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Lockheed Martin Corporation

Interim Data Report for Supplemental Field Activities

Former American Beryllium Company Site

February 22, 2008

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Interim Data Report for Supplemental Field Activities

Former American Beryllium Company Site

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Acronyms:

ABC	American Beryllium Company
AF Gravel	Arcadian Formation Gravels
cm/sec	centimeter per second
DPT	direct-push technology
ECD	electron capture detector
EPA	Environmental Protection Agency
F.A.C.	Florida Administrative Code
facility	former American Beryllium Company facility
FDEP	Florida Department of Environmental Protection
FID	flame ionization detector
ft bls	Feet below land surface
IDR	Interim Data Report
IRA	Interim Remedial Action
IRAP	Interim Remedial Action Plan
Kd	Soil Adsorption
K_v	vertical hydraulic conductivity
Lockheed Martin	Lockheed Martin Corporation
LSAS	Lower Surficial Aquifer System
MIP	Membrane Interface Probe
PID	photoionization detector
PVC	polyvinyl chloride
RAP	Remedial Action Plan
S&P Sand	Salt and Pepper Sands
SARA 3	Site Assessment Report Addendum 3
SOW	Scope of Work
TCE	trichloroethene
TOC	total organic carbon
USAS	Upper Surficial Aquifer System
VOC	volatile organic compounds

1. Introduction

This document is being submitted pursuant to the Florida Department of Environmental Protection (FDEP) approval (dated October 2, 2007) of the request for extension of time by Lockheed Martin Corporation (Lockheed Martin) on September 11, 2007. Lockheed Martin has assumed responsibility for the assessment and cleanup of environmental impacts from the former American Beryllium Company (ABC) facility (facility) located at 1600 Tallevast Road in Tallevast, Manatee County, Florida. These obligations are being conducted pursuant to the requirements detailed in Consent Order No. 04-1328 executed by and between Lockheed Martin and the FDEP, effective July 28, 2004. These assessment activities comply with applicable sections of Chapter 62-780, Florida Administrative Code (F.A.C.), and Section 376.30701 of the Florida Statutes.

Lockheed Martin acquired ownership of the former ABC facility through its 1996 acquisition of Loral Corporation, the parent company of ABC. Lockheed Martin ceased operations in 1997 and, in 2000, sold the former ABC facility to BECSD, LLC, which currently leases it to Lockheed Martin. The site assessment report addendum 3 (SARA 3) dated April 26, 2006 satisfying the site assessment requirements set forth in Chapter 62-780.600, F.A.C. was approved by FDEP via letter dated September 25, 2006.

A Remedial Action Plan (RAP) was provided by Lockheed Martin on May 4, 2007 in accordance with applicable sections of Chapter 62-780, F.A.C., Contaminated Site Cleanup Criteria. The FDEP provided comments on the RAP in a letter dated July 27, 2007. In response to the FDEP comments on the RAP, on September 11, 2007 Lockheed Martin requested an extension of time to respond to the RAP comments. The extension of time allows for additional field data to be collected and incorporated into the groundwater model that will be used to refine the remedy evaluation and selection that will be provided in a revised RAP. The additional efforts or activities proposed by Lockheed Martin to respond to FDEP comments and develop a revised RAP were discussed in a meeting with the FDEP on September 27, 2007 and outlined in the letter requesting an of extension of time. In a letter dated October 2, 2007, the FDEP granted the extension and concurred with the submission of Interim Data Reports (IDR) to document the progress of work towards submitting a revised RAP on September 1, 2008. As set forth in the schedule provided by Lockheed Martin in the request for extension of time and as approved by the FDEP, five interim reports will be submitted to FDEP as follows:

- 2/22/08 Interim Data Report
- 3/19/08 Groundwater Model Calibration Report
- 4/25/08 Pilot Study Evaluation
- 4/30/08 Groundwater Model Hydraulic Containment Evaluation
- 7/8/08 Groundwater Model Solute Transport Evaluation

This IDR summarizes supplemental field activities performed by ARCADIS on behalf of Lockheed Martin that were detailed in the following two work plans provided to FDEP:

- Proposed Field Activities Scope of Work (SOW) dated October 5, 2007:
    - Geotechnical borings to recover soil samples for laboratory analysis;
    - Installation of additional monitoring wells to measure water levels during the proposed pumping tests;
    - Pond and ditch characterization to further evaluate the potential interaction of surface water on the shallow groundwater; and
    - Long-Term Monitoring Water levels to provide additional water level data to be used in the groundwater model and aid in model calibration.
- Proposed Pumping Test SOW dated November 16, 2007:
    - Characterization of hydraulic properties of the groundwater flow for use in the three dimensional (3-D) groundwater model in preparation of the final remedy.

In addition, this IDR also provides results of field work conducted to date as detailed in the Proposed Membrane Interface Probe (MIP) SOW dated October 12, 2007, The MIP work is being conducted to assist in evaluating remedial actions that may accelerate the reduction of contaminant mass,

As discussed above, the objective of this IDR is to document the progress of work being conducted as part of the preparation of the revised RAP by presenting the data collected during each SOW listed above. As a result, the IDR presents a number of draft items, such as boring logs and summary tables. All data presented herein will be submitted in fully validated final form, along with appropriate interpretations, in the revised RAP.

All planned field activities related to the additional data collection as detailed in the above SOWs have been completed and are presented in the following sections. In cases where an activity is still in progress, such as the MIP investigations, a notation to this effect has been made, with the understanding that the associated data and interpretations will be provided in future interim deliverables and in the revised RAP.

2. Activities Pursuant to the October 5, 2007 SOW

The October 5, 2007 SOW included drilling ten geotechnical borings, installing three monitoring wells, collecting samples from twenty-two pond or drainage ditch locations, and monitoring water levels at selected locations to obtain additional information on the physical properties of the aquifers that will be used to develop a three dimensional groundwater model to support the evaluation and selection of a remedial alternative.

2.1 Geotechnical Borings

Six deep (~175 to 180 feet below land surface [ft bls]) and four shallow (~40 to 50 ft bls) geotechnical borings were drilled at the locations shown on **Figure 1** to recover soil samples for laboratory analysis. The deep borings include GT-D-1, GT-D-2, GT-D-3, GT-D-4, GT-D-5, and GT-D-6. The shallow borings include GT-S-7, GT-S-8, GT-S-9, and GT-S-10. Soil samples were retrieved at the depths shown in **Table 1** and analyzed for:

- Total organic carbon (TOC) by EPA Method 9060. This method requires correction for carbonate carbon (inorganic carbon) either by direct measurement (ASTM D513 Method B) and mathematical subtraction or removal by acidification (Environmental Protection Agency [EPA] Lloyd Kahn Method);
- Volatile organic compounds (VOCs), including the full volatile list by 8260B and 1,4-dioxane by 8260C SIM;
- Vertical hydraulic conductivity (K_v) by ASTM D 5084 (Flexible Wall Permeameter);
- Soil adsorption (Kd) of TCE using batch-type procedures outlined in technical resource document: EPA-530/SW-87/006-F;
- Porosity by ASTM D 854;
- Bulk density by ASTM D 2937;
- Particle size distribution by ASTM D 422/4464; and
- Moisture content by ASTM D 2216.

The soil samples were retrieved from the borehole using various collection methods. In general, undisturbed samples, as best practical, were collected to be tested for the various physical properties, as listed above, such that physical properties of the subsurface units could be reliably tested and quantified. Depending on lithology type, degree of consolidation, and sub-surface drilling conditions, the following methods were employed for collection of subsurface samples:

- Un-lined 2-inch diameter split-spoon sampling;
- Lexan-lined 2-inch and 3-inch diameter split-spoon sampling;
- Brass sleeve-lined 3-inch diameter split-spoon sampling;
- Dual-tube split-barrel HQ-wireline coring (Layne-Christensen model); and
- Triple-tube split-barrel HQ-wireline coring (Boart Longyear model).

Hollow-stem augers were used to advance boreholes within the surficial aquifer units and into the upper portion of the Venice Clay unit. The HQ-wireline and spin casing were used to advance the boreholes through the Venice Clay and underlying units. Upon termination of the borings at their total depths, each borehole was tremie-grouted to land surface. Materials that were retrieved via coring have been archived in labeled wooden core boxes stored on-site.

The draft geologic logs of the soil borings are provided in **Appendix A**. **Table 2** provides the survey data for the geotechnical borings. **Tables 3A, 3B, and 3C** provide a summary of laboratory analytical data for the geotechnical borings. The actual laboratory data reports are provided in **Appendix B**. The data is still undergoing validation (reviewed for completeness and appropriately qualified) and is therefore noted as draft at this time. The trichloroethene (TCE) soil adsorption (Kd) batch testing is still being evaluated and results will be presented in the groundwater model interim deliverable. Validated results, summary tables, and interpretations will be presented in the revised RAP.

2.2 Monitoring Wells

Three monitoring wells were originally proposed to be installed, one in each of the lower surficial aquifer system (LSAS), Arcadian Formation Gravels (AF Gravel) and Salt and Pepper Sands (S&P Sand) zones. These monitoring wells were to be clustered near existing upper surficial aquifer system (USAS) monitoring wells MW-4 and MW-70, located at the northwest corner of building 3 (see **Figure 1**). Ultimately, two wells were installed: MW-252 (S&P Sand); and MW-253 (AF Gravel).

The third monitoring well, intended for the LSAS, was not installed because, as discussed and agreed upon during the November 29, 2007 meeting with FDEP, groundwater extraction well EW-102 installed in the LSAS as part of interim remedial action plan (IRAP) was located in the vicinity and with the IRAP system being shut down during the pumping test, EW-102 served as the LSAS monitoring well. Wells MW-252 and MW-253 were installed using a rotosonic rig consistent with procedures and materials used for monitoring wells installed during the SARA 3 field activities. **Table 2** provides the survey data for these well locations, and the draft boring logs are provided in **Appendix A**.

The monitoring wells (MW-252 and MW-253) have been added to the comprehensive monitoring event list. The new LSAS groundwater extraction well EW-102 and the new USAS groundwater extraction well EW-107 installed previously as part of the IRAP modifications were plumbed into the IRAP groundwater extraction system. Since these extraction wells were developed prior to the aquifer testing activities, they were monitored as part of the aquifer testing and comprehensive water level events.

2.3 Pond and Ditch Characterization

Two sediment/soil cores were retrieved from each of the 22 pond or ditch locations shown on **Figure 2** and identified in **Table 1**. **Table 2** provides survey data for the sampled locations.

One sediment/soil core at each location was recovered from the sediment/water interface to a depth of approximately 3 ft below the pond bottom or refusal, whichever was encountered first. Observation of the material in the core was noted, and the draft sediment logs are provided in **Appendix A**. Two samples, one from the top half and one from the bottom half of the core, were collected for grain size analysis using *ASTM D 422/4464*. If the material in the core was stratified, then the grain size samples were collected from the top two to three strata observed in the core. A second core from each location was retrieved from the sediment/water interface to a depth of approximately 1 to 2 ft below the pond bottom and sent to the laboratory for K_v by *ASTM D 5084*. The depth of water at each boring location was recorded.

During pond coring activities, three stilling well/staff gauge pairs were installed: one located in the pond on the Boothe property, one in the pond located at 1975/2003 Tallevast Road and one located within the ditch along Tallevast Road, north of the airport. A stilling well was also installed in the pond located on the former ABC facility, next to the existing staff gauge. **Figure 3** indicates the locations of all existing and new staff gauges and stilling wells. The locations will be surveyed at a future date, and the survey data may be provided in a future interim deliverable and will be provided in the revised RAP. **Table 3A** provides a summary of analytical data for the sediment samples collected. The laboratory data reports are contained in **Appendix B**. The presented results are not currently fully validated, and so should be considered draft. This data will be incorporated into the 3-D groundwater model to evaluate remedial alternatives and the validated results and interpretation will be presented in the revised RAP.

2.4 Long-Term Monitoring Water Levels

Transducers were installed in the three stilling wells and all the monitoring wells shown on **Figure 3**. The transducers located in the stilling wells were programmed to record water level data at 15-minute intervals. The transducers in the monitoring wells were programmed to record water level data at 2-minute intervals. Periodically, manual water level measurements were collected from the three new and six previously-existing staff gauges and at the monitoring wells shown **Figure 3**. These water level measurements are described in Section 4, since they were collected concurrently with the aquifer testing activities. Long-term monitoring of water levels is currently ongoing.

3. Activities Pursuant to the October 12, 2007 SOW

Lockheed Martin is evaluating additional Interim Remedial Actions (IRA) that may reduce the mass of contaminants as part of the overall remedy for the former ABC site. Prior to preparation of an IRAP, the actual area and volume that is most amenable to mass reduction activities need to be more accurately defined. As discussed during the September 27, 2007 meeting and illustrated in **Figure 4A**, the target area initially identified for further IRA evaluation included the vicinity of the former process sumps (Area A).

In addition to the area defined in **Figure 4A**, Lockheed Martin is evaluating the potential for IRA at the offsite location shown in **Figure 4B** (Area B). Area B is located at 1864 Tallevast Road, in the vicinity of monitoring well MW-21, which is located approximately 700 feet east-southeast of the former ABC facility. This location was not proposed in the initial SOW of October 12, 2007, however, upon further consideration and discussions with the community technical representative it was agreed that Area B might be amenable to some form of focused mass reduction and therefore warranted further evaluation. An access agreement was subsequently obtained to conduct a limited investigation in this area.

A MIP was used to more precisely determine the depth of contaminants in the target area. This tool consists of a heated probe containing both a soil conductivity sensor and a gas-permeable port. As the probe was advanced using direct-push technology (DPT), the soil conductivity sensor provided a direct read-out that could be correlated to lithology. Simultaneously, organic vapors were drawn through the membrane and transferred through a heated trunk line to an gas chromatograph equipped with an electron capture detector (ECD), flame ionization detector (FID), and photoionization detector (PID), providing a real-time vertical profile of the distribution of volatile organic compounds at approximately six-inch intervals. Prior to the advancement of the probe, a response test was conducted to determine that the probe was functioning within acceptable limits. The probe was then advanced at a rate of approximately one foot per minute until refusal. In specific locations, soil samples and groundwater samples were also collected using DPT to better correlate the MIP data.

3.1 Mobilization

VIRONEX was subcontracted to perform the MIP work. A site visit was conducted to mark out the initial boring grid, the locations of the former process sumps, and other locations of interest (such as former FDEP sampling location SP-TT-MW-10). Personnel and equipment were then mobilized to the field location.

3.2 MIP/Conductivity System Correlation

Initial MIP probes were conducted on the facility near the former process sumps and other locations of interest. At some of these locations, a direct push soil or groundwater sampler was used to collect samples from specific intervals selected based on the MIP responses. The samples submitted for laboratory analysis were collected from direct push borings located within one foot of the MIP probed location. The groundwater samples and selected soil samples were analyzed by the contracted laboratory, under 24-hour turn-around-time protocol, for volatile organic compounds by Method 8260B and 1,4-dioxane by Method 8260C (SIM isotope dilution).

MIP ECD response over a range of TCE concentrations (prepared response check standards) was used to generate a response regression to provide a tool for evaluating in-situ response. These regression data points are provided on the right side of **Table 4A**. By evaluating the correlation between the MIP response and the check standard results, an approximate magnitude of the concentration relative to the MIP response was determined. This information was used to allow for dynamic modification of the sampling plan to more precisely identify areas amenable to potential focused IRA.

DPT borings were advanced until the probe encountered refusal. The depth of refusal varied, but was no deeper than the USAS hard streak, so MIP characterization was performed in the USAS only. Completed boreholes were filled with grout from the bottom of the borehole to land surface using a tremie-pipe.

Detailed boring logs were generated for three of the MIP locations, and these draft logs are presented in **Appendix A**. As shown in **Table 1**, samples were collected for grain size analysis; however, the laboratory analytical results for the grain size analyses are still in progress. In addition, limited lithologic logging was performed for locations in which soil samples were obtained. The content of these logs will be provided in the revised RAP.

3.3 MIP Survey – Area A

Figure 4A shows the Area A (on-site) MIP probe locations. The locations are numbered sequentially starting with the first locations. Probing was initiated in the area of the former sumps, and step-out locations were determined based on the maximum

ECD responses encountered. As shown in **Figure 4A**, and in accordance with the work plan, step-out locations were completed on a 25-foot grid. **Table 4A** shows the correlation between the MIP response and the analytical laboratory results from the same interval, providing an approximate magnitude of the concentration relative to the MIP response in on-site (Area A) locations.

Selected probe locations were also sampled for lithology, groundwater VOCs and soil VOCs to continue to provide correlation of the data to the response of the instrument. The sample summary is provided in **Table 1**. The results of groundwater and soil sampling for organic compounds are reported in **Tables 4B** and **4C**, and **Appendix B** contains the associated analytical laboratory data reports. The lithologic logs are provided in **Appendix A**. Raw data outputs from VIRONEX are provided in **Appendix C**.

3.4 MIP Survey – Area B

After an access agreement was obtained from the landowner, MIP probing was initiated in Area B, which is located off-site on the Ward property. **Figure 4B** shows the Area B (off-site) MIP probe locations. The locations are numbered sequentially starting with the first locations. Probing was initiated near the locations of wells MW-27 and MW-54, and step-out locations were determined based on the maximum ECD responses encountered. The offsite work is ongoing, with additional borings planned for the Schmidt property, which is adjacent to the eastern edge of the Ward property.

Table 4D shows the correlation between the MIP response and the analytical laboratory results from the same interval, providing an approximate magnitude of the concentration relative to the MIP response in the Area B locations. **Table 4B** shows the results of corresponding laboratory samples, and **Appendix B** contains the laboratory data reports. Raw data outputs from VIRONEX are provided in **Appendix C**.

3.5 Data Reduction and Evaluation

Following completion of the MIP survey, the data will be normalized and evaluated using data visualization software to develop a three-dimensional model of source material distribution and associated lithology. This model will then be used to optimize design of the IRA. This work is currently in progress.

4. Activities Pursuant to the November 16, 2007 SOW

The November 16, 2007 SOW outlined proposed aquifer testing field work, which was presented and discussed during a meeting with FDEP on September 27, 2007. The goals and objectives of this field work, as discussed during the meeting, were as follows:

- Provide data for improving the characterization of hydraulic properties of the groundwater flow system in the immediate vicinity of the site, for incorporation in the 3D modeling;
- Specifically, perform testing focused on identifying influences between the LSAS and AF Gravel units, under controlled test conditions that include measured flow rates;
- Characterize non-pumping groundwater flow patterns through shut-down of the IRAP pumping system, and also identify the zone-of-influence of the IRAP pumping via the shut-down and re-start responses; and
- Attempt to produce responses that could help identify the location of the abandoned production well.

As agreed during the meeting, the plan was as follows:

- Drill and install seven piezometers onsite in the LSAS zone;
- Measure water levels at on-site and nearby off-site monitoring wells while the IRAP system is operating;
- Shut down the IRAP system and measure recovery at the same wells twice a week for three weeks, or less, based on adequately achieving sufficient recovery;
- Complete a comprehensive round of static water level measurements at the accessible monitoring wells, piezometers, and staff gauges;
- Perform on-site AF Gravel/LSAS hydraulic interaction tests;
- Complete a second comprehensive round of static water level measurements at the accessible wells, piezometers, and staff gauges; and
- Re-start the IRAP system and monitor hydraulic responses in on-site and nearby off-site wells and piezometers.

The progress to date on these activities is described in additional detail below.

4.1 LSAS Piezometer Installation

Seven piezometers were installed to the top of the Venice Clay to monitor water levels within the LSAS during aquifer testing. **Figure 1** indicates the locations of the piezometers, and the survey data are provided in **Table 2**. **Appendix A** contains the draft boring logs and well completion diagrams.

The piezometers were screened in the LSAS using 2-inch pre-threaded polyvinyl chloride (PVC) screen. The screened interval was the five-foot interval directly overlying the Venice Clay. Screen intervals were selected during drilling based on the observed location of the LSAS at the piezometers. The top of the sand pack extended one foot above the top of the screen. The remainder of the annulus was backfilled with bentonite up to the surface completion, which consisted of a steel curb box set in concrete.

4.2 Water Level Collection

Both the October 5, 2007 and the November 16, 2007 work plans described collection of water levels at a number of locations. In addition, both work plans discussed installation of pressure transducers for continuous water level monitoring. Hence, the water data collection efforts were combined. **Table 5** provides a master list of water level monitoring locations, and indicates which locations were included as part of each data collection effort.

4.2.1 Transducer Installation

Transducers were ultimately installed in a total of 52 locations. **Figure 5** indicates the locations of transducers, and shows which of the transducers were installed as part of the long-term water level data collection.

Table 6 provides a list of the transducer installation locations and the serial numbers of the actual instruments installed. Transducer installation began on November 8, 2007. Most transducers were installed by November 13, 2007. New wells were instrumented after installation was complete. In addition, wells EW-101/EXU-1 and EW-108/EXL-1 were instrumented after they were connected to the IRAP system.

Transducer data downloaded from November 8, 2007 to January 30, 2008 are provided electronically as **Appendix D** for convenience. Draft files divided by well and aquifer testing event are provided are in Microsoft Excel format. Raw data files are provided in comma-delimited text file and binary format. The transducers currently in use have a large amount of memory, allowing for flexibility in download times. Transducer data collection is ongoing through February 2008.

4.2.2 Manual Water Level Collection

Manual water level collection was also planned as part of the aquifer testing work plan. The measurement events were conducted as follows:

- Aquifer test data collection. All on-site and selected nearby off-site wells were monitored as part of the aquifer test data collection. The group of wells measured is shown on **Figure 6** and listed in **Table 5** under "Manual Water Levels". Because the long-term monitoring locations listed in Section 2.4 were instrumented with transducers, water levels were also collected from these locations when the transducers were downloaded; and

- Comprehensive water level events. Two comprehensive water level events were completed. **Table 5** lists the intended wells for monitoring during the comprehensive events, and **Figure 7** provides a plot of the well locations.

All manual water level data collected from November 8, 2007 to January 2, 2008 is provided as **Tables 7A** to **7M**. Data collected subsequent to that date is still in the process of being checked for accuracy and will be provided in the revised RAP.

4.3 Data Collection Events

The following sub-sections describe the data collection events in chronological order. **Table 8** provides a timeline of events relating to aquifer testing and water level collection activities. Barometric pressure and precipitation data for the time period covered by the aquifer testing data collection efforts are provided in **Appendix F**.

4.3.1 Pre-Shutdown Data Collection

Transducer data collection began on November 10, 2007. Manual water levels during IRAP system operation were collected on November 9, 2007, and are reported in **Table 7A.**

4.3.2 IRAP System Shutdown

The IRAP system shut down on November 12, 2007. The groundwater system was allowed to recover for 3 weeks. Water levels in the wells listed in **Table 5** were measured regularly to evaluate water level recovery. **Tables 7B** through **7G** report the manual measurements collected during system recovery.

The pressure transducer data was also downloaded periodically and plotted to evaluate the progress of water level recovery. **Figures 8A** through **8J** show the response to IRAP system shutdown in monitored groundwater zones.

4.3.3 First Round of Comprehensive Static Water Level Measurements

Water levels in the groundwater zones had stabilized within the three weeks following IRAP system shutdown. Hence, a comprehensive round of water level measurements was completed at the accessible monitoring wells, extraction wells, and piezometers listed in **Table 5** and shown on **Figure 7**. In addition, field personnel measured water levels at available staff gauges. **Table 7H** provides the water level measurements for the wells which were accessible for measurement during the comprehensive water level event. **Table 7I** provides additional water levels measured a few days later at wells with special access requirements. Potentiometric surface maps illustrating the static groundwater elevations are being prepared and will be presented in the revised RAP.

4.3.4 On-Site Aquifer Testing

A series of hydraulic tests were conducted at the on-site AF Gravel wells. The continuous transducer data collected during each test at each well is provided in **Appendix D**. The transducers in the wells listed in **Table 5** were continuously recording for the duration of this task. The following tests were conducted:

- A falling head test was performed at well DW-1. The results from this test indicate a hydraulic conductivity of 1.3×10^{-5} centimeter/second (cm/sec). However, as described in a memo to the FDEP dated December 12, 2007, well DW-1 does not appear to be screened in the same zone as other AF Gravel wells. Rather, it appears to be screened above the AF Gravel and has limited connectivity to the AF Gravel wells. Hence, no further hydraulic testing was performed at this location;

- Specific capacity tests were performed at wells EW-UAFG-1, IWI-1, MW-127, and MW-134 to select the pumping rates for the longer term pumping tests. Each tested well was pumped separately for approximately one hour and then allowed to recover to its static water level before testing was conducted on the next well;

- One-day pumping tests were performed at three on-site AF Gravel wells to evaluate spatial distribution of interaction between the AF Gravel and LSAS. These tests were 24 hours in duration and were conducted at wells IWI-1, MW-127, and MW-134. The aquifer system was allowed to recover for at least 24 hours between tests. The extraction wells were observed to recover to within 90% of their static water levels during this time; and

- A 7-day pumping test was conducted at well EW-UAFG-1, with the intent of evaluating longer-term responses to pumping in the AF Gravel. Extraction began on January 7, 2008 and ended on January 14, 2008. The groundwater system was allowed to recover until January 21, 2008 after the cessation of extraction. **Figures 9A** through **9J** show the water level responses in the monitored zones during the pumping and recovery phases of this test. In addition, **Appendix E** provides data collected regarding the operation of the well located at the nearby golf course.

Manual water levels measured as part of the aquifer testing activities are provided in **Tables 7J** through **7M**.

4.3.5 Second Round of Comprehensive Static Water Level Measurements

After water levels in the groundwater zones had been allowed to recover following the final AF Gravel pumping test, a comprehensive round of water level measurements was completed at the available monitoring wells, extraction wells, and piezometers listed in **Table 5** and shown on **Figure 7**. In addition, field personnel monitored water level elevation at the available staff gauges. These water levels are in the process of being checked for accuracy and will be provided as part of a future report. Potentiometric surface maps illustrating the static groundwater elevations are being prepared and will be presented in the revised RAP.

4.3.6 IRAP System Startup

The IRAP groundwater recovery and treatment system was re-started on February 4, 2008. The extraction wells in the IRAP system were re-started at as close to the same time as possible. The pressure transducers at the wells listed in **Table 5** continued operating for approximately two weeks following the IRAP system startup. Additionally, water levels were measured manually approximately twice a week at the monitoring wells, extraction wells, and piezometers listed in **Table 5** during the system startup. The hydraulic response data collected will be used in the verification phase of the groundwater flow model development program.

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Appendix A

Geologic Logs and Well Completion Diagrams (In Compact Disc Holder)

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Appendix B

Laboratory Data Reports (In Compact Disc Holder)

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Appendix C

MIP Data Output (In Compact Disc Holder)

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Appendix D

Pressure Transducer Data (Data in Compact Disc Holder)

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Appendix E

Golf Course Well Operation Data

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Appendix F

Weather Data (Data in Compact Disc Holder)

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