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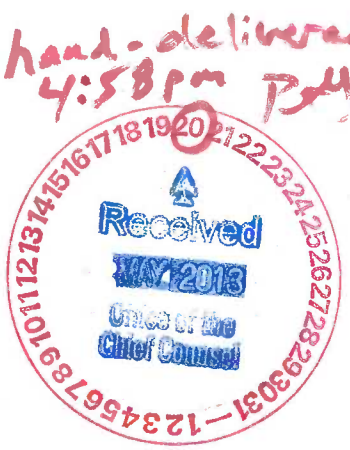

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

In the Matter of Order No. R4-2013-0063, Requirement for Technical Report Pursuant to California Water Code Section 13267 at Former Lockheed Martin Corporation Plants A-1 North located at 2555 North Hollywood Way, Burbank, California (File No. 104.5152); B-1 Located at 1705 Victory Place, Burbank California (File No. 104.0676); B-6 Located at 2801 North Hollywood Way, Burbank, California (File No. 104.0674); and C-1 Located at 10720 Sherman Way, Burbank, California (File No. 104.1343).	**PETITION FOR REVIEW OF LOS ANGELES REGIONAL WATER QUALITY CONTROL BOARD ORDER NO. R4-2013-0063**

Lockheed Martin Corporation ("Lockheed Martin" or "Petitioner") respectfully petitions the California State Water Resources Control Board ("State Board") to vacate Los Angeles Regional Water Quality Control Board ("Regional Board") Order No. R4-2013-0063 ("Order") pursuant to Section 13320 of California Water Code and Section 2050 of Title 23 of the California Code of Regulations (CCR). Lockheed Martin also respectfully requests that the State Board hold this Petition in abeyance to allow additional discussions between Lockheed Martin and the Regional Board regarding the Order, which may resolve some or all of the issues presented in this Petition, pursuant to Section 2050.5(d) of Title 23 of the CCR.

I. NAME AND ADDRESS OF PETITIONER

Lockheed Martin Corporation
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Petitioner can be contacted through counsel: Alan N. Bick, Gibson, Dunn & Crutcher LLP, 3161 Michelson Drive, Suite 1200, Irvine, California 92612, telephone: (949) 451-3800, email: ABick@gibsondunn.com.

II. THE SPECIFIC ACTION OR INACTION OF THE REGIONAL BOARD WHICH THE STATE BOARD IS REQUESTED TO REVIEW AND A COPY OF ANY ORDER OR RESOLUTION OF THE REGIONAL BOARD WHICH IS REFERRED TO IN THE PETITION

This Petition is filed in response to the Order issued to Lockheed Martin attached hereto as Exhibit 13.

III. THE DATE ON WHICH THE REGIONAL BOARD ACTED OR REFUSED TO ACT OR ON WHICH THE REGIONAL BOARD WAS REQUESTED TO ACT

The Regional Board issued its Order on April 18, 2013.

IV. A FULL AND COMPLETE STATEMENT OF THE REASONS THE ACTION OR FAILURE TO ACT WAS INAPPROPRIATE OR IMPROPER

The State Board should vacate the Order in its entirety because it is unsupported, would impose significant burdens upon Lockheed Martin without clear benefit, and thus constitutes an abuse of discretion and an arbitrary and capricious action in violation of law.

A. LOCKHEED MARTIN HAS EXTENSIVELY CHARACTERIZED AND REMEDIATED THE PROPERTIES COVERED BY THE REGIONAL BOARD'S ORDER

The Regional Board's Order mandates that Lockheed Martin perform substantial subsurface investigation at former Lockheed Martin properties within the City of Burbank. The properties at issue, formerly known as Plant A-1 North, Plant B-1, Plant B-6, and Plant C-1, were owned and operated by Lockheed Martin and its predecessors for aircraft manufacturing, assembly, maintenance, and related research and development from the late 1920s until 1994. The stated purpose of the

Regional Board's Order is to "delineate" volatile organic compounds ("VOCs") and hexavalent chromium that might exist in subsurface soil and groundwater.

Lockheed Martin has already extensively investigated, characterized, and remediated the facilities covered by the Board's Order in cooperation with the Environmental Protection Agency (EPA) and the Regional Board. These facilities exist within the Burbank area of the San Fernando Valley Superfund Sites, actively managed in different capacities by EPA and the Regional Board since the early 1980s.[1] In the Burbank area alone, Lockheed Martin has removed hundreds of thousands of pounds of VOCs (more than 234,000 pounds through its Burbank Operable Unit Water Treatment Plant monitored by EPA), excavated hundreds of thousands of tons of contaminated soil containing VOCs and metals (including hexavalent chromium), and continues to mitigate groundwater and soil vapor. Further, Lockheed Martin's partnership with the Cities of Burbank and Glendale has ensured safe drinking water for the Valley's citizens, all while returning the former Lockheed Martin properties to beneficial use for the community. In fact, the properties covered by the Order have been repaved and redeveloped and are currently utilized by various third parties for a multitude of beneficial industrial and commercial operations.

The following provides a non-comprehensive summary of just some of the investigation and remediation conducted at the specific locations covered by the Regional Board's Order, which constitute only a portion of the remedial work performed by Lockheed Martin in the Burbank area.

1. Plant A-1 North

Since 1985, Lockheed Martin has conducted more than 61 environmental investigations and assessments at the former Plant A-1 North, with the majority occurring pursuant to the Regional Board's Cleanup and Abatement Order No. 87-161. These investigations included environmental site assessments, Underground Storage Tank (UST) leak detection programs, and soil, soil vapor, and groundwater investigations. The purpose of these investigations was to characterize and delineate the extent of chemicals existing in the subsurface, including VOCs and chromium and hexavalent

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[1] EPA has taken the lead on monitoring and remediating groundwater throughout the San Fernando Valley Groundwater basin, including at and around the areas covered by the Order.

chromium. Lockheed Martin identified a total of 127 features of environmental concern, drilled 500 soil borings, and collected and analyzed 1,402 soil samples, with some samples collected as deep as 180 feet below ground surface.

Lockheed Martin conducted more than 31 remedial activities at the former Plant A-1 North as a result of its extensive investigation. Through these remedial activities, which included various UST removals, delineation excavation, demolition and removal of other subsurface features of concern, and soil vapor extraction, Lockheed Martin removed more than 32,000 pounds of VOCs and 13,000 tons of metal (including chromium and hexavalent chromium), Total Petroleum Hydrocarbons (TPH), or VOC impacted soil.

Lockheed Martin's remedial activities resulted in a total of 130 "No Further Requirements" letters from the Regional Board. Groundwater oversight has been transferred to EPA. Lockheed Martin understands that a site-wide No Further Action ("NFA") determination for former Plant A-1 North will issue soon, following the finalization of restrictive covenants. The area currently houses mixed commercial, parking lots, and the currently constructed Regional Intermodal Transportation Center at the Burbank Bob Hope Airport. A partial chronology of investigation and remediation events at Plant A-1 North is attached hereto as Exhibit 1 and supporting documentation is included as Exhibit 6. *See also* Exhibits 5 and 10.

2. Plant B-1

Similarly, former Plant B-1 has been the subject of more than 100 environmental assessments and investigations by Lockheed Martin. This includes UST leak detection programs, and soil, soil vapor, and groundwater investigations specifically intended to characterize and delineate the extents of chemicals, including VOCs, chromium, and hexavalent chromium. Lockheed Martin's investigations and assessments resulted in more than 500 soil borings or sampling locations with more than 4,000 samples collected and analyzed specifically for VOCs and metals (including chromium and hexavalent chromium).

Lockheed Martin conducted extensive remedial activities based on these investigations and assessments. This includes the installation of the AquaDetox system at Buildings 175/180, UST removals and closures, demolition and removal of other subsurface features of concern, removals

within the former buried debris area, and installation and operation of the currently active soil vapor extraction (SVE) system—all of which has resulted in removal of over 180,000 pounds of VOCs and approximately 212,000 tons of metal (including chromium and hexavalent chromium), TPH, or VOC impacted soil.

As a result, the Regional Board has issued six "No Further Requirements" letters, including one concluding that no further requirements for the Site are warranted except for the SVE system, which removes approximately 350 pounds of VOCs per year. Groundwater oversight has been transferred to EPA. The area currently houses mixed commercial and office space as well as multiple parking lots. A partial chronology of investigation and remediation events at Plant B-1 is attached hereto as Exhibit 2 and supporting documentation is included as Exhibit 7. *See also* Exhibits 5 and 10.

3. Plant B-6

Since 1989, Lockheed Martin has conducted more than 25 environmental investigations and assessments at the former Plant B-6 that identified various features of environmental concern. Lockheed Martin's efforts involved 295 borings and samplings and collection and analysis of 891 samples specifically for metals (including total chromium and hexavalent chromium) and VOCs.

Based on the data gathered from these investigations and assessments, Lockheed Martin conducted various remedial activities at former Plant B-6 prior to the Airport Authority claiming the property under eminent domain. These remedial activities included UST removals and closures and demolition and removal of other subsurface features of concern, reducing metal (including total chromium and hexavalent chromium), TPH, or VOC impacted soil by over 6,000 tons.

As a result, the Regional Board has issued 12 "No Further Requirements" letters for former Plant B-6 as well as an NFA. Groundwater oversight has been transferred to EPA. The area currently houses office buildings, parking lots, storage units, airport parking, and a large paved area that is used by the Burbank Police Department for motorcycle training. A partial chronology of investigation and remediation events at Plant B-6 is attached hereto as Exhibit 3 and supporting documentation is included as Exhibit 8. *See also* Exhibits 5 and 10.

4. Plant C-1

Finally, former Plant C-1 has also been the subject of more than 30 historical environmental investigations and assessments characterizing various features of environmental concern. Through these investigations and assessments, Lockheed Martin sampled 93 locations and collected and analyzed 260 samples specifically for metals (including total chromium and hexavalent chromium) and VOCs.

Based on the data gathered from its investigations and assessments, Lockheed Martin removed more than 110,000 tons of soil impacted with chromium, hexavalent chromium and/or VOCs at former Plant C-1. These remedial activities resulted in two Regional Board "No Further Requirements" letters and an NFA. Groundwater oversight has been transferred to EPA. The area currently houses a private aircraft terminal and hangar. A partial chronology of investigation and remediation events at Plant C-1 is attached hereto as Exhibit 4 and supporting documentation is included as Exhibit 9. *See also* Exhibits 5 and 10.

B. THE BOARD PREMISES ITS ORDER ON AN UNSUPPORTED CONCLUSION

The Regional Board's Order casts aside more than 25 years of thorough remedial actions as well as EPA's and the Regional Board's own findings regarding their efficacy. As justification, the Regional Board concludes that "[p]reviously investigated areas of the former plants A-1 North, B-1, B-6, and C-1, as well as areas affected by historical industrial waste water discharge produced from the various former Lockheed facilities have not been fully delineated with respect to VOCs or hexavalent chromium." Exhibit 13 at 5 (LMC-PET-00003052). Based on this conclusion, the Regional Board orders Lockheed Martin to conduct additional subsurface investigation of at least 50 different features as deep as 150 feet below ground surface, at Lockheed Martin's expense. *Id.* at 8-11 (LMC-PET-00003055-LMC-PET-00003058).

Yet, the Regional Board fails to set forth any evidence or analysis that would support the rationale for its decision. Instead, it references without elaboration a single report submitted in April

2012, which does not actually support the Regional Board's conclusion,[2] "as well as historical documents contained in [the Regional Board's] case files for the various former facilities." Exhibit 13 at 5 (LMC-PET-00003052). Such vague and conclusory remarks cannot satisfy California Water Code section 13267, which requires that the Regional Board "provide [Lockheed Martin] with a **written explanation** with regard to the need for the reports, and shall **identify the evidence** that supports [the Regional Board's Order]." To find otherwise would endow the Regional Board with unlimited, unreviewable authority and carte blanche to issue arbitrary and capricious orders. This is especially true where, as here, the Regional Board's "case files" likely contain hundreds of thousands of documents (if not more) submitted across several decades. Lockheed Martin simply cannot respond to the Regional Board's concerns without understanding their genesis. Nor can the State Board or a court of law effectively review the Regional Board's decisions without a true record.

Further, the evidence known to Lockheed Martin demonstrates the error of the Regional Board's conclusion. VOCs and hexavalent chromium have already been fully delineated at the former Burbank facilities as a direct result of Lockheed Martin's extraordinary investigation and remediation efforts. In fact, both EPA and Lockheed Martin have determined that exposure to and risk from contaminants that remain in the soil and groundwater are controlled, and have been for more than 10 years. Indeed, in addition to the extensive soil investigations and remediation, the impacted local groundwater is managed by EPA under the Burbank Operable Unit of the San Fernando Valley Superfund Site. The groundwater has been extracted by eight wells and treated at

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[2] To the contrary, the April 2012 report referenced by the Order demonstrates the breadth of data and delineation already completed by Lockheed Martin. *See* April 2012 Technical Report, Exhibit 11. In 2004, Lockheed Martin provided, in response to a Regional Board Order dated October 20, 2001 requesting a summary of technical data previously submitted, an electronic database and maps with data locations. The database indicated coordinates for sample locations, sample depths, sample collection dates, the results of analysis, the feature(s) that each sample was used to characterize, a reference to the report where the data was originally presented, and a note as to whether the sample was representative of current conditions (i.e., soil not removed) or only historic conditions (i.e., the soil was removed during remediation). The database was updated and corrected as a result of technical exchanges between the Regional Board and Lockheed Martin from 2004 to the present. Further, the database evolved to include soils data for metals representative of current conditions (i.e., soil not removed) at all the former Lockheed Martin Plants. The April 2012 report presented the previously submitted database information on maps and provided an updated B-1 electronic database to clarify soils removed and left in place. That database is included with this Petition (in electronic format only). *See* LMC-PET-00002985.

the Burbank Operable Unit Treatment Facility prior to municipal distribution since 1996.[3] Much of the remaining contamination continues to be removed at the Burbank Operable Unit Treatment Facility, at a continually declining rate. And while some remaining contaminants remain unfeasible to excavate or are managed by containment and/or isolation, additional controls are in place with the use of deed restrictions and Regional Board notification requirements to ensure that future land usage is appropriate. Thus, to the extent that contaminants still exist at the locations identified, they do not pose any threat to public health or the environment and require no further characterization.

C. THE BURDENS ASSOCIATED WITH CONDUCTING THE ADDITIONAL REQUESTED INVESTIGATION FAR OUTWEIGH THE PURPORTED BENEFITS

For many of the same reasons, the Order fails to satisfy the mandatory statutory criterion that "the burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports." California Water Code, § 13267(a) and (b). As set forth above, all of the areas covered by the Order have already been extensively characterized and remediated under both EPA and Regional Board direction and oversight. Lockheed Martin has already fully investigated and delineated the identified areas with respect to VOCs and hexavalent chromium, and these contaminants have either been adequately remediated,[4] are already being fully addressed by Lockheed Martin's efforts in conjunction with EPA, or have already been determined not to pose any threat to public health or to the environment[5]; there can be no benefit derived from

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[3] Beneficial use of the groundwater by the City of Burbank has also been continuous since 1996, meeting or exceeding all state and federal drinking water standards and compliant with the City's policy of maintaining hexavalent chromium concentrations at or below 5 ppb.

[4] All of the former Lockheed Martin plants have been granted No Further Action status from the Regional Board, with the exception of two. As discussed above, a site-wide NFA for former Plant A1-North is pending finalization of restrictive covenants and the Regional Board has determined no further action is required for former Plant B-1 except for the operation of the SVE. Moreover, the fact that VOC mass removed by the SVE at B-1 continues to decline each year indicates that source areas have been addressed.

[5] According to EPA, "The remedy at [Burbank] is protective of human health and the environment because there is no exposure to untreated groundwater. The treatment system effluent contaminant concentrations are less than their regulatory cleanup goals. There are governmental controls in place that prevent exposure to untreated groundwater." *See* NHOU/BOU Five Year Review, 2008, Exhibit 12 at 10 (LMC-PET-00003004). EPA also concluded that "The presence of . . . hexavalent chromium . . . [is] not currently affecting the protectiveness of the remedy." *Id.* at 51 (LMC-PET-00003045).

further investigation. Further, notwithstanding the Regional Board's vague and generalized statement to the contrary, additional investigation will yield no identifiable benefit as any residual contaminants pose no threat as set forth above.

In contrast, the Order imposes a substantial burden upon Lockheed Martin. Lockheed Martin estimates that compliance with the Order will require several million dollars and potentially thousands of man hours. The true costs will likely exceed these initial estimates, as many of the Areas of Concern and investigation and analytical requirements remain unspecified or "TBD." *See* Exhibit 13, at 8-11 (LMC-PET-00003055-LMC-PET-00003058). Additionally, Lockheed Martin no longer owns any property in Burbank, and will therefore have to gain access to the 50 plus identified areas, many of which are located on Burbank Bob Hope Airport property. Moreover, the additional groundwater monitoring well data sought by the Order (a significant cost driver) will provide little value in delineating source areas of VOCs or hexavalent chromium, which are already being monitored and treated under EPA's direction. As a result, the burden imposed by the Order far outweighs the need for and benefits to be obtained.

D. CONCLUSION

Though it has been well over a decade since the last former Lockheed Martin manufacturing facility closed, Lockheed Martin remains an active presence in the Valley due to its ongoing participation with the agencies and communities in support of regional redevelopment. No other manufacturer with a former presence in the Valley has done as much to improve conditions while providing comprehensive reporting and documentation. Yet, it is Lockheed Martin that continues to receive overreaching orders to reassess properties cleaned and closed more than a decade ago. Lockheed Martin respectfully requests that the State Board avoid further undue burden by vacating the Regional Board's most recent Order.

V. THE MANNER IN WHICH PETITIONER IS AGGRIEVED

Petitioner is aggrieved for the reasons set forth in Section IV above.

VI. THE SPECIFIC ACTION BY THE STATE OR REGIONAL BOARD WHICH PETITIONER REQUESTS

Petitioner respectfully requests that the State Board: (i) accept this Petition; and (ii) vacate the 13267 Order. Petitioner also requests that the Petition be held in abeyance pursuant to CCR, Title 23, Section 2050.5(d), and reserves its right to supplement the Petition.

VII. A STATEMENT OF POINTS AND AUTHORITIES IN SUPPORT OF LEGAL ISSUES RAISED IN THE PETITION

Petitioner will provide a detailed statement of points and authorities in the event that the Regional Board fails to modify its Order following the parties' discussions, thereby necessitating a request that the State Board convert this Petition to active status.

VIII. A STATEMENT THAT THE PETITION HAS BEEN SENT TO THE APPROPRIATE REGIONAL BOARD AND TO THE DISCHARGERS, IF NOT THE PETITIONER

A true and complete copy of this Petition was sent electronically (without attachment) and by courier to the Executive Officer of the Regional Water Quality Control Board, Los Angeles Region, 320 W. 4th Street, Suite 200, Los Angeles, California 90013.

IX. A STATEMENT THAT THE ISSUES RAISED IN THE PETITION WERE PRESENTED TO THE REGIONAL BOARD BEFORE THE REGIONAL BOARD, OR AN EXPLANATION OF WHY THE PETITIONER COULD NOT RAISE THOSE OBJECTIONS BEFORE THE REGIONAL BOARD

Lockheed Martin has worked closely with the Regional Board to investigate, characterize, and remediate San Fernando Valley soils and groundwater for more than 25 years. Over the course of this past year and since issuance of the Order, Lockheed Martin and the Regional Board have discussed the characterization of site contaminants several times, most recently on May 2, 2013. Lockheed Martin identified the issues raised in this Petition during this most recent meeting, and remains hopeful that additional discussions will narrow or resolve these issues.

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Respectfully Submitted,

DATED: May 20, 2013

GIBSON, DUNN & CRUTCHER LLP
ALAN N. BICK
JOHN N. CARTER
SEAN S. TWOMEY

By: _____
ALAN N. BICK

Attorneys for Petitioner,
LOCKHEED MARTIN CORPORATION

CERTIFICATE OF SERVICE

I, Gricelda Rebollar, declare as follows:

I am employed in the County of Orange, State of California, I am over the age of eighteen years and am not a party to this action; my business address is 3161 Michelson Drive, Irvine, CA 92612-4412, in said County and State. On May 20, 2013, I served the following document(s):

PETITION FOR REVIEW OF LOS ANGELES REGIONAL WATER QUALITY CONTROL BOARD ORDER NO. R4-2013-0063

on the parties stated below, by the following means of service:

State Water Resources Control Board
Office of Chief Counsel
Jeannette L. Bashaw, Legal Analyst
1001 "I" Street, 22nd Floor
Sacramento, CA 95814

Executive Officer
LA RWQCB
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

☑ **BY MESSENGER SERVICE**: Providing true and correct copies to a professional messenger service for service for delivery before 5:00 p.m. on the above-mentioned date.

☐ **BY ELECTRONIC SERVICE**: On the above-mentioned date at _____ [a.m./p.m] , based on a court order or an agreement of the parties to accept service by electronic transmission, I caused the documents to be sent to the persons at the electronic notification addresses as shown above.

☑ I am employed in the office of Alan N. Bick, a member of the bar of this court, and that the foregoing document(s) was(were) printed on recycled paper.

☑ **(STATE)** I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

☐ **(FEDERAL)** I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 20, 2013.

Gricelda Rebollar

Exhibit 1

Partial Chronology of Remedial Actions at Plant A-1 North

Partial Chronology of Remedial Actions at Plant A-1 North

Underground Storage Tank Investigation (1984-85) Lockheed Martin implemented an Underground Storage Tank Leak Detection Program for all underground storage tanks at the Burbank facilities pursuant to RWQCB's direction.

Cleanup and Abatement Order 87-161 (1987) Cleanup and Abatement Order 87-161 required Lockheed Martin to investigate and remediate impacted soil and groundwater beneath their former facilities, specifically Plants B-1 and A-1. Groundwater oversight transferred to the EPA following extensive investigations and remediation.

Subsurface investigation Plant A-1 North (1988) Lockheed Martin conducted subsurface investigation of five containment pits associated with sumps and clarifiers in Building 69. VOCs and metals were detected at various locations.

Soil Vapor investigation Plant A-1 North (1988) Lockheed Martin conducted a plant-wide soil vapor survey, collecting 60 soil vapor samples at various depths.

Plant A-1 North Removal Actions (1994) Lockheed Martin removed features of concern (USTs, clarifiers, sumps, machine pits, and other structures).

Soil Excavation Plant A-1 North (1995) Lockheed Martin removed 13 tons of hydrocarbon-impacted soil encountered following UST removals in 1994.

Phase I Environmental Assessment Plant A-1 North (1995)

Site-wide Assessment at Plant A-1 North (1998-99) Lockheed Martin initiated a comprehensive site-wide subsurface assessment. The site was divided into 3 areas: Areas "A", "B", and "C". A total of more than 1,400 soil samples were collected from 183 borings. A total of 127 features of potential concern were identified.

Soil Excavation at Plant A-1 North (1999) Lockheed Martin removed 140 cubic yards of VOC-impacted soils from Area C/Bldg 70.

Soil Excavation at Plant A-1 North (1999) Lockheed Martin excavated Area A Feature 9 measuring 20 ft wide, 70 ft long and 25 ft bgs.

Soil Excavation at Plant A-1 North (1999-2000) Lockheed Martin excavated 5,075 cubic yards of metal-impacted soil at Area B/Bldg 69 (Features 28, 29, and 30)

No Further Requirements Issued for Plant A-1 North (1999-2001) Soil NFRs obtained for all of Area A, B (excluding Features 33 and 38), and C (excluding Feature 48).

- October 1999 –NFR for Area C feature 21, former compressors Building 71
- September 2000 –NFR Area C feature 5, former machine pad Building 75
- September 2000 –Partial NFR for Area A

- April 2000 –NFR for Area B feature 48, former clarifier A-1-S Building 69
- September 2000 –Partial NFR for Area A
- October 2000 –NFR for Area A feature 10, tank A-1-F
- March 2001 –NFRs for Area C feature 51, former refrigerator floor drain; feature 35, former paint booth; feature 19, former spar mill sump and sand trap; feature 49, former containment pit; feature 34, former boiler blowdown sump; feature 50, former conveyor trench; feature 1, former floor drains
- March 2001 –NFR for Area B feature 34, former sump A-1-ZE
- March 2001 –NFR for Area A feature 9, former degreaser pit
- April 2001 –NFRs for Area C feature 36, former sump Building 75; feature 15, former sump
- June 2001 –Partial NFR for Area A
- June 2001 –Partial NFR for Area B
- July 2001 –Partial NFR for Area C
- August 2001 –Partial Site-Wide NFR
- August 2001 –Partial NFR for Area B; NFR for Area B feature 6, former aluminum sulfuric anodizing process tank area
- August 2001 –NFR for Area C (except 48)
- November 2001 –NFR for Area B features 28, 29, and 30

Soil Excavation at Plant A-1 North (2002) Lockheed Martin removed 263 cubic yards of PCB-impacted soils beneath five transformers.

Soil Excavation at Plant A-1 North (2002) Lockheed Martin removed 2,156 tons of metal-impacted trash/debris.

SVE System at Plant A-1 North (2003-2009) SVE system operation with a Cat-Ox unit began January 27, 2003. SVE system operation with GAC vessels began December 27, 2004. Approximately 28,000 pounds of VOCs removed.

NFR Issued for A-1 North remaining features (2009) No further requirements for VOCs at Area B features 33 and 38, and Area C feature 48.

Exhibit 2
Partial Chronology of Remedial Actions at Plant B-1

Partial Chronology of Remedial Actions at Plant B-1

Plant B-1: Central (eastern 80-acre portion of the site)

- **Underground Tank Leak Detection Program (1983 - 1989)** Lockheed Martin identified and assessed a total of 52 underground tanks (including wastewater clarifiers, sumps, machine pits and utility vaults, as well as underground fuel storage tanks) between 1983 and 1989.

- **Follow-up Subsurface Soil Investigations (1986 - 1991)** Lockheed Martin conducted a series of follow-up subsurface soil investigations and removal/remediation for the central portion of Plant B-1 between the end of the underground tank leak detection program in 1986 and closure of the facility in 1991.

- **Environmental Assessment (1990 - 1991)** Lockheed Martin performed a comprehensive Environmental Assessment (EA) of Plant B-1 and identified historical Plant operations and features that could have caused chemical releases into the soil.

- **Comprehensive Subsurface Investigation (1991 - 1993)** Lockheed Martin performed a comprehensive subsurface investigation to determine the nature and extent of chemicals in the subsurface soils. At the direction of the RWQCB, hundreds of soil borings were completed and thousands of soil samples were collected.

- **Infrastructure Demolition and Remedial Actions (1993 - 1994)** Lockheed Martin demolished and removed all above ground and subsurface structures and excavated and removed chemically impacted soils above the site action levels in the upper 10 to 25 feet of soil.

- **Post-demolition Investigations and Removal/Remedial Actions (1994 - 1997)** Lockheed Martin conducted additional subsurface investigations and soil removal actions on the central portion of Plant B-1, including a soil gas survey in 1994 in the area of Building 149 to delineate the horizontal and vertical extent of impacted soil so that this area could be included in the soil vapor extraction (SVE) system design.

- **No Further Requirements (NFR) Letter (1996)** Based on the collection and evaluation of more than 11,000 soil samples, 1,000 soil gas samples, soil excavations and removal activities, and installation of an active soil vapor extraction system, the RWQCB issued a NFR letter on March 28, 1996, for shallow soils in the central portion of Plant B-1.

Plant B-1: Building 199 (southeastern 13-acre portion of the site)

- **Environmental Assessment (1989)** Lockheed Martin initiated Environmental Assessment (EA) for the Building 199 portion of Plant B-1.

- **Preliminary Subsurface Investigation (1990)** A total of 83 soil borings were drilled and 405 samples collected to evaluate the 59 areas of potential environmental concern identified in the EA. In addition, underground storage tanks (USTs) and dry wells were removed during this initial phase of investigation

- **Plant B-1 - Building 199 Demolition Activities (1991)** Lockheed Martin demolished Building 199.

- **Follow-up Subsurface Soil Investigations (1991 - 1993)** Based on the identification of discolored soil beneath the paving at Building 199, several additional investigations were conducted. From 1991 to 1993, six separate investigations were performed to characterize and delineate the extent of the chemicals encountered during the demolition program.

- **Excavation of Chemically Impacted Soil and Buried Debris (1993)** Chemically impacted soil and buried debris identified in the follow-up subsurface soil investigations were excavated and removed from the site. Approximately 5,653 tons of soil and 240 cubic yards of buried debris was excavated and transported off-site.

- **Post Excavation Subsurface Assessment (1993)** After the excavation activities, a supplemental subsurface investigation was performed to document the concentration and extent of residual chemicals remaining in the soil at the Building 199 area.

- **Issuance of No Further Requirements Letter (1994)** Based on the results of the multiple soil excavations and removal activities, and post excavation sampling results, the RWQCB issued a NFR letter for Building 199 on March 28, 1994.

Plant B-1 - Building 175/180 (western 12-acre portion of the facility)

- **Underground Storage Tank Leak Detection Investigation (1984)** Lockheed Martin performed investigations were performed of all underground tanks, clarifiers and sumps.

- **Subsurface Investigations of Building 175 Clarifier B-I-ZB (1985 - 1987)** Several soil investigations were performed to quantify and delineate the extent of PCE in soil beneath and around clarifier B-I-ZB.

- **Installation of Soil and Groundwater Treatment System at Clarifier B-I-ZB (1988)** RWQCB issued a Cleanup and Abatement Order (CAO) for the soil and groundwater beneath Building 175. Lockheed Martin subsequently designed and installed a soil and groundwater treatment system adjacent to clarifier B-I-ZB. The treatment system consisted of pumping and treating groundwater and a soil vapor extraction system. The system was reviewed by the RWQCB, California EPA - Department of Toxic Substance Control (DTSC), and EPA. The remediation system operated from approximately 1988 through 1994.

- **Preparation of an Environmental Assessment Report (1989)** Lockheed Martin initiated the preparation of an EA for Plant B-1 West under direction by RWQCB.

- **Preliminary Site Investigation of Plant B-1 West (Bldg. 175/180) (1994)** Lockheed Martin performed a comprehensive subsurface soil investigation for the B-1 West area. The site investigation consisted of soil borings at each location where the EA had

documented potential chemical usage, storage, dispensing or discharge. A total of 56 soil borings were drilled in the Building 175/180 area.

- **Plant B-1 Site-wide Soil Vapor Investigation (1994)** Lockheed Martin conducted a soil gas survey throughout all of Plant B-1, including the Building 175/180 portion of the site. The soil gas survey documented elevated soil vapor concentrations of PCE near clarifier B-I-ZB, the location that was undergoing active remediation through vapor extraction and groundwater treatment.

- **Completion of Soil and Groundwater Treatment at Clarifier B-I-ZB (1994)** After approximately 6 years of operation, the soil and groundwater treatment system for clarifier B-I-ZB was turned off. The remediation system was discontinued for two primary reasons: (1) the groundwater capture, extraction and treatment system had been installed down gradient of Plant B-1 - identified as the BOU Treatment System; and (2) no appreciable additional volatile organic compounds were being extracted from the subsurface soils.

- **Plant B-1 West, Building 175/180 Demolition and Slab Removal (1995)** Lockheed Martin demolished and removed the buildings and subsurface concrete and asphalt slabs in the western portion of Plant B-1. Demolition activities included the removal of the concrete clarifier B-I-ZB and sampling.

- **Plant B-1 West Supplemental Site Investigation Delineation Program (1996)** Lockheed Martin conducted further investigations at locations where elevated chemical concentrations were detected in 1994. As a result of the follow-on investigations, the presence of PCE was documented in fined-grained soils beneath former clarifier B-I-ZB.

- **Excavation of Soil at Area #3 at Building 175/180 Site (plant B-1 West) (1996)** Lockheed Martin excavated 472 cubic yards of soil contaminated with petroleum hydrocarbons and volatile organic compounds to a depth of 18 feet below ground surface from Area #3 at Building 175/180.

- **No Further Requirements Letter (1997)** RWQCB issued a NFR letter for Area #3 on January 29, 1997.

- **Excavation of Soil at Clarifier B-I-ZB at Northwest Corner of Building 175 (1997)** Lockheed Martin excavated soil to a depth of approximately 70 feet below ground surface in the area.

- **No Further Requirements Letter (1997)** RWQCB issued a NFR letter on May 2, 1997, for Building 175 former clarifier B-1-ZB Excavation.

- **Plant B-1 West Developer Due Diligence Survey (1998)** Lockheed Martin conducted a reconnaissance survey consisting of 158 soil gas samples from the westerly portion of Plant B-1. PCE was detected in the subsurface soil at the location of former clarifier B-I-ZB.

- **Plant B-1 West, Comprehensive Subsurface Soil Assessment (1998)** Lockheed Martin conducted an additional subsurface assessment of the area surrounding the northwest corner of former Building 175 (i.e., clarifier B-I-ZB), consisting of 76 soil gas samples and 28 soil matrix samples.

Plant B1: Site-Wide Soil Vapor Extraction

- **SVE System (1997)** Lockheed Martin installed a SVE system consisting of over 200 vapor extraction and injection vents to remediate VOC-impacted soil primarily below the northeastern part of the former B-1 Plant. The system began operation in July 1997.

- **First SVE Rebound Test (2002 - 2003)** Lockheed Martin submitted a Site Closure Work Plan to RWQCB, proposing a 12-month rebound test, which was then initiated in September 2002 and halted in January 2003 due to rebound concentrations that exceeded Cleanup Screening Levels (CSLs). Following the completion of the rebound test, an additional 12 vapor monitoring points (VMPs) were added to the site. One of the VMPs (i.e., VMP-5) was later converted to a vapor extraction point.

- **SVE Pulsing Operation (2003 – 2006)** In 2003 the operation of the SVE system switched from continuous to intermittent pulsing due to the lower concentrations of VOCs at the inlet to the treatment plant.

- **High Vacuum Booster Blower (2007)** Lockheed Martin installed a new blower, increasing the system vacuum from approximately 50 inches of water to 140 inches of water. The blower operated until the SVE system was shut down in September 2009.

- **Closure of SVE Branches E-1 and E-2 (2010)** Lockheed Martin submitted a closure work plan approved by the RWQCB. The plan to grout-in-place branches E-1 and E-2 was implemented in 2010 in advance of the City of Burbank planned widening of Empire Avenue.

- **Second SVE Rebound Test (2009 - 2010)** At the time of the system shut-down in September 2009, the volume of solvent recovered was estimated to be 14,740 gallons, or 191,620 pounds. Rebound data was collected from four quarterly events. Significant rebound was observed in several locations and the final rebound report was delayed to allow additional vadose zone modeling of the effects of the residual concentrations on underlying groundwater.

- **SVE Closure Petition (2011)** In May 2011, Lockheed Martin's contractor, AECOM, submitted the final results of four quarters of SVE rebound data to the RWQCB. The SVE System Shutdown and Rebound Testing Final Report included AECOM's request for a soils-only (e.g., SVE) closure. Vadose zone modeling provided with the report concluded that the impacts to underlying groundwater would result in groundwater VOC concentrations well below groundwater MCLs. At the time of the preparation of this Project Management Plan, the RWQCB response to the closure request is pending.

Exhibit 3

Partial Chronology of Remedial Actions at Plant B-6

Partial Chronology of Remedial Actions at Plant B-6

Soil Excavation (1985) Lockheed Martin removed 980 cubic yards of impacted soil associated with Pacific Airmotive Corporation (PAC) spill. Lockheed Martin is not responsible for soil cleanup at PAC; soil removal was executed prior to the identification of GE as a responsible party.

Underground Storage Tank Investigation (1984-1985) Lockheed Martin conducted UST Leak Detection Program of all underground storage tanks (USTs) at the Burbank facilities pursuant to RWQCB direction.

Cleanup and Abatement Order (1987) RWQCB issued Cleanup and Abatement Order (CAO) 87-161 to Lockheed Martin, requiring the investigation and remediation of impacted soil and groundwater beneath their former operations (specifically Plants B-1 and A-1). Groundwater oversight was later transferred to the EPA

Environmental Assessments (1991) Lockheed Martin conducted Environmental Assessments of Parcel 1 and Parcel 2.

Cleanup and Abatement Order (1992) RWQCB issued CAO No. 92-066 to Lockheed Martin, PAC, and American Real Estate Holding Limited Partnership. The CAO required the responsible parties to "identify and cleanup of the Plant B-6 East facilities that are sources of contamination to groundwater".

Soil investigation (1993) Preliminary subsurface soil investigation performed. Plant B-6 was divided into sub-areas, designated as Areas "A" through "F." A total of 203 borings were completed, 1,967 soil samples collected, and 118 areas of concern identified. Chemicals were detected at elevated concentrations at 35 locations. Five of the locations required no further action.

- Area A: 270 soil samples collected from 29 borings (to 30 or 60 ft below ground surface). Identified 16 features of concern.
- Area B: 272 soil samples from 30 borings (to 30 or 60 ft bgs). Identified 19 features of concern.
- Area C: 541 soil samples from 58 borings. (to 30 or 60 ft bgs). Identified 44 features of concern.
- Area D: 228 soil samples from 28 borings (to 30 or 60 ft bgs). Identified 8 features of concern.
- Area E: 330 soil samples from 29 borings (to 30 or 60 ft bgs). Identified 9 features of concern.
- Area F: 326 soil samples collected from 29 borings (to 30 or 60 ft bgs). Identified 22 features of concern.

Excavation at Building 369 (1994) Lockheed Martin removed 290 cubic yards of impacted soil associated with three debris excavation areas in February 1994.

Phase II Subsurface Soil Investigation (1995-1996) Phase II subsurface soil investigation performed. Site divided into 13 Areas of delineation. 912 samples were collected from 59 borings. NFRs were issued for 11 of the areas.

Soil Excavations (1996)

- Removal of 590 cubic yards of impacted soil associated with Building 370 sump/sand trap excavation (Area #1) in September 1996.
- Removal of 900 cubic yards of impacted soil associated with Building 352 former sewage sump (Area #6) in October 1996.
- Removal of 59 cubic yards of impacted soil associated with 17 excavations in July 1996. More soil (i.e., the majority of soil excavated) was excavated but deemed reusable at the site.

No Further Requirements Issued (1996-1997) RWQCB found that all regulatory requirements had been met so many parcels at B-6 were released from any further requirements of CAO 87-161.

- July 1996 –NFR Parcel D and F
- August 1996 –NFR for Parcel B
- August 1996 –NFR for Parcel C
- August 1996 –NFR for Parcel G
- August 1996 –NFR for Parcel I
- August 1996 –NFR for Parcel L
- October 1996 –NFR for Parcel H
- October 1996 _NFR for Area #3 Building 535 dry well and reservoir sump
- October 1996 –NFR for Area #4 Building 353 process lines
- October 1996 –NFR for Area #7 Building 88 former fuel UST
- November 1996 –NFA for Parcel E
- November 1996 –NFR for Area #5 Building 353 former TCA degreaser
- December 1996 –NFA for Parcel A

- December 1996 –NFR Parcel J
- August 1997 –NFR for Plant B-6 West

Demolition (1997) Lockheed Martin conducted foundation and infrastructure demolition in southern part of the site.

Soil Excavation at Building 371 (2000) Lockheed Martin removed 203 cubic yards of VOC-impacted soil and 525 cubic yards of chromium-impacted soil associated with Building 371 demolition.

Exhibit 4
Partial Chronology of Remedial Actions at Plant C-1

Partial Chronology of Remedial Actions at Plant C-1

Underground Storage Tank Investigation (1984-1985) Lockheed Martin conducted a UST Leak Detection Program of all underground storage tanks (USTs) at the Burbank facilities under RWQB direction.

Cleanup and Abatement Order (1987) RWQCB issued Cleanup and Abatement Order (CAO) 87-161 to Lockheed Martin. The CAO required Lockheed Martin to investigate and remediate impacted soil and groundwater beneath their former operations (specifically Plants B-1 and A-1). Groundwater oversight was later transferred to the EPA

Closure of Tank C-1-A (1989)

NFR Issued (1990) No further soil investigation or soil remediation required at Building 528.

Soil Excavation (1992-1993) Lockheed Martin removed 93,834 cubic yards of soil, including clean soil used for backfill, during Phase I and II excavations at Buildings 35, 40, and 41 in the southwest and southeast corner from January 1992-August 1993. Total of 48,098 cubic yards of soil (class I waste) and 17,760 cubic yards of soil (class III waste).

Soil Excavation CMP trench (1993) Lockheed Martin removed 196 cubic yards of soil (class III waste) associated with CMP trench excavations in January 1993.

Soil Excavation Building 44 (1993) Lockheed Martin removed 200 tons of soil near Building 44 water vault area in October 1993.

NFR Issued (1994) No further remediation required at C-1. Former plant C-1 excluded from requirements set forth in Clean Up and Abatement Order 87-161.

Exhibit 5
Q4 Semiannual Report

Semiannual Groundwater Monitoring Report Fourth Quarter 2012
Burbank Operable Unit
Burbank, California

Prepared for:

Lockheed Martin

Prepared by:

ARCADIS U.S., Inc.

January 30, 2013

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Table of Contents

Appendices

List of Figures

List of Tables

Acronyms and Abbreviations

ARCADIS	ARCADIS U.S., Inc.
BAL	blank action level
B-HSU	deeper water table hydrostratigraphic unit
BOU	Burbank Operable Unit
CAO	Cleanup and Abatement Order
CDPH	California Department of Public Health
COB	City of Burbank Water and Power
COC	constituent of concern
CSM	conceptual site model
cis-1,2-DCE	*cis*-1,2-dichloroethene
EDGE	Electronic Data Gathering Environment
ESD	Explanation of Significant Differences
ft/ft	foot per foot
GE	General Electric
GMP	groundwater monitoring program
gpm	gallons per minute
LARWQCB	California Regional Water Quality Control Board, Los Angeles Region
LPGAC	liquid-phase granular-activated carbon
Lockheed Martin	Lockheed Martin Corporation
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
MCL	maximum contaminant level
MDL	method detection level
µg/L	microgram(s) per liter
MS/MSD	matrix spike/matrix spike duplicate
MTBE	methyl tert-butyl ether
NDMA	n-nitrosodimethylamine
NHOU	North Hollywood Operable Unit
NPL	National Priorities List
OSP	Operational Sampling Plan
PAC	Pacific Airmotive Corporation
PCE	tetrachloroethene
PRP	potentially responsible party
QA/QC	quality assurance and quality control
ROD	Record of Decision
RPD	relative percent difference
SAL	state action level
SFV	San Fernando Valley

SM	standard method
SOP	standard operating procedure
TCE	trichloroethene
1,2,3-TCP	1,2,3-trichloropropane
TDS	total dissolved solids
TIN	triangular irregular network
TOC	total organic carbon
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WQO	Water Quality Objective
WT-HSU	water table hydrostratigraphic unit

Section 1
Introduction

On behalf of Lockheed Martin Corporation (Lockheed Martin), ARCADIS U.S., Inc. (ARCADIS) has prepared this groundwater monitoring report presenting the results of the ongoing quarterly water level and semiannual water quality monitoring performed at the Burbank Operable Unit (BOU), located in Burbank, California. The BOU is part of the North Hollywood National Priorities List (NPL) site in the San Fernando Valley (SFV) (Figure 1).

Groundwater monitoring activities are conducted at the BOU by Lockheed Martin to comply with the provisions of the United States Environmental Protection Agency (USEPA) Consent Decree (Docket No. 91-4527-MRP [Tx]) filed on March 25, 1992, and California Regional Water Quality Control Board, Los Angeles Region (LARWQCB) Cleanup and Abatement Order (CAO) No. 87-161, dated December 17, 1987. The groundwater monitoring activities detailed in this report were conducted in accordance with the Draft Phase 2 Operational Sampling Plan (OSP) (HSI Geotrans 1997) as modified by the documents described and referenced in Section 1.2. The Draft Phase 2 OSP provided a summary of the objectives, schedule, rationale, and field procedures for collecting water level and water quality data; quality assurance and quality control (QA/QC) procedures; and analytical methods for monitoring the groundwater well network.

1.1 GENERAL OVERVIEW AND OBJECTIVES OF THE GROUNDWATER MONITORING PROGRAM

A groundwater monitoring program (GMP) was implemented by Lockheed Martin at the BOU in December 1986. The GMP has been performed since that time. The primary purpose of the BOU GMP is to assess the effectiveness of the groundwater extraction and treatment system currently operating at the site. The BOU GMP employs wells screened within the water table hydrostratigraphic units (WT-HSUs) and the deeper water table hydrostratigraphic unit (B-HSU). The HSUs are further described in the conceptual site model (CSM) included as Appendix A.

As part of the GMP, between 1986 and 1988, water levels were measured only at wells where water quality was monitored, but not necessarily at the same frequency. Groundwater levels at Lockheed Martin monitoring wells were measured monthly between 1988 and 1997. Following implementation of the OSP in 1997, and continuing until April 2012, water level measurements at all operational and routine monitoring wells (refer to the OSP for well designations) have been collected quarterly, including the observation wells (OW-VO1 through OW-VO7) associated with the BOU treatment system extraction array. Water levels have been continuously monitored at extraction wells VO-1 through VO-8 as part of the operation and monitoring of the BOU groundwater extraction and treatment system.

In addition to water level measurements, water quality monitoring at the BOU has been performed as part of the GMP. Since 1986, six different phases of water quality monitoring have occurred. For details on these previous phases, please refer to the OSP. Presently, wells at the BOU are sampled annually or semiannually in accordance with the OSP. The monitoring frequency and analyte selection identified in the OSP were based on several factors, including estimates of the capture zone developed from the operation of the BOU treatment system, the presence and distribution of chemical constituents in groundwater, historical analytical data, and established regulatory monitoring requirements. As noted in Section 1.2, several monitoring wells and analytes have also been added to the GMP by the USEPA and LARWQCB since the OSP was implemented.

Following a settlement agreement between Pacific Airmotive Corporation (PAC; an indirect wholly-owned subsidiary of General Electric [GE]) and Lockheed Martin, the eight monitoring wells on the PAC sites (Figure 2) were incorporated into the BOU GMP in 2005. Water levels and quality from these wells are being documented as required by the USEPA in letters directed to GE dated October 20, 2005 (USEPA 2005) and June 8, 2007 (USEPA 2007) and those data are incorporated herein.

1.2 REGULATORY HISTORY OF THE GROUNDWATER MONITORING PROGRAM

The BOU GMP outlined in the OSP has been revised and updated over the years to incorporate numerous USEPA and LARWQCB requests and recommendations, as summarized in the following table.

Summary of Groundwater Monitoring Program Modifications (Tetra Tech, Inc. 2012)

Date	Summary of Modifications
June 28, 2001	USEPA Methods 8010 and 8020 for halogenated volatile organic and purgeable aromatic compounds were replaced by USEPA Method 8260B for volatile organic compounds (VOCs), including freon-113 and methyl tert-butyl ether (MTBE). Also, LARWQCB requested hexavalent chromium analysis by USEPA Method 218.6.
March 28, 2002	Analysis for 1,2,3-trichloropropane (1,2,3-TCP) was added to the GMP.
November 18, 2002	Monitoring of wells B-6-CW01, B-6-CW02, B-6-CW03, B-6-CW03R, and B-6-CW16 for VOCs and heavy metals was added to the GMP. 1,2,3-TCP was added to the discussion and analysis of constituents of concern (COCs) in the groundwater monitoring reports.
December 16, 2003	LARWQCB requested sampling and analysis for emergent chemicals (perchlorate, n-nitrosodimethylamine [NDMA], and 1,4-dioxane) in addition to 1,2,3-TCP and hexavalent chromium as part of the BOU GMP.
September 2004	USEPA requested that Lockheed Martin continue to monitor upgradient wells for emerging contaminants and evaluate the spatial distributions and concentrations of emergent contaminants at the BOU site.
December 8, 2004	After reviewing the results of emergent chemical sampling, LARWQCB limited monitoring of emergent chemicals at the site to specific wells.
April 27, 2005	Lockheed Martin submitted a request to USEPA, with a copy to LARWQCB, to change the BOU GMP sampling schedule from the first and third quarters to the second and fourth quarters.
October 20, 2005	USEPA sent a letter to GE requesting sampling of eight monitoring wells at the former PAC site. Due to a settlement agreement between Lockheed Martin and PAC (an indirect wholly-owned subsidiary of GE), Lockheed Martin is responsible for monitoring and reporting these wells. Monitoring of the PAC wells is currently conducted semiannually concurrent with the BOU GMP.
February 10, 2006	USEPA requested sampling of nine BOU monitoring wells in the vicinity of former Lockheed Martin Plants B-5 and C-1.
November 3, 2006	USEPA concurred with proposed changes to the sampling frequency for specific constituents.

Date	Summary of Modifications
October 22, 2010	USEPA requested monitoring of 14 BOU wells as part of the North Hollywood Operable Unit (NHOU) Baseline Sampling Program.
November 3, 2010	USEPA approved the combination of GE's PAC and Lockheed Martin's BOU Semiannual Reports.
February 25, 2011	USEPA requested that Lockheed Martin and other potentially responsible parties (PRPs) within the SFV modify sampling schedules to April and October to coincide with Basinwide Remedial Investigation sampling being performed under USEPA oversight for the SFV superfund sites.

Section 2
Groundwater Monitoring Field Activities

The following sections present the details of groundwater gauging, purging and sampling activities completed during the fourth quarter of 2012. All field activities were performed in accordance with the site-specific health and safety plan (ARCADIS 2012) and under the supervision of a State of California Professional Geologist. Details of the field procedures implemented during the fourth quarter monitoring activities are provided in Appendix B.

2.1 GROUNDWATER LEVEL MEASUREMENTS

Between October 8 and 11, 2012, groundwater levels were measured in select BOU wells for the fourth quarter monitoring event. Table 1 identifies the wells scheduled to be gauged during the event. Groundwater levels were measured in all of the wells scheduled to be gauged.

The gauging data were recorded on Electronic Data Gathering Environment (EDGE) data forms, hard copies of which are provided in Appendix C. Groundwater level measurements and calculated elevation data for the fourth quarter 2012 are summarized in Table 2.

2.2 GROUNDWATER PURGING AND SAMPLING

Between October 11 and 17, 2012, groundwater samples were collected from the 35 wells scheduled for sampling in accordance with the standard operating procedures (SOPs) presented in the Draft Phase 2 OSP. The list of wells scheduled to be sampled, as well as the planned analytical program for each, is presented in Table 1. Purge volumes and field stabilization parameters (e.g. pH, temperature, electrical conductivity, dissolved oxygen, turbidity, and oxidation-reduction potential) were recorded on EDGE electronic data forms, hard copies of which are provided in Appendix C.

Groundwater samples collected from BOU wells during the fourth quarter 2012 were analyzed for one or more of the following using the noted laboratory methods:

- VOCs; including freon-113 and MTBE, using USEPA Method 8260B
- 1,2,3-TCP using USEPA Method 8260M
- 1,4-dioxane using USEPA Method 8270C(M) Isotope Dilution
- Title 22 metals (including iron, manganese, total chromium, and/or thallium) using USEPA Methods 6010B/7470A
- Hexavalent chromium using USEPA Method 218.6
- Nitrite/nitrate as nitrogen using USEPA Method 300.0
- Total dissolved solids (TDS) using Standard Method (SM) 2540-C
- General minerals including calcium and magnesium (USEPA Method 200.7); silicon (SM 4500-Si-C); chloride, fluoride, and sulfate (USEPA Method 300.0); pH (SM 4500-H+B); specific conductance (SM 2510-B); total alkalinity (SM 2320-B); and total organic carbon (TOC; SM 5310B)

Copies of chain-of-custody forms and the laboratory analytical reports are provided in Appendix D. Analytical results for detected organic and inorganic analytes are summarized in Table 3.

2.3 QUALITY ASSURANCE/QUALITY CONTROL

To ensure accurate and reproducible field measurements, the instruments and equipment used were maintained, calibrated, and operated in accordance with the manufacturer's specifications, guidelines, and recommendations and as further detailed in the OSP.

In accordance with USEPA QA/QC guidance, trip blanks, duplicate samples, and equipment blanks were collected for each applicable analytical method to assess whether cross-contamination

of the environmental samples occurred during handling, while in transit, and/or as a result of contamination from sampling equipment. Trip blanks for VOC analysis were provided by Associated Laboratories and placed inside each cooler containing groundwater samples to be analyzed for VOCs. Duplicate samples were collected at a frequency of 10 percent to assess sampling and analytical precision. Nine monitoring wells (A-1-CW07, B-1-CW12, B-1-CW13, B-1-CW17, B-5-CW03, B-6-CW03R, C-1-CW03, MW-5, and MW-8) were selected for duplicate sampling and analysis for at least one of the analytical methods identified in Section 2.2. The duplicate sample names were followed by "DUP" (e.g., MW-5 DUP is the duplicate for sample MW-5). To ensure proper decontamination between samples, equipment blanks were collected on each sampling day by passing laboratory-provided deionized water over decontaminated sampling equipment, then into the appropriate sample containers. Equipment blank samples were analyzed for the full suite of constituents identified in Section 2.2. Environmental sample validation based on relative percent difference (RPD) values calculated from field duplicate and primary sample results is discussed in Section 3. Analytical results for the duplicate samples are summarized with other analytical results in Table 3.

2.4 DEVIATIONS FROM OSP

No deviations from the OSP occurred during the fourth quarter 2012 field event.

Section 3
Groundwater Monitoring Results

The following sections present the groundwater level and quality results obtained during the fourth quarter 2012 groundwater monitoring event.

3.1 GROUNDWATER ELEVATION DATA

The localized BOU hydraulic gradient orientations and magnitudes within and between the WT-HSUs and B-HSU are summarized in the following sections. The hydraulic gradients in relation to the extraction system operations and potential capture are discussed further in Section 6.2.

Calculated groundwater elevations for the October monitoring event are listed in Table 2. Wells B-6-CW03 and B-6-CW06 were dry wells during the October monitoring event and therefore have no associated groundwater elevations. Potentiometric maps based on the groundwater elevation data are shown on Figures 3 and 4. The potentiometric surface maps were generated using a combination of Golden Software's Surfer version 10 and hand-contouring. Groundwater elevation data were imported into the program and initial contours were generated using the kriging algorithm and then adjusted by hand using professional judgment.

3.1.1 Water Table HSUs

During the October monitoring event, the overall hydraulic gradient in the WT-HSUs was oriented toward a hydraulic low centered on the area around V01A, V02A, V03A, and V04A in the southeastern portion of the BOU (Figure 3). The apparent cone of depression illustrated in this area propagates outward in a somewhat ovoid shape with the long axis oriented predominantly in a northwest-southeast direction. Gradient magnitudes varied from a low of approximately 0.003 foot per foot (ft/ft) in the northwestern portion of the BOU to a high of approximately 0.007 ft/ft in the area of groundwater pumping center at V03A.

3.1.2 B-HSU

During the October monitoring event, the hydraulic gradient in the B-HSU was oriented to the southeast over the majority of the BOU area (Figure 4) towards the pumping center. A hydraulic low centered on the area around V03B was observed in the southeast quadrant of the BOU. The apparent cone of depression illustrated in this area propagates outward from V03B an average distance of approximately 2,400 feet in a relatively concentric manner. Gradient magnitudes varied from a low of approximately 0.002 ft/ft in the northern and western portions of the BOU to a high of approximately 0.03 ft/ft in the area slightly west of V03B.

3.1.3 Vertical Gradients in Clustered Wells

The USEPA's 2004 Five-Year Review included an annual evaluation of the potential for downward vertical migration of groundwater and COCs within the BOU from the various WT-HSUs to the underlying B-HSU (USEPA 2004). For this report, vertical gradients were calculated for 17 well pairs (i.e., collocated WT- and B-HSU wells) using groundwater elevations measured in the fourth quarter 2012 to evaluate the potential for vertical groundwater flow between hydrostratigraphic units.

The vertical gradients for each well pair were calculated using the following equation:

$$i = (h_{B\text{-}HSU} - h_{WT\text{-}HSU})/d$$

where

$h_{B\text{-}HSU}$ = hydraulic head of B-HSU well (ft)

$h_{WT\text{-}HSU}$ = hydraulic head of WT-HSU well (ft)

d = distance between midpoint of monitoring well screens (ft)

i = vertical gradient

For wells screened across the water table, the midpoint of the screen was calculated by using the water level and the bottom of the well screen.

The magnitude and direction of the calculated vertical gradient indicate whether the potential exists for groundwater to flow vertically and in which direction it would flow—in this case, a positive result indicates an upward flow potential, while a negative result suggests a downward flow potential. The well pairs, the corresponding groundwater elevation data from the October 2012 gauging event, and the calculated vertical gradients (magnitude and direction) between the B-HSU and the overlying WT-HSUs are presented in Table 4. The locations of the wells used for the evaluation are shown on Figure 2.

As shown on Figure 2, the well clusters are distributed throughout the BOU—upgradient, downgradient, and in the immediate vicinity of the BOU extraction system. Four of the well pairs analyzed for vertical gradient are located within the line of BOU extraction wells (well cluster sets 3850N/3850R, B-1-CW13/B-1-CW28, B-1-CW25/B-1-CW27, and B-1-CW12/B-1-CW11). Of these four well pairs, only 3850N/3850R had a downward vertical gradient (-0.27 ft/ft). Vertical gradients at well pairs B-1-CW13/B-1-CW28, B-1-CW25/B-1-CW27, and B-1-CW12/ B-1-CW11 were upward with gradient values of 0.07, 0.11, and 0.07 ft/ft, respectively. Vertical hydraulic gradients at 12 of the 13 well pairs located outside the line of BOU extraction wells also indicated upward vertical gradients for the fourth quarter 2012 event. Vertical gradients at these locations varied from 0.002 ft/ft at B-5-CW03/B-5-CW02 to 0.09 ft/ft at B-6-CW03R/B-6-CW02. Well pair 3852M/3852N, located downgradient of the BOU extraction wells, had a slight (-0.01 ft/ft) downward gradient.

3.1.4 Water Level Trends

Water level trends were evaluated for each well equipped with a transducer and each of the wells currently being manually gauged. A total of 14 wells were equipped with transducers/data loggers to continuously monitor groundwater levels on a 15-minute recording interval. The recorded groundwater-level data were converted to groundwater elevations, and hydrographs were completed for each of these wells (hydrographs for wells with transducers are provided in Appendix E). The transducers are non-vented, and data have been corrected for the barometric pressure recorded at weather station CQ067 located in the southeastern portion of the BOU near the intersection of Victory Boulevard and West Palm Avenue (University of Utah, 2012).

Barometric data recorded at well 3852J could not be used due to a failure in the date/time stamp recorder within the transducer.

Wells equipped with transducers were all located south of the BOU extraction wells. Overall, between the timeframe of April 10, 2012 to October 8, 2012 (i.e. since the last monitoring period), the data show little change in groundwater levels with total fluctuations typically on the order of approximately ± 1 foot and no significant net loss or gain. Variations from this overall trend and additional observations are detailed below.

- Wells 3852M, 3862D, and 3872Q show a progressive deviation between transducer data and correlating manual measurements over the last 2 years. Further evaluation of this, including verification of the depths at which the transducers are set, will be performed following the next field event.

- Well 3871H, screened within the A zone of the WT-HSUs, has a general increasing trend as with most of the WT-HSU wells; however, there are several short-term patterns of rapid drawdown and apparent recovery. These patterns and the relative proximity of 3871H to extraction wells VO1A, VO2A, and VO3A suggest that water levels in the well are influenced by short-term variations in pumping rates at these BOU extraction wells.

- Well B-1-CW20, screened within the B-HSU, has a similar general increasing trend as demonstrated by most of the WT-HSU wells. However, there are also several short-term patterns of rapid drawdown and apparent recovery similar to those recorded in 3871H. These patterns and the relative proximity of B-1-CW20 to extraction well VO1A suggest that water levels in the well are influenced by short-term variations in pumping rates at this BOU extraction well.

Additional hydrographs were prepared for the manual groundwater elevations collected at wells across the site for the period of record available at each well (hydrographs for manually gauged wells are provided in Appendix F). Where there were multiple wells in close proximity, the groundwater elevation data were plotted on the same hydrograph. At almost all of the well clusters, the groundwater elevation pattern over time in both the WT-HSUs and B-HSU wells has

been the same. Since the monitoring began, water levels have decreased from a high in elevations in the mid-1990s (1995 to 1997). This may be associated with the nearby BOU extraction system going online. Water levels declined in both the WT-HSUs and B-HSU to lowest monitored elevations in the mid-2000s (2004 to 2005). Since then, the elevations have increased overall but have not reached the mid-1990 levels. From September 2010 to the present, groundwater levels in both the WT-HSUs and the B-HSU have risen approximately 10 feet. As indicated by data from well pairs B-1-CW11/ B-1-CW12, B-1-CW25/B-1-CW27, B-1-CW28/B-1-CW13, and 3850N/3850R, following startup of the BOU extraction system, historical groundwater elevations within the B-HSU have been generally greater than those within the WT-HSUs, indicating the potential exists at these locations for groundwater to flow upward. This overall historical trend in these wells is consistent with the current vertical gradient analyses detailed in Section 3.1.3.

3.2 GROUNDWATER SAMPLING DATA VALIDATION AND QUALITY

The following activities were performed to verify the suitability of analytical results to support groundwater monitoring decisions:

- Checked laboratory reports and chain-of-custody documentation for errors and omissions.
- Checked laboratory reports for correct reporting limits and units.
- Checked extraction and analysis holding times.
- Checked surrogate, laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and matrix spike/matrix spike duplicate (MS/MSD) results.
- Assessed blank results and noted any detected analytes, their respective concentrations, and any impact to associated samples.
- Assessed sample internal standard responses and surrogate recoveries.
- Reviewed instrument tunings and calibrations.

- Compared laboratory and field duplicate sample results and noted any significant variations.

The samples were received at the laboratory in good condition. No problems that might impact data quality were noted on the laboratory receipt or chain-of-custody records. Several analytes were detected in the associated blanks; however, the detected analytes were at relatively low concentrations and did not indicate a systemic problem, as none exceeded the laboratory blank action level (BAL).

A BAL of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) was calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL was compared to the associated sample results to determine the appropriate qualification of the sample results, if needed. The chromium results for locations C-1-CW05 and 3851M were less than the associated BAL and were therefore qualified as not detected.

Most sample analyses were performed within the USEPA recommended holding time. The 1,2,3-trichloropropane analyses for sample locations B-6-CW03R Duplicate, C-1-CW05, B1CW17, and B-1-CW12 were performed slightly past the holding time (within 3 days after the USEPA-recommended 14 day holding time) and were therefore qualified as estimated. Internal standard responses, surrogate recoveries, LCS/LCSD, and MS/MSD results met the quality control acceptance criteria. Some sample results were qualified as estimated due to calibration variances. No sample results were rejected as unusable. On the whole, the quality control criteria were sufficient to support site decisions. Based upon the data review, the data are considered usable as qualified. The complete data validation summaries are provided in Appendix G.

3.3 DISTRIBUTION OF CONSTITUENTS OF CONCERN

Figures 5 through 17 show isocontours of tetrachloroethene (PCE), trichloroethene (TCE), *cis*-1,2-dichloroethene (*cis*-1,2-DCE), 1,2,3-TCP, 1,4-dioxane, total chromium, and hexavalent chromium in the WT-HSUs and B-HSU based on the analytical results from the October sampling event. These compounds were selected for contouring because they are either considered primary COCs,

are emergent COCs, or are immediate dechlorination products of one or more of the primary COCs. The isocontours were generated by hand using professional judgment and, where possible, taking into consideration recent order of magnitude concentrations in wells sampled during prior more comprehensive events and located in areas of uncertainty in contouring. PCE, TCE, and *cis*-1,2-DCE were contoured to their respective California Department of Public Health (CDPH) maximum contaminant level (MCL) for drinking water. 1,2,3-TCP and 1,4-dioxane were contoured to their respective CDPH notification level. Total chromium and hexavalent chromium were contoured to 5 micrograms per liter (µg/L) and 0.5 µg/L, respectively.

It should be noted that the isocontour maps developed for the WT-HSUs are a two dimensional projection of the data within the units comprising the WT-HSUs and not necessarily representative of distribution within the individual A, X, A', and Y HSU zones. The occurrence and overall plume geometry of each COC within the WT-HSUs and B-HSU is described in the following sections.

3.3.1 Tetrachloroethene

Within the WT-HSUs, PCE was detected in 23 of the 24 wells where it was analyzed. Detected concentrations ranged from 4.9 µg/L to 650 µg/L (C-1-CW03 and B-1-CW25, respectively). As shown on Figure 5, the data indicate that PCE is present within the BOU WT-HSUs at concentrations above the Water Quality Objective (WQO) of 5 µg/L throughout the majority of the BOU. The highest concentrations were detected predominantly in the eastern portion of the BOU in the area slightly southeast of the former PAC sites with concentrations approaching the WQO detected in wells located along the western portion of the Bob Hope Airport. In general, the PCE solute plume orientation trends from the northwest to the southeast. The overall distribution of PCE within the WT-HSUs during the fourth quarter was similar to that observed during the second quarter 2012 monitoring event.

Within the B-HSU, PCE was detected in seven of the eight wells where it was analyzed. Detected concentrations ranged from 0.7 µg/L to 140 µg/L (C-1-CW02 and 3850R, respectively). As shown on Figure 6, the PCE solute plume in the B-HSU has the highest concentrations in the area of Well 3850R located within the line of BOU extraction wells, and extends toward the southeast. The

overall distribution of PCE within the B-HSU during the fourth quarter was similar to that observed during the second quarter 2012 monitoring event.

3.3.2 Trichloroethene

Within the WT-HSUs, TCE was detected in 21 of the 24 wells where it was analyzed. Detected concentrations ranged from 0.6 µg/L to 340 µg/L (C-1-CW08 and A-1-CW07, respectively). As shown on Figure 7, the data indicate that there are two distinct TCE solute plumes with concentrations above the WQO (5 µg/L) within the BOU WT-HSUs. When examined together, these two plumes show an overall distribution similar to that of the PCE solute plume in the WT-HSUs. The more laterally extensive TCE plume resides in the eastern portion of the BOU area and trends from the northwest in the area of the former PAC sites to the southeast. The second and less laterally extensive plume occurs in the westernmost portion of the Bob Hope Airport and again is oriented roughly northwest-to-southeast. The overall distribution of TCE within the WT-HSUs during the fourth quarter was similar to that observed during the second quarter 2012 monitoring event.

Within the B-HSU, TCE was detected in three of the eight wells where it was analyzed. Detected concentrations ranged from 3.8 µg/L to 12 µg/L (B-1-CW27 and 3850R, respectively). As shown on Figure 8, the data indicate that the lateral extent of TCE above the WQO in the B-HSU is significantly less than the distribution in the overlying WT-HSUs. The solute plume geometry appears to be oriented approximately northwest-to-southeast and is predominantly located within the area south of the BOU extraction wells. The overall distribution of TCE within the B-HSU during the fourth quarter was similar to that observed during the second quarter 2012 monitoring event.

3.3.3 *cis*-1,2-Dichloroethene

Within the WT-HSUs, *cis*-1,2-DCE was detected in three of the 24 wells where it was analyzed (Figure 9). Detected concentrations were 1.1 µg/L in 3850N, 5.3 µg/L in B-1-CW12, and 6.2 µg/L in B-1-CW17. Of these three wells, only B-1-CW17 had a concentration of *cis*-1,2-DCE above the WQO of 6 µg/L.

Within the B-HSU, *cis*-1,2-DCE was not detected in any of the eight wells where it was analyzed (Figure 10).

3.3.4 1,2,3-Trichloropropane

Within the WT-HSUs, 1,2,3-TCP was detected in 13 of the 20 wells where it was analyzed. Detected concentrations ranged from 0.085 µg/L to 31 µg/L (3850N and A-1-CW07, respectively). As shown on Figure 11, the data indicate that there are two comingled 1,2,3-TCP solute plumes with concentrations above the WQO (0.005 µg/L) within the BOU WT-HSUs. The plumes are located within the central portion of the BOU and trend from the northwest in the area of the former PAC sites to the southeast, and southeast from the vicinity of B-5-CW03. The overall distribution of 1,2,3-TCP within the WT-HSUs during the fourth quarter was similar to that observed during the second quarter 2012 monitoring event.

Within the B-HSU, 1,2,3-TCP was not detected in the four wells where it was analyzed (Figure 12).

3.3.5 1,4-Dioxane

Within the WT-HSUs, 1,4-dioxane was detected in six of the eight wells where it was analyzed. Detected concentrations ranged from 0.58J µg/L (estimated) to 8.8 µg/L (MW-05 and MW-08, respectively). As shown on Figure 13, there is a relatively narrow plume extending from the area of the former PAC sites southeast toward extraction wells VO5A, VO6A, and VO7A. The overall distribution of this plume was similar to that observed during the second quarter 2012 monitoring event. No wells were sampled for 1,4-dioxane in the westernmost portion of the Bob Hope Airport where a second plume was observed during previous more comprehensive sampling events (e.g., second quarter 2012 monitoring event).

In accordance with the current sampling schedule (Table 1), no wells within the B-HSU were sampled for 1,4-dioxane during the fourth quarter monitoring event.

3.3.6 Total Chromium

Within the WT-HSUs, total chromium was detected in 18 of the 19 wells where it was analyzed. Detected concentrations ranged from 3.0J µg/L (estimated) in wells MW-03 and C-1-CW03 to 27 µg/L in well B-1-CW17. All detected concentrations were below the WQO for total chromium of 50 µg/L (Figure 14).

Within the B-HSU, total chromium was detected in one of the three wells where it was analyzed. The detected concentration (4J µg/L [estimated] in C-1-CW05) was below the WQO (Figure 15).

3.3.7 Hexavalent Chromium

Within the WT-HSUs, hexavalent chromium was detected in 18 of the 19 wells where it was analyzed. Detected concentrations ranged from 0.1J µg/L (estimated) to 24.2 µg/L (B-6-CW16 and B-1-CW17, respectively). All detected concentrations were below the WQO for hexavalent chromium of 50 µg/L (Figure 16).

Within the B-HSU, hexavalent chromium was not detected in the three wells where it was analyzed (Figure 17).

Section 4
Constituent of Concern Trend Analyses

Statistical trend analyses were performed on chemical data from the 65 monitoring wells presently being sampled as part of the BOU groundwater monitoring program. Trends of one or more of the following COCs were tested for each well: PCE, TCE, *cis*-1,2-DCE, 1,2,3-TCP, 1,4-dioxane, chromium, and hexavalent chromium. The specific COCs selected for statistical testing at each well was based on the current sample analyses planned for the given location (refer to Table 1 for details). Trends were determined using the Mann-Kendall test function in ChemStat, version 5.2.0.0, distributed by Starpoint Software, Inc.

The Mann-Kendall trend test is a non-parametric test for linear trends based on the concept that a series of data points without a trend should fluctuate randomly around a constant mean. If an increasing trend were to exist, one would expect an earlier point to have a lower value than a later point. The converse would be true if a decreasing trend were present. A Mann-Kendall statistic S is computed by comparing each pair of data points in a data set and assigning a value of +1 or -1 if the earlier data point is less than the later data point or greater than the later one, respectively. If the two data points are equal, the pair is assigned a zero. The values assigned to the pairs are summed. If the total is positive, it implies that the majority of the differences between points are positive, indicating a positive trend. Likewise, a negative sum indicates a decreasing trend. A value at or near zero indicates that the differences are roughly equal, implying that there is no trend. A critical value of S is determined based on the number of points in the data set and the level of significance (α) of the test. If the Mann-Kendall statistic S exceeds the critical S, then an upward trend is statistically significant. Conversely, if the Mann-Kendall S is negative and its absolute value is greater than the critical S, then there is a statistically significant downward trend.

The Mann-Kendall test is nonparametric because there is no requirement that the data follow any specific underlying statistical distribution (e.g. normal, log-normal, etc.). A nonparametric test is important in data sets with a large proportion of non-detections, as is the case with many of the data sets from the BOU. Further details concerning this test and how to conduct it can be found in Section 17.3.2 of the Unified Guidance provided by the USEPA statistical analysis of groundwater monitoring data (USEPA 2009).

4.1 TESTING PROTOCOLS

The Mann-Kendall statistical tests were run in two-tailed mode. Although the Unified Guidance is comprehensive, it does not recommend a value of α. In the past, Mann-Kendall testing at the BOU was conducted with $\alpha = 0.05$ and $\alpha = 0.10$, representing significant and "probably" significant trends, respectively. However, based upon personal communication with Dr. Kirk Cameron, the first author of Unified Guidance and of the 1992 Addendum to the Interim Final Guidance (Cameron pers. comm. 2011), ARCADIS has applied the following:

- Data sets with 20 data points or more were run with $\alpha = 0.02$
- Data sets with 10 to 19 data points were run with $\alpha = 0.05$
- Data sets with fewer than 10 data points were run with $\alpha = 0.10$

For the BOU, this approach is useful because the data sets have varying numbers of members. At a given level of statistical significance, a trend becomes more discernible as the number of data points increases. Smaller data sets require higher levels of statistical significance to identify trends.

In the data sets where statistically significant trends were not identified, a distinction was made between data sets with a coefficient of variation that was less than or equal to 1.0, and those greater than 1.0. Data sets with a coefficient of variation less than 1.0 are considered "stable". Other data sets were categorized as having "no trends". The coefficient of variation was defined as the sample standard deviation divided by the sample mean.

In the Mann-Kendall tests, non-detections were handled by substituting a zero value for the data point. This approach is acceptable in a nonparametric test that is looking at the change in value from one sampling period to the next. This substitution was also used in computing the coefficient of variation. Mann-Kendall tests were not attempted for data sets with fewer than four members. The tests were also not run on data sets composed exclusively of non-detections.

4.2 TIME INTERVAL

The data used in the trend tests represented a time period from the last sampling event of 2000 to the most recent sampling event, October 2012. Whenever trend tests are conducted on data sets with a long history, there is always the potential that recent changes can be lost in the added stability provided by the long line of older data points. For this reason, a second set of Mann-Kendall tests was conducted using only data points collected in the past 5 years (i.e., since December 2007).

4.3 RESULTS

The overall results of the trend analyses are presented in the sections below by COC. Additional discussion of the spatial distribution of the trends for each COC and the significance with regard to plume evolution and capture is presented in Section 6.3.

4.3.1 PCE

Twenty-six data sets for PCE had statistically significant trends that were identified by the Mann-Kendall test (Table 5). All but three of the trends were decreasing (Attachment 1 in Appendix H). Most of the data sets that did not have trends were stable. Repeating the trend testing for the most recent 5 years of data yielded somewhat similar results. There were no increasing trends and only 15 declining trends. Not all of the decreasing trends in the 5-year analyses were in monitoring wells that had decreasing trends in the analyses of the full data sets. All but one of the 35 data sets without trends was stable. In summary, the PCE data for the past 5 years were stable or decreasing in 49 of 50 monitoring wells in which there were sufficient data to allow statistical testing.

4.3.2 TCE

Twenty-two data sets for TCE had statistically significant trends that were identified by the Mann-Kendall test (Table 6). All but two of the trends were decreasing (Attachment 2 in Appendix H).

Sixteen of the 30 wells without a trend were identified as stable. Repeating the trend testing for the most recent 5 years of data yielded somewhat similar results. There were one increasing trend and 14 declining trends. Not all of the decreasing trends in the 5-year analyses were in monitoring wells that had decreasing trends in the analyses of the full data sets. All but five of the 34 data sets without trends were stable. In summary, the TCE data for the past 5 years were stable or decreasing in 44 of 50 monitoring wells in which there were sufficient data to allow statistical testing.

4.3.3 *cis*-1,2-DCE

Less than half of the monitoring wells had a sufficient size or detections to allow the Mann-Kendall test to be performed for *cis*-1,2-DCE (Table 7, Figures 9 and 10). One data set exhibited statistically significant increasing trends (3860K) and two data sets had decreasing trends (B1-CW17 and B5-CW03). ChemStat output for the data sets with trends is provided in Attachment 3 in Appendix H. Repeating the trend testing for the most recent 5 years of data revealed two decreasing trends at monitoring wells B1-CW12 and B-5-CW03. Well B-5-CW03 was identified as decreasing in both the full data set and the 5-year data set. The large number of data sets with insufficient data was the result of the low detection frequency of *cis*-1,2-DCE. Two of the monitoring wells in which no trends were identified exhibited "stable" behavior when using data from the past 5 years.

4.3.4 1,2,3-TCP

Most of the data sets for 1,2,3-TCP had a sufficient size or number of detections to allow the Mann-Kendall test to be performed (Table 8). Eight data sets exhibited statistically significant trends (Attachment 4 in Appendix H). Six of the trends were increasing trends. The statistically significant declines in the 1,2,3-TCP concentrations were in monitoring well 3850N and 3872Q. Only one monitoring well (A-1-CW07) without a trend had a coefficient of variation less than 1.0, indicating stability. Repeating the trend testing for the most recent 5 years of data yielded decreasing trends in three wells: 3830Q, 3872Q, and MW-5. However, only one of the six monitoring wells with increasing trends had statistically significant trends when only the data from the past 5 years were used: monitoring well MW-4. Six of the monitoring wells without a trend were identified as stable when using data from the past 5 years.

4.3.5 1,4-Dioxane

The results of the Mann-Kendall tests on the 1,4-dioxane data are presented in Table 9. Three increasing trends and one decreasing trend were identified. When the trend testing was repeated using the most recent 5 years of data, three increasing trends were found to be statistically significant. An increasing trend in the monitoring well C-1-CW08 was found to be statistically significant using both the full data set and the 5-year data set (Attachment 5 in Appendix H). The trend is the result of an increase in the concentration of 1,4-dioxane since November 2010. Only one of the monitoring wells in which no trends were identified exhibited "stable" behavior. No wells were found to be stable when only the past 5 years were tested.

4.3.6 Total Chromium

The Mann-Kendall test results for chromium are summarized in Table 10. One data set exhibited an increasing trend, and six data sets had a decreasing trend (Attachment 6 in Appendix H). Eight of the 18 monitoring wells in which there was no trend in the chromium data exhibited stable behavior. When the data representing the last 5 years was tested, one decreasing (3850N) and one new increasing (3880) trend were observed. None of the statistically significant trends were in the same monitoring wells between the full data set and the 5-year data set. Eight of the 21 monitoring wells without trends in the 5-year data set had stable chromium concentrations.

4.3.7 Hexavalent Chromium

Based on the Mann-Kendall tests, five data sets were identified as having statistically significant decreasing trends in hexavalent chromium concentration (Table 11). No increasing trends were identified, and 26 data sets had no statistically significant trends, most of which were stable (Attachment 7 in Appendix H). Using the data from the last 5 years, two of the data sets (C-1-CW03 and MW-08) exhibited an increasing trend and only one (3850N) had a decreasing trend. Most of the monitoring wells without trends were stable.

4.4 SUMMARY OF TREND ANALYSES

The Mann-Kendall test results are summarized in Table 12. As shown in the summary table, the majority of the monitoring wells did not exhibit statistically significant trends. Many of the data sets

without trends were stable. Many data sets did not have any detections or were too small to allow Mann-Kendall testing. After combining the full data set testing with that conducted for the past 5 years, 24 percent of all of the data files were not suitable for testing due to data set size or the lack of detections. Of the data sets that could be tested, 75 percent did not exhibit statistically significant trends. Almost half of these were stable. Coefficient of variation test results are provided in Attachment 8 in Appendix H. Seventy-nine percent of the statistically significant trends were decreasing trends. In the data representing the past 5 years, 80 percent of the trends were declining trends. In summary, the Mann-Kendall test results indicate that the concentrations of the constituents are stable or declining in a majority of the data sets for which statistical testing was possible. Less than five percent of the data sets exhibited statistically significant increasing trends. Changes in concentrations related to historic plume evolution and operation of the ongoing groundwater remediation program are discussed in Section 6.3.

Section 5

BOU Groundwater Extraction and Treatment

Following the selection of groundwater extraction and treatment as an interim remedy in the Record of Decision (ROD) (USEPA 1989), two subsequent explanations of significant differences (ESD) documents were issued by USEPA in 1990 and 1997 to record minor modifications in the operation of the system. As stated in the ROD, the primary objective of the groundwater extraction system is to provide capture and prevent further migration of COCs present in BOU groundwater at concentrations above COC-specific action levels (e.g. the WQO's specified in the ROD of 5 µg/kg for PCE and TCE).

5.1 BOU WATER TREATMENT PLANT OVERVIEW

Currently, eight groundwater extraction wells (VO-1 through VO-8) operate on a nearly continuous basis as part of the BOU groundwater remedy. The City of Burbank Water and Power (COB) operates the eight extraction wells and associated BOU Water Treatment Plant where groundwater is treated through air stripping and liquid-phase granular activated carbon (LPGAC) adsorption prior to blending into the City's water supply system. Per the ROD and associated ESD documents, treated groundwater must meet existing federal and state MCLs and state action levels (SALs).

5.2 GROUNDWATER PUMPING ACTIVITIES

As part of routine BOU Water Treatment Plant operation, the COB tracks the total daily volume of water pumped from each of the eight BOU extraction wells, as well as other compliance parameters required for plant operation and public water distribution. The plant was operational throughout the reporting period.

Extraction well and plant operational data are presented in Monthly Operations Reports which are currently prepared by APT Water Services, LLC on behalf of the City of Burbank. Table 13 provides a summary of monthly groundwater production rates from each of the eight groundwater extraction wells as reported in the Monthly Operations Reports for the May through November 2012 reporting period. Additional extraction well and plant operational information is summarized below:

- During the operational period between May and November 2012, daily system-wide average groundwater extraction rates ranged from a minimum of approximately 6,000 gallons per minute (gpm) to a maximum of approximately 12,900 gpm.
- Extraction well VO-1 was offline during all of October and November due to mechanical actuator problems.

Additional details of the extraction system operations, including which wells were operating during the field events and the effects on the capture zone analyses, are discussed in Section 6.

Section 6
Capture Zone Analysis

To assess the current status of hydraulic capture at the BOU, the general approach outlined in the USEPA guidance document *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems* (USEPA 2008) was followed using the data collected during the fourth quarter 2012. For this report, several diagnostic components (i.e., lines of evidence) were applied and evaluated to assess capture. These lines of evidence include the following: summation of extraction system operation, evaluation of the potentiometric surface maps, analysis of hydraulic gradients (horizontal and vertical), concentration trend analysis, and a review of water level trends during this reporting period. The following sections present a summary of each of these diagnostic components.

6.1 FOURTH QUARTER 2012 BOU GROUNDWATER EXTRACTION SYSTEM OPERATIONS

As documented in previous reports, the BOU groundwater extraction and treatment system was designed to intercept the migration of affected groundwater within the BOU. A total of eight extraction wells (designated VO-1 to VO-8) screened across various portions of the WT-HSU (A', X, A and Y zones) and in the B-HSU (B zone) comprise the BOU extraction system. Due to the design and construction of the extraction wells, all identified water table (WT) HSUs are contributing flow during operation of any of the extraction wells (VO-1 to VO-8).

During the fourth quarter 2012 groundwater level monitoring event (wells were gauged between October 8 and October 11, 2012), BOU extraction wells VO-2, VO-3, VO-4, VO-5, VO-6, VO-7, and VO-8 were operational. Extraction well VO-1 was not operational throughout the fourth quarter gauging event, while well VO-5 was off-line during the fourth quarter 2012 gauging activities. The following tables detail extraction system operations during the 4-day gauging period (October 8 through 11, 2012).

October 8, 2012 BOU Extraction System Operations		
Extraction Well	Daily Total (gallons)	Average Daily Pumping Rate (gpm)
VO-1	0	0
VO-2	0	0
VO-3	1,934,436	1,343
VO-4	2,099,690	1,458
VO-5	0	0
VO-6	2,717,631	1,887
VO-7	2,646,676	1,838
VO-8	2,152,870	1,495

October 9, 2012 BOU Extraction System Operations		
Extraction Well	Daily Total (gallons)	Average Daily Pumping Rate (gpm)
VO-1	0	0
VO-2	0	0
VO-3	1,919,781	1,333
VO-4	2,083,979	1,447
VO-5	0	0
VO-6	2,743,243	1,905
VO-7	2,612,655	1,814
VO-8	2,123,062	1,474

October 10, 2012 BOU Extraction System Operations		
Extraction Well	Daily Total (gallons)	Average Daily Pumping Rate (gpm)
VO-1	0	0
VO-2	753,810	1,332
VO-3	1,905,645	1,323
VO-4	1,267,679	1,457
VO-5	0	0
VO-6	2,758,784	1,916
VO-7	2,587,359	1,797
VO-8	2,109,927	1,465

October 11, 2012 BOU Extraction System Operations		
Extraction Well	Daily Total (gallons)	Average Daily Pumping Rate (gpm)
VO-1	0	0
VO-2	1,978,241	1,374
VO-3	1,943,160	1,349
VO-4	0	0
VO-5	0	0
VO-6	2,794,426	1,941
VO-7	2,645,921	1,837
VO-8	2,169,805	1,507

As shown in the tables above, extraction wells VO-3, VO-6, VO-7, and VO-8 were operational at consistent flow rates throughout the entire fourth quarter gauging event. Extraction wells VO-2 and VO-4 were periodically operational during the fourth quarter gauging event while extraction wells VO-1 and VO-5 did not operate during the gauging event.

6.2 OBSERVED WATER-LEVEL DATA

6.2.1 Potentiometric Surface Maps

As noted in the previous section, groundwater depth measurements were collected from the BOU monitoring well network for the fourth quarter 2012 gauging event between October 8 and October 11, 2012. Groundwater elevations were calculated (Table 2) and water-level contours were generated for both the WT-HSU and the B-HSU (Figures 3 and 4, respectively). As shown on both Figures 3 and 4, the water-level contours developed for the fourth quarter 2012 event show a relatively large cone of depression centered around (and groundwater flowing towards) extraction well VO-3 in both the WT-HSUs and the B-HSU. While this pattern corresponds with the overall reported pumping activities, it is somewhat offset from the area where the greatest volume of water was extracted (i.e. in the vicinity of wells VO-6, VO-7, and VO-8) during the months of September and October.

Upgradient of the BOU extraction system, the WT-HSUs potentiometric surface map (Figure 3) generally depicts a northwest-to-southeast hydraulic gradient. As groundwater moves downgradient, it is influenced by pumping, and the gradient orientation is altered toward the active BOU extraction wells. Downgradient of the extraction well transect, the WT-HSU water-level data indicate a hydraulic divide (i.e., stagnation point) in the approximate vicinity of wells/well clusters 3852J/3852K/3852L, PW-02, 3871G/3871H, and 3872Q/3872R.

Upgradient of the BOU extraction system, the B-HSU potentiometric map (Figure 4) also depicts a northwest-to-southeast hydraulic gradient. As groundwater moves downgradient, it is influenced by pumping and the gradient orientation is altered toward the wells actively being pumped in the WT-HSUs with the hydraulic low centered around well VO-3. Downgradient of the extraction well transect, the B-HSU water-level data indicate a hydraulic divide (i.e., stagnation point) approximately located between wells 3861F and 3852N and in the vicinity of well 3871J.

6.2.2 Horizontal Hydraulic Gradient TIN Network

In addition to evaluating hydraulic capture via potentiometric surface maps, observed water-level data were used to assess hydraulic containment at the BOU by calculating the magnitude and direction of hydraulic gradients between sets of adjacent monitoring wells located in the vicinity of the extraction wells. This analysis provides an alternative and more discrete means of evaluating observed water-level data.

Hydraulic gradients were calculated to evaluate the flow vector (direction and magnitude) using water-level data from sets of three adjacent monitoring wells (Devlin 2003). This horizontal hydraulic gradient analysis was completed using a triangular irregular network (TIN) defined by monitoring wells distributed in the WT-HSUs and B-HSU and the water-level data collected in the October 2012 gauging event. The TIN networks (or cells) established for this evaluation are shown on Figures 18 and 19 for the WT-HSU and the B-HSU, respectively. As shown in these figures, the TIN cells are located adjacent to and immediately downgradient of the BOU extraction system. Consequently, the application of this diagnostic tool can help determine the near-well and downgradient extent of capture generated by the BOU extraction system.

A total of 20 TIN cells were defined for the WT-HSUs (A through T) and a total of 14 TIN cells were defined for the B-HSU (A through N) to determine the direction and magnitude of the horizontal hydraulic gradient in the downgradient area of the BOU extraction system within the respective hydrostratigraphic units (Tables 14 and 15 and Figures 18 and 19). Note that the designated TIN cells are identical with the TIN cells used in the previous reporting period (ARCADIS, 2012). Using the same network of TIN cells each time will allow for an easy and consistent comparison/objective analysis over time.

6.2.2.1 WT-HSUs TIN Results

For the October 2012 water level gauging event, there were 20 TIN cells analyzed for the WT-HSUs (A through T) to determine the direction and magnitude of the horizontal hydraulic gradient in this hydrostratigraphic unit (Table 14 and Figure 18).

As shown on Figure 18, calculated horizontal hydraulic gradients indicate a northerly flow pattern (i.e., towards the BOU extraction system) for TIN cells E, G, H and J. The calculated gradients for TIN cells A through F, I, N, O, R, S and T indicate an easterly/northeasterly flow direction. The calculated gradients for TIN cell K indicates a southeasterly flow direction. The gradients for the remaining TIN cells (i.e., L, M, P, and Q) show a southerly/southeasterly flow pattern. The location of the deviation in flow directions from northerly to southerly (i.e., flow divide) correlates well with the inferred stagnation point (Section 6.2.1). Overall, these results are consistent with the inferred flow patterns observed on the corresponding potentiometric surface map.

Calculated hydraulic gradients ranged in magnitude from 0.0003 ft/ft to 0.007 ft/ft with an average at 0.0028 ft/ft.

6.2.2.1 B-HSU TIN Results

For the October 2012 water level gauging event, there were 14 TIN cells analyzed for the B-HSU (A through N) to determine the direction and magnitude of the horizontal hydraulic gradient in this hydrostratigraphic unit (Table 15 and Figure 19).

As shown in Figure 19, the calculated horizontal hydraulic gradients indicate southerly flow directions (i.e., away from the BOU extraction system) for TIN cells D, E, F, G, H, K, L, and M. The calculated gradients for TIN cells A, B, and C show an easterly flow pattern with a minor southerly component. The TIN cells I and J have a southwestern to westerly flow direction. While these results are somewhat consistent with the inferred flow patterns depicted on the corresponding potentiometric surface map, discrepancies are apparent predominantly in the area south/southeast of the extraction wells. This is primarily due to the limited monitoring network in the B-HSU (relative to the WT-HSUs) and exclusion of the extraction well monitoring points which were considered (along with the corresponding pumping data) when delineating the potentiometric surface map.

Gradient magnitudes range from 0.0001 ft/ft to 0.003 ft/ft with an average at 0.0011 ft/ft.

6.2.3 Vertical Hydraulic Gradients

To evaluate the potential for vertical groundwater flow between hydrostratigraphic units, vertical gradients were calculated for 17 well pairs (i.e., collocated WT- and B-HSU wells) using groundwater elevations measured in the fourth quarter 2012. Vertical gradient calculations and results were described and presented previously in Section 3.1.3 and in Table 4. Results show that a predominant positive (upward) gradient is present across the BOU. Well pairs 3850N/3850R and 3852M/3852N were the only locations that exhibited a relatively slight downward gradient. In comparison to the data from the first and second quarter 2012 monitoring events, well pair 3852M/3852N is the only location with a consistently downward vertical gradient. Results also indicate the following trend: upward vertical gradients are generally larger in magnitude in well pairs located closer to the extraction system (e.g., B-1-CW25/B-1-CW27 and B-1-CW11/B-1-CW12) and smaller in well pairs located farther away from the extraction wells (e.g., C-1-CW03/C-1-CW02 and 3852F/3852H). Water level contours generated from the fourth quarter 2012 gauging events (Figures 3 and 4) indicate that most of these well pairs are within the area of influence of the BOU groundwater extraction system, so it is likely that the upward vertical gradients observed across the BOU are, at least in part, the result of groundwater extraction in the WT-HSUs.

6.3 CONSTITUENT OF CONCERN CONCENTRATION TRENDS

Evaluating concentration trends at select monitoring wells is a key step in hydraulic capture analyses as recommend by U.S. EPA (U.S. EPA, 2008). In particular, concentration trends at down-gradient monitoring points may provide the most compelling line of evidence of effective capture. To that end, and as detailed in Section 4, a number of chemical constituents that have been historically detected in groundwater in the BOU monitoring well network were statistically tested for trends. The chemical constituents included the following: tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), 1,2,3-trichloropropane (TCP), 1,4-dioxane, total chromium, and chromium VI.

Results of the statistical trend analyses for each of the selected chemical constituents are presented on Figures 20 through 33. Results presented in these figures correspond to the Mann-Kendall tests

performed on data points that cover the time period from the last sampling event of 2000 to the most recent sampling event in October 2012, as presented in Section 4 and in Tables 5 through 11.

6.3.1 PCE Concentration Trends

PCE concentration trend results are presented on Figures 20 and 21 for monitoring wells screened in the WT-HSUs and B-HSU, respectively. As shown on Figure 20, PCE trend results in the WT-HSUs show that only two monitoring wells had increasing trends (3852L and B-1-CW16) while the majority of wells either had a decreasing trend or are stable. Monitoring well 3852L is located downgradient of the BOU extraction system (approximately 4,000 feet) and was not sampled for PCE during the October event. When last sampled (April 2012), the PCE concentration at this well was 0.9 µg/L, which is significantly below the WQO for PCE (5 µg/L). Additionally, although the long-term data indicate an increasing trend, the 5-year trend test indicates that this well is stable. Monitoring well B-1-CW16 is located approximately 1,300 feet north (upgradient) of extraction well VO-3. Because this monitoring well is located upgradient of the extraction system and within the inferred capture zone, concentration trends are more difficult to interpret with respect to assessing overall plume capture (i.e., upgradient residual source mass may be moving through the area toward the pumping center creating an increasing trend in this well). However, while the long-term data indicate an increasing trend, the 5-year trend test indicates that this well is stable. Overall, these results indicate that the PCE plume in the WT-HSUs is hydraulically contained and is shrinking or stable.

As shown on Figure 21, PCE trend results in the B-HSU show that only one monitoring well exhibits an increasing trend (B-1-CW28), while the majority of wells either show a decreasing trend or are stable. Monitoring well B-1-CW28 is located between and just slightly upgradient of extraction wells VO-5 and VO-6. Because this monitoring well is located upgradient of the extraction system and within the inferred capture zone, concentration trends are more difficult to interpret with respect to evaluating downgradient plume capture. However, while the long-term data indicate an increasing trend, the 5-year trend test indicates that this well is stable. Overall, these results suggest that the PCE plume in the B-HSU is hydraulically contained and is shrinking or stable.

6.3.2 TCE Concentration Trends

Concentration trend results for TCE are presented on Figures 22 and 23 for monitoring wells screened in the WT-HSUs and B-HSU, respectively. As shown on Figure 22, TCE trend results in the WT-HSUs show that only one monitoring well displays an increasing trend (3852L), while the majority of wells either show a decreasing trend or are stable. As previously noted in Section 6.3.1 for PCE, monitoring well 3852L is located downgradient of the BOU extraction system (approximately 4,000 feet) and was not sampled for TCE during the October event. When last sampled in April 2012, the concentration at this well was 7.3 µg/L, which is slightly above the WQO for TCE (5 µg/L). Additionally, although the long-term data indicate an increasing trend, the 5-year trend test indicates a stable trend. Overall, these results imply that the TCE plume in the WT-HSUs is hydraulically contained and is shrinking or stable.

As shown on Figure 23, TCE trend results in the B-HSU show that only one monitoring well exhibits an increasing trend (B-1-CW28), while the majority of wells either show a decreasing trend or are stable. Monitoring well B-1-CW28 is located between extraction wells VO-5 and VO-6 and just slightly upgradient. As previously noted, concentration trends in monitoring wells located upgradient of an extraction system and within the inferred capture zone are difficult to interpret relative to hydraulic capture because of the transient plume dynamics encountered within this area of the plume.. However, while the long-term data indicate an increasing trend, the 5-year trend test indicates that this well is stable. These results indicate that the TCE plume in the B-HSU is hydraulically contained and is shrinking or stable.

6.3.3 *cis*-1,2-DCE Concentration Trends

Cis-1,2-DCE concentration trend results are presented on Figures 24 and 25 for monitoring wells screened in the WT-HSUs and B-HSU, respectively. As shown on Figure 24, *cis*-1,2-DCE trend results in the WT-HSUs show that one monitoring well (3860K) demonstrates an increasing trend, while the majority of the remaining wells indicate no discernible trend. Monitoring well 3860K is located approximately 2,300 feet north (upgradient) of extraction well VO-5. The most recent analytical data from this well was a concentration of 1.6 µg/L, which is well below the WQO of 6 µg/L. However, as previously discussed, because this monitoring well is located upgradient of the

extraction system and within the inferred capture zone, concentration trends are more difficult to interpret with respect to evaluating downgradient hydraulic capture (i.e., the monitoring well may continue to be impacted by upgradient groundwater containing higher concentrations as it migrates towards the pumping center). However, even though the long-term data indicate an increasing trend, the 5-year trend test indicates that this well is stable. Because the majority of wells indicate no discernible trend, trend results for *cis*-1,2-DCE in the WT-HSUs are inconclusive; however, currently only one monitoring well exhibits measured concentrations slightly above the WQO (B-1-CW17 at 6.2 µg/L) and results from this well indicate a decreasing trend.

As shown on Figure 25, *cis*-1,2-DCE trend results in the B-HSU show that only two monitoring wells had sufficient data sets available for analysis, and neither well demonstrates a statistically significant trend. Irrespective of the lack of statistically significant trends, no monitoring wells in the B-HSU currently have *cis*-1,2-DCE concentrations above the WQO.

6.3.4 1,2,3-TCP Concentration Trends

1,2,3-TCP concentration trend results are presented on Figures 26 and 27 for monitoring wells screened in the WT-HSUs and B-HSU, respectively. As shown on Figure 26, 1,2,3-TCP trend results in the WT-HSUs show that several monitoring wells demonstrate an increasing trend (MW-03, MW-04, MW-08, B-1-CW13, B-5-CW13, and A-1-CW-08), while the majority of the remaining wells indicate no discernible trend. All of the monitoring wells exhibiting an increasing trend are located upgradient of the BOU extraction well system. As previously discussed, because these monitoring wells are located upgradient of the extraction system and within the inferred capture zone, concentration trends are difficult to interpret with respect to assessing downgradient hydraulic capture. However, while the long-term data indicate an increasing trend in these wells, the 5-year trend test indicates stability or no statistically significant trend at all of these wells except MW-04 which is located immediately downgradient of the 1,2,3-TCP source area (increasing trend for both data sets) and A-1-CW08 (insufficient data). Because the majority of wells indicate no discernible trend, trend results for 1,2,3-TCP in the WT-HSUs are inconclusive.

As shown on Figure 27, 1,2,3-TCP trend results in the B-HSU show that no statistically significant trends were detected in the available data sets. These trend results are inconclusive, but no

monitoring wells in the B-HSU currently have concentrations above the WQO for 1,2,3-TCP (0.005 µg/L).

6.3.5 1,4-Dioxane Concentration Trends

Concentration trend results for 1,4-dioxane are presented on Figures 28 and 29 for monitoring wells screened in the WT-HSUs and B-HSU, respectively. As shown on Figure 28, 1,4-dioxane trend results in the WT-HSUs show that two monitoring wells (C-1-CW08 and MW-06) exhibit an increasing trend, while the majority of the remaining wells indicate no discernible trend. Monitoring well C-1-CW08 is located approximately 6,500 feet northwest (upgradient) of the BOU extraction well system (within the Bob Hope Airport) and shows an increasing trend based on both the long term and 5-year trend tests. Well MW-06 is located approximately 3,500 feet north (upgradient) of the BOU extraction well system. While an increasing trend was determined from the long term data, the 5-year trend test resulted in no statistically significant trend. Because the majority of wells indicate no statistically significant trend, trend results for 1,4-dioxane in the WT-HSUs are inconclusive.

No wells screened within the B-HSU were analyzed for 1,4-dioxane during the October 2012 event. As such, the trends shown on Figure 29 only encompass data through April 2012. Based on the available data, 1,4-dioxane trend results in the B-HSU show that only one monitoring well (C-1-CW02) exhibits an increasing trend, while the majority of wells indicate no discernible trend. Monitoring well C-1-CW02 is located approximately 8,000 feet northwest (upgradient) of the BOU extraction well system (just outside of the Bob Hope Airport) and, as such, the concentration trend in this well does not support evaluation of downgradient plume capture. However, the last recorded concentration at this well was 1 µg/L, which is equivalent to the WQO for 1,4-dioxane. Overall, these trend results are inconclusive for 1,4-dioxane in the B-HSU.

6.3.6 Total Chromium Concentration Trends

Concentration trend results for total chromium are presented on Figures 30 and 31 for monitoring wells screened in the WT-HSUs and B-HSU, respectively. As shown on Figure 30, trend results in the WT-HSUs show that only one monitoring well displays an increasing total chromium trend (A-1-CW07), while the majority of wells show either a decreasing trend or are stable. Monitoring

well A-1-CW07 is located approximately 1,300 feet north (upgradient) of BOU extraction system well VO-6, and the current concentration at this well is 8J µg/L (estimated), which is an order of magnitude below the WQO for total chromium (50 µg/L). The overall results of the trend analyses suggest that the total chromium plume in the WT-HSUs is hydraulically contained and is shrinking or stable.

No wells screened within the B-HSU were sampled for total chromium during the October 2012 event. As such, the trends shown on Figure 31 only encompass data through April 2012. Based on the available data, only two monitoring wells had sufficient data sets available for analysis, with one well showing stable results and the other with no statistically significant trend. These trend results are inconclusive, but none of the monitoring wells in the B-HSU have total chromium concentrations above the WQO.

6.3.7 Hexavalent Chromium Concentration Trends

Concentration trend results for hexavalent chromium are presented on Figures 32 and 33 for monitoring wells screened in the WT-HSUs and B-HSU, respectively. As shown on Figure 32, trend results in the WT-HSUs show that currently, no monitoring wells display an increasing trend for hexavalent chromium, with the majority of wells indicating stability. Based on these trend results, the hexavalent chromium plume in the WT-HSUs appears to be hydraulically contained and stable. Also, none of the monitoring wells in the WT-HSUs currently have concentrations of hexavalent chromium above the WQO.

As shown on Figure 33, trend results in the B-HSU show that only six monitoring wells had sufficient data sets available for analysis. Results of the trend analyses indicated no monitoring wells with an increasing trend for hexavalent chromium and the majority of wells showing either a decreasing or stable trend. Based on these results, the hexavalent chromium plume in the B-HSU appears to be hydraulically contained and shrinking or stable. Also, none of the monitoring wells in the B-HSU currently have concentrations of hexavalent chromium above the WQO.

6.4 CAPTURE ZONE SUMMARY

For this report, several diagnostic components (i.e., lines of evidence) were applied to qualitatively evaluate the extent of capture produced by the BOU extraction system and assess the effectiveness of the system in hydraulically containing the various COC plumes within multiple hydrostratigraphic units. This analysis was primarily based on data collected and conditions observed during the fourth quarter of 2012 (October 2012).

Evaluation of the potentiometric surface maps, assessment of hydraulic gradients (horizontal and vertical), and analysis of long-term concentration trends indicate that during the fourth quarter 2012 the BOU extraction system was effectively controlling migration (both laterally and vertically) of the various site-related COC plumes. These various lines of evidence suggest that, when the system operates at or near an average period flow rate of 5,500 to 5,800 gpm, a significant capture zone is produced and is evident within the WT-HSUs and, to a lesser extent, within the B-HSU that is effective in controlling migration of site-related COCs.

Section 7
Summary and Conclusions

Conclusions regarding the fourth quarter 2012 groundwater monitoring events are as follows:

- The groundwater flow direction in the WT-HSUs is to the southeast under horizontal gradients varying between approximately 0.003 and 0.007 ft/ft, and the groundwater flow direction in the B-HSU is to the southeast under horizontal gradients varying between approximately 0.002 to 0.03 ft/ft. The WT-HSUs and B-HSU water-bearing unit gradients and flow directions remain consistent with historical site interpretations.

- Although multiple chlorinated VOCs have been historically detected in site groundwater, PCE and TCE are currently the primary COCs. Besides PCE and TCE, other compounds detected in site groundwater at concentrations above MCLs or established notification levels included *cis*-1,1-DCE, 1,2,3-TCP, and 1,4-dioxane.

- The PCE and TCE solute plumes represent the general orientation of the groundwater plume at the BOU (i.e. on overall plume orientation to the southeast).

    - WT-HSUs – PCE and TCE solute plumes are present within the BOU with concentrations above the Water Quality Objective (WQO; 5 µg/L). PCE appears to be present as a continuous plume oriented predominantly northwest to southeast. TCE appears to be present as two distinct plumes. The more laterally extensive plume resides in the eastern portion of the BOU area and trends from the northwest in the area of the former PAC sites to the southeast. The second and apparently less laterally extensive plume occurs in the westernmost portion of the Bob Hope Airport. The TCE plumes in the WT-HSUs are also oriented approximately northwest-to-southeast.

    - B-HSU – the lateral extent of PCE and TCE above the WQO is significantly less than the distribution in the overlying WT-HSUs and is predominantly relegated to the area

south of the BOU extraction wells. The solute plume geometry again is oriented approximately northwest-to-southeast.

- Statistical analysis has confirmed the general trends for PCE and TCE are stable or decreasing along the northwest to southeast axis of the groundwater solute plume. Seventy-nine percent of the statistically significant trends were decreasing trends. In the data representing the past 5 years, 80 percent of the wells had decreasing trends. In summary, the Mann-Kendall test results indicate that the concentrations of the COCs are stable or declining in a majority of the data sets for which statistical testing was possible. Less than 5 percent of the data sets exhibited statistically significant increasing trends.

- Upgradient of the BOU extraction system, the potentiometric surface map generally depicts a northwest-to-southeast hydraulic gradient. As groundwater moves downgradient from the northern boundary of the BOU, it is influenced by pumping at the extraction wells associated with the BOU treatment system, and the gradient orientation is altered toward the active BOU extraction wells. Downgradient of the extraction well transect, the water-level data indicate a hydraulic divide (i.e., stagnation point) in the approximate vicinity of wells/well clusters 3852J/3852K/3852L, PW-02, 3871G/3871H, and 3872Q/3872R in the WT-HSUs. Within the B-HSU, water-level data indicate a hydraulic divide approximately located between wells 3861F and 3852N and in the vicinity of well 3871J. This is in the same general area as is evidenced in the WT-HSUs however the stagnation point within the B-HSU is less discernable.

- Based on evaluation of the potentiometric surface maps, assessment of hydraulic gradients (horizontal and vertical), and analysis of long-term concentration trends, the BOU extraction system for the fourth quarter of 2012 is effectively controlling migration (both laterally and vertically) of the various site-related COC plumes. These various lines of evidence suggest that when the system operates at or near average period flow rates of 5,500 to 5,800 gpm or more, a significant capture zone is produced and is evident within the WT-HSUs and, to a lesser extent, within the B-HSU. The developed capture zone is effective in controlling migration of site-related COCs.

Section 8
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Tables

Table 1
Groundwater Monitoring Matrix - Fourth Quarter 2012
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID	Screened HSU	Screen Interval (feet bgs)	Fourth Quarter Water Level Monitoring	Laboratory Analyses								
				VOCs (Freon and MTBE)	1,2,3-Trichloropropane	1,4-Dioxane	Total Chromium (Filtered)	Hexavalent Chromium	Thallium	Nitrate/ Nitrite	TDS	General Minerals
3830Q	B	335 - 355	•									
3830R	Y	--	•									
3830S	X/A (WT)	218 - 258	•									
3831Q	A	--	•									
3850M	X/A (WT)	182 - 232	•									
3850N	X (WT)	165 - 215	•	X	X		X	X				
3850P	A'/X	--	•									
3850Q	A	--	•									
3850R	B	337 - 347	•	X								
3850S	A'/X (WT)	183 - 233	•									
3850T	A'/X (WT)	194 - 239	•									
3850U	A'/X (WT)	189 - 234	•									
3850V	A'/X (WT)	203 - 243	•									
3850W	A'/X (WT)	200 - 240	•									
3851M	X/A (WT)	165 - 215	•				X	X				
3851N	B	305 - 325	•									
3851P	OA	--	•									
3852F	X (WT)	125 - 175	•									
3852G	A'/X (WT)	196 - 216	•									
3852H	B	269 - 299	•									
3852J	Y	--	•									
3852K	A	213 - 233	•									
3852L	X (WT)	139 - 179	•									
3852M	A	208 - 228	•									
3852N	B	283 - 303	•									
3860H	X (WT)	172 - 222	•									
3860J	X (WT)	170 - 210	•									
3860K	A'/X (WT)	180 - 230	•									
3861D	X (WT)	130 - 180	•									
3861E	A	--	•									
3861F	B	303 - 323	•									
3862C	A' (WT)	90 - 130	•									
3862D	A	174 - 194	•									
3862E	B	256 - 276	•									
3870D	K (WT)	140 - 190	•									
3870E	K (WT)	--	•									
3871G	A' (WT)	95 - 135	•				X	X				
3871H	A	200 - 241	•									
3871J	B	274 - 284	•									
3872K	A' (WT)	70 - 120	•									
3872L	--	--	•									
3872M	B	274 - 304	•									
3872N	X	--	•									
3872P	Y	--	•									
3872Q	A' (WT)	93 - 133	•									
3872R		--	•									
3872S	B	275 - 295	•									
3880	K (WT)	120 - 170	•									
4948	A/Y (WT)	247 - 297	•									
4949C	A (WT)	222 - 272	•									
4959E	X/A (WT)	195 - 246	•									
4959F	A (WT)	204 - 255	•									
4959G	A (WT)	201 - 252	•									
4959H	A (WT)	200 - 250	•									
4959J	X/A (WT)	194 - 240	•									
4959K	X (WT)	184 - 240	•									
A-1-CW01	OA	--	•									
A-1-CW02	B	350 - 360	•									
A-1-CW03	X (WT)	175 - 195	•									
A-1-CW03R	A (WT)	--	•									
A-1-CW04	A (WT)	--	•									
A-1-CW05	B	336 - 376	•									
A-1-CW06	OA	--	•									
A-1-CW07	X (WT)	174 - 224	•	X	X		X	X				
A-1-CW08	X (WT)	175 - 235	•									
A-1-CW09	X (WT)	187 - 227	•	X								
B-1-CW11	B	300 - 330	•									
B-1-CW12	A' (WT)	120 - 170	•	X	X		X	X		X	X	X
B-1-CW13	A'/X (WT)	150 - 210	•	X	X							

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Well ID	Screened HSU	Screen Interval (feet bgs)	Fourth Quarter Water Level Monitoring	Laboratory Analyses								
				VOCs (Freon and MTBE)	1,2,3-Trichloropropane	1,4-Dioxane	Total Chromium (Filtered)	Hexavalent Chromium	Thallium	Nitrate/ Nitrite	TDS	General Minerals
B-1-CW16	A' (WT)	140 - 190	•									
B-1-CW17	A' (WT)	125 - 165	•	X	X		X	X		X	X	X
B-1-CW20	B	285 - 305	•	X						X	X	X
B-1-CW25	A' (WT)	150 - 190	•	X								
B-1-CW27	B	314 - 334	•	X	X							
B-1-CW28	B	326 - 346	•	X								
B-1-CW29	A' (WT)	131 - 171	•	X								
B-5-CW01	OA	--	•									
B-5-CW02	B	340 - 350	•	X	X		X	X				
B-5-CW03	A (WT)	211 - 231	•	X	X		X	X				
B-6-CW01	OA	580 - 590	•	X								
B-6-CW02	B	330 - 340	•	X								
B-6-CW03	X (WT)	185 - 215	•	X	X							
B-6-CW03R	A (WT)	240 - 260	•	X	X							
B-6-CW04	OA	--	•									
B-6-CW05	B	345 - 355	•									
B-6-CW06	X (WT)	215 - 235	•									
B-6-CW08	B	361 - 371	•									
B-6-CW09	A (WT)	242 - 262	•									
B-6-CW10	A (WT)	203 - 253	•									
B-6-CW14	B	325 - 365	•									
B-6-CW15	A (WT)	--	•									
B-6-CW16	X/A (WT)	210 - 260	•	X	X		X	X				
B-6-CW17	A/Y (WT)	240 - 270	•									
C-1-CW01	OA	--	•									
C-1-CW02	B	382 - 392	•	X	X		X	X				
C-1-CW03	A (WT)	259 - 280	•	X	X		X	X				
C-1-CW05	B	376 - 386	•	X	X		X	X				
C-1-CW06	A (WT)	232 - 252	•	X	X		X	X				
C-1-CW07	Y	--	•									
C-1-CW08	A (WT)	--	•	X	X		X	X				
MW-01	--	180 - 240	•	X	X	X	X	X	X	X		
MW-02	--	180 - 240	•	X	X	X	X	X	X	X		
MW-03	--	220 - 280	•	X	X	X	X	X	X	X		
MW-04	A (WT)	200 - 260	•	X	X	X	X	X	X	X		
MW-05	A (WT)	205 - 265	•	X	X	X	X	X	X	X		
MW-06	A (WT)	200 - 260	•	X	X	X	X	X	X	X		
MW-07	A (WT)	195 - 255	•	X	X	X	X	X	X	X		
MW-08	A (WT)	195 - 255	•	X	X	X	X	X	X	X		
Tt-PW-01	A (WT)	--	•									
Tt-PW-02	A (WT)	--	•									
OW-V01A	WT	--	•									
OW-V01B	B	--	•									
OW-V02A	WT	92 - 264	•									
OW-V02B	B	303 - 322	•									
OW-V03A	WT	79 - 271	•									
OW-V03B	B	310 - 329	•									
OW-V04A	WT	110 - 282	•									
OW-V04B	B	320 - 350	•									
OW-V05A	WT	--	•									
OW-V05B	B	--	•									
OW-V06A	WT	120 - 273	•									
OW-V06B	B	312 - 350	•									
OW-V07A	WT	120 - 273	•									
OW-V07B	B	312 - 350	•									
OW-V08	WT	--	•									

Notes:

a. **Bold Well ID** indicates well to be gauged and sampled, otherwise only gauged.

B - Deep water hydrostratigraphic unit

bgs - Below ground surface

HSU - Hydrostratigraphic unit

MTBE - Methyl tert-butyl ether

TDS - Total dissolved solids

VOCs - Volatile organic compounds

WT - water table hydrostratigraphic unit

Table 2
Groundwater Elevation Data - Fourth Quarter 2012
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID	Screened HSU	Date	Well Casing Elevation (feet amsl)	Total Measured Depth	Depth to Groundwater (feet btoc)	Groundwater Elevation	Well Condition during 2012 Q4
3830Q	B	10/9/2012	702.56	--	208.14	494.42	
3830S	X/A (WT)	10/9/2012	702.37	--	208.22	494.15	
3850M	X/A (WT)	10/9/2012	684.67	--	207.52	477.15	
3850N	X (WT)	10/10/2012	658.07	--	139.52	518.55	
3850R	B	10/10/2012	657.49	--	179.61	477.88	
3850S	A'/X (WT)	10/9/2012	668.04	--	195.98	472.06	
3850T	A'/X (WT)	10/8/2012	680.30	--	204.61	475.69	
3850U	A'/X (WT)	10/8/2012	684.83	--	207.35	477.48	
3850V	A'/X (WT)	10/8/2012	693.20	--	211.42	481.78	
3850W	A'/X (WT)	10/9/2012	693.01	--	212.12	480.89	
3851M	X/A (WT)	10/8/2012	650.35	--	172.85	477.50	
3851N	B	10/8/2012	650.10	--	171.61	478.49	
3852F	X (WT)	10/8/2012	607.65	--	133.68	473.97	
3852G	A'/X (WT)	10/8/2012	607.85	--	133.54	474.31	
3852H	B	10/8/2012	607.93	--	133.72	474.21	
3852K	A	10/8/2012	623.08	--	144.05	479.03	
3852L	X (WT)	10/8/2012	623.05	--	145.24	477.81	
3852M	A	10/8/2012	593.45	--	121.82	471.63	
3852N	B	10/8/2012	593.47	--	122.93	470.54	
3860H	X (WT)	10/8/2012	674.85	--	227.00	447.85	
3860J	X (WT)	10/8/2012	660.22	--	188.30	471.92	
3860K	A'/X (WT)	10/8/2012	667.57	--	195.12	472.45	
3861D	X (WT)	10/8/2012	617.88	--	150.53	467.35	
3861F	B	10/8/2012	617.46	--	143.78	473.68	
3862C	A' (WT)	10/8/2012	587.57	--	118.60	468.97	
3862D	A	10/8/2012	587.50	--	119.28	468.22	
3862E	B	10/8/2012	587.35	--	113.59	473.76	
3870D	K (WT)	10/8/2012	639.78	--	151.27	488.51	
3871G	A' (WT)	10/9/2012	591.86	--	124.97	466.89	
3871H	A	10/8/2012	591.34	--	124.17	467.17	
3871J	B	10/9/2012	591.14	--	117.11	474.03	
3872K	A' (WT)	10/8/2012	564.61	--	97.60	467.01	
3872L	A (WT)	10/8/2012	562.06	--	98.24	463.82	
3872M	B	10/8/2012	564.35	--	90.52	473.83	
3872Q	A' (WT)	10/8/2012	575.25	--	108.78	466.47	
3872S	B	10/9/2012	574.95	--	101.26	473.69	
3880	K (WT)	10/8/2012	620.06	--	145.31	474.75	
4948	A/Y (WT)	10/11/2012	763.46	--	255.71	507.75	
4949C	A (WT)	10/11/2012	733.32	--	238.13	495.19	
4959E	X/A (WT)	10/8/2012	699.59	--	217.46	482.13	
4959F	A (WT)	10/8/2012	708.95	--	223.10	485.85	
4959G	A (WT)	10/11/2012	713.62	--	255.46	458.16	
4959H	A (WT)	10/8/2012	704.76	--	220.34	484.42	
4959J	X/A (WT)	10/8/2012	695.73	--	215.26	480.47	
4959K	X (WT)	10/8/2012	689.10	--	211.29	477.81	
A-1-CW02	B	10/9/2012	684.64	--	201.31	483.33	
A-1-CW03R	A (WT)	10/9/2012	685.09	--	207.73	477.36	
A-1-CW04		10/9/2012	675.40	--	197.12	478.28	
A-1-CW05	B	10/9/2012	677.91	--	194.75	483.16	
A-1-CW06	X (WT)	10/9/2012	675.04	--	185.33	489.71	
A-1-CW07	X (WT)	10/9/2012	674.35	--	202.34	472.01	
A-1-CW08	X (WT)	10/9/2012	682.74	--	206.64	476.10	
A-1-CW09	X (WT)	10/9/2012	673.80	--	200.19	473.61	

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Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
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Well ID	Screened HSU	Date	Well Casing Elevation (feet amsl)	Total Measured Depth	Depth to Groundwater (feet btoc)	Groundwater Elevation	Well Condition during 2012 Q4
B-1-CW03	A' (WT)	--	NS	--	NM	--	Inaccessible, paved over during redevelopment
B-1-CW11	B	10/9/2012	610.05	--	134.40	475.65	
B-1-CW12	A' (WT)	10/9/2012	609.85	--	144.98	464.87	
B-1-CW13	A'/X (WT)	10/8/2012	651.49	--	185.04	466.45	
B-1-CW16	A' (WT)	10/8/2012	639.07	--	173.29	465.78	
B-1-CW17	A' (WT)	10/9/2012	596.35	--	129.72	466.63	
B-1-CW20	B	10/8/2012	600.23	--	124.84	475.39	
B-1-CW25	A' (WT)	10/9/2012	636.54	--	176.17	460.37	
B-1-CW27	B	10/9/2012	636.93	244.75	161.79	475.14	
B-1-CW28	B	10/8/2012	650.15	--	173.75	476.40	
B-1-CW29	A' (WT)	10/9/2012	623.12	--	142.38	480.74	
B-5-CW02	B	10/9/2012	697.67	--	208.14	489.53	
B-5-CW03	A (WT)	10/9/2012	697.26	--	207.76	489.50	
B-6-CW01	OA	10/8/2012	699.99	--	199.07	500.92	
B-6-CW02	B	10/8/2012	699.99	--	208.31	491.68	
B-6-CW03	X (WT)	--	699.89	214.33	--	--	dry well
B-6-CW03R	A (WT)	10/8/2012	699.76	--	216.07	483.69	
B-6-CW05	B	10/9/2012	725.42	--	230.29	495.13	
B-6-CW06	X (WT)	--	725.51	--	--	--	dry well
B-6-CW08	B	10/8/2012	727.06	--	232.08	494.98	
B-6-CW09	A (WT)	10/8/2012	727.04	--	234.08	492.96	
B-6-CW10	A (WT)	10/9/2012	710.11	--	220.85	489.26	
B-6-CW14	B	10/9/2012	704.79	--	213.75	491.04	
B-6-CW15	A (WT)	10/9/2012	702.35	274.50	203.66	498.69	
B-6-CW16	X/A (WT)	10/8/2012	714.62	274.50	226.07	488.55	
B-6-CW17	A/Y (WT)	10/8/2012	742.39	282.50	244.91	497.48	
C-1-CW02	B	10/9/2012	740.07	279.40	238.41	501.66	
C-1-CW03	A (WT)	10/9/2012	740.39	--	238.78	501.61	
C-1-CW05	B	10/9/2012	720.87	--	221.10	499.77	
C-1-CW06	A (WT)	10/9/2012	720.91	--	221.63	499.28	
C-1-CW08	A (WT)	10/9/2012	731.72	--	233.20	498.52	
MW-01	--	10/9/2012	719.39	256.10	230.91	488.48	
MW-02	--	10/9/2012	720.05	251.70	232.08	487.97	
MW-03	--	10/11/2012	720.63	295.30	231.26	489.37	
MW-04	A (WT)	10/9/2012	NS	274.50	217.40	--	Inaccessible for surveying, within a construction zone
MW-05	A (WT)	10/9/2012	NS	282.50	219.21	--	Inaccessible for surveying, within a construction zone
MW-06	A (WT)	10/9/2012	NS	279.84	220.81	--	Inaccessible for surveying, within a construction zone
MW-07	A (WT)	10/9/2012	698.00	270.50	215.48	482.52	
MW-08	A (WT)	10/9/2012	702.95	--	221.08	481.87	
OW-V01A	WT	10/10/2012	617.28	--	142.95	474.33	
OW-V01B	B	10/10/2012	617.35	--	152.82	464.53	
OW-V02A	WT	10/10/2012	621.81	--	159.21	462.60	
OW-V02B	B	10/10/2012	621.88	--	159.04	462.84	
OW-V03A	WT	10/10/2012	627.79	--	173.37	454.42	
OW-V03B	B	10/10/2012	627.81	--	175.47	452.34	
OW-V04A	WT	10/10/2012	639.66	--	164.35	475.31	
OW-V04B	B	10/10/2012	639.72	--	157.52	482.20	
OW-V05A	WT	10/10/2012	645.61	--	169.96	475.65	
OW-V05B	B	10/10/2012	645.68	--	180.08	465.60	
OW-V06A	WT	10/10/2012	656.38	--	188.42	467.96	
OW-V06B	B	10/10/2012	656.45	--	195.61	460.84	
OW-V07A	WT	10/10/2012	668.86	--	188.63	480.23	
OW-V07B	B	41192.00	668.65	--	204.40	464.25	

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Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID	Screened HSU	Date	Well Casing Elevation (feet amsl)	Total Measured Depth	Depth to Groundwater (feet btoc)	Groundwater Elevation	Well Condition during 2012 Q4
OW-V08	WT	10/10/2012	645.14	--	172.55	472.59	
Tt-PW-01	A (WT)	10/8/2012	611.96	--	142.18	469.78	
Tt-PW-02	A (WT)	10/8/2012	603.18	--	133.01	470.17	

Notes:
a. Site wells were surveyed by KDM Meridian, Inc. in April/ May 2012. All horizontal positions are based upon the California Coordinate System of 1983, Zone V. All elevations are based upon the National American Vertical Datum o 1988 (NAVD88) and were established using the City of Burbank Benchmark System.
-- Data not available
amsl - Above mean sea level
B - deeper water hydrostratigraphic unit
btoc - Below top of casing
HSU - Hydrostratigraphic unit
NM - Not measured
NS - Not surveyed
WT - water table hydrostratigraphic uni

Table 3
Groundwater Analytical Data
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID		3850N	3850R	3851M	3871G	A-1-CW07	A-1-CW07-DUP	A-1-CW09	B-1-CW12	B-1-CW12-DUP	B-1-CW13	B-1-CW13-DUP	B-1-CW17	B-1-CW20
Sample Date														
Parameter	Unit													
Metals														
Calcium	mg/L	--	--	--	--	--	--	--	119	123	--	--	118	88.7
Chromium	mg/L	0.015	--	0.005 J	0.006 J	0.008 J	--	--	0.017	--	--	--	0.027	--
Hexavalent Chromium	µg/L	1	--	1.42	1.36	0.7 J	--	--	12.8	--	--	--	24.2	--
Magnesium	mg/L	--	--	--	--	--	--	--	36.8	37.4	--	--	33.8	30.7
Thallium	mg/L	--	--	--	--	< 0.005 U	--	--	--	--	--	--	--	--
Volatile Organic Compounds (VOCs)														
1,1,1,2-Tetrachloroethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,1-Trichloroethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,2,2-Tetrachloroethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,2-trichloro-1,2,2-trifluoroethane	µg/L	< 0.5 U	< 0.5 U	--	--	5.2	--	< 0.5 U	< 0.5 U	< 0.5 U	4	3.9	< 0.5 U	< 0.5 U
1,1,2-Trichloroethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	6.5	< 0.5 U	< 0.5 U	0.8	0.8	< 0.5 U	< 0.5 U
1,1-Dichloroethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1-Dichloroethene	µg/L	< 0.5 U	< 0.5 U	--	--	9.1	--	1.1	7.8	7.2	6.1	5	0.5	< 0.5 U
1,1-Dichloropropene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2,3-Trichlorobenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2,3-Trichloropropane	µg/L	0.085	< 0.5 U	--	--	31	< 0.5 U	8.9	< 0.005 U	< 0.5 U	17	16	< 0.005 U	< 0.5 U
1,2,4-Trichlorobenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2,4-Trimethylbenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dibromo-3-Chloropropane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dibromoethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dichlorobenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dichloroethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	0.8	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dichloropropane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	1.1	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,3,5-Trimethylbenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,3-Dichlorobenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,3-Dichloropropane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,4-Dichlorobenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
2,2-Dichloropropane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
2-Butanone	µg/L	< 5 U	< 5 U	--	--	< 5 U	--	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
2-Chloroethyl Vinyl Ether	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
2-Chlorotoluene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
4-Chlorotoluene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
4-Methyl-2-Pentanone	µg/L	< 5 U	< 5 U	--	--	< 5 U	--	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Acetone	µg/L	< 10 U	< 10 U	--	--	< 10 U	--	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Allyl chloride	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U

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Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID		3850N	3850R	3851M	3871G	A-1-CW07	A-1-CW07-DUP	A-1-CW09	B-1-CW12	B-1-CW12-DUP	B-1-CW13	B-1-CW13-DUP	B-1-CW17	B-1-CW20
Sample Date														
Parameter	Unit													
Benzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Bromobenzene	µg/L	< 1 U	< 1 U	--	--	< 1 U	--	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Bromomethane	µg/L	< 1 U	< 1 U	--	--	< 1 U	--	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Carbon Tetrachloride	µg/L	1.4	< 0.5 U	--	--	4	--	1.1	< 0.5 U	< 0.5 U	2.3	2.3	< 0.5 U	< 0.5 U
CFC-11	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
CFC-12	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chlorobenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chlorobromomethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chlorodibromomethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chloroethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chloroform	µg/L	1.4	0.9	--	--	18	--	5.9	1.8	1.8	17	16	3.5	< 0.5 U
Chloromethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
cis-1,2-Dichloroethene	µg/L	1.1	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	3.3	5.1	< 0.5 U	< 0.5 U	6.2	< 0.5 U
cis-1,3-Dichloropropene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
cis-1,4-Dichloro-2-Butene	µg/L	< 5 U	< 5 U	--	--	< 5 U	--	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Cymene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Dibromomethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Dichloromethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Diisopropyl Ether	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Ethylbenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Hexachloro-1,3-Butadiene	µg/L	< 1 U	< 1 U	--	--	< 1 U	--	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Isopropylbenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
m,p-Xylene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Methyl-Tert-Butylether	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Naphthalene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
N-Butylbenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
N-Propylbenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
o-Xylene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Styrene (Monomer)	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Tert-amylmethyl ether	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Tert-Butyl Alcohol	µg/L	< 5 U	< 5 U	--	--	< 5 U	--	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Tert-butyl ethyl ether	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Tert-Butylbenzene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Tetrachloroethene	µg/L	130	140	--	--	210	--	21	38	34	290	280	81	1
Toluene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Total Xylenes	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
trans-1,2-Dichloroethene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	0.7	< 0.5 U
trans-1,3-Dichloropropene	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
trans-1,4-Dichlorobutene	µg/L	< 5 U	< 5 U	--	--	< 5 U	--	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Tribromomethane	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Trichloroethene	µg/L	9.1	12	--	--	340	--	16	110	100	310	280	120	< 0.5 U
Vinyl Chloride	µg/L	< 0.5 U	< 0.5 U	--	--	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U

Table 3
Groundwater Analytical Data
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID		3850N	3850R	3861M	3871G	A-1-CW07	A-1-CW07-DUP	A-1-CW09	B-1-CW12	B-1-CW12-DUP	B-1-CW13	B-1-CW13-DUP	B-1-CW17	B-1-CW20
Sample Date														
Parameter	Unit													
Semi-Volatile Organic Compounds (SVOCs)														
1,4-Dioxane	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--
Anions														
Chloride	mg/L	--	--	--	--	--	--	--	64.1	62	--	--	66.8	67.3
Fluoride (F-, Anion)	mg/L	--	--	--	--	--	--	--	0.39	0.36	--	--	0.34	0.44
Nitrate (as nitrogen)	mg/L	--	--	--	--	--	--	--	12.8	13.1	--	--	17.5	6.8
Nitrite (as nitrogen)	mg/L	--	--	--	--	--	--	--	< 0.1 U	< 0.1 U	--	--	< 0.1 U	0.05 J
Sulfate	mg/L	--	--	--	--	--	--	--	88	88.2	--	--	102	100
General Chemistry														
Alkalinity (as calcium carbonate)	mg/L	--	--	--	--	--	--	--	295	295	--	--	275	215
Bicarbonate (as HCO3)	mg/L	--	--	--	--	--	--	--	360	360	--	--	336	262
Carbonate (as CO3)	mg/L	--	--	--	--	--	--	--	< 5 U	< 5 U	--	--	< 5 U	< 5 U
Hydroxide	mg/L	--	--	--	--	--	--	--	< 5 U	< 5 U	--	--	< 5 U	< 5 U
pH	pH units	--	--	--	--	--	--	--	7.59	7.62	--	--	7.24	7.51
Silica Dioxide	mg/L	--	--	--	--	--	--	--	33.8	31.3	--	--	29.6	27.6
Specific Conductivity	µmhos/cm	--	--	--	--	--	--	--	959	971	--	--	1000	853
Total Dissolved Solids	mg/L	--	--	--	--	--	--	--	508	508	--	--	554	428
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	< 0.5 U	< 0.5 U	--	--	0.5	0.5

Table 3
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Well ID		B-1-CW25	B-1-CW27	B-1-CW28	B-1-CW29	B-5-CW02	B-5-CW03	B-5-CW03-D	B-6-CW01	B-6-CW02	B-6-CW03R	B-6-CW03R-	B-6-CW16
Sample Date													
Parameter	Unit												
Metals													
Calcium	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	mg/L	--	--	--	--	< 0.01 U	0.007 J	0.004 J	--	--	--	--	0.004 J
Hexavalent Chromium	µg/L	--	--	--	--	< 1 U	1.41	1.39	--	--	--	--	0.1 J
Magnesium	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Volatile Organic Compounds (VOCs)													
1,1,1,2-Tetrachloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,1,1-Trichloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,1,2,2-Tetrachloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,1,2-trichloro-1,2,2-trifluoroethane	µg/L	0.5	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	0.7	--	< 0.5 U	< 0.5 U	< 0.5 U	--	1.5
1,1,2-Trichloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	6.2	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,1-Dichloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,1-Dichloroethene	µg/L	0.8	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	3.3
1,1-Dichloropropene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,2,3-Trichlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,2,3-Trichloropropane	µg/L	< 0.5 U	< 0.005 U	< 0.5 U	< 0.5 U	< 0.005 U	21	--	< 0.5 U	< 0.5 U	< 0.005 U	< 0.005 U	< 0.5 U
1,2,4-Trichlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,2,4-Trimethylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,2-Dibromo-3-Chloropropane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,2-Dibromoethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,2-Dichlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,2-Dichloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,2-Dichloropropane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,3,5-Trimethylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,3-Dichlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,3-Dichloropropane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
1,4-Dichlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
2,2-Dichloropropane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
2-Butanone	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U	< 5 U	< 5 U	--	< 5 U
2-Chloroethyl Vinyl Ether	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
2-Chlorotoluene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
4-Chlorotoluene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
4-Methyl-2-Pentanone	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U	< 5 U	< 5 U	--	< 5 U
Acetone	µg/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	--	< 10 U	< 10 U	< 10 U	--	< 10 U
Allyl chloride	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U

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Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID		B-1-CW25	B-1-CW27	B-1-CW28	B-1-CW29	B-5-CW02	B-5-CW03	B-5-CW03-D	B-6-CW01	B-6-CW02	B-6-CW03R	B-6-CW03R-	B-6-CW16
Sample Date													
Parameter	Unit												
Benzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Bromobenzene	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	--	< 1 U	< 1 U	< 1 U	--	< 1 U
Bromodichloromethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Bromomethane	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	--	< 1 U	< 1 U	< 1 U	--	< 1 U
Carbon Tetrachloride	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	2.1	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
CFC-11	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
CFC-12	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Chlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Chlorobromomethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Chlorodibromomethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Chloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Chloroform	µg/L	0.9	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	4	--	< 0.5 U	< 0.5 U	< 0.5 U	--	0.8
Chloromethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
cis-1,2-Dichloroethene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
cis-1,3-Dichloropropene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
cis-1,4-Dichloro-2-Butene	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U	< 5 U	< 5 U	--	< 5 U
Cymene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Dibromomethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Dichloromethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Diisopropyl Ether	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Ethylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Hexachloro-1,3-Butadiene	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	--	< 1 U	< 1 U	< 1 U	--	< 1 U
Isopropylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
m,p-Xylene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Methyl-Tert-Butylether	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Naphthalene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
N-Butylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
N-Propylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
o-Xylene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Styrene (Monomer)	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Tert-amyl methyl ether	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Tert-Butyl Alcohol	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U	< 5 U	< 5 U	--	< 5 U
Tert-butyl ethyl ether	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Tert-Butylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Tetrachloroethene	µg/L	630	8.9	46	140	3.8	14	--	< 0.5 U	< 0.5 U	17	--	26
Toluene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Total Xylenes	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
trans-1,2-Dichloroethene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
trans-1,3-Dichloropropene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
trans-1,4-Dichlorobutene	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U	< 5 U	< 5 U	--	< 5 U
Tribromomethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U
Trichloroethene	µg/L	78	3.8	3.9	3.4	< 0.5 U	11	--	< 0.5 U	< 0.5 U	< 0.5 U	--	9.1
Vinyl Chloride	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U

Table 3
Groundwater Analytical Data
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID		B-1-CW26	B-1-CW27	B-1-CW28	B-1-CW29	B-5-CW02	B-5-CW03	B-5-CW03-D	B-6-CW01	B-6-CW02	B-6-CW03R	B-6-CW03R-	B-6-CW16
Sample Date													
Parameter	Unit												
Semi-Volatile Organic Compounds (8 VOCs)													
1,4-Dioxane	µg/L	--	--	--	--	--	--	--	--	--	--	--	--
Anions													
Chloride	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride (F-, Anion)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate (as nitrogen)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite (as nitrogen)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
General Chemistry													
Alkalinity (as calcium carbonate)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Bicarbonate (as HCO3)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Carbonate (as CO3)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Hydroxide	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
pH	pH units	--	--	--	--	--	--	--	--	--	--	--	--
Silica Dioxide	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Specific Conductivity	umhos/cm	--	--	--	--	--	--	--	--	--	--	--	--
Total Dissolved Solids	mg/L	--	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	--	--	--

Table 3
Groundwater Analytical Data
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID		C-1-GW02	C-1-GW03	C-1-GW03-D	C-1-GW05	C-1-GW06	C-1-GW08	MW-01	MW-02	MW-03	MW-04	MW-05	MW-05-DUP	MW-06	MW-07	MW-08	MW-08-DUP
Sample Date																	
Parameter	Unit																
Metals																	
Calcium	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	mg/L	< 0.01 U	0.003 J	--	0.004 J	0.004 J	< 0.01 U	0.005 J	0.012	0.003 J	0.004 J	0.005 J	--	0.005 J	0.004 J	0.006 J	--
Hexavalent Chromium	µg/L	< 1 U	0.4 J	--	< 1 U	0.6 J	< 1 U	0.9 J	6.82	0.6 J	1.67	2.68	--	2.23	1.55	1.96	--
Magnesium	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	mg/L	--	--	--	--	--	--	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	--
Volatile Organic Compounds (VOCs)																	
1,1,1,2-Tetrachloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,1,1-Trichloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	1.8	1.9	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,1,2,2-Tetrachloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,1,2-trichloro-1,2,2-trifluoroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	4.2	2.5	3.2	1.4	0.7	--	1	0.8	1.4	--
1,1,2-Trichloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,1-Dichloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,1-Dichloroethene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	0.7	< 0.5 U	31	20	1.3	0.8	0.8	--	2.4	0.6	3.1	--
1,1-Dichloropropene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,2,3-Trichlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,2,3-Trichloropropane	µg/L	< 0.005 U	< 0.005 U	< 0.5 U	< 0.005 U	--	< 0.005 U	6.9	0.9	6.2	1.3	0.8	0.8	0.175	0.5	1.5	--
1,2,4-Trichlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,2,4-Trimethylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,2-Dibromo-3-Chloropropane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,2-Dibromoethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,2-Dichlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,2-Dichloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	1.1	3.6	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	1.7	--
1,2-Dichloropropane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,3,5-Trimethylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,3-Dichlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,3-Dichloropropane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
1,4-Dichlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
2,2-Dichloropropane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
2-Butanone	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U	< 5 U	< 5 U	--
2-Chloroethyl Vinyl Ether	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
2-Chlorotoluene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
4-Chlorotoluene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
4-Methyl-2-Pentanone	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U	< 5 U	< 5 U	--
Acetone	µg/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	--	< 10 U	< 10 U	< 10 U	--
Allyl chloride	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--

Table 3
Groundwater Analytical Data
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID		C-1-CW02	C-1-CW03	C-1-CW03-D	C-1-CW05	C-1-CW06	C-1-CW08	MW-01	MW-02	MW-03	MW-04	MW-05	MW-05-DUP	MW-06	MW-07	MW-08	MW-08-DUP
Sample Date																	
Parameter	Unit																
Benzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Bromobenzene	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	--	< 1 U	< 1 U	< 1 U	--
Bromodichloromethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Bromomethane	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	--	< 1 U	< 1 U	< 1 U	--
Carbon Tetrachloride	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	3	5.5	< 0.5 U	< 0.5 U	< 0.5 U	--	1.9	< 0.5 U	2.6	--
CFC-11	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
CFC-12	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Chlorobenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Chlorobromomethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Chlorodibromomethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Chloroethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Chloroform	µg/L	< 0.5 U	0.6	0.5	< 0.5 U	0.5	< 0.5 U	3.5	3.8	2	1	1.8	--	3.3	0.8	2.3	--
Chloromethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
cis-1,2-Dichloroethene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
cis-1,3-Dichloropropene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
cis-1,4-Dichloro-2-Butene	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U	< 5 U	< 5 U	--
Cymene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Dibromomethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Dichloromethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Diisopropyl Ether	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Ethylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Hexachloro-1,3-Butadiene	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	--	< 1 U	< 1 U	< 1 U	--
Isopropylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
m,p-Xylene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Methyl-Tert-Butylether	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Naphthalene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
N-Butylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
N-Propylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
o-Xylene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Styrene (Monomer)	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Tert-amyl methyl ether	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Tert-Butyl Alcohol	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U	< 5 U	< 5 U	--
Tert-butyl ethyl ether	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Tert-Butylbenzene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Tetrachloroethene	µg/L	0.7	4.9	5.6	0.8	12	7.9	110	92	95	37	62	--	72	36	73	--
Toluene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	13	< 0.5 U	< 0.5 U	--
Total Xylenes	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
trans-1,2-Dichloroethene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
trans-1,3-Dichloropropene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
trans-1,4-Dichlorobutene	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U	< 5 U	< 5 U	--
Tribromomethane	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--
Trichloroethene	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	190	0.6	55	78	23	7.8	15	--	56	6.2	57	--
Vinyl Chloride	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	< 0.5 U	< 0.5 U	< 0.5 U	--

Table 3
Groundwater Analytical Data
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID		C-1-CW02	C-1-CW03	C-1-CW03-D	C-1-CW05	C-1-CW06	C-1-CW08	MW-01	MW-02	MW-03	MW-04	MW-05	MW-05-DUP	MW-06	MW-07	MW-08	MW-08-DUP
Sample Date																	
Parameter	Unit																
Semi-Volatile Organic Compounds (SVOCs)																	
1,4-Dioxane	µg/L	--	--	--	--	--	--	4.9	< 1 U	1.9	0.72 J	0.58 J	--	1.1	< 1 U	8.8	8.7
Anions																	
Chloride	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride (F, Anion)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate (as nitrogen)	mg/L	--	--	--	--	--	--	21.3	26.7	16.5	15.2	14.5	14.3	16.3	15.4	15.9	--
Nitrite (as nitrogen)	mg/L	--	--	--	--	--	--	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	--
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General Chemistry																	
Alkalinity (as calcium carbonate)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bicarbonate (as HCO3)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbonate (as CO3)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hydroxide	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	pH units	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica Dioxide	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Specific Conductivity	µmhos/cm	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Dissolved Solids	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
a. Metals were analyzed using USEPA Methods 6010B/200.7. Hexavalent chromium was analyzed using USEPA Method 218.6.
b. VOCs were analyzed using USEPA Method 8260B
c. SVOCs were analyzed using USEPA Method 8270C(M) isotope dilution
d. Anions were analyzed using USEPA Methods 300.0 (chloride, fluoride, nitrate, nitrite, and sulfate)
e. Alkalinity was analyzed using SM 2320-B
f. pH was analyzed using SM 4500-H+B
g. Silica was analyzed using SM 4500-Si-C
h. Specific conductance was analyzed using SM 2510-B
i. Total dissolved solids were analyzed using SM 2540-C
j. Total organic carbon was analyzed using SM 5310B
DUP - Duplicate sample
µg/L - Microgram(s) per liter
mg/L - Milligram(s) per liter
µmhos/cm - Micromhos per centimeter
SM - Standard method
SVOCs - Semi-volatile organic compounds
USEPA - United States Environmental Protection Agency
VOCs - Volatile organic compounds

Laboratory Qualifiers
J - Estimated concentration, reported above the method detection limit but below the method reporting limit
U - Analyte not detected at or above the indicated method reporting limit

Table 4
Vertical Gradient Calculations
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID	HSU	Top of Well Screen Elevation (feet amsl)	Bottom of Well Screen Elevation (feet amsl)	Oct-12		
				Midpoint of Screen Elevation (feet amsl)	GW Elevation (feet amsl)	Vertical Gradient (ft/ft)
3850N	X/A	493.07	443.07	468.07	518.55	-0.27
3850R	B	320.49	310.49	315.49	477.88	down
3852F	X	482.65	432.65	453.31	473.97	0.002
3852H	B	338.93	308.93	323.93	474.21	up
3861D	X	487.88	437.88	452.61	467.35	0.04
3861F	B	314.46	294.46	304.46	473.68	up
3862C	A'	497.57	457.57	463.27	468.97	0.03
3862E	B	331.35	311.35	321.35	473.76	up
3872K	A'	494.61	444.61	455.81	467.01	0.04
3872M	B	290.35	260.35	275.35	473.83	up
B-1-CW13	A'/X	501.49	441.49	453.97	466.45	0.07
B-1-CW28	B	324.15	304.15	314.15	476.40	up
B-1-CW25	A'	486.54	446.54	453.45	460.37	0.11
B-1-CW27	B	322.93	302.93	312.93	475.14	up
B-6-CW09	A	485.04	465.04	475.04	492.96	0.02
B-6-CW08	B	366.06	356.06	361.06	494.98	up
B-6-CW03R	A	459.76	439.76	449.76	483.69	0.09
B-6-CW02	B	369.99	359.99	364.99	491.68	up
C-1-CW03	A	481.39	460.39	470.89	501.61	0.0005
C-1-CW02	B	358.07	348.07	353.07	501.66	up
C-1-CW06	A	488.91	468.91	478.91	499.28	0.003
C-1-CW05	B	344.87	334.87	339.87	499.77	up
3830S	X/A	484.37	444.37	464.37	494.15	0.003
3830Q	B	367.56	347.56	357.56	494.42	up
B-5-CW03	A	486.26	466.26	476.26	489.50	0.0002
B-5-CW02	B	357.67	347.67	352.67	489.53	up
B-1-CW12	A'	489.85	439.85	452.36	464.87	0.07
B-1-CW11	B	310.05	280.05	295.05	475.65	up
3851M	X/A	485.35	435.35	456.43	477.50	0.01
3851N	B	345.35	325.35	335.35	478.49	up

Table 4
Vertical Gradient Calculations
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID	HSU	Top of Well Screen Elevation (feet amsl)	Bottom of Well Screen Elevation (feet amsl)	Oct-12		
				Midpoint of Screen Elevation (feet amsl)	GW Elevation (feet amsl)	Vertical Gradient (ft/ft)
3852M	A	385.45	365.45	375.45	471.63	-0.01
3852N	B	310.47	290.47	300.47	470.54	down
3872Q	A'	482.25	442.25	454.36	466.47	0.04
3872S	B	299.95	279.95	289.95	473.69	up

Notes:

a. If well is screened across water table, groundwater elevation is used in place of top of screen to establish midpoint.

amsl - above mean sea level

ft/ft - foot per foot

GW - groundwater

HSU - hydrostratigraphic unit

Table 5
Mann-Kendall Test Results for Tetrachloroethene
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID	Data Set Since 2000						Data Collected in the Past Five Years[a]					
	Data	Detects	Detection Rate	Coefficient of Variation	Confidence	Result	Data	Detects	Detection Rate	Coefficient of Variation	Confidence	Result
3830Q	14	14	100%	0.332	95%	Stable[b]	9	9	100%	0.360	90%	Stable
3830S	19	19	100%	0.287	95%	Stable[b]	9	8	89%	0.121	90%	Stable
3850M	10	10	100%	0.585	95%	Decreasing[b]	6	6	100%	0.735	90%	Decreasing
3850N	23	23	100%	0.685	98%	Decreasing	10	10	100%	0.481	95%	Decreasing
3850R	21	21	100%	0.219	98%	Stable	9	9	100%	0.233	90%	Stable
3850V	12	12	100%	1.355	95%	Decreasing[b]	6	6	100%	0.723	90%	Decreasing
3850W	8	8	100%	1.188	90%	Decreasing[b]	6	6	100%	1.557	90%	Decreasing
3851M	11	11	100%	0.591	95%	Stable[b]	6	6	100%	0.477	90%	Stable
3851N	12	12	100%	1.199	95%	Decreasing[b]	6	6	100%	0.368	90%	Decreasing
3852F	9	9	100%	0.408	90%	Decreasing[b]	6	6	100%	0.248	90%	Stable
3852H	12	12	100%	0.195	95%	Stable[b]	6	6	100%	0.229	90%	Stable
3852L	12	6	50%	1.117	95%	Increasing[b]	6	4	67%	0.827	90%	Stable
3860J	11	11	100%	0.811	95%	No trend[b]	6	6	100%	0.450	90%	Stable
3860K	13	13	100%	0.403	95%	Decreasing[b]	6	6	100%	0.510	90%	Decreasing
3861D	9	9	100%	1.580	90%	No trend[b]	4	4	100%	1.640	90%	No trend
3861F	9	9	100%	0.454	90%	Stable[b]	3	3	100%	c	c	c
3862C	10	2	20%	3.149	95%	No trend[b]	6	0	0%	c	c	c
3862D	10	10	100%	0.490	95%	Decreasing[b]	4	4	100%	0.358	90%	Stable
3862E	12	12	100%	0.375	95%	Decreasing[b]	6	6	100%	0.204	90%	Stable
3871G	8	8	100%	0.668	90%	Stable[b]	6	6	100%	0.170	90%	Stable
3872K	8	8	100%	0.591	90%	Stable[b]	3	3	100%	c	c	c
3872M	12	12	100%	0.301	95%	Stable[b]	6	6	100%	0.139	90%	Stable
4949C	6	5	83%	2.278	90%	No trend[b]	4	3	75%	0.789	90%	Stable
4959H	7	7	100%	1.488	90%	Decreasing[b]	4	4	100%	0.862	90%	Stable
4959K	10	10	100%	1.022	95%	No trend[b]	6	6	100%	0.485	90%	Stable

See Notes on Page 3.

Table 5
Mann-Kendall Test Results for Tetrachloroethene
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

	Data Set Since 2000						Data Collected in the Past Five Years[a]					
Well ID	Data	Detects	Detection Rate	Coefficient of Variation	Confidence	Result	Data	Detects	Detection Rate	Coefficient of Variation	Confidence	Result
A-1-CW05	10	10	100%	0.607	95%	Decreasing[b]	6	6	100%	0.208	90%	Stable
A-1-CW07	17	17	100%	0.554	95%	Stable	9	9	100%	0.702	90%	Decreasing
A-1-CW08	10	10	100%	0.469	95%	Stable[b]	6	6	100%	0.422	90%	Stable
A-1-CW09	22	22	100%	0.907	98%	Decreasing	10	10	100%	0.339	95%	Stable
B-1-CW12	22	22	100%	0.548	98%	Stable	9	9	100%	0.383	90%	Stable
B-1-CW13	20	20	100%	0.685	98%	Decreasing	6	6	100%	0.394	90%	Decreasing
B-1-CW16	16	15	94%	1.381	95%	Increasing[b]	6	6	100%	0.473	90%	Stable
B-1-CW17	23	23	100%	0.353	98%	Stable	10	10	100%	0.234	95%	Decreasing
B-1-CW20	23	18	78%	1.492	98%	No trend	10	9	90%	0.659	95%	Stable
B-1-CW25	26	26	100%	1.181	98%	No trend	10	10	100%	0.973	95%	Stable
B-1-CW27	22	22	100%	3.936	98%	No trend	10	10	100%	0.493	95%	Stable
B-1-CW28	24	23	96%	0.515	98%	Increasing	10	10	100%	0.383	95%	Stable
B-1-CW29	12	12	100%	0.898	95%	Stable	8	8	100%	0.785	90%	Stable
B-5-CW02	20	20	100%	0.802	98%	Decreasing	12	12	100%	0.788	95%	Decreasing
B-5-CW03	15	15	100%	0.367	95%	Decreasing	9	9	100%	0.299	90%	Decreasing
B-6-CW01	11	0	0%	c	c	c	5	0	0%	c	c	c
B-6-CW02	13	0	0%	c	c	c	7	0	0%	c	c	c
B-6-CW03R	7	7	100%	1.976	90%	No trend	5	5	100%	0.134	90%	Stable
B-6-CW16	10	10	100%	1.179	95%	No trend	6	6	100%	0.759	90%	Stable
C-1-CW02	20	20	100%	0.447	98%	Decreasing	10	10	100%	0.513	95%	Decreasing
C-1-CW03	19	19	100%	0.626	95%	Decreasing	10	10	100%	0.249	95%	Decreasing
C-1-CW05	16	16	100%	0.350	95%	Decreasing	10	10	100%	0.370	95%	Stable
C-1-CW06	17	17	100%	0.479	95%	Decreasing	9	9	100%	0.666	90%	Decreasing
C-1-CW08	16	16	100%	0.598	95%	Decreasing	11	11	100%	0.669	95%	Decreasing

See Notes on Page 3.

Table 5
Mann-Kendall Test Results for Tetrachloroethene
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID	Data Set Since 2000						Data Collected in the Past Five Years[a]					
	Data	Detects	Detection Rate	Coefficient of Variation	Confidence	Result	Data	Detects	Detection Rate	Coefficient of Variation	Confidence	Result
MW-01	2	2	100%	c	c	c	2	2	100%	c	c	c
MW-02	2	2	100%	c	c	c	2	2	100%	c	c	c
MW-03	13	13	100%	0.469	95%	Stable	8	8	100%	0.401	90%	Stable
MW-04	11	11	100%	0.485	95%	Decreasing	7	7	100%	0.141	90%	Stable
MW-05	13	13	100%	0.395	95%	Decreasing	8	8	100%	0.196	90%	Stable
MW-06	12	12	100%	0.314	95%	Decreasing	7	7	100%	0.175	90%	Stable
MW-07	12	12	100%	0.234	95%	Stable	7	7	100%	0.151	90%	Stable
MW-08	12	11	92%	0.436	95%	Stable	7	6	86%	0.466	90%	Stable

Notes:

a. Data collected from December 2007 to October 2012.

b. No new data added to the dataset from the June 2012 statistical analysis.

c. Mann-Kendall testing was not possible due to a sample size less than 4, or because the analyte was never detected.

Table 6
Mann-Kendall Test Results for Trichloroethene
Semiannual Groundwater Monitoring Report - Fourth Quarter 2012
Lockheed Martin Corporation
Burbank Operable Unit, Burbank, California

Well ID	Data Set Since 2000						Data Collected in the Past Five Years[a]					
	Data	Detects	Detection Rate	Coefficient of Variation	Confidence	Result	Data	Detects	Detection Rate	Coefficient of Variation	Confidence	Result
3830Q	14	2	14%	2.551	95%	No trend[b]	9	1	11%	3.000	90%	No trend
3830S	19	19	100%	1.620	95%	No trend[b]	9	9	100%	1.392	90%	Decreasing
3850M	10	10	100%	0.638	95%	Stable[b]	6	6	100%	0.655	90%	Decreasing
3850N	23	23	100%	0.770	98%	Decreasing	10	10	100%	0.729	95%	Decreasing
3850R	21	21	100%	0.172	98%	Stable	9	9	100%	0.171	90%	Increasing
3850V	12	12	100%	0.998	95%	Decreasing[b]	6	6	100%	0.704	90%	Decreasing
3850W	8	8	100%	0.668	90%	Decreasing[b]	6	6	100%	0.645	90%	Stable
3851M	11	11	100%	0.522	95%	Stable[b]	6	6	100%	0.478	90%	Stable
3851N	12	12	100%	1.329	95%	Decreasing[b]	6	6	100%	0.356	90%	Decreasing
3852F	9	7	78%	0.883	90%	Stable[b]	6	4	67%	1.137	90%	No trend
3852H	12	12	100%	0.145	95%	Decreasing[b]	6	6	100%	0.131	90%	Decreasing
3852L	12	10	83%	0.849	95%	Increasing[b]	6	6	100%	0.704	90%	Stable
3860J	11	11	100%	1.045	95%	No trend[b]	6	6	100%	0.653	90%	Stable
3860K	13	13	100%	0.216	95%	Stable[b]	6	6	100%	0.280	90%	Stable
3861D	9	9	100%	1.401	90%	No trend[b]	4	4	100%	1.774	90%	No trend
3861F	9	9	100%	0.355	90%	Stable[b]	3	3	100%	c	c	c
3862C	10	1	10%	3.162	95%	No trend[b]	6	0	0%	c	c	c
3862D	10	10	100%	0.499	95%	Decreasing[b]	4	4	100%	0.340	90%	Stable
3862E	12	12	100%	0.565	95%	Decreasing[b]	6	6	100%	0.237	90%	Stable
3871G	8	8	100%	0.769	90%	Stable[b]	6	6	100%	0.098	90%	Stable
3872K	8	8	100%	0.528	90%	Stable[b]	3	3	100%	c	c	c
3872M	12	12	100%	0.269	95%	Stable[b]	6	6	100%	0.193	90%	Stable
4949C	6	6	100%	1.223	90%	No trend[b]	4	4	100%	0.446	90%	Stable
4959H	7	7	100%	0.939	90%	Decreasing[b]	4	4	100%	0.734	90%	Stable
4959K	10	10	100%	1.195	95%	No trend[b]	6	6	100%	0.435	90%	Stable

See Notes on Page 3.