging and PV drains has been successfully employed on the I-15 Reconstruction Project. The decision to use these geo-technologies varied from location to location. However, the primary contributing factors included cost, construction time and settlement tolerances of adjacent facilities at each location. This monitoring program described herein provides case histories of relative comparison of these associated factors, which in turn can be used by others to explore the use of these geo-technologies for future projects. The results of this monitoring project have also strengthened the understanding of the behaviors of these systems in conjunction with the long-term settlement behavior of Lake Bonneville and underlying clayey deposits in the Salt Lake Valley.

The I-15 embankment monitoring program was established to investigate the construction and post-construction behavior of these innovate technologies and techniques and to analyze the performance of such embankments. The program was established with a ten-year post construction monitoring period in mind. This report has provided a summary of the settlement results of both the construction and ten-year post-construction periods obtained during this monitoring project.

The long-term monitoring indicates that construction and post-construction settlement performance of each technology varied widely. Two-stage MSE walls with PV drains and surcharging created the most settlement impacts to adjacent facilities and produced the largest amount of post-construction settlement. Primary consolidation settlement at a typical 2-stage MSE wall face exceeded 3 ft (1 m) and the zone of significant settlement [i.e., 1 in (25 mm)] extended a distance of up to 1.5 times the full wall height, including the height of surcharge. Thus, it is recommended that alternatives to this technology be considered at locations where settlement sensitive infrastructure falls within this zone of significant settlement. Additionally, based on the ten-year monitoring results of post-construction settlements at 4 locales (1 MSE wall and 3 sloped embankments), the surcharging strategy used by the design-build team appears to only limit the 10-year post-construction settlement in the foundation soils to about 4 to 6 in (100 to 150 mm). These values at these select locations have exceeded the post-construction settlement goal established by the project of 3 in (76 mm), thus, we recommend that further evaluations be made regarding the surcharge design and construction practices. In addition, the feasibility of achieving this 3 in (76 mm) performance goal using conventional embankment construction and surcharging for the lacustrine sediments in the Salt Lake Valley should be evaluated.

The lime cement column treated foundation system developed about 6 in (150 mm) of construction settlement due to the placement of the construction of the MSE wall, embankment and surcharge. An additional 2.5 in (64 mm) of post-construction settlement has been observed at the face of the MSE wall over the 10-year post construction monitoring period. Our monitoring shows that the south side of the adjacent building, which is located nearest to the MSE wall face, has undergone about 2.8 inches (71 mm) of construction and post-construction settlement in ten years resulting from the placement of the adjacent MSE wall. Survey points around this building show that the zone of significant settlement [i.e., 1 in (25 mm)] extends about 66 ft (20 m) from the wall face, or about 1.7 times the full height of the wall, including surcharge. Differential settlements across the adjacent building are about 2.6 inches (65 mm). Thus, the LCC treatment has effectively reduced primary consolidation settlement near the wall face, but a significant zone beyond the wall face has been exposed to potentially damaging settlements. This zone is broader than what is typical for a non-treated site and may be a result of consolidation in deeper clays layers caused by a partial stress transfer from the overlying columns. Post-construction settlements remain with the design goal of no more than 3 inches (76 mm) of creep settlements over a 10-year post-construction period.

Geofoam embankments typically had the best overall settlement performance of the technologies monitored. Gap closure and deformation of the geofoam embankment due to placement of the load distribution slab and overlying roadway materials during construction was about 1 percent of the embankment height, or about 3.1 in (80 mm) at our array locations. The trend of post-construction creep strain within the geofoam embankment suggests that geofoam embankments will meet the 50-year post construction deformation limit of 1% axial strain. At one geofoam array (3300 South Street), the foundation soil settled about 0.6 in (15 mm) due to the placement of the embankment and overlying loads. Subsequently, the face of the embankment settled an additional 1.0 in (25 mm) in a 5-year period due to the placement of a 5 ft (1.5-m) toe berm at the toe of the fascia wall. At the other geofoam array (100 South Street), 7.5 inches (190 mm) of foundation movement has occurred over the monitoring period. This is a significant amount of foundation settlement with respect to the intent of using geofoam to greatly minimize foundation settlement. The larger than anticipated foundation settlements experienced at both the 100 South and 3300 South Street geofoam arrays indicate the highly compressible nature of the foundation soils and the care that must be taken not to overload these soils by placing dead loads that approach or exceed the preconsolidation stress. Thus, it is imperative that the preconsolidation pressure be obtained accurately for such locales, and that care be taken in determining the dead loads (e.g., weight of borrow, base and pavement) which approach that limit. An increase in the amount of creep settlement is expected for cases where the dead loads approach the preconsolidation stress, as shown by these two cases. Furthermore, construction oversight should verify that the design loads are not exceeded during construction.

6.0 IMPLEMENTATION

Implementation of this report at UDOT will best be performed as the results of the study are used by others in the design and selection process of utilizing the different geo-technologies on future projects. Many of the lessons learned throughout this project have already been utilized by designers for construction of embankments over soft soil sties on other similar projects. These results should continue to be utilized in future applications as well.

UDOT Report UT-08.05 (Farnsworth and Bartlett, 2008) includes a generalized flowchart that shows the type of logic that can be used in the selection process of identifying an appropriate geo-technology based on settlement, time of construction, and cost. This project has provided a good case study in comparing these technologies based on those project constraints. UDOT Report UT-08.05 provides a good overview of these factors for the three different geo-technologies as used over the soft, thick Lake Bonneville soils.

This study has also shown that additional research is warranted in better understanding the nature of secondary settlement in the Lake Bonneville clayey deposits, developing better methodologies for determining when to release embankment surcharges, and in continuing to understand the true effects of surcharging in reducing the rate of secondary settlement. A subsequent UDOT research project is just underway to investigate the design and monitoring of surcharged embankments for reducing the rate of secondary settlement. This additional work aims to expand on the results of the embankment monitoring study (contained within this report) by developing design guidance for determining the amount of surcharge required, the appropriate laboratory testing program and in situ testing methods to support the design, and methods to monitor and release fills that are consistent with the design data and project performance goals. This further surcharge work specifically addresses the additional research need identified during the embankment monitoring study.

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8.0 APPENDIX

The appendix to this report includes the complete set of data for all instrumentation installed as part of this long-term embankment monitoring project. This data includes the full series of readings from instrumentation installation through the duration of the ten-year post-construction monitoring period. In a number of instances the instrumentation was damaged and readings were suspended early. The initial set of readings for each set of instrumentation was typically considered the baseline dataset and was taken shortly after installation. All subsequent data then provides any measurable change relative to the baseline readings. The instrumentation that remained accessible and survived the entire post-construction monitoring period includes all data gathered through the final set of readings taken in 2011.

Each set of instrumentation data within this appendix includes a plot of the raw data and a table with the corresponding tabulated values. The data is shown in the respective units for which the data was collected. The data is organized according to each separate technology type, containing the same order of instrumentation arrays listed in Table 2.1.

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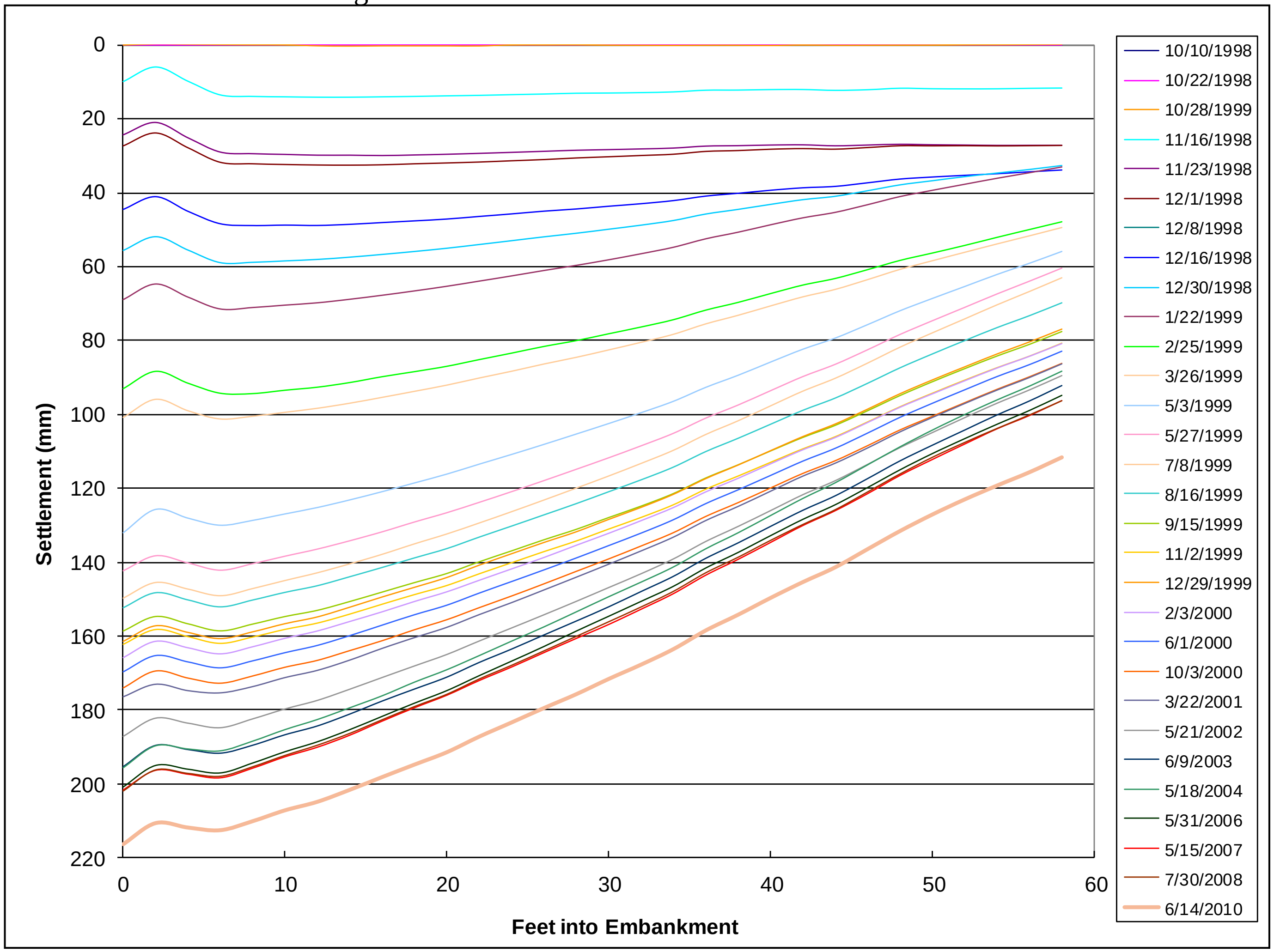

Table A1. Lime Cement Columns – Inclinometer 1 Data (in mm)

Depth (ft)	10/10/1998	10/22/1998	10/28/1999	11/16/1998	11/23/1998	12/1/1998	12/16/1998	12/30/1998	1/22/1999	2/25/1999	3/26/1999	5/3/1999	5/27/1999	7/8/1999
0	0.0	0.0	0.0	9.9	24.3	27.3	44.5	55.6	68.9	93.0	100.8	132.0	142.3	149.7
2	0.0	0.0	-0.3	6.0	21.0	23.8	41.1	51.9	64.7	88.3	95.9	125.7	138.2	145.5
4	0.0	0.0	-0.2	9.8	25.1	27.8	45.0	55.5	68.2	91.5	99.0	128.1	140.2	147.3
6	0.0	0.0	-0.1	13.5	29.0	31.8	48.4	58.9	71.5	94.3	101.2	130.0	142.1	149.1
8	0.0	0.0	-0.1	13.9	29.4	32.2	48.9	58.8	71.1	94.4	100.5	128.7	140.4	147.1
10	0.0	0.0	0.0	14.0	29.6	32.3	48.7	58.4	70.4	93.4	99.4	126.9	138.4	144.9
12	0.0	0.0	0.2	14.1	29.8	32.5	48.8	58.0	69.8	92.6	98.3	125.2	136.4	142.8
14	0.0	0.0	0.3	14.1	29.8	32.5	48.5	57.4	68.8	91.4	97.0	123.1	134.2	140.4
16	0.0	0.0	0.2	14.0	29.9	32.4	48.1	56.7	67.7	89.8	95.4	120.9	131.8	137.8
18	0.0	0.0	0.2	13.9	29.8	32.2	47.6	55.9	66.6	88.4	93.7	118.5	129.1	135.0
20	0.0	0.0	0.2	13.8	29.6	31.9	47.1	55.0	65.3	87.0	92.1	116.1	126.6	132.3
22	0.0	0.0	0.3	13.6	29.3	31.7	46.4	54.0	63.9	85.2	90.1	113.4	123.8	129.4
24	0.0	0.0	0.0	13.4	29.1	31.3	45.7	53.0	62.5	83.4	88.3	110.8	120.9	126.3
26	0.0	0.0	0.0	13.3	28.8	31.0	45.0	51.9	61.0	81.6	86.3	108.1	117.9	123.2
28	0.0	0.0	0.0	13.1	28.5	30.6	44.4	51.0	59.6	80.0	84.5	105.3	114.8	119.9
30	0.0	0.0	0.1	13.0	28.3	30.3	43.6	49.9	58.1	78.2	82.5	102.5	111.7	116.7
32	0.0	0.0	0.1	12.9	28.1	29.9	43.0	48.8	56.5	76.3	80.5	99.5	108.5	113.2
34	0.0	0.0	0.1	12.7	27.9	29.6	42.1	47.5	54.7	74.4	78.3	96.4	105.1	109.7
36	0.0	0.0	0.1	12.2	27.4	28.8	40.9	45.8	52.5	71.8	75.5	92.7	101.0	105.4
38	0.0	0.0	0.1	12.2	27.3	28.6	40.1	44.5	50.7	69.7	73.2	89.4	97.4	101.7
40	0.0	0.0	0.2	12.1	27.1	28.2	39.3	43.1	48.7	67.3	70.6	85.8	93.6	97.7
42	0.0	0.0	0.0	12.1	27.0	28.0	38.7	41.9	46.8	65.0	68.2	82.3	89.7	93.7
44	0.0	0.0	0.1	12.3	27.3	28.2	38.3	41.0	45.3	63.2	66.1	79.3	86.4	90.2
46	0.0	0.0	0.1	12.1	27.1	27.8	37.3	39.4	43.2	60.8	63.5	75.7	82.5	86.1
48	0.0	0.0	0.1	11.7	26.9	27.3	36.3	37.9	41.0	58.3	60.7	71.9	78.3	81.8
50	0.0	0.0	0.0	11.8	27.0	27.3	35.7	36.7	39.3	56.3	58.4	68.6	74.6	77.9
52	0.0	0.0	0.0	11.9	27.1	27.3	35.3	35.6	37.7	54.3	56.1	65.4	71.0	74.1
54	0.0	0.0	-0.1	11.9	27.2	27.3	34.8	34.7	36.1	52.1	53.8	62.1	67.4	70.3
56	0.0	0.0	-0.1	11.7	27.2	27.3	34.3	33.7	34.6	49.9	51.7	59.1	63.9	66.7
58	0.0	0.0	-0.2	11.7	27.2	27.2	33.8	32.6	33.0	47.9	49.4	55.9	60.4	63.0

Table A1 Continued. Lime Cement Columns – Inclinometer 1 Data (in mm)

Depth (ft)	8/16/1999	9/15/1999	11/2/1999	12/29/1999	2/3/2000	6/1/2000	10/3/2000	3/22/2001	5/21/2002	6/9/2003	5/18/2004	5/31/2006	5/15/2007	7/30/2008	6/14/2010
0	152.3	158.6	162.2	161.4	165.8	169.6	174.0	176.4	187.1	195.3	195.6	200.8	201.6	201.9	216.3
2	148.2	154.7	158.2	157.2	161.4	165.3	169.4	173.0	182.2	189.6	189.7	195.0	196.3	196.2	210.6
4	150.2	156.7	160.1	159.0	163.1	167.0	171.3	174.7	183.5	190.7	190.5	196.0	197.4	197.1	211.8
6	152.1	158.6	161.9	160.7	164.8	168.6	172.7	175.3	184.8	191.7	191.0	197.0	198.3	197.9	212.5
8	150.2	156.7	160.2	158.8	162.9	166.7	170.8	173.6	182.4	189.5	188.4	194.3	195.7	195.3	210.1
10	148.1	154.7	158.2	156.6	160.6	164.5	168.4	171.2	179.7	186.7	185.3	191.3	192.6	192.3	207.1
12	146.3	153.0	156.5	154.8	158.6	162.5	166.5	169.3	177.4	184.3	182.6	188.6	190.0	189.5	204.8
14	143.9	150.6	154.0	152.2	156.0	159.9	163.9	166.5	174.4	181.1	179.4	185.3	186.8	186.3	201.6
16	141.4	148.1	151.4	149.4	153.4	157.0	161.2	163.3	171.2	177.6	176.1	181.7	183.0	182.6	198.1
18	138.8	145.5	148.7	146.8	150.6	154.2	158.3	160.4	168.1	174.3	172.4	178.1	179.4	179.0	194.8
20	136.3	143.0	146.3	144.1	148.0	151.6	155.5	157.6	165.0	171.1	169.1	174.7	176.0	175.7	191.4
22	133.2	139.9	143.1	140.8	144.9	148.3	152.3	154.2	161.3	167.1	165.3	170.7	172.0	171.6	187.2
24	130.2	136.9	140.1	137.7	141.8	145.2	149.1	150.9	157.8	163.5	161.3	166.8	168.3	167.9	183.4
26	127.2	133.9	137.1	134.6	138.7	142.1	145.8	147.5	154.2	159.7	157.5	162.8	164.4	164.0	179.5
28	124.1	131.1	134.2	131.7	135.4	138.8	142.5	144.0	150.6	155.9	153.4	158.6	160.6	160.1	175.7
30	120.9	127.9	131.0	128.4	132.2	135.5	139.1	140.5	146.8	152.1	149.3	154.6	156.8	156.1	171.6
32	117.7	124.8	127.9	125.1	128.7	132.1	135.6	136.9	143.1	147.9	145.4	150.6	152.7	152.1	167.7
34	114.2	121.4	124.4	121.6	125.2	128.5	132.0	133.2	139.1	143.8	141.3	146.5	148.5	147.9	163.5
36	110.0	117.2	120.2	117.4	120.9	124.1	127.6	128.7	134.4	138.9	136.3	141.5	143.5	142.8	158.5
38	106.4	113.6	116.7	113.7	117.3	120.4	123.9	124.9	130.3	134.7	132.0	137.3	139.2	138.6	154.2
40	102.7	109.9	113.0	109.8	113.4	116.5	119.9	120.8	126.0	130.3	127.4	132.8	134.6	134.1	149.7
42	98.9	106.2	109.3	106.0	109.6	112.6	116.0	116.7	121.7	125.9	122.7	128.4	130.1	129.8	145.4
44	95.6	102.9	106.0	102.6	106.2	109.2	112.5	113.2	117.9	122.0	118.5	124.4	126.0	125.8	141.4
46	91.6	99.0	102.0	98.6	102.2	105.0	108.4	109.1	113.5	117.4	113.6	119.8	121.4	121.0	136.4
48	87.4	94.9	97.9	94.4	98.1	100.8	104.2	104.7	109.0	112.6	108.8	115.0	116.5	116.1	131.6
50	83.6	91.1	94.3	90.7	94.4	97.0	100.5	100.8	104.9	108.3	104.2	110.6	112.2	111.6	127.1
52	80.0	87.6	90.7	87.1	90.9	93.3	96.8	97.0	100.9	104.2	100.0	106.5	108.0	107.6	123.0
54	76.5	84.2	87.3	83.6	87.4	89.7	93.2	93.4	97.0	100.1	96.1	102.7	103.9	103.8	119.2
56	73.3	81.0	84.2	80.4	84.3	86.5	89.8	90.0	93.4	96.3	92.3	98.9	100.3	100.1	115.6
58	69.8	77.6	80.7	76.9	80.8	82.9	86.2	86.3	89.5	92.2	88.3	94.8	96.3	96.3	111.6

Figure A2. Lime Cement Columns – Inclinometer 2

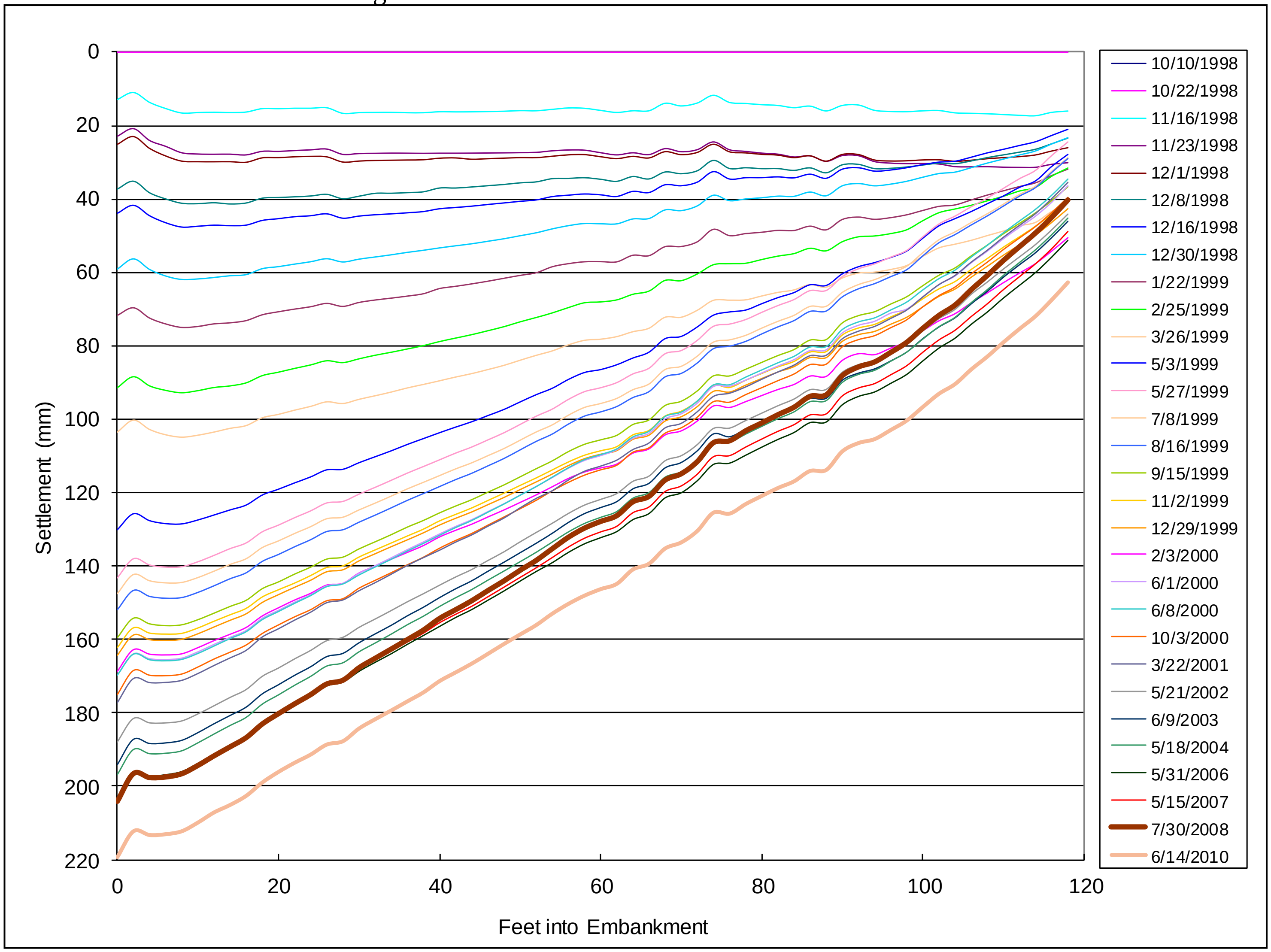

Table A2. Lime Cement Columns – Inclinometer 2 Data (in mm)

Depth (ft)	10/10/1998	10/22/1998	11/16/1998	11/23/1998	12/1/1998	12/8/1998	12/16/1998	12/30/1998	1/22/1999
0	0.0	0.0	12.9	22.9	25.1	37.3	43.9	59.1	71.7
2	0.0	0.0	11.0	20.8	23.0	35.2	41.7	56.3	69.6
4	0.0	0.0	13.7	24.1	26.2	38.3	44.6	59.2	72.4
6	0.0	0.0	15.4	25.7	28.3	40.0	46.5	61.0	74.0
8	0.0	0.0	16.6	27.4	29.7	41.2	47.7	61.9	75.0
10	0.0	0.0	16.5	27.8	29.8	41.3	47.4	61.8	74.7
12	0.0	0.0	16.4	27.8	29.9	41.0	47.1	61.4	74.0
14	0.0	0.0	16.5	27.8	29.8	41.4	47.3	60.9	73.7
16	0.0	0.0	16.3	28.0	30.0	41.1	47.1	60.6	73.1
18	0.0	0.0	15.4	27.0	28.8	39.8	45.8	59.0	71.5
20	0.0	0.0	15.4	27.0	28.7	39.6	45.4	58.4	70.7
22	0.0	0.0	15.3	26.8	28.5	39.4	44.8	57.7	70.0
24	0.0	0.0	15.3	26.6	28.4	39.2	44.6	57.1	69.4
26	0.0	0.0	15.1	26.4	28.5	38.7	44.1	56.3	68.5
28	0.0	0.0	16.7	27.9	29.9	39.9	45.2	57.2	69.3
30	0.0	0.0	16.5	27.6	29.7	39.2	44.7	56.4	68.2
32	0.0	0.0	16.4	27.6	29.5	38.5	44.3	55.8	67.5
34	0.0	0.0	16.4	27.5	29.4	38.4	44.1	55.2	67.0
36	0.0	0.0	16.5	27.5	29.4	38.3	43.8	54.5	66.5
38	0.0	0.0	16.5	27.6	29.3	38.0	43.4	54.0	65.8
40	0.0	0.0	16.2	27.5	28.9	37.0	42.7	53.3	64.4
42	0.0	0.0	16.3	27.5	28.8	37.0	42.3	52.8	63.8
44	0.0	0.0	16.3	27.5	29.2	36.7	42.0	52.2	63.1
46	0.0	0.0	16.2	27.5	29.0	36.4	41.5	51.5	62.4
48	0.0	0.0	16.1	27.4	28.9	36.0	41.1	50.8	61.6
50	0.0	0.0	15.9	27.4	28.7	35.6	40.6	50.0	60.8
52	0.0	0.0	16.0	27.3	28.7	35.3	40.3	49.2	60.1
54	0.0	0.0	15.6	26.9	28.4	34.5	39.3	48.1	58.5
56	0.0	0.0	15.2	26.7	28.0	34.4	39.0	47.3	57.6
58	0.0	0.0	15.3	26.7	27.9	34.2	38.6	46.7	57.1
60	0.0	0.0	15.9	27.4	28.5	34.6	38.9	46.8	57.1
62	0.0	0.0	16.4	28.0	29.0	35.2	39.3	46.8	57.1
64	0.0	0.0	16.0	27.4	28.4	33.9	37.9	45.4	55.3
66	0.0	0.0	16.0	27.9	28.8	34.5	38.2	45.3	55.5
68	0.0	0.0	13.9	26.3	27.1	32.7	36.1	43.0	53.0
70	0.0	0.0	14.7	27.1	27.9	33.1	36.4	43.2	53.0
72	0.0	0.0	13.9	26.6	27.3	32.3	35.4	41.9	51.7
74	0.0	0.0	11.8	24.5	25.1	29.5	32.5	39.0	48.3
76	0.0	0.0	13.7	26.6	27.2	31.7	34.6	40.5	50.0
78	0.0	0.0	14.0	27.0	27.4	31.5	34.2	40.0	49.4
80	0.0	0.0	14.3	27.5	27.8	31.7	34.2	39.7	49.1
82	0.0	0.0	14.5	27.8	28.1	31.7	34.0	39.2	48.6
84	0.0	0.0	15.1	28.6	28.7	32.2	34.2	39.3	48.6
86	0.0	0.0	14.7	28.3	28.2	31.5	33.3	38.1	47.4
88	0.0	0.0	16.0	29.7	29.7	32.9	34.4	39.1	48.4
90	0.0	0.0	14.5	28.2	27.9	30.7	31.9	36.4	45.6
92	0.0	0.0	14.4	28.2	27.9	30.6	31.5	35.8	44.9
94	0.0	0.0	15.9	29.8	29.4	31.7	32.4	36.4	45.5
96	0.0	0.0	16.2	30.2	29.7	31.6	32.1	36.0	45.1
98	0.0	0.0	16.2	30.4	29.6	31.3	31.5	35.2	44.3
100	0.0	0.0	16.0	30.3	29.4	30.7	30.6	34.1	43.1
102	0.0	0.0	15.9	30.5	29.3	30.3	30.0	33.1	42.0
104	0.0	0.0	16.5	31.2	29.7	30.4	29.7	32.7	41.6
106	0.0	0.0	16.7	31.2	29.4	29.6	28.6	31.5	40.3
108	0.0	0.0	16.8	31.2	29.0	28.7	27.4	30.2	38.9
110	0.0	0.0	17.0	31.3	28.7	28.0	26.5	29.1	37.8
112	0.0	0.0	17.2	31.4	28.5	27.2	25.4	28.0	36.6
114	0.0	0.0	17.3	31.4	28.0	26.4	24.4	26.9	35.6
116	0.0	0.0	16.4	30.6	26.9	25.0	22.7	25.0	33.6
118	0.0	0.0	16.0	30.1	26.0	23.4	21.0	23.3	31.9

Table A2 Continued. Lime Cement Columns – Inclinometer 2 Data (in mm)

Depth (ft)	2/25/1999	3/26/1999	5/3/1999	5/27/1999	7/8/1999	8/16/1999	9/15/1999	11/2/1999	12/29/1999
0	91.4	103.5	130.1	143.2	147.5	151.9	159.5	162.2	164.3
2	88.4	100.3	125.8	138.0	142.3	146.6	154.2	156.8	158.8
4	90.9	102.8	127.6	139.7	144.0	148.3	155.8	158.3	160.1
6	92.1	104.2	128.4	140.3	144.6	148.8	156.2	158.5	160.3
8	92.8	104.9	128.5	140.2	144.5	148.6	156.0	158.3	160.0
10	92.2	104.4	127.5	138.8	143.1	147.2	154.6	156.9	158.5
12	91.4	103.5	126.1	137.1	141.4	145.4	152.8	155.0	156.6
14	90.9	102.5	124.7	135.3	139.6	143.5	151.0	153.3	154.8
16	90.1	101.7	123.4	133.7	138.0	141.8	149.3	151.5	153.0
18	88.1	99.6	120.7	130.7	135.0	138.7	146.2	148.4	149.9
20	87.2	98.7	119.1	128.9	133.2	136.9	144.3	146.5	147.8
22	86.2	97.5	117.4	126.8	131.1	134.8	142.2	144.6	145.8
24	85.2	96.5	115.7	125.0	129.3	132.8	140.3	142.6	143.9
26	84.1	95.3	113.8	122.8	127.1	130.6	138.1	140.4	141.6
28	84.6	95.7	113.6	122.4	126.7	130.1	137.6	140.0	141.0
30	83.6	94.6	111.9	120.4	124.7	128.1	135.3	137.6	138.6
32	82.6	93.6	110.2	118.6	122.9	126.1	133.4	135.6	136.7
34	81.8	92.6	108.6	116.6	120.9	124.1	131.5	133.7	134.7
36	80.9	91.5	106.9	114.7	119.0	122.1	129.4	131.8	132.9
38	80.0	90.5	105.3	112.9	117.2	120.3	127.6	129.9	130.9
40	78.8	89.5	103.7	111.1	115.4	118.4	125.5	127.7	128.8
42	77.9	88.5	102.2	109.2	113.5	116.5	123.7	125.9	127.0
44	77.0	87.6	100.7	107.6	111.9	114.7	121.9	124.2	125.3
46	75.9	86.5	99.0	105.6	109.9	112.7	119.9	122.1	123.3
48	74.8	85.3	97.3	103.7	108.0	110.7	117.9	120.1	121.3
50	73.5	83.9	95.3	101.4	105.7	108.4	115.7	118.0	119.2
52	72.3	82.6	93.3	99.2	103.5	106.0	113.5	116.0	117.1
54	71.0	81.4	91.6	97.2	101.5	104.0	111.3	113.8	114.9
56	69.6	79.7	89.2	94.6	98.9	101.3	108.8	111.6	112.6
58	68.3	78.5	87.3	92.5	96.8	99.1	106.8	109.8	110.8
60	68.0	78.2	86.5	91.4	95.7	98.0	105.6	108.6	109.5
62	67.5	77.5	85.2	90.0	94.3	96.5	104.4	107.5	108.5
64	66.0	76.2	83.3	87.7	92.0	94.1	101.5	104.3	105.5
66	65.1	75.2	81.7	86.1	90.4	92.5	100.2	103.1	104.3
68	62.2	72.2	78.1	82.2	86.5	88.5	96.3	99.1	100.5
70	62.3	72.2	77.4	81.3	85.6	87.5	95.1	97.8	99.3
72	60.4	70.3	74.9	78.5	82.8	84.7	92.3	95.1	96.5
74	57.9	67.6	71.7	74.7	79.0	80.8	88.2	90.9	92.4
76	57.6	67.6	70.8	74.1	78.4	80.1	88.2	91.4	92.6
78	57.5	67.5	70.3	72.8	77.1	78.8	86.4	89.4	90.7
80	56.5	66.4	68.5	70.9	75.2	76.8	84.5	87.5	88.9
82	55.6	65.5	66.9	69.0	73.3	74.8	82.7	85.8	87.1
84	54.9	64.8	65.5	67.4	71.7	73.1	81.0	84.3	85.7
86	53.4	63.3	63.4	65.0	69.3	70.6	78.4	81.7	83.2
88	54.1	64.0	63.6	64.9	69.2	70.5	78.3	81.6	83.2
90	51.6	61.5	60.4	61.2	65.5	66.7	73.8	77.1	78.8
92	50.3	60.2	58.5	59.0	63.3	64.5	71.8	75.2	77.0
94	50.1	59.9	57.3	57.7	62.0	63.1	70.7	74.2	76.1
96	49.4	59.2	55.9	55.9	60.2	61.2	68.6	72.2	74.1
98	48.4	58.1	54.2	54.0	58.3	59.3	66.6	70.1	72.2
100	45.9	55.6	50.7	50.3	54.6	55.5	63.6	67.2	69.4
102	43.7	53.3	47.3	46.8	51.1	51.9	60.8	64.5	66.5
104	42.7	52.3	45.3	44.7	49.0	49.7	58.8	62.5	64.5
106	41.7	51.3	43.4	42.1	46.4	47.1	55.5	59.2	61.3
108	40.5	50.0	41.3	39.7	44.0	44.6	52.6	56.2	58.3
110	39.3	48.7	39.2	37.1	41.4	41.9	49.5	53.1	55.3
112	37.8	47.3	36.8	34.5	38.8	39.2	46.6	50.3	52.5
114	36.8	46.4	35.0	32.2	36.5	36.9	43.8	47.4	49.8
116	33.8	43.4	31.1	28.1	32.4	32.7	40.4	44.1	46.4
118	31.6	41.2	27.9	24.5	28.8	29.0	36.7	39.9	42.7

Table A2 Continued. Lime Cement Columns – Inclinometer 2 Data (in mm)

Depth (ft)	2/3/2000	6/1/2000	6/8/2000	10/3/2000	3/22/2001	5/21/2002	6/9/2003	5/18/2004	5/31/2006
0	168.7	169.7	169.7	175.0	177.2	187.9	194.1	196.8	203.6
2	162.8	163.9	164.0	168.5	170.7	181.5	187.2	190.0	196.4
4	164.0	165.3	165.5	169.7	171.8	182.7	188.4	191.1	197.2
6	164.2	165.5	165.8	169.9	171.7	182.7	188.2	191.0	196.8
8	163.9	165.1	165.4	169.4	171.1	182.2	187.5	190.3	196.0
10	162.2	163.4	163.8	167.5	169.3	180.3	185.4	188.2	193.7
12	160.3	161.4	161.8	165.3	167.1	178.1	183.0	185.8	191.2
14	158.6	159.4	159.8	163.5	165.0	175.8	180.7	183.4	188.9
16	156.7	157.6	157.9	161.5	163.0	173.6	178.4	181.2	186.6
18	153.6	154.2	154.6	158.4	159.3	170.0	174.8	177.6	183.0
20	151.4	152.1	152.4	156.0	157.1	167.8	172.3	175.1	180.5
22	149.3	149.9	150.2	153.9	154.7	165.3	169.8	172.5	177.9
24	147.4	147.8	148.0	151.9	152.6	163.0	167.4	170.1	175.5
26	145.2	145.4	145.6	149.5	150.0	160.3	164.7	167.3	172.7
28	144.7	144.8	144.9	148.9	149.2	159.4	163.8	166.4	171.6
30	141.9	142.0	142.4	146.0	146.7	156.7	160.9	163.4	168.7
32	140.0	139.9	140.3	143.9	144.5	154.4	158.5	161.0	166.2
34	138.1	137.8	138.2	141.8	142.2	152.1	156.2	158.5	163.9
36	136.3	135.5	135.9	139.7	139.8	149.7	153.6	156.0	161.3
38	134.4	133.4	133.8	137.6	137.7	147.5	151.2	153.7	158.9
40	132.1	131.3	131.6	135.1	135.7	145.2	148.6	151.0	156.5
42	130.3	129.2	129.5	133.0	133.5	143.0	146.2	148.6	154.0
44	128.6	127.4	127.6	131.1	131.5	140.9	144.0	146.4	151.9
46	126.6	125.2	125.3	128.9	129.2	138.5	141.4	143.8	149.3
48	124.7	123.0	123.1	126.6	126.9	136.1	139.0	141.4	146.8
50	122.7	120.7	120.7	124.4	124.2	133.4	136.4	138.8	144.1
52	120.6	118.3	118.4	122.1	121.6	130.9	133.8	136.3	141.5
54	118.4	115.9	115.8	119.5	119.5	128.3	131.1	133.5	139.1
56	116.1	113.3	113.2	117.2	116.6	125.7	128.1	130.7	136.3
58	114.4	111.2	111.0	115.2	114.2	123.4	125.7	128.4	133.9
60	113.3	109.9	109.6	113.8	112.8	121.8	124.1	126.7	132.3
62	112.2	108.3	108.1	112.5	111.1	120.2	122.5	125.2	130.6
64	109.2	105.2	104.8	109.0	108.3	116.9	119.0	121.5	127.4
66	108.1	103.8	103.3	107.8	106.5	115.5	117.5	120.0	125.7
68	104.3	99.9	99.3	103.8	102.4	111.3	113.3	115.8	121.4
70	103.2	98.5	98.1	102.3	101.1	109.9	111.8	114.3	120.0
72	100.5	95.6	95.0	99.4	97.9	106.9	108.6	111.1	116.8
74	96.4	91.1	90.6	95.2	93.8	102.5	104.0	106.4	112.3
76	96.8	91.0	90.6	95.4	92.9	102.4	104.8	106.3	112.0
78	95.2	89.3	88.5	93.3	91.2	100.4	102.7	104.1	109.8
80	93.6	87.4	86.6	91.4	89.1	98.3	100.6	101.9	107.6
82	91.9	85.5	84.6	89.5	87.1	96.3	98.8	99.9	105.5
84	90.5	83.8	82.9	87.7	85.3	94.5	96.9	98.0	103.6
86	88.3	81.3	80.3	85.1	82.7	92.0	94.4	95.2	100.9
88	88.3	81.1	80.2	85.0	82.6	91.9	94.3	94.9	100.8
90	84.0	76.5	75.6	80.3	78.1	87.2	89.4	90.0	96.1
92	82.2	74.4	73.5	78.3	76.0	85.1	87.5	87.8	93.8
94	82.4	73.3	72.4	77.2	74.7	84.0	86.3	86.7	92.6
96	80.6	71.1	70.3	75.1	72.5	81.8	84.1	84.2	90.2
98	78.9	70.0	68.1	72.9	70.2	79.5	81.7	81.7	87.8
100	75.9	66.7	64.8	69.4	66.7	75.9	78.0	78.2	84.1
102	73.2	63.3	61.7	66.3	63.3	72.6	74.9	74.8	80.6
104	71.2	61.0	59.4	64.0	60.8	70.1	72.4	72.2	77.9
106	68.3	57.4	55.8	60.4	57.2	66.0	68.6	68.3	74.2
108	65.6	54.2	52.6	57.2	54.0	62.6	65.1	64.7	70.8
110	62.8	50.8	49.2	53.8	50.4	59.1	61.3	60.8	67.0
112	60.2	47.7	46.0	50.6	47.2	55.8	57.9	57.3	63.5
114	57.6	44.6	42.8	47.5	43.9	52.4	54.6	53.8	60.0
116	54.2	40.9	39.0	43.7	39.9	48.4	50.5	49.7	55.8
118	50.6	36.4	34.6	39.6	35.5	44.1	46.1	45.2	51.3

Table A2 Continued. Lime Cement Columns – Inclinometer 2 Data (in mm)

Depth (ft)	5/15/2007	7/30/2008	6/14/2010
0	203.6	204.1	219.3
2	196.2	196.5	212.3
4	197.2	197.6	213.3
6	196.9	197.5	213.1
8	196.1	196.6	212.3
10	193.8	194.3	209.9
12	191.4	191.7	207.1
14	188.9	189.2	205.1
16	186.6	186.7	202.6
18	182.9	183.0	199.0
20	180.3	180.2	196.1
22	177.7	177.6	193.6
24	175.2	175.0	191.4
26	172.4	172.1	188.6
28	171.4	171.1	187.7
30	168.1	167.7	184.3
32	165.6	165.1	181.7
34	163.2	162.6	179.4
36	160.7	160.0	176.9
38	158.3	157.4	174.4
40	155.5	154.3	171.4
42	153.1	151.9	169.0
44	151.0	149.4	166.6
46	148.4	146.7	163.9
48	145.8	144.0	161.2
50	143.1	141.2	158.6
52	140.5	138.5	156.1
54	137.7	135.3	153.0
56	134.8	132.1	150.3
58	132.4	129.7	148.1
60	130.7	127.8	146.3
62	129.2	126.3	144.8
64	125.5	122.5	141.0
66	123.9	121.0	139.4
68	119.7	116.6	135.2
70	118.2	114.9	133.6
72	115.0	111.5	130.4
74	110.2	106.4	125.5
76	109.9	105.9	125.7
78	107.6	103.2	123.1
80	105.4	101.0	120.9
82	103.3	98.8	118.7
84	101.5	96.7	116.9
86	98.8	93.8	114.1
88	98.5	93.4	113.8
90	93.6	88.1	108.8
92	91.5	85.8	106.5
94	90.3	84.4	105.4
96	87.9	81.8	103.0
98	85.4	79.0	100.4
100	81.8	75.2	96.7
102	78.4	71.7	93.1
104	75.8	68.9	90.4
106	72.0	64.7	86.4
108	68.6	60.8	82.9
110	64.7	56.7	79.1
112	61.2	53.0	75.4
114	57.6	49.2	71.9
116	53.5	45.0	67.5
118	48.8	40.3	62.7

Figure A3. Lime Cement Columns – Magnet Extensometer

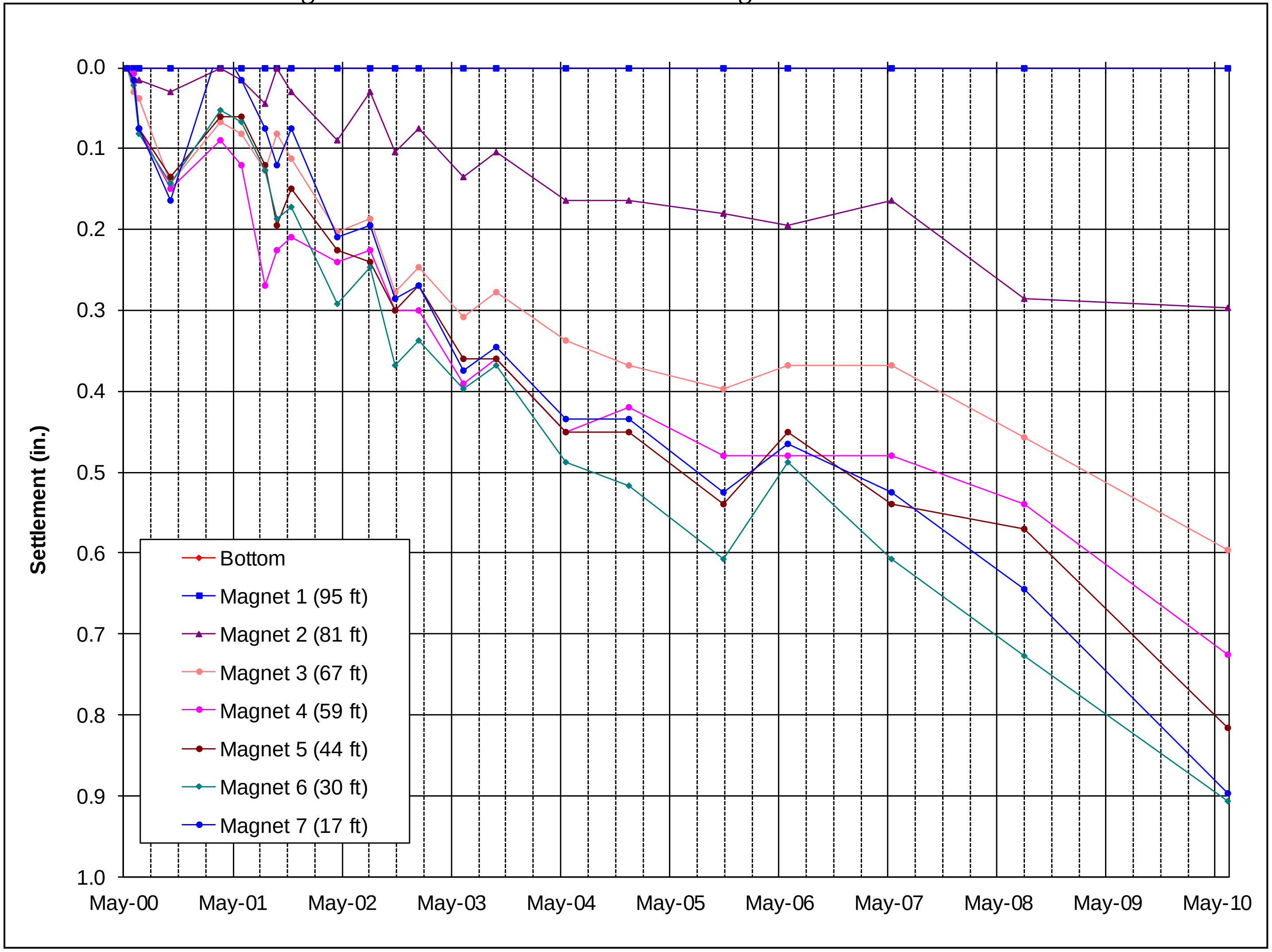

Table A3. Lime Cement Columns – Magnet Extensometer (in inches)

Date	Bottom	Magnet 1 (95 ft)	Magnet 2 (81 ft)	Magnet 3 (67 ft)	Magnet 4 (59 ft)	Magnet 5 (44 ft)	Magnet 6 (30 ft)	Magnet 7 (17 ft)
05/11/00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06/01/00	0.00	0.00	0.01	0.03	0.01	0.01	0.02	0.01
06/21/00	0.00	0.00	0.01	0.04	0.07	0.07	0.08	0.07
06/21/00	0.00	0.00	0.01	0.04	0.07	0.07	0.08	0.07
10/03/00	0.00	0.00	0.03	0.14	0.15	0.13	0.14	0.16
03/20/01	0.00	0.00	0.00	0.07	0.09	0.06	0.05	-0.03
05/31/01	0.00	0.00	0.01	0.08	0.12	0.06	0.07	0.01
08/14/01	0.00	0.00	0.04	0.13	0.27	0.12	0.13	0.07
09/26/01	0.00	0.00	0.00	0.08	0.22	0.19	0.19	0.12
11/12/01	0.00	0.00	0.03	0.11	0.21	0.15	0.17	0.07
04/15/02	0.00	0.00	0.09	0.20	0.24	0.22	0.29	0.21
08/01/02	0.00	0.00	0.03	0.19	0.22	0.24	0.25	0.19
10/25/02	0.00	0.00	0.10	0.28	0.30	0.30	0.37	0.28
01/14/03	0.00	0.00	0.07	0.25	0.30	0.27	0.34	0.27
06/10/03	0.00	0.00	0.13	0.31	0.39	0.36	0.40	0.37
09/30/03	0.00	0.00	0.10	0.28	0.36	0.36	0.37	0.34
05/19/04	0.00	0.00	0.16	0.34	0.45	0.45	0.49	0.43
12/16/04	0.00	0.00	0.16	0.37	0.42	0.45	0.52	0.43
10/27/05	0.00	0.00	0.18	0.40	0.48	0.54	0.61	0.52
05/31/06	0.00	0.00	0.19	0.37	0.48	0.45	0.49	0.46
05/15/07	0.00	0.00	0.16	0.37	0.48	0.54	0.61	0.52
07/30/08	0.00	0.00	0.28	0.46	0.54	0.57	0.73	0.64
06/14/10	0.00	0.00	0.30	0.60	0.73	0.82	0.91	0.90

Figure A4. Lime Cement Columns – Settlement Points

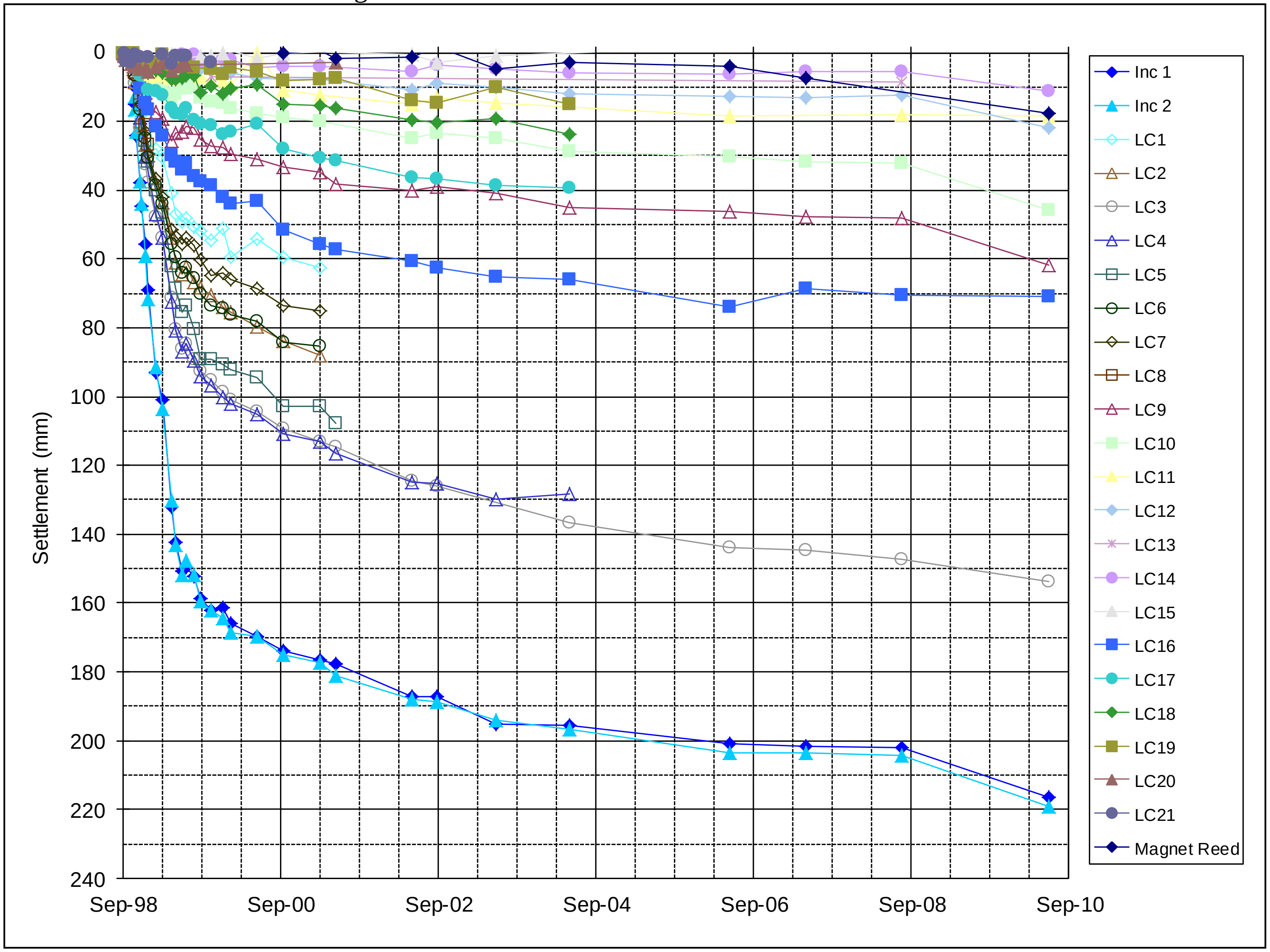

Table A4. Lime Cement Columns – Settlement Points (in mm)

Date	Inc 1	Inc 2	LC1	LC2	LC3	LC4	LC5	LC6
9/23/1998			0.0	0.0	0.0	0.0	0.0	0.0
9/28/1998			-3.2	0.4	-0.5	-2.1	-2.8	-1.4
10/2/1998			-4.1	-5.3	-3.4	-5.0	-5.3	-2.6
10/7/1998			-2.5	-2.6	-2.2	-4.0	-3.9	-1.8
10/28/1998	0.0	0.0	4.1	3.3	1.5	-0.2	0.2	1.6
11/12/1998	#N/A	#N/A	4.8	4.6	4.5	1.5	0.4	2.4
11/16/1998	9.9	12.9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
11/19/1998	15.0	16.5	8.1	8.7	8.8	5.5	4.4	6.8
11/23/1998	24.3	22.9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
12/8/1998	38.0	37.4	18.5	20.0	21.7	18.6	15.4	16.6
12/17/1998	44.5	43.9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
1/4/1999	55.6	59.1	27.2	26.9	32.7	30.4	25.7	24.8
1/14/1999	68.9	71.7	29.2	30.0	38.0	#N/A	31.6	30.6
2/24/1999	93.0	91.4	28.0	37.7	47.8	47.1	40.1	38.6
3/26/1999	100.8	103.5	30.8	43.5	54.0	54.0	46.6	44.0
5/4/1999	132.0	130.1	40.7	53.8	71.2	72.4	62.1	55.7
5/25/1999	142.3	143.2	46.9	61.0	80.3	80.7	68.5	59.6
6/23/1999	150.9	152.0	49.4	64.6	86.1	86.8	75.4	64.1
7/8/1999	149.7	147.5	48.2	62.1	84.5	84.4	73.6	62.6
8/17/1999	152.3	151.9	50.9	66.5	89.3	89.4	80.3	65.7
9/15/1999	158.6	159.5	52.0	68.1	92.4	94.2	89.0	70.3
11/2/1999	162.2	162.2	54.7	70.5	95.1	96.9	89.1	73.4
12/29/1999	161.4	164.3	51.1	74.1	98.8	100.2	90.8	74.5
2/2/2000	165.8	168.7	59.7	75.5	101.1	102.1	92.4	76.2
6/1/2000	169.7	169.8	54.3	79.6	104.3	105.2	94.4	78.1
10/3/2000	174.1	175.1	59.4	83.9	109.2	110.6	102.7	84.1
3/22/2001	176.4	177.2	62.4	87.8	113.0	113.2	102.8	85.3
5/31/2001	177.6	181.1	#N/A	#N/A	114.4	116.5	108.0	#N/A
5/22/2002	187.1	187.9	#N/A	#N/A	124.3	124.9	#N/A	#N/A
9/13/2002	187.1	188.8	#N/A	#N/A	125.9	125.3	#N/A	#N/A
6/10/2003	195.3	194.1	#N/A	#N/A	#N/A	129.7	#N/A	#N/A
5/19/2004	195.6	196.8	#N/A	#N/A	136.5	128.1	#N/A	#N/A
5/31/2006	200.8	203.6	#N/A	#N/A	143.9	#N/A	#N/A	#N/A
5/15/2007	201.6	203.6	#N/A	#N/A	144.6	#N/A	#N/A	#N/A
7/30/2008	202.0	204.2	#N/A	#N/A	147.1	#N/A	#N/A	#N/A
6/14/2010	216.3	219.3	#N/A	#N/A	153.6	#N/A	#N/A	#N/A

Table A4 Continued. Lime Cement Columns – Settlement Points (in mm)

Date	LC7	LC8	LC9	LC10	LC11	LC12	LC13	LC14
9/23/1998	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/28/1998	-0.7	-0.1	-3.6	-4.0	-3.2	-3.1	-3.0	-1.7
10/2/1998	-2.3	#N/A	-2.0	-2.2	-1.5	-1.4	-1.3	-0.8
10/7/1998	-1.1	-1.3	-2.0	-2.1	-1.5	-1.4	-1.4	-0.7
10/28/1998	1.5	1.6	1.1	0.9	0.7	0.9	1.0	1.1
11/12/1998	2.5	1.7	#N/A	2.0	2.1	1.5	1.1	1.5
11/16/1998	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
11/19/1998	7.0	6.0	4.1	2.9	1.9	1.2	0.6	0.6
11/23/1998	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
12/8/1998	15.1	13.8	8.7	5.5	4.4	3.1	#N/A	1.8
12/17/1998	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
1/4/1999	23.2	21.2	11.6	7.1	5.0	3.8	2.8	2.1
1/14/1999	29.4	26.9	15.4	9.7	7.1	5.5	4.5	3.8
2/24/1999	36.8	#N/A	17.2	10.4	6.1	#N/A	#N/A	#N/A
3/26/1999	41.9	#N/A	19.3	11.1	6.5	4.7	#N/A	3.1
5/4/1999	51.4	#N/A	25.7	13.1	7.3	#N/A	#N/A	1.6
5/25/1999	53.5	#N/A	23.4	12.1	6.5	4.1	#N/A	2.0
6/23/1999	55.7	#N/A	22.9	10.5	4.4	2.0	#N/A	0.7
7/8/1999	53.7	#N/A	21.4	10.3	4.4	2.3	2.0	1.0
8/17/1999	56.0	#N/A	21.7	9.9	3.8	1.5	1.2	0.7
9/15/1999	60.3	#N/A	25.2	13.0	6.9	4.7	#N/A	2.9
11/2/1999	64.7	#N/A	27.3	14.2	8.0	5.2	7.2	3.0
12/29/1999	64.2	#N/A	27.5	14.6	8.0	5.1	#N/A	2.0
2/2/2000	66.0	#N/A	29.5	16.2	9.1	5.7	#N/A	2.0
6/1/2000	68.5	#N/A	31.0	17.8	#VALUE!	7.5	#N/A	4.2
10/3/2000	73.4	#N/A	33.2	18.9	11.0	7.6	#N/A	4.1
3/22/2001	74.9	#N/A	34.6	20.1	12.4	7.7	#N/A	3.8
5/31/2001	#N/A	#N/A	38.2	#N/A	#N/A	#N/A	#N/A	#N/A
5/22/2002	#N/A	#N/A	40.2	24.9	15.0	10.7	#N/A	5.5
9/13/2002	#N/A	#N/A	38.8	23.2	13.2	8.9	#N/A	3.7
6/10/2003	#N/A	#N/A	41.0	25.1	14.5	10.0	#N/A	4.8
5/19/2004	#N/A	#N/A	45.1	28.7	#N/A	12.0	#N/A	5.8
5/31/2006	#N/A	#N/A	46.2	30.4	18.4	12.8	#N/A	6.1
5/15/2007	#N/A	#N/A	47.6	31.7	#N/A	13.0	#N/A	5.6
7/30/2008	#N/A	#N/A	48.1	32.3	18.2	12.3	8.6	5.4
6/14/2010	#N/A	#N/A	61.9	45.6	18.5	21.7	#N/A	11.0

Table A4 Continued. Lime Cement Columns – Settlement Points (in mm)

Date	LC15	LC16	LC17	LC18	LC19	LC20	LC21	Magnet
9/23/1998	0.0	0.0	0.0	0.0	0.0	0.0	#N/A	
9/28/1998	-2.3	-3.0	-1.6	-2.4	-3.7	0.8	0.0	
10/2/1998	-0.4	-2.7	-1.2	-0.6	-2.3	2.1	2.5	
10/7/1998	-0.8	-2.1	-0.7	-1.2	-2.0	2.0	2.5	
10/28/1998	1.0	0.4	1.2	0.1	-0.1	3.2	2.9	
11/12/1998	0.6	3.0	3.4	3.5	0.0	4.1	#N/A	
11/16/1998	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
11/19/1998	0.2	3.6	2.7	0.4	0.0	3.3	0.5	
11/23/1998	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
12/8/1998	3.6	10.6	6.7	4.4	5.0	4.9	1.3	
12/17/1998	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
1/4/1999	#N/A	14.7	#N/A	5.4	#N/A	4.9	#N/A	
1/14/1999	2.5	16.7	10.8	6.0	2.9	5.5	1.4	
2/24/1999	#N/A	21.5	11.3	5.1	3.2	4.0	#N/A	
3/26/1999	1.0	24.0	12.3	6.0	0.7	2.9	0.6	
5/4/1999	0.7	30.0	16.1	7.9	3.7	5.3	3.1	
5/25/1999	-0.3	31.9	17.5	7.7	3.1	4.1	1.1	
6/23/1999	0.0	34.2	18.2	7.5	3.1	3.1	0.9	
7/8/1999	1.9	32.0	16.3	6.6	2.8	3.7	0.9	
8/17/1999	#N/A	35.7	19.6	6.5	4.4	#N/A	-0.8	
9/15/1999	1.0	37.4	20.8	11.5	#N/A	#N/A	-0.6	
11/2/1999	0.9	38.5	21.1	9.5	4.7	#N/A	2.7	
12/29/1999	0.1	41.9	23.9	12.0	6.2	#N/A	#N/A	
2/2/2000	-0.5	44.0	23.2	10.5	4.6	#N/A	#N/A	
6/1/2000	1.8	43.3	20.7	9.4	5.5	#N/A	#N/A	
10/3/2000	0.2	51.3	27.9	15.0	8.0	#N/A	#N/A	0.0
3/22/2001	0.0	55.6	30.7	15.5	7.9	#N/A	#N/A	-0.7
5/31/2001	#N/A	57.1	31.2	16.2	7.2	2.9	#N/A	1.9
5/22/2002	0.6	60.6	36.5	19.6	13.8	#N/A	#N/A	1.2
9/13/2002	2.9	62.6	36.8	20.3	14.5	#N/A	#N/A	-1.7
6/10/2003	1.0	65.2	38.4	19.1	10.1	#N/A	#N/A	4.8
5/19/2004	#N/A	65.8	39.2	23.9	15.1	#N/A	#N/A	2.8
5/31/2006	-1.9	74.0	#N/A	#N/A	#N/A	#N/A	#N/A	4.1
5/15/2007	-4.4	68.8	#N/A	#N/A	#N/A	#N/A	#N/A	7.5
7/30/2008	-3.3	70.5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
6/14/2010	#N/A	71.0	#N/A	#N/A	#N/A	#N/A	#N/A	17.6

Figure A5. 2nd South – Inclinometer

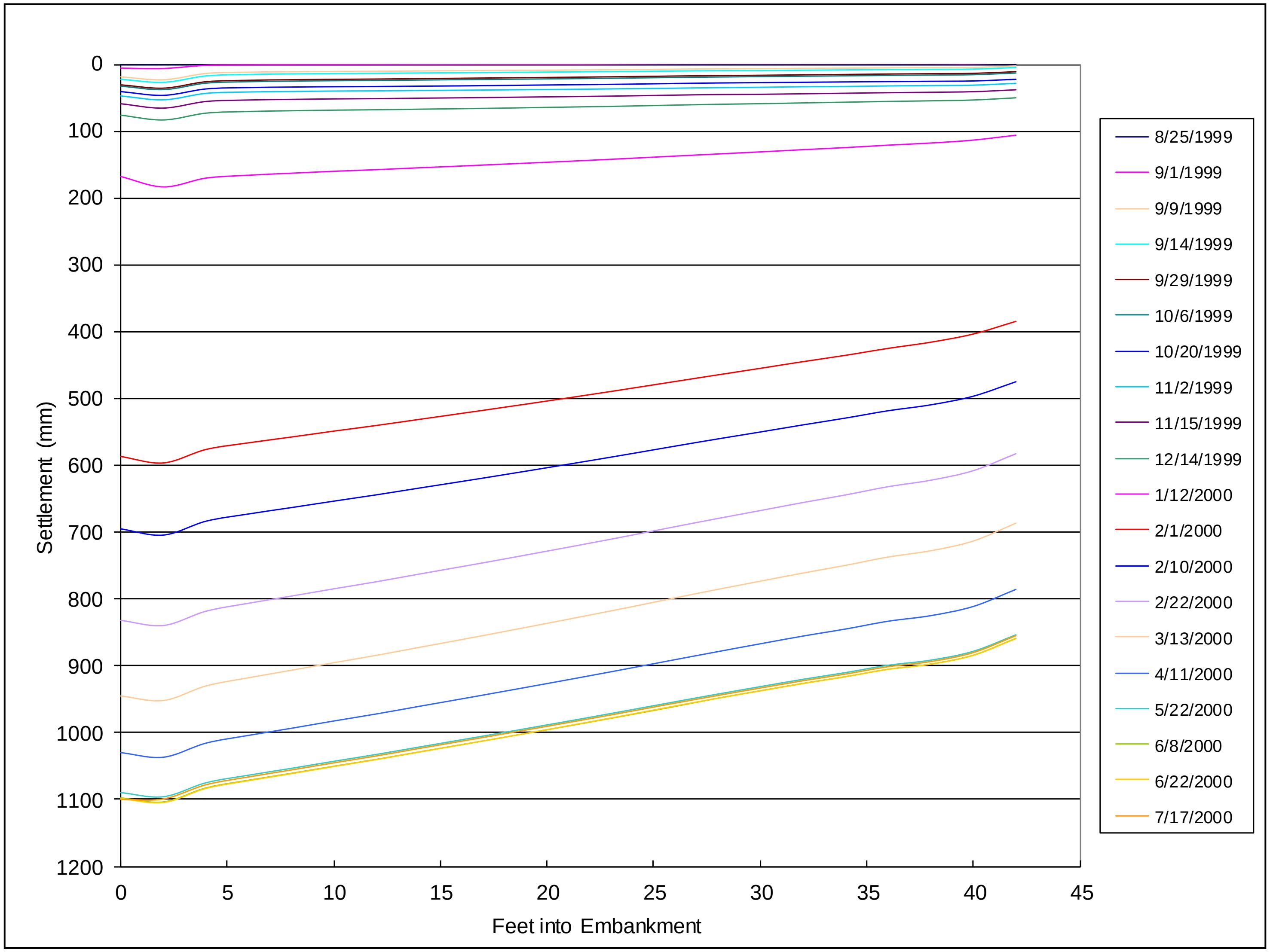

Table A5. 2nd South – Inclinometer (in mm)

Depth (ft)	8/25/1999	9/1/1999	9/9/1999	9/14/1999	9/21/1999	9/29/1999	10/6/1999	10/20/1999	11/2/1999
0	0	5.8	18.8	22.4	27.5	30.8	32.7	40.9	47.4
2	0	5.3	14.4	17.8	23.2	25.9	27.5	35.3	41.6
4	0	10.0	23.8	27.4	33.5	35.5	37.2	44.9	51.3
6	0	10.8	25.7	29.6	36.1	37.6	39.3	46.9	53.3
8	0	11.0	26.4	30.4	37.4	38.5	40.2	47.7	54.1
10	0	11.1	26.8	30.9	38.5	39.1	40.8	48.2	54.7
12	0	11.3	27.1	31.2	39.5	39.5	41.2	48.5	55.0
14	0	11.4	27.6	31.8	40.5	40.1	41.8	49.0	55.5
16	0	11.5	27.9	32.2	41.6	40.7	42.4	49.5	56.0
18	0	11.6	28.4	32.7	42.6	41.3	43.0	50.1	56.5
20	0	11.6	28.8	33.1	43.7	41.9	43.5	50.8	57.0
22	0	11.7	29.2	33.6	44.9	42.5	44.1	51.4	57.6
24	0	12.0	29.7	34.1	46.1	43.2	44.9	52.1	58.3
26	0	12.2	30.3	34.7	47.3	44.0	45.7	53.0	59.0
28	0	12.4	30.8	35.2	48.5	44.7	46.4	53.8	59.8
30	0	12.4	31.0	35.4	49.5	45.1	46.9	54.3	60.4
32	0	12.5	31.5	35.9	50.6	45.8	47.6	54.9	61.2
34	0	12.5	31.8	36.4	51.6	46.4	48.1	55.4	61.6
36	0	12.5	32.2	36.9	52.6	47.0	48.8	55.9	62.4
38	0	12.4	32.5	37.3	53.6	47.5	49.3	56.3	62.9
40	0	12.2	32.8	37.6	54.6	48.0	49.8	56.8	63.5
42	0	13.9	35.0	40.0	57.5	50.5	52.3	59.3	66.3

Table A5 Continued. 2nd South – Inclinometer (in mm)

Depth (ft)	11/15/1999	12/14/1999	1/12/2000	2/1/2000	2/10/2000	2/22/2000	3/13/2000	4/11/2000	5/22/2000
0	59.1	76.2	168.0	586.9	695.2	832.1	945.2	1030.0	1089.8
2	52.6	69.1	152.5	577.3	685.9	824.5	938.4	1023.2	1083.7
4	62.5	79.3	165.7	597.4	706.7	845.9	960.2	1044.3	1104.6
6	64.7	81.7	170.0	607.4	717.6	857.7	972.5	1055.9	1115.9
8	65.7	82.9	173.0	616.0	727.1	868.4	983.6	1066.4	1126.1
10	66.4	83.8	175.9	624.9	736.8	879.4	995.0	1077.4	1136.7
12	66.8	84.3	178.3	633.4	746.2	890.0	1006.1	1088.0	1147.0
14	67.5	85.2	181.1	642.4	756.3	901.4	1017.9	1099.3	1158.0
16	68.0	86.0	183.8	651.5	766.2	912.6	1029.6	1110.5	1168.9
18	68.7	86.8	186.6	660.6	776.3	924.0	1041.6	1121.9	1179.9
20	69.4	87.9	189.4	669.9	786.7	935.7	1053.9	1133.4	1191.1
22	70.1	88.9	192.3	679.4	797.2	947.6	1066.3	1145.1	1202.4
24	71.0	90.0	195.4	689.2	808.0	959.7	1078.9	1157.0	1214.0
26	72.0	91.3	198.6	699.1	819.0	972.2	1091.9	1169.1	1225.7
28	72.9	92.5	201.8	709.0	829.7	984.5	1104.6	1181.1	1237.2
30	73.3	93.4	204.9	718.8	840.1	996.4	1116.9	1192.9	1248.3
32	74.0	94.6	208.2	728.8	850.8	1008.4	1129.1	1204.4	1259.3
34	74.9	95.6	211.3	738.3	861.0	1019.8	1140.6	1215.0	1269.4
36	75.7	96.8	214.9	748.7	872.0	1032.1	1153.1	1226.6	1280.3
38	76.3	97.7	218.1	757.9	880.8	1041.8	1162.5	1235.0	1288.0
40	77.2	98.9	222.5	770.2	893.7	1056.1	1177.1	1248.7	1301.2
42	80.0	102.2	229.9	789.1	915.4	1081.5	1203.8	1274.3	1325.9

Table A5 Continued. 2nd South – Inclinometer (in mm)

Depth (ft)	6/8/2000	6/22/2000	7/17/2000	7/18/2000
0	1097.7	1098.7	1099.9	1099.9
2	1091.7	1092.9	1100.6	1113.7
4	1112.7	1114.0	1121.8	1127.6
6	1124.2	1125.6	1133.5	1139.8
8	1134.5	1136.0	1143.9	1150.6
10	1145.1	1146.7	1154.6	1164.7
12	1155.4	1157.1	1165.0	1175.7
14	1166.5	1168.3	1176.1	1181.2
16	1177.5	1179.3	1187.1	1192.5
18	1188.5	1190.5	1198.1	1199.3
20	1199.7	1201.9	1209.3	1207.8
22	1211.1	1213.4	1220.6	1218.0
24	1222.7	1225.1	1232.1	1226.6
26	1234.5	1237.2	1243.9	1229.8
28	1246.9	1248.8	1255.3	1244.1
30	1258.0	1259.8	1266.5	1264.4
32	1269.0	1270.8	1277.4	1276.7
34	1279.1	1281.1	1287.4	1279.8
36	1290.2	1292.1	1298.4	1297.8
38	1298.0	1299.9	1306.1	1308.4
40	1311.2	1313.1	1319.6	1329.4
42	1336.4	1338.1	1344.9	1354.5

Figure A6. 2nd South – Settlement Points

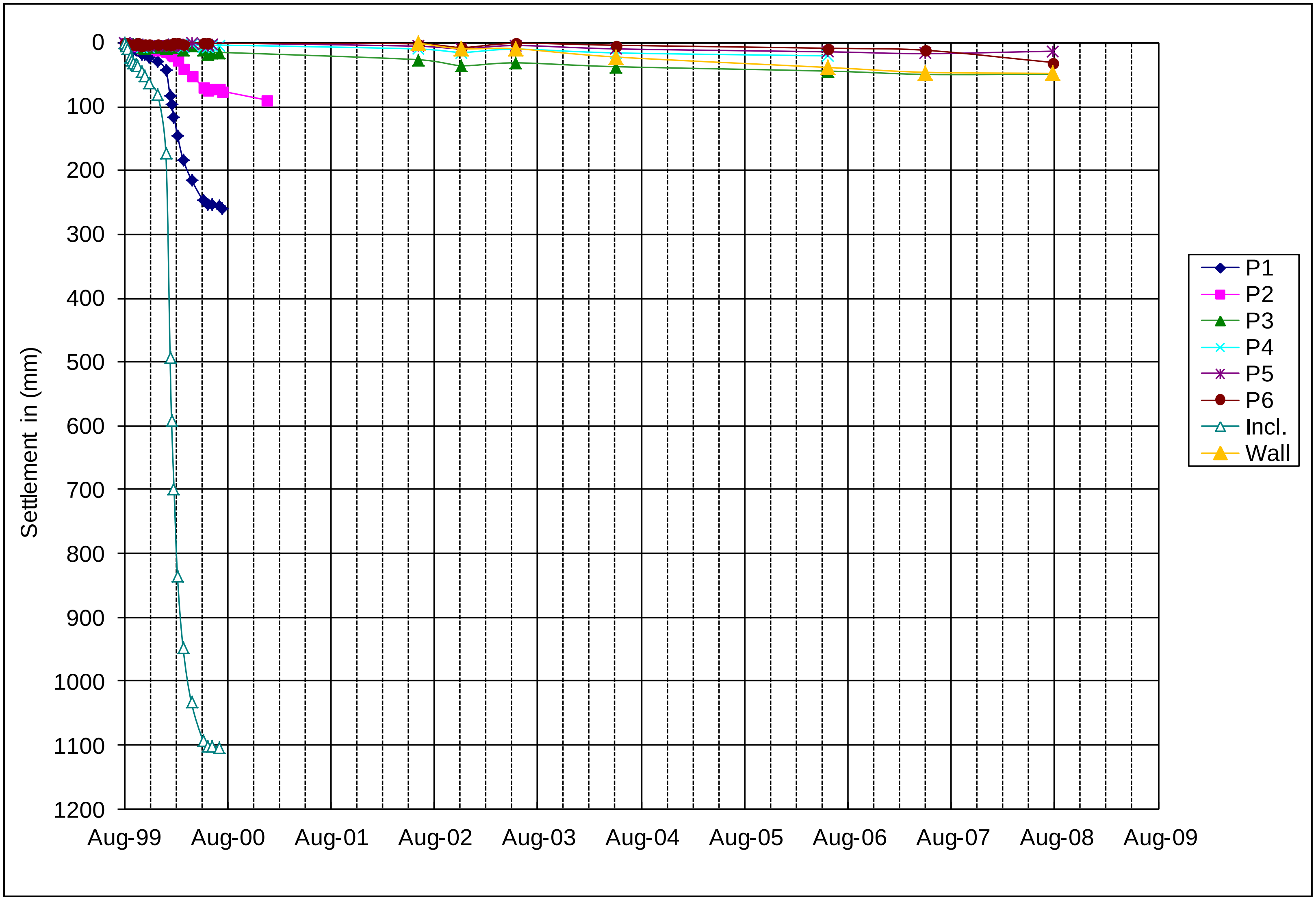

Table A6. 2nd South – Settlement Points (in mm)

Date	P1	P2	P3	P4	P5	P6	Incl.	Wall
8/23/1999	0	0	0	0	0	0	0	
8/25/1999	2.1	-0.2	2.1	1.7	1.6	0.7	3.6	
9/1/1999	4.3	0.7	2.2	1.2	1.1	-0.1	9.4	
9/9/1999	6.6	1.8	-0.1	1.6	1.3	-0.2	22.4	
9/14/1999	7.6	1.9	1.3	1.4	1.1	-0.1	26	
9/21/1999	10.9	5	2.1	3.8	3.3	2.3	31.1	
9/29/1999	11.6	5.3	2.8	3.5	3.1	1.5	34.4	
10/6/1999	11.3	4.6	0.9	2.5	1.9	0.6	36.3	
10/20/1999	17.4	9	5.6	6	5.2	3.5	44.5	
11/1/1999	18.2	7.8	7.7	4.5	3.6	2	51	
11/15/1999	22.3	9.4	7.3	5.4	4.4	2.8	62.7	
12/14/1999	28	11.4	6.6	#N/A	3.2	2	79.8	
1/12/2000	42.6	14	8.4	5.1	3.5	1.1	171.6	
1/27/2000	83.6	14.6	4.8	4.5	4	2.1	492	
2/1/2000	96.7	18.5	6.8	4.9	4.1	2.3	590.5	
2/10/2000	115.7	19.9	5.6	2.8	2.1	0.7	698.8	
2/22/2000	144.7	26.9	5.7	3.2	2.6	0.7	835.7	
3/13/2000	182.5	41.1	9.9	6.5	5.1	2.6	948.8	
4/11/2000	213.9	50.5	4.3	1.4	0	-2.4	1033.6	
5/22/2000	246.5	68.5	11.4	5.9	3	0.2	1093.4	
6/8/2000	253.2	72.7	16.9	6.5	3.2	0.4	1101.3	
6/22/2000	253.8	72.4	14.7	4.6	1.3	#N/A	1102.3	
7/17/2000	255.7	71.9	14.4	3.1	-0.1	#N/A	1103.5	
7/26/2000	258.8	74.9	#N/A	#N/A	#N/A	#N/A	#N/A	
1/3/2001	#N/A	89.4	#N/A	#N/A	#N/A	#N/A	#N/A	
6/18/2002	#N/A	#N/A	25.9	9.1	4.8	1	#N/A	0
11/15/2002	#N/A	#N/A	35.3	14.5	9	6.9	#N/A	8.6
5/30/2003	#N/A	#N/A	30.9	9.4	3.7	0.2	#N/A	8.8
5/17/2004	#N/A	#N/A	36.9	15.3	9	3.3	#N/A	21.8
5/31/2006	#N/A	#N/A	43.8	19.9	13.6	8	#N/A	38.1
5/8/2007	#N/A	#N/A	49	#N/A	16.4	11.1	#N/A	45.7
7/29/2008	#N/A	#N/A	48.7	#N/A	12.6	30.2	#N/A	47.4

Figure A7. 35th South – Settlement Points

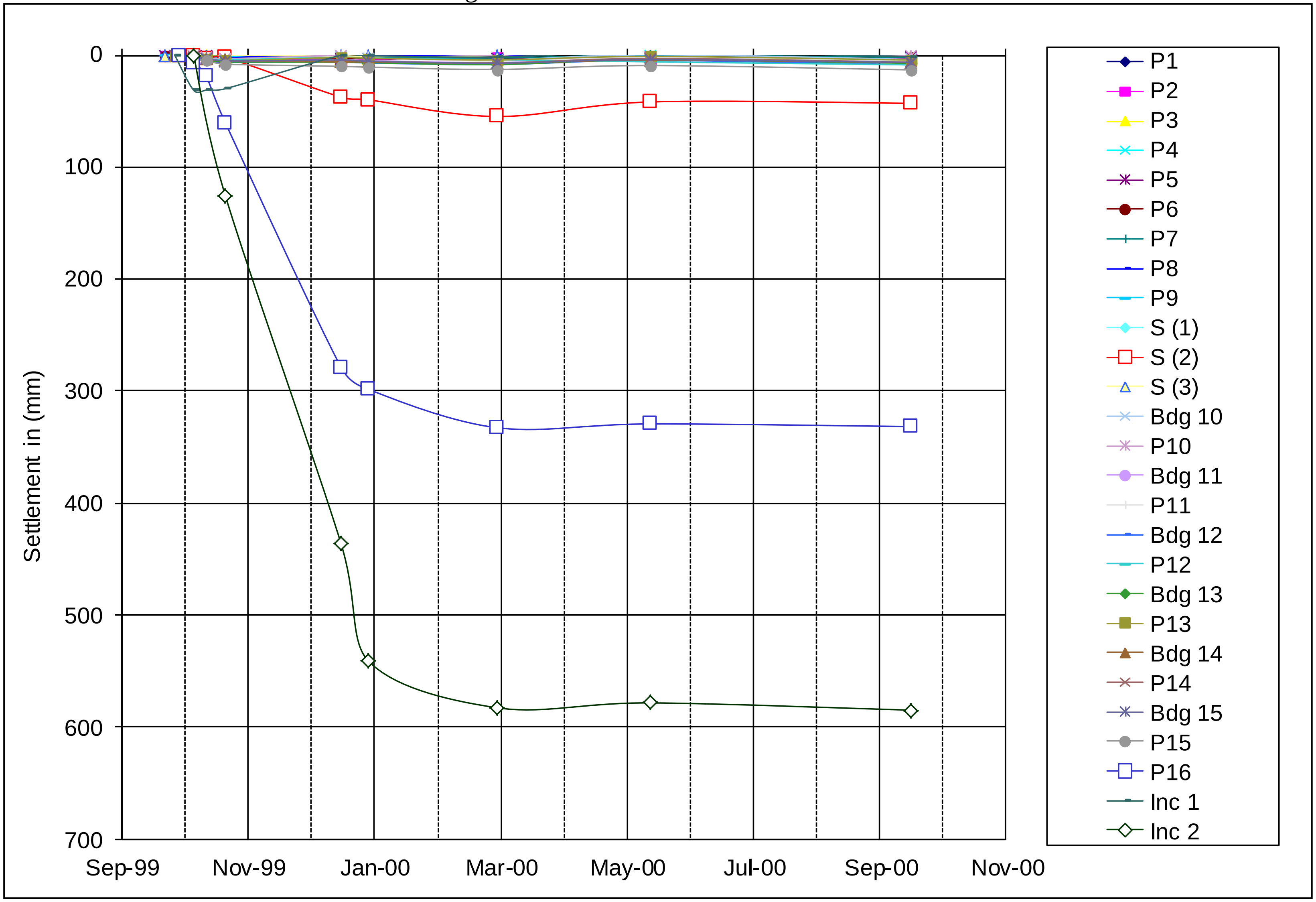

Table A7. 35th South – Settlement Points (in mm)

Date	P1	P2	P3	P4	P5	P6	P7	P8
10/7/1999	0	0	0	0	0	0	0	0
10/12/1999	-0.8	-0.4	-0.6	-0.6	-0.6	-0.4	-0.3	-0.1
10/14/1999	-1.9	-3.3	-2.3	-2.3	-2.2	-1.8	-2.1	-2.1
10/21/1999	0.9	1.4	1.0	1.0	1.2	1.4	1.5	1.6
10/27/1999	0.6	1.1	0.6	0.7	0.7	0.7	1.0	1.2
11/5/1999	0.8	2.2	1.3	1.5	1.7	1.9	1.9	2.1
12/30/1999	2.1	4.5	2.7	2.4	2.7	2.8	1.6	-0.9
1/12/2000	2.3	4.1	3.1	2.8	3.1	3.2	1.9	-0.4
3/13/2000	2.1	1.8	3.2	2.9	3.2	3.8	2.5	0.2
5/25/2000	#N/A	2.8	#N/A	1.2	1.3	1.0	0.2	-2.5
9/26/2000	#N/A	2.7	#N/A	2.1	2.3	2.3	2.0	-0.7

Table A7 Continued. 35th South – Settlement Points (in mm)

Date	P9	S(2)	Bdg10	P10	Bdg11	P11	Bdg12	P12
10/7/1999	0							
10/12/1999	-0.2			0		0		0
10/14/1999	-2.6	0	0	-1.9	0	-1.3	0	-0.9
10/21/1999	3.0	0.9	1.8	0.2	2.5	1.1	2.5	2.0
10/27/1999	1.6	3.3	3.8	2.3	4.5	3.0	5.0	3.5
11/5/1999	1.9	1.9	5.1	3.2	6.2	4.0	6.4	4.1
12/30/1999	-7.7	37.5	1.8	0.0	4.1	1.6	6.0	1.9
1/12/2000	-7.1	39.9	2.7	-1.7	4.8	2.5	7.0	2.7
3/13/2000	-6.0	54.8	4.3	-0.1	6.6	5.3	8.4	4.1
5/25/2000	-8.9	41.8	-0.3	-3.6	2.5	1.9	4.7	6.0
9/26/2000	-6.8	43.1	3.8	0.2	5.7	5.3	8.7	8.7

Table A7 Continued. 35th South – Settlement Points (in mm)

Date	Bdg13	P13	Bdg14	P14	Bdg15	P15	P16	Inc2
10/7/1999								
10/12/1999		0		0				
10/14/1999	0	-0.6	0	0.0	0	0	0	
10/21/1999	1.9	1.6	1.0	1.7	2.6	3.6	7.1	0
10/27/1999	4.4	3.3	3.6	3.2	2.7	4.9	18.7	#N/A
11/5/1999	6.1	5.0	5.1	5.2	5.2	8.1	60.2	125.3
12/30/1999	6.4	2.0	6.1	4.8	4.3	10.1	278.6	436.1
1/12/2000	6.7	2.7	6.0	5.3	5.4	10.7	298.5	541.0
3/13/2000	8.4	4.3	7.2	7.0	7.2	12.8	332.8	582.9
5/25/2000	4.1	1.2	4.5	3.0	4.0	9.3	329.4	578.6
9/26/2000	7.3	4.4	6.5	6.3	6.5	13.2	331.8	585.1

Figure A8. 1st South – North Inclinometer

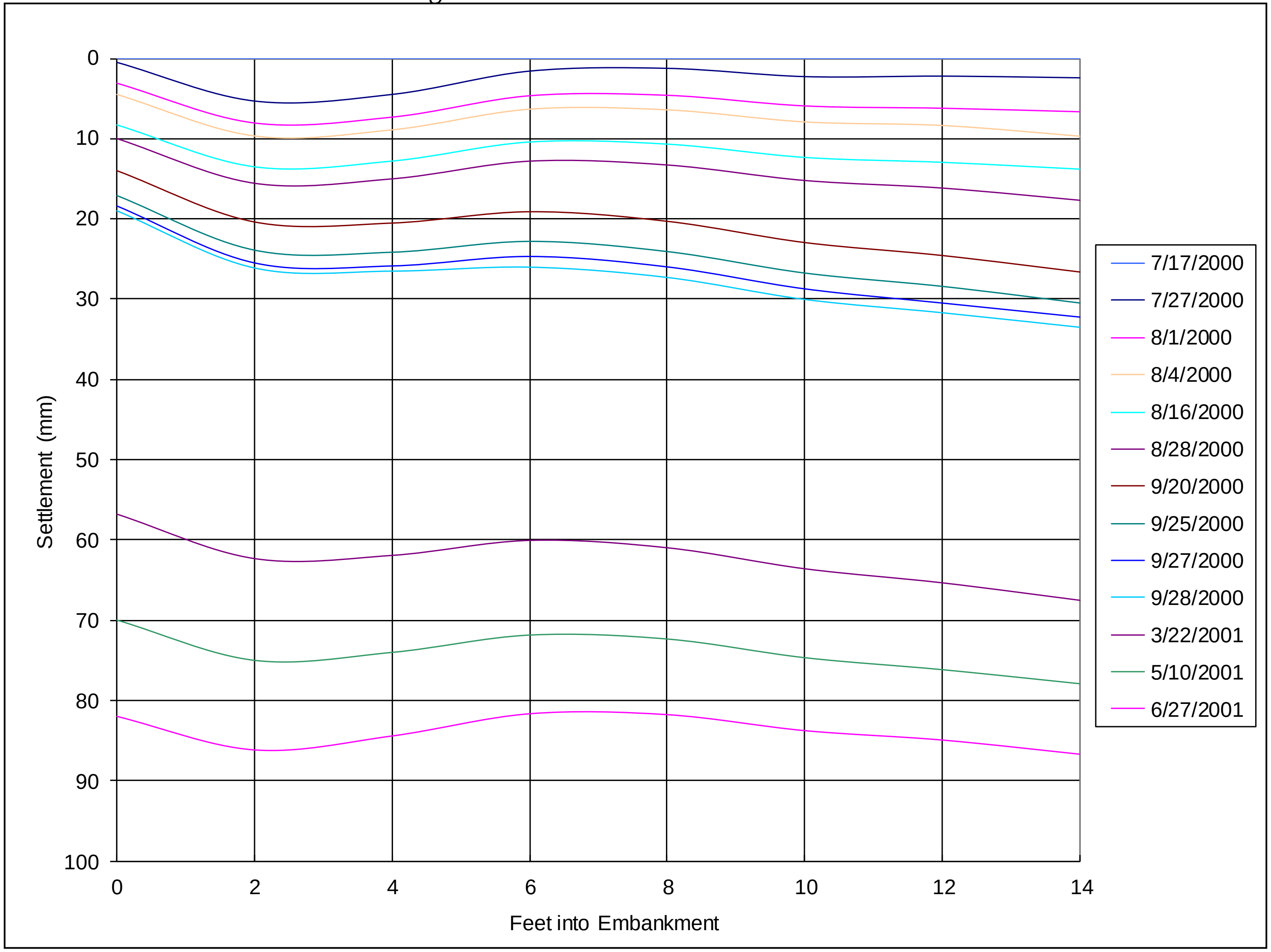

Table A8. 1st South – North Inclinometer (in mm)

Depth (ft)	7/17/2000	7/27/2000	8/1/2000	8/4/2000	8/16/2000	8/28/2000	9/20/2000	9/25/2000	9/27/2000
0	0	0.5	3.1	4.5	8.3	10.0	14.0	17.1	18.4
2	0	5.3	8.1	9.7	13.5	15.6	20.4	23.9	25.5
4	0	4.5	7.3	8.9	12.8	15.0	20.5	24.2	25.9
6	0	1.6	4.7	6.3	10.4	12.8	19.1	22.8	24.7
8	0	1.2	4.6	6.4	10.7	13.3	20.3	24.1	26.0
10	0	2.3	5.9	7.9	12.3	15.2	23.0	26.8	28.7
12	0	2.2	6.2	8.4	13.0	16.2	24.6	28.4	30.5
14	0	2.4	6.7	9.7	13.8	17.7	26.6	30.5	32.2

Table A8 Continued. 1st South – North Inclinometer (in mm)

Depth (ft)	9/28/2000	3/22/2001	5/10/2001	6/27/2001
0	19.0	56.8	70.0	82.0
2	26.1	62.3	75.0	86.2
4	26.5	61.9	74.0	84.4
6	26.0	60.1	71.9	81.7
8	27.3	61.0	72.4	81.8
10	30.0	63.6	74.7	83.8
12	31.7	65.4	76.2	84.9
14	33.5	67.5	77.9	86.7

Figure A9. 1st South – South Inclinometer

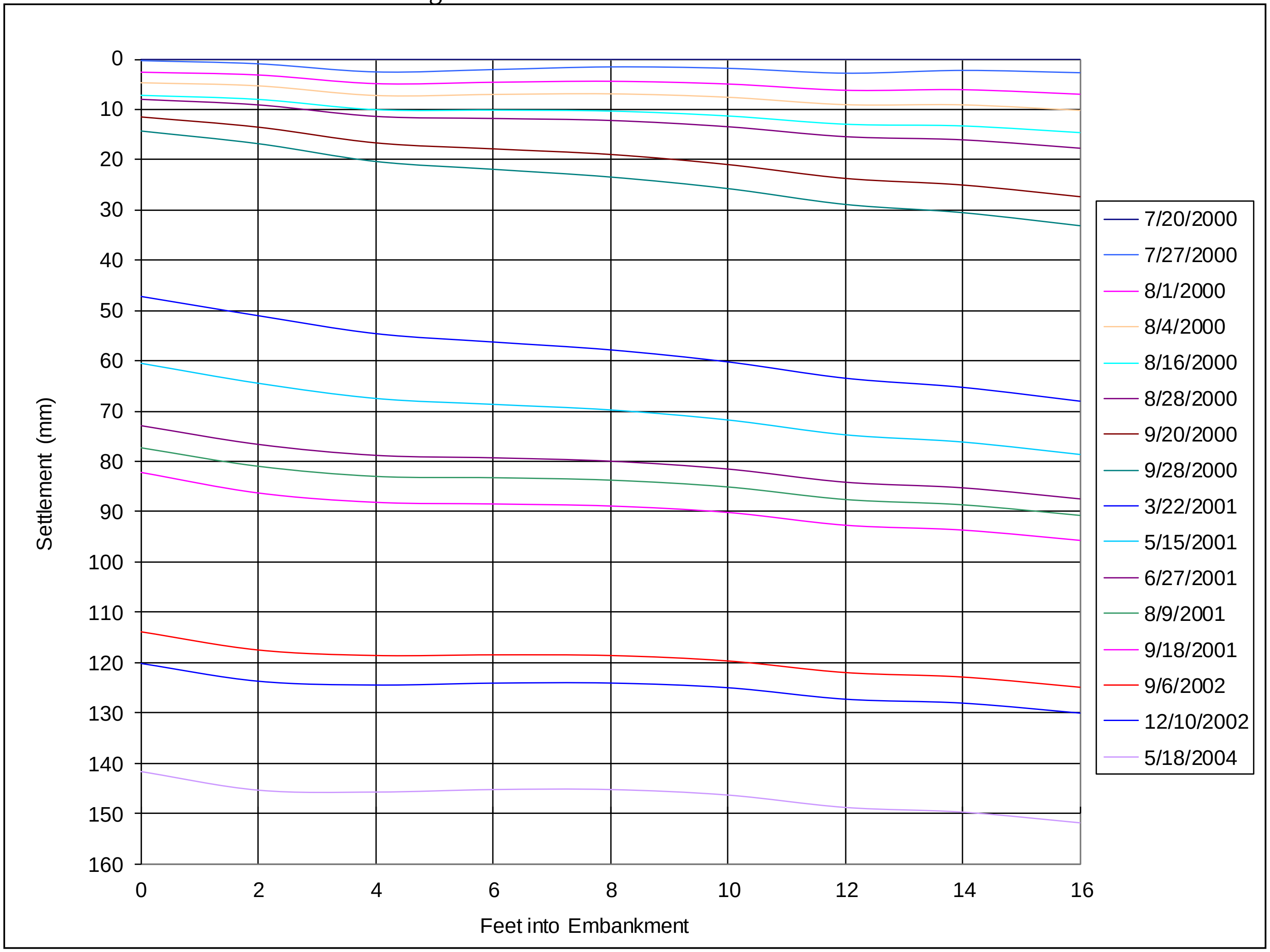

Table A9. 1st South – South Inclinometer (in mm)

Depth (ft)	7/20/2000	7/27/2000	8/1/2000	8/4/2000	8/16/2000	8/28/2000	9/20/2000	9/28/2000	3/22/2001
0	0.0	0.3	2.6	4.7	7.2	8.0	11.5	14.3	47.2
2	0.0	0.9	3.2	5.3	8.0	9.1	13.5	16.8	51.0
4	0.0	2.5	4.9	7.2	10.1	11.4	16.7	20.4	54.6
6	0.0	2.1	4.6	7.0	10.1	11.8	17.8	21.9	56.3
8	0.0	1.5	4.4	6.9	10.3	12.2	19.0	23.5	57.8
10	0.0	1.8	5.0	7.6	11.3	13.4	21.0	25.7	60.2
12	0.0	2.8	6.2	9.1	12.9	15.4	23.7	28.9	63.5
14	0.0	2.2	6.1	9.1	13.3	16.1	25.0	30.5	65.3
16	0.0	2.7	7.0	10.2	14.6	17.7	27.4	33.1	68.0

Table A9 Continued. 1st South – South Inclinometer (in mm)

Depth (ft)	5/15/2001	6/27/2001	8/9/2001	9/18/2001	9/6/2002	12/10/2002	5/18/2004
0	60.5	72.9	77.3	82.2	113.9	120.2	141.7
2	64.5	76.6	81.0	86.3	117.5	123.7	145.4
4	67.5	78.8	83.0	88.1	118.6	124.5	145.8
6	68.7	79.3	83.3	88.5	118.5	124.1	145.3
8	69.8	80.0	83.7	88.9	118.6	124.1	145.3
10	71.8	81.5	85.1	90.2	119.7	125.0	146.4
12	74.7	84.1	87.6	92.7	122.0	127.3	148.8
14	76.2	85.3	88.6	93.7	122.9	128.1	149.8
16	78.6	87.5	90.7	95.7	124.9	130.1	151.9

Figure A10. 1st South – Top Inclinometer

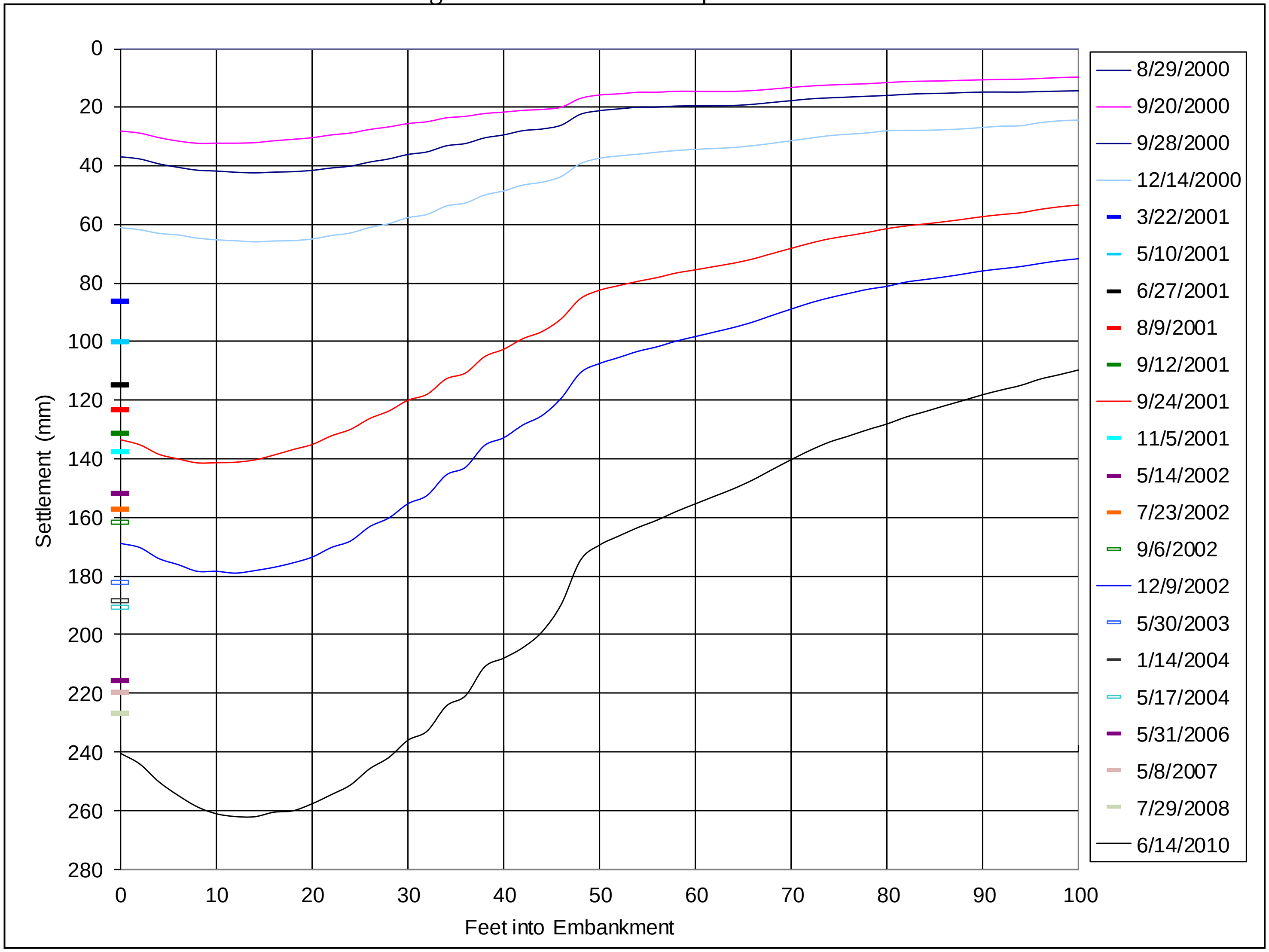

Table A10. 1st South – Top Inclinometer (in mm)

Depth (ft)	8/29/2000	9/20/2000	9/28/2000	12/14/2000	9/24/2001	12/9/2002	6/14/2010
0	0.0	28.1	36.9	61.1	133.5	168.9	240.6
2	0.0	28.8	37.6	61.8	135.2	170.3	244.2
4	0.0	30.4	39.3	63.0	138.5	174.1	250.3
6	0.0	31.5	40.5	63.6	140.0	176.1	254.9
8	0.0	32.3	41.5	64.7	141.4	178.4	258.8
10	0.0	32.2	41.8	65.2	141.3	178.4	261.2
12	0.0	32.2	42.2	65.6	141.2	179.0	262.1
14	0.0	32.1	42.4	65.9	140.4	178.2	262.2
16	0.0	31.4	42.1	65.7	138.7	177.1	260.7
18	0.0	30.9	42.0	65.5	136.8	175.5	260.2
20	0.0	30.4	41.5	65.0	135.1	173.6	257.8
22	0.0	29.4	40.7	63.8	132.2	170.3	254.7
24	0.0	28.8	40.1	62.9	130.0	168.1	251.3
26	0.0	27.6	38.7	61.0	126.3	163.2	245.8
28	0.0	26.7	37.6	59.7	123.7	160.2	242.0
30	0.0	25.6	36.1	57.7	120.0	155.3	236.1
32	0.0	24.9	35.2	56.6	118.0	152.5	233.0
34	0.0	23.6	33.2	53.7	112.7	145.5	224.4
36	0.0	23.1	32.4	52.7	110.7	142.9	220.9
38	0.0	22.1	30.4	50.0	105.1	135.4	211.1
40	0.0	21.6	29.4	48.5	102.6	132.8	208.1
42	0.0	21.0	28.0	46.6	99.0	128.5	204.5
44	0.0	20.7	27.4	45.6	96.6	125.2	199.1
46	0.0	20.0	26.1	43.6	92.2	119.3	189.7
48	0.0	17.0	22.4	39.2	85.3	110.6	174.7
50	0.0	15.8	21.2	37.4	82.5	107.5	169.5
52	0.0	15.4	20.5	36.6	80.9	105.4	166.4
54	0.0	14.9	20.0	36.0	79.4	103.3	163.5
56	0.0	14.8	19.9	35.3	78.1	101.8	161.0
58	0.0	14.5	19.6	34.8	76.6	99.8	158.0
60	0.0	14.5	19.5	34.4	75.5	98.3	155.4
62	0.0	14.6	19.5	34.1	74.3	96.7	152.8
64	0.0	14.6	19.4	33.7	73.2	95.2	150.2
66	0.0	14.3	19.0	33.1	71.8	93.3	147.2
68	0.0	13.8	18.3	32.3	69.9	91.1	143.7
70	0.0	13.2	17.7	31.4	68.2	88.9	140.3
72	0.0	12.7	17.1	30.5	66.4	86.8	137.1
74	0.0	12.4	16.8	29.7	64.9	85.0	134.3
76	0.0	12.1	16.5	29.2	63.8	83.6	132.2
78	0.0	11.9	16.2	28.7	62.7	82.1	130.1
80	0.0	11.6	16.0	28.0	61.4	81.1	128.1
82	0.0	11.2	15.6	27.9	60.5	79.7	125.8
84	0.0	11.1	15.3	27.9	59.8	78.8	123.9
86	0.0	11.0	15.2	27.7	59.1	77.9	121.9
88	0.0	10.8	15.0	27.3	58.2	76.9	120.1
90	0.0	10.6	14.8	26.9	57.3	75.9	118.1
92	0.0	10.5	14.8	26.4	56.6	75.1	116.5
94	0.0	10.4	14.8	26.3	56.0	74.4	114.9
96	0.0	10.2	14.6	25.3	54.9	73.3	112.8
98	0.0	9.9	14.5	24.6	54.0	72.4	111.3
100	0.0	9.7	14.4	24.4	53.4	71.7	109.7

Figure A11. 1st South – South Magnet Extensometer

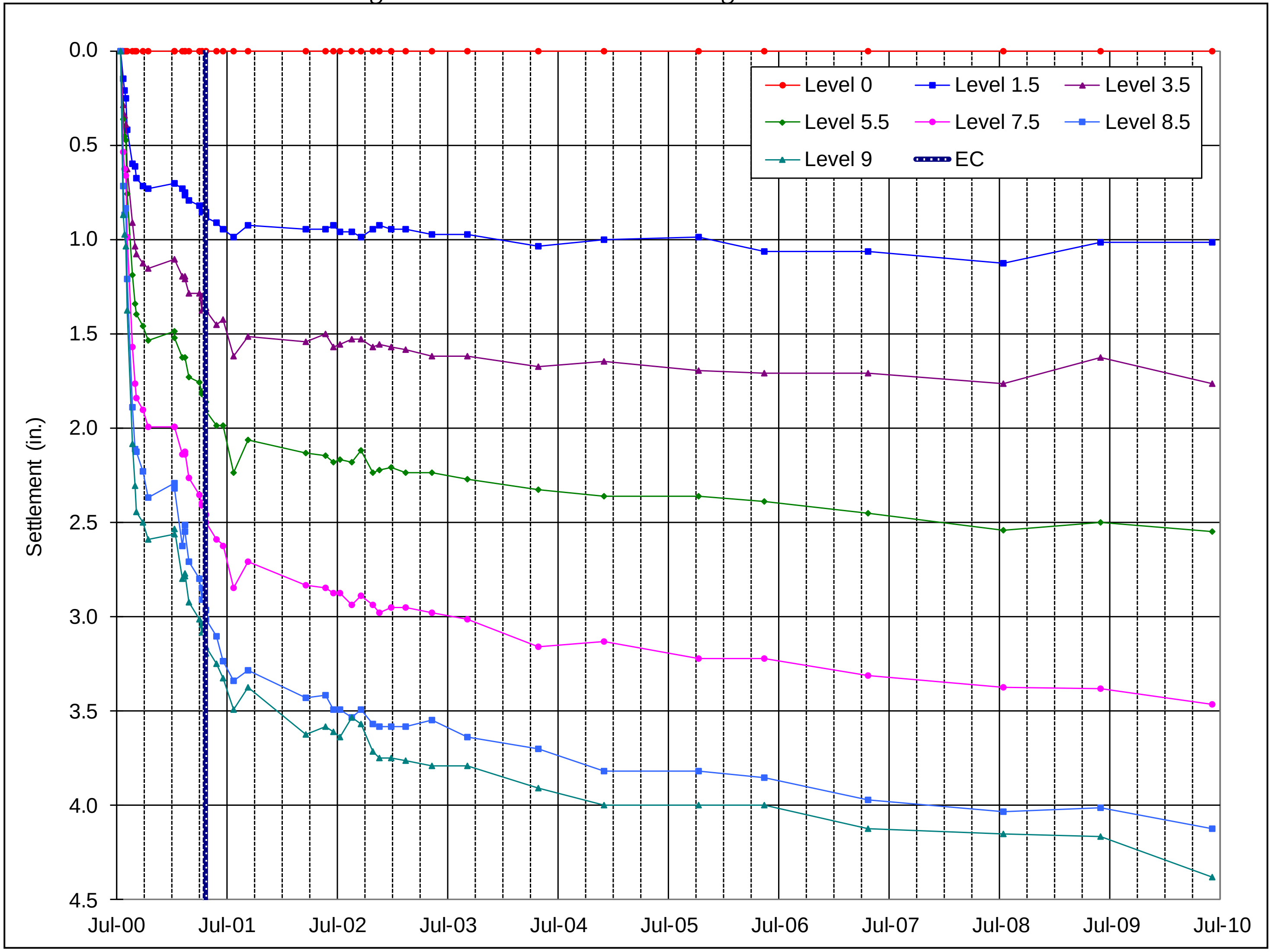

Table A11. 1st South – South Magnet Extensometer (in inches)

Date	Level 0	Level 1.5	Level 3.5	Level 5.5	Level 7.5	Level 8.5	Level 9
8/8/2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8/16/2000	0.00	0.15	0.28	0.37	0.54	0.72	0.87
8/21/2000	0.00	0.21	0.34	0.46	0.63	0.87	0.98
8/22/2000	0.00	0.26	0.39	0.47	0.66	0.84	1.04
8/30/2000	0.00	0.42	0.63	0.76	0.99	1.21	1.38
9/13/2000	0.00	0.60	0.91	1.19	1.57	1.89	2.09
9/21/2000	0.00	0.61	1.03	1.34	1.77	2.11	2.31
9/28/2000	0.00	0.67	1.08	1.40	1.84	2.13	2.45
10/19/2000	0.00	0.72	1.12	1.46	1.90	2.23	2.50
11/7/2000	0.00	0.73	1.16	1.54	2.00	2.37	2.60
2/1/2001	0.00	0.71	1.11	1.49	2.00	2.30	2.57
2/1/2001	0.00	0.70	1.11	1.52	2.00	2.32	2.54
2/26/2001	0.00	0.73	1.20	1.63	2.14	2.62	2.81
3/6/2001	0.00	0.75	1.20	1.63	2.15	2.52	2.79
3/6/2001	0.00	0.76	1.21	1.63	2.13	2.55	2.78
3/20/2001	0.00	0.79	1.29	1.73	2.26	2.72	2.93
4/24/2001	0.00	0.83	1.29	1.76	2.36	2.81	3.02
5/3/2001	0.00	0.85	1.38	1.82	2.41	2.91	3.09
5/3/2001	0.00	0.82	1.30	1.81	2.40	2.85	3.05
5/15/2001	0.00	0.85	1.36	1.87	2.46	2.97	3.19
5/15/2001	0.00	0.88	1.38	1.91	2.50	3.01	3.16
6/19/2001	0.00	0.92	1.46	1.99	2.60	3.11	3.26
7/11/2001	0.00	0.94	1.42	1.99	2.62	3.24	3.33
8/14/2001	0.00	0.99	1.62	2.24	2.85	3.34	3.49
10/1/2001	0.00	0.93	1.51	2.06	2.72	3.29	3.38
4/8/2002	0.00	0.94	1.55	2.14	2.83	3.43	3.63
6/12/2002	0.00	0.94	1.50	2.15	2.85	3.42	3.58
7/9/2002	0.00	0.93	1.57	2.18	2.88	3.49	3.61
8/1/2002	0.00	0.96	1.56	2.17	2.88	3.50	3.65
9/6/2002	0.00	0.96	1.53	2.18	2.94	3.54	3.54
10/7/2002	0.00	0.99	1.53	2.12	2.90	3.50	3.57
11/15/2002	0.00	0.94	1.57	2.24	2.94	3.57	3.72
12/10/2002	0.00	0.93	1.56	2.23	2.98	3.58	3.75
1/14/2003	0.00	0.94	1.57	2.21	2.96	3.59	3.75
3/4/2003	0.00	0.94	1.59	2.24	2.96	3.59	3.77
5/30/2003	0.00	0.97	1.62	2.24	2.98	3.55	3.80
9/25/2003	0.00	0.97	1.62	2.27	3.02	3.65	3.80
5/17/2004	0.00	1.04	1.68	2.33	3.16	3.71	3.92
12/16/2004	0.00	1.01	1.65	2.36	3.14	3.83	4.01
10/27/2005	0.00	0.99	1.69	2.36	3.23	3.83	4.01
5/31/2006	0.00	1.06	1.71	2.39	3.23	3.85	4.01
5/8/2007	0.00	1.06	1.71	2.45	3.31	3.97	4.13
7/29/2008	0.00	1.12	1.77	2.54	3.38	4.04	4.16
6/15/2009	0.00	1.02	1.63	2.51	3.39	4.02	4.17
6/16/2010	0.00	1.02	1.76	2.55	3.47	4.13	4.38

Figure A12. 1st South – North Magnet Extensometer

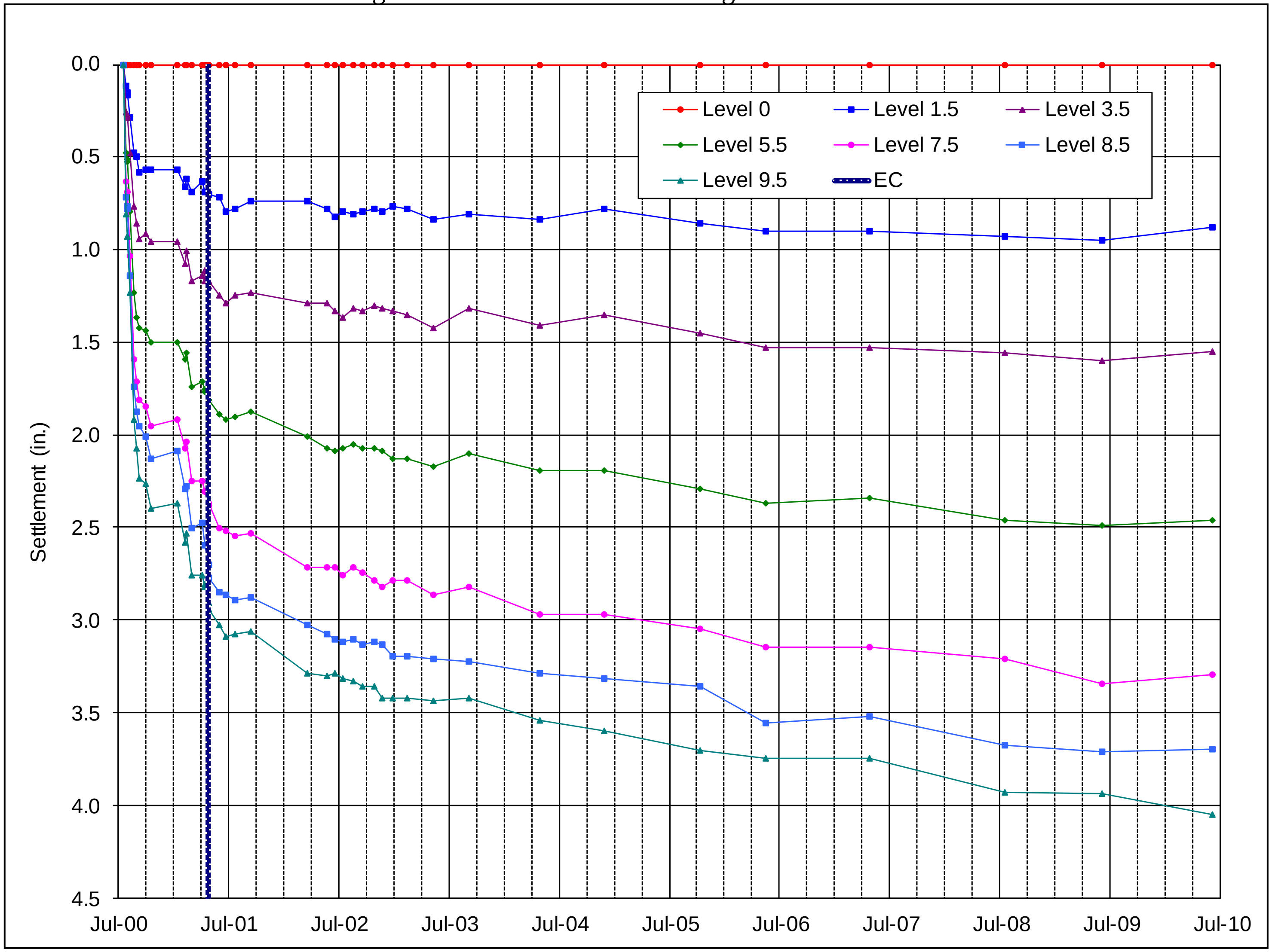

Table A12. 1st South – North Magnet Extensometer (in inches)

Date	Level 0	Level 1.5	Level 3.5	Level 5.5	Level 7.5	Level 8.5	Level 9.5
8/8/2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8/16/2000	0.00	0.12	0.25	0.48	0.63	0.72	0.81
8/21/2000	0.00	0.16	0.28	0.52	0.69	0.78	0.93
8/22/2000	0.00	0.15	0.27	0.51	0.69	0.76	0.93
8/30/2000	0.00	0.28	0.48	0.79	1.03	1.14	1.23
9/13/2000	0.00	0.48	0.76	1.23	1.59	1.74	1.92
9/21/2000	0.00	0.49	0.85	1.36	1.71	1.88	2.07
9/28/2000	0.00	0.58	0.94	1.42	1.81	1.95	2.23
10/19/2000	0.00	0.57	0.91	1.44	1.84	2.01	2.26
11/7/2000	0.00	0.57	0.96	1.50	1.95	2.13	2.40
2/1/2001	0.00	0.57	0.96	1.50	1.92	2.08	2.37
2/26/2001	0.00	0.66	1.08	1.59	2.07	2.29	2.58
3/6/2001	0.00	0.61	1.00	1.56	2.04	2.28	2.53
3/20/2001	0.00	0.69	1.17	1.74	2.25	2.50	2.76
4/24/2001	0.00	0.63	1.14	1.71	2.25	2.47	2.76
5/3/2001	0.00	0.69	1.17	1.75	2.31	2.59	2.82
5/3/2001	0.00	0.69	1.11	1.77	2.31	2.59	2.80
5/15/2001	0.00	0.70	1.20	1.81	2.38	2.70	2.91
5/15/2001	0.00	0.70	1.17	1.82	2.37	2.78	2.94
6/19/2001	0.00	0.72	1.24	1.89	2.50	2.85	3.03
7/11/2001	0.00	0.80	1.29	1.92	2.52	2.87	3.09
8/14/2001	0.00	0.78	1.24	1.90	2.55	2.90	3.07
10/1/2001	0.00	0.73	1.23	1.88	2.54	2.88	3.06
4/8/2002	0.00	0.73	1.29	2.01	2.71	3.03	3.28
6/12/2002	0.00	0.78	1.29	2.07	2.72	3.08	3.30
7/9/2002	0.00	0.82	1.33	2.08	2.71	3.10	3.28
8/1/2002	0.00	0.79	1.36	2.07	2.76	3.12	3.31
9/6/2002	0.00	0.81	1.32	2.06	2.72	3.10	3.33
10/7/2002	0.00	0.79	1.34	2.07	2.75	3.14	3.36
11/15/2002	0.00	0.78	1.30	2.07	2.79	3.12	3.36
12/10/2002	0.00	0.79	1.32	2.09	2.82	3.14	3.42
1/14/2003	0.00	0.76	1.34	2.13	2.79	3.20	3.42
3/4/2003	0.00	0.78	1.35	2.13	2.79	3.20	3.42
5/30/2003	0.00	0.84	1.42	2.18	2.86	3.21	3.43
9/25/2003	0.00	0.81	1.32	2.10	2.82	3.23	3.42
5/17/2004	0.00	0.84	1.41	2.19	2.97	3.29	3.54
12/16/2004	0.00	0.78	1.35	2.19	2.97	3.32	3.60
10/27/2005	0.00	0.85	1.45	2.29	3.05	3.36	3.70
5/31/2006	0.00	0.90	1.53	2.37	3.15	3.56	3.75
5/8/2007	0.00	0.90	1.53	2.34	3.15	3.52	3.75
7/29/2008	0.00	0.93	1.56	2.46	3.21	3.68	3.93
6/15/2009	0.00	0.95	1.60	2.49	3.34	3.71	3.94
6/16/2010	0.00	0.88	1.55	2.46	3.29	3.70	4.05

Figure A13. 1st South – Pressure Cell 55540

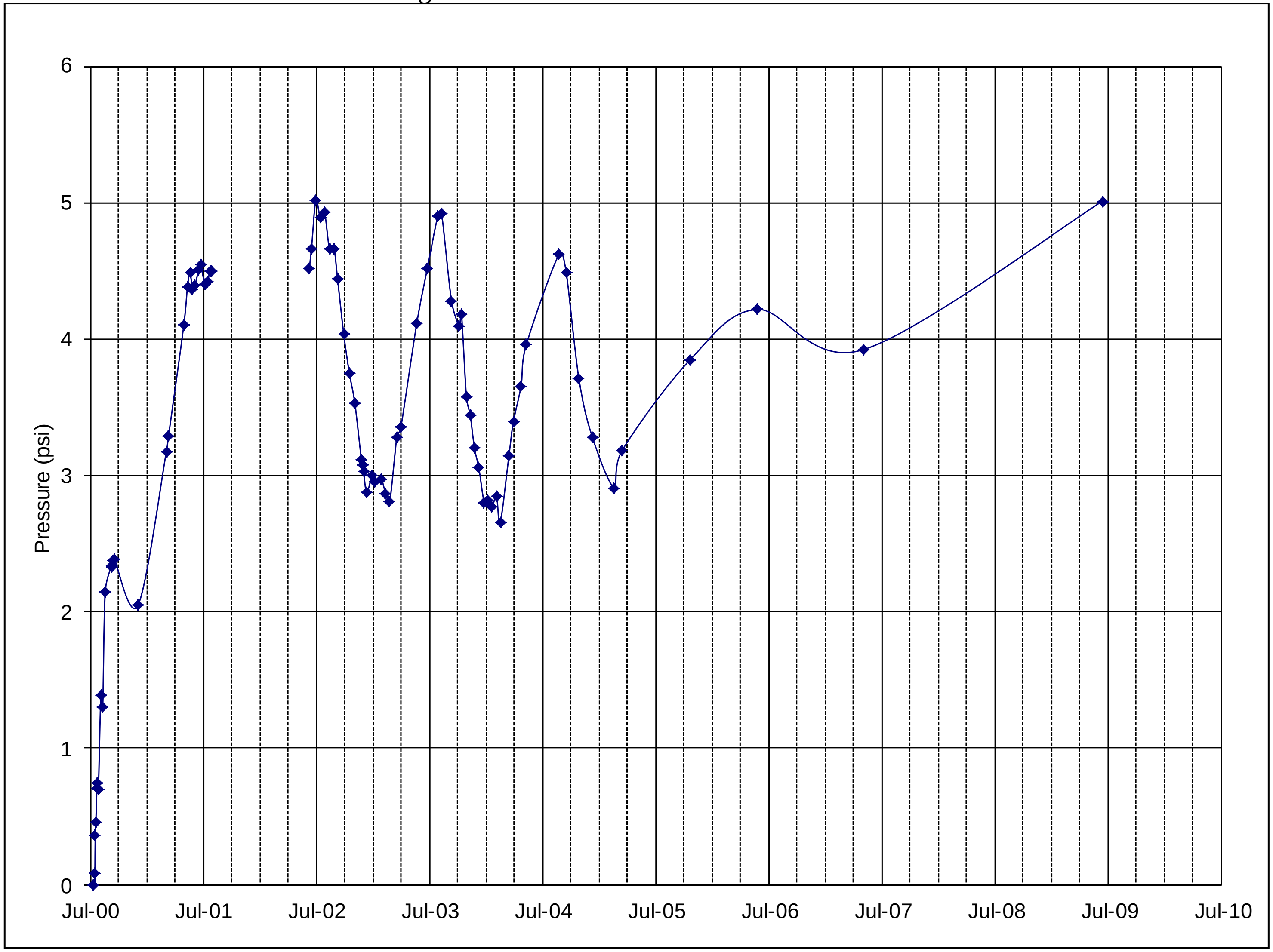

Table A13. 1st South – Pressure Cell 55540 (in psi)

Date	Pressure
7/21/2000	0.00
7/21/2000	-0.29
7/21/2000	-0.28
7/25/2000	-0.40
7/26/2000	-0.34
7/27/2000	-0.11
7/28/2000	0.08
7/29/2000	0.36
7/31/2000	0.45
8/3/2000	0.70
8/4/2000	0.74
8/8/2000	0.70
8/16/2000	1.39
8/22/2000	1.30
8/30/2000	2.14
9/19/2000	2.33
9/21/2000	2.33
9/25/2000	2.38
9/28/2000	2.39
12/14/2000	2.05
3/15/2001	3.18
3/22/2001	3.29
5/10/2001	4.10
5/22/2001	4.39
5/30/2001	4.49
6/7/2001	4.36
6/14/2001	4.39
6/27/2001	4.50
7/3/2001	4.54
7/17/2001	4.40
7/26/2001	4.42
8/2/2001	4.50
8/8/2001	4.50
6/18/2002	4.52
6/25/2002	4.66
7/9/2002	5.02
7/23/2002	4.90
8/6/2002	4.93
8/22/2002	4.66
9/6/2002	4.66
9/17/2002	4.44
10/7/2002	4.04
10/25/2002	3.75
11/12/2002	3.53
12/3/2002	3.12

Date	Pressure
12/9/2002	3.08
12/10/2002	3.03
12/20/2002	2.88
1/7/2003	3.00
1/14/2003	2.95
2/4/2003	2.97
2/19/2003	2.87
3/4/2003	2.81
3/27/2003	3.28
4/9/2003	3.35
5/30/2003	4.11
7/3/2003	4.52
8/6/2003	4.90
8/18/2003	4.92
9/19/2003	4.28
10/14/2003	4.09
10/21/2003	4.18
11/6/2003	3.58
11/18/2003	3.45
12/2/2003	3.20
12/16/2003	3.05
1/2/2004	2.80
1/14/2004	2.81
1/28/2004	2.77
2/11/2004	2.85
2/23/2004	2.66
3/22/2004	3.15
4/5/2004	3.39
4/30/2004	3.66
5/17/2004	3.96
8/31/2004	4.63
9/22/2004	4.49
11/2/2004	3.71
12/16/2004	3.28
2/24/2005	2.91
3/21/2005	3.18
10/27/2005	3.85
5/31/2006	4.22
5/8/2007	3.92
6/15/2009	5.01

Figure A14. 1st South – Pressure Cell 55541

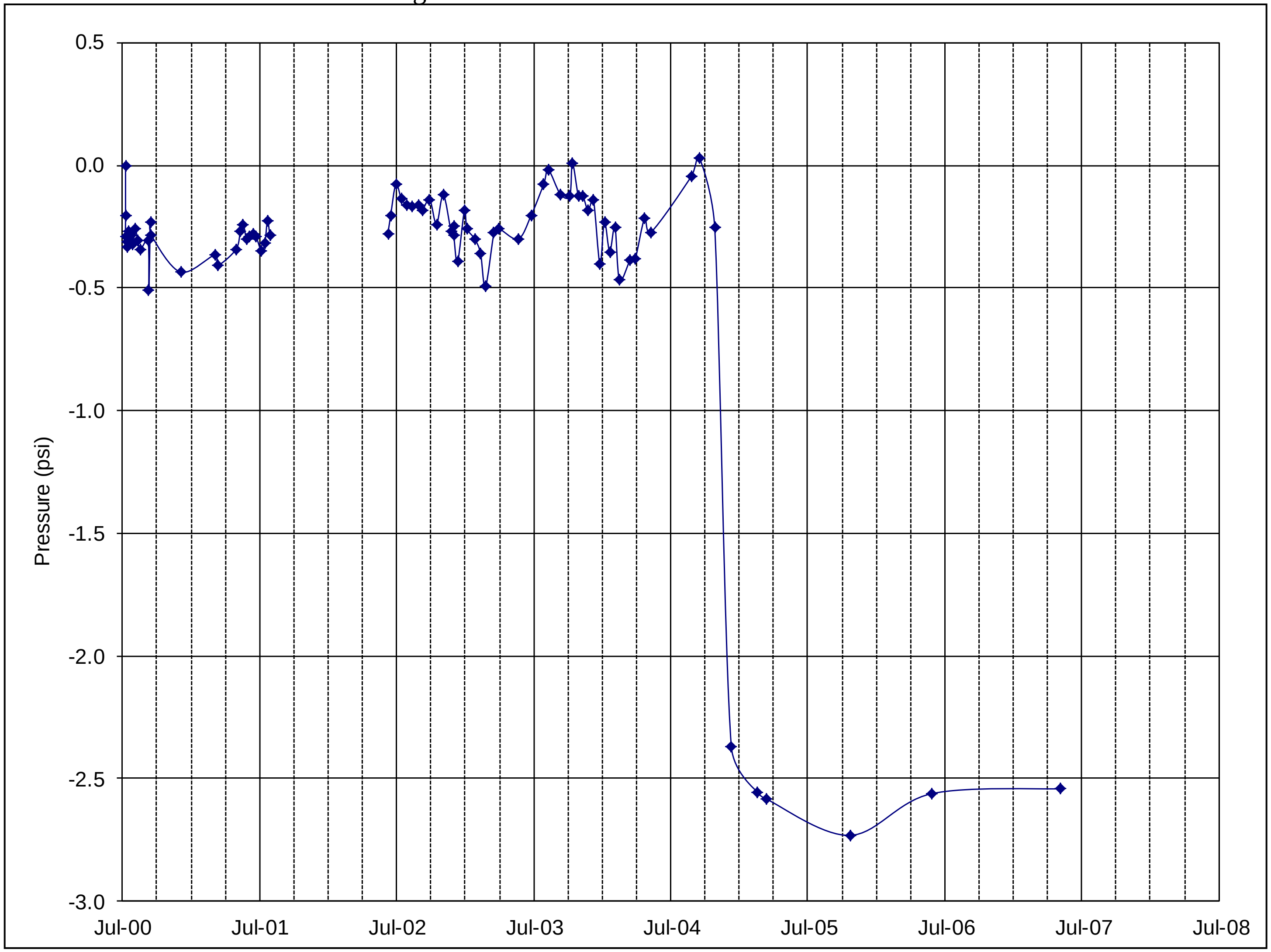

Table A14. 1st South – Pressure Cell 55541

Date	Pressure
7/21/2000	0.00
7/21/2000	-0.20
7/21/2000	-0.29
7/25/2000	-0.31
7/26/2000	-0.31
7/27/2000	-0.33
7/28/2000	-0.27
7/29/2000	-0.30
7/31/2000	-0.31
8/3/2000	-0.31
8/4/2000	-0.28
8/8/2000	-0.32
8/16/2000	-0.26
8/22/2000	-0.31
8/30/2000	-0.34
9/19/2000	-0.31
9/21/2000	-0.51
9/25/2000	-0.23
9/28/2000	-0.29
12/14/2000	-0.43
3/15/2001	-0.37
3/22/2001	-0.41
5/10/2001	-0.34
5/22/2001	-0.27
5/30/2001	-0.24
6/7/2001	-0.30
6/14/2001	-0.29
6/27/2001	-0.28
7/3/2001	-0.29
7/17/2001	-0.35
7/26/2001	-0.32
8/2/2001	-0.23
8/8/2001	-0.28
6/18/2002	-0.28
6/25/2002	-0.21
7/9/2002	-0.08
7/23/2002	-0.13
8/6/2002	-0.16
8/22/2002	-0.17
9/6/2002	-0.16
9/17/2002	-0.18
10/7/2002	-0.14
10/25/2002	-0.24
11/12/2002	-0.12
12/3/2002	-0.27

Date	Pressure
12/9/2002	-0.25
12/10/2002	-0.29
12/20/2002	-0.39
1/7/2003	-0.19
1/14/2003	-0.26
2/4/2003	-0.30
2/19/2003	-0.36
3/4/2003	-0.49
3/27/2003	-0.27
4/9/2003	-0.26
5/30/2003	-0.30
7/3/2003	-0.21
8/6/2003	-0.08
8/18/2003	-0.02
9/19/2003	-0.12
10/14/2003	-0.13
10/21/2003	0.01
11/6/2003	-0.13
11/18/2003	-0.13
12/2/2003	-0.18
12/16/2003	-0.14
1/2/2004	-0.40
1/14/2004	-0.23
1/28/2004	-0.35
2/11/2004	-0.25
2/23/2004	-0.47
3/22/2004	-0.39
4/5/2004	-0.38
4/30/2004	-0.21
5/17/2004	-0.27
8/31/2004	-0.05
9/22/2004	0.03
11/2/2004	-0.25
12/16/2004	-2.37
2/24/2005	-2.56
3/21/2005	-2.59
10/27/2005	-2.73
5/31/2006	-2.56
5/8/2007	-2.54

Figure A15. 1st South – Pressure Cell 55542

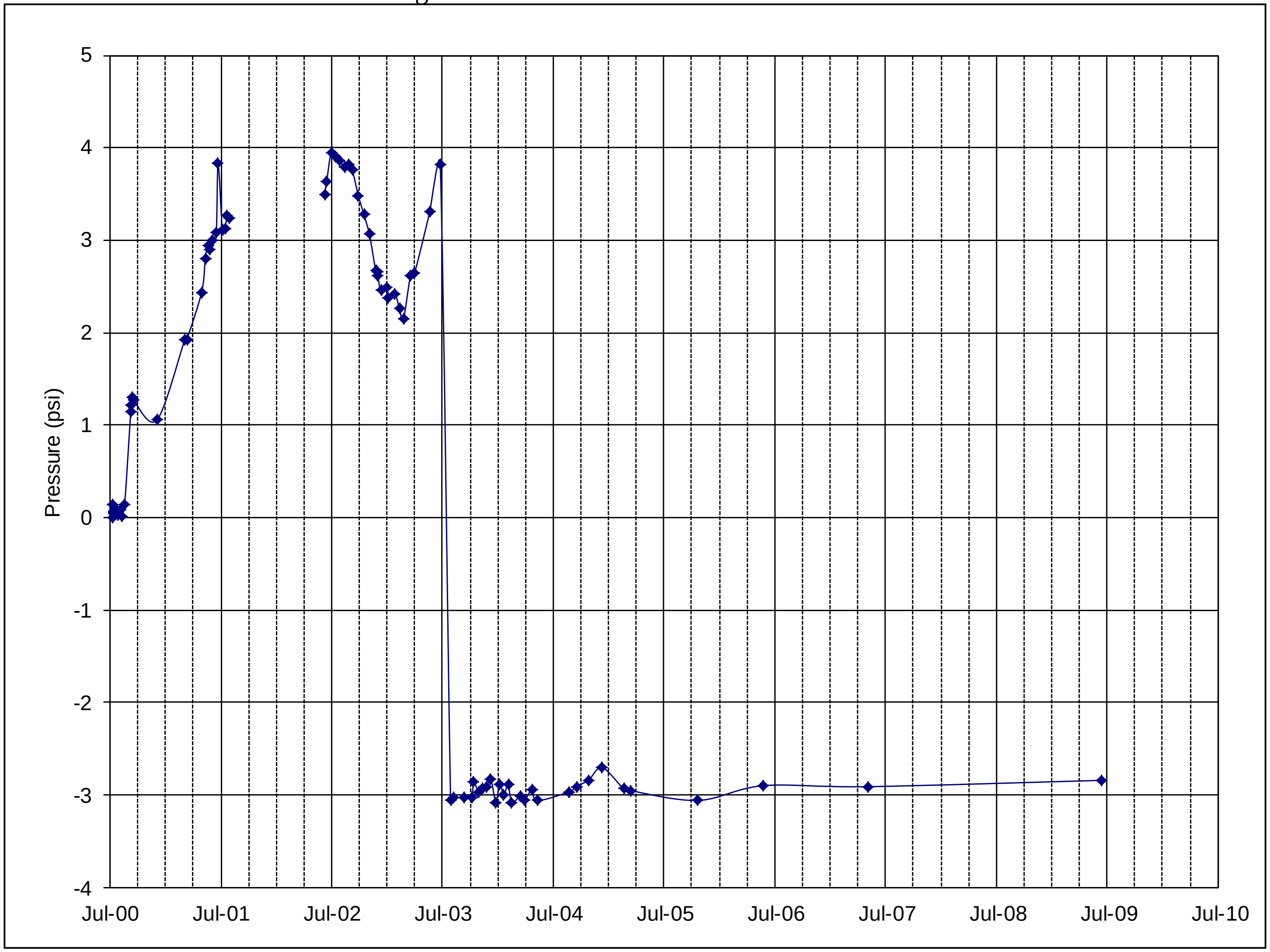

Table A15. 1st South – Pressure Cell 55542

Date	Pressure
7/21/2000	0.00
7/21/2000	0.13
7/25/2000	0.05
7/26/2000	0.06
7/27/2000	0.06
7/28/2000	0.10
7/29/2000	0.09
7/31/2000	0.07
8/3/2000	0.06
8/4/2000	0.09
8/8/2000	0.03
8/16/2000	0.09
8/22/2000	0.02
8/30/2000	0.14
9/19/2000	1.15
9/21/2000	1.21
9/25/2000	1.30
9/28/2000	1.27
12/14/2000	1.05
3/15/2001	1.92
3/22/2001	1.92
5/10/2001	2.44
5/22/2001	2.80
5/30/2001	2.95
6/7/2001	2.89
6/14/2001	2.99
6/27/2001	3.08
7/3/2001	3.83
7/17/2001	3.10
7/26/2001	3.13
8/2/2001	3.27
8/8/2001	3.24
6/18/2002	3.50
6/25/2002	3.64
7/9/2002	3.94
7/23/2002	3.90
8/6/2002	3.87
8/22/2002	3.78
9/6/2002	3.81
9/17/2002	3.75
10/7/2002	3.48
10/25/2002	3.28
11/12/2002	3.06
12/3/2002	2.67
12/9/2002	2.66

Date	Pressure
12/10/2002	2.61
12/20/2002	2.45
1/7/2003	2.49
1/14/2003	2.37
2/4/2003	2.42
2/19/2003	2.26
3/4/2003	2.14
3/27/2003	2.61
4/9/2003	2.64
5/30/2003	3.31
7/3/2003	3.81
8/6/2003	-3.06
8/18/2003	-3.03
9/19/2003	-3.03
10/14/2003	-3.03
10/21/2003	-2.87
11/6/2003	-2.97
11/18/2003	-2.93
12/2/2003	-2.92
12/16/2003	-2.83
1/2/2004	-3.08
1/14/2004	-2.88
1/28/2004	-3.00
2/11/2004	-2.89
2/23/2004	-3.08
3/22/2004	-3.02
4/5/2004	-3.06
4/30/2004	-2.95
5/17/2004	-3.06
8/31/2004	-2.97
9/22/2004	-2.91
11/2/2004	-2.84
12/16/2004	-2.71
2/24/2005	-2.93
3/21/2005	-2.96
10/27/2005	-3.06
5/31/2006	-2.90
5/8/2007	-2.91
6/15/2009	-2.85

Figure A16. 1st South – Settlement Points

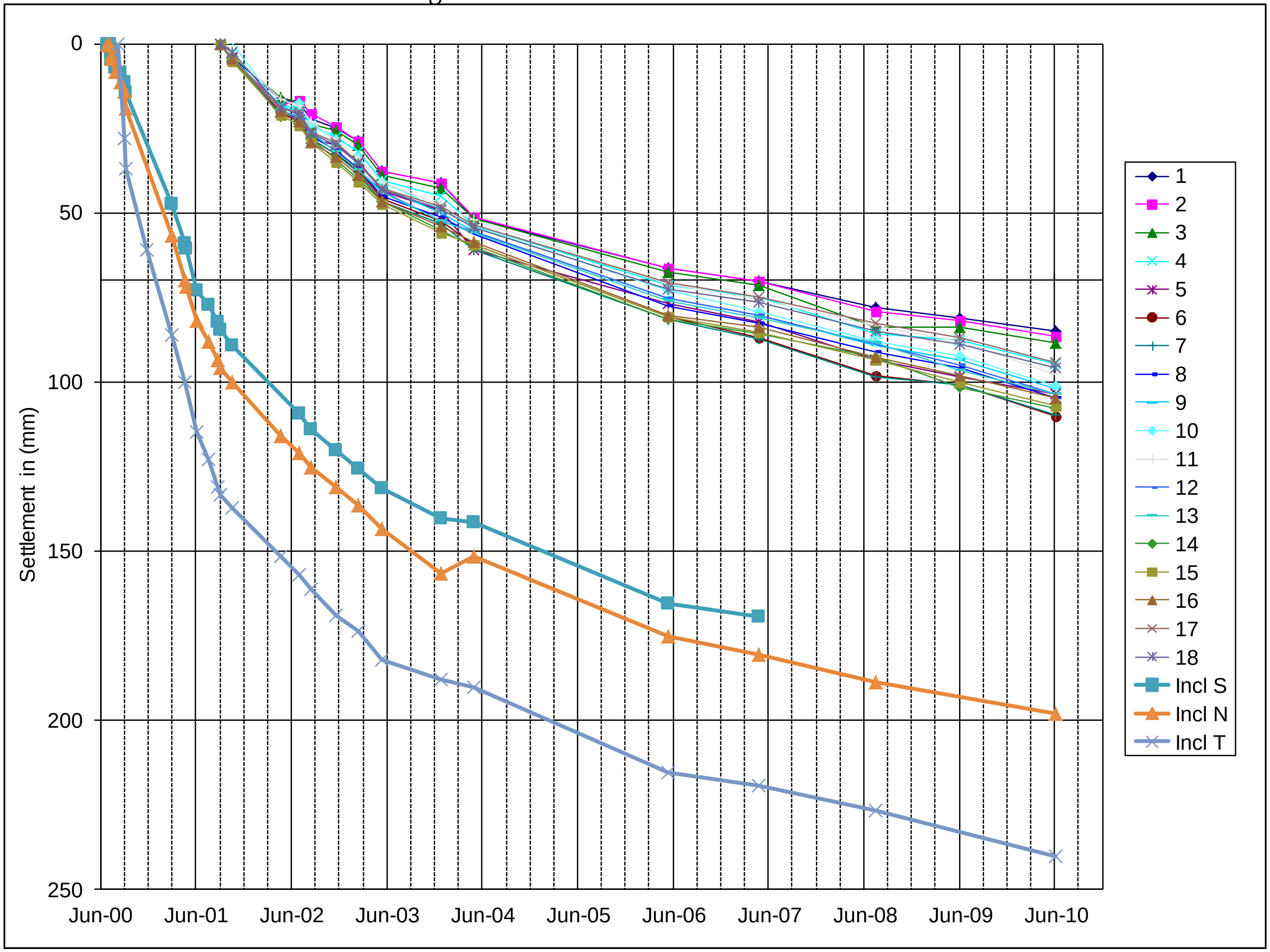

Table A16. 1st South – Settlement Points (in mm)

Date	Incl T	Incl N	Incl S	1	2	3	4	5
7/20/2000		0.0	0.0					
7/27/2000		0.4	0.2					
8/1/2000		3.2	2.7					
8/4/2000		4.5	4.7					
8/8/2000		#N/A	#N/A					
8/17/2000		8.3	7.2					
8/21/2000		#N/A	#N/A					
8/21/2000		#N/A	#N/A					
8/29/2000	0.0	#N/A	#N/A					
9/5/2000	#N/A	11.2	8.5					
9/20/2000	28.2	14.0	11.5					
9/28/2000	37.0	19.0	14.3					
12/14/2000	61.1	#N/A	#N/A					
3/22/2001	86.1	56.8	47.2					
5/10/2001	100.0	70.0	59.0					
5/15/2001	#N/A	71.9	60.5					
6/27/2001	114.8	82.0	72.9					
8/9/2001	123.0	88.2	77.3					
9/12/2001	131.0	93.4	82.2					
9/24/2001	133.5	95.9	84.6	0.0	0.0	0.0	0.0	0.0
11/5/2001	137.2	100.3	89.2	3.8	4.9	3.7	2.8	4.0
5/14/2002	151.5	116.1	#N/A	16.5	17.8	16.1	18.3	20.3
7/23/2002	157.0	121.1	109.3	17.6	16.9	17.3	18.8	21.3
9/6/2002	161.4	125.5	113.9	22.2	20.8	23.7	23.7	28.0
12/9/2002	168.9	131.1	120.2	25.0	24.6	25.8	27.5	30.1
3/4/2003	173.7	136.5	125.6	28.9	28.7	29.8	32.0	34.6
5/30/2003	182.2	143.5	131.5	37.9	37.9	39.0	40.4	43.5
1/14/2004	188.2	156.8	140.5	41.2	41.3	42.6	45.0	49.2
5/17/2004	190.4	151.6	141.7	51.6	51.1	51.6	53.5	61.1
5/31/2006	215.7	175.4	165.6	66.5	66.5	67.6	71.3	76.8
5/8/2007	219.5	180.6	169.6	70.3	70.3	71.6	74.8	82.2
7/29/2008	226.8	189.0	#N/A	78.2	79.4	83.7	85.8	93.4
6/15/2009	#N/A	#N/A	#N/A	81.3	82.0	83.7	87.6	98.6
6/14/2010	240.6	198.3	#N/A	85.0	86.6	88.4	94.8	103.5

Table A16 Continued. 1st South – Settlement Points (in mm)

Date	6	7	8	9	10	11	12	13
9/24/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11/5/2001	3.9	4.2	3.8	3.8	-0.4	3.0	5.1	3.9
5/14/2002	20.7	21.4	20.3	19.1	19.5	16.2	19.9	19.9
7/23/2002	23.1	23.7	22.3	19.3	17.4	18.2	21.6	21.7
9/6/2002	28.2	28.2	27.4	26.5	23.9	23.0	26.4	26.0
12/9/2002	32.6	32.6	31.5	29.9	28.4	28.4	32.0	31.7
3/4/2003	37.2	38.2	36.9	35.4	33.9	33.7	37.4	37.2
5/30/2003	45.7	46.7	45.0	42.5	40.8	40.9	43.4	43.8
1/14/2004	52.3	53.1	51.4	50.0	49.0	47.8	52.3	52.5
5/17/2004	59.4	60.8	56.5	55.5	53.9	52.2	55.4	56.0
5/31/2006	80.5	81.5	77.6	75.2	73.1	71.1	75.4	76.1
5/8/2007	87.0	87.4	82.6	80.3	79.2	75.7	80.3	81.2
7/29/2008	98.4	98.7	91.3	89.4	88.1	83.4	89.0	88.7
6/15/2009	101.0	101.0	96.0	93.4	92.3	88.2	95.1	96.5
6/14/2010	110.1	109.8	104.7	102.1	101.3	97.7	103.5	103.7

Table A16 Continued. 1st South – Settlement Points (in mm)

Date	14	15	16	17	18
9/24/2001	0.0	0.0	0.0	0.0	0.0
11/5/2001	4.5	5.1	4.3	4.3	2.6
5/14/2002	21.6	20.9	19.9	18.9	18.6
7/23/2002	23.7	24.1	22.9	20.4	21.0
9/6/2002	28.0	29.3	29.3	26.1	26.4
12/9/2002	34.4	35.0	33.6	29.3	30.1
3/4/2003	40.1	40.7	39.0	35.1	35.5
5/30/2003	46.8	47.5	46.6	42.8	43.1
1/14/2004	55.1	55.9	53.9	48.3	49.0
5/17/2004	60.1	59.6	58.6	53.7	54.3
5/31/2006	81.3	80.6	80.2	70.8	72.7
5/8/2007	85.7	85.5	84.0	74.8	76.5
7/29/2008	93.0	93.4	92.7	82.9	85.2
6/15/2009	101.8	100.3	98.0	87.0	89.0
6/14/2010	107.9	107.1	105.0	94.2	95.8

Figure A17. SS-07 – Pressure Cell 52197

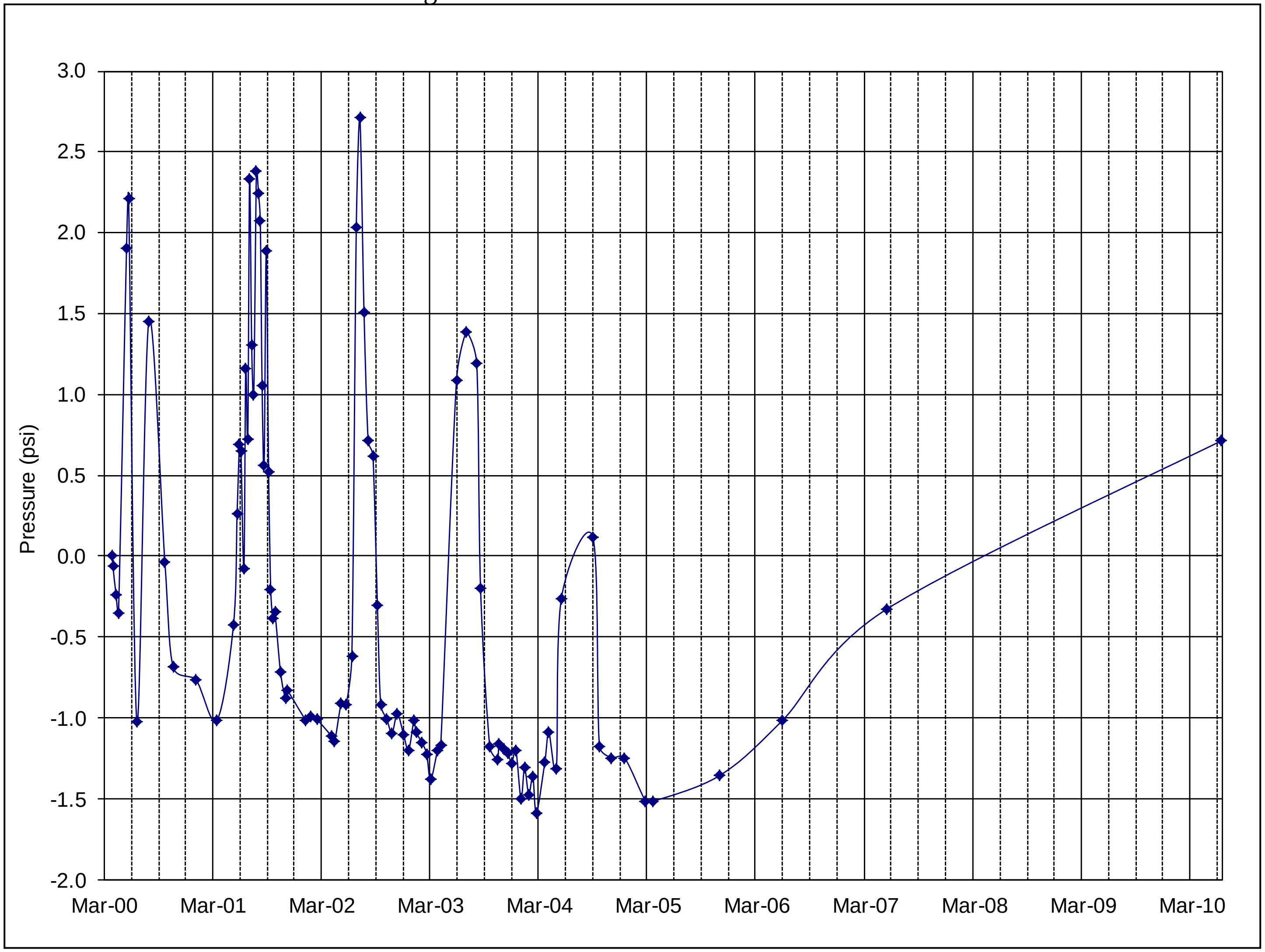

Table A17. SS-07 – Pressure Cell 52197 (in psi)

Date	Pressure
3/29/2000	0.00
3/30/2000	-0.06
4/10/2000	-0.24
4/18/2000	-0.35
5/15/2000	1.90
5/22/2000	2.21
6/19/2000	-1.03
7/29/2000	1.45
9/21/2000	-0.04
10/19/2000	-0.69
1/3/2001	-0.76
3/15/2001	-1.02
5/10/2001	-0.42
5/22/2001	0.26
5/30/2001	0.69
6/4/2001	0.65
6/14/2001	-0.08
6/20/2001	1.16
6/27/2001	0.72
7/3/2001	2.34
7/10/2001	1.30
7/17/2001	1.00
7/26/2001	2.38
8/2/2001	2.24
8/8/2001	2.08
8/14/2001	1.05
8/21/2001	0.56
8/28/2001	1.89
9/5/2001	0.52
9/12/2001	-0.20
9/19/2001	-0.39
9/26/2001	-0.35
10/15/2001	-0.72
10/31/2001	-0.88
11/5/2001	-0.83
1/8/2002	-1.01
1/23/2002	-0.99
2/14/2002	-1.01
4/3/2002	-1.11
4/15/2002	-1.15
5/7/2002	-0.92
5/23/2002	-0.92
6/12/2002	-0.62
6/27/2002	2.03
7/9/2002	2.71
7/23/2002	1.50
8/6/2002	0.71
8/22/2002	0.62
9/6/2002	-0.30
9/17/2002	-0.92
10/7/2002	-1.01
10/25/2002	-1.10
11/12/2002	-0.98
12/3/2002	-1.10
12/20/2002	-1.20
1/7/2003	-1.02
1/14/2003	-1.09
2/4/2003	-1.16
2/19/2003	-1.23
3/4/2003	-1.38
3/27/2003	-1.21
4/7/2003	-1.17
5/30/2003	1.08
7/2/2003	1.38
8/6/2003	1.19
8/19/2003	-0.20
9/19/2003	-1.18
10/14/2003	-1.26
10/21/2003	-1.16
11/6/2003	-1.20
11/18/2003	-1.22
12/2/2003	-1.28
12/16/2003	-1.20
1/2/2004	-1.50
1/14/2004	-1.31
1/28/2004	-1.47
2/11/2004	-1.37
2/23/2004	-1.59
3/22/2004	-1.28
4/5/2004	-1.09
4/30/2004	-1.32
5/17/2004	-0.26
8/31/2004	0.11
9/22/2004	-1.18
11/2/2004	-1.25
12/16/2004	-1.25
2/24/2005	-1.52
3/21/2005	-1.52
11/1/2005	-1.36
5/31/2006	-1.02
5/15/2007	-0.33
6/16/2010	0.71

Figure A18. SS-07 – Pressure Cell 52198

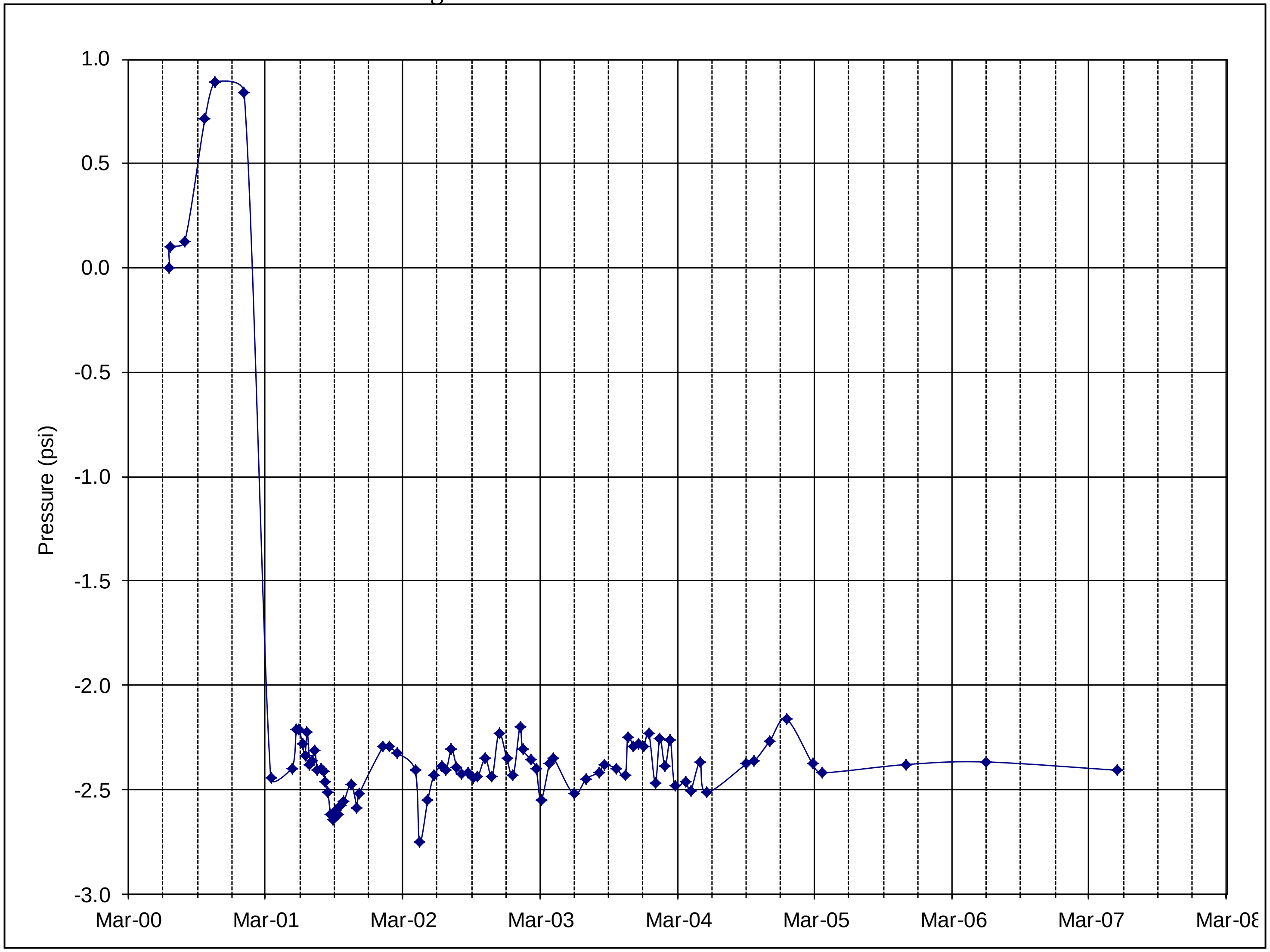

Table A18. SS-07 – Pressure Cell 52198 (in psi)

Date	Pressure
6/19/2000	0.00
6/20/2000	0.10
7/29/2000	0.13
9/21/2000	0.72
10/19/2000	0.89
1/3/2001	0.84
3/15/2001	-2.45
5/10/2001	-2.40
5/22/2001	-2.21
5/30/2001	-2.21
6/7/2001	-2.28
6/14/2001	-2.34
6/20/2001	-2.22
6/27/2001	-2.38
7/3/2001	-2.36
7/10/2001	-2.31
7/17/2001	-2.41
7/26/2001	-2.40
8/2/2001	-2.42
8/8/2001	-2.46
8/14/2001	-2.51
8/21/2001	-2.62
8/28/2001	-2.65
9/5/2001	-2.60
9/12/2001	-2.62
9/19/2001	-2.58
9/26/2001	-2.56
10/15/2001	-2.47
10/31/2001	-2.59
11/5/2001	-2.52
1/8/2002	-2.30
1/23/2002	-2.30
2/14/2002	-2.33
4/3/2002	-2.41
4/15/2002	-2.75
5/7/2002	-2.55
5/23/2002	-2.43
6/12/2002	-2.39
6/25/2002	-2.40
7/9/2002	-2.31
7/23/2002	-2.39
8/6/2002	-2.43
8/22/2002	-2.42
9/6/2002	-2.44
9/17/2002	-2.44
10/7/2002	-2.35
10/25/2002	-2.44
11/12/2002	-2.23
12/3/2002	-2.35
12/20/2002	-2.44
1/7/2003	-2.20
1/14/2003	-2.31
2/4/2003	-2.36
2/19/2003	-2.40
3/4/2003	-2.55
3/27/2003	-2.37
4/7/2003	-2.35
5/30/2003	-2.52
7/2/2003	-2.45
8/6/2003	-2.42
8/19/2003	-2.38
9/19/2003	-2.40
10/14/2003	-2.43
10/21/2003	-2.25
11/6/2003	-2.29
11/18/2003	-2.28
12/2/2003	-2.29
12/16/2003	-2.23
1/2/2004	-2.47
1/14/2004	-2.25
1/28/2004	-2.39
2/11/2004	-2.27
2/23/2004	-2.49
3/22/2004	-2.46
4/5/2004	-2.51
4/30/2004	-2.37
5/17/2004	-2.52
8/31/2004	-2.38
9/22/2004	-2.36
11/2/2004	-2.27
12/16/2004	-2.16
2/24/2005	-2.38
3/21/2005	-2.42
11/1/2005	-2.38
5/31/2006	-2.37
5/15/2007	-2.41

Figure A19. SS-07 – Pressure Cell 52199

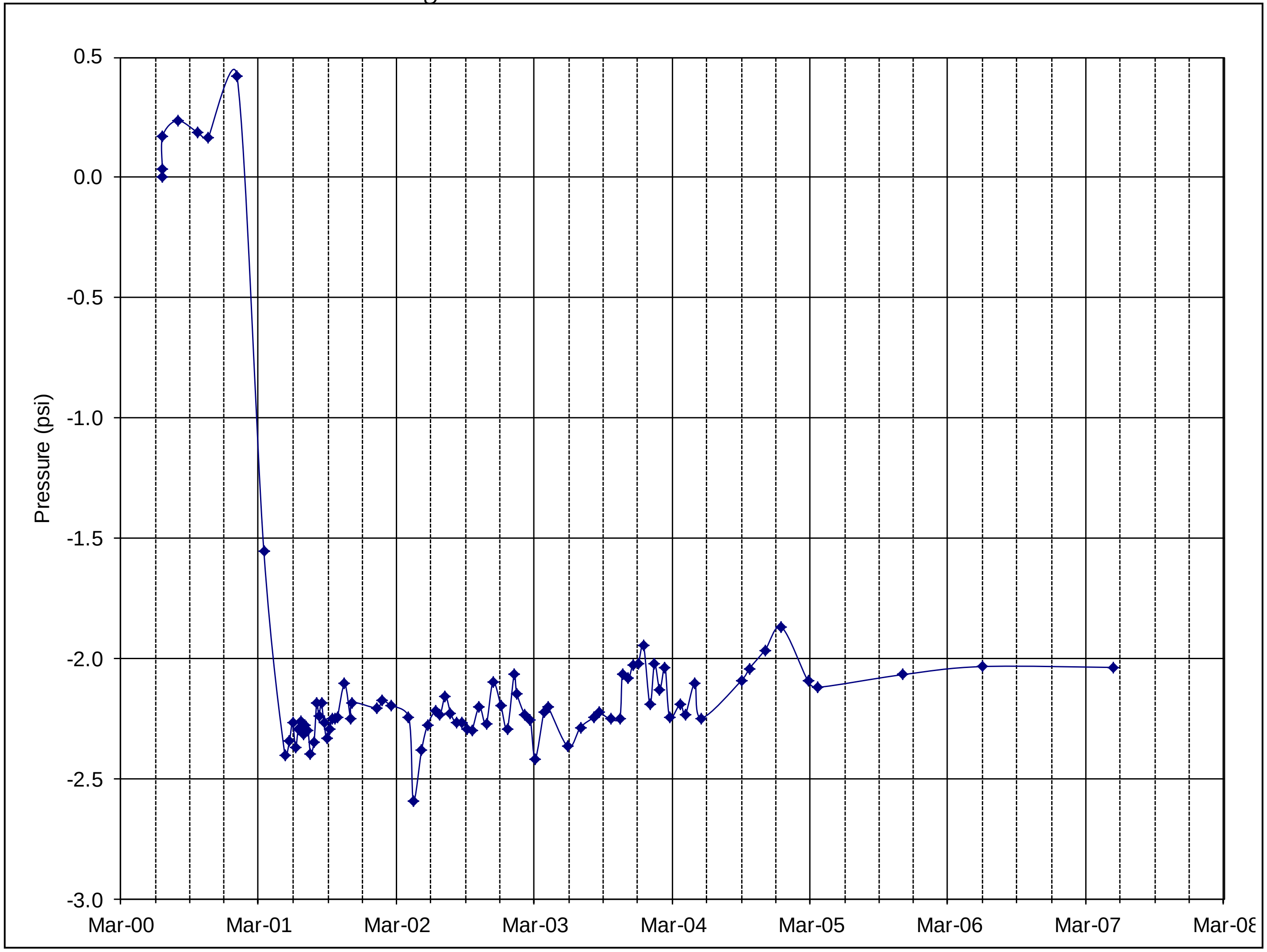

Table A19. SS-07 – Pressure Cell 52199 (in psi)

Date	Pressure
6/19/2000	0.00
6/19/2000	0.04
6/20/2000	0.17
7/29/2000	0.24
9/21/2000	0.19
10/19/2000	0.17
1/3/2001	0.42
3/15/2001	-1.56
5/10/2001	-2.41
5/22/2001	-2.34
5/30/2001	-2.27
6/7/2001	-2.37
6/14/2001	-2.29
6/20/2001	-2.26
6/27/2001	-2.32
7/3/2001	-2.28
7/10/2001	-2.30
7/17/2001	-2.40
7/26/2001	-2.35
8/2/2001	-2.19
8/8/2001	-2.24
8/14/2001	-2.18
8/21/2001	-2.27
8/28/2001	-2.33
9/5/2001	-2.30
9/12/2001	-2.25
9/19/2001	-2.25
9/26/2001	-2.24
10/15/2001	-2.11
10/31/2001	-2.25
11/5/2001	-2.19
1/8/2002	-2.21
1/23/2002	-2.17
2/14/2002	-2.20
4/3/2002	-2.25
4/15/2002	-2.59
5/7/2002	-2.38
5/23/2002	-2.28
6/12/2002	-2.22
6/25/2002	-2.23
7/9/2002	-2.16
7/23/2002	-2.23
8/6/2002	-2.27
8/22/2002	-2.27
9/6/2002	-2.30
9/17/2002	-2.30
10/7/2002	-2.20
10/25/2002	-2.27
11/12/2002	-2.10
12/3/2002	-2.20
12/20/2002	-2.29
1/7/2003	-2.07
1/14/2003	-2.15
2/4/2003	-2.24
2/19/2003	-2.26
3/4/2003	-2.42
3/27/2003	-2.22
4/7/2003	-2.20
5/30/2003	-2.37
7/2/2003	-2.29
8/6/2003	-2.25
8/19/2003	-2.22
9/19/2003	-2.25
10/14/2003	-2.25
10/21/2003	-2.07
11/6/2003	-2.09
11/18/2003	-2.03
12/2/2003	-2.02
12/16/2003	-1.95
1/2/2004	-2.19
1/14/2004	-2.02
1/28/2004	-2.13
2/11/2004	-2.04
2/23/2004	-2.24
3/22/2004	-2.19
4/5/2004	-2.23
4/30/2004	-2.10
5/17/2004	-2.25
8/31/2004	-2.09
9/22/2004	-2.04
11/2/2004	-1.97
12/16/2004	-1.87
2/24/2005	-2.10
3/21/2005	-2.12
11/1/2005	-2.07
5/31/2006	-2.03
5/15/2007	-2.04

Figure A20. SS-07 – Pressure Cell 52200

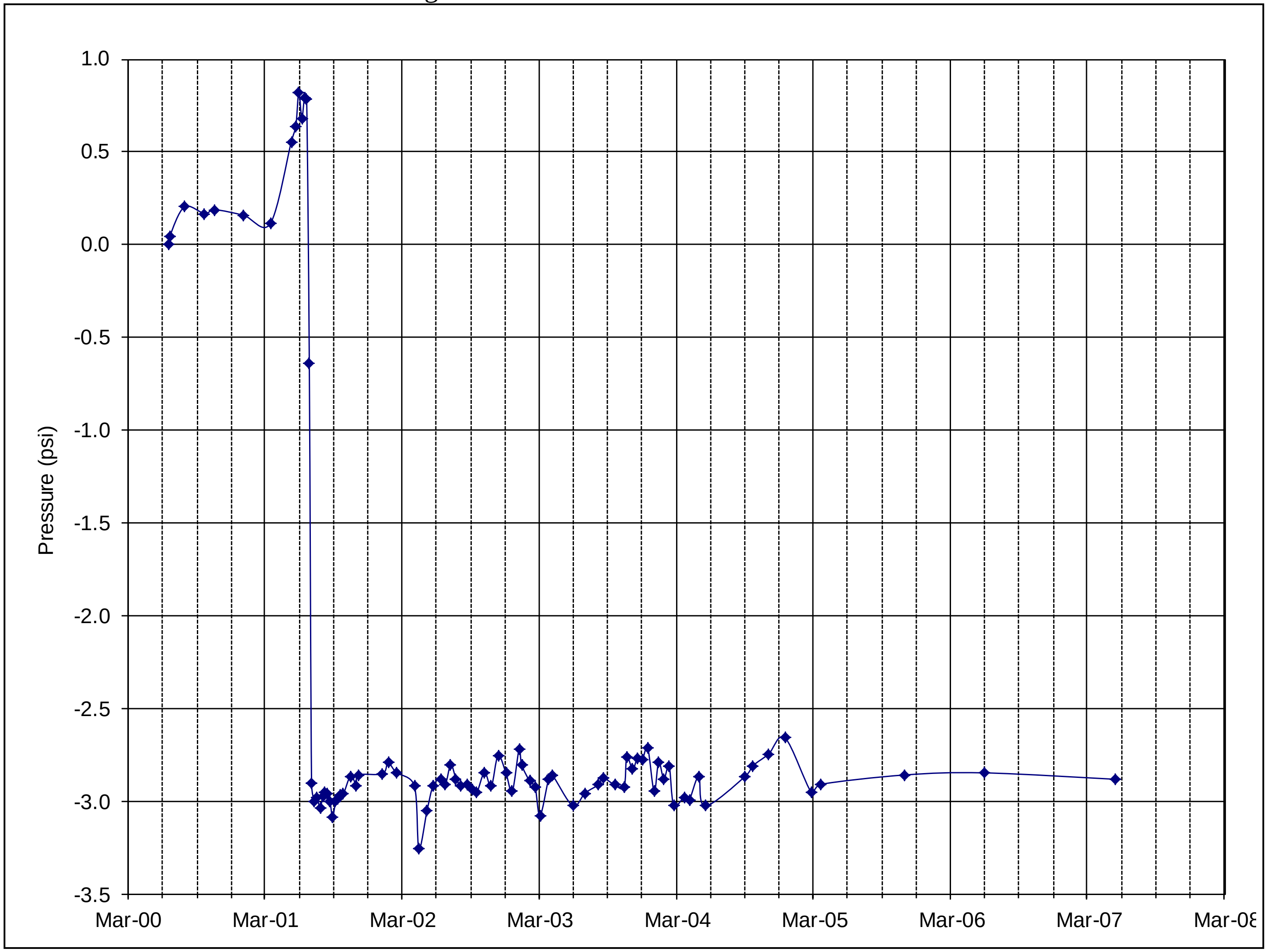

Table A20. SS-07 – Pressure Cell 52200 (in psi)

Date	Pressure
6/19/2000	0.00
6/20/2000	0.04
7/29/2000	0.20
9/21/2000	0.17
10/19/2000	0.19
1/3/2001	0.16
3/15/2001	0.11
5/10/2001	0.55
5/22/2001	0.64
5/30/2001	0.82
6/7/2001	0.68
6/14/2001	0.79
6/20/2001	0.78
6/27/2001	-0.64
7/3/2001	-2.91
7/10/2001	-3.00
7/17/2001	-2.98
7/26/2001	-3.04
8/2/2001	-2.97
8/8/2001	-2.96
8/14/2001	-2.96
8/21/2001	-3.00
8/28/2001	-3.09
9/5/2001	-3.01
9/12/2001	-2.99
9/19/2001	-2.97
9/26/2001	-2.96
10/15/2001	-2.87
10/31/2001	-2.91
11/5/2001	-2.86
1/8/2002	-2.85
1/23/2002	-2.79
2/14/2002	-2.85
4/3/2002	-2.92
4/15/2002	-3.26
5/7/2002	-3.05
5/23/2002	-2.92
6/12/2002	-2.88
6/25/2002	-2.91
7/9/2002	-2.80
7/23/2002	-2.88
8/6/2002	-2.92
8/22/2002	-2.91
9/6/2002	-2.94
9/17/2002	-2.95
10/7/2002	-2.85
10/25/2002	-2.92
11/12/2002	-2.76
12/3/2002	-2.85
12/20/2002	-2.95
1/7/2003	-2.72
1/14/2003	-2.81
2/4/2003	-2.89
2/19/2003	-2.93
3/4/2003	-3.08
3/27/2003	-2.88
4/7/2003	-2.86
5/30/2003	-3.03
7/2/2003	-2.96
8/6/2003	-2.91
8/19/2003	-2.88
9/19/2003	-2.91
10/14/2003	-2.93
10/21/2003	-2.76
11/6/2003	-2.83
11/18/2003	-2.77
12/2/2003	-2.77
12/16/2003	-2.71
1/2/2004	-2.95
1/14/2004	-2.79
1/28/2004	-2.88
2/11/2004	-2.81
2/23/2004	-3.02
3/22/2004	-2.98
4/5/2004	-2.99
4/30/2004	-2.87
5/17/2004	-3.03
8/31/2004	-2.87
9/22/2004	-2.81
11/2/2004	-2.75
12/16/2004	-2.66
2/24/2005	-2.95
3/21/2005	-2.91
11/1/2005	-2.86
5/31/2006	-2.85
5/15/2007	-2.88

Figure A21. SS-07 – Pressure Cell 52201

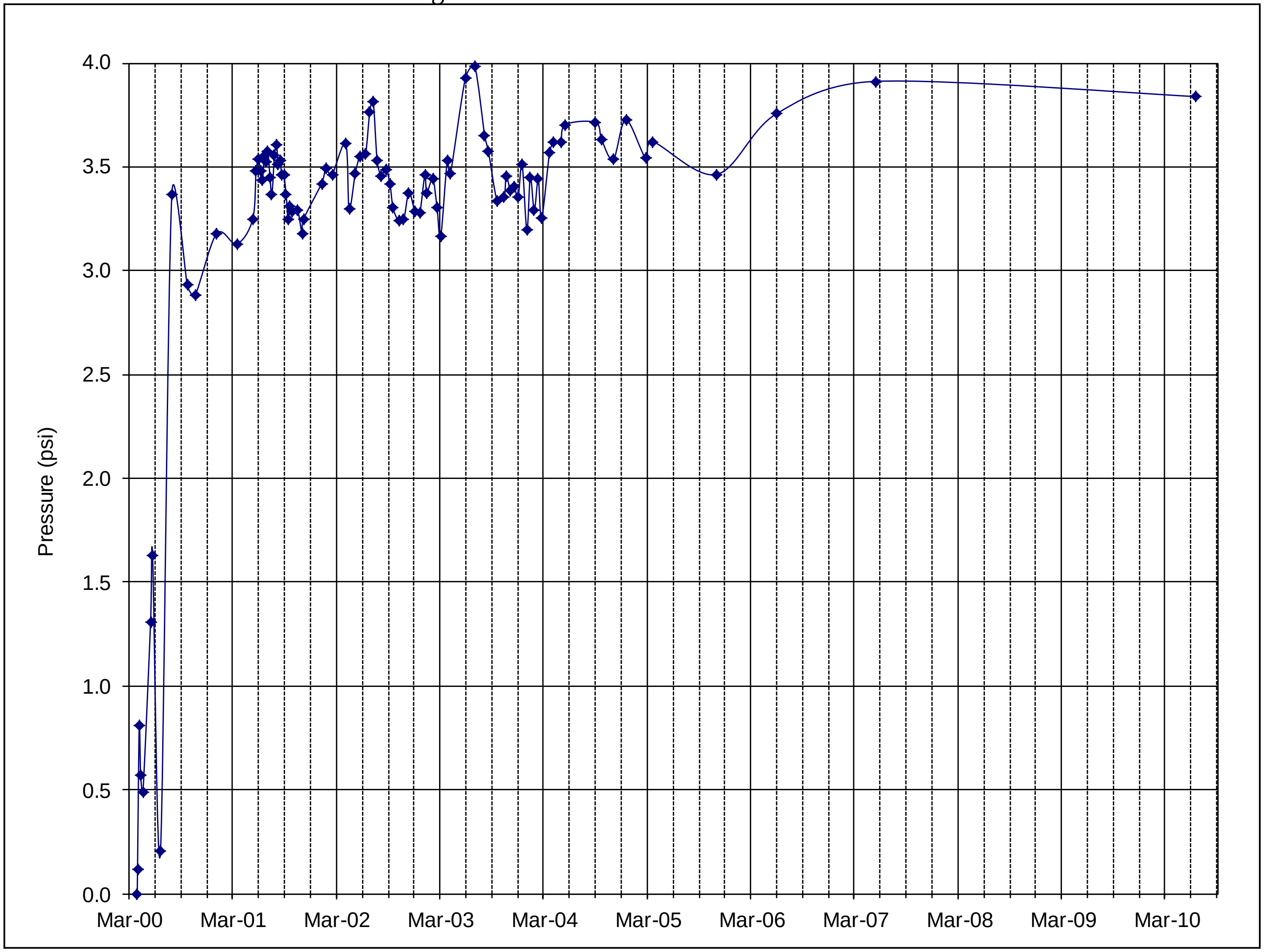

Table A21. SS-07 – Pressure Cell 52201 (in psi)

Date	Pressure
3/29/2000	0.00
3/30/2000	0.11
4/5/2000	0.81
4/10/2000	0.57
4/18/2000	0.49
5/15/2000	1.31
5/22/2000	1.63
6/19/2000	0.21
7/29/2000	3.37
9/21/2000	2.93
10/19/2000	2.88
1/3/2001	3.18
3/15/2001	3.13
5/10/2001	3.25
5/22/2001	3.48
5/30/2001	3.54
6/7/2001	3.48
6/14/2001	3.44
6/20/2001	3.56
6/27/2001	3.53
7/3/2001	3.57
7/10/2001	3.45
7/17/2001	3.37
7/26/2001	3.56
8/2/2001	3.61
8/8/2001	3.51
8/14/2001	3.53
8/21/2001	3.46
8/28/2001	3.46
9/5/2001	3.37
9/12/2001	3.24
9/19/2001	3.31
9/26/2001	3.29
10/15/2001	3.29
10/31/2001	3.18
11/5/2001	3.25
1/8/2002	3.42
1/23/2002	3.49
2/14/2002	3.46
4/3/2002	3.61
4/15/2002	3.30
5/7/2002	3.47
5/23/2002	3.55
6/12/2002	3.56
6/27/2002	3.77
7/9/2002	3.82
7/23/2002	3.53
8/6/2002	3.46
8/22/2002	3.49
9/6/2002	3.42
9/17/2002	3.30
10/7/2002	3.24
10/25/2002	3.25
11/12/2002	3.38
12/3/2002	3.29
12/20/2002	3.28
1/7/2003	3.46
1/14/2003	3.37
2/4/2003	3.44
2/19/2003	3.31
3/4/2003	3.16
3/27/2003	3.53
4/7/2003	3.47
5/30/2003	3.93
7/2/2003	3.98
8/6/2003	3.65
8/19/2003	3.58
9/19/2003	3.34
10/14/2003	3.36
10/21/2003	3.45
11/6/2003	3.38
11/18/2003	3.41
12/2/2003	3.35
12/16/2003	3.51
1/2/2004	3.19
1/14/2004	3.45
1/28/2004	3.29
2/11/2004	3.44
2/23/2004	3.25
3/22/2004	3.57
4/5/2004	3.62
4/30/2004	3.62
5/17/2004	3.70
8/31/2004	3.71
9/22/2004	3.63
11/2/2004	3.54
12/16/2004	3.73
2/24/2005	3.54
3/21/2005	3.62
11/1/2005	3.46
5/31/2006	3.76
5/15/2007	3.91
6/16/2010	3.84

Figure A22. SS-07 – Pressure Cell 52202

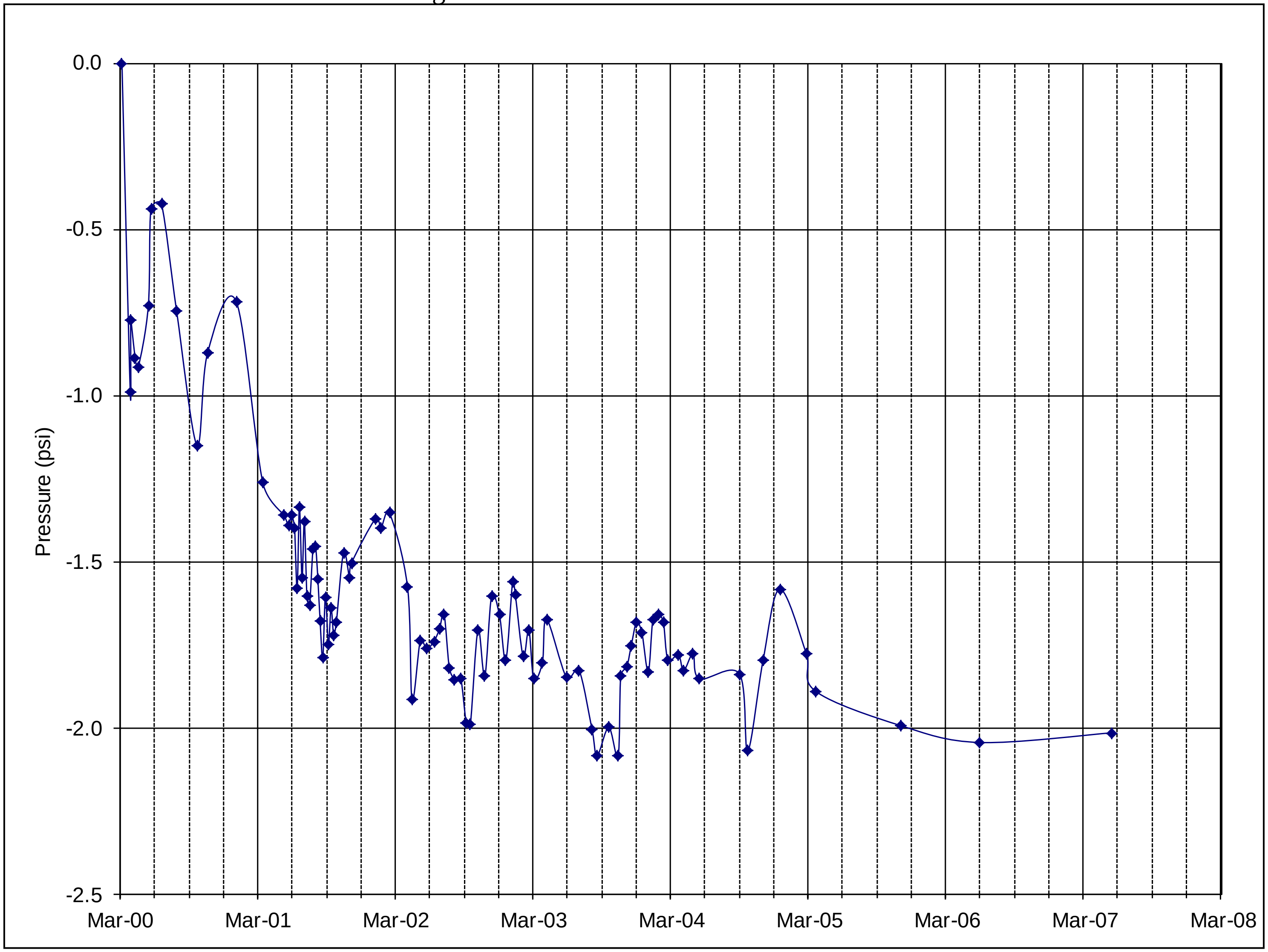

Table A22. SS-07 – Pressure Cell 52202 (in psi)

Date	Pressure
3/6/2000	0.00
3/28/2000	-0.99
3/29/2000	-0.77
3/30/2000	-0.77
4/10/2000	-0.89
4/18/2000	-0.92
5/15/2000	-0.73
5/22/2000	-0.44
6/19/2000	-0.43
7/29/2000	-0.75
9/21/2000	-1.15
10/19/2000	-0.87
1/3/2001	-0.72
3/15/2001	-1.26
5/10/2001	-1.36
5/22/2001	-1.39
5/30/2001	-1.36
6/7/2001	-1.40
6/14/2001	-1.58
6/20/2001	-1.34
6/27/2001	-1.55
7/3/2001	-1.38
7/10/2001	-1.60
7/17/2001	-1.63
7/26/2001	-1.46
8/2/2001	-1.46
8/8/2001	-1.55
8/14/2001	-1.68
8/21/2001	-1.79
8/28/2001	-1.61
9/5/2001	-1.75
9/12/2001	-1.64
9/19/2001	-1.72
9/26/2001	-1.68
10/15/2001	-1.47
10/31/2001	-1.55
11/5/2001	-1.51
1/8/2002	-1.37
1/23/2002	-1.40
2/14/2002	-1.35
4/3/2002	-1.58
4/15/2002	-1.92
5/7/2002	-1.74
5/23/2002	-1.76
6/12/2002	-1.74
6/27/2002	-1.70
7/9/2002	-1.66
7/23/2002	-1.82
8/6/2002	-1.86
8/22/2002	-1.85
9/6/2002	-1.99
9/17/2002	-1.99
10/7/2002	-1.71
10/25/2002	-1.85
11/12/2002	-1.61
12/3/2002	-1.66
12/20/2002	-1.80
1/7/2003	-1.56
1/14/2003	-1.60
2/4/2003	-1.79
2/19/2003	-1.71
3/4/2003	-1.85
3/27/2003	-1.80
4/7/2003	-1.67
5/30/2003	-1.85
7/2/2003	-1.83
8/6/2003	-2.01
8/19/2003	-2.09
9/19/2003	-2.00
10/14/2003	-2.09
10/21/2003	-1.84
11/6/2003	-1.82
11/18/2003	-1.75
12/2/2003	-1.68
12/16/2003	-1.71
1/2/2004	-1.83
1/14/2004	-1.68
1/28/2004	-1.66
2/11/2004	-1.68
2/23/2004	-1.80
3/22/2004	-1.78
4/5/2004	-1.83
4/30/2004	-1.78
5/17/2004	-1.85
8/31/2004	-1.84
9/22/2004	-2.07
11/2/2004	-1.80
12/16/2004	-1.58
2/24/2005	-1.78
3/21/2005	-1.89
11/1/2005	-1.99
5/31/2006	-2.05
5/15/2007	-2.02

Figure A23. SS-07 – Pressure Cell 52203

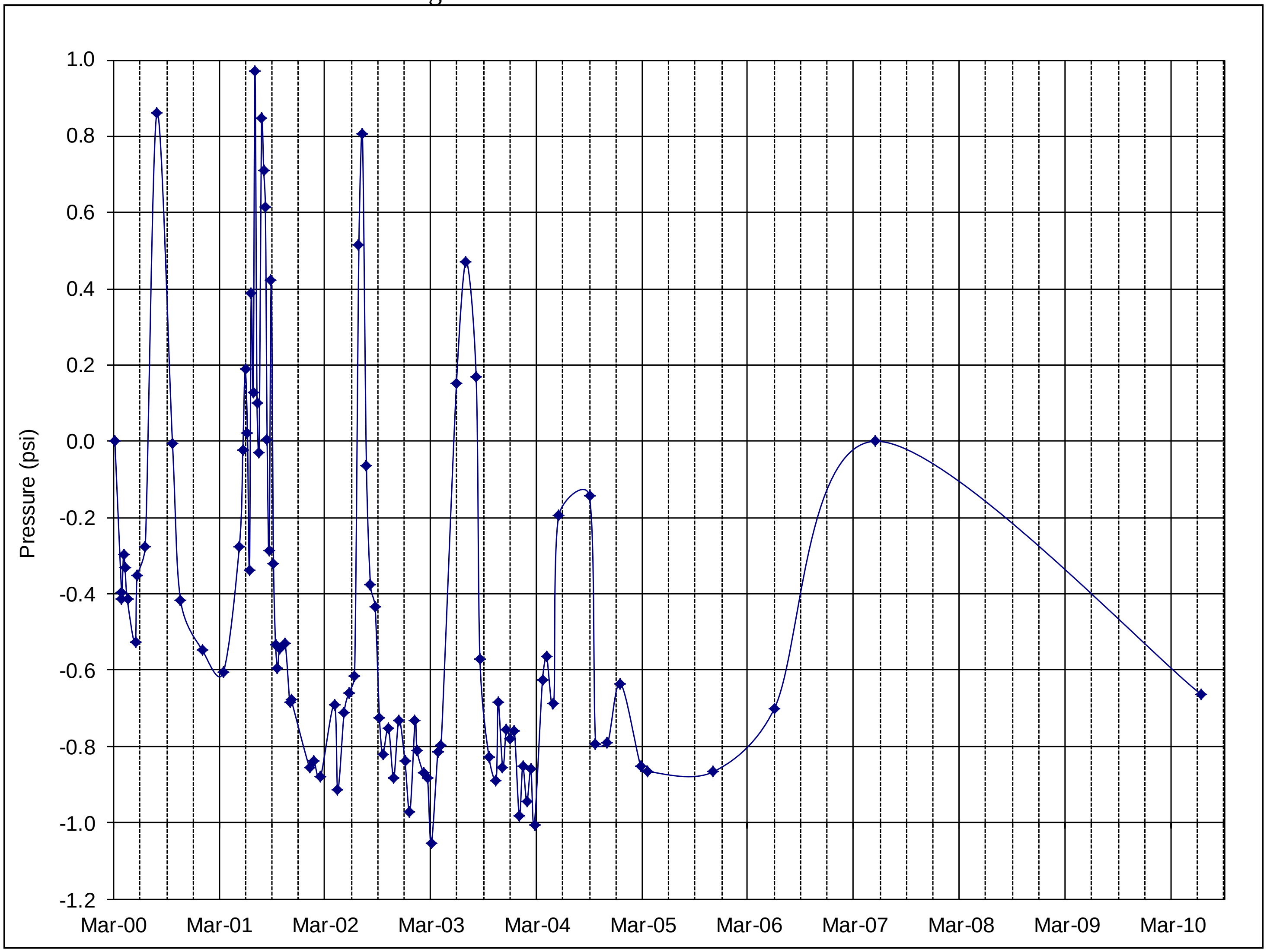

Table A23. SS-07 – Pressure Cell 52203 (in psi)

Date	Pressure
3/6/2000	0.00
3/29/2000	-0.40
3/30/2000	-0.41
4/5/2000	-0.30
4/10/2000	-0.33
4/18/2000	-0.41
5/15/2000	-0.53
5/22/2000	-0.35
6/19/2000	-0.27
7/29/2000	0.86
9/21/2000	-0.01
10/19/2000	-0.42
1/3/2001	-0.55
3/15/2001	-0.61
5/10/2001	-0.28
5/22/2001	-0.02
5/30/2001	0.19
6/7/2001	0.02
6/14/2001	-0.34
6/20/2001	0.39
6/27/2001	0.13
7/3/2001	0.97
7/10/2001	0.10
7/17/2001	-0.03
7/26/2001	0.85
8/2/2001	0.71
8/8/2001	0.61
8/14/2001	0.00
8/21/2001	-0.29
8/28/2001	0.42
9/5/2001	-0.32
9/12/2001	-0.53
9/19/2001	-0.60
9/26/2001	-0.54
10/15/2001	-0.53
10/31/2001	-0.68
11/5/2001	-0.68
1/8/2002	-0.86
1/23/2002	-0.84
2/14/2002	-0.88
4/3/2002	-0.69
4/15/2002	-0.91
5/7/2002	-0.71
5/23/2002	-0.66
6/12/2002	-0.62
6/27/2002	0.52
7/9/2002	0.81
7/23/2002	-0.07
8/6/2002	-0.38
8/22/2002	-0.44
9/6/2002	-0.73
9/17/2002	-0.82
10/7/2002	-0.75
10/25/2002	-0.88
11/12/2002	-0.73
12/3/2002	-0.84
12/20/2002	-0.97
1/7/2003	-0.73
1/14/2003	-0.81
2/4/2003	-0.87
2/19/2003	-0.88
3/4/2003	-1.06
3/27/2003	-0.81
4/7/2003	-0.80
5/30/2003	0.15
7/2/2003	0.47
8/6/2003	0.17
8/19/2003	-0.57
9/19/2003	-0.83
10/14/2003	-0.89
10/21/2003	-0.68
11/6/2003	-0.86
11/18/2003	-0.76
12/2/2003	-0.78
12/16/2003	-0.76
1/2/2004	-0.98
1/14/2004	-0.85
1/28/2004	-0.95
2/11/2004	-0.86
2/23/2004	-1.00
3/22/2004	-0.63
4/5/2004	-0.56
4/30/2004	-0.69
5/17/2004	-0.20
8/31/2004	-0.14
9/22/2004	-0.79
11/2/2004	-0.79
12/16/2004	-0.64
2/24/2005	-0.85
3/21/2005	-0.87
11/1/2005	-0.87
5/31/2006	-0.70
6/16/2010	-0.66

Figure A24. SS-05 – Inclinometer 1

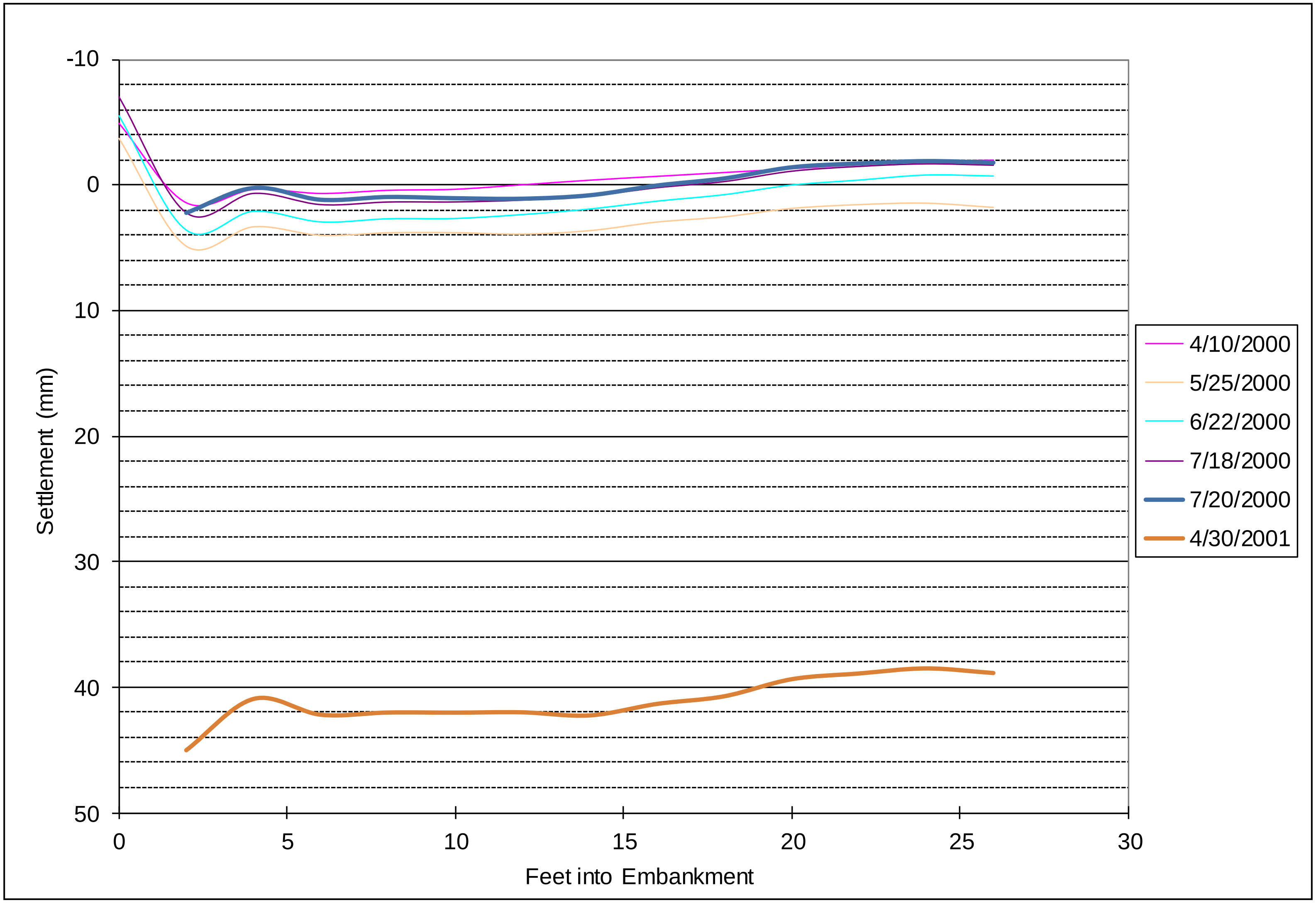

Table A24. SS-05 – Inclinometer 1 (in mm)

Depth (ft)	3/14/2000	4/10/2000	5/25/2000	6/22/2000	7/18/2000	7/20/2000	4/30/2001
0	0.0	-4.9	-3.7	-5.5	-7.0		
2	0.0	1.4	4.9	3.6	2.2	2.2	45.0
4	0.0	0.4	3.3	2.1	0.7	0.2	40.9
6	0.0	0.7	4.0	3.0	1.6	1.2	42.2
8	0.0	0.4	3.8	2.7	1.4	1.0	42.0
10	0.0	0.4	3.8	2.7	1.4	1.1	42.0
12	0.0	0.0	3.9	2.4	1.2	1.1	42.0
14	0.0	-0.4	3.6	1.9	0.9	0.8	42.3
16	0.0	-0.7	3.0	1.3	0.2	0.1	41.3
18	0.0	-1.0	2.5	0.8	-0.3	-0.5	40.7
20	0.0	-1.3	1.9	0.0	-1.1	-1.4	39.4
22	0.0	-1.6	1.6	-0.4	-1.5	-1.7	38.9
24	0.0	-1.9	1.5	-0.8	-1.7	-1.9	38.5
26	0.0	-2.0	1.8	-0.7	-1.6	-1.8	38.9

Figure A25. SS-05 – Inclinometer 2

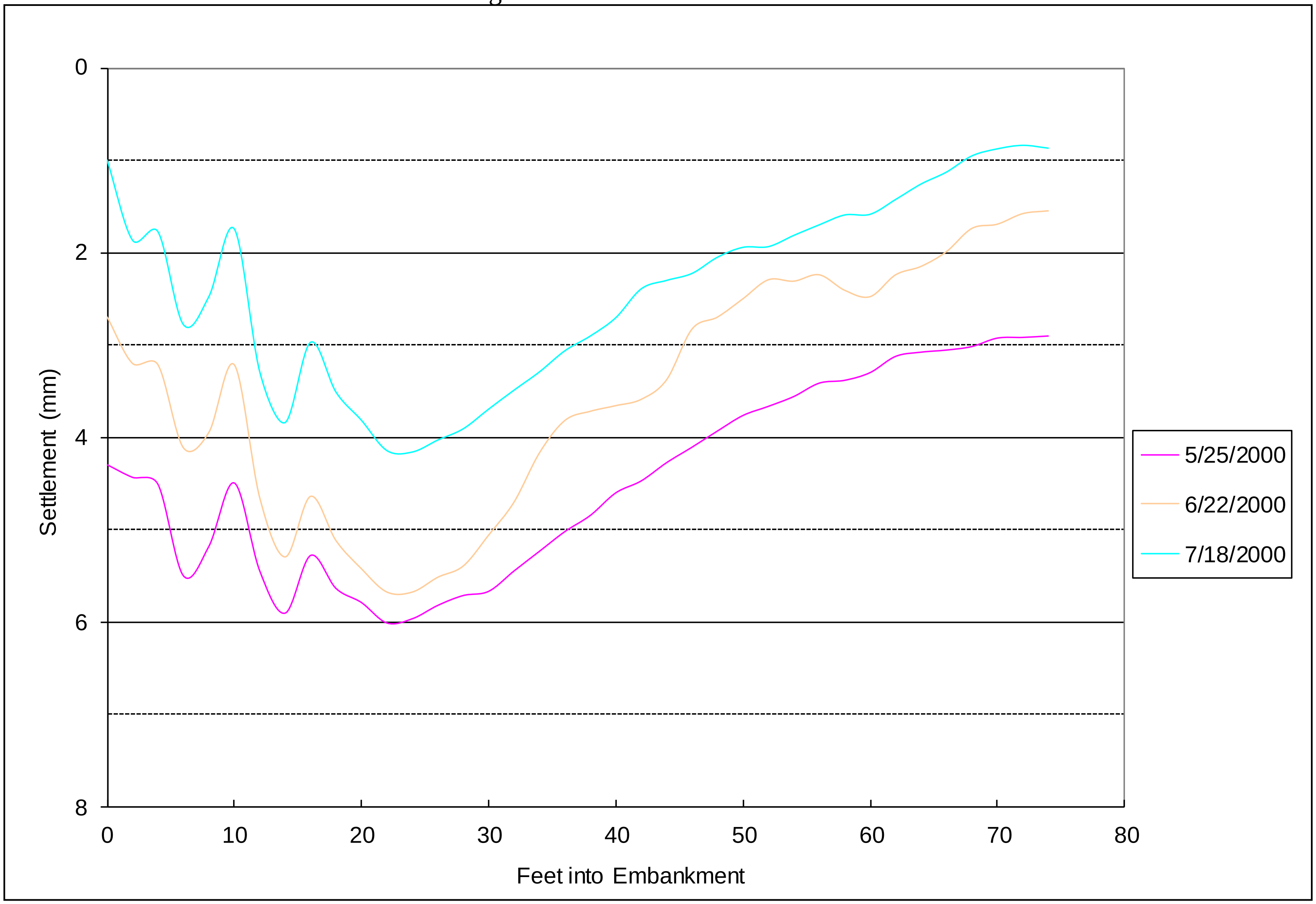

Table A25. SS-05 – Inclinometer 2 (in mm)

Depth	4/11/2000	5/25/2000	6/22/2000	7/18/2000
0	0	4.3	2.7	1.0
2	0	4.4	3.2	1.9
4	0	4.5	3.2	1.8
6	0	5.5	4.1	2.8
8	0	5.2	3.9	2.5
10	0	4.5	3.2	1.7
12	0	5.5	4.7	3.3
14	0	5.9	5.3	3.8
16	0	5.3	4.6	3.0
18	0	5.6	5.1	3.5
20	0	5.8	5.4	3.8
22	0	6.0	5.7	4.1
24	0	6.0	5.7	4.2
26	0	5.8	5.5	4.0
28	0	5.7	5.4	3.9
30	0	5.7	5.1	3.7
32	0	5.5	4.7	3.5
34	0	5.2	4.2	3.3
36	0	5.0	3.8	3.1
38	0	4.8	3.7	2.9
40	0	4.6	3.7	2.7
42	0	4.5	3.6	2.4
44	0	4.3	3.4	2.3
46	0	4.1	2.8	2.2
48	0	3.9	2.7	2.1
50	0	3.8	2.5	1.9
52	0	3.7	2.3	1.9
54	0	3.6	2.3	1.8
56	0	3.4	2.2	1.7
58	0	3.4	2.4	1.6
60	0	3.3	2.5	1.6
62	0	3.1	2.2	1.4
64	0	3.1	2.2	1.3
66	0	3.1	2.0	1.1
68	0	3.0	1.7	1.0
70	0	2.9	1.7	0.9
72	0	2.9	1.6	0.8
74	0	2.9	1.5	0.9

Figure A26. SS-05 – Magnet Extensometer

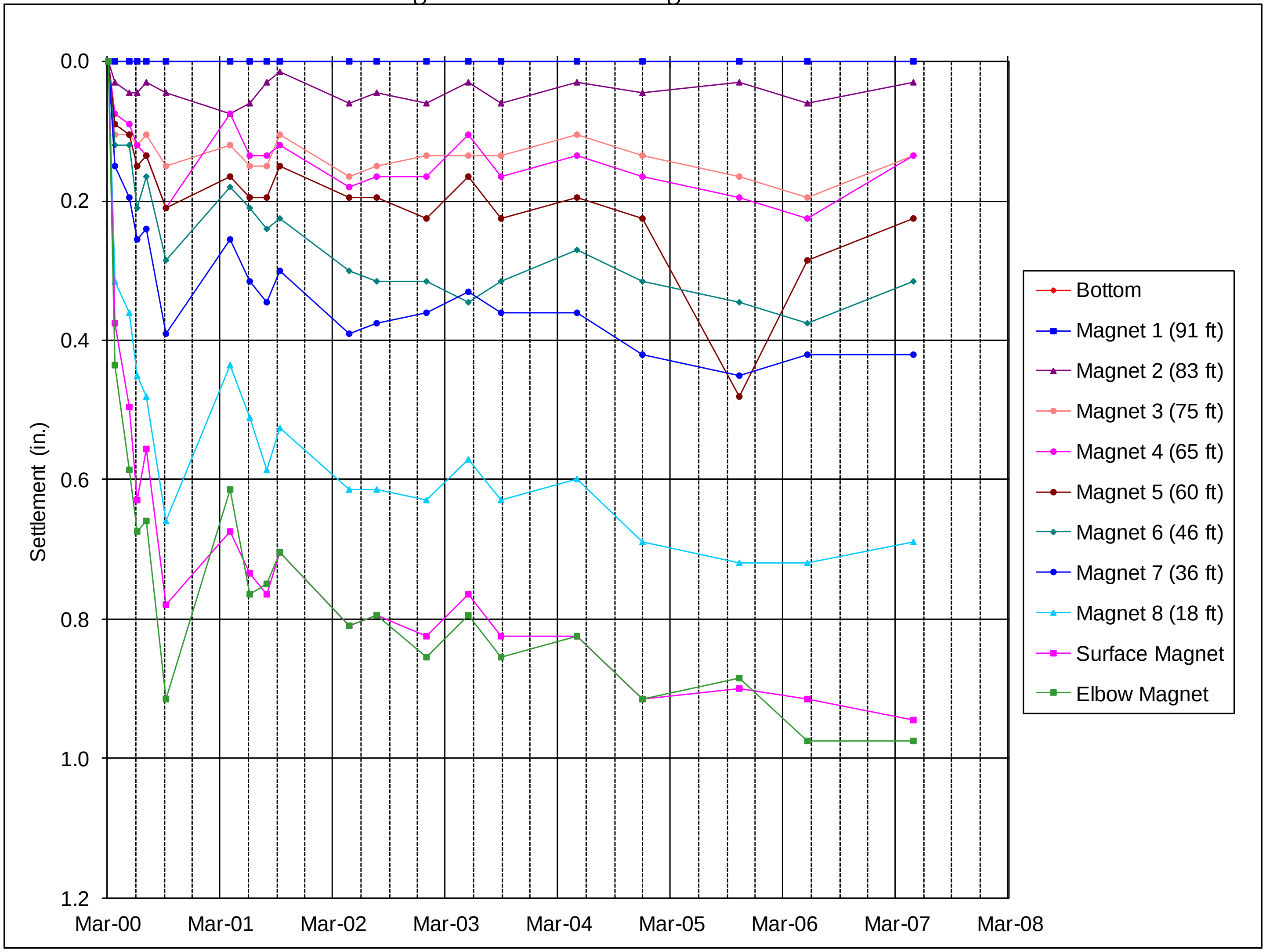

Table A26. SS-05 – Magnet Extensometer (in inches)

Date	Bottom	Magnet 1 (91 ft)	Magnet 2 (83 ft)	Magnet 3 (75 ft)	Magnet 4 (65 ft)	Magnet 5 (60 ft)	Magnet 6 (46 ft)	Magnet 7 (36 ft)	Magnet 8 (18 ft)	Surface Magnet	Elbow Magnet
3/17/2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4/10/2000	0.00	0.00	0.03	0.10	0.07	0.09	0.12	0.15	0.31	0.37	0.43
5/25/2000	0.00	0.00	0.04	0.10	0.09	0.10	0.12	0.19	0.36	0.49	0.58
6/22/2000	0.00	0.00	0.04	0.12	0.12	0.15	0.21	0.25	0.45	0.63	0.67
7/18/2000	0.00	0.00	0.03	0.10	0.13	0.13	0.16	0.24	0.48	0.55	0.66
09/21/00	0.00	0.00	0.04	0.15	0.21	0.21	0.28	0.39	0.66	0.78	0.91
04/19/01	0.00	0.00	0.07	0.12	0.07	0.17	0.18	0.26	0.44	0.67	0.61
06/19/01	0.00	0.00	0.06	0.15	0.13	0.19	0.21	0.31	0.51	0.73	0.76
08/14/01	0.00	0.00	0.03	0.15	0.13	0.19	0.24	0.34	0.58	0.76	0.75
09/26/01	0.00	0.00	0.01	0.11	0.12	0.15	0.22	0.30	0.52	0.70	0.70
05/08/02	0.00	0.00	0.06	0.16	0.18	0.19	0.30	0.39	0.61	0.81	0.81
08/07/02	0.00	0.00	0.04	0.15	0.16	0.19	0.31	0.37	0.61	0.79	0.79
01/14/03	0.00	0.00	0.06	0.13	0.16	0.22	0.31	0.36	0.63	0.82	0.85
06/02/03	0.00	0.00	0.03	0.13	0.10	0.16	0.34	0.33	0.57	0.76	0.79
09/14/03	0.00	0.00	0.06	0.13	0.16	0.22	0.31	0.36	0.63	0.82	0.85
05/19/04	0.00	0.00	0.03	0.10	0.13	0.19	0.27	0.36	0.60	0.82	0.82
12/16/04	0.00	0.00	0.04	0.14	0.17	0.22	0.31	0.42	0.69	0.91	0.91
10/27/05	0.00	0.00	0.03	0.16	0.19	0.48	0.34	0.45	0.72	0.90	0.88
06/05/06	0.00	0.00	0.06	0.19	0.22	0.28	0.38	0.42	0.72	0.91	0.97
05/15/07	0.00	0.00	0.03	0.14	0.13	0.22	0.31	0.42	0.69	0.94	0.97

Figure A27. SS-05 – Settlement Points

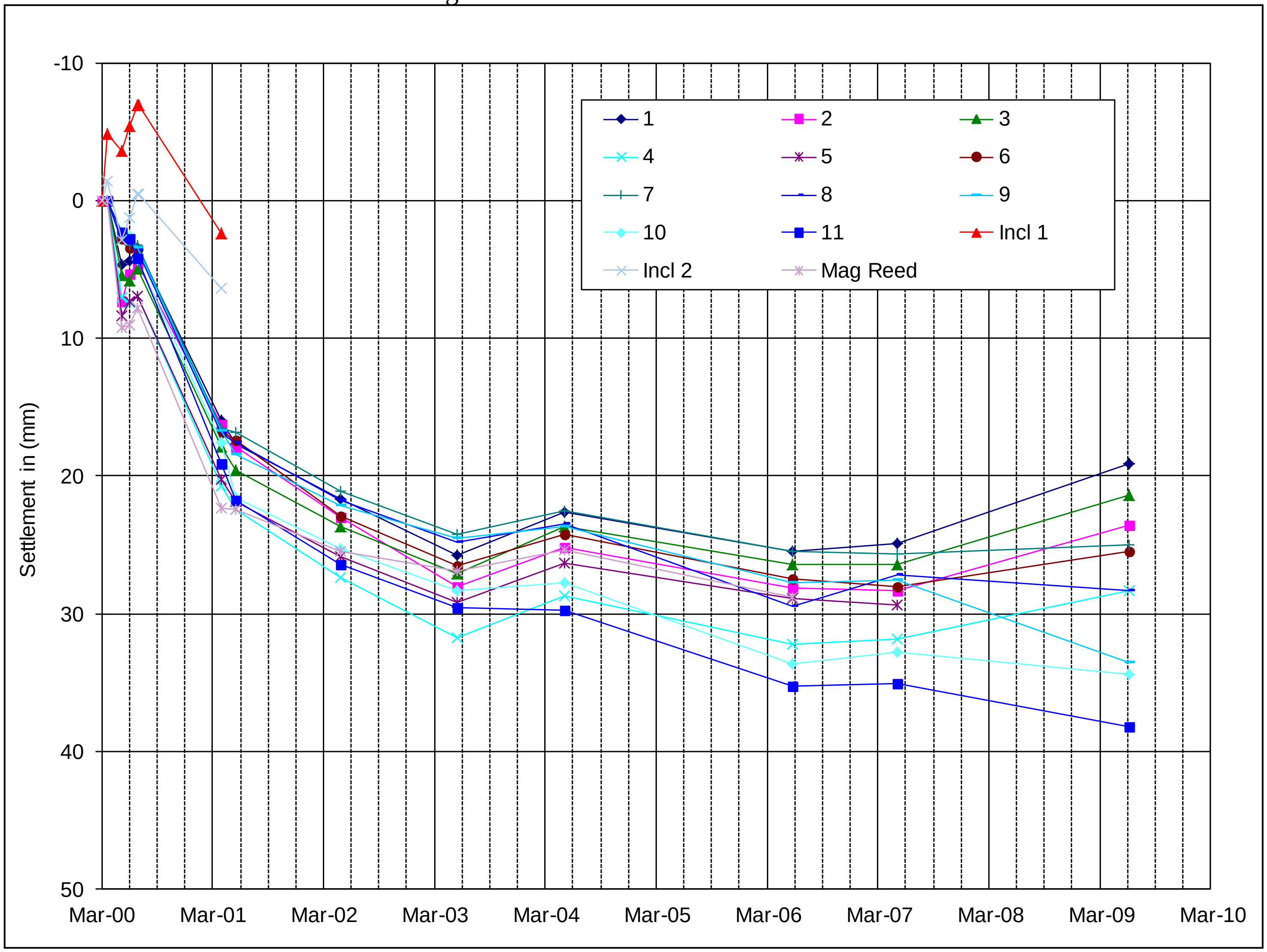

Table A27. SS-05 – Settlement Points (in mm)

Date	1	2	3	4	5	6	7	8
3/22/2000								
4/11/2000	0	0	0	0	0	0	0	0
5/25/2000	4.6	7.3	5.4	7	8.3	2.7	2.6	2.9
6/22/2000	4.3	5.3	5.8	7.4	7.3	3.4	3.2	3
7/18/2000	3.4	4.5	4.9	6.9	6.9	3.5	3.2	3.6
7/20/2000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
4/19/2001	16	16.2	17.9	20.7	20.2	16.8	16.5	16.9
4/19/2001	#N/A	#N/A	#N/A	#N/A	#N/A	16.8	16.5	16.9
6/4/2001	#N/A	#N/A	#N/A	#N/A	#N/A	17.4	16.8	17.6
6/4/2001	17.7	17.9	19.6	22.4	21.9	17.4	16.8	17.6
5/15/2002	21.7	23	23.7	27.4	25.9	22.9	21.1	21.8
6/2/2003	25.8	28	27.1	31.8	29.2	26.5	24.2	24.8
5/19/2004	22.6	25.2	23.7	28.7	26.3	24.2	22.5	23.5
6/5/2006	25.5	28.1	26.4	32.2	28.9	27.5	25.5	29.5
5/15/2007	24.9	28.3	26.4	31.9	29.4	28	25.7	27.2
6/15/2009	19.1	23.6	21.4	28.3	#N/A	25.5	25	28.3

Table A27 Continued. SS-05 – Settlement Points (in mm)

Date	9	10	11	Incl 1	Incl 2	Magnet
3/22/2000	#N/A	#N/A	#N/A	0	0	#N/A
4/11/2000	0	0	0	-4.9	-1.5	0
5/25/2000	2.2	2.2	2.2	-3.7	2.8	9.2
6/22/2000	2.5	2.5	2.7	-5.5	1.2	9
7/18/2000	3.4	4.2	4.1	-7	-0.5	7.8
7/20/2000	#N/A	#N/A	#N/A	-7	-0.5	#N/A
4/19/2001	16.7	17.6	19.1	2.3	6.3	22.3
4/19/2001	16.7	17.6	19.1	#N/A	#N/A	#N/A
6/4/2001	18.4	21.6	21.8	#N/A	#N/A	#N/A
6/4/2001	18.4	21.6	21.8	#N/A	#N/A	22.4
5/15/2002	22.1	25.3	26.4	#N/A	#N/A	25.5
6/2/2003	24.5	28.3	29.6	#N/A	#N/A	26.9
5/19/2004	23.7	27.8	29.8	#N/A	#N/A	25.4
6/5/2006	27.8	33.7	35.3	#N/A	#N/A	28.8
5/15/2007	27.6	32.8	35.1	#N/A	#N/A	#N/A
6/15/2009	33.6	34.4	38.2	#N/A	#N/A	#N/A

Figure A28. 33rd South – South Magnet Extensometer

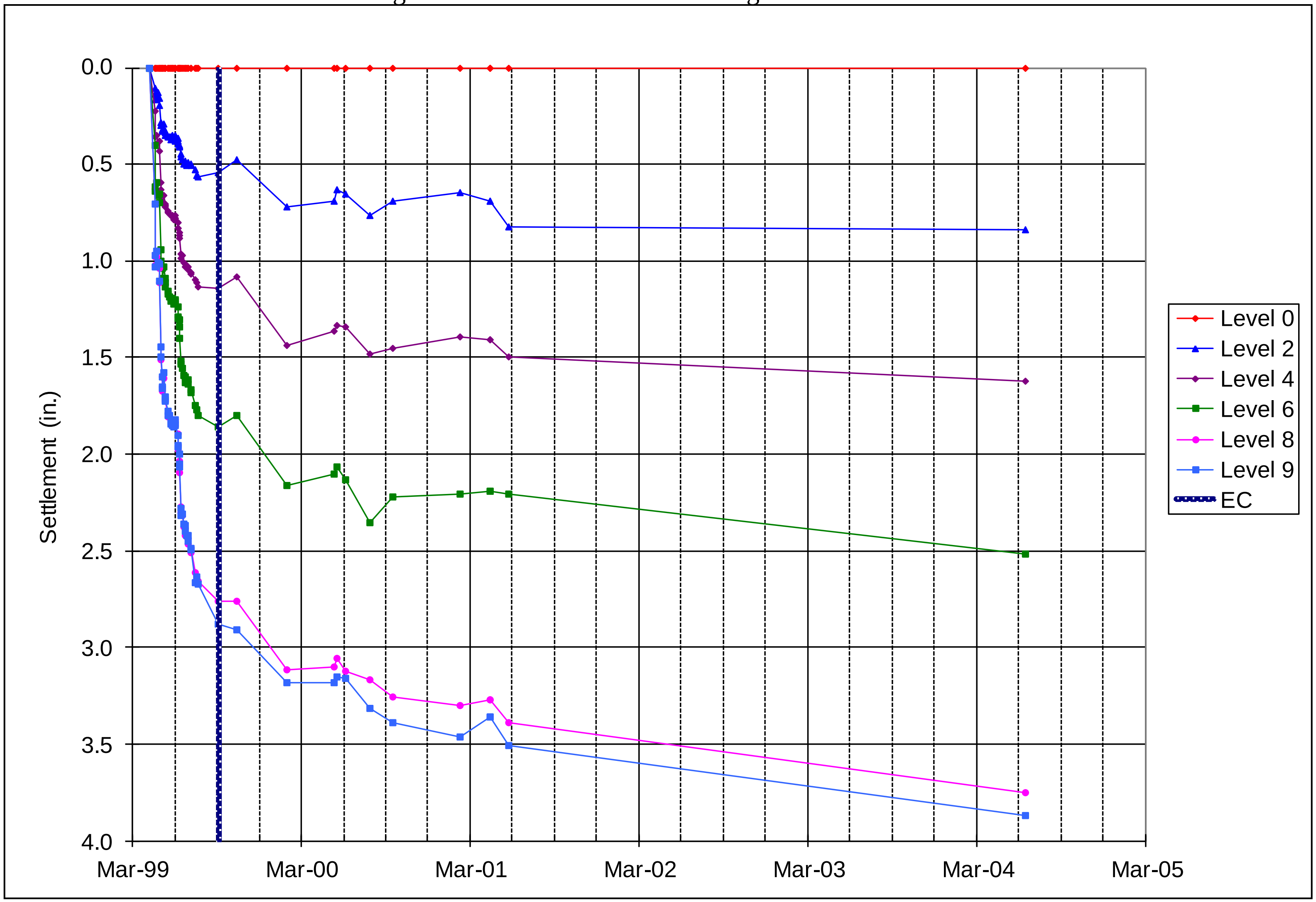

Table A28. 33rd South – South Magnet Extensometer (in inches)

Date	Level 0	Level 2	Level 4	Level 6	Level 8	Level 9
04/20/99	0.00	0.00	0.00	0.00	0.00	0.00
05/03/99	0.00	0.10	0.23	0.40	0.70	0.70
05/05/99	0.00	0.13	0.36	0.64	1.03	1.04
05/05/99	0.00	0.16	0.36	0.61	0.98	0.98
05/06/99	0.00	0.16	0.35	0.59	0.98	0.95
05/10/99	0.00	0.13	0.39	0.66	1.03	1.01
05/12/99	0.00	0.16	0.38	0.65	1.04	1.02
05/13/99	0.00	0.19	0.43	0.70	1.11	1.10
05/15/99	0.00	0.29	0.60	0.94	1.44	1.44
05/17/99	0.00	0.30	0.63	1.00	1.51	1.50
05/18/99	0.00	0.32	0.66	1.04	1.60	1.60
05/19/99	0.00	0.33	0.70	1.09	1.67	1.66
05/20/99	0.00	0.33	0.69	1.09	1.65	1.65
05/22/99	0.00	0.30	0.66	1.03	1.61	1.58
05/24/99	0.00	0.33	0.70	1.09	1.71	1.70
05/25/99	0.00	0.35	0.72	1.14	1.73	1.73
05/26/99	0.00	0.33	0.71	1.12	1.72	1.70
05/27/99	0.00	0.34	0.71	1.12	1.72	1.72
06/01/99	0.00	0.36	0.74	1.16	1.79	1.78
06/02/99	0.00	0.36	0.75	1.17	1.81	1.80
06/03/99	0.00	0.36	0.76	1.19	1.80	1.80
06/07/99	0.00	0.36	0.76	1.21	1.84	1.84
06/08/99	0.00	0.37	0.77	1.20	1.84	1.84
06/09/99	0.00	0.35	0.77	1.20	1.83	1.83
06/10/99	0.00	0.36	0.77	1.20	1.85	1.85
06/14/99	0.00	0.37	0.78	1.22	1.86	1.86
06/15/99	0.00	0.35	0.77	1.20	1.83	1.84
06/16/99	0.00	0.38	0.78	1.21	1.82	1.82
06/17/99	0.00	0.37	0.78	1.22	1.85	1.85
06/21/99	0.00	0.37	0.80	1.24	1.90	1.90
06/22/99	0.00	0.38	0.83	1.29	1.96	1.96
06/23/99	0.00	0.39	0.83	1.30	1.98	1.96
06/24/99	0.00	0.41	0.85	1.31	2.00	2.00
06/26/99	0.00	0.40	0.87	1.34	2.04	2.05
06/26/99	0.00	0.41	0.89	1.40	2.09	2.07
06/29/99	0.00	0.45	0.96	1.52	2.27	2.28
06/30/99	0.00	0.46	0.99	1.54	2.30	2.32
07/01/99	0.00	0.48	0.97	1.55	2.32	2.31
07/06/99	0.00	0.50	1.01	1.59	2.37	2.36
07/07/99	0.00	0.48	1.02	1.60	2.39	2.37
07/08/99	0.00	0.50	1.04	1.63	2.42	2.40
07/12/99	0.00	0.50	1.04	1.63	2.43	2.42
07/13/99	0.00	0.50	1.03	1.61	2.43	2.42
07/15/99	0.00	0.49	1.04	1.64	2.47	2.45
07/19/99	0.00	0.50	1.07	1.68	2.51	2.50

Table A28 Continued. 33rd South – South Magnet Extensometer (in inches)

Date	Level 0	Level 2	Level 4	Level 6	Level 8	Level 9
07/20/99	0.00	0.50	1.06	1.67	2.49	2.49
07/28/99	0.00	0.53	1.10	1.75	2.61	2.67
08/02/99	0.00	0.56	1.11	1.77	2.63	2.64
08/05/99	0.00	0.56	1.13	1.80	2.66	2.68
9/17/1999	0.00	0.54	1.14	1.86	2.76	2.88
10/28/1999	0.00	0.48	1.08	1.80	2.76	2.91
2/11/2000	0.00	0.72	1.44	2.16	3.12	3.18
5/23/2000	0.00	0.69	1.36	2.10	3.11	3.18
5/30/2000	0.00	0.63	1.33	2.07	3.06	3.15
6/19/2000	0.00	0.65	1.34	2.13	3.13	3.16
8/8/2000	0.00	0.76	1.49	2.36	3.17	3.32
9/26/2000	0.00	0.69	1.46	2.22	3.26	3.39
2/20/2001	0.00	0.64	1.40	2.21	3.30	3.47
4/24/2001	0.00	0.69	1.41	2.19	3.27	3.36
4/24/2001	0.00	0.69	1.41	2.19	3.27	3.36
6/4/2001	0.00	0.82	1.50	2.20	3.39	3.51
6/23/2004	0.00	0.84	1.62	2.52	3.75	3.87

Figure A29. 33rd South – Middle Magnet Extensometer

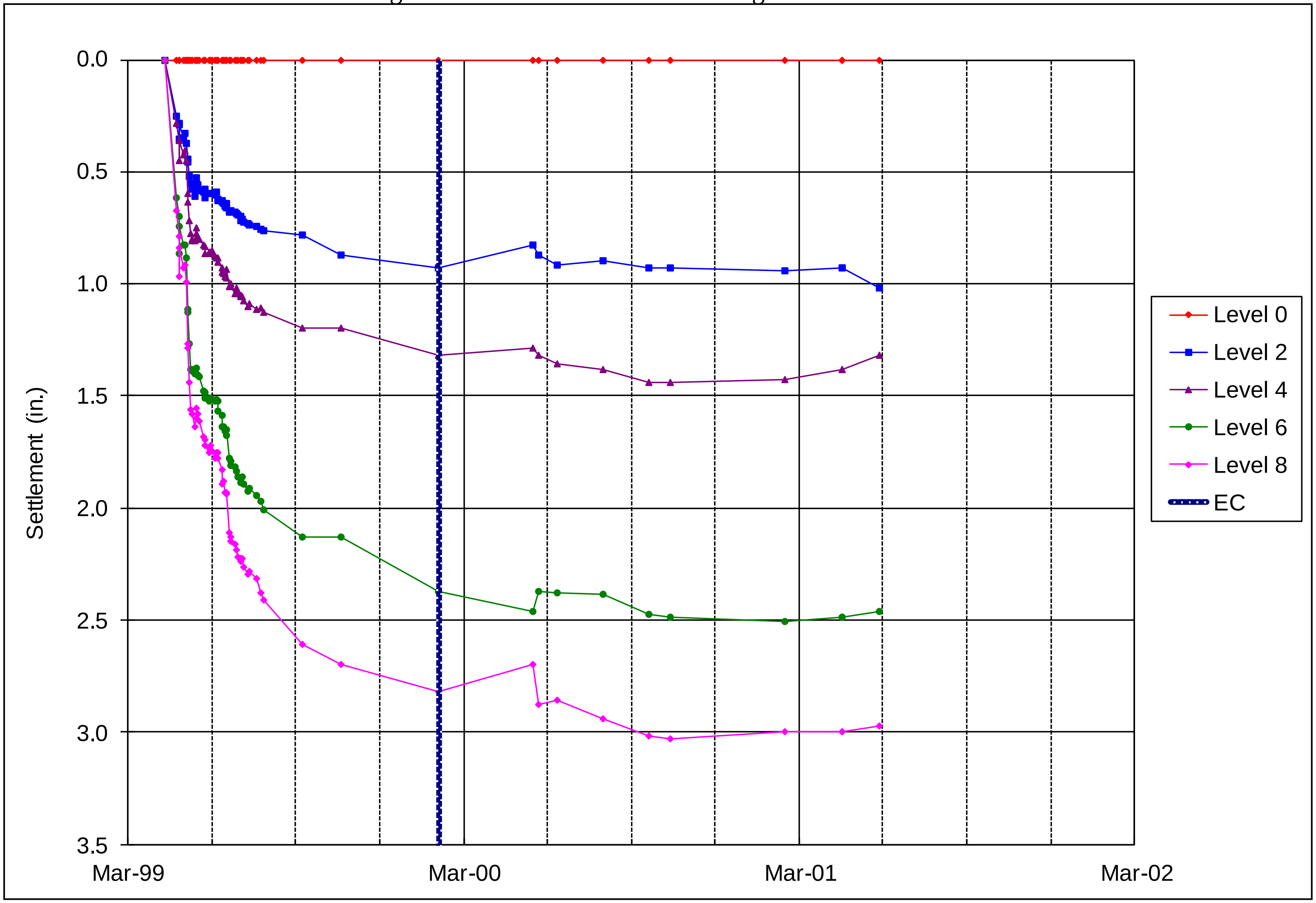

Table A29. 33rd South – Middle Magnet Extensometer (in inches)

Date	Level 0	Level 2	Level 4	Level 6	Level 8
04/20/99	0.00	0.00	0.00	0.00	0.00
05/03/99	0.00	0.26	0.29	0.62	0.68
05/05/99	0.00	0.29	0.36	0.70	0.79
05/06/99	0.00	0.35	0.45	0.86	0.97
05/06/99	0.00	0.29	0.36	0.74	0.84
05/10/99	0.00	0.35	0.43	0.83	0.93
05/12/99	0.00	0.33	0.40	0.82	0.91
05/13/99	0.00	0.38	0.45	0.89	0.99
05/15/99	0.00	0.44	0.59	1.11	1.27
05/15/99	0.00	0.46	0.63	1.13	1.29
05/17/99	0.00	0.52	0.72	1.27	1.44
05/18/99	0.00	0.55	0.78	1.38	1.56
05/19/99	0.00	0.58	0.81	1.39	1.58
05/20/99	0.00	0.57	0.80	1.38	1.58
05/22/99	0.00	0.61	0.81	1.40	1.64
05/24/99	0.00	0.53	0.75	1.38	1.56
05/25/99	0.00	0.55	0.78	1.40	1.60
05/26/99	0.00	0.56	0.80	1.41	1.58
05/27/99	0.00	0.58	0.80	1.42	1.61
06/01/99	0.00	0.59	0.83	1.48	1.68
06/02/99	0.00	0.58	0.83	1.49	1.70
06/03/99	0.00	0.62	0.86	1.51	1.72
06/07/99	0.00	0.59	0.86	1.53	1.75
06/08/99	0.00	0.60	0.86	1.52	1.74
06/09/99	0.00	0.60	0.86	1.51	1.72
06/10/99	0.00	0.59	0.86	1.52	1.75
06/14/99	0.00	0.61	0.88	1.52	1.78
06/15/99	0.00	0.59	0.88	1.52	1.75
06/16/99	0.00	0.62	0.89	1.52	1.75
06/17/99	0.00	0.63	0.90	1.57	1.78
06/21/99	0.00	0.63	0.93	1.59	1.83
06/22/99	0.00	0.63	0.95	1.64	1.89
06/23/99	0.00	0.64	0.96	1.64	1.88
06/24/99	0.00	0.66	0.96	1.66	1.93
06/26/99	0.00	0.66	0.97	1.68	1.94
06/26/99	0.00	0.64	0.94	1.65	1.93
06/29/99	0.00	0.68	1.01	1.78	2.11
06/30/99	0.00	0.67	1.00	1.79	2.13
07/01/99	0.00	0.68	1.01	1.81	2.15
07/06/99	0.00	0.68	1.05	1.82	2.16
07/07/99	0.00	0.69	1.02	1.84	2.19
07/08/99	0.00	0.69	1.04	1.86	2.22
07/12/99	0.00	0.70	1.05	1.89	2.24
07/12/99	0.00	0.72	1.05	1.87	2.23
07/13/99	0.00	0.71	1.06	1.86	2.22

Table A29 Continued. 33rd South – Middle Magnet Extensometer (in inches)

Date	Level 0	Level 2	Level 4	Level 6	Level 8
07/15/99	0.00	0.72	1.08	1.89	2.26
07/19/99	0.00	0.73	1.10	1.92	2.29
07/20/99	0.00	0.74	1.09	1.91	2.28
07/28/99	0.00	0.74	1.11	1.94	2.32
08/02/99	0.00	0.76	1.11	1.97	2.38
08/05/99	0.00	0.76	1.12	2.01	2.41
9/17/1999	0.00	0.78	1.20	2.13	2.61
10/28/1999	0.00	0.87	1.20	2.13	2.70
2/11/2000	0.00	0.93	1.32	2.37	2.82
5/23/2000	0.00	0.83	1.29	2.46	2.70
5/30/2000	0.00	0.87	1.32	2.37	2.88
6/19/2000	0.00	0.92	1.36	2.38	2.86
8/8/2000	0.00	0.90	1.38	2.39	2.94
9/26/2000	0.00	0.93	1.44	2.48	3.02
10/19/2000	0.00	0.93	1.44	2.49	3.03
2/20/2001	0.00	0.95	1.43	2.51	3.00
4/24/2001	0.00	0.93	1.38	2.49	3.00
4/24/2001	0.00	0.93	1.38	2.49	3.00
6/4/2001	0.00	1.02	1.32	2.46	2.97

Figure A30. 33rd South – Settlement Points

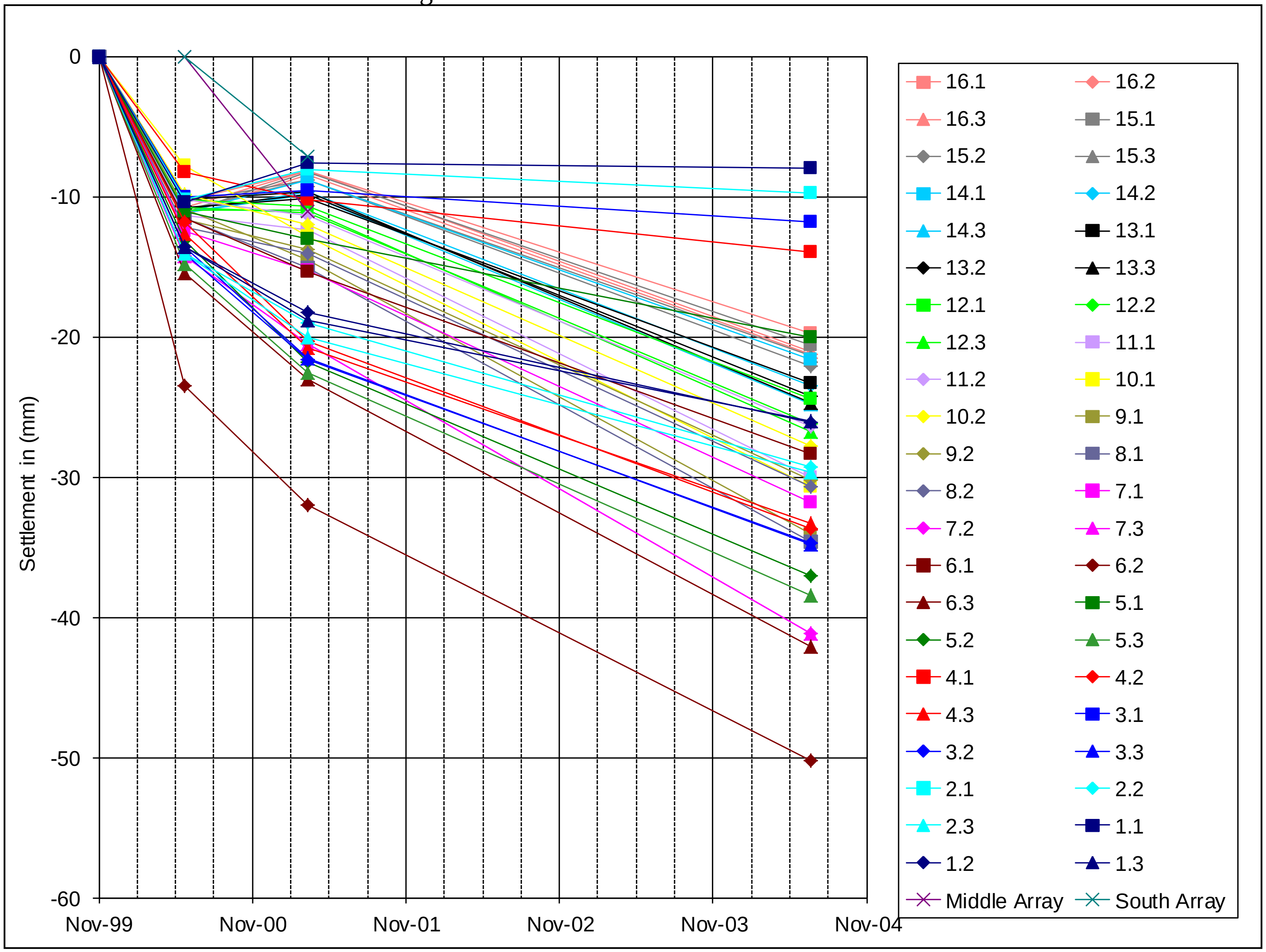

Table A30. 33rd South – Settlement Points (in mm)

Date	M Array	S Array	1.1	1.2	1.3	2.1	2.2	2.3
11/10/1999			0.0	0.0	0.0	0.0	0.0	0.0
5/30/2000	0.0	0.0	-10.4	-13.5	-13.5	-10.2	-14.0	-14.0
3/18/2001	-11.0	-7.0	-7.5	-18.2	-18.7	-8.0	-18.9	-19.9
6/24/2004			-7.9	-26.1	-26.0	-9.7	-29.3	-29.6

Table A30 Continued. 33rd South – Settlement Points (in mm)

Date	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2
11/10/1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/30/2000	-10.0	-14.0	-13.5	-8.2	-11.8	-12.6	-11.0	-13.1
3/18/2001	-9.5	-21.5	-21.4	-10.1	-20.2	-20.7	-12.9	-21.7
6/24/2004	-11.8	-34.7	-34.8	-13.9	-33.7	-33.3	-20.0	-37.0

Table A30 Continued. 33rd South – Settlement Points (in mm)

Date	5.3	6.1	6.2	6.3	7.1	7.2	7.3	8.1
11/10/1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/30/2000	-14.8	-11.5	-23.5	-15.4	-12.4	-12.2	-14.2	-11.5
3/18/2001	-22.5	-15.3	-31.9	-22.9	-15.2	-19.3	-20.4	-15.0
6/24/2004	-38.4	-28.3	-50.2	-42.1	-31.8	-39.3	-41.1	-34.6

Table A30 Continued. 33rd South – Settlement Points (in mm)

Date	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1
11/10/1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/30/2000	-12.1	-10.8	-11.6	-7.7	-9.8	-11.3	-10.2	-10.2
3/18/2001	-14.0	-14.4	-13.7	-12.7	-11.9	-12.3	-11.2	-10.6
6/24/2004	-30.7	-34.0	-30.2	-30.7	-27.8	-30.0	-26.4	-24.4

Table A30 Continued. 33rd South – Settlement Points (in mm)

Date	12.2	12.3	13.1	13.2	13.3	14.1	14.2	14.3
11/10/1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/30/2000	-10.7	-10.9	-10.7	-10.8	-10.2	-11.1	-11.1	-11.1
3/18/2001	-11.1	-10.9	-10.0	-9.7	-9.6	-8.7	-9.6	-9.7
6/24/2004	-26.2	-26.7	-23.3	-24.2	-24.7	-21.6	-23.5	-24.8

Table A30 Continued. 33rd South – Settlement Points (in mm)

Date	15.1	15.2	15.3	16.1	16.2	16.3
11/10/1999	0.0	0.0	0.0	0.0	0.0	0.0
5/30/2000	-11.1	-10.9	-10.4	-10.3	-11.2	-10.7
3/18/2001	-8.2	-8.7	-8.7	-8.1	-8.3	-8.1
6/24/2004	-20.6	-22.1	-21.3	-19.7	-21.2	-21.0

Figure A31. 33rd South – Pressure Cell 23403

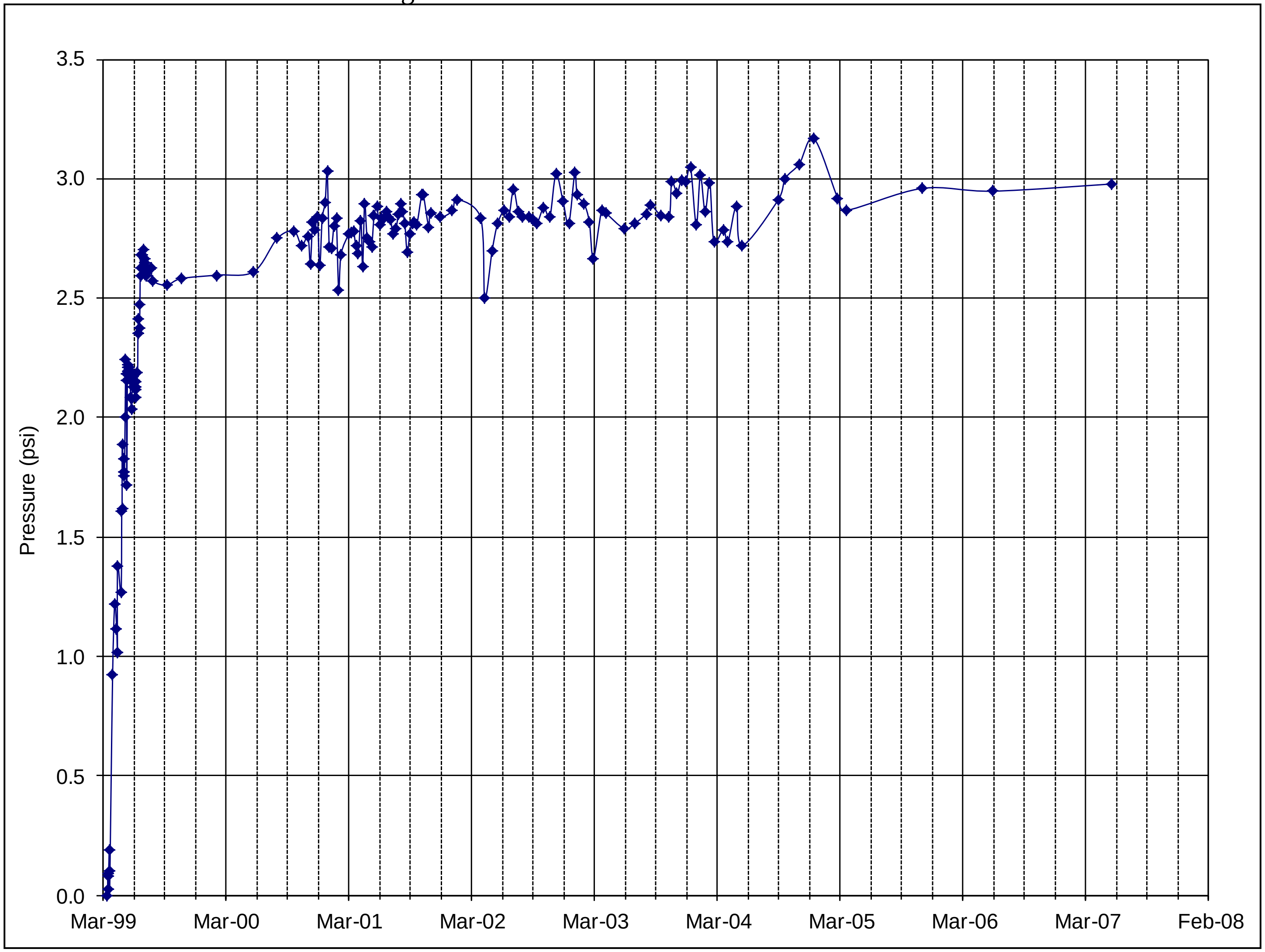

Table A31. 33rd South – Pressure Cell 23403 (in psi)

Date	Pressure
3/24/1999	0.00
3/24/1999	0.08
3/25/1999	0.09
3/25/1999	0.02
3/26/1999	0.02
3/29/1999	0.19
3/29/1999	0.10
3/30/1999	-0.01
4/8/1999	0.93
4/14/1999	1.22
4/20/1999	1.11
4/22/1999	1.02
4/22/1999	1.02
4/22/1999	1.38
5/3/1999	1.27
5/5/1999	1.61
5/6/1999	1.62
5/6/1999	1.89
5/10/1999	1.77
5/11/1999	1.83
5/12/1999	1.77
5/13/1999	1.75
5/15/1999	2.00
5/17/1999	2.24
5/18/1999	2.15
5/19/1999	2.18
5/20/1999	1.72
5/22/1999	2.21
5/24/1999	2.20
5/25/1999	2.22
5/26/1999	2.21
5/27/1999	2.20
6/1/1999	2.08
6/2/1999	2.03
6/3/1999	2.08
6/7/1999	2.14
6/8/1999	2.13
6/9/1999	2.17
6/10/1999	2.15
6/14/1999	2.15
6/15/1999	2.12
6/16/1999	2.09
6/17/1999	2.13
6/21/1999	2.19
6/22/1999	2.35
6/23/1999	2.41
6/24/1999	2.35
6/26/1999	2.37
6/28/1999	2.47
6/29/1999	2.68
6/30/1999	2.63
7/1/1999	2.59
7/6/1999	2.68
7/7/1999	2.63
7/8/1999	2.70
7/12/1999	2.66
7/13/1999	2.65
7/14/1999	2.60
7/15/1999	2.59
7/19/1999	2.62
7/20/1999	2.62
7/28/1999	2.62
8/2/1999	2.63
8/5/1999	2.57
9/15/1999	2.55
10/28/1999	2.58
2/11/2000	2.60
5/30/2000	2.61
8/8/2000	2.75
9/26/2000	2.78
10/19/2000	2.72
11/7/2000	2.76
11/14/2000	2.64
11/21/2000	2.82
11/28/2000	2.79
12/5/2000	2.84
12/12/2000	2.63
12/19/2000	2.83
12/28/2000	2.90
1/3/2001	3.03
1/9/2001	2.71
1/16/2001	2.71
1/23/2001	2.80
1/30/2001	2.83
2/6/2001	2.53
2/13/2001	2.68
3/8/2001	2.77
3/15/2001	2.77
3/22/2001	2.78
3/29/2001	2.72
4/5/2001	2.69
4/13/2001	2.82
4/18/2001	2.63
4/24/2001	2.90
5/1/2001	2.75
5/9/2001	2.73
5/15/2001	2.72
5/22/2001	2.84
5/30/2001	2.88
6/7/2001	2.80
6/14/2001	2.84
6/20/2001	2.83
6/27/2001	2.86
7/3/2001	2.84
7/10/2001	2.83
7/17/2001	2.77
7/26/2001	2.79
8/2/2001	2.85
8/8/2001	2.89
8/14/2001	2.86
8/21/2001	2.81
8/28/2001	2.69
9/5/2001	2.77
9/12/2001	2.81
9/19/2001	2.82
9/26/2001	2.81
10/10/2001	2.93
10/15/2001	2.93
10/31/2001	2.80
11/5/2001	2.86
12/5/2001	2.84
1/9/2002	2.87
1/23/2002	2.91
4/3/2002	2.83
4/15/2002	2.50
5/7/2002	2.70
5/23/2002	2.81
6/12/2002	2.87
6/25/2002	2.84
7/9/2002	2.95
7/23/2002	2.86
8/6/2002	2.84
8/22/2002	2.84
9/6/2002	2.83
9/17/2002	2.81
10/7/2002	2.88
10/25/2002	2.84
11/12/2002	3.02
12/3/2002	2.90
12/20/2002	2.81
1/7/2003	3.02
1/14/2003	2.93
2/4/2003	2.89
2/19/2003	2.82
3/3/2003	2.67
3/27/2003	2.86
4/9/2003	2.86
6/2/2003	2.79
7/3/2003	2.81
8/6/2003	2.85
8/19/2003	2.89
9/19/2003	2.85
10/14/2003	2.84
10/21/2003	2.99
11/6/2003	2.94
11/18/2003	2.99
12/2/2003	2.99
12/16/2003	3.05
1/2/2004	2.81
1/14/2004	3.01
1/28/2004	2.86
2/11/2004	2.98
2/23/2004	2.74
3/22/2004	2.79
4/5/2004	2.74
4/30/2004	2.89
5/17/2004	2.72
8/31/2004	2.91
9/22/2004	3.00
11/2/2004	3.06
12/16/2004	3.17
2/24/2005	2.92
3/21/2005	2.87
11/1/2005	2.96
5/31/2006	2.95
5/15/2007	2.98

Figure A32. 33rd South – Pressure Cell 23405

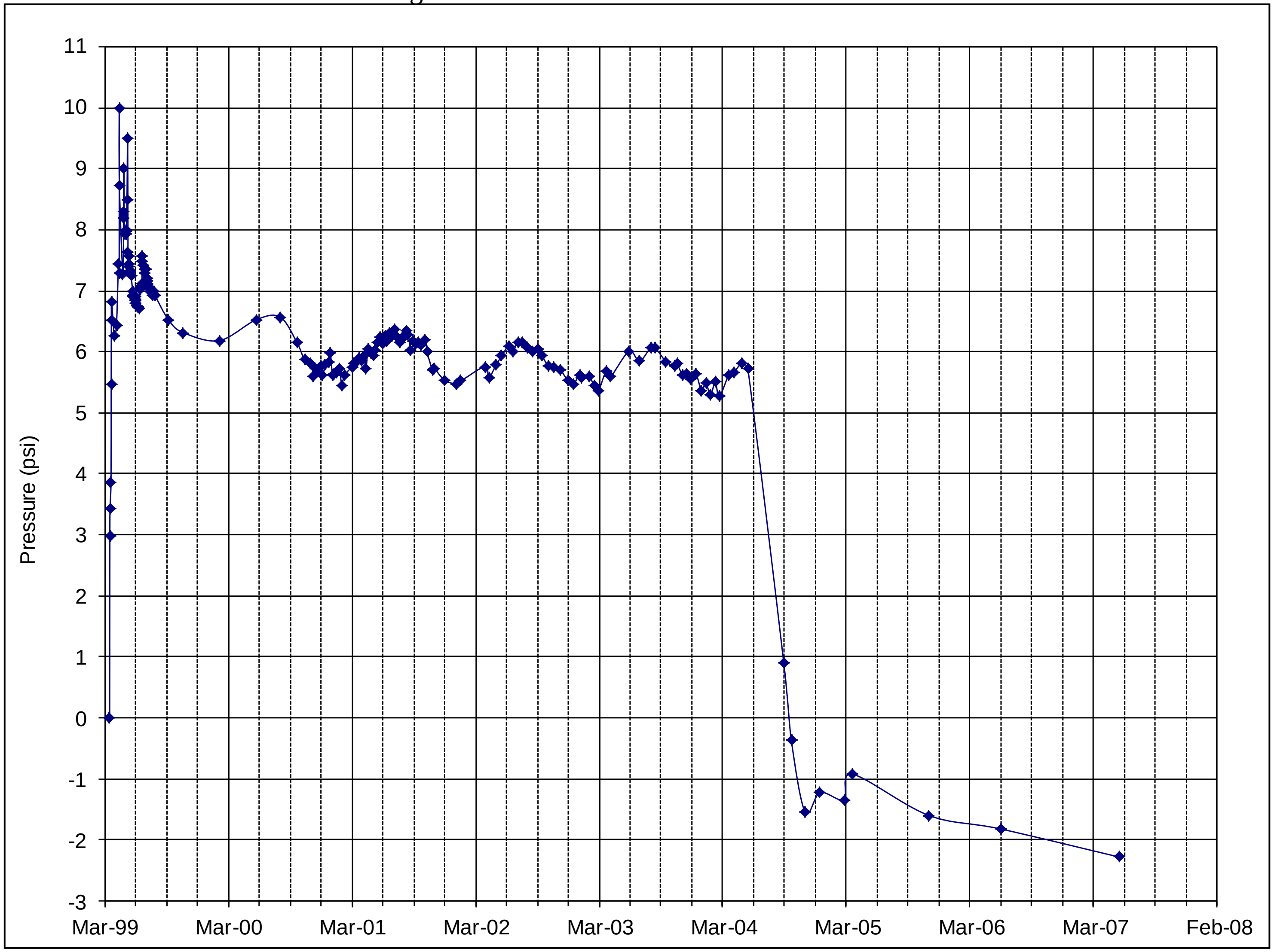

Table A32. 33rd South – Pressure Cell 23405 (in psi)

Date	Pressure	Date	Pressure	Date	Pressure	Date	Pressure
3/25/1999	0.00	6/24/1999	7.06	4/13/2001	5.94	10/25/2002	5.75
3/25/1999	2.97	6/26/1999	7.03	4/18/2001	5.72	11/12/2002	5.70
3/26/1999	3.43	6/28/1999	7.11	4/24/2001	6.04	12/3/2002	5.54
3/29/1999	3.87	6/29/1999	7.57	5/1/2001	5.99	12/20/2002	5.48
3/29/1999	5.47	6/30/1999	7.49	5/9/2001	5.94	1/7/2003	5.62
3/30/1999	6.51	7/1/1999	7.42	5/15/2001	6.02	1/14/2003	5.57
3/30/1999	6.83	7/6/1999	7.37	5/22/2001	6.15	2/4/2003	5.59
4/8/1999	6.26	7/7/1999	7.29	5/30/2001	6.24	2/19/2003	5.45
4/14/1999	6.42	7/8/1999	7.35	6/7/2001	6.13	3/3/2003	5.35
4/20/1999	7.44	7/12/1999	7.19	6/14/2001	6.25	3/27/2003	5.69
4/22/1999	7.29	7/13/1999	7.16	6/20/2001	6.18	4/9/2003	5.59
4/22/1999	10.00	7/14/1999	7.11	6/27/2001	6.31	6/2/2003	6.01
4/22/1999	8.73	7/15/1999	7.09	7/3/2001	6.25	7/3/2003	5.85
5/3/1999	7.27	7/19/1999	7.06	7/10/2001	6.37	8/6/2003	6.08
5/5/1999	8.29	7/20/1999	7.00	7/17/2001	6.27	8/19/2003	6.06
5/6/1999	8.99	7/28/1999	6.92	7/26/2001	6.15	9/19/2003	5.84
5/6/1999	8.18	8/2/1999	6.98	8/2/2001	6.24	10/14/2003	5.77
5/10/1999	7.93	8/5/1999	6.93	8/8/2001	6.24	10/21/2003	5.81
5/11/1999	7.94	9/15/1999	6.52	8/14/2001	6.34	11/6/2003	5.62
5/12/1999	8.01	10/28/1999	6.31	8/21/2001	6.29	11/18/2003	5.64
5/13/1999	7.97	2/11/2000	6.18	8/28/2001	6.02	12/2/2003	5.56
5/15/1999	8.48	5/30/2000	6.53	9/5/2001	6.17	12/16/2003	5.64
5/17/1999	9.49	8/8/2000	6.57	9/12/2001	6.13	1/2/2004	5.36
5/18/1999	7.62	9/26/2000	6.16	9/19/2001	6.14	1/14/2004	5.50
5/19/1999	7.56	10/19/2000	5.87	9/26/2001	6.10	1/28/2004	5.29
5/20/1999	7.44	11/7/2000	5.82	10/10/2001	6.19	2/11/2004	5.50
5/22/1999	7.39	11/14/2000	5.60	10/15/2001	6.00	2/23/2004	5.27
5/24/1999	7.32	11/21/2000	5.73	10/31/2001	5.70	3/22/2004	5.62
5/25/1999	7.34	11/28/2000	5.68	11/5/2001	5.73	4/5/2004	5.66
5/26/1999	7.30	12/5/2000	5.78	12/5/2001	5.54	4/30/2004	5.82
5/27/1999	7.25	12/12/2000	5.62	1/9/2002	5.47	5/17/2004	5.72
6/1/1999	6.98	12/19/2000	5.80	1/23/2002	5.52	8/31/2004	0.89
6/2/1999	6.90	12/28/2000	5.83	4/3/2002	5.75	9/22/2004	-0.37
6/3/1999	6.92	1/3/2001	5.99	4/15/2002	5.58	11/2/2004	-1.55
6/7/1999	6.90	1/9/2001	5.63	5/7/2002	5.79	12/16/2004	-1.23
6/8/1999	6.85	1/16/2001	5.63	5/23/2002	5.93	2/24/2005	-1.34
6/9/1999	6.87	1/23/2001	5.66	6/12/2002	6.09	3/21/2005	-0.92
6/10/1999	6.80	1/30/2001	5.73	6/25/2002	6.01	11/1/2005	-1.60
6/14/1999	6.76	2/6/2001	5.44	7/9/2002	6.16	5/31/2006	-1.82
6/15/1999	6.74	2/13/2001	5.61	7/23/2002	6.15	5/15/2007	-2.28
6/16/1999	6.72	3/8/2001	5.75	8/6/2002	6.07		
6/17/1999	6.74	3/15/2001	5.81	8/22/2002	6.01		
6/21/1999	6.71	3/22/2001	5.84	9/6/2002	6.04		
6/22/1999	7.04	3/29/2001	5.90	9/17/2002	5.95		
6/23/1999	7.07	4/5/2001	5.85	10/7/2002	5.77		

Figure A33. 33rd South – Pressure Cell 23406

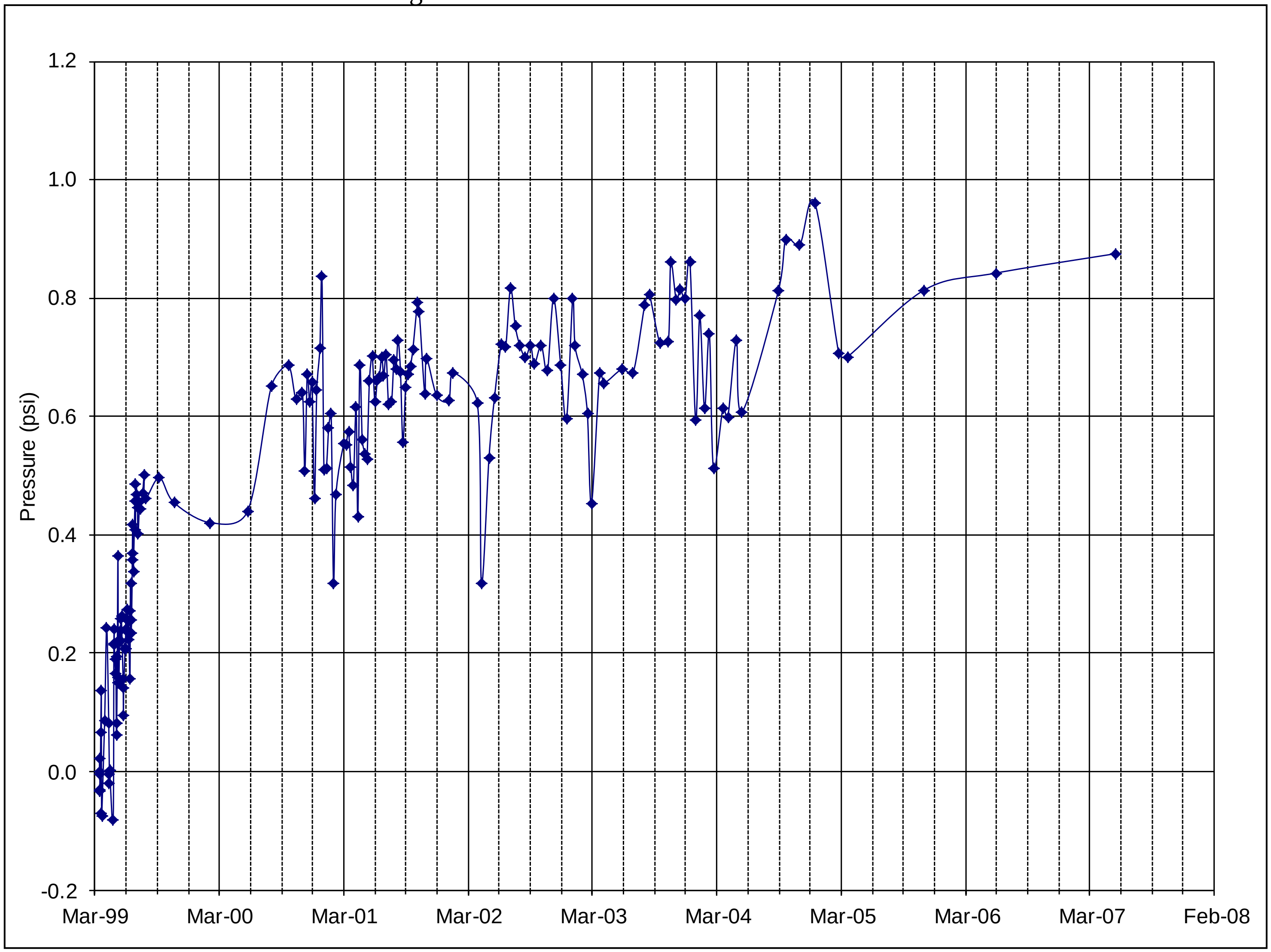

Table A33. 33rd South – Pressure Cell 23406 (in psi)

Date	Pressure
3/24/1999	0.00
3/24/1999	0.02
3/25/1999	0.00
3/25/1999	-0.03
3/26/1999	-0.03
3/29/1999	0.14
3/29/1999	0.07
3/30/1999	-0.07
3/30/1999	-0.08
4/8/1999	0.09
4/14/1999	0.24
4/20/1999	0.08
4/22/1999	-0.02
4/22/1999	-0.01
4/22/1999	0.00
5/3/1999	-0.08
5/5/1999	0.22
5/6/1999	0.24
5/6/1999	0.21
5/10/1999	0.16
5/11/1999	0.19
5/12/1999	0.08
5/13/1999	0.06
5/15/1999	0.19
5/17/1999	0.36
5/18/1999	0.15
5/19/1999	0.16
5/20/1999	0.16
5/22/1999	0.22
5/24/1999	0.22
5/25/1999	0.24
5/26/1999	0.26
5/27/1999	0.26
6/1/1999	0.16
6/2/1999	0.10
6/3/1999	0.14
6/7/1999	0.21
6/8/1999	0.21
6/9/1999	0.26
6/10/1999	0.24
6/14/1999	0.27
6/15/1999	0.24
6/16/1999	0.22
6/17/1999	0.25
6/21/1999	0.16
6/22/1999	0.27
6/23/1999	0.32
6/24/1999	0.23
6/26/1999	0.26
6/28/1999	0.36
6/29/1999	0.42
6/30/1999	0.37
7/1/1999	0.34
7/6/1999	0.46
7/7/1999	0.41
7/8/1999	0.49
7/12/1999	0.47
7/13/1999	0.44
7/15/1999	0.40
7/19/1999	0.46
7/20/1999	0.44
7/28/1999	0.47
8/2/1999	0.50
8/5/1999	0.46
9/15/1999	0.50
10/28/1999	0.45
2/11/2000	0.42
5/30/2000	0.44
8/8/2000	0.65
9/26/2000	0.69
10/19/2000	0.63
11/7/2000	0.64
11/14/2000	0.51
11/21/2000	0.67
11/28/2000	0.62
12/5/2000	0.66
12/12/2000	0.46
12/19/2000	0.64
12/28/2000	0.72
1/3/2001	0.84
1/9/2001	0.51
1/16/2001	0.51
1/23/2001	0.58
1/30/2001	0.61
2/6/2001	0.32
2/13/2001	0.47
3/8/2001	0.55
3/15/2001	0.55
3/22/2001	0.57
3/29/2001	0.51
4/5/2001	0.48
4/13/2001	0.62
4/18/2001	0.43
4/24/2001	0.69
5/1/2001	0.56
5/9/2001	0.54
5/15/2001	0.53
5/22/2001	0.66
5/30/2001	0.70
6/7/2001	0.63
6/14/2001	0.66
6/20/2001	0.67
6/27/2001	0.70
7/3/2001	0.67
7/10/2001	0.70
7/17/2001	0.62
7/26/2001	0.62
8/2/2001	0.70
8/8/2001	0.68
8/14/2001	0.73
8/21/2001	0.68
8/28/2001	0.56
9/5/2001	0.65
9/12/2001	0.67
9/19/2001	0.68
9/26/2001	0.71
10/10/2001	0.79
10/15/2001	0.78
10/31/2001	0.64
11/5/2001	0.70
12/5/2001	0.64
1/9/2002	0.63
1/23/2002	0.67
4/3/2002	0.62
4/15/2002	0.32
5/7/2002	0.53
5/23/2002	0.63
6/12/2002	0.72
6/25/2002	0.72
7/9/2002	0.82
7/23/2002	0.75
8/6/2002	0.72
8/22/2002	0.70
9/6/2002	0.72
9/17/2002	0.69
10/7/2002	0.72
10/25/2002	0.68
11/12/2002	0.80
12/3/2002	0.69
12/20/2002	0.60
1/7/2003	0.80
1/14/2003	0.72
2/4/2003	0.67
2/19/2003	0.60
3/3/2003	0.45
3/27/2003	0.67
4/9/2003	0.66
6/2/2003	0.68
7/3/2003	0.67
8/6/2003	0.79
8/19/2003	0.81
9/19/2003	0.72
10/14/2003	0.73
10/21/2003	0.86
11/6/2003	0.80
11/18/2003	0.82
12/2/2003	0.80
12/16/2003	0.86
1/2/2004	0.59
1/14/2004	0.77
1/28/2004	0.61
2/11/2004	0.74
2/23/2004	0.51
3/22/2004	0.61
4/5/2004	0.60
4/30/2004	0.73
5/17/2004	0.61
8/31/2004	0.81
9/22/2004	0.90
11/2/2004	0.89
12/16/2004	0.96
2/24/2005	0.71
3/21/2005	0.70
11/1/2005	0.81
5/31/2006	0.84
5/15/2007	0.87

Figure A34. 33rd South – Pressure Cell 23407

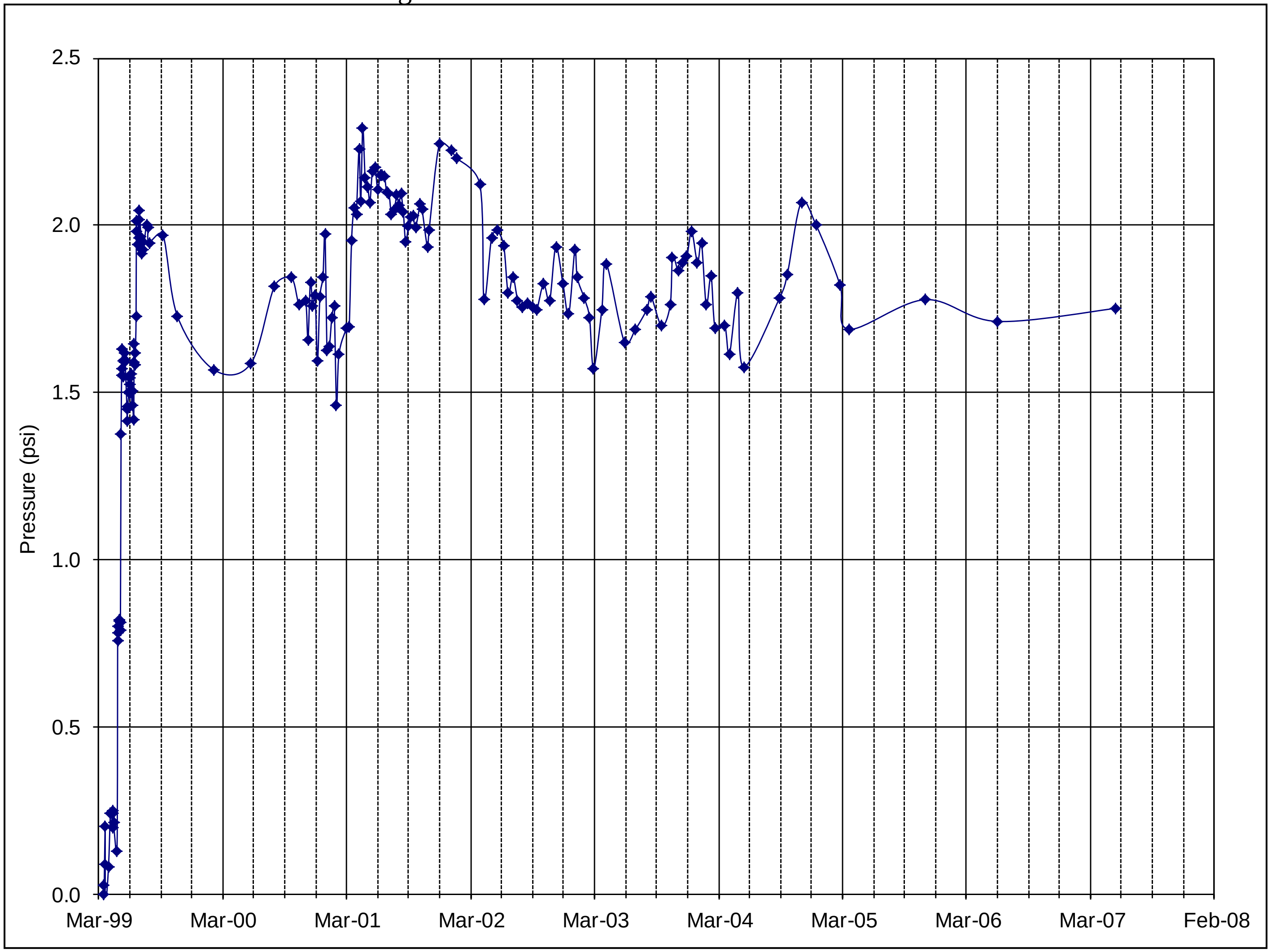

Table A34. 33rd South – Pressure Cell 23407 (in psi)

Date	Pressure
3/24/1999	0.00
3/25/1999	0.03
3/25/1999	-0.02
3/26/1999	-0.02
3/29/1999	0.20
3/29/1999	0.09
3/30/1999	-0.04
4/8/1999	0.08
4/14/1999	0.24
4/20/1999	0.20
4/22/1999	0.25
4/22/1999	0.24
4/22/1999	0.22
5/3/1999	0.13
5/5/1999	0.80
5/6/1999	0.78
5/6/1999	0.76
5/10/1999	0.81
5/11/1999	0.82
5/12/1999	0.81
5/13/1999	0.79
5/15/1999	1.38
5/17/1999	1.57
5/18/1999	1.55
5/19/1999	1.63
5/20/1999	1.55
5/22/1999	1.60
5/24/1999	1.60
5/25/1999	1.62
5/26/1999	1.60
5/27/1999	1.59
6/1/1999	1.46
6/2/1999	1.41
6/3/1999	1.45
6/7/1999	1.50
6/8/1999	1.49
6/9/1999	1.54
6/10/1999	1.52
6/14/1999	1.56
6/15/1999	1.50
6/16/1999	1.46
6/17/1999	1.51
6/21/1999	1.42
6/22/1999	1.59
6/23/1999	1.65

Date	Pressure
6/24/1999	1.58
6/26/1999	1.62
6/28/1999	1.73
6/29/1999	2.01
6/30/1999	1.98
7/1/1999	1.94
7/6/1999	2.02
7/7/1999	1.96
7/8/1999	2.04
7/12/1999	1.97
7/13/1999	1.95
7/14/1999	1.93
7/15/1999	1.91
7/19/1999	1.95
7/20/1999	1.93
7/28/1999	2.00
8/2/1999	1.99
8/5/1999	1.95
9/15/1999	1.97
10/28/1999	1.73
2/11/2000	1.57
5/30/2000	1.59
8/8/2000	1.82
9/26/2000	1.84
10/19/2000	1.76
11/7/2000	1.77
11/14/2000	1.66
11/21/2000	1.83
11/28/2000	1.76
12/5/2000	1.79
12/12/2000	1.60
12/19/2000	1.79
12/28/2000	1.84
1/3/2001	1.97
1/9/2001	1.62
1/16/2001	1.64
1/23/2001	1.72
1/30/2001	1.76
2/6/2001	1.46
2/13/2001	1.61
3/8/2001	1.69
3/15/2001	1.69
3/22/2001	1.95
3/29/2001	2.05
4/5/2001	2.03

Date	Pressure
4/13/2001	2.23
4/18/2001	2.07
4/24/2001	2.29
5/1/2001	2.14
5/9/2001	2.11
5/15/2001	2.07
5/22/2001	2.16
5/30/2001	2.17
6/7/2001	2.10
6/14/2001	2.15
6/20/2001	2.15
6/27/2001	2.14
7/3/2001	2.10
7/10/2001	2.10
7/17/2001	2.03
7/26/2001	2.05
8/2/2001	2.09
8/8/2001	2.06
8/14/2001	2.09
8/21/2001	2.04
8/28/2001	1.95
9/5/2001	2.00
9/12/2001	2.03
9/19/2001	2.03
9/26/2001	1.99
10/10/2001	2.06
10/15/2001	2.05
10/31/2001	1.93
11/5/2001	1.99
12/5/2001	2.24
1/9/2002	2.23
1/23/2002	2.20
4/3/2002	2.12
4/15/2002	1.78
5/7/2002	1.96
5/23/2002	1.99
6/12/2002	1.94
6/25/2002	1.80
7/9/2002	1.85
7/23/2002	1.78
8/6/2002	1.76
8/22/2002	1.77
9/6/2002	1.75
9/17/2002	1.75
10/7/2002	1.82

Date	Pressure
10/25/2002	1.78
11/12/2002	1.94
12/3/2002	1.82
12/20/2002	1.73
1/7/2003	1.93
1/14/2003	1.84
2/4/2003	1.78
2/19/2003	1.72
3/3/2003	1.57
3/27/2003	1.75
4/9/2003	1.89
6/2/2003	1.65
7/3/2003	1.69
8/6/2003	1.75
8/19/2003	1.79
9/19/2003	1.70
10/14/2003	1.76
10/21/2003	1.91
11/6/2003	1.87
11/18/2003	1.89
12/2/2003	1.91
12/16/2003	1.98
1/2/2004	1.89
1/14/2004	1.94
1/28/2004	1.76
2/11/2004	1.85
2/23/2004	1.69
3/22/2004	1.70
4/5/2004	1.61
4/30/2004	1.80
5/17/2004	1.58
8/31/2004	1.78
9/22/2004	1.85
11/2/2004	2.07
12/16/2004	2.00
2/24/2005	1.82
3/21/2005	1.69
11/1/2005	1.78
5/31/2006	1.71
5/15/2007	1.75

Figure A35. 33rd South – Pressure Cell 23408

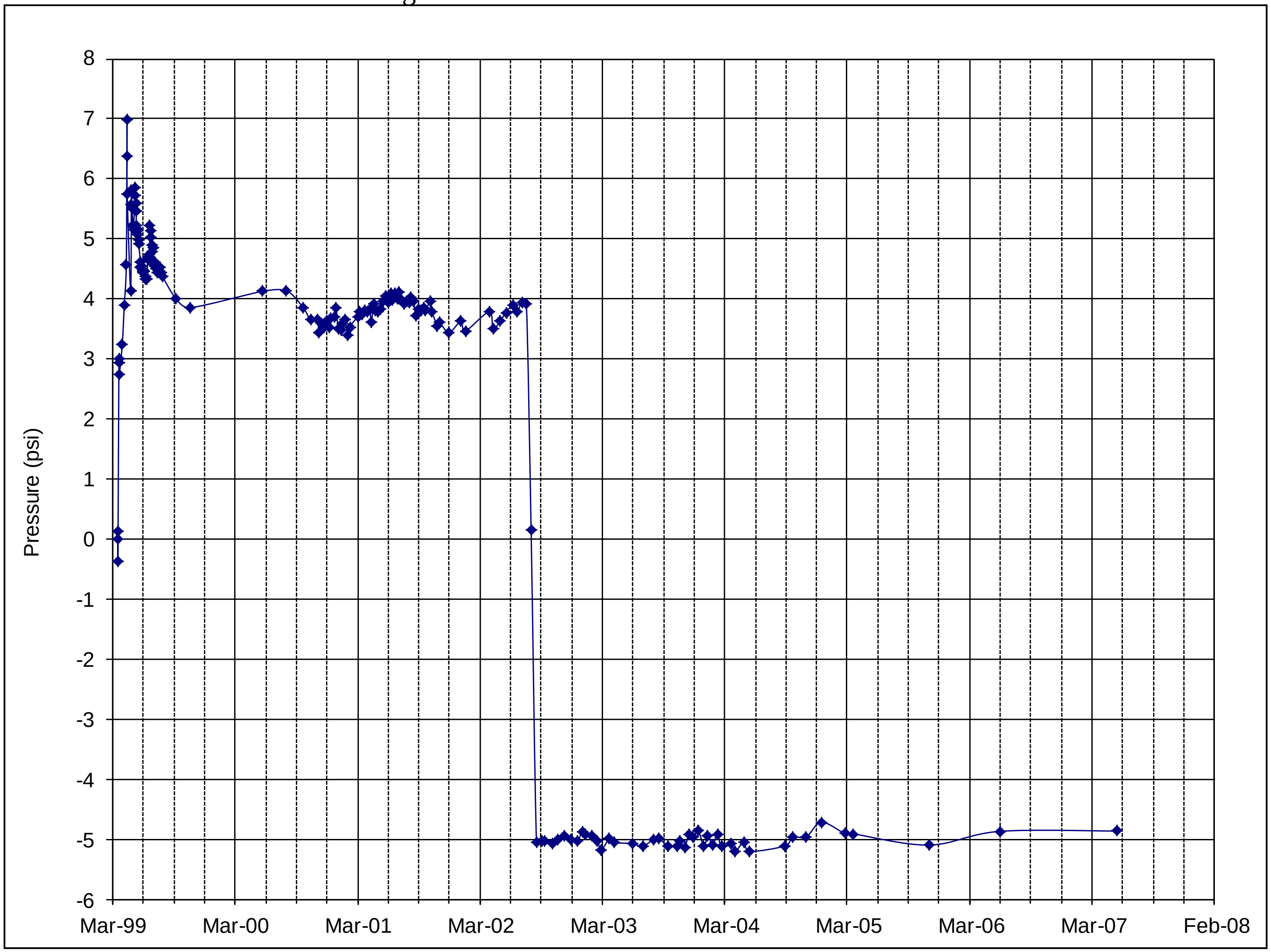

Table A35. 33rd South – Pressure Cell 23408 (in psi)

Date	Pressure	Date	Pressure	Date	Pressure	Date	Pressure
3/25/1999	0.00	6/28/1999	4.75	5/1/2001	3.81	12/20/2002	-5.03
3/25/1999	0.13	6/29/1999	5.23	5/9/2001	3.79	1/7/2003	-4.88
3/26/1999	-0.37	6/30/1999	5.13	5/15/2001	3.83	1/14/2003	-4.93
3/29/1999	3.00	7/1/1999	5.04	5/22/2001	3.97	2/4/2003	-4.95
3/29/1999	2.94	7/6/1999	4.89	5/30/2001	4.04	2/19/2003	-5.03
3/30/1999	2.74	7/7/1999	4.79	6/7/2001	3.94	3/3/2003	-5.18
4/8/1999	3.24	7/8/1999	4.85	6/14/2001	4.08	3/27/2003	-4.99
4/14/1999	3.90	7/12/1999	4.62	6/20/2001	3.98	4/9/2003	-5.06
4/20/1999	4.57	7/13/1999	4.62	6/27/2001	4.09	6/2/2003	-5.08
4/22/1999	6.98	7/14/1999	4.58	7/3/2001	4.00	7/3/2003	-5.12
4/22/1999	6.38	7/15/1999	4.56	7/10/2001	4.11	8/6/2003	-5.00
4/22/1999	5.74	7/19/1999	4.50	7/17/2001	3.99	8/19/2003	-4.98
5/3/1999	4.14	7/20/1999	4.45	7/26/2001	3.92	9/19/2003	-5.12
5/5/1999	5.81	7/28/1999	4.53	8/2/2001	3.97	10/14/2003	-5.11
5/6/1999	5.57	8/2/1999	4.43	8/8/2001	3.94	10/21/2003	-5.04
5/6/1999	5.51	8/5/1999	4.38	8/14/2001	4.03	11/6/2003	-5.13
5/10/1999	5.22	9/15/1999	4.00	8/21/2001	3.97	11/18/2003	-4.93
5/11/1999	5.15	10/28/1999	3.86	8/28/2001	3.72	12/2/2003	-4.97
5/12/1999	5.16	5/30/2000	4.13	9/5/2001	3.82	12/16/2003	-4.86
5/15/1999	5.74	8/8/2000	4.13	9/12/2001	3.80	1/2/2004	-5.11
5/17/1999	5.86	9/26/2000	3.86	9/19/2001	3.85	1/14/2004	-4.95
5/18/1999	5.60	10/19/2000	3.65	9/26/2001	3.81	1/28/2004	-5.11
5/19/1999	5.47	11/7/2000	3.66	10/10/2001	3.96	2/11/2004	-4.92
5/20/1999	5.23	11/14/2000	3.45	10/15/2001	3.79	2/23/2004	-5.12
5/22/1999	5.16	11/21/2000	3.59	10/31/2001	3.55	3/22/2004	-5.08
5/24/1999	5.13	11/28/2000	3.52	11/5/2001	3.62	4/5/2004	-5.20
5/25/1999	5.08	12/5/2000	3.64	12/5/2001	3.44	4/30/2004	-5.04
5/26/1999	4.99	12/12/2000	3.52	1/9/2002	3.63	5/17/2004	-5.20
5/27/1999	4.92	12/19/2000	3.68	1/23/2002	3.47	8/31/2004	-5.11
6/1/1999	4.61	12/28/2000	3.70	4/3/2002	3.78	9/22/2004	-4.97
6/2/1999	4.53	1/3/2001	3.85	4/15/2002	3.50	11/2/2004	-4.96
6/3/1999	4.54	1/9/2001	3.51	5/7/2002	3.64	12/16/2004	-4.72
6/7/1999	4.49	1/16/2001	3.49	5/23/2002	3.77	2/24/2005	-4.91
6/8/1999	4.46	1/23/2001	3.60	6/12/2002	3.89	3/21/2005	-4.91
6/9/1999	4.48	1/30/2001	3.65	6/25/2002	3.78	11/1/2005	-5.10
6/10/1999	4.44	2/6/2001	3.40	7/9/2002	3.94	5/31/2006	-4.87
6/14/1999	4.47	2/13/2001	3.54	7/23/2002	3.91	5/15/2007	-4.87
6/15/1999	4.38	3/8/2001	3.71	8/6/2002	0.16		
6/16/1999	4.34	3/15/2001	3.78	8/22/2002	-5.06		
6/17/1999	4.38	3/22/2001	3.75	9/6/2002	-5.04		
6/21/1999	4.32	3/29/2001	3.81	9/17/2002	-5.04		
6/22/1999	4.65	4/5/2001	3.78	10/7/2002	-5.08		
6/23/1999	4.71	4/13/2001	3.82	10/25/2002	-5.01		
6/24/1999	4.67	4/18/2001	3.61	11/12/2002	-4.94		
6/26/1999	4.68	4/24/2001	3.91	12/3/2002	-5.01		

Figure A36. 33rd South – Pressure Cell 23410

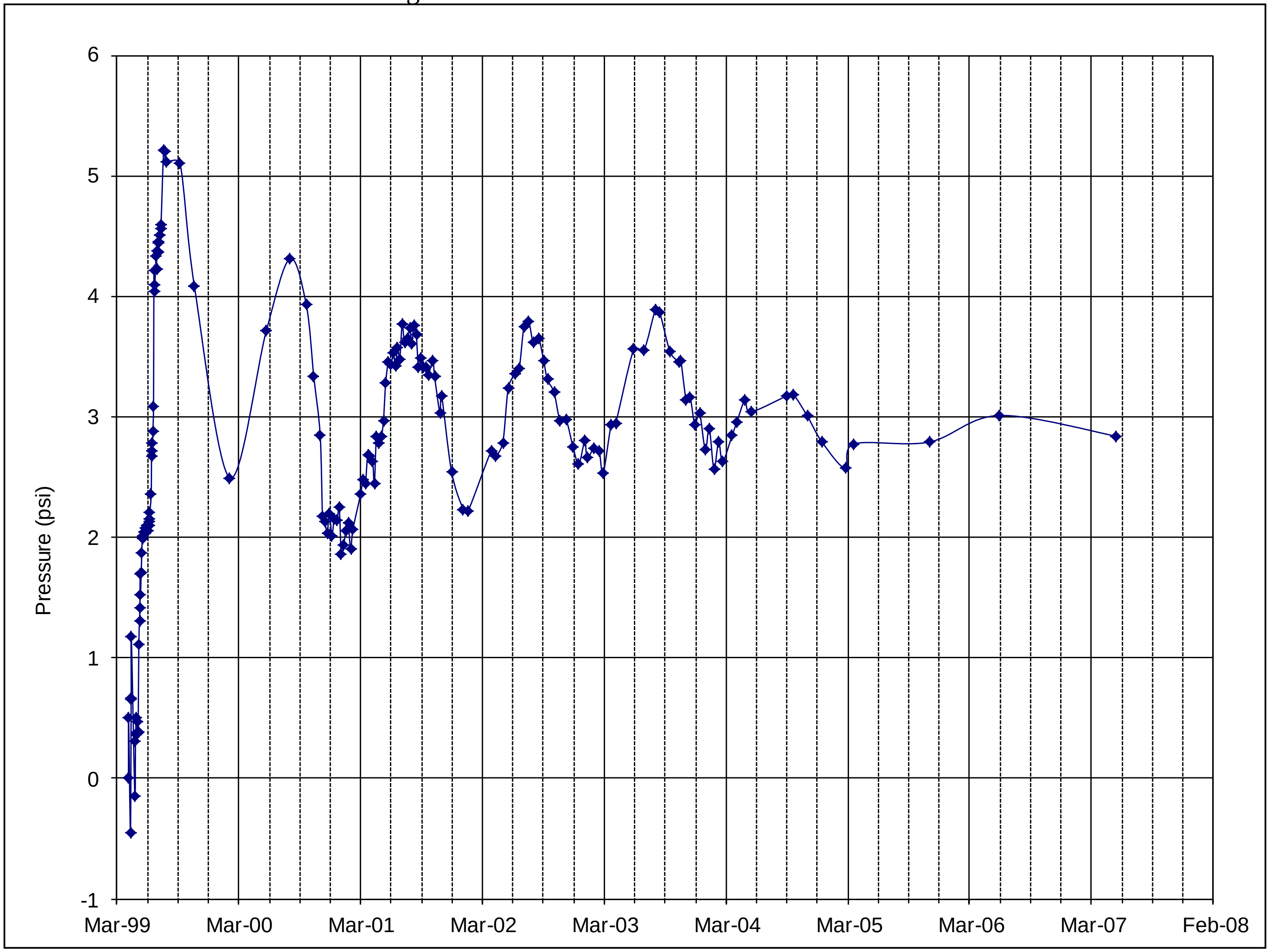

Table A36. 33rd South – Pressure Cell 23410 (in psi)

Date	Pressure	Date	Pressure	Date	Pressure	Date	Pressure
4/14/1999	0.00	7/7/1999	4.23	5/30/2001	3.45	2/19/2003	2.72
4/14/1999	0.51	7/8/1999	4.38	6/7/2001	3.44	3/3/2003	2.54
4/20/1999	-0.45	7/12/1999	4.44	6/14/2001	3.53	3/27/2003	2.94
4/22/1999	0.66	7/13/1999	4.45	6/20/2001	3.43	4/9/2003	2.95
4/22/1999	0.66	7/14/1999	4.36	6/27/2001	3.57	6/2/2003	3.56
4/22/1999	1.17	7/15/1999	4.50	7/3/2001	3.48	7/3/2003	3.55
5/3/1999	-0.14	7/19/1999	4.60	7/10/2001	3.76	8/6/2003	3.89
5/5/1999	0.31	7/20/1999	4.57	7/17/2001	3.62	8/19/2003	3.86
5/6/1999	0.36	7/28/1999	5.21	7/26/2001	3.65	9/19/2003	3.54
5/6/1999	0.51	8/2/1999	5.20	8/2/2001	3.73	10/14/2003	3.46
5/10/1999	0.48	8/5/1999	5.11	8/8/2001	3.61	10/21/2003	3.46
5/11/1999	0.39	9/15/1999	5.10	8/14/2001	3.76	11/6/2003	3.14
5/12/1999	0.38	10/28/1999	4.09	8/21/2001	3.69	11/18/2003	3.16
5/13/1999	0.38	2/11/2000	2.49	8/28/2001	3.41	12/2/2003	2.94
5/15/1999	1.11	5/30/2000	3.71	9/5/2001	3.49	12/16/2003	3.03
5/17/1999	1.31	8/8/2000	4.31	9/12/2001	3.41	1/2/2004	2.73
5/18/1999	1.41	9/26/2000	3.94	9/19/2001	3.41	1/14/2004	2.90
5/19/1999	1.70	10/19/2000	3.33	9/26/2001	3.35	1/28/2004	2.57
5/20/1999	1.52	11/7/2000	2.85	10/10/2001	3.46	2/11/2004	2.79
5/22/1999	1.71	11/14/2000	2.18	10/15/2001	3.33	2/23/2004	2.63
5/24/1999	1.87	11/21/2000	2.13	10/31/2001	3.03	3/22/2004	2.84
5/25/1999	2.01	11/28/2000	2.04	11/5/2001	3.17	4/5/2004	2.95
5/26/1999	1.99	12/5/2000	2.20	12/5/2001	2.54	4/30/2004	3.14
5/27/1999	1.99	12/12/2000	2.01	1/9/2002	2.23	5/17/2004	3.04
6/1/1999	2.04	12/19/2000	2.16	1/23/2002	2.22	8/31/2004	3.17
6/2/1999	2.03	12/28/2000	2.15	4/3/2002	2.72	9/22/2004	3.18
6/3/1999	2.08	1/3/2001	2.25	4/15/2002	2.67	11/2/2004	3.01
6/7/1999	2.05	1/9/2001	1.86	5/7/2002	2.79	12/16/2004	2.79
6/8/1999	2.05	1/16/2001	1.93	5/23/2002	3.23	2/24/2005	2.57
6/9/1999	2.10	1/23/2001	2.06	6/12/2002	3.36	3/21/2005	2.77
6/10/1999	2.05	1/30/2001	2.12	6/25/2002	3.40	11/1/2005	2.79
6/14/1999	2.16	2/6/2001	1.90	7/9/2002	3.75	5/31/2006	3.01
6/15/1999	2.13	2/13/2001	2.07	7/23/2002	3.79	5/15/2007	2.84
6/16/1999	2.09	3/8/2001	2.36	8/6/2002	3.61		
6/17/1999	2.21	3/15/2001	2.48	8/22/2002	3.65		
6/21/1999	2.36	3/22/2001	2.44	9/6/2002	3.47		
6/22/1999	2.72	3/29/2001	2.68	9/17/2002	3.31		
6/23/1999	2.78	4/5/2001	2.67	10/7/2002	3.20		
6/24/1999	2.67	4/13/2001	2.63	10/25/2002	2.97		
6/26/1999	2.88	4/18/2001	2.44	11/12/2002	2.98		
6/28/1999	3.09	4/24/2001	2.83	12/3/2002	2.75		
6/29/1999	4.21	5/1/2001	2.79	12/20/2002	2.61		
6/30/1999	4.09	5/9/2001	2.83	1/7/2003	2.80		
7/1/1999	4.04	5/15/2001	2.96	1/14/2003	2.66		
7/6/1999	4.33	5/22/2001	3.29	2/4/2003	2.74		

Figure A37. 33rd South – Pressure Cell 23412

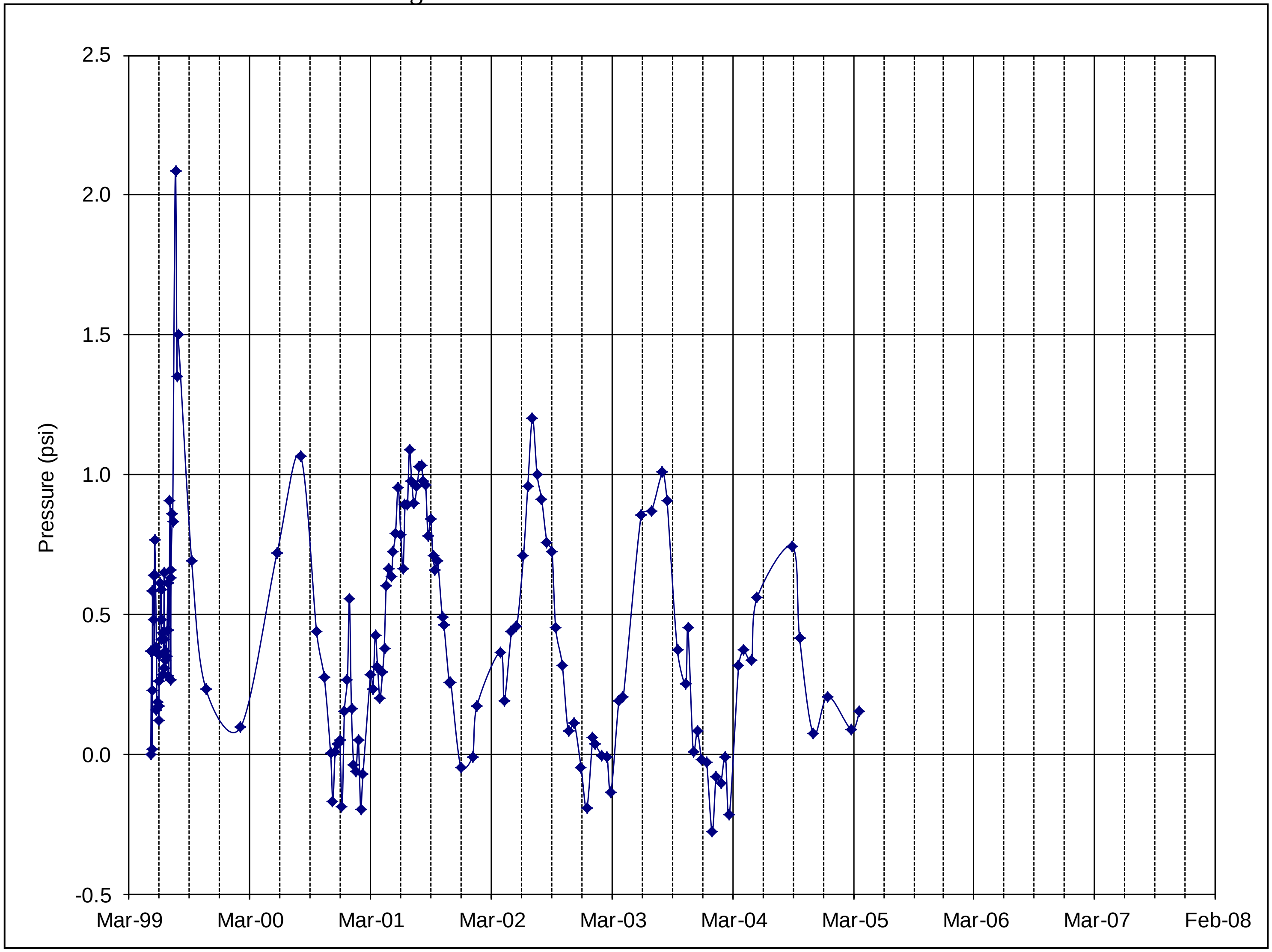

Table A37. 33rd South – Pressure Cell 23412 (in psi)

Date	Pressure	Date	Pressure	Date	Pressure	Date	Pressure
5/15/1999	0.00	5/30/2000	0.72	9/5/2001	0.84	12/16/2003	-0.03
5/17/1999	0.37	8/8/2000	1.07	9/12/2001	0.71	1/2/2004	-0.28
5/18/1999	0.23	9/26/2000	0.44	9/19/2001	0.66	1/14/2004	-0.08
5/19/1999	0.02	10/19/2000	0.28	9/26/2001	0.69	1/28/2004	-0.10
5/20/1999	0.59	11/7/2000	0.00	10/10/2001	0.49	2/11/2004	-0.01
5/22/1999	0.48	11/14/2000	-0.17	10/15/2001	0.46	2/23/2004	-0.22
5/24/1999	0.64	11/21/2000	0.01	10/31/2001	0.26	3/22/2004	0.31
5/25/1999	0.37	11/28/2000	0.04	11/5/2001	0.25	4/5/2004	0.37
5/26/1999	0.64	12/5/2000	0.05	12/5/2001	-0.05	4/30/2004	0.34
5/27/1999	0.77	12/12/2000	-0.19	1/9/2002	-0.01	5/17/2004	0.56
6/1/1999	0.38	12/19/2000	0.15	1/23/2002	0.17	8/31/2004	0.74
6/2/1999	0.16	12/28/2000	0.27	4/3/2002	0.36	9/22/2004	0.41
6/3/1999	0.18	1/3/2001	0.55	4/15/2002	0.19	11/2/2004	0.07
6/7/1999	0.17	1/9/2001	0.16	5/7/2002	0.44	12/16/2004	0.21
6/8/1999	0.12	1/16/2001	-0.04	5/23/2002	0.46	2/24/2005	0.09
6/9/1999	0.26	1/23/2001	-0.06	6/12/2002	0.71	3/21/2005	0.15
6/10/1999	0.35	1/30/2001	0.05	6/25/2002	0.96		
6/14/1999	0.61	2/6/2001	-0.20	7/9/2002	1.20		
6/15/1999	0.48	2/13/2001	-0.07	7/23/2002	1.00		
6/16/1999	0.59	3/8/2001	0.28	8/6/2002	0.91		
6/17/1999	0.41	3/15/2001	0.23	8/22/2002	0.76		
6/21/1999	0.43	3/22/2001	0.42	9/6/2002	0.73		
6/22/1999	0.28	3/29/2001	0.31	9/17/2002	0.45		
6/23/1999	0.31	4/5/2001	0.20	10/7/2002	0.32		
6/24/1999	0.65	4/13/2001	0.29	10/25/2002	0.08		
6/26/1999	0.41	4/18/2001	0.38	11/12/2002	0.11		
6/28/1999	0.34	4/24/2001	0.60	12/3/2002	-0.05		
6/29/1999	0.37	5/1/2001	0.66	12/20/2002	-0.19		
6/30/1999	0.35	5/9/2001	0.63	1/7/2003	0.06		
7/1/1999	0.35	5/15/2001	0.72	1/14/2003	0.04		
7/6/1999	0.61	5/22/2001	0.79	2/4/2003	-0.01		
7/7/1999	0.44	5/30/2001	0.95	2/19/2003	-0.01		
7/8/1999	0.28	6/7/2001	0.78	3/3/2003	-0.14		
7/12/1999	0.91	6/14/2001	0.66	3/27/2003	0.19		
7/13/1999	0.63	6/20/2001	0.89	4/9/2003	0.20		
7/14/1999	0.27	6/27/2001	0.89	6/2/2003	0.85		
7/15/1999	0.66	7/3/2001	1.09	7/3/2003	0.87		
7/19/1999	0.86	7/10/2001	0.97	8/6/2003	1.01		
7/20/1999	0.83	7/17/2001	0.89	8/19/2003	0.91		
7/28/1999	2.09	7/26/2001	0.96	9/19/2003	0.37		
8/2/1999	1.35	8/2/2001	1.03	10/14/2003	0.25		
8/5/1999	1.50	8/8/2001	1.03	10/21/2003	0.45		
9/15/1999	0.69	8/14/2001	0.98	11/6/2003	0.01		
10/28/1999	0.23	8/21/2001	0.96	11/18/2003	0.08		
2/11/2000	0.10	8/28/2001	0.78	12/2/2003	-0.02		

Figure A38. 33rd South – Pressure Cell 23414

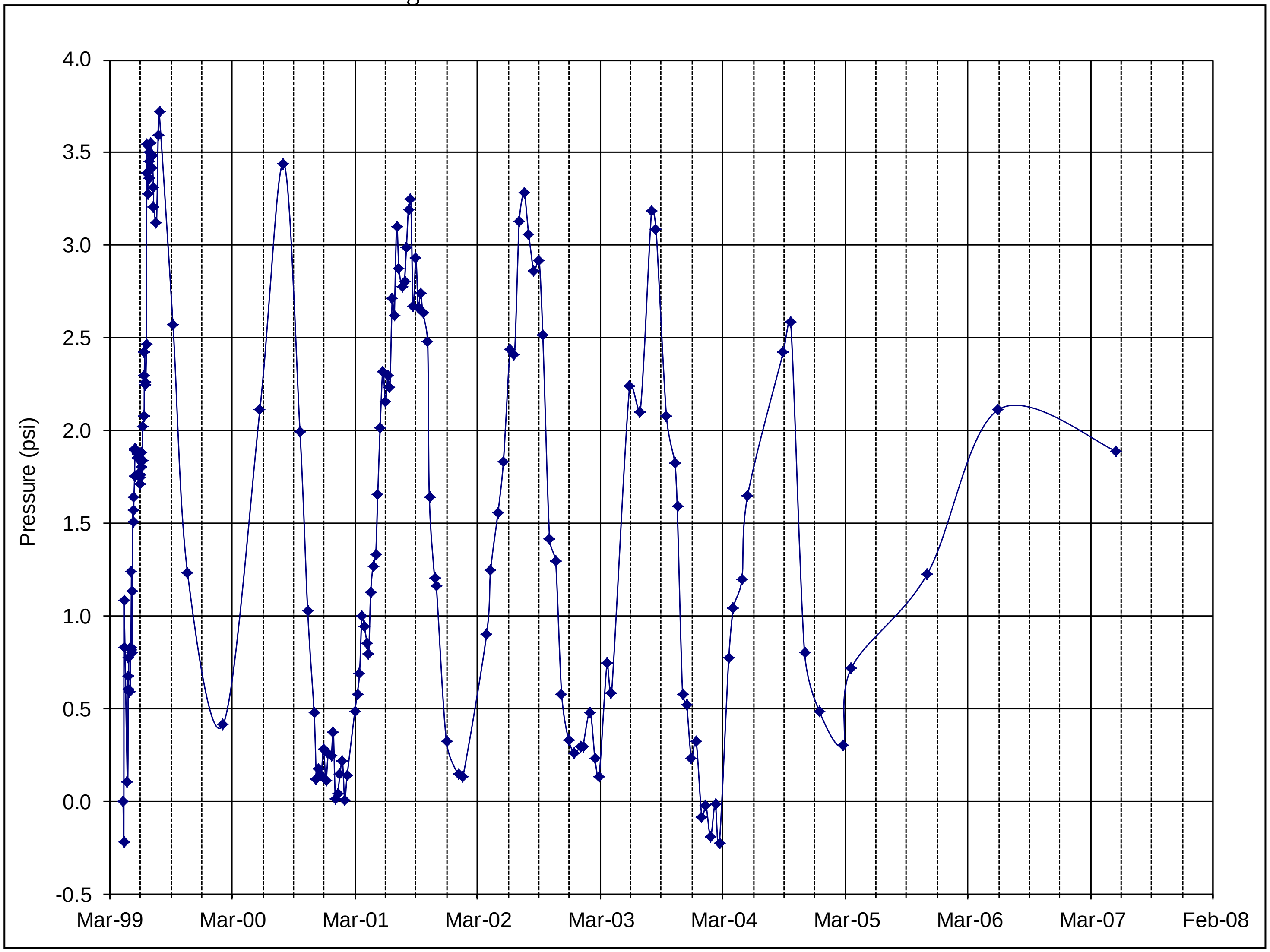

Table A38. 33rd South – Pressure Cell 23414 (in psi)

Date	Pressure
4/20/1999	0.00
4/22/1999	-0.22
4/22/1999	0.83
4/22/1999	1.08
5/3/1999	0.10
5/5/1999	0.68
5/6/1999	0.60
5/6/1999	0.78
5/10/1999	0.83
5/11/1999	0.59
5/12/1999	0.83
5/13/1999	0.82
5/15/1999	1.24
5/17/1999	0.80
5/18/1999	1.13
5/19/1999	1.57
5/20/1999	1.51
5/22/1999	1.64
5/24/1999	1.75
5/25/1999	1.90
5/26/1999	1.90
5/27/1999	1.89
6/1/1999	1.88
6/2/1999	1.87
6/3/1999	1.85
6/7/1999	1.77
6/8/1999	1.71
6/9/1999	1.75
6/10/1999	1.76
6/14/1999	1.80
6/15/1999	1.88
6/16/1999	1.84
6/17/1999	2.02
6/21/1999	2.07
6/22/1999	2.30
6/23/1999	2.43
6/24/1999	2.25
6/26/1999	2.26
6/28/1999	2.46
6/29/1999	3.55
6/30/1999	3.39
7/1/1999	3.27
7/6/1999	3.45
7/7/1999	3.36
7/8/1999	3.50
7/12/1999	3.55
7/13/1999	3.48
7/14/1999	3.42
7/15/1999	3.49
7/19/1999	3.31
7/20/1999	3.21
7/28/1999	3.12
8/2/1999	3.60
8/5/1999	3.72
9/15/1999	2.57
10/28/1999	1.23
2/11/2000	0.41
5/30/2000	2.11
8/8/2000	3.44
9/26/2000	2.00
10/19/2000	1.02
11/7/2000	0.48
11/14/2000	0.11
11/21/2000	0.18
11/28/2000	0.14
12/5/2000	0.28
12/12/2000	0.11
12/19/2000	0.26
12/28/2000	0.24
1/3/2001	0.37
1/9/2001	0.01
1/16/2001	0.04
1/23/2001	0.15
1/30/2001	0.22
2/6/2001	0.00
2/13/2001	0.14
3/8/2001	0.48
3/15/2001	0.58
3/22/2001	0.69
3/29/2001	1.00
4/5/2001	0.94
4/13/2001	0.85
4/18/2001	0.79
4/24/2001	1.13
5/1/2001	1.27
5/9/2001	1.33
5/15/2001	1.65
5/22/2001	2.02
5/30/2001	2.32
6/7/2001	2.16
6/14/2001	2.30
6/20/2001	2.24
6/27/2001	2.71
7/3/2001	2.62
7/10/2001	3.10
7/17/2001	2.87
7/26/2001	2.77
8/2/2001	2.80
8/8/2001	2.99
8/14/2001	3.19
8/21/2001	3.25
8/28/2001	2.67
9/5/2001	2.93
9/12/2001	2.67
9/19/2001	2.74
9/26/2001	2.63
10/10/2001	2.48
10/15/2001	1.64
10/31/2001	1.20
11/5/2001	1.16
12/5/2001	0.32
1/9/2002	0.14
1/23/2002	0.13
4/3/2002	0.90
4/15/2002	1.25
5/7/2002	1.56
5/23/2002	1.83
6/12/2002	2.44
6/25/2002	2.41
7/9/2002	3.13
7/23/2002	3.28
8/6/2002	3.06
8/22/2002	2.86
9/6/2002	2.92
9/17/2002	2.51
10/7/2002	1.42
10/25/2002	1.29
11/12/2002	0.57
12/3/2002	0.33
12/20/2002	0.26
1/7/2003	0.29
1/14/2003	0.30
2/4/2003	0.48
2/19/2003	0.23
3/3/2003	0.13
3/27/2003	0.75
4/9/2003	0.58
6/2/2003	2.24
7/3/2003	2.10
8/6/2003	3.19
8/19/2003	3.09
9/19/2003	2.08
10/14/2003	1.83
10/21/2003	1.59
11/6/2003	0.57
11/18/2003	0.52
12/2/2003	0.23
12/16/2003	0.32
1/2/2004	-0.08
1/14/2004	-0.02
1/28/2004	-0.19
2/11/2004	-0.01
2/23/2004	-0.23
3/22/2004	0.77
4/5/2004	1.04
4/30/2004	1.19
5/17/2004	1.65
8/31/2004	2.42
9/22/2004	2.58
11/2/2004	0.80
12/16/2004	0.48
2/24/2005	0.30
3/21/2005	0.72
11/1/2005	1.22
5/31/2006	2.11
5/15/2007	1.89

Figure A39. 33rd South – Pressure Cell 48833

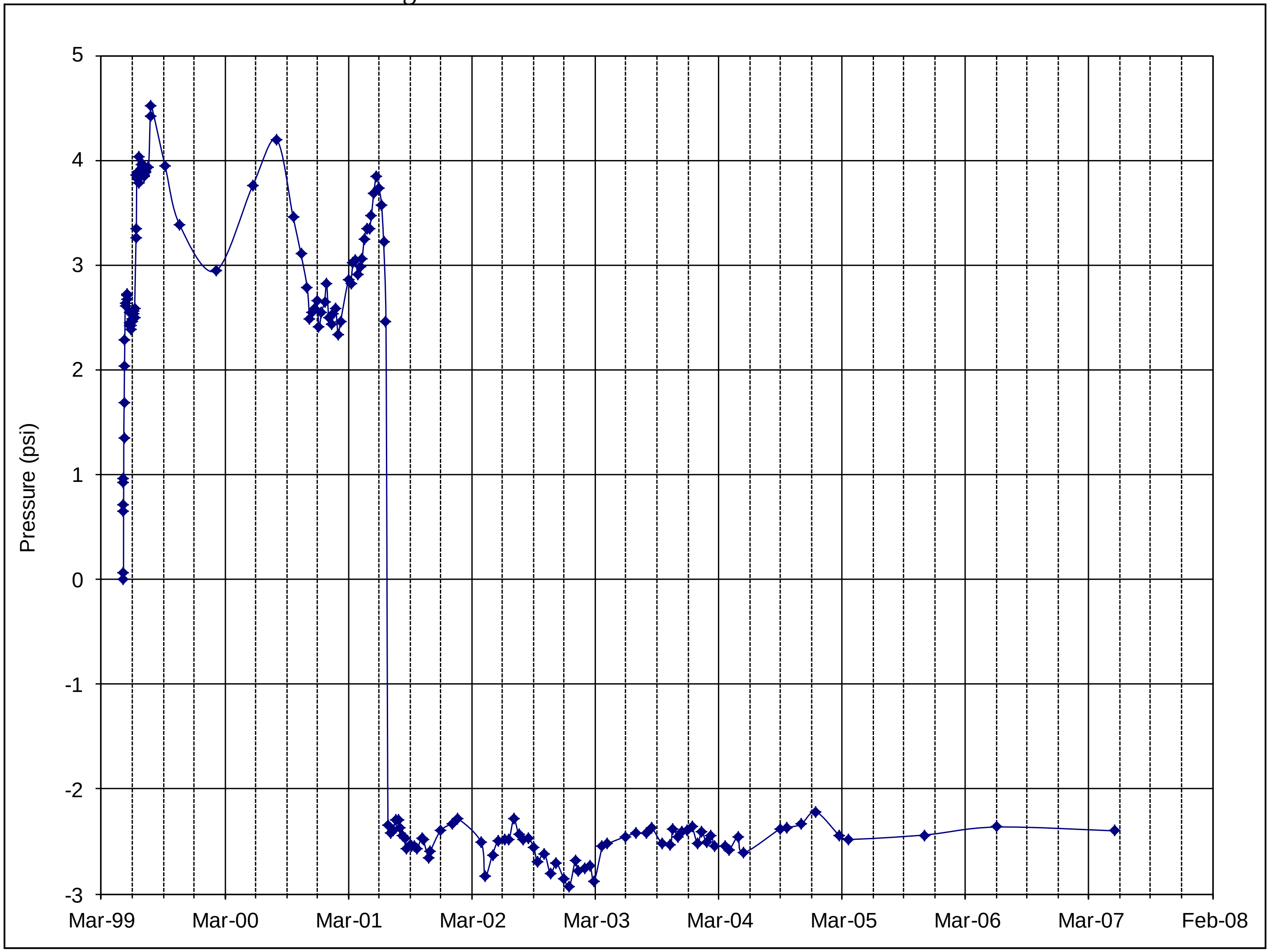

Table A39. 33rd South – Pressure Cell 48833 (in psi)

Date	Pressure	Date	Pressure	Date	Pressure	Date	Pressure
5/15/1999	0.00	7/28/1999	3.93	7/26/2001	-2.30	9/19/2003	-2.52
5/15/1999	0.06	8/2/1999	4.42	8/2/2001	-2.30	10/14/2003	-2.53
5/15/1999	0.65	8/5/1999	4.52	8/8/2001	-2.37	10/21/2003	-2.38
5/15/1999	0.71	9/15/1999	3.94	8/14/2001	-2.45	11/6/2003	-2.46
5/15/1999	0.93	10/28/1999	3.38	8/21/2001	-2.47	11/18/2003	-2.41
5/15/1999	0.96	2/11/2000	2.94	8/28/2001	-2.57	12/2/2003	-2.39
5/15/1999	1.35	5/30/2000	3.76	9/5/2001	-2.54	12/16/2003	-2.36
5/17/1999	1.69	8/8/2000	4.20	9/12/2001	-2.54	1/2/2004	-2.52
5/18/1999	2.04	9/26/2000	3.46	9/19/2001	-2.54	1/14/2004	-2.41
5/19/1999	2.28	10/19/2000	3.11	9/26/2001	-2.57	1/28/2004	-2.51
5/20/1999	2.61	11/7/2000	2.78	10/10/2001	-2.47	2/11/2004	-2.45
5/22/1999	2.63	11/14/2000	2.49	10/15/2001	-2.48	2/23/2004	-2.55
5/24/1999	2.68	11/21/2000	2.54	10/31/2001	-2.66	3/22/2004	-2.54
5/25/1999	2.72	11/28/2000	2.58	11/5/2001	-2.60	4/5/2004	-2.58
5/26/1999	2.71	12/5/2000	2.66	12/5/2001	-2.40	4/30/2004	-2.46
5/27/1999	2.72	12/12/2000	2.41	1/9/2002	-2.33	5/17/2004	-2.61
6/1/1999	2.54	12/19/2000	2.55	1/23/2002	-2.28	8/31/2004	-2.38
6/2/1999	2.43	12/28/2000	2.65	4/3/2002	-2.50	9/22/2004	-2.37
6/3/1999	2.44	1/3/2001	2.83	4/15/2002	-2.83	11/2/2004	-2.34
6/7/1999	2.39	1/9/2001	2.50	5/7/2002	-2.63	12/16/2004	-2.22
6/8/1999	2.42	1/16/2001	2.44	5/23/2002	-2.50	2/24/2005	-2.45
6/9/1999	2.48	1/23/2001	2.54	6/12/2002	-2.48	3/21/2005	-2.48
6/10/1999	2.45	1/30/2001	2.58	6/25/2002	-2.48	11/1/2005	-2.44
6/14/1999	2.53	2/6/2001	2.33	7/9/2002	-2.29	5/31/2006	-2.36
6/15/1999	2.56	2/13/2001	2.46	7/23/2002	-2.43	5/15/2007	-2.40
6/16/1999	2.50	3/8/2001	2.85	8/6/2002	-2.49		
6/17/1999	2.59	3/15/2001	2.83	8/22/2002	-2.47		
6/21/1999	3.26	3/22/2001	3.02	9/6/2002	-2.56		
6/22/1999	3.35	3/29/2001	3.05	9/17/2002	-2.69		
6/23/1999	3.86	4/5/2001	2.92	10/7/2002	-2.61		
6/24/1999	3.82	4/13/2001	2.99	10/25/2002	-2.80		
6/26/1999	3.88	4/18/2001	3.06	11/12/2002	-2.71		
6/28/1999	4.03	4/24/2001	3.25	12/3/2002	-2.85		
6/29/1999	3.89	5/1/2001	3.35	12/20/2002	-2.93		
6/30/1999	3.83	5/9/2001	3.35	1/7/2003	-2.68		
7/1/1999	3.78	5/15/2001	3.47	1/14/2003	-2.79		
7/6/1999	3.96	5/22/2001	3.68	2/4/2003	-2.76		
7/7/1999	3.87	5/30/2001	3.85	2/19/2003	-2.73		
7/8/1999	3.92	6/7/2001	3.73	3/3/2003	-2.88		
7/12/1999	3.95	6/14/2001	3.57	3/27/2003	-2.55		
7/13/1999	3.92	6/20/2001	3.22	4/9/2003	-2.53		
7/14/1999	3.84	6/27/2001	2.47	6/2/2003	-2.46		
7/15/1999	3.85	7/3/2001	-2.35	7/3/2003	-2.42		
7/19/1999	3.90	7/10/2001	-2.41	8/6/2003	-2.42		
7/20/1999	3.88	7/17/2001	-2.39	8/19/2003	-2.37		

Figure A40. 33rd South – Pressure Cell 48834

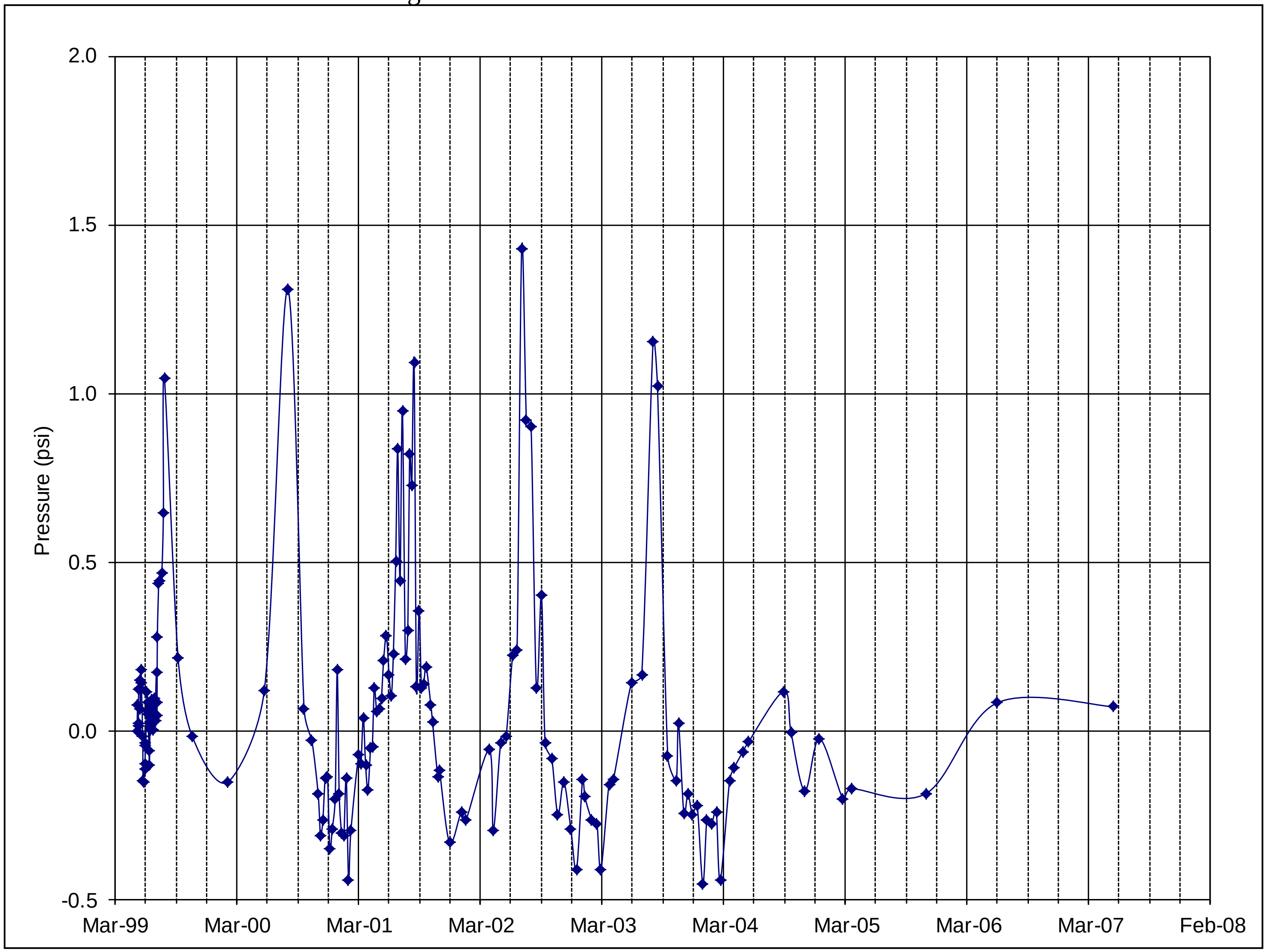

Table A40. 33rd South – Pressure Cell 48834 (in psi)

Date	Pressure	Date	Pressure	Date	Pressure	Date	Pressure
5/15/1999	0.00	5/30/2000	0.12	9/5/2001	0.35	12/16/2003	-0.22
5/17/1999	0.07	8/8/2000	1.31	9/12/2001	0.12	1/2/2004	-0.46
5/18/1999	0.01	9/26/2000	0.06	9/19/2001	0.14	1/14/2004	-0.26
5/19/1999	0.02	10/19/2000	-0.03	9/26/2001	0.19	1/28/2004	-0.28
5/20/1999	0.12	11/7/2000	-0.19	10/10/2001	0.08	2/11/2004	-0.24
5/22/1999	0.13	11/14/2000	-0.31	10/15/2001	0.03	2/23/2004	-0.44
5/24/1999	0.15	11/21/2000	-0.27	10/31/2001	-0.14	3/22/2004	-0.15
5/25/1999	0.06	11/28/2000	-0.14	11/5/2001	-0.12	4/5/2004	-0.11
5/26/1999	0.14	12/5/2000	-0.14	12/5/2001	-0.33	4/30/2004	-0.06
5/27/1999	0.18	12/12/2000	-0.35	1/9/2002	-0.24	5/17/2004	-0.03
6/1/1999	-0.02	12/19/2000	-0.29	1/23/2002	-0.27	8/31/2004	0.12
6/2/1999	-0.15	12/28/2000	-0.20	4/3/2002	-0.06	9/22/2004	-0.01
6/3/1999	-0.15	1/3/2001	0.18	4/15/2002	-0.30	11/2/2004	-0.18
6/7/1999	-0.12	1/9/2001	-0.19	5/7/2002	-0.04	12/16/2004	-0.02
6/8/1999	-0.10	1/16/2001	-0.30	5/23/2002	-0.02	2/24/2005	-0.20
6/9/1999	-0.05	1/23/2001	-0.31	6/12/2002	0.22	3/21/2005	-0.17
6/10/1999	-0.04	1/30/2001	-0.14	6/25/2002	0.24	11/1/2005	-0.19
6/14/1999	0.12	2/6/2001	-0.44	7/9/2002	1.43	5/31/2006	0.08
6/15/1999	0.05	2/13/2001	-0.30	7/23/2002	0.92	5/15/2007	0.07
6/16/1999	0.08	3/8/2001	-0.07	8/6/2002	0.90		
6/17/1999	0.06	3/15/2001	-0.10	8/22/2002	0.13		
6/21/1999	-0.10	3/22/2001	0.04	9/6/2002	0.40		
6/22/1999	-0.06	3/29/2001	-0.10	9/17/2002	-0.04		
6/23/1999	0.01	4/5/2001	-0.18	10/7/2002	-0.08		
6/24/1999	0.00	4/13/2001	-0.05	10/25/2002	-0.25		
6/26/1999	0.03	4/18/2001	-0.05	11/12/2002	-0.15		
6/28/1999	0.07	4/24/2001	0.13	12/3/2002	-0.29		
6/29/1999	0.09	5/1/2001	0.06	12/20/2002	-0.41		
6/30/1999	0.03	5/9/2001	0.06	1/7/2003	-0.14		
7/1/1999	0.00	5/15/2001	0.09	1/14/2003	-0.20		
7/6/1999	0.05	5/22/2001	0.21	2/4/2003	-0.27		
7/7/1999	0.09	5/30/2001	0.28	2/19/2003	-0.28		
7/8/1999	0.03	6/7/2001	0.17	3/3/2003	-0.41		
7/12/1999	0.17	6/14/2001	0.10	3/27/2003	-0.16		
7/13/1999	0.08	6/20/2001	0.23	4/9/2003	-0.15		
7/14/1999	0.05	6/27/2001	0.50	6/2/2003	0.14		
7/15/1999	0.28	7/3/2001	0.84	7/3/2003	0.17		
7/19/1999	0.44	7/10/2001	0.44	8/6/2003	1.15		
7/20/1999	0.45	7/17/2001	0.95	8/19/2003	1.02		
7/28/1999	0.47	7/26/2001	0.21	9/19/2003	-0.08		
8/2/1999	0.65	8/2/2001	0.29	10/14/2003	-0.15		
8/5/1999	1.04	8/8/2001	0.82	10/21/2003	0.02		
9/15/1999	0.21	8/14/2001	0.73	11/6/2003	-0.25		
10/28/1999	-0.02	8/21/2001	1.09	11/18/2003	-0.19		
2/11/2000	-0.15	8/28/2001	0.13	12/2/2003	-0.25		

Figure A41. 33rd South – Pressure Cell 48835

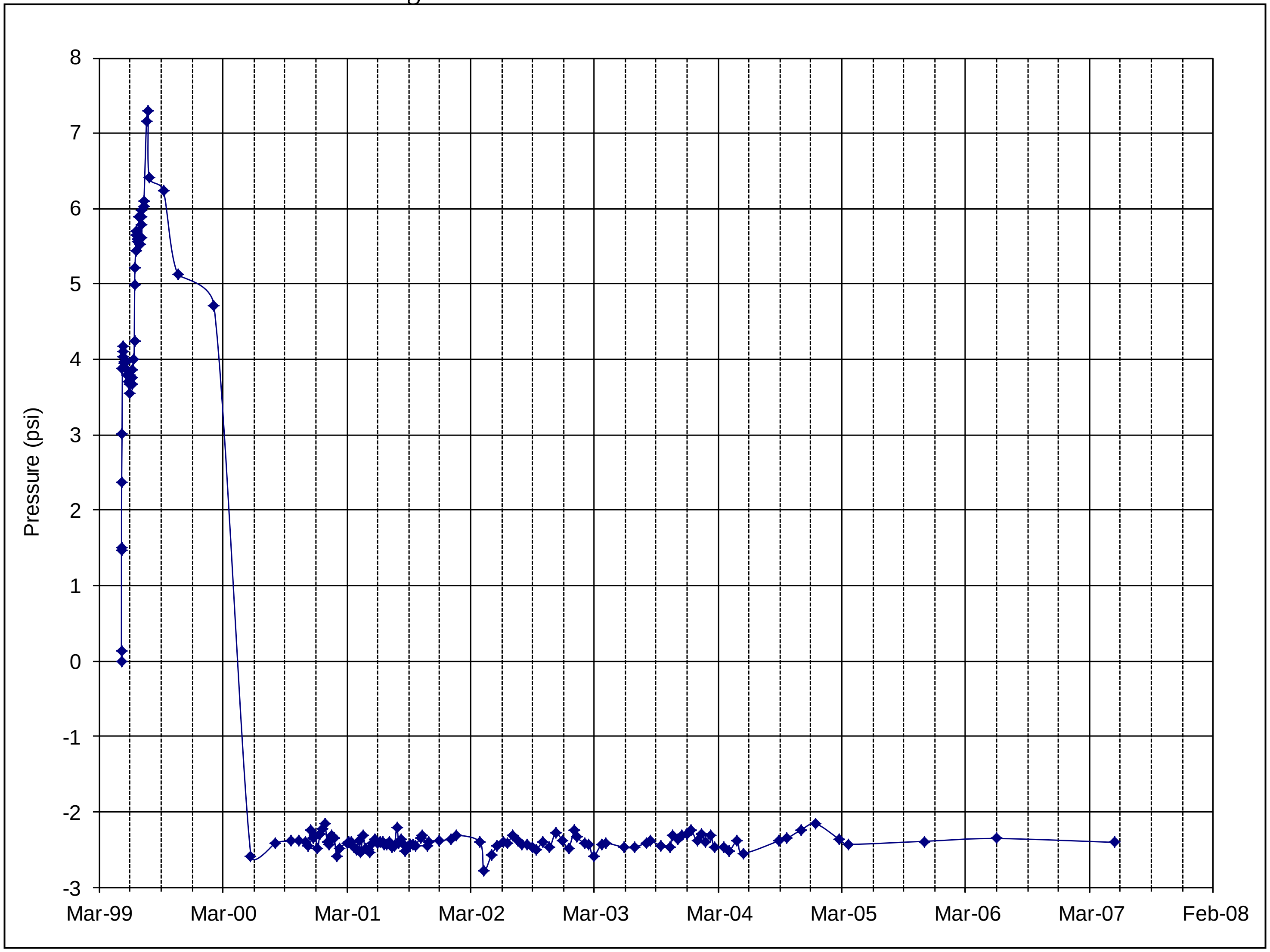

Table A41. 33rd South – Pressure Cell 48835 (in psi)

Date	Pressure
5/15/1999	0.00
5/15/1999	0.13
5/15/1999	1.47
5/15/1999	1.51
5/15/1999	2.37
5/17/1999	3.01
5/18/1999	3.88
5/19/1999	4.18
5/20/1999	4.11
5/22/1999	4.03
5/24/1999	3.97
5/25/1999	3.95
5/26/1999	3.97
5/27/1999	3.99
6/1/1999	3.79
6/2/1999	3.87
6/3/1999	3.71
6/7/1999	3.55
6/8/1999	3.67
6/9/1999	3.79
6/10/1999	3.77
6/14/1999	3.76
6/15/1999	3.75
6/16/1999	3.68
6/17/1999	3.86
6/21/1999	4.00
6/22/1999	4.24
6/23/1999	4.98
6/24/1999	5.22
6/26/1999	5.44
6/28/1999	5.69
6/29/1999	5.64
6/30/1999	5.56
7/1/1999	5.60
7/6/1999	5.88
7/7/1999	5.59
7/8/1999	5.53
7/12/1999	5.98
7/13/1999	5.89
7/14/1999	5.62
7/15/1999	5.79
7/19/1999	6.09
7/20/1999	6.03
7/28/1999	7.17
8/2/1999	7.29
8/5/1999	6.41
9/15/1999	6.24
10/28/1999	5.13
2/11/2000	4.72
5/30/2000	-2.59
8/8/2000	-2.42
9/26/2000	-2.39
10/19/2000	-2.39
11/7/2000	-2.40
11/14/2000	-2.46
11/21/2000	-2.25
11/28/2000	-2.35
12/5/2000	-2.31
12/12/2000	-2.49
12/19/2000	-2.30
12/28/2000	-2.22
1/3/2001	-2.15
1/9/2001	-2.40
1/16/2001	-2.44
1/23/2001	-2.32
1/30/2001	-2.35
2/6/2001	-2.59
2/13/2001	-2.48
3/8/2001	-2.42
3/15/2001	-2.41
3/22/2001	-2.41
3/29/2001	-2.48
4/5/2001	-2.51
4/13/2001	-2.38
4/18/2001	-2.54
4/24/2001	-2.32
5/1/2001	-2.49
5/9/2001	-2.51
5/15/2001	-2.53
5/22/2001	-2.42
5/30/2001	-2.37
6/7/2001	-2.41
6/14/2001	-2.41
6/20/2001	-2.41
6/27/2001	-2.43
7/3/2001	-2.44
7/10/2001	-2.40
7/17/2001	-2.47
7/26/2001	-2.45
8/2/2001	-2.21
8/8/2001	-2.42
8/14/2001	-2.37
8/21/2001	-2.44
8/28/2001	-2.53
9/5/2001	-2.48
9/12/2001	-2.43
9/19/2001	-2.44
9/26/2001	-2.45
10/10/2001	-2.34
10/15/2001	-2.32
10/31/2001	-2.46
11/5/2001	-2.39
12/5/2001	-2.39
1/9/2002	-2.36
1/23/2002	-2.31
4/3/2002	-2.40
4/15/2002	-2.78
5/7/2002	-2.58
5/23/2002	-2.46
6/12/2002	-2.41
6/25/2002	-2.42
7/9/2002	-2.31
7/23/2002	-2.39
8/6/2002	-2.43
8/22/2002	-2.44
9/6/2002	-2.47
9/17/2002	-2.50
10/7/2002	-2.40
10/25/2002	-2.48
11/12/2002	-2.29
12/3/2002	-2.39
12/20/2002	-2.48
1/7/2003	-2.25
1/14/2003	-2.34
2/4/2003	-2.42
2/19/2003	-2.44
3/3/2003	-2.60
3/27/2003	-2.43
4/9/2003	-2.41
6/2/2003	-2.47
7/3/2003	-2.47
8/6/2003	-2.41
8/19/2003	-2.39
9/19/2003	-2.45
10/14/2003	-2.48
10/21/2003	-2.31
11/6/2003	-2.36
11/18/2003	-2.31
12/2/2003	-2.30
12/16/2003	-2.25
1/2/2004	-2.39
1/14/2004	-2.29
1/28/2004	-2.41
2/11/2004	-2.31
2/23/2004	-2.48
3/22/2004	-2.46
4/5/2004	-2.53
4/30/2004	-2.39
5/17/2004	-2.55
8/31/2004	-2.39
9/22/2004	-2.36
11/2/2004	-2.25
12/16/2004	-2.16
2/24/2005	-2.37
3/21/2005	-2.43
11/1/2005	-2.39
5/31/2006	-2.36
5/15/2007	-2.41

Figure A42. 4th South – Magnet Extensometer

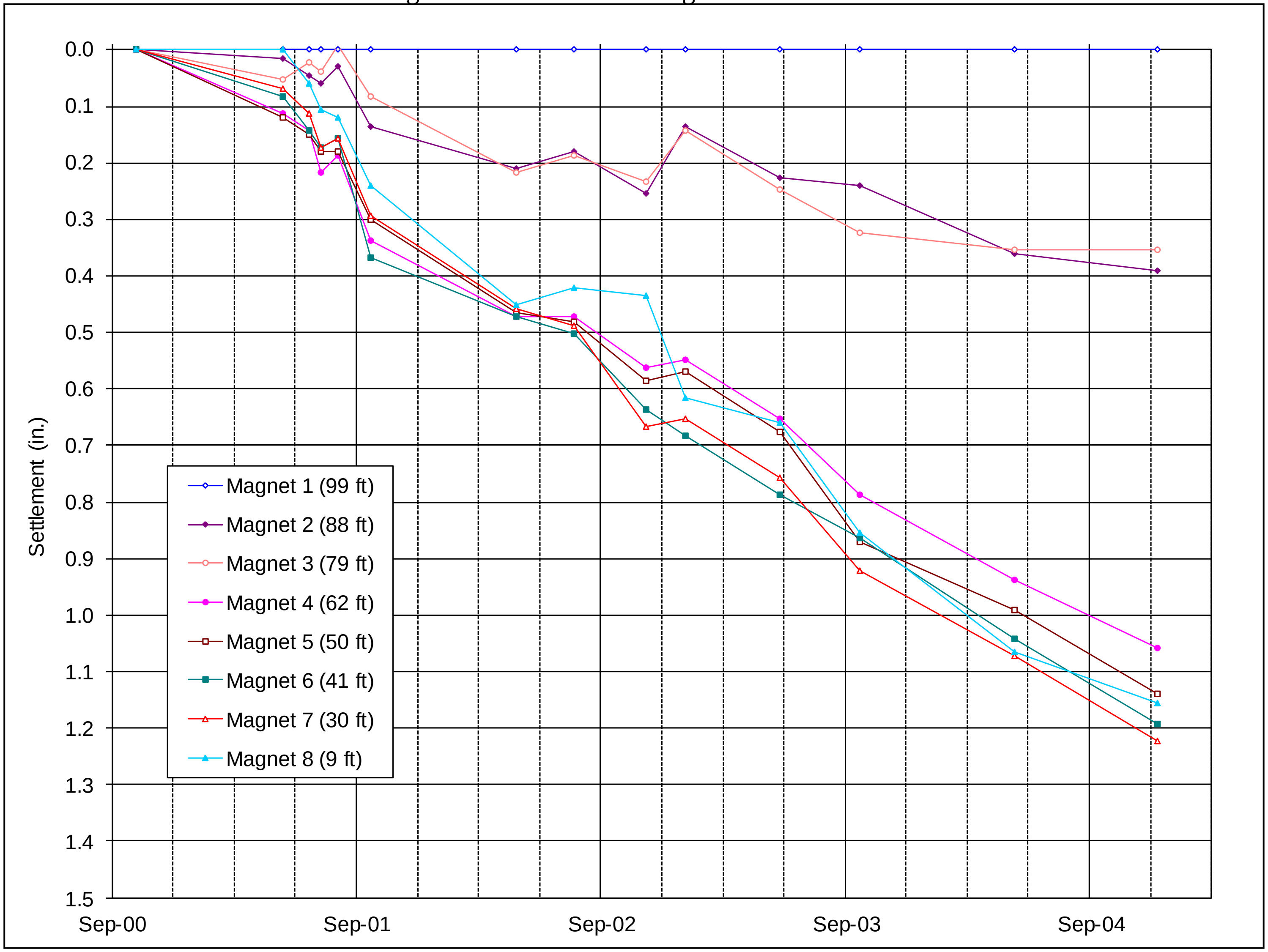

Table A42. 4th South – Magnet Extensometer (in inches)

Date	Bottom	Magnet 1 (99 ft)	Magnet 2 (88 ft)	Magnet 3 (79 ft)	Magnet 4 (62 ft)	Magnet 5 (50 ft)	Magnet 6 (41 ft)	Magnet 7 (30 ft)
10/17/2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5/23/2001	0.00	0.00	0.01	0.05	0.11	0.12	0.08	0.07
7/2/2001	0.00	0.00	0.04	0.02	0.14	0.15	0.14	0.11
7/19/2001	0.00	0.00	0.06	0.04	0.22	0.18	0.17	0.17
8/14/2001	0.00	0.00	0.03	-0.01	0.19	0.18	0.16	0.16
10/01/01	0.00	0.00	0.14	0.08	0.34	0.30	0.37	0.29
05/07/02	0.00	0.00	0.21	0.22	0.47	0.47	0.47	0.46
08/01/02	0.00	0.00	0.18	0.19	0.47	0.48	0.50	0.49
11/15/02	0.00	0.00	0.25	0.23	0.56	0.59	0.64	0.67
01/14/03	0.00	0.00	0.14	0.14	0.55	0.57	0.68	0.65
06/02/03	0.00	0.00	0.22	0.25	0.65	0.68	0.79	0.76
09/30/03	0.00	0.00	0.24	0.32	0.79	0.87	0.86	0.92
05/17/04	0.00	0.00	0.36	0.35	0.94	0.99	1.04	1.07
12/16/04	0.00	0.00	0.39	0.35	1.06	1.14	1.19	1.22

Figure A43. 4th South – Settlement Points

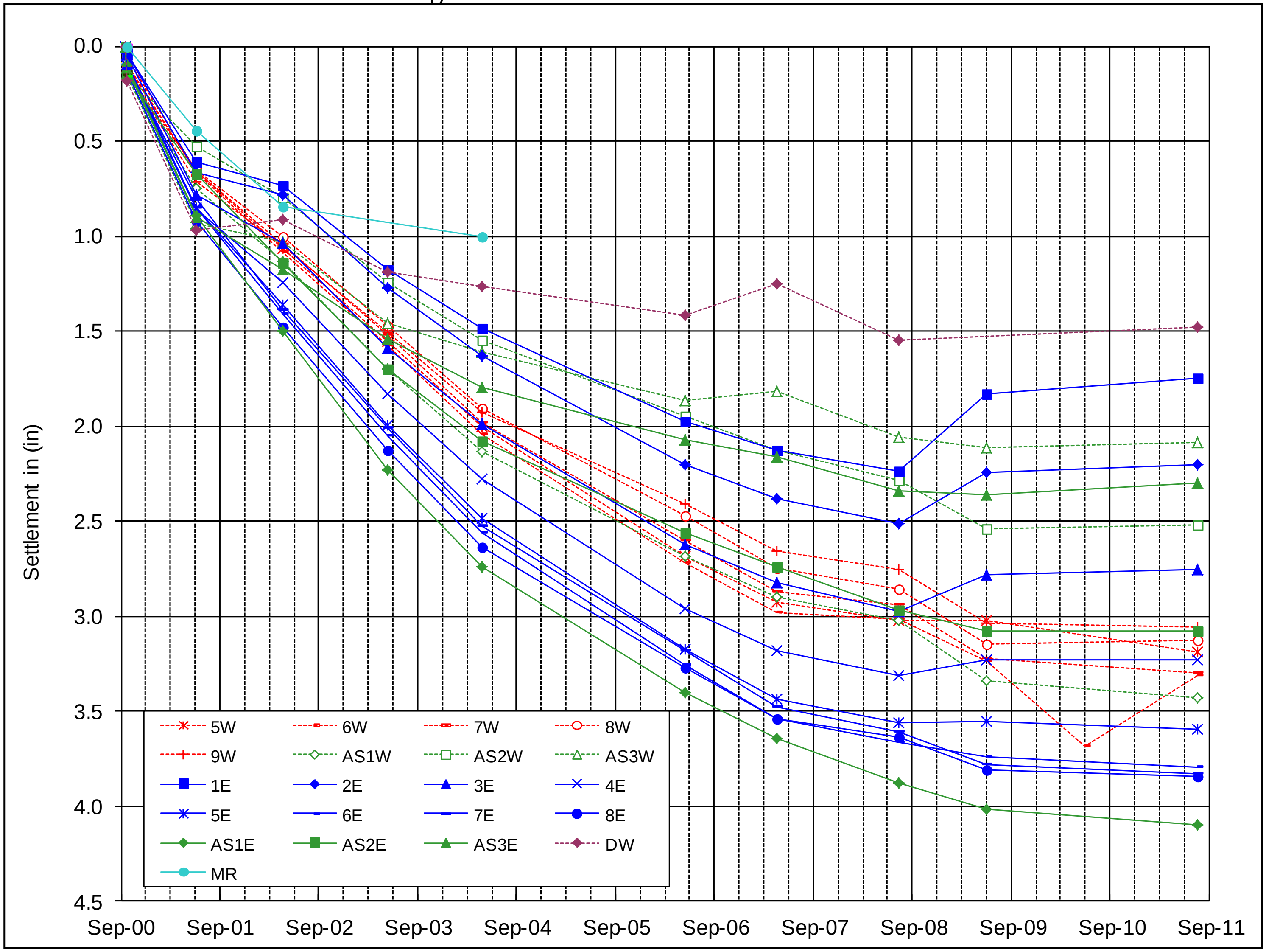

Table A43. 4th South – Settlement Points (in mm)

Date	5W	6W	7W	8W	9W	1E	2E	3E
10/12/2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10/17/2000	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0
7/2/2001	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.8
7/2/2001	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.8
5/15/2002	1.1	1.1	1.0	1.0	1.1	0.7	0.8	1.0
6/6/2003	1.6	1.6	1.5	1.5	1.5	1.2	1.3	1.6
5/17/2004	2.0	2.0	2.0	1.9	1.9	1.5	1.6	2.0
6/5/2006	2.7	2.7	2.6	2.5	2.4	2.0	2.2	2.6
5/8/2007	2.9	3.0	2.9	2.7	2.7	2.1	2.4	2.8
7/29/2008	3.0	3.0	2.9	2.9	2.8	2.2	2.5	3.0
6/15/2009	3.0	3.2	3.2	3.2	3.0	1.8	2.2	2.8
8/4/2011	3.2	3.3	3.3	3.1	3.1	1.7	2.2	2.8

Table A43 Continued. 4th South – Settlement Points (in mm)

Date	4E	5E	6E	7E	8E	AS1W	AS1E	AS2W
10/12/2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10/17/2000	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
7/2/2001	0.9	0.8	0.9	0.8	0.9	0.7	0.9	0.5
7/2/2001	0.9	0.8	0.9	0.8	0.9	0.7	0.9	0.5
5/15/2002	1.2	1.4	1.4	1.4	1.5	1.1	1.5	0.8
6/6/2003	1.8	2.0	2.1	2.0	2.1	1.7	2.2	1.2
5/17/2004	2.3	2.5	2.6	2.5	2.6	2.1	2.7	1.5
6/5/2006	3.0	3.2	3.3	3.2	3.3	2.7	3.4	1.9
5/8/2007	3.2	3.4	3.5	3.5	3.5	2.9	3.6	2.1
7/29/2008	3.3	3.6	3.7	3.6	3.6	3.0	3.9	2.3
6/15/2009	3.2	3.6	3.7	3.8	3.8	3.3	4.0	2.5
8/4/2011	3.2	3.6	3.8	3.8	3.8	3.4	4.1	2.5

Table A43 Continued. 4th South – Settlement Points (in mm)

Date	AS2E	AS3W	AS3E	DW	MR
10/12/2000	0.0	0.0	0.0	0.0	
10/17/2000	0.1	0.1	0.1	0.2	0.0
7/2/2001	0.7	0.9	0.9	1.0	0.4
7/2/2001	0.7	0.9	0.9	1.0	0.4
5/15/2002	1.1	1.0	1.2	0.9	0.8
6/6/2003	1.7	1.5	1.5	1.2	#N/A
5/17/2004	2.1	1.6	1.8	1.3	1.0
6/5/2006	2.6	1.9	2.1	1.4	#N/A
5/8/2007	2.7	1.8	2.2	1.3	#N/A
7/29/2008	3.0	2.1	2.3	1.5	#N/A
6/15/2009	3.1	2.1	2.4	#N/A	#N/A
8/4/2011	3.1	2.1	2.3	1.5	#N/A

Figure A44. 9th West – Magnet Extensometer

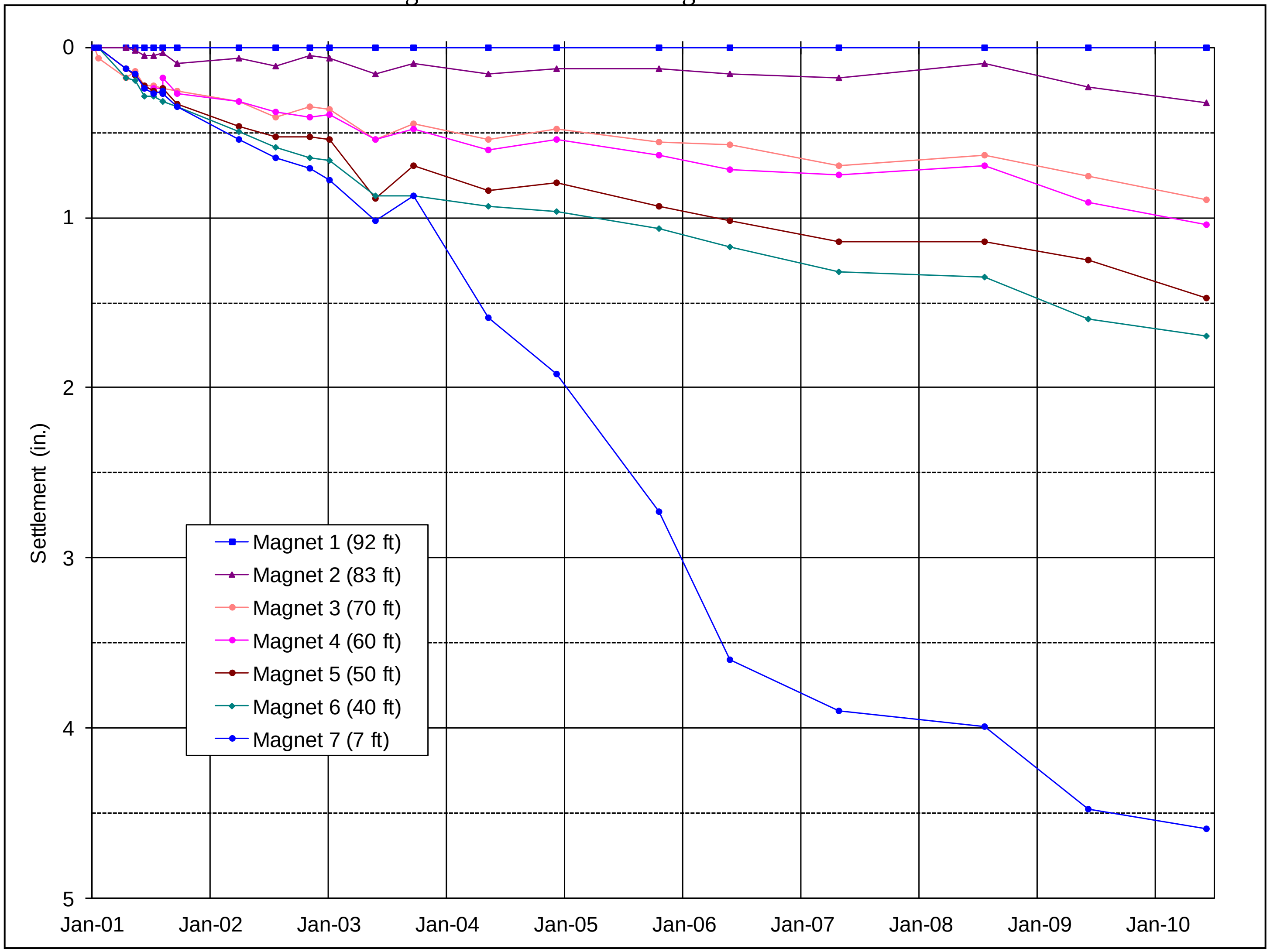

Table A44. 9th West – Magnet Extensometer (in inches)

Date	Bottom	Magnet 1 (92 ft)	Magnet 2 (83 ft)	Magnet 3 (70 ft)	Magnet 4 (60 ft)	Magnet 5 (50 ft)	Magnet 6 (40 ft)	Magnet 7 (7 ft)
01/17/01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
01/30/01	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00
04/24/01	0.00	0.00	0.00	0.18	0.12	0.12	0.18	0.12
05/23/01	0.00	0.00	0.01	0.14	0.15	0.16	0.19	0.15
06/19/01	0.00	0.00	0.04	0.23	0.24	0.22	0.28	0.24
07/19/01	0.00	0.00	0.04	0.22	0.24	0.25	0.28	0.27
08/14/01	0.00	0.00	0.03	0.24	0.24	0.27	0.31	0.25
08/14/01	0.00	0.00	0.03	0.24	0.18	0.24	0.31	0.27
10/01/01	0.00	0.00	0.09	0.26	0.27	0.33	0.34	0.34
04/08/02	0.00	0.00	0.06	0.32	0.31	0.46	0.49	0.54
08/01/02	0.00	0.00	0.10	0.40	0.37	0.52	0.58	0.64
11/15/02	0.00	0.00	0.04	0.35	0.40	0.52	0.64	0.70
01/14/03	0.00	0.00	0.06	0.36	0.39	0.54	0.66	0.78
06/06/03	0.00	0.00	0.15	0.54	0.54	0.89	0.87	1.02
09/30/03	0.00	0.00	0.09	0.45	0.48	0.69	0.87	0.87
05/17/04	0.00	0.00	0.15	0.54	0.60	0.84	0.93	1.59
12/16/04	0.00	0.00	0.12	0.48	0.54	0.79	0.96	1.92
10/27/05	0.00	0.00	0.12	0.56	0.63	0.93	1.06	2.73
06/05/06	0.00	0.00	0.15	0.57	0.72	1.02	1.17	3.60
05/08/07	0.00	0.00	0.18	0.69	0.75	1.14	1.32	3.90
07/30/08	0.00	0.00	0.09	0.63	0.69	1.14	1.35	3.99
06/15/09	0.00	0.00	0.23	0.76	0.91	1.25	1.60	4.48
06/16/10	0.00	0.00	0.32	0.89	1.04	1.47	1.70	4.60

Figure A45. 9th West – Settlement Points

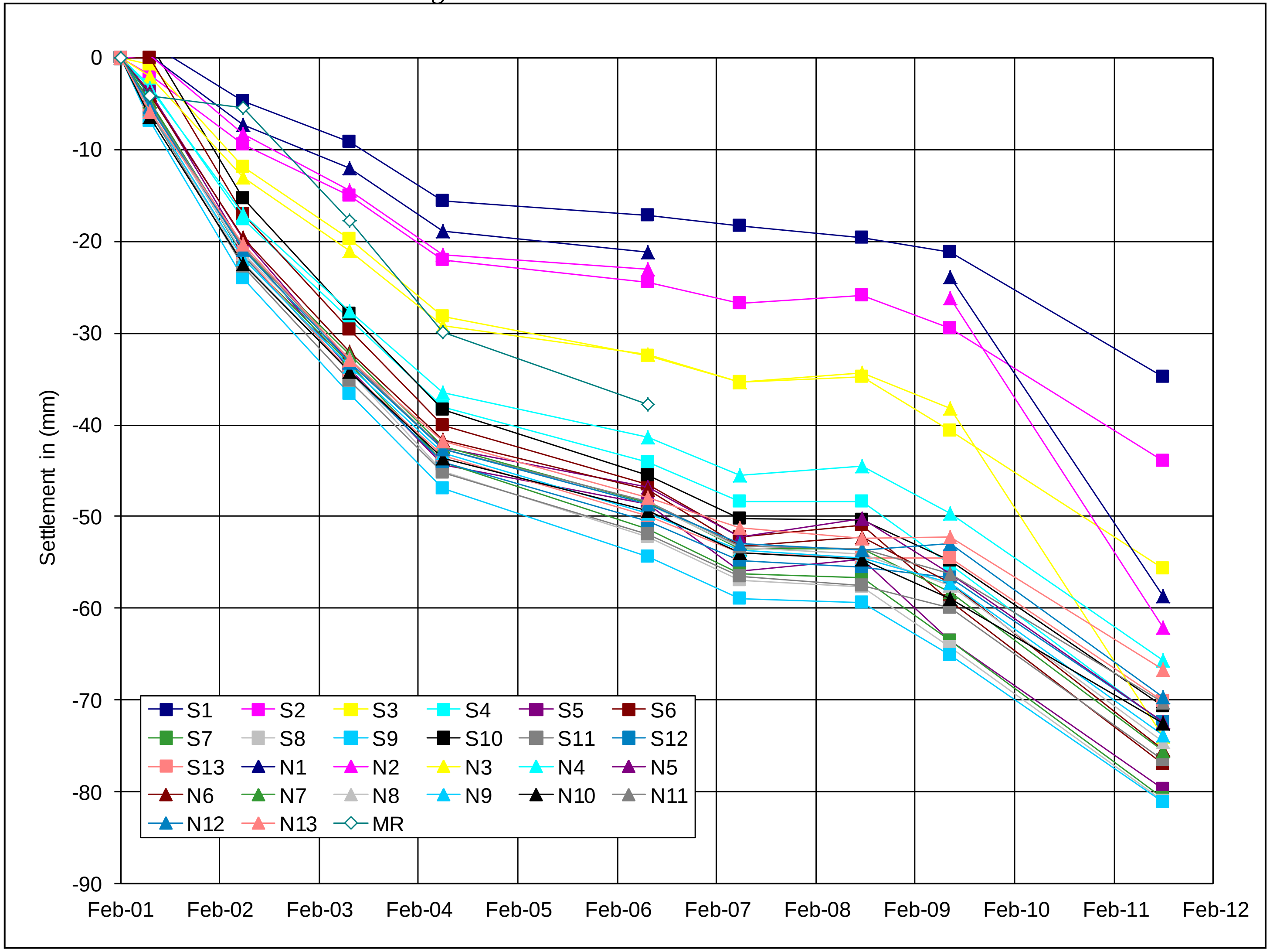

Table A45. 9th West – Settlement Points (in mm)

Date	S1	S2	S3	S4	S5	S6	S7	S8
2/20/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/7/2001	1.6	-1.8	-0.6	-3.0	-3.6	0.0	-4.6	-5.5
6/7/2001	1.6	-1.8	-0.6	-3.0	-3.6	0.0	-4.6	-5.5
5/14/2002	-4.6	-9.3	-11.8	-17.6	-20.6	-16.9	-21.5	-22.2
6/6/2003	-9.0	-15.0	-19.6	-28.4	-33.9	-29.6	-33.3	-34.2
5/17/2004	-15.6	-22.0	-28.1	-38.0	-44.4	-40.1	-44.1	-45.1
6/5/2006	-17.1	-24.5	-32.5	-44.1	-48.6	-46.5	-51.4	-52.2
5/8/2007	-18.3	-26.7	-35.4	-48.3	-56.0	-52.3	-56.2	-57.0
7/30/2008	-19.6	-25.9	-34.8	-48.3	-54.7	-50.9	-56.7	-57.7
6/15/2009	-21.1	-29.4	-40.7	-55.3	-63.5	-59.2	-63.6	-64.2
8/4/2011	-34.7	-43.9	-55.6	-72.6	-79.7	-76.9	-80.7	-81.0

Table A45 Continued. 9th West – Settlement Points (in mm)

Date	S1	S2	S3	S4	S5	S6	S7	S8
2/20/2001	S9	S10	S11	S12	S13	N1	N2	N3
6/7/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/7/2001	-6.8	1.7	-5.8	-5.0	-5.3	0.3	0.3	-2.0
5/14/2002	-6.8	1.7	-5.8	-5.0	-5.3	0.3	0.3	-2.0
6/6/2003	-24.0	-15.2	-22.7	-21.4	-21.2	-7.2	-8.2	-13.0
5/17/2004	-36.6	-27.9	-35.1	-34.1	-34.2	-12.0	-14.3	-20.9
6/5/2006	-47.0	-38.3	-45.2	-44.0	-43.4	-18.8	-21.5	-29.2
5/8/2007	-54.4	-45.5	-52.0	-50.5	-49.9	-21.2	-23.0	-32.3
7/30/2008	-59.0	-50.2	-56.6	-54.8	-54.0	N/A	N/A	-35.3
6/15/2009	-59.4	-50.4	-57.5	-55.5	-54.5	N/A	N/A	-34.3
8/4/2011	-65.1	-54.8	-59.9	-56.7	-54.5	-23.9	-26.2	-38.2

Table A45 Continued. 9th West – Settlement Points (in mm)

Date	N4	N5	N6	N7	N8	N9	N10	N11
2/20/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/7/2001	-3.2	-3.6	-3.9	-4.7	-5.2	-5.7	-6.4	-5.1
6/7/2001	-3.2	-3.6	-3.9	-4.7	-5.2	-5.7	-6.4	-5.1
5/14/2002	-16.9	-19.7	-19.5	-20.9	-21.2	-21.9	-22.4	-20.6
6/6/2003	-27.5	-33.1	-32.0	-32.3	-32.7	-33.6	-34.1	-32.8
5/17/2004	-36.5	-42.5	-41.7	-42.4	-42.6	-43.1	-43.7	-42.7
6/5/2006	-41.3	-46.8	-47.1	-48.5	-48.6	-49.6	-49.3	-48.4
5/8/2007	-45.5	-52.3	-53.2	-53.5	-53.4	-53.7	-54.0	-53.2
7/30/2008	-44.5	-50.2	-52.2	-53.5	-54.1	-54.5	-54.6	-53.5
6/15/2009	-49.7	-56.2	-57.3	-58.2	-57.6	-57.2	-59.0	-56.3
8/4/2011	-65.6	-72.4	-75.4	-75.5	-74.6	-73.8	-72.5	-70.3

Table A45 Continued. 9th West – Settlement Points (in mm)

Date	N12	N13	MR
2/20/2001	0.0	0.0	0.0
6/7/2001	-5.3	-5.8	-4.1
6/7/2001	-5.3	-5.8	-4.1
5/14/2002	-20.9	-20.3	-5.4
6/6/2003	-33.1	-32.8	-17.6
5/17/2004	-42.6	-41.8	-29.9
6/5/2006	-48.6	-47.9	-37.8
5/8/2007	-52.9	-51.3	
7/30/2008	-53.7	-52.3	
6/15/2009	-52.9	-52.3	
8/4/2011	-69.6	-66.6	

Figure A46. I-15 Median – Magnet Extensometer

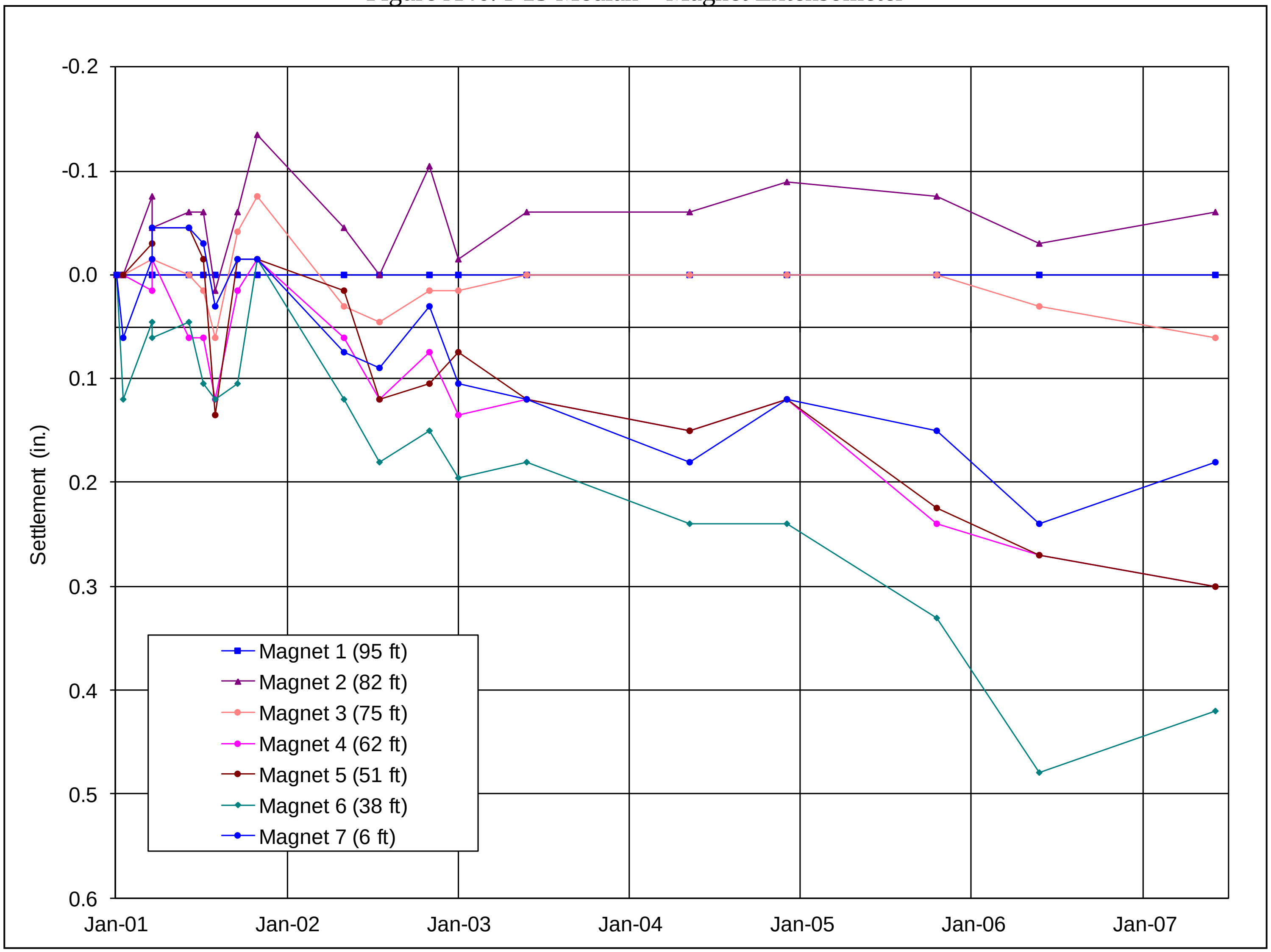

Table A46. I-15 Median – Magnet Extensometer (in inches)

Date	Bottom	Magnet 1 (95 ft)	Magnet 2 (82 ft)	Magnet 3 (75 ft)	Magnet 4 (62 ft)	Magnet 5 (51 ft)	Magnet 6 (38 ft)	Magnet 7 (6 ft)
01/17/01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
01/30/01	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.06
04/03/01	0.00	0.00	-0.07	-0.02	0.01	-0.03	0.04	-0.02
04/03/01	0.00	0.00	-0.04	-0.01	-0.02	-0.05	0.06	-0.05
06/19/01	0.00	0.00	-0.06	0.00	0.06	-0.05	0.04	-0.05
07/19/01	0.00	0.00	-0.06	0.01	0.06	-0.02	0.10	-0.03
08/14/01	0.00	0.00	0.01	0.06	0.12	0.13	0.12	0.03
10/01/01	0.00	0.00	-0.06	-0.04	0.01	-0.02	0.10	-0.02
11/12/01	0.00	0.00	-0.14	-0.08	-0.02	-0.02	-0.02	-0.02
05/15/02	0.00	0.00	-0.04	0.03	0.06	0.01	0.12	0.07
08/01/02	0.00	0.00	0.00	0.04	0.12	0.12	0.18	0.09
11/15/02	0.00	0.00	-0.10	0.01	0.07	0.10	0.15	0.03
01/14/03	0.00	0.00	-0.01	0.01	0.13	0.08	0.19	0.11
06/09/03	0.00	0.00	-0.06	0.00	0.12	0.12	0.18	0.12
05/24/04	0.00	0.00	-0.06	0.00	0.15	0.15	0.24	0.18
12/16/04	0.00	0.00	-0.09	0.00	0.12	0.12	0.24	0.12
11/01/05	0.00	0.00	-0.07	0.00	0.24	0.23	0.33	0.15
06/07/06	0.00	0.00	-0.03	0.03	0.27	0.27	0.48	0.24
06/19/07	0.00	0.00	-0.06	0.06	0.30	0.30	0.42	0.18

Figure A47. I-15 Median – Settlement Points

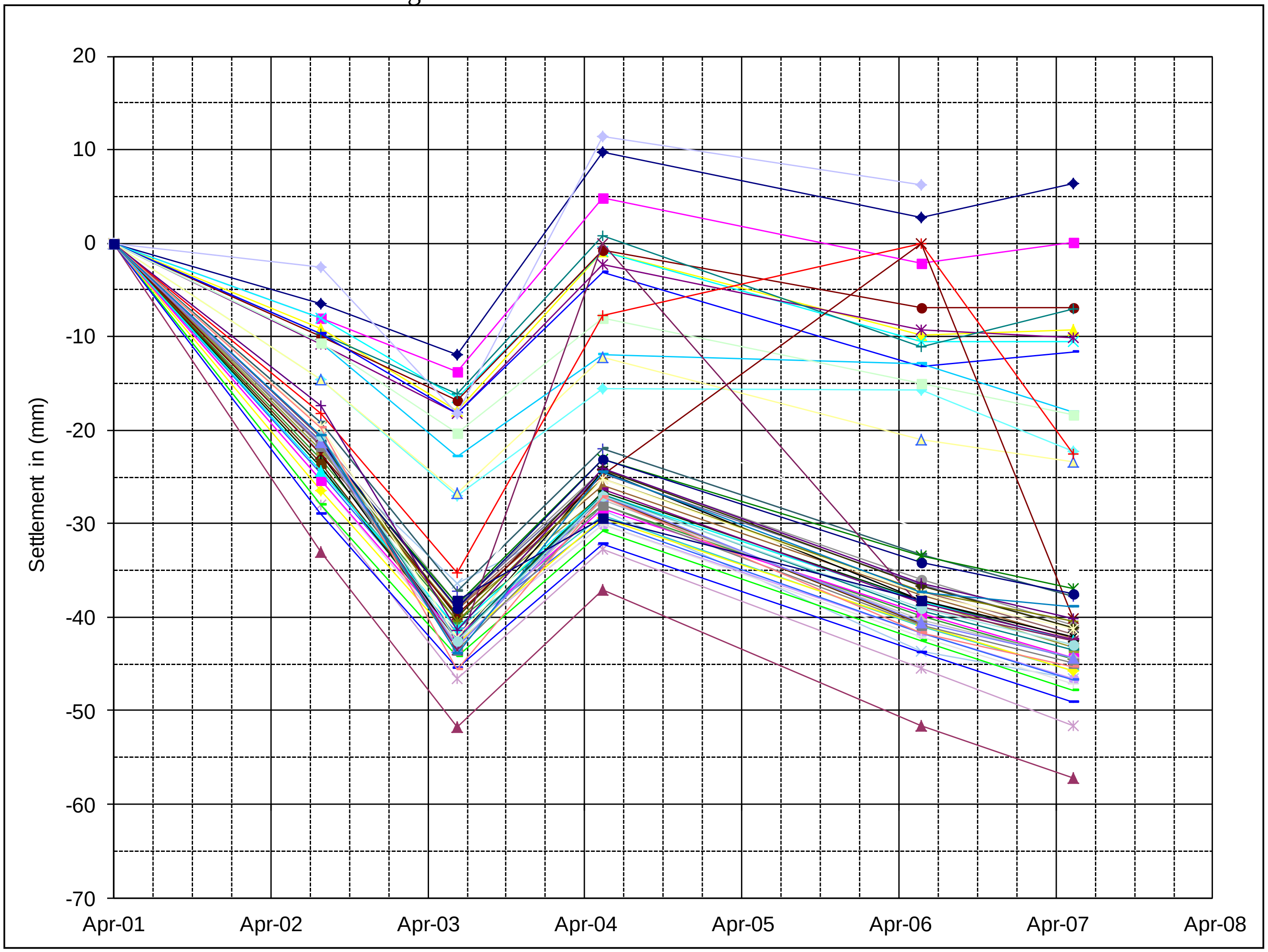

Table A47. I-15 Median – Settlement Points (in mm)

Date	NE1	NE2	NE3	NE4	NE5	NE6	W1	W2
4/3/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/31/2002	-6.4	-8.0	-9.1	-8.0	-10.8	-10.0	-9.6	-9.7
6/16/2003	-12.0	-13.7	-17.9	-16.5	-18.2	-16.9	-16.2	-18.2
5/24/2004	9.7	4.8	-0.9	-0.9	-2.2	-0.7	0.8	-3.2
6/7/2006	2.8	-2.2	-9.8	-10.5	-9.3	-6.8	-11.1	-13.2
5/31/2007	6.4	0.0	-9.2	-10.5	-10.1	-6.9	-7.0	-11.6

Table A47 Continued. I-15 Median – Settlement Points (in mm)

Date	W3	W4	W5	W6	W7	W8	W9	W10
4/3/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/31/2002	-10.7	-14.6	-10.6	-14.6	-22.5	-28.0	-25.4	-25.3
6/16/2003	-22.9	-27.1	-20.3	-26.8	-36.4	-46.5	-42.7	-42.6
5/24/2004	-12.0	-15.6	-8.0	-12.2	-28.5	-32.7	-30.2	-30.2
6/7/2006	-12.9	-15.6	-14.9	-21.0	-43.7	-45.5	-41.8	-42.1
5/31/2007	-18.1	-22.3	-18.4	-23.4	-46.6	-51.7	-46.6	-47.2

Table A47 Continued. I-15 Median – Settlement Points (in mm)

Date	W11	W12	W13	W14	W15	W16	W17	W18
4/3/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/31/2002	-24.6	-24.0	-23.1	-22.2	-21.3	-21.1	-21.1	-20.9
6/16/2003	-41.8	-41.3	-40.5	-39.7	-39.2	-39.1	-38.8	-38.7
5/24/2004	-29.7	-29.1	-28.0	-26.9	-26.0	-25.2	-24.7	-24.3
6/7/2006	-41.7	-41.0	-39.9	-38.4	-37.7	-37.2	-36.6	-36.0
5/31/2007	-46.8	-45.8	-44.5	-43.2	-42.2	-41.9	-41.1	-40.9

Table A47 Continued. I-15 Median – Settlement Points (in mm)

Date	W19	W20	W21	W22	W23	W24	W26	W27
4/3/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/31/2002	-20.8	-19.2	-23.9	-21.1	-23.5	-33.0	-22.6	-21.0
6/16/2003	-39.0	-37.2	-42.4	-40.0	-42.4	-51.8	-42.5	-38.8
5/24/2004	-23.8	-22.0	-26.6	-24.3	-27.2	-37.1	-24.4	-18.0
6/7/2006	-35.5	-33.3	-38.2	-36.7	-40.8	-51.6	-38.2	-30.7
5/31/2007	-39.6	-37.8	-42.5	-41.1	N/A	-57.2	-42.1	-34.9

Table A47 Continued. I-15 Median – Settlement Points (in mm)

Date	W28	SE1	SE2	SE3	SE4	SE5	SE6	SE7
4/3/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/31/2002	-18.2	-28.0	-29.0	-26.4	-25.4	-24.4	-22.6	-21.6
6/16/2003	-35.3	-44.3	-45.5	-42.9	-42.1	-41.2	-39.8	-38.7
5/24/2004	-7.8	-30.9	-32.2	-29.4	-28.5	-26.9	-24.8	-23.1
6/7/2006	N/A	-42.6	-43.8	-40.9	-39.7	-38.4	N/A	-33.5
5/31/2007	-22.5	-47.8	-49.1	-45.7	-44.3	-42.6	-40.1	-36.9

Table A47 Continued. I-15 Median – Settlement Points (in mm)

Date	SE8	SE9	SE10	SE11	SE12	SE13	SE14	SE15
4/3/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/31/2002	-21.3	-21.7	-21.6	-21.3	-21.5	-21.7	-21.3	-20.7
6/16/2003	-39.1	-40.5	N/A	-42.4	-43.1	-43.6	-43.3	-43.6
5/24/2004	-23.2	-25.3	-26.4	-26.9	-27.5	-28.1	-27.1	N/A
6/7/2006	-34.2	-37.2	-38.5	-39.3	-40.4	-40.9	-40.6	-38.9
5/31/2007	-37.5	-40.5	-42.4	-43.5	-44.3	-44.9	-44.3	-42.6

Table A47 Continued. I-15 Median – Settlement Points (in mm)

Date	SE16	SE17	SE18	SE19	SE20	SE21	MR
4/3/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/31/2002	-19.6	-20.6	-17.4	-19.7	-20.6	-2.6	N/A
6/16/2003	-42.1	-42.6	-41.5	-45.6	-43.9	-18.2	-38.3
5/24/2004	-25.2	-27.1	-24.1	-27.2	-24.4	11.4	-29.3
6/7/2006	-37.6	-39.1	-36.5	-41.7	-37.3	6.3	-38.2
5/31/2007	-41.3	-43.0	-40.2	-45.3	-38.9	N/A	N/A

Figure A48. I-15 Merger – Magnet Extensometer

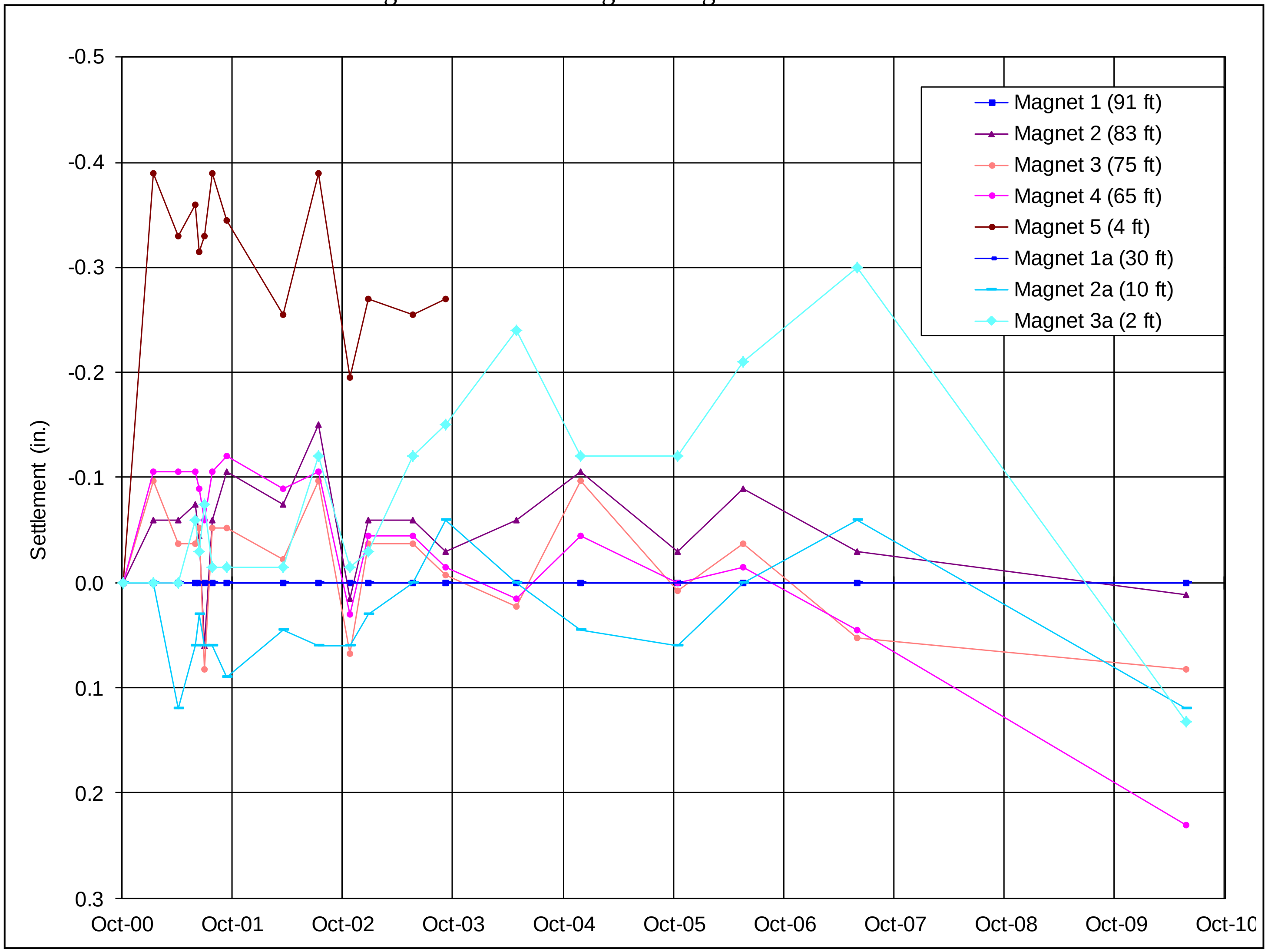

Table A48. I-15 Merger – Magnet Extensometer (in inches)

Date	Bottom	Magnet 1 (91 ft)	Magnet 2 (83 ft)	Magnet 3 (75 ft)	Magnet 4 (65 ft)	Magnet 5 (4 ft)	Bottom 2 (32 ft)	Magnet 1a (30 ft)	Magnet 2a (10 ft)	Magnet 3a (2 ft)
10/24/2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1/30/2001	0.00	0.00	-0.06	-0.10	-0.10	-0.39	0.00	0.00	0.00	0.00
4/24/2001	0.06	0.00	-0.06	-0.04	-0.10	-0.33	0.24	0.00	0.12	0.00
6/19/2001	0.36	0.00	-0.07	-0.04	-0.10	-0.36	0.30	0.00	0.06	-0.06
7/3/2001	0.30	0.00	-0.04	-0.05	-0.09	-0.31	0.24	0.00	0.03	-0.03
07/19/01	0.30	0.00	0.06	0.08	-0.06	-0.33	0.39	0.00	0.06	-0.08
08/14/01	0.30	0.00	-0.06	-0.05	-0.10	-0.39	0.24	0.00	0.06	-0.02
10/01/01	0.42	0.00	-0.10	-0.05	-0.12	-0.34	0.24	0.00	0.09	-0.02
04/08/02	0.24	0.00	-0.07	-0.02	-0.09	-0.25	0.24	0.00	0.04	-0.02
08/01/02	0.30	0.00	-0.15	-0.10	-0.10	-0.39	0.36	0.00	0.06	-0.12
11/15/02	0.27	0.00	0.02	0.07	0.03	-0.19	0.36	0.00	0.06	-0.01
01/14/03	0.24	0.00	-0.06	-0.04	-0.04	-0.27	0.36	0.00	0.03	-0.03
06/09/03	0.24	0.00	-0.06	-0.04	-0.04	-0.25	0.42	0.00	0.00	-0.12
09/25/03	0.42	0.00	-0.03	-0.01	-0.01	-0.27	0.84	0.00	-0.06	-0.15
05/17/04	0.30	0.00	-0.06	0.02	0.02	N/A	0.42	0.00	0.00	-0.24
12/16/04	N/A	0.00	-0.10	-0.10	-0.04	N/A	0.36	0.00	0.04	-0.12
11/01/05	N/A	0.00	-0.03	0.01	0.00	N/A	0.54	0.00	0.06	-0.12
06/07/06	N/A	0.00	-0.09	-0.04	-0.01	N/A	0.54	0.00	0.00	-0.21
06/19/07	N/A	0.00	-0.03	0.05	0.05	N/A	0.54	0.00	-0.06	-0.30
06/16/10	N/A	0.00	0.01	0.08	0.23	N/A	-0.53	0.00	0.12	0.13

Figure A49. I-15 Merger – Settlement Points

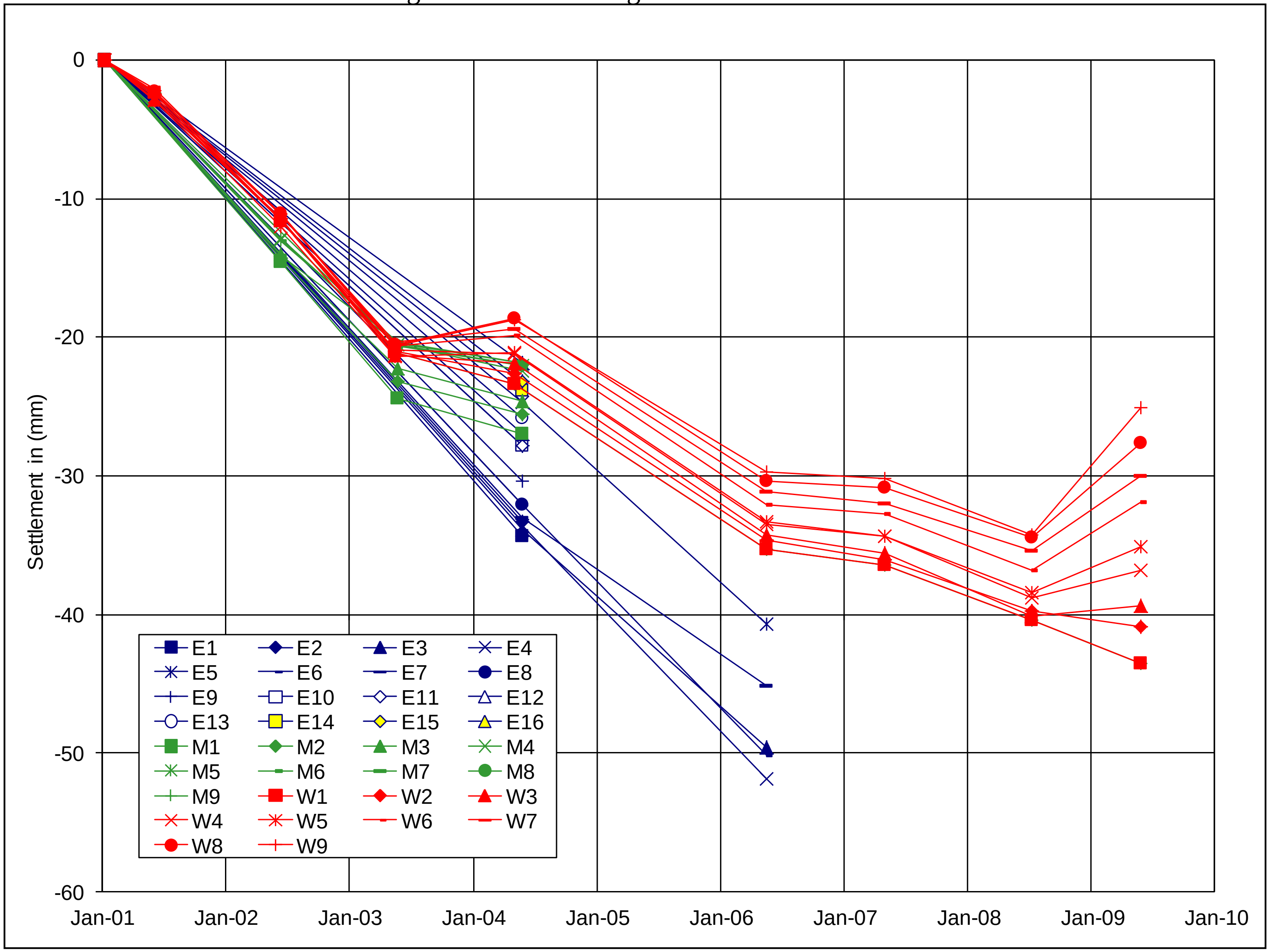

Table A49. I-15 Merger – Settlement Points (in mm)

Date	E1	E2	E3	E4	E5	E6	E7	E8
2/6/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/19/2004	-34.4	-33.4	-33.9	-33.6	-24.7	-32.1	-33.1	-32.1
6/7/2006	#N/A	#N/A	-49.6	-51.8	-40.7	-50.1	-45.1	#N/A

Table A49 Continued. I-15 Merger – Settlement Points (in mm)

Date	E9	E10	E11	E12	E13	E14	E15	E16
2/6/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/19/2004	-30.4	-27.9	-27.9	-27.0	-25.9	-23.9	-23.2	-21.9

Table A49 Continued. I-15 Merger – Settlement Points (in mm)

Date	M1	M2	M3	M4	M5	M6	M7	M8	M9
2/6/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/10/2002	-14.6	-14.3	-14.0	-12.9	-13.0	-13.1	-14.1	#N/A	#N/A
6/17/2003	-24.4	-23.2	-22.2	-20.5	-20.5	-20.3	-20.4	-20.6	-21.1
6/19/2004	-27.0	-25.6	-24.6	-22.5	-22.1	-21.9	-21.9	-22.1	-21.5

Table A49 Continued. I-15 Merger – Settlement Points (in mm)

Date	W1	W2	W3	W4	W5	W6	W7	W8	W9
2/6/2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/3/2001	-2.3	-2.4	-2.8	-2.6	-2.9	-2.4	-2.1	-2.2	-2.6
7/10/2002	-11.6	-11.5	-11.6	-11.6	-12.0	-11.2	-11.2	-11.1	-11.6
6/11/2003	-21.1	-21.0	-21.2	-20.9	-21.3	-20.6	-20.3	-20.5	-20.6
5/26/2004	-23.4	-22.6	-21.9	-21.2	-21.1	-19.9	-19.4	-18.7	-18.8
6/7/2006	-35.3	-34.6	-34.2	-33.5	-33.3	-32.0	-31.1	-30.3	-29.7
5/24/2007	-36.5	-36.1	-35.6	-34.4	-34.4	-32.8	-32.0	-30.9	-30.2
7/30/2008	-40.4	-39.8	-40.1	-38.8	-38.4	-36.8	-35.4	-34.4	-34.3
6/15/2009	-43.5	-40.9	-39.3	-36.8	-35.1	-31.9	-30.0	-27.6	-25.0

Table A49 Continued. I-15 Merger – Settlement Points (in mm)

Date	MRS	MRN
2/6/2001	0.0	0.0
7/3/2001	0.0	0.0
6/17/2003	-20.0	-17.6
5/26/2004	-22.8	-22.2
6/7/2006	-36.0	-35.6

Figure A50. Provo – Inclinometer North

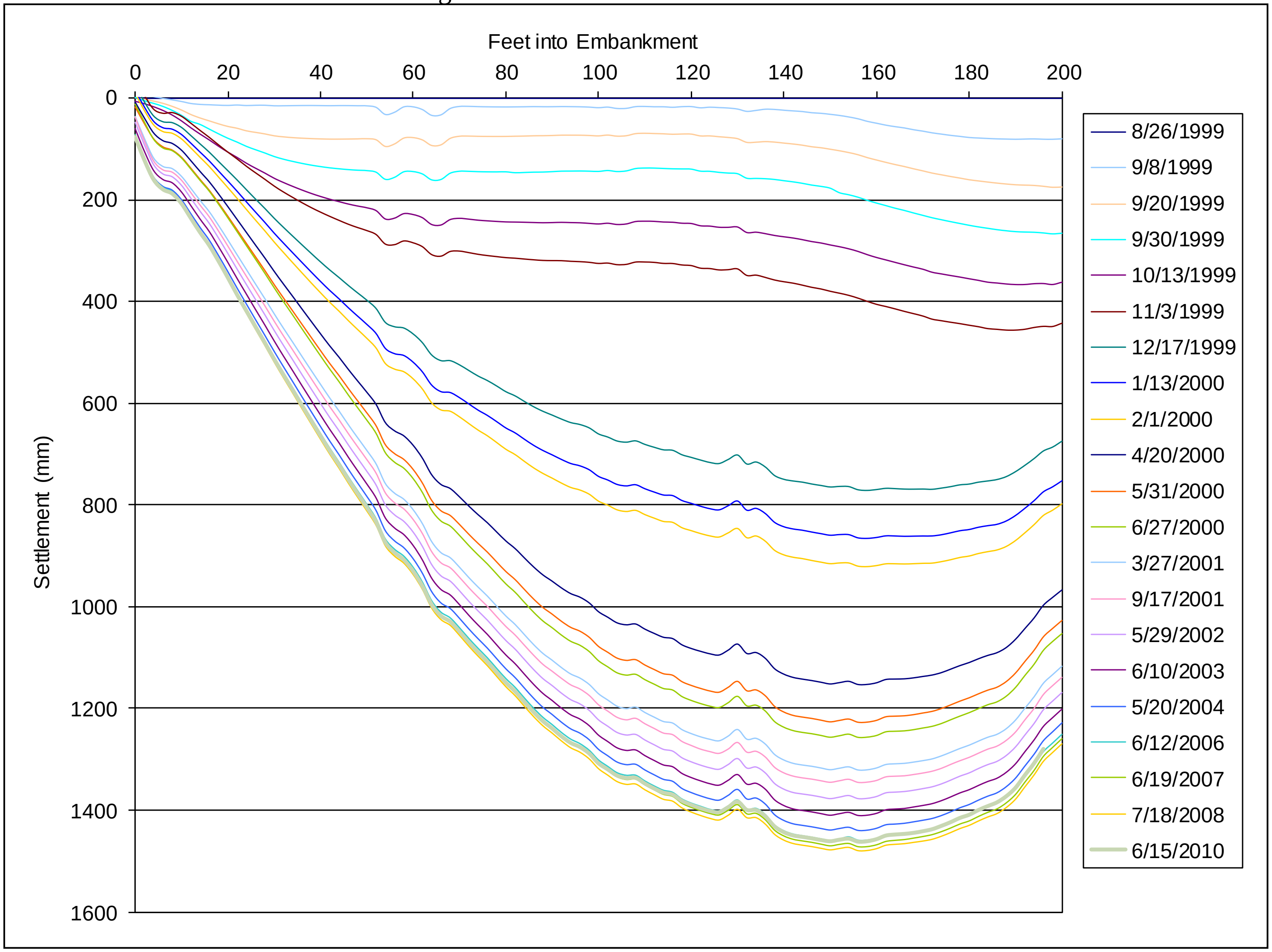

Table A50. Provo – Inclinometer North (in mm)

Depth (ft)	8/26/1999	9/8/1999	9/20/1999	9/30/1999	10/13/1999	11/3/1999	12/17/1999	1/13/2000	2/1/2000
0	0	-5	-1	-2	6	-37	-26	-16	-10
2	0	-4	2	5	11	-6	7	17	24
4	0	-3	5	10	17	21	35	45	52
6	0	0	10	16	24	29	46	58	65
8	0	3	16	24	33	28	48	61	69
10	0	6	23	33	44	35	57	71	80
12	0	10	32	45	58	49	73	88	97
14	0	12	39	51	70	63	90	106	116
16	0	13	44	61	82	77	106	123	134
18	0	13	50	70	94	92	124	143	155
20	0	14	55	78	106	106	142	163	176
22	0	13	59	86	116	119	160	183	197
24	0	14	64	94	128	134	180	204	218
26	0	14	67	101	137	147	198	224	240
28	0	14	70	107	147	159	217	244	261
30	0	15	74	114	157	172	236	265	283
32	0	15	76	120	165	184	254	285	303
34	0	14	77	124	173	195	271	304	323
36	0	14	78	128	180	205	288	323	343
38	0	14	79	131	187	215	305	342	363
40	0	14	80	134	193	224	322	360	382
42	0	14	80	137	198	232	338	378	401
44	0	14	80	138	203	240	352	394	419
46	0	14	80	140	208	248	368	412	437
48	0	14	80	141	212	254	383	428	455
50	0	15	79	142	215	260	397	445	472
52	0	18	81	145	221	268	413	463	491
54	0	32	95	159	237	287	441	492	522
56	0	27	90	155	235	288	449	502	533
58	0	17	78	144	227	280	452	506	538
60	0	17	77	144	229	284	463	519	552
62	0	22	82	149	235	292	481	538	572
64	0	33	93	160	248	307	505	564	599
66	0	32	91	159	249	310	516	577	613
68	0	20	79	147	238	301	516	579	615
70	0	16	74	143	236	300	524	589	627
72	0	16	74	143	238	303	535	601	640
74	0	16	75	144	240	307	546	613	652
76	0	17	75	145	241	309	555	624	664
78	0	17	75	145	242	311	566	636	677
80	0	17	75	144	243	313	577	648	690
82	0	17	74	146	243	314	585	658	701
84	0	17	74	146	244	316	596	670	714
86	0	16	74	145	244	318	607	682	727
88	0	16	73	145	245	319	615	693	738
90	0	16	73	144	244	319	623	701	747
92	0	16	72	143	244	319	631	710	757
94	0	16	72	143	244	320	638	718	765
96	0	17	72	143	245	321	642	723	770
98	0	17	73	143	246	322	648	731	779
100	0	18	74	144	247	325	660	744	792

Table A50 Continued. Provo – Inclinometer North (in mm)

Depth (ft)	8/26/1999	9/8/1999	9/20/1999	9/30/1999	10/13/1999	11/3/1999	12/17/1999	1/13/2000	2/1/2000
102	0	17	72	142	246	324	666	751	800
104	0	20	74	144	248	327	674	759	809
106	0	20	73	143	247	326	676	762	813
108	0	16	69	138	242	322	674	760	810
110	0	16	69	137	242	322	681	768	819
112	0	17	69	137	242	323	686	774	826
114	0	17	70	138	243	325	691	780	832
116	0	18	71	139	244	325	692	781	834
118	0	16	70	139	246	328	701	791	844
120	0	16	70	139	246	329	706	797	850
122	0	19	74	143	251	334	711	802	856
124	0	17	74	143	251	335	716	807	860
126	0	18	75	146	254	337	718	809	863
128	0	19	77	147	254	337	710	801	854
130	0	21	79	148	253	335	701	792	846
132	0	26	87	157	264	348	719	810	864
134	0	24	86	157	263	348	715	806	861
136	0	21	85	158	266	352	725	817	871
138	0	22	86	160	270	357	742	834	889
140	0	23	88	162	272	361	749	843	898
142	0	25	90	164	275	363	753	847	903
144	0	26	92	167	278	367	755	849	905
146	0	28	95	171	282	372	758	853	909
148	0	29	97	173	284	375	761	856	912
150	0	31	100	177	288	379	764	859	915
152	0	34	103	186	292	383	763	858	914
154	0	37	107	190	296	387	764	858	914
156	0	40	111	194	301	393	770	864	920
158	0	45	117	201	307	399	771	865	921
160	0	49	121	206	313	405	769	864	919
162	0	53	126	211	318	409	767	860	915
164	0	56	130	216	323	414	768	861	915
166	0	58	134	220	327	419	768	861	916
168	0	62	139	225	332	423	769	861	915
170	0	64	143	230	336	428	768	861	914
172	0	68	147	235	342	434	769	861	914
174	0	70	150	239	345	437	767	858	911
176	0	73	154	243	348	440	764	854	907
178	0	75	157	246	352	443	760	850	903
180	0	77	160	250	355	446	759	848	900
182	0	78	162	253	358	449	755	844	895
184	0	79	165	256	362	453	753	840	892
186	0	80	167	258	363	454	750	838	888
188	0	80	168	260	365	456	744	831	881
190	0	80	170	262	366	456	734	820	870
192	0	80	171	263	366	454	722	806	855
194	0	80	171	263	365	451	708	791	838
196	0	80	173	265	364	448	694	774	820
198	0	80	175	266	366	449	686	764	810
200	0	80	174	265	362	442	674	752	797

Table A50 Continued. Provo – Inclinometer North (in mm)

Depth (ft)	4/20/2000	5/31/2000	6/27/2000	3/27/2001	9/17/2001	5/29/2002	6/10/2003	5/20/2004	6/12/2006
0	7	17	11	36	37	47	60	71	71
2	39	50	47	79	84	91	104	117	117
4	68	80	81	118	123	131	142	155	156
6	83	95	98	134	141	149	160	173	175
8	89	102	103	138	145	154	166	181	183
10	102	116	117	153	161	171	184	199	203
12	122	137	139	177	185	196	211	227	232
14	144	159	161	201	210	222	237	254	260
16	164	181	183	223	233	246	262	279	286
18	188	206	208	250	261	275	292	309	317
20	213	232	235	279	291	305	323	341	349
22	238	259	262	308	320	336	354	373	382
24	264	285	290	337	350	366	385	404	414
26	289	312	317	366	379	396	416	436	446
28	314	339	344	394	408	426	446	466	477
30	340	366	372	424	438	456	477	498	509
32	365	393	400	452	467	486	507	528	539
34	390	418	426	480	495	514	536	557	569
36	414	444	453	508	523	543	565	587	599
38	439	470	480	535	551	572	594	616	629
40	463	496	506	562	579	600	623	645	659
42	487	522	533	589	606	628	651	674	688
44	509	545	557	615	632	654	678	701	715
46	533	571	583	642	659	682	706	729	744
48	556	595	608	667	685	708	732	756	772
50	578	619	633	693	710	734	758	783	798
52	602	644	659	719	737	761	786	811	827
54	638	681	697	758	776	800	825	851	867
56	654	699	716	777	796	819	845	871	887
58	664	710	728	789	808	832	858	884	901
60	682	730	748	809	828	853	880	906	923
62	708	757	775	837	856	881	908	934	952
64	740	791	810	872	892	917	944	970	988
66	759	811	831	894	914	939	966	992	1011
68	767	820	841	904	923	950	977	1003	1022
70	784	838	860	922	942	969	996	1023	1041
72	802	857	879	942	962	989	1017	1043	1062
74	819	875	898	961	981	1008	1036	1063	1082
76	835	892	916	979	999	1026	1054	1081	1100
78	853	912	936	999	1019	1047	1075	1102	1121
80	871	931	955	1018	1039	1066	1095	1122	1141
82	886	947	971	1035	1056	1083	1112	1139	1158
84	904	966	991	1055	1076	1104	1133	1160	1179
86	922	985	1011	1074	1095	1124	1153	1180	1199
88	937	1001	1028	1092	1113	1141	1170	1198	1217
90	950	1015	1041	1105	1127	1155	1184	1212	1232
92	963	1029	1056	1120	1141	1170	1199	1227	1247
94	974	1040	1068	1132	1154	1183	1212	1240	1260
96	981	1048	1076	1140	1162	1191	1221	1249	1269
98	992	1060	1088	1153	1174	1204	1234	1262	1282
100	1010	1078	1106	1171	1193	1222	1253	1280	1301

Table A50 Continued. Provo – Inclinometer North (in mm)

Depth (ft)	4/20/2000	5/31/2000	6/27/2000	3/27/2001	9/17/2001	5/29/2002	6/10/2003	5/20/2004	6/12/2006
102	1021	1090	1118	1183	1205	1235	1265	1293	1314
104	1032	1101	1130	1195	1217	1247	1277	1305	1326
106	1035	1105	1134	1200	1222	1252	1282	1310	1331
108	1034	1104	1133	1197	1219	1251	1282	1310	1331
110	1044	1114	1143	1208	1230	1262	1293	1321	1343
112	1052	1123	1152	1217	1239	1271	1302	1330	1352
114	1060	1132	1161	1226	1248	1280	1311	1339	1361
116	1063	1135	1164	1229	1252	1284	1315	1343	1365
118	1075	1147	1176	1242	1265	1297	1328	1357	1378
120	1082	1155	1184	1249	1273	1305	1336	1365	1386
122	1088	1160	1190	1256	1280	1311	1342	1372	1392
124	1092	1165	1195	1261	1285	1317	1348	1377	1398
126	1095	1168	1198	1264	1288	1319	1351	1380	1401
128	1085	1158	1188	1254	1280	1310	1341	1371	1391
130	1073	1147	1176	1241	1267	1298	1330	1359	1380
132	1092	1165	1195	1260	1286	1317	1349	1378	1398
134	1090	1163	1194	1259	1284	1315	1347	1376	1396
136	1101	1175	1205	1270	1296	1327	1359	1388	1409
138	1122	1196	1226	1290	1316	1348	1380	1409	1429
140	1133	1207	1237	1301	1327	1359	1391	1420	1440
142	1139	1214	1243	1308	1333	1365	1397	1427	1447
144	1142	1217	1247	1311	1336	1368	1401	1430	1450
146	1145	1220	1250	1314	1339	1371	1403	1433	1453
148	1148	1223	1253	1317	1342	1374	1407	1436	1456
150	1152	1226	1256	1320	1345	1377	1410	1439	1459
152	1149	1223	1254	1317	1342	1374	1407	1436	1456
154	1147	1221	1251	1315	1339	1371	1404	1434	1452
156	1153	1227	1257	1321	1345	1377	1410	1440	1459
158	1153	1227	1256	1321	1345	1377	1410	1439	1459
160	1149	1223	1253	1317	1341	1373	1406	1436	1455
162	1143	1216	1246	1310	1334	1366	1399	1429	1449
164	1142	1215	1245	1309	1333	1364	1398	1427	1447
166	1142	1214	1244	1308	1332	1363	1397	1426	1446
168	1140	1212	1242	1305	1330	1361	1394	1423	1443
170	1137	1209	1238	1303	1327	1358	1391	1420	1441
172	1134	1206	1235	1299	1323	1354	1387	1416	1437
174	1129	1200	1230	1293	1318	1348	1381	1410	1432
176	1123	1193	1222	1286	1310	1341	1374	1403	1424
178	1116	1185	1215	1279	1303	1333	1366	1395	1417
180	1110	1179	1208	1272	1296	1327	1360	1389	1410
182	1102	1171	1200	1264	1288	1318	1351	1380	1401
184	1096	1164	1193	1257	1280	1310	1344	1372	1393
186	1090	1158	1187	1251	1274	1304	1337	1366	1386
188	1080	1147	1176	1240	1263	1292	1325	1354	1374
190	1064	1130	1158	1223	1246	1275	1309	1337	1358
192	1043	1108	1135	1200	1222	1252	1285	1313	1334
194	1022	1085	1113	1177	1200	1229	1262	1290	1311
196	997	1059	1086	1150	1173	1202	1235	1263	1285
198	981	1042	1068	1133	1155	1185	1218	1246	1268
200	967	1027	1053	1117	1139	1169	1201	1228	1251

Table A50 Continued. Provo – Inclinometer North (in mm)

Depth (ft)	6/19/2007	7/18/2008	6/15/2010
0	73	75	76
2	119	121	122
4	158	160	160
6	177	179	179
8	186	188	187
10	206	209	207
12	234	238	235
14	263	266	264
16	289	293	289
18	320	324	320
20	353	357	353
22	386	391	386
24	418	423	418
26	450	455	450
28	482	486	481
30	514	519	513
32	545	550	544
34	574	580	574
36	605	610	604
38	635	640	634
40	665	670	664
42	694	700	693
44	721	727	721
46	750	757	750
48	778	784	777
50	805	811	804
52	833	840	833
54	874	880	873
56	894	901	894
58	908	914	908
60	930	937	930
62	959	966	959
64	996	1003	996
66	1018	1025	1018
68	1029	1036	1029
70	1049	1056	1049
72	1070	1077	1070
74	1089	1097	1089
76	1108	1116	1108
78	1129	1137	1129
80	1149	1157	1149
82	1167	1175	1166
84	1187	1196	1187
86	1208	1216	1207
88	1226	1234	1225
90	1240	1248	1239
92	1255	1264	1255
94	1268	1277	1268
96	1277	1286	1276
98	1290	1299	1289
100	1309	1318	1308
102	1322	1331	1320
104	1334	1344	1332
106	1340	1349	1337
108	1339	1349	1336
110	1350	1360	1348
112	1360	1369	1357
114	1369	1379	1365
116	1373	1382	1369
118	1386	1395	1382
120	1394	1404	1390
122	1401	1410	1396
124	1406	1416	1402
126	1409	1419	1404
128	1400	1410	1394
130	1389	1398	1383
132	1407	1415	1399
134	1406	1415	1400
136	1419	1428	1412
138	1439	1448	1432
140	1451	1459	1443
142	1457	1466	1450
144	1460	1469	1453
146	1463	1472	1455
148	1467	1475	1459
150	1470	1478	1461
152	1467	1475	1458
154	1465	1473	1456
156	1472	1480	1462
158	1472	1479	1461
160	1468	1476	1457
162	1461	1469	1450
164	1459	1467	1448
166	1458	1466	1447
168	1455	1463	1445
170	1452	1461	1441
172	1448	1457	1437
174	1442	1451	1431
176	1435	1444	1423
178	1427	1436	1415
180	1421	1430	1409
182	1412	1421	1400
184	1404	1413	1392
186	1397	1407	1384
188	1385	1395	1372
190	1369	1378	1356
192	1345	1354	1331
194	1322	1331	1307
196	1294	1304	1279
198	1277	1286	N/A
200	1259	1269	N/A

Figure A51. Provo – Inclinometer South

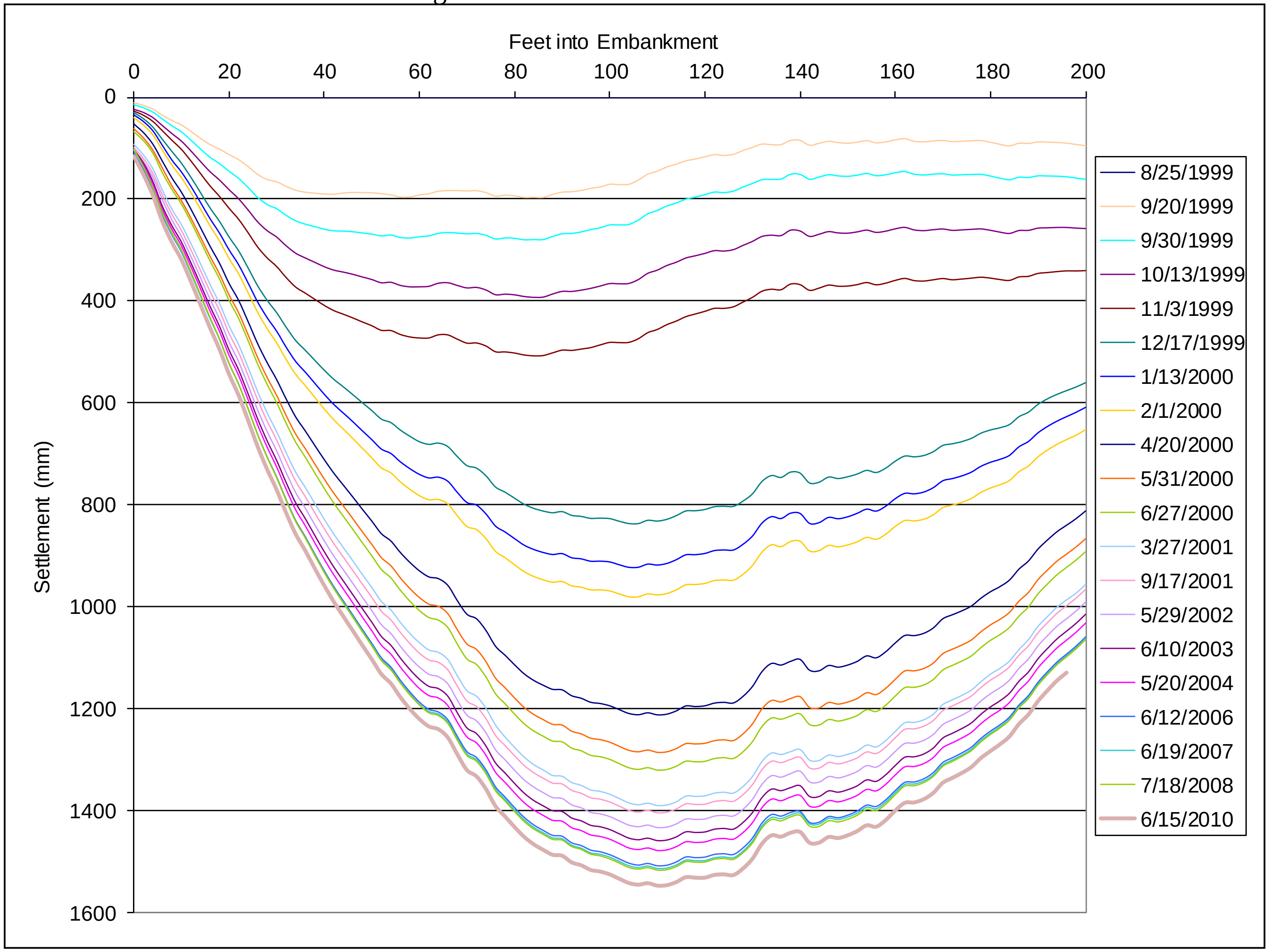

Table A51. Provo – Inclinometer South (in mm)

Depth (ft)	8/25/1999	9/20/1999	9/30/1999	10/13/1999	11/3/1999	12/17/1999	1/13/2000	2/1/2000	4/20/2000
0	0	11	15	24	27	30	35	40	53
2	0	16	21	30	36	42	48	55	70
4	0	24	29	40	48	59	66	74	93
6	0	35	43	56	66	83	95	104	126
8	0	46	56	72	85	107	124	134	159
10	0	55	68	86	103	130	147	158	187
12	0	67	85	106	125	158	176	188	220
14	0	81	102	126	150	187	207	220	256
16	0	93	118	146	174	217	239	253	293
18	0	102	131	163	195	244	267	282	326
20	0	113	146	182	218	274	300	317	366
22	0	123	160	200	240	302	329	347	399
24	0	136	177	222	266	335	365	384	441
26	0	152	197	245	294	370	402	422	484
28	0	162	211	262	316	399	433	455	521
30	0	166	219	275	333	423	460	483	555
32	0	175	232	292	354	452	491	515	593
34	0	183	243	306	373	478	519	544	628
36	0	187	249	316	385	497	540	566	655
38	0	188	254	324	397	517	562	589	684
40	0	190	259	333	409	536	583	612	712
42	0	191	262	340	419	554	603	634	738
44	0	188	263	344	426	569	620	652	762
46	0	187	264	348	433	584	637	670	785
48	0	187	267	353	441	600	655	689	809
50	0	188	269	358	449	615	673	708	833
52	0	190	272	365	458	632	691	728	857
54	0	192	271	364	458	639	700	738	872
56	0	196	276	370	466	654	716	756	894
58	0	196	277	372	471	666	730	770	914
60	0	192	274	372	473	677	741	783	930
62	0	190	272	371	473	682	748	791	942
64	0	185	267	365	467	679	746	790	946
66	0	184	266	365	467	686	755	799	959
68	0	184	267	370	475	706	777	823	989
70	0	184	268	375	483	724	796	843	1016
72	0	184	268	374	483	729	801	849	1024
74	0	187	271	379	489	744	819	867	1048
76	0	194	279	388	500	766	842	892	1078
78	0	192	276	387	500	776	854	904	1096
80	0	194	277	388	503	788	867	918	1115
82	0	197	280	391	506	799	880	932	1132
84	0	197	280	393	508	807	888	941	1145
86	0	197	280	393	507	813	894	948	1155
88	0	191	274	387	502	816	898	953	1163
90	0	187	268	381	497	814	896	951	1164
92	0	186	268	382	497	821	905	960	1176
94	0	183	265	379	495	823	907	962	1181
96	0	179	260	376	492	827	911	968	1188
98	0	176	257	371	487	827	911	968	1191
100	0	171	251	366	482	828	913	970	1195

Table A51 Continued. Provo – Inclinometer South (in mm)

Depth (ft)	8/25/1999	9/20/1999	9/30/1999	10/13/1999	11/3/1999	12/17/1999	1/13/2000	2/1/2000	4/20/2000
102	0	172	251	367	482	833	918	976	1203
104	0	171	250	366	482	837	923	981	1210
106	0	163	241	358	474	837	923	981	1213
108	0	151	229	346	462	831	917	976	1209
110	0	145	223	340	456	833	919	978	1213
112	0	137	214	331	447	829	916	975	1212
114	0	132	208	324	440	822	908	968	1205
116	0	125	200	316	431	813	899	958	1196
118	0	121	196	311	426	812	898	957	1197
120	0	117	191	307	421	810	896	955	1195
122	0	113	186	301	415	804	890	949	1190
124	0	114	187	302	415	803	889	948	1189
126	0	112	184	299	412	804	889	949	1190
128	0	105	176	291	402	793	878	937	1177
130	0	99	170	283	393	779	862	920	1157
132	0	92	162	274	381	755	836	894	1128
134	0	93	162	271	377	743	824	879	1112
136	0	93	161	272	378	747	828	883	1115
138	0	85	151	261	367	736	817	873	1108
140	0	85	152	263	368	738	818	872	1104
142	0	94	161	273	379	758	837	891	1125
144	0	91	157	269	375	756	836	890	1127
146	0	87	152	264	369	746	825	880	1116
148	0	89	155	267	371	749	828	883	1119
150	0	90	155	267	371	746	824	879	1115
152	0	88	153	265	368	740	817	873	1108
154	0	85	150	261	364	733	809	864	1097
156	0	90	154	266	368	737	813	868	1101
158	0	88	152	263	365	729	803	858	1089
160	0	84	148	259	360	715	789	843	1072
162	0	82	146	256	356	705	778	832	1057
164	0	87	151	261	360	706	779	832	1057
166	0	88	153	262	361	704	775	829	1053
168	0	86	151	260	359	696	767	820	1042
170	0	85	150	259	356	684	753	806	1024
172	0	87	153	262	359	681	749	801	1017
174	0	86	152	261	357	676	744	796	1009
176	0	86	152	260	355	670	736	788	999
178	0	85	152	259	354	660	725	776	984
180	0	89	155	261	355	654	717	768	971
182	0	93	159	265	358	649	711	761	961
184	0	96	162	268	360	643	703	753	948
186	0	90	157	262	353	628	687	736	927
188	0	91	158	262	352	619	676	724	911
190	0	88	155	257	346	603	659	706	887
192	0	88	155	257	344	592	647	693	870
194	0	89	155	256	343	584	636	682	853
196	0	90	156	256	341	576	627	673	841
198	0	93	159	257	341	569	619	664	828
200	0	95	161	258	341	561	609	653	813

Table A51 Continued. Provo – Inclinometer South (in mm)

Depth (ft)	5/31/2000	6/27/2000	3/27/2001	9/17/2001	5/29/2002	6/10/2003	5/20/2004	6/12/2006	6/19/2007
0	62	68	93	99	103	103	106	110	104
2	80	85	113	120	126	130	134	143	138
4	104	110	141	150	157	166	172	183	178
6	140	149	183	192	201	215	221	232	229
8	174	181	220	230	241	253	260	271	269
10	203	210	251	262	274	285	292	304	302
12	238	245	288	300	313	326	333	346	346
14	275	283	327	340	355	368	377	390	390
16	312	321	368	381	397	411	420	434	434
18	348	357	405	420	436	450	460	476	476
20	388	399	449	464	481	497	507	523	523
22	423	434	486	501	519	536	546	563	564
24	467	478	531	547	566	583	594	612	612
26	511	524	578	594	614	632	644	662	663
28	551	564	620	636	656	675	687	706	707
30	586	600	657	674	695	714	726	746	747
32	625	640	698	716	737	757	770	790	792
34	662	678	737	754	777	797	810	831	833
36	690	707	766	784	807	827	841	863	865
38	720	738	798	816	839	860	875	897	899
40	750	768	829	847	871	893	907	930	932
42	778	797	858	877	901	923	938	961	964
44	803	823	884	903	928	950	966	989	992
46	828	849	911	929	955	977	993	1017	1020
48	853	875	937	956	982	1004	1021	1045	1048
50	878	901	963	982	1008	1031	1048	1073	1076
52	904	928	990	1010	1036	1059	1076	1101	1105
54	920	944	1007	1027	1053	1076	1094	1119	1123
56	944	968	1031	1051	1078	1102	1119	1145	1149
58	965	990	1053	1073	1101	1124	1142	1168	1172
60	983	1008	1071	1092	1119	1143	1161	1188	1192
62	996	1022	1086	1105	1133	1157	1175	1202	1207
64	1000	1027	1090	1110	1138	1162	1180	1208	1212
66	1015	1042	1105	1125	1153	1177	1195	1223	1228
68	1047	1075	1137	1157	1185	1209	1228	1256	1260
70	1074	1103	1166	1186	1214	1239	1257	1285	1290
72	1085	1114	1177	1197	1225	1250	1268	1297	1301
74	1109	1139	1200	1221	1249	1275	1293	1321	1326
76	1141	1172	1233	1254	1282	1308	1326	1355	1359
78	1160	1191	1257	1273	1301	1327	1346	1375	1379
80	1180	1212	1277	1293	1322	1348	1366	1395	1400
82	1198	1230	1296	1312	1341	1367	1385	1414	1419
84	1212	1245	1311	1327	1355	1381	1400	1429	1434
86	1222	1255	1321	1337	1366	1392	1410	1440	1445
88	1232	1265	1332	1347	1375	1401	1420	1450	1455
90	1233	1266	1334	1349	1377	1403	1422	1452	1456
92	1245	1278	1346	1361	1390	1416	1435	1464	1469
94	1250	1284	1352	1367	1396	1421	1440	1470	1475
96	1259	1293	1360	1376	1405	1430	1449	1479	1484
98	1262	1295	1363	1379	1408	1433	1452	1482	1487
100	1267	1301	1369	1384	1413	1438	1457	1488	1492

Table A51 Continued. Provo – Inclinometer South (in mm)

Depth (ft)	5/31/2000	6/27/2000	3/27/2001	9/17/2001	5/29/2002	6/10/2003	5/20/2004	6/12/2006	6/19/2007
102	1275	1309	1377	1392	1421	1447	1466	1496	1501
104	1283	1317	1386	1401	1430	1455	1474	1504	1509
106	1286	1320	1390	1404	1433	1458	1478	1508	1513
108	1282	1317	1387	1401	1430	1455	1475	1505	1510
110	1287	1321	1391	1405	1434	1460	1479	1509	1515
112	1286	1320	1390	1404	1434	1459	1478	1508	1514
114	1279	1314	1384	1398	1427	1453	1472	1502	1508
116	1270	1304	1373	1388	1418	1443	1462	1492	1498
118	1270	1305	1373	1389	1418	1444	1464	1493	1499
120	1269	1304	1372	1388	1418	1443	1463	1492	1499
122	1264	1299	1367	1383	1412	1438	1457	1487	1494
124	1262	1297	1365	1381	1410	1436	1456	1486	1492
126	1263	1299	1367	1383	1412	1437	1457	1487	1494
128	1250	1286	1354	1370	1399	1425	1444	1474	1481
130	1231	1266	1334	1350	1379	1405	1425	1455	1461
132	1201	1236	1305	1321	1349	1375	1395	1425	1431
134	1185	1219	1288	1304	1333	1359	1379	1409	1415
136	1188	1222	1291	1307	1335	1362	1382	1412	1417
138	1181	1216	1285	1301	1328	1356	1375	1405	1410
140	1177	1211	1281	1296	1324	1352	1371	1403	1406
142	1199	1232	1302	1317	1345	1373	1392	1424	1427
144	1199	1233	1303	1318	1345	1373	1392	1424	1427
146	1189	1222	1292	1307	1334	1362	1381	1413	1416
148	1192	1225	1295	1309	1337	1365	1384	1415	1419
150	1188	1221	1291	1305	1332	1360	1379	1410	1414
152	1181	1214	1284	1298	1324	1352	1371	1402	1406
154	1170	1203	1273	1286	1313	1341	1360	1390	1394
156	1173	1206	1276	1289	1316	1344	1362	1393	1397
158	1161	1194	1264	1276	1303	1331	1349	1380	1384
160	1143	1176	1246	1258	1285	1313	1331	1362	1366
162	1127	1160	1229	1241	1269	1296	1315	1346	1350
164	1127	1159	1228	1241	1269	1295	1314	1345	1349
166	1122	1154	1223	1235	1263	1290	1309	1339	1343
168	1111	1144	1212	1224	1251	1278	1297	1326	1331
170	1093	1125	1193	1205	1232	1259	1277	1307	1311
172	1084	1116	1184	1196	1223	1249	1268	1297	1302
174	1076	1107	1175	1187	1214	1240	1259	1288	1292
176	1066	1097	1164	1176	1203	1229	1247	1277	1281
178	1050	1081	1148	1159	1186	1212	1230	1259	1263
180	1036	1067	1133	1145	1172	1197	1216	1245	1249
182	1026	1056	1122	1133	1160	1186	1204	1233	1236
184	1012	1041	1107	1119	1145	1171	1189	1217	1221
186	990	1019	1085	1096	1122	1147	1165	1194	1197
188	972	1001	1065	1077	1103	1129	1147	1175	1178
190	948	975	1039	1052	1078	1103	1121	1149	1153
192	929	956	1020	1032	1057	1083	1100	1128	1132
194	911	938	1002	1014	1039	1064	1081	1109	1113
196	897	923	987	999	1024	1049	1066	1094	1097
198	883	909	974	984	1009	1033	1051	1078	1081
200	867	892	957	966	992	1016	1033	1060	1063

Table A51 Continued. Provo – Inclinometer South (in mm)

Depth (ft)	7/18/2008	6/15/2010
0	102	116
2	137	152
4	177	193
6	227	245
8	266	285
10	300	319
12	343	363
14	388	408
16	432	453
18	474	496
20	522	544
22	563	585
24	611	635
26	662	686
28	707	731
30	747	771
32	792	817
34	833	858
36	865	890
38	900	925
40	933	959
42	965	991
44	993	1019
46	1021	1048
48	1050	1076
50	1078	1104
52	1106	1133
54	1125	1151
56	1151	1178
58	1174	1202
60	1194	1221
62	1209	1236
64	1215	1241
66	1230	1258
68	1263	1291
70	1293	1322
72	1304	1334
74	1329	1359
76	1362	1393
78	1382	1413
80	1403	1433
82	1422	1453
84	1437	1467
86	1448	1478
88	1458	1488
90	1459	1490
92	1472	1503
94	1477	1508
96	1487	1518
98	1490	1521
100	1496	1526

Depth (ft)	7/18/2008	6/15/2010
102	1504	1535
104	1513	1543
106	1516	1547
108	1513	1544
110	1518	1548
112	1517	1548
114	1511	1541
116	1501	1532
118	1503	1533
120	1502	1533
122	1497	1527
124	1495	1526
126	1497	1528
128	1484	1515
130	1465	1496
132	1435	1466
134	1419	1450
136	1421	1452
138	1413	1445
140	1411	1443
142	1432	1464
144	1432	1464
146	1421	1453
148	1423	1455
150	1418	1450
152	1410	1441
154	1399	1430
156	1401	1433
158	1388	1420
160	1370	1401
162	1353	1386
164	1352	1385
166	1346	1379
168	1334	1366
170	1314	1346
172	1304	1337
174	1295	1327
176	1283	1315
178	1266	1298
180	1252	1284
182	1239	1271
184	1223	1255
186	1200	1231
188	1181	1212
190	1155	1186
192	1134	1165
194	1115	1146
196	1099	1130
198	1083	N/A
200	1065	N/A

Figure A52. Provo – Manometers and Combined Inclinometers

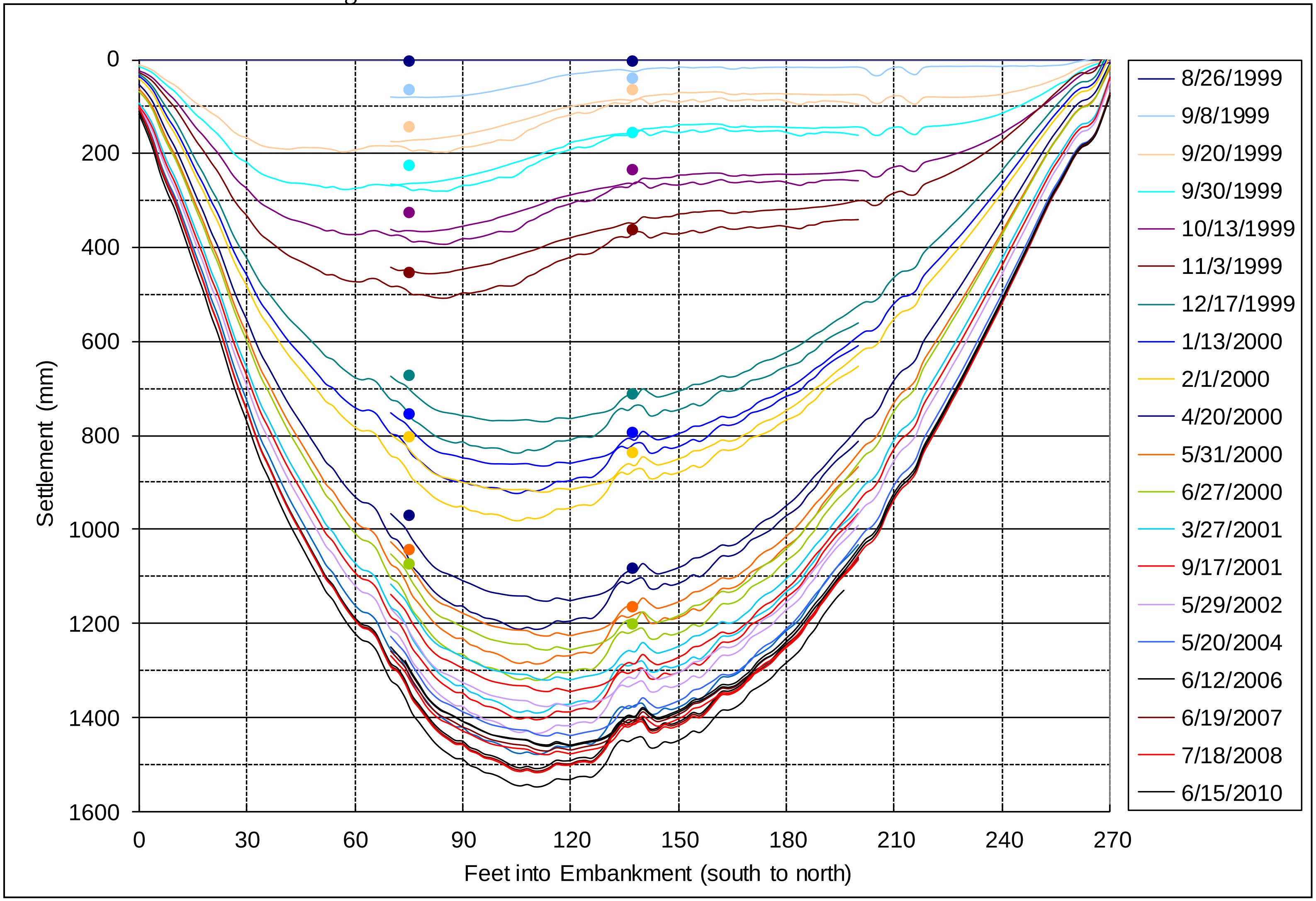

Table A52. Provo – Manometers (in mm)

Date	Middle Station	Reading	Adjusted Reading	South Station	Reading	Adjusted Reading	Elevation
8/26/1999	137	0	0	75	0	0	97.4286
9/8/1999	137	30	38.6	75	53	61.6	97.4200
9/20/1999	137	50	61.1	75	130	141.1	97.4175
9/30/1999	137	140	154.8	75	210	224.8	97.4138
10/13/1999	137	210	233.8	75	300	323.8	97.4048
11/3/1999	137	332	359.3	75	425	452.3	97.4013
12/15/1999	137	680	710.3	75	640	670.3	97.3983
1/13/2000	137	758	792.8	75	718	752.8	97.3938
2/1/1999	137	796	836.3	75	762	802.3	97.3883
4/20/2000	137	1028	1080.7	75	916	968.7	97.3759
5/31/2000	137	1101	1163.0	75	980	1042.0	97.3666
6/27/2000	137	1131	1198.8	75	1003	1070.8	97.3608

Figure A53. Provo – Pressure Cell 50015

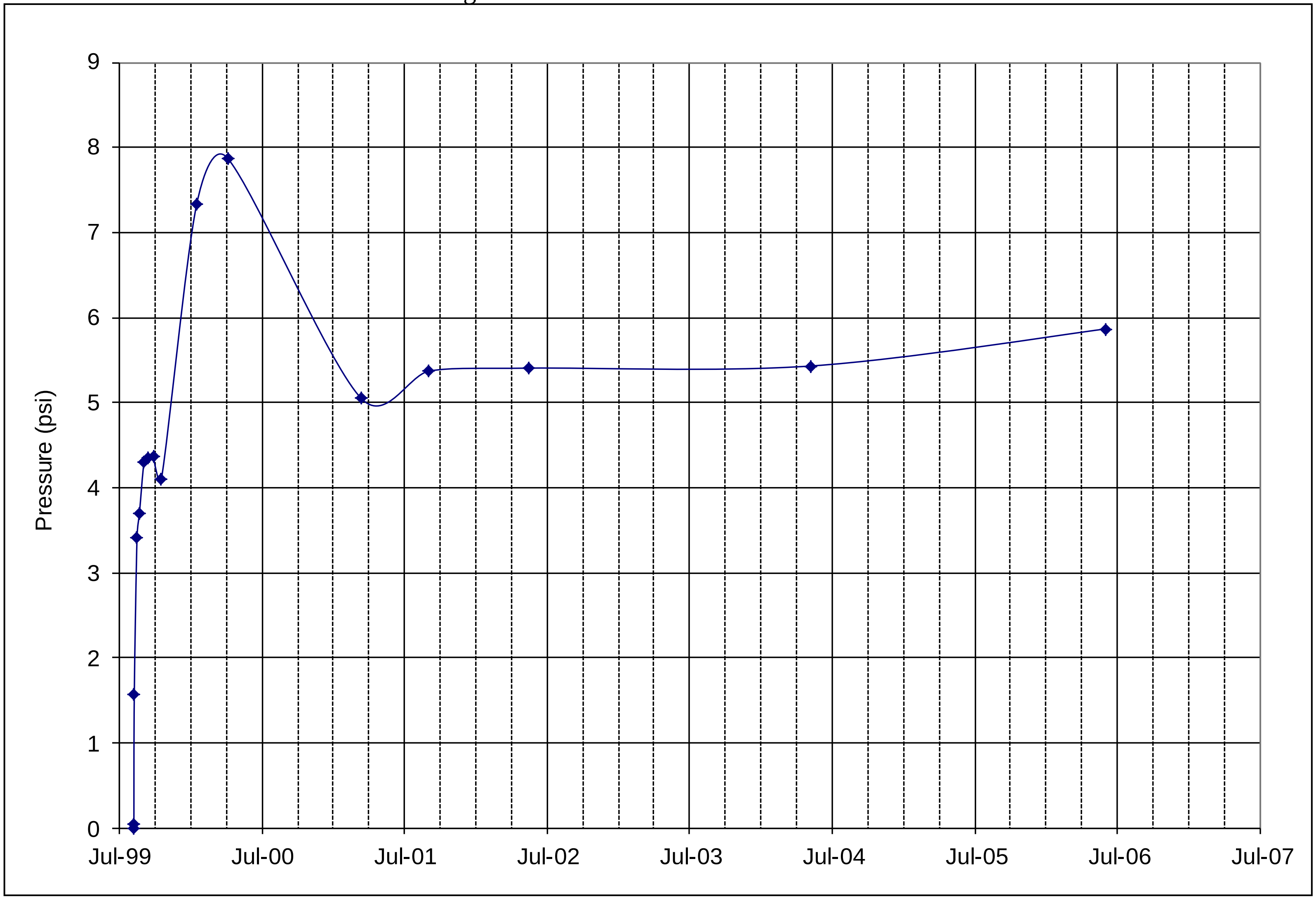

Table A53. Provo – Pressure Cell 50015 (in psi)

Date	Pressure
8/25/1999	0.00
8/25/1999	0.05
8/26/1999	1.56
9/2/1999	3.42
9/8/1999	3.69
9/20/1999	4.30
9/30/1999	4.34
10/13/1999	4.37
11/3/1999	4.09
2/1/2000	7.32
4/20/2000	7.87
3/27/2001	5.05
9/17/2001	5.37
5/29/2002	5.40
5/20/2004	5.43
6/12/2006	5.87

Figure A54. Provo – Pressure Cell 50016

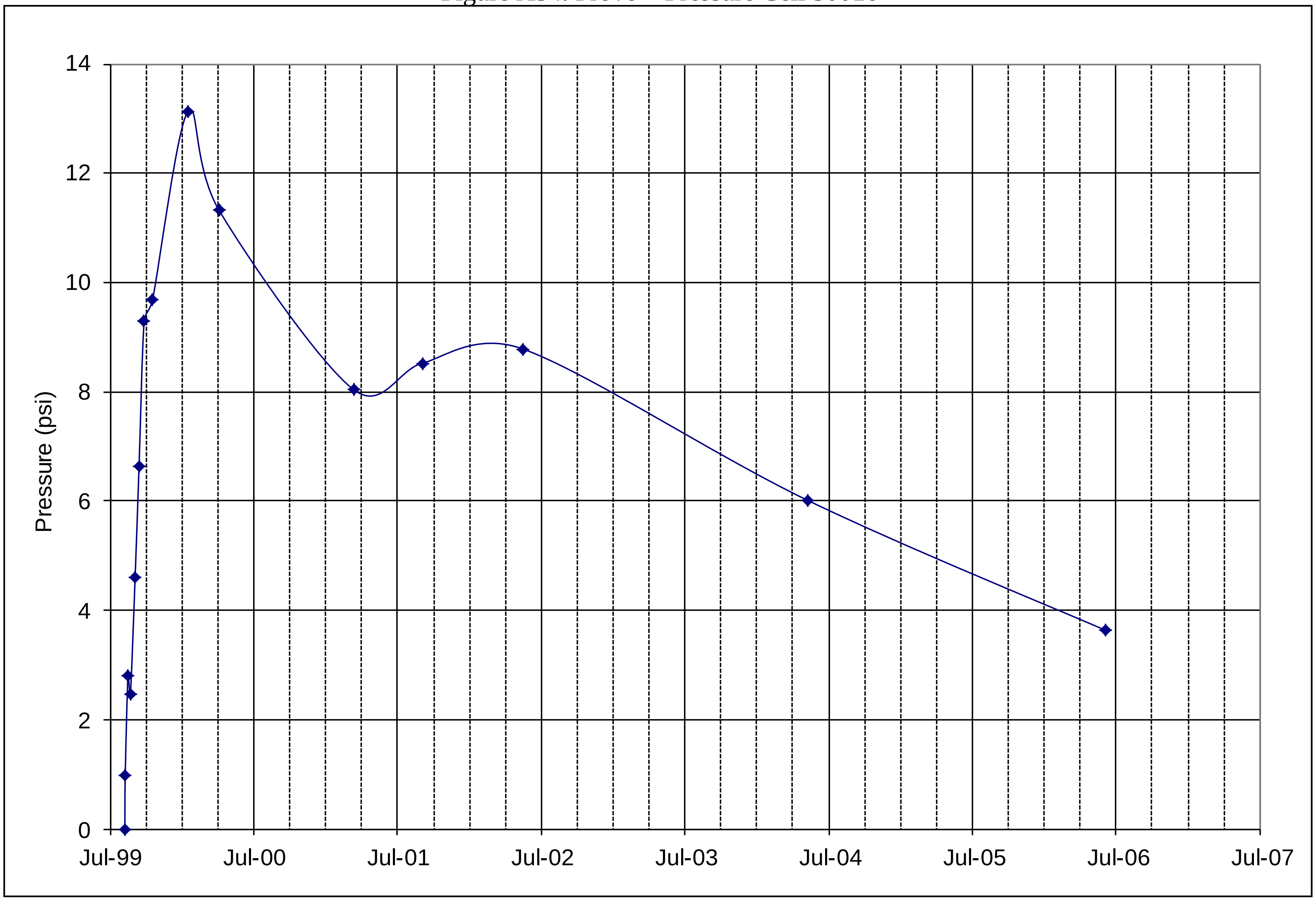

Table A53. Provo – Pressure Cell 50016 (in psi)

Date	Pressure
8/25/1999	
8/25/1999	0.00
8/26/1999	0.99
9/2/1999	2.81
9/8/1999	2.46
9/20/1999	4.60
9/30/1999	6.64
10/13/1999	9.29
11/3/1999	9.68
2/1/2000	13.13
4/20/2000	11.32
3/27/2001	8.04
9/17/2001	8.52
5/29/2002	8.78
5/20/2004	6.01
6/12/2006	3.64

Figure A55. Provo – Piezometer 69288

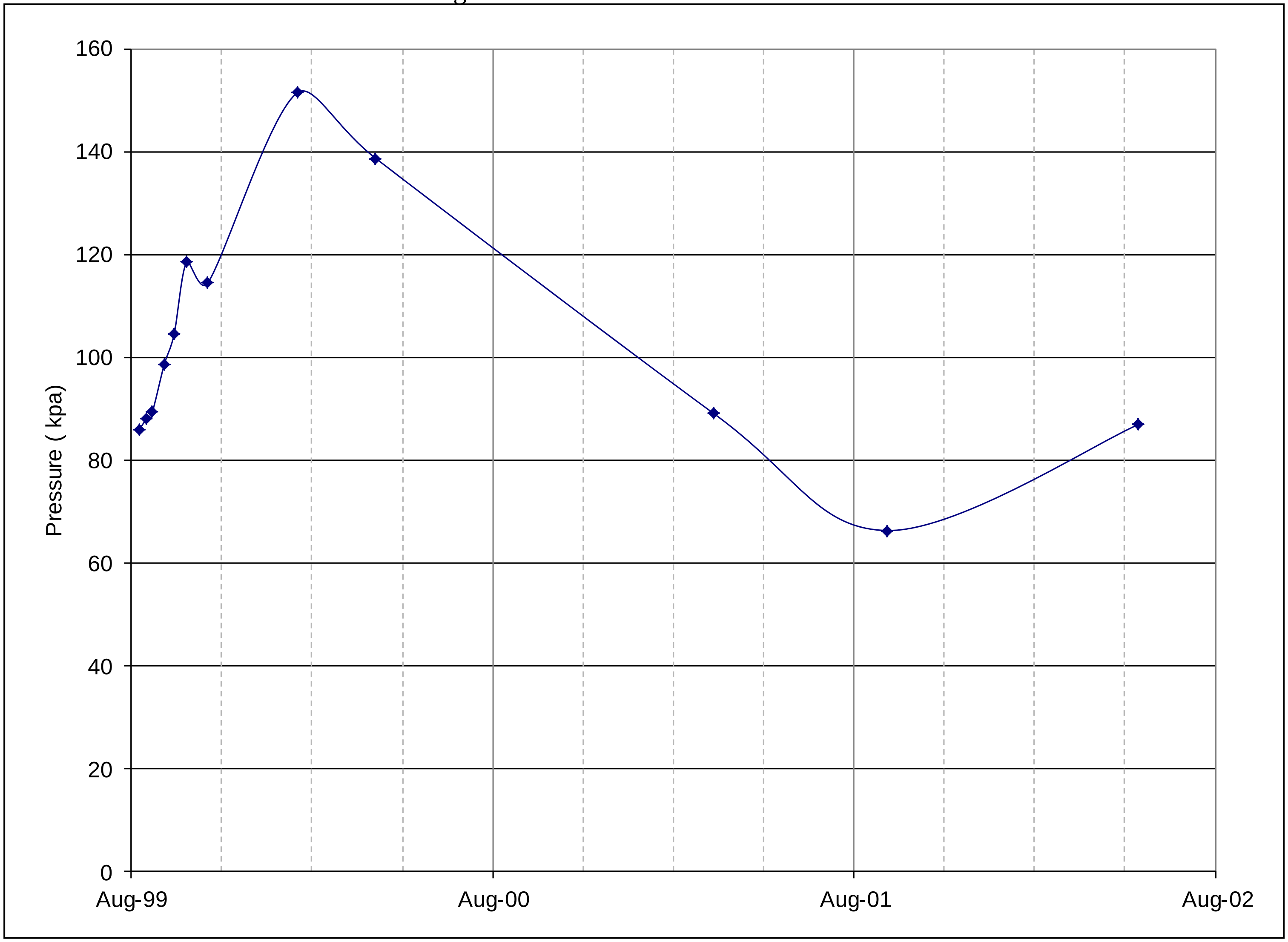

Table A55. Provo – Piezometer 69288 (in kPa)

Date	Pressure
8/26/1999	86.0
9/2/1999	88.0
9/8/1999	89.3
9/20/1999	98.6
9/30/1999	104.5
10/13/1999	118.7
11/3/1999	114.5
2/1/2000	151.5
4/20/2000	138.8
3/27/2001	89.1
9/17/2001	66.3
5/29/2002	87.0

Figure A56. Provo – Piezometer 69290

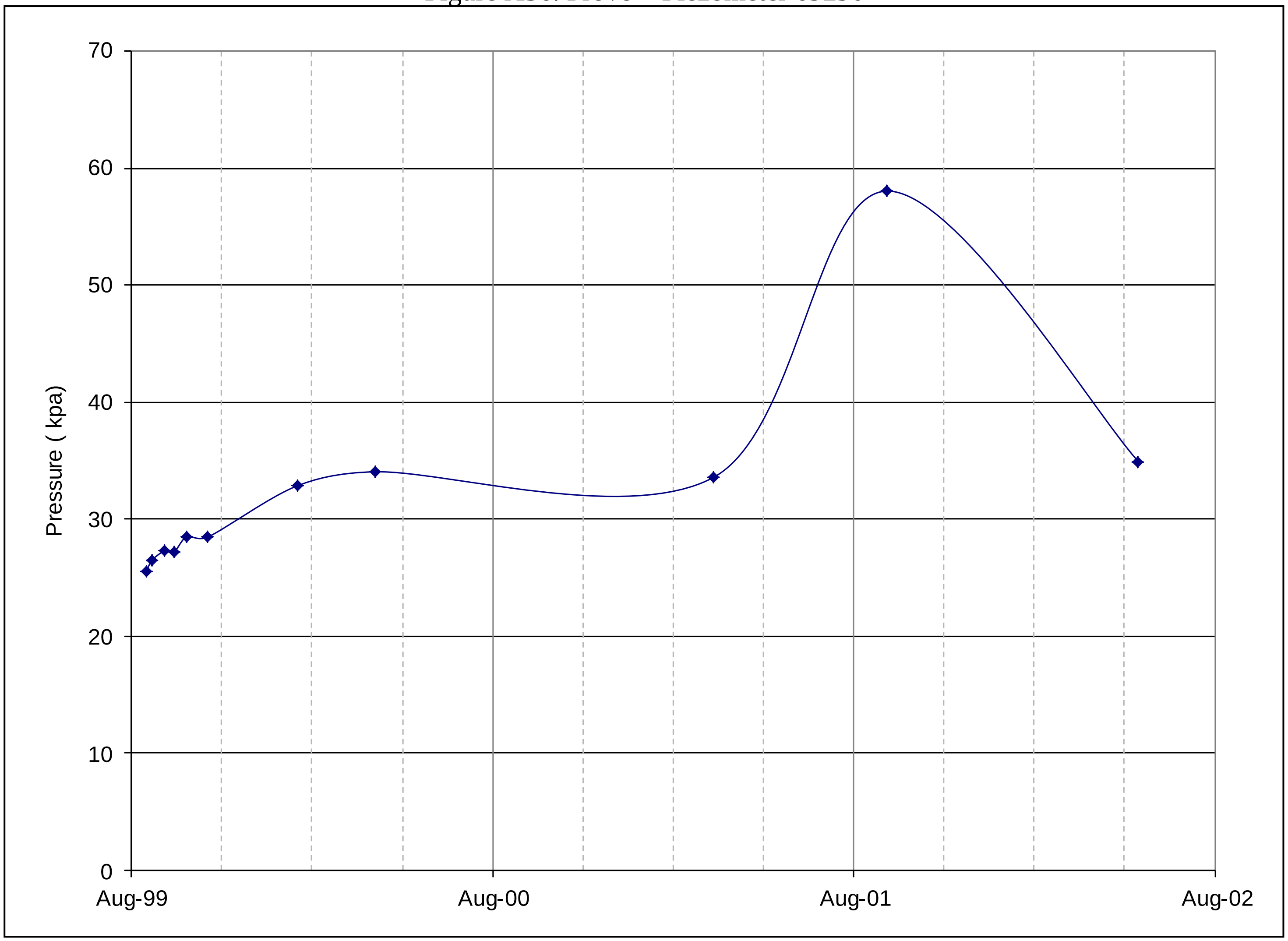

Table A56. Provo – Piezometer 69290 (in kPa)

Date	Pressure
8/26/1999	27.1
9/2/1999	25.6
9/8/1999	26.5
9/20/1999	27.3
9/30/1999	27.2
10/13/1999	28.5
11/3/1999	28.5
2/1/2000	32.9
4/20/2000	34.1
3/27/2001	33.6
9/17/2001	58.0
5/29/2002	34.9

Figure A57. Provo – Settlement Points

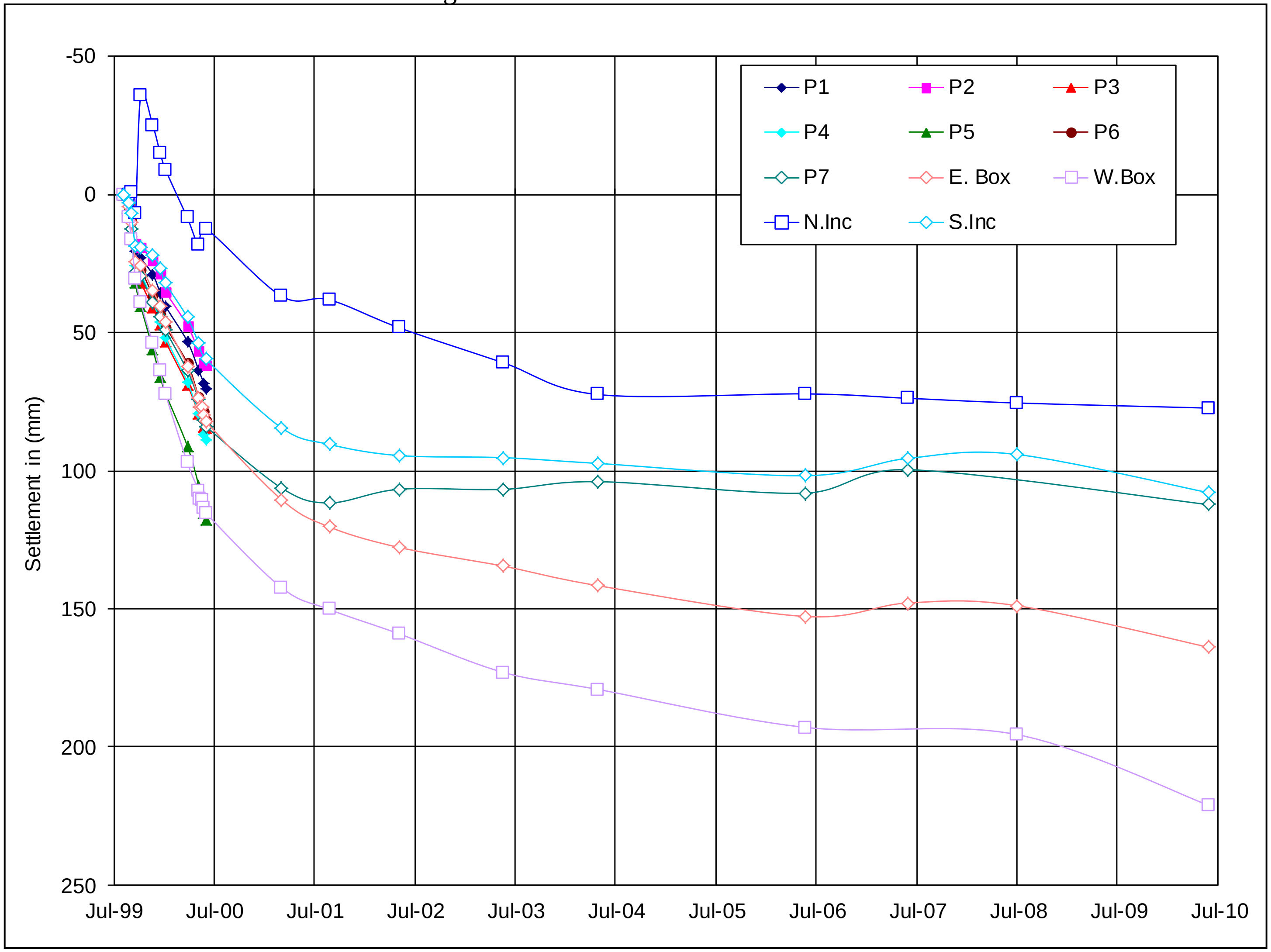

Table A57. Provo – Settlement Points (in mm)

Date	P1	P2	P3	P4	P5	P6	P7	N.Inc	S.Inc	E.box	W. box	Fill
9/2/1999	0	0	0	0	0	0	0	#N/A	0	0	0	0
9/20/1999	3.9	1.4	5.8	5.8	3.8	3.6	6.5	0.0	2.8	4.5	8.3	-1.2
9/30/1999	8.8	6.0	13.6	12.2	14.1	9.6	12.3	-0.9	6.5	10.0	16.3	-2.3
10/15/1999	20.7	17.6	28.5	25.5	31.9	24.1	28.2	6.8	18.8	24.1	30.3	#N/A
11/3/1999	23.1	19.0	31.9	28.4	40.3	27.0	29.7	-35.8	19.1	25.5	39.1	-3.8
12/17/1999	29.0	23.9	41.1	38.8	56.1	36.6	38.9	-25.0	22.1	34.8	53.9	-10.5
1/13/2000	35.7	28.8	47.2	46.0	66.2	43.1	44.1	-14.9	26.5	40.2	63.8	-10.5
2/1/2000	40.4	35.0	53.1	51.8	72.0	47.8	49.1	-9.0	32.0	46.3	72.2	-10.5
4/20/2000	53.1	47.3	68.9	67.8	91.0	61.0	63.7	8.4	44.4	62.0	97.0	#N/A
5/31/2000	63.5	56.7	79.2	79.4	105.3	73.2	74.2	18.1	53.8	73.7	107.3	#N/A
6/5/2000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	76.9	110.2	#N/A
6/12/2000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	76.9	110.6	#N/A
6/20/2000	68.6	60.7	83.9	86.9	115.4	78.5	81.9	#N/A	#N/A	80.0	113.7	#N/A
6/27/2000	70.3	61.8	84.8	88.9	118.0	81.7	84.0	12.4	59.6	82.3	115.5	#N/A
3/27/2001	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	106.2	36.7	84.4	110.4	142.3	#N/A
9/17/2001	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	111.7	38.1	90.5	120.4	150.3	#N/A
5/29/2002	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	106.7	48.2	94.5	127.8	159.1	#N/A
6/10/2003	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	106.8	60.9	95.3	134.6	173.1	#N/A
5/20/2004	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	104.0	72.4	97.4	141.7	179.3	#N/A
6/12/2006	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	108.1	72.2	101.8	152.8	193.0	#N/A
6/19/2007	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	99.6	73.8	95.5	147.9	#N/A	#N/A
7/18/2008	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	75.5	94.1	148.9	195.6	#N/A
6/15/2010	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	112.3	77.3	108.0	164.0	221.3	#N/A