CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. R2-2012-0019

REVISION OF FINAL SITE CLEANUP REQUIREMENTS and RESCISSION OF ORDER NO. R2-2004-0032 for:

UNITED TECHNOLOGIES CORPORATION

for the property located at:

600 METCALF ROAD
SANTA CLARA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Water Board), finds that:

1. **Named Discharger:** United Technologies Corporation (UTC), hereinafter also referred to as the Discharger, is named as the sole discharger because it is the current property owner and owned and occupied the property during the time of the activities that resulted in the discharges, has knowledge of the discharges or the activities that caused the discharges, and has the legal ability to prevent future discharges. The results of investigations have confirmed the presence of chemicals used by UTC in soil and groundwater in several areas of the site.

2. **Site Location**: The UTC San Jose facility ("the site," as shown in Figure 1) occupies 5,113 acres in an unincorporated area of Santa Clara County, approximately five miles south of San Jose and four miles east of U.S. Highway 101. The site is situated in the foothills, far from heavily populated areas, in an area of rolling hills and relatively broad valleys. Site elevations range from 680 to 1,400 feet above mean sea level. Most of the industrial development of the site occurred in two valleys known as Shingle Valley and Mixer Valley. Three seasonal creeks flow through the site, while a fourth passes around the eastern and southeastern perimeter of the site. These four creeks converge near the southeastern corner of the property. The combined flow of these creeks (i.e., Las Animas Creek) discharges into Anderson Reservoir, Santa Clara County's largest drinking water reservoir. Water released from Anderson Reservoir flows to Coyote Creek, which flows northward across Santa Clara Valley and empties into San Francisco Bay.

3. **Site History**: UTC began operations at the site in 1959. UTC developed, manufactured, and tested space and missile propulsion systems at the site until 2003. The production of solid propellant was discontinued in August 2003 and other manufacturing operations ceased in December 2004. The site, now closed, previously included over 200 stations (typically comprised of buildings or other structures) used for laboratories, research, testing, manufacturing, storage, maintenance, and administration. Solid rocket motors were filled with propellants designed to cause a controlled oxidation reaction that released energy and gas. Solid rocket propellants produced at the site were typically composed of synthetic rubber with the reactive materials, primarily ammonium perchlorate and aluminum, suspended in the rubber matrix. Other materials used in operations at the site included epoxies, paints, insulating materials, chlorofluorocarbons, and degreasing agents (primarily chlorinated and non-chlorinated solvents).

4. **Current Site Status**: Following site closure in 2004, decommissioning activities began in 2005. All stations and laboratories were removed between 2005 and July 2011. UTC has completed site demolition and grading activities under the oversight of Santa Clara County and the Water Board. Following restoration of the site to a more natural condition, remediation activities will continue in an effort to achieve long-term groundwater cleanup standards.

Soil and groundwater in portions of the site have been impacted by chemicals released by historic industrial operations. Surface water at the site is also impacted by chemicals released from contaminated soil and through discharge of contaminated groundwater. Surface water within the site's boundaries is not used for human consumption, and potable use of groundwater is prohibited pursuant to a "Deed Notation and Covenant and Environmental Restriction on Property" ("deed restriction") recorded with the Santa Clara County Recorder on July 29, 2002. Based on remedial decisions to date, most of the site will be remediated to unrestricted use; however, portions of the site may be restricted to non-residential use, or unrestricted use with vapor mitigation measures. Portions of the site where certain land uses are restricted through institutional controls are shown in Figure 2.

As summarized in the findings that follow, UTC has fully investigated and characterized the nature and extent of contamination in soil, groundwater, surface water, and soil gas at the site. UTC has also performed an extensive amount of remediation of contaminated media pursuant to previous site cleanup orders. This Order recognizes work previously accomplished at the site and lays out future tasks required to complete environmental site restoration based on a comprehensive assessment of residual risk.

5. **Study Area**: The site has been divided into the following eight geographic/investigative areas, each of which has been impacted to some extent by chemicals released to the environment:

- Upper Shingle Valley (USV)
- Middle Shingle Valley (MSV)
- Lower Shingle Valley (LSV)
- Motor Test Area (MTA)
- Research and Advanced Technology Area (R&AT)
- Motor Assembly Area and Component Test Area (MAA/CTA)
- Mixer Valley
- Open Burning Facility (OBF)

These areas are identified on the site map (Figure 1). More information on environmental investigations and remedial actions in these areas is provided below.

6. **Adjacent properties:** Land surrounding the site is used primarily for grazing. Ranch lands are located to the north, east, and southeast of the site. Two regional parks and public open space are located approximately 4,000 feet to the northwest and west. The nearest residences are a few ranch houses located within 3,000 feet to the north, northeast, and southeast of the site's boundaries.

The site has not been impacted by chemicals from adjacent offsite sources. There is evidence that chemicals originating from the site have migrated onto adjacent properties through groundwater migration. However, offsite contamination from the site is neither laterally extensive nor present in high concentrations. One isolated subsurface area located north of the OBF contains groundwater impacted by low concentrations of perchlorate in one groundwater monitoring well (RI-61W) a short distance across the site's property line (Figure 3). Perchlorate concentrations in Well RI-61W have ranged from 32 micrograms per liter (μg/L) to 57 μg/L between 2005 (when the well was installed) until 2011, with the highest concentrations occurring in the first two years. Surface and subsurface drainage patterns limit the extent of water migration in this area. Other offsite wells in the vicinity of RI-61W have not yielded detectable concentrations of perchlorate.

Anderson Reservoir, which is located approximately 800 to 4,000 feet south of the site (depending on the volume and elevation of water stored in the reservoir), receives the combined surface flow from all the creeks that pass through the site. As discussed below, the creeks periodically contain perchlorate and volatile organic compounds (VOCs) at onsite monitoring stations. The monitoring point at the confluence of all of the surface water creeks (outside the site's property boundary) has

shown decreasing perchlorate impacts since the cessation of site operations. The majority of analytical results from offsite samples have shown no detectable concentrations of perchlorate.

7. **Regulatory History**: The site has been under Water Board oversight since 1965, and the Water Board is the lead agency for site-wide corrective actions. The California Department of Toxic Substances Control (DTSC) also regulates portions of the site under its Resource Conservation and Recovery Act (RCRA) authority, as explained in Finding 9. The site has been regulated under several Water Board orders, including Site Cleanup Requirements (SCR) orders, Waste Discharge Requirements (WDR) orders, and a Water Reclamation Requirements order. To facilitate regulatory oversight, the site was divided in the 1990s into two operable units based on the status of corrective action. At the time, the fully characterized portion of the site (Mixer Valley and most of Shingle Valley) was designated Operable Unit 1; the remainder of the site was designated Operable Unit 2.

   SCR orders issued previously for the site include:

   a) The SCR for Operable Unit 1, Order No. 94-064, which was adopted May 18, 1994, and amended on May 24, 1995, September 13, 1995, and May 21, 1997;

   b) The SCR for Operable Unit 2, Order No. 95-193, which was adopted September 14, 1995, and was later replaced by Order No. 98-070, adopted on July 15, 1998; and

   c) Order No. R2-2004-0032, which was adopted on May 19, 2004, rescinded Order No. 94-064 (along with its amendments) and No. 98-070, combined the two OUs into one, and regulated cleanup of soil and groundwater for the entire site.

   This Order rescinds and supersedes Order No. R2-2004-0032, will continue to regulate the cleanup of soil and groundwater for the entire site, and will continue to satisfy the requirements of RCRA Corrective Action with the Water Board as lead regulatory agency.

   In 1991, the Water Board issued a Water Reclamation Requirements order, Order No. 91-006, which permitted UTC to reuse treated groundwater for onsite irrigation and dust control. Order No. R2-2004-0032 rescinded Order No. 91-006; however, onsite reuse of reclaimed water was still permitted with adherence to specific requirements specified in Section D of Order No. R2-2004-0032. This Order maintains the conditions put forth in Order No. R2-2004-0032 and allows the onsite reuse of reclaimed water as discussed in Finding 22, subject to the requirements specified in Section D of this Order, as well as the October 5, 2006, Water Board staff approval of onsite reuse of treated groundwater through spray irrigation during times of heavy runoff. Treated effluent from the groundwater treatment system may be used in other remediation activities at the site with prior approval from Water Board staff.

   The site was also regulated under a WDR order, Order No. 95-190, adopted on September 13, 1995. This WDR regulated the discharge of treated water from the site's sanitary wastewater treatment plant (WWTP; former location shown on Figure 4). The WWTP was decommissioned in February 2009, and its final closure was approved by Water Board staff on January 21, 2010. On April 14, 2010, the Water Board adopted Order No. R2-2010-0063, which rescinded Order No. 95-190.

   UTC manages stormwater runoff at the site under the State Water Resources Control Board's (State Water Board) General Permit for Storm Water Discharges Associated with Industrial Activities, Permit No. CAS000001.

8. **Purpose of Order:** UTC has completed the majority of tasks stipulated in Order No. R2-2004-0032. Findings 14 through 19 summarize the substantial amount of remediation that has been performed at the site since 2004. The site's SCR order is being updated for the following reasons:

- To specify additional remediation tasks necessary to achieve cleanup goals.
- To update the cleanup standards for chemicals of potential concern (COPCs) in water and establish cleanup goals for COPCs in soil based on evaluations of site-specific soil conditions and leaching potential. The updated cleanup standards are presented in Finding 20 and summarized in Tables 1, 2, & 3.
- To optimize and streamline the groundwater and surface water monitoring programs for the site. Water Board staff approved significant changes to the site's groundwater monitoring program on April 14, 2010, based on a demonstration by UTC that many of the groundwater monitoring wells were no longer needed because of changes in site conditions, implemented corrective actions, or redundancy with other wells. The revised monitoring program is summarized in the Self-Monitoring Program (SMP) attached to this Order. The revised SMP is focused on the collection of data that allow assessment of current contaminant concentrations, support evaluations of the effectiveness of implemented remedies, and facilitate decisions regarding future remedial actions.

9. **RCRA Regulation**: Some portions of the site have been regulated by DTSC under RCRA Corrective Actions, beginning with a RCRA Facility Assessment in 1986. In 1991 UTC entered into a 1991 RCRA Consent Order to perform a RCRA Facility Investigation, to complete a Corrective Measures Study, and to implement various corrective measures. RCRA Corrective Actions have been coordinated with work completed under the Water Board's SCR orders.

   In 1991, DTSC certified closure of three RCRA Class I surface impoundments (stations 0250, 0635, and 0706) (Figure 3). The three impoundments were not clean-closed due to the presence of impacted groundwater beneath the impoundments. Although the groundwater impacts are likely due to releases from other nearby or upgradient operations and activities and not from the RCRA units themselves, the closed impoundments are regulated and monitored under a RCRA Post-Closure Permit. This Post-Closure Permit became effective on December 4, 2006.

   The former Open Burning Facility (OBF), located in the eastern "Panhandle" portion of the facility (Figure 1), was a RCRA-regulated thermal treatment facility used for open-air burning of waste propellants and explosives. Thermal treatment at the OBF was discontinued on October 18, 1996. Closure certification for the OBF, addressing impacts to soil and groundwater from VOCs, was submitted to DTSC on June 2, 2000. RCRA Post-Closure Permit applications to address perchlorate impacts to groundwater were submitted to DTSC in 2004 and 2005.

   The OBF closure is currently in Interim Status. A revised Closure Plan addressing impacts to soil and groundwater was submitted in June 2010 and amended in December 2010 and January 2011. On January 27, 2011, DTSC determined the Closure Plan to be technically complete. DTSC provided final approval of the Closure Plan on May 31, 2011. Post-Closure regulation will commence following submittal and approval of the RCRA Post-Closure Permit Application.

   The four RCRA units under DTSC oversight (the three closed surface impoundments and the OBF) are subject to specific RCRA monitoring requirements in addition to the regional groundwater monitoring requirements mandated by this Order. Specific RCRA monitoring requirements are incorporated into the Self-Monitoring Program attached to this Order.

10. **Surface Hydrology:** Three seasonal creek systems (Shingle Creek, Mixer Creek, and Las Animas Creek) are present within the site's boundaries, as shown on Figure 4. Shingle Creek and Mixer Creek flow in a southeasterly direction through Shingle Valley and Mixer Valley, respectively. Las Animas Creek flows southward through the site, passing between the OBF and the main portion of the site. A fourth creek, San Felipe Creek, traverses the eastern side of the site before flowing into Las Animas Creek southeast of the site's boundary. Shingle Creek, Mixer Creek, and San Felipe Creek flow into Las Animas Creek, and this combined flow empties into Anderson

Reservoir. Shingle and Mixer creeks, along with Las Animas Creek above its confluence with San Felipe Creek, are generally small, ephemeral streams with highly variable flows. Hydrologic studies have confirmed that some stretches of the streams are gaining, or receive a contribution of their flow from groundwater discharge.

The discharge of contaminated groundwater into the creeks flowing through the site has been documented through numerous hydrologic investigations. Thus, the creeks provide a pathway for the potential transport of VOCs and perchlorate to Anderson Reservoir, which is used as a source of drinking water for Santa Clara County residents. Given the rapid flow rate of surface water relative to groundwater, preventing or minimizing contaminants in surface waters is a high priority to protect water quality in Anderson Reservoir. VOCs and perchlorate have been detected in surface waters on the site, particularly during the wetter winter months. Studies have shown that these detections result primarily from the transport of contaminants from surface soils via stormwater runoff, as well as from the discharge of groundwater in gaining sections of the creeks.

11. **Surface Water Monitoring**: The direct communication between groundwater and surface water at the site requires that UTC monitor chemical concentrations in surface water. The previous SCR (Order No. R2-2004-0032) required UTC to significantly increase the amount of surface water monitoring to develop a better understanding of contaminant loading to creeks. Creeks are currently sampled monthly at 15 specified sampling stations inside and outside the site's boundaries. In addition, surface water is sampled during rainy season storm events at four specified sampling stations located on Las Animas Creek, Mixer Creek, Shingle Creek, and after the confluence of these three creeks with San Felipe Creek. Figure 4 shows the surface water monitoring locations.

Low concentrations of perchlorate have been detected occasionally in Las Animas Creek between the site boundary and Anderson Reservoir. Since enhanced surface water monitoring was initiated in response to Order No. R2-2004-0032, only 3 monthly creek samples collected from offsite monitoring station C-29a on Las Animas Creek have shown perchlorate detections. These detections ranged between 3.8 and 5.9 µg/L; thus all detections were below the perchlorate maximum contaminant level (MCL) (6 µg/L). In the five-year period from July 2006 through June 2011, none of the monthly creek samples collected at C-29a has yielded detections of perchlorate. Also, neither VOCs nor perchlorate have been detected to date in the reservoir. The Santa Clara Valley Water District samples Anderson Reservoir monthly for perchlorate and quarterly for VOCs.

Due to the importance of surface water monitoring, monthly creek sampling and sampling during storm events will continue as part of the surface water monitoring program during site remediation. It may be appropriate to reduce the number of creek sampling stations and the frequency of sample collection following the completion of site remediation, pending a demonstration that corrective actions have adequately mitigated chemical impacts to surface water.

12. **Site Hydrogeology:**
Hydrogeologic Units: The previously developed portions of the site are located either in stream valleys filled with geologically young, unconsolidated alluvium, or on hilly areas underlain by exposed or thinly buried bedrock. Bedrock at the site generally consists of variably consolidated, non-marine sediments of the Santa Clara Formation, which is of Plio-Pleistocene age. The Santa Clara Formation is a heterogeneous assemblage of discontinuous, fluvial deposits ranging from clays to sandy gravels, and dips to the northeast. The alluvium that fills the stream valleys consists of lenses and layers of clay, silt, sand, and gravel. The Santa Clara Formation underlies alluvium in the stream valleys.

The Santa Clara Formation's ability to store and transmit water is variable, but it typically has a lower hydraulic conductivity than the alluvium. Hydraulic conductivities measured in the

alluvium range from 3 x 10^{-2} centimeters per second (cm/sec) to 2 x 10^{-4} cm/sec, while hydraulic conductivities measured in the Santa Clara Formation range from 2 x 10^{-3} to 1 x 10^{-8} cm/sec. In general, the alluvium serves as an aquifer where it is saturated, whereas the Santa Clara Formation typically acts as a barrier to vertical (and in some places, lateral) groundwater migration. Isolated lenses of groundwater have been identified in the Santa Clara Formation between 25 and 70 feet below ground surface (bgs).

Hydrogeology of the Valleys: In Shingle and Mixer valleys, groundwater occurs primarily in the alluvium, which attains a maximum thickness of approximately 50 feet. In Shingle Valley, the water table typically occurs between 15 to 40 feet bgs. In Mixer Valley, groundwater is encountered in the alluvium at shallower depths, typically between 4 and 20 feet bgs. Groundwater in the alluvium appears to be unconfined in some portions of the valleys and semi-confined in others. This situation is characteristic of fluvial deposits containing interbedded, laterally varying materials with contrasting permeability.

In the upper portions of each valley, groundwater is also present in a limited and discontinuous manner in the Santa Clara Formation. Saturated alluvium generally overlies tighter Santa Clara Formation deposits, which are sometimes described as moist. However, in some areas, laterally discontinuous lenses of saturated, coarse-grained Santa Clara Formation materials appear to be in contact with saturated alluvium, suggesting there may be localized hydraulic communication between the alluvial and Santa Clara Formation deposits.

Hydrogeology of the Hills: The other previously developed areas of the site are located in hilly areas underlain primarily by Santa Clara Formation bedrock. These areas include the MAA/CTA, R&AT area, MTA, and the OBF (Figure 1).

The MAA/CTA is located in the hills southwest of Shingle Valley. Isolated occurrences of groundwater in the MAA/CTA are generally encountered in the Santa Clara Formation at depths between 25 and 70 feet bgs. The R&AT and the MTA are located in side valleys adjacent to seasonal creeks that drain into Shingle Valley. The R&AT and MTA are located either on alluvial soils or directly on the Santa Clara Formation. Isolated groundwater at the R&AT and MTA is encountered at various depths ranging from approximately 14 to 42 feet bgs in alluvium and the Santa Clara Formation. Because the geologic structure of the Santa Clara Formation is less well defined, it is difficult to determine groundwater flow pathways in the area. Available data suggest that the groundwater flow direction and orientation of the groundwater plumes reflects the orientation of surface drainages in the tributary valleys. These tributary drainages contain surface flow only during the winter months.

The OBF is located on a north-sloping ridge of exposed Santa Clara Formation. Surface drainage is toward both the northwest and east. A thin layer of colluvium varying from 1 to 5 feet thick overlies the Santa Clara Formation in the area. Some alluvium occurs in isolated locations along the two small drainages that trend north and west of the OBF. Groundwater flow at the OBF is variable because of the lateral discontinuity of Santa Clara Formation deposits and because of surface topography associated with the nearby Calaveras Fault.

13. **Groundwater Contamination and Monitoring:** Groundwater in portions of the site has been impacted by chemicals (primarily VOCs and perchlorate) released from historic site operations. Groundwater beneath Shingle Valley, Mixer Valley, and the OBF contain the highest concentrations of chemicals, although groundwater has been impacted in other portions of the site as well. The highest concentrations of perchlorate occur in the Oxidizer Road area of Mixer Valley and at the OBF. Impacts from VOCs are also significant in these areas. Groundwater contamination in Shingle Valley consists primarily of VOCs with lower concentrations of perchlorate. UTC has been performing remediation of groundwater through extraction and treatment since 1988. As a result of

remediation, groundwater plumes have remained stable and the maximum chemical concentrations have decreased. However, a significant mass of perchlorate and VOCs remains in site groundwater.

Groundwater on the site, and beneath drainage pathways adjacent to the site, has been monitored since 1983. Since that time, groundwater monitoring has been expanded and reduced as needed. At the present time, UTC monitors groundwater at 150 onsite monitoring locations and at 11 offsite monitoring locations (Figure 5).

14. **Work Performed In Compliance With Previous Order:** The Discharger has completed the following tasks as required in Order No. R2-2004-0032:

a) **Task 1a: Work Plan For Enhanced Surface Water Monitoring**
UTC documented compliance with Task 1a with the submittal of the report entitled, *"Workplan for Enhanced Surface Water Monitoring,"* dated July 2004 (approved by Water Board staff on October 12, 2004).

b) **Task 1b: Implementation of Enhanced Surface Water Monitoring Program**
UTC documented compliance with Task 1b with the submittal of the following reports:

- *"Surface Water Monitoring Report,"* dated July 2005 (approved by Water Board staff on July 14, 2005); and
- Subsequent annual groundwater monitoring reports submitted to Water Board staff also described the enhanced surface water monitoring program activities.

c) **Task 2a: Work Plan for Elimination of Perchlorate Discharge To Creeks**
UTC documented compliance with Task 2a with the submittal of the report entitled, *"Work Plan for Elimination of Perchlorate Discharge to Creeks,"* dated September 2004 (approved by Water Board staff on December 15, 2004).

d) **Task 2b: Implementation of Remedial Measures to Eliminate Perchlorate Discharge to Creeks**
UTC documented compliance with Task 2b with the submittal of the following reports:

- *"2004-2005 Rainy Season Remedial Activities to Prevent Perchlorate Discharge to Creeks,"* dated May 2005;
- *"Gaining Conditions Report,"* dated August 2005 (approved by Water Board staff on November 2, 2005); and
- *"Revised Supplemental Final Remedial Action Plan,"* (*"Revised SFRAP"*), dated May 2010 and approved by Water Board staff on May 27, 2010.

e) **Task 3a: Work Plan for Enhanced Las Animas Area Groundwater Monitoring**
UTC documented compliance with Task 3a with the submittal of the following reports:

- *"Work Plan for Enhanced Las Animas Area Groundwater Monitoring,"* dated September 2004 (approved by Water Board staff on December 15, 2004);
- *"Addendum to the Work Plan for Enhanced Las Animas Area Groundwater Monitoring,"* dated November 2004 (approved by Water Board staff on December 15, 2004);
- *"Evaluation of Alternatives to Enhance Groundwater Containment in Lower Shingle Valley,"* dated March 2005 (approved by Water Board staff on July 17, 2005); and
- *"Work Plan for Enhanced Las Animas Area Groundwater Monitoring Addendum #3,"* dated June 2005 (approved by Water Board staff on July 14, 2005).

f) **Task 3b: Implementation of Enhanced Las Animas Area Groundwater Monitoring Program**
UTC documented compliance with Task 3b with the submittal of the following reports:

- *"Implementation of Enhanced Las Animas Area Groundwater Monitoring Plan,"* dated September 2005 (approved by Water Board staff on November 2, 2005); and

- *"Implementation of Enhanced Las Animas Area Groundwater Monitoring Plan Addendum,"* dated June 2007.

g) **Task 4a: Submit Work Plan for Perchlorate Characterization in Soil**
UTC documented compliance with Task 4a with the submittal of the following reports:

- *"Work Plan for Perchlorate Characterization in Surface Soils,"* dated June 2004 (approved by Water Board staff on October 12, 2004);
- *"Work Plan for Characterization of Perchlorate in Subsurface Soils,"* dated August 2004 (approved by Water Board staff on October 12, 2004); and
- "A*ddendum to Work Plan for Characterization of Perchlorate in Subsurface Soils,"* dated October 2004 (approved by Water Board staff on December 15, 2004).

h) **Task 4b: Submit Perchlorate Characterization Report for Surface Soil**
UTC documented compliance with Task 4b with the submittal of the report entitled, *"Perchlorate Characterization Report for Surface Soil,"* dated January 2005 (approved by Water Board staff on May 12, 2005).

i) **Task 4c: Submit Work Plan for Pilot Testing of Surface Soil Treatment Technologies**
UTC documented compliance with Task 4c with the submittal of the following reports:

- *"Work Plan for Pilot Testing of Field-Proven Treatment Technologies for Perchlorate Contaminated Surface Soils,"* dated August 2004 (approved by Water Board staff on October 12, 2004); and
- *"Work Plan for Soil Composting in Mixer Valley,"* dated June 2005 (approved by Water Board staff on July 14, 2005).

j) **Task 4d: Completion of Pilot Testing of Surface Soil Treatment Technologies**
UTC documented compliance with Task 4d with the submittal of the report entitled, *"Pilot Test of a Field-Proven Treatment Technology for Perchlorate Contaminated Surface Soils,"* dated January 2005 (approved by Water Board staff on May 12, 2005).

k) **Task 4e: Submit Perchlorate Characterization Report for Subsurface Soil**
UTC documented compliance with Task 4e with the submittal of the report entitled, *"Characterization of Perchlorate in Subsurface Soil,"* dated March 2005 (approved by Water Board staff on July 17, 2005).

l) **Task 4f: Evaluation of Alternative Remedial Technologies and Remedial Action Plan Supplement for Perchlorate in Soil**
UTC documented compliance with Task 4f with the submittal of the following reports:

- *"Interim Remedial Action Plan,"* dated August 2005;
- *"Supplemental Final Remedial Action Plan ("SFRAP),"* dated February 2007; and
- *"Revised SFRAP,"* dated May 2010.

m) **Task 4g: Implementation of Final Remedial Measures Perchlorate Contamination in Soil**
UTC documented compliance with Task 4g with the submittal of the following reports:

- *"Revised SFRAP,"* dated May 2010; and
- *"Sitewide Soil Excavation Completion Report,"* submitted in September 2010.

n) **Task 5a: Submit Work Plan for Perchlorate Characterization in Groundwater**
UTC documented compliance with Task 5a with the submittal of the following reports:

- *"Work Plan for Characterization of Perchlorate in Groundwater,"* dated August 2004 (approved by Water Board staff on October 12, 2004); and
- *"Addendum to Work Plan for Characterization of Perchlorate in Groundwater,"* dated March 2005 (approved by Water Board staff on May 12, 2005).

o) **Task 5b: Complete Characterization of Perchlorate Contamination in Groundwater**
UTC documented compliance with Task 5b with the submittal of the following reports:

- *"Characterization of Perchlorate in Groundwater,"* dated January 2005 (approved by Water Board staff on May 12, 2005);
- *"Addendum to Characterization of Perchlorate in Groundwater,"* dated October 2005 (approved by Water Board staff on November 2, 2005); and
- *"Update to Addendum to Characterization of Perchlorate in Groundwater,"* dated June 2007.

p) **Task 5c: Submit Evaluation of Remedial Technologies and Remedial Action Plan Supplement for Perchlorate in Groundwater**
UTC documented compliance with Task 5c with the submittal of the report entitled, *"Groundwater Remedial Action Plan, Perchlorate Supplement,"* dated April 2005 (approved by Water Board staff on July 17, 2005).

q) **Task 5d: Implementation of Final Remedial Measures for Perchlorate in Groundwater**
UTC documented compliance with Task 5d with the submittal of the following report:

- *"SFRAP,"* dated February 2007, and the "*Revised SFRAP,"* dated May 2010.

r) **Task 6a: Submit Evaluation of Alternative Remedial Technologies for VOCs**
UTC documented compliance with Task 6a with submittal of the following reports:

- *"Alternative Remedial Technologies for Total Volatile Organic Compounds,"* dated May 2006 (approved by Water Board staff on August 7, 2006); and
- The May 2010 *Revised SFRAP* discussed the alternatives that could be considered for VOCs in groundwater and determined that groundwater hydraulic containment was the appropriate remedy at this time.

s) **Task 6b: Implementation of Alternative Remedial Technologies for VOCs**
The implementation of the VOC groundwater remedy discussed in the Work Plan and the approved SFRAP is groundwater hydraulic containment. Groundwater hydraulic containment is ongoing, and information is reported to Water Board staff through semi-annual submittal of environmental monitoring reports.

t) **Task 8a: Soil Vapor Extraction Curtailment Proposal**
UTC submitted a request to Water Board staff to close the Station 0710 Biosparge System. Water Board staff approved the request on May 13, 2008, and the Station 0710 Biosparge System was abandoned and closed. The Station 0710 Biosparge System closure activities are described in the *"2010 Characterization Report"*, dated September 2010. In addition, in June 2007, UTC requested approval to dismantle the soil vapor extraction (SVE) well fields in preparation for upcoming demolition and grading activities at the site. Water Board staff conditionally approved the request on August 13, 2007.

u) **Task 8b: Completion of Soil Vapor Extraction Curtailment**
Water Board staff's conditional approval for destruction of SVE well fields stated that the request was approved to facilitate grading activities and required further evaluation of each of the SVE areas to determine if any additional soil remediation would be warranted to protect human health and the environment. These SVE areas were evaluated and described in the *"2010 Characterization Report,"* which stated that the SVE systems were put in place primarily to protect groundwater at specific locations where total VOC concentrations in subsurface soil exceeded one milligram per kilogram (mg/kg). The approved groundwater remedy for the site is long-term groundwater remediation coupled with hydraulic control. Soil data were evaluated in accordance with the approved *Risk Assessment Work Plan* (RAWP) to determine if the soil concentrations pose a potential risk to human or ecological receptors.

In addition to the work performed to comply with tasks specified in Order No. R2-2004-0032, as summarized above, UTC has performed other significant remediation projects at the site, including:

- Excavation of perchlorate-impacted soil to protect surface water and groundwater quality;
- Installation of an in-situ biological treatment trench in upper Mixer Valley to treat groundwater prior to discharge into Mixer Creek (Figure 3); and
- Construction of a centralized groundwater treatment system to replace the outdated groundwater treatment systems located at stations 2403, 2404, and 2405 (Figure 3).

Additional information about these remedial measures is provided in Finding 19.

15. **Environmental Risk Assessment:** The following risk assessment activities have been conducted for the site:

- *Baseline Risk Assessment* (1992): In partial fulfillment of RCRA Corrective Action requirements, UTC performed a baseline risk assessment and a human health and ecological evaluation for the site. Primary chemicals of interest and the potential risks/hazards they could pose were assessed and potential exposure pathways were identified.
- *Proposed Final Remedial Actions and Cleanup Standards for Operable Unit 2* (December 1997): UTC provided a risk assessment for industrial cleanup exposures to chemicals of concern (VOCs and semivolatile organic compounds [SVOCs]) and for potential residential exposure to existing site conditions at that time.
- *Addendum to the 1997 Risk Assessment* (December 2003): This addendum evaluated the human health risk posed by two additional chemicals, perchlorate and 1,4-dioxane (1,4-dioxane was used as a stabilizer in some blends of 1,1,1-trichlorothane [1,1,1-TCA]).
- *Interim Remedial Action Plan* (IRAP; May 2006): The IRAP focused on a remedial approach for addressing perchlorate in soil, groundwater, and surface water. The IRAP also included cleanup goals for perchlorate in soil, groundwater, and surface water.
- *Supplemental Final Remedial Action Plan* (SFRAP; February 2007): The SFRAP included human health risk assessments that evaluated potential risk to a future residential receptor and a future commercial-industrial site worker from all detected compounds in soil for individual stations. A limited ecological risk assessment was also performed, which included an evaluation of perchlorate in soil and a scoping evaluation of other contaminants in soil.
- *Risk Assessment Work Plan* (RAWP), and *Revised Human Health and Ecological Risk Assessment Work Plan* (Revised RAWP; April 2010): Based on comments received from Water Board staff and DTSC on the SFRAP, UTC agreed that additional risk assessment work was necessary. A Revised RAWP was prepared to present methodologies to evaluate risk from all site constituents in current and future risk assessments at the site. After several revisions, Water Board staff approved the Revised RAWP on April 26, 2010.
- *Site Characterization Report* (September 2010): Human health risk assessments for each individual station evaluated to date were presented in the *Site Characterization Report* using methodology presented in the Revised RAWP. Exposure to soil and soil gas was evaluated; exposure to groundwater as specified in the approved Revised RAWP (ARCADIS 2010) had not been evaluated at the time the *Site Characterization Report* was submitted. The results of limited ecological risk assessments were also presented, including exposure to perchlorate in soil and VOCs in animal burrow air (using data available at the time).
- *OBF Closure Plan* (January 2011): A risk assessment for the OBF was submitted to the agencies as part of the *OBF Closure Plan*. The Human Health and Ecological Risk Assessment (HHERA) for the OBF evaluated residual risk remaining to potential receptors from available site media following construction of a proposed cover system. Human receptors included a maintenance

worker and a trespasser; otherwise, risk assessment evaluations were conducted according to the approved Revised RAWP (ARCADIS 2010).

- RCRA Units Closure Reports (December 2010): Complete HHERAs were conducted for stations 0312, 0503, and 2233 according to the methods presented in the approved Revised RAWP. Potential exposures to soil, soil gas, groundwater, and surface water were evaluated for the current conditions of these stations (following any remedial work completed to date) in preparation of closure for these RCRA-permitted facilities.

16. **Risk Management**: The Water Board considers the following human health risks to be acceptable at remediation sites: a cumulative hazard index of 1.0 or less for non-carcinogens and a cumulative excess cancer risk of 10^{-6} to 10^{-4} or less for carcinogens. UTC has been using these risk threshold values to assess risk associated with site contaminants since the 1990s. Risk assessments performed at the site (summarized in Finding 15) found contamination-related risks in excess of these acceptable levels. Many of these risks have already been reduced, and continue to be reduced, through active remediation. However, risk management measures are needed at this site during the remediation period to assure protection of human health and ecological receptors. This Order requires that UTC develop and implement a Risk Management Plan (Task C.3) and requires UTC to adopt institutional controls, such as deed restrictions, that may apply beyond the active remediation period.

17. **Institutional Controls:** Due to potentially unacceptable risks that may be present at the site until remediation activities have been completed, UTC has implemented institutional controls that are expected to limit onsite exposure potential. Institutional controls include deed restrictions, measures to maintain site security, and requirements for worker notification of potential health and safety concerns due to the potential presence of hazardous chemicals in the environment. Portions of the site covered under deed restrictions are shown in Figure 2. The deed restriction, which was approved by the Water Board's Executive Officer and recorded with Santa Clara County in 2002, among other restrictions, prohibits the use of groundwater for drinking water at the site. For areas overlying the groundwater VOC plume and other areas where soil vapor data exceed screening levels for inhalation of indoor air due to vapor intrusion concerns from subsurface, UTC also plans to file a deed restriction requiring vapor mitigation for future enclosed buildings while soil vapor data exceeding screening levels for inhalation of indoor air remains in these areas (Figure 2). It may also be necessary for UTC to file a deed restriction for areas where soil remediation to residential standards is infeasible or impractical.

18. **Remedial Investigations:** UTC began conducting remedial investigations at the site in the 1980s to support Corrective Action decisions. UTC continues to conduct focused investigations as needed to design, implement, and evaluate remedial efforts. Until the late 1990's, most investigations were focused on remediation of VOCs, metals, and polychlorinated biphenyls (PCBs). Since 1998, the primary focus at the site has been on characterization and remediation of perchlorate impacts. Site investigations have defined the general extent of VOC and perchlorate impacts. Perchlorate has been detected in groundwater in most previously developed portions of the site, and its distribution generally coincides with the VOC plumes. The highest concentrations of VOCs occur in the OBF and Shingle Valley, whereas the highest levels of perchlorate in soil and groundwater occur in the Oxidizer Road area. Perchlorate impacts are also significant in Mixer Valley and the OBF.

From 2004 to 2010, multiple soil and groundwater investigations were conducted in fulfillment of requirements of Order No. R2-2004-0032 and Corrective Action requirements to further delineate the lateral and vertical extent of perchlorate and other constituents of potential concern (COPCs) and to refine the remedial options for the site. Additional investigations were completed to support facility closure.

Investigations performed at the site from 2004 to 2010 included the following:

1) Soil and soil gas investigations at stations that had SVE systems or elevated VOC groundwater concentrations;
2) Sub-slab soil investigations throughout the site;
3) Pre-remediation groundwater investigations in MSV, LSV, and Mixer Valley;
4) Test pit excavations at Station 0470 (location shown on Figure 3);
5) Soil and groundwater investigations at the former OBF;
6) In-situ and ex-situ pilot studies to test bioremediation composting for soil.

These investigations were summarized in the SFRAP and the *2010 Characterization Report* that was submitted in September 2010.

The investigations conducted between 2004 and 2009 resulted in the collection and analysis of more than 8,200 surface and subsurface soil samples. These samples were analyzed for perchlorate, VOCs, and other COPCs to further delineate the vertical and lateral extent of contamination or to support closure activities. In total, UTC has investigated and characterized contamination at 129 stations on the site. At 111 of these stations, investigations are considered complete. At the other 18 stations, soil gas investigations were recommended and completed in 2010. An additional 85 stations were reviewed to determine if physical investigation was needed, but these stations were not sampled due to an absence of historical chemical use.

19. **Remediation Objectives and Alternatives Analysis**:
Soil: The objectives for soil remediation are to reduce chemical concentrations in vadose-zone soils to levels protective of human and ecological receptors and to prevent further impacts to groundwater. Remedial action alternatives considered for contaminated soils have included the following: land use controls, cover systems, SVE and enhanced SVE, in-situ soil flushing, ex-situ soil washing, anaerobic soil composting, bioremediation, excavation and off-site disposal, low temperature thermal stripping, thermal destruction (both in-situ and ex-situ), phytoremediation, and no action.

Groundwater: The objectives for groundwater remediation are to stop migration of the VOC and perchlorate plumes, minimize contaminant mobilization from source areas, and reduce chemical concentrations in groundwater plumes to below the groundwater cleanup goals. A variety of remedial actions considered for groundwater treatment were included in the report titled *Alternative Remedial Technologies for Total Volatile Organic Compounds*, which was submitted to the Water Board in 2006. Additional remediation alternatives for perchlorate were evaluated in 2004 and presented in the 2005 *Groundwater Remedial Action Plan, Perchlorate Supplement* and in the SFRAP. Water Board staff approved retaining groundwater hydraulic control, in-situ chemical oxidation, in-situ bioremediation (ISBIO) via injection, and ISBIO trenches or treatment zones as technologies that would be evaluated in the SFRAP.

20. **Implemented Remedial Measures:** Interim remedial measures to remove VOCs and other chemicals from soil and groundwater began in the late 1980s pursuant to the various agency orders referenced in Finding 7. The primary focus of the corrective actions performed prior to 1998 was the treatment of VOCs, metals, and PCBs in soil and groundwater. Interim remedial activities included soil excavation, soil vapor extraction throughout the site, and groundwater extraction and treatment.

Multiple additional remedial measures, primarily focused on perchlorate, have been implemented from 2004 to 2010 in compliance with Order No. R2-2004-0032. These remedial actions were summarized in the SFRAP and the *2010 Characterization Report* and included the following:

1) Assessment and optimization of SVE systems;
2) Closure of biosparge wells at Station 0710 (location shown on Figure 3);
3) Facility closures, including RCRA-permitted unit closures;
4) Surface soil excavation and offsite disposal;

5) Sub-slab soil excavation and offsite disposal;
6) Installation of an ISBIO trench in Mixer Valley (location shown on Figure 3);
7) Operation of multiple groundwater treatment systems (GTS) until 2010; and
8) Construction in 2010 of a centralized groundwater treatment system (CGTS; location shown on Figure 3) to replace the individual GTS units.

SVE systems were previously used to remediate VOC-impacted soils at the site. With Water Board staff approval, the 15 stationary SVE systems were abandoned in 2007, 2008, and 2010 to facilitate site decommissioning activities and prepare the areas for alternative remedial actions (e.g., OBF closure with proposed cover system remedy).

From 2007 to 2009, soil excavation was conducted at 42 stations in accordance with the SFRAP, the RAWP, and the Revised RAWP. A total of 28,693 tons of soil impacted with perchlorate and/or other COPCs were excavated from 112 removal areas to help achieve the goals of Order No. R2-2004-0032.

Following the completion of these remedial measures, UTC requested closure of 111 of the 129 stations that have been decommissioned and investigated at the site since 2004. Soil gas investigations were completed at the remaining 18 stations (or nine combined station exposure areas) in 2010; however, Water Board staff has not yet evaluated these data. Another 85 stations were recommended for closure with no remedial action based on a lack of historical chemical use. In total, 196 stations were investigated and remediated in accordance with the methodologies established in the approved SFRAP. Following additional slab demolition activities at the remaining stations, soil samples will be collected and analyzed and additional remedial measures will be completed, as necessary.

In addition to the soil remediation work summarized above, UTC also completed construction of the CGTS in 2010 to replace the outdated GTS units formerly located at stations 2403, 2404, and 2405. The CGTS consists of a groundwater collection system, lift station, and treatment compound. The groundwater collection system includes 63 extraction wells located across the site. Extracted groundwater is transported through underground pipes to the CGTS located at former Station 0696, where it is treated to remove perchlorate, VOCs, 1,4-dioxane, and other COPCs. The CTGS is now in full operation, and the former GTS units have been dismantled. Several other remedial systems associated with interim remedies have been removed from service (with Water Board staff approval) to support facility closure and decommissioning activities at the site.

21. **Final Remedial Action Plan:** A thorough compilation and evaluation of the results of all prior environmental investigations, interim remedial actions, alternatives analyses, and risk assessments was presented in the SFRAP, submitted in 2007. After several substantial revisions based on comments from Water Board and DTSC staff, the Revised SFRAP was approved by Water Board staff in May 2010.

The SFRAP included a *Five-Year Status Report and Remediation Effectiveness Evaluation*, a comprehensive evaluation of remedial actions that had previously been implemented at the site, and alternate technologies that were under consideration at the time. The SFRAP determined that the remedial actions currently implemented for soil and groundwater cleanup were effective and recommended that these actions be continued. The final remedial actions that were selected in the SFRAP to achieve site cleanup goals are summarized below. As noted in the previous finding, most of these remedies have already been implemented and are currently in operation:

a) *Groundwater and Surface Water Remediation*: UTC will continue operation of the CGTS to remove chemical mass, reduce concentrations, prevent vertical or lateral migration of dissolved contaminants (i.e., maintain hydraulic plume control), prevent discharge of

contaminated groundwater into creeks, and restore groundwater quality. Full attainment of groundwater cleanup goals is expected to require operation of the CGTS for at least a decade.

In addition to the use of the CGTS, UTC will enhance groundwater treatment by constructing ISBIO treatment zones in strategic locations within groundwater plumes. These treatment zones will passively treat impacted groundwater before it discharges to surface water by providing dissolved carbon to groundwater as a nutrient to enhance growth of bacteria and in-situ microbial reduction of perchlorate in groundwater. The in-situ bioremediation treatment zones will aid in eliminating surface water impacts by remediating groundwater prior to its discharge to surface water. In addition, to protect surface water, selective removal of impacted soil will continue in order to achieve the cleanup goals for surface water.

b) *Soil Remediation*: As proposed in the SFRAP, contaminated soils in known source areas have been excavated and disposed offsite to remove contaminant mass and immediately reduce human health and ecological risk associated with soil contact to acceptable levels. The removal of contaminated soils is expected to produce an observable reduction in contaminant concentrations in groundwater and surface water and to expedite the attainment of remedial action objectives for perchlorate and VOCs in water.

c) *OBF Closure:* Cleanup of the OBF is being performed through the RCRA-closure process under DTSC oversight. The *OBF Closure Plan* proposes the installation of an engineered cover system, excavation of perchlorate-impacted soil, and electrical resistance heating technology to remediate VOC-impacted soils; and proposes continued groundwater extraction with the installation of five additional extraction wells to remediate groundwater and mitigate the groundwater-to-surface-water pathway.

d) *Alternate remedial measures*: UTC will periodically evaluate the performance of current soil and groundwater remedial actions and will propose and implement modifications to the remedial measures to optimize performance, as needed.

22. **Basis for Cleanup Standards:**

a. **General**: State Water Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality, or the highest level of water quality that is reasonable if background levels of water quality cannot be restored. Cleanup goals other than background must be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedances of applicable water quality objectives. The Water Board concurs with the Discharger's conclusion in the previously cited SFRAP that background levels of water quality probably cannot be restored in a reasonable amount of time at this site; thus alternative cleanup standards are warranted and appropriate. This Order and its requirements are consistent with Resolution No. 68-16.

State Water Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304," applies to this discharge. This Order and its requirements are consistent with the provisions of Resolution No. 92-49, as amended.

b. **Beneficial Uses**: The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality

objectives. The Basin Plan was duly adopted by the Water Board and approved by the State Water Board, Office of Administrative Law and U.S. EPA, where required.

Water Board Resolution No. 89-39, "Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the San Francisco Bay Region, with limited exceptions for areas of high total dissolved solids (TDS), low yield, or naturally high contaminant levels. Groundwater underlying and adjacent to the site is a potential source of drinking water.

The Basin Plan designates the following potential beneficial uses of groundwater underlying and adjacent to the site:

i. Municipal and domestic water supply,
ii. Industrial process water supply,
iii. Industrial service water supply,
iv. Agricultural water supply, and
v. Freshwater replenishment to surface waters.

At present, there is no known use of groundwater underlying the site for the above purposes other than localized replenishment to the creeks that flow through the site.

Anderson Reservoir is located downstream from the site. The existing and potential beneficial uses of Anderson Reservoir and the streams that flow into the reservoir include:

i. Municipal water supply,
ii. Groundwater recharge,
iii. Non-contact water recreation,
iv. Warm and cold freshwater habitat,
v. Wildlife habitat,
vi. Fish spawning, and
vii. Preservation of rare and endangered species.

c. **Basis for Groundwater and Surface Water Cleanup Standards**: Groundwater and surface water cleanup goals for the site are summarized in Table 1. The groundwater cleanup goals are based on applicable water quality objectives and are the more stringent of U.S.EPA or California primary MCLs for each potential contaminant. For chemicals that do not have established MCLs, current California provisional action levels or public health goals are used, if such exist. Secondary drinking water goals, based on taste and odor characteristics, were not used in setting cleanup goals at this site.

Because groundwater discharges to creeks that flow through the site, and these creeks discharge into Anderson Reservoir that is used as a source of drinking water, the same cleanup goals are generally applied to surface waters at the site. To protect aquatic life, surface water cleanup goals for some chemicals are lower than drinking water goals. Cleanup to these levels will result in acceptable residual risk to humans and ecologic receptors.

d. **Interim Discharge Limits for VOCs in Surface Water:** In Upper Shingle Valley, groundwater containing VOCs discharges into Shingle Creek, causing certain VOC concentrations in the creek to sometimes exceed the surface water cleanup goals, which are set equal to drinking water standards (i.e., MCLs). However, human consumption of water from the creeks within the site is prohibited under institutional controls. VOCs are not detected in surface waters at concentrations that threaten aquatic organisms, and VOC concentrations decrease downstream from discharge areas due to various attenuation processes, including evaporation, dilution and photodegradation. The discharge of VOCs into creeks, and the resultant exceedance of surface water VOC

standards, is expected to persist until groundwater in Upper Shingle Valley is adequately remediated.

UTC has evaluated its ability to expedite remediation by increasing the capture of contaminated groundwater or to reduce VOC concentrations prior to discharge; however, remedial options are limited because of the likelihood of de-watering streams during portions of the year and reducing the quality of riparian habitat. For this reason, this Order establishes interim discharge limits (IDLs) for VOCs in surface water that will apply until groundwater standards for VOCs are achieved. The IDLs do not apply to groundwater, do not apply to non-volatile chemicals including perchlorate, and do not replace the long-term surface water cleanup standards. The approved IDLs, which are set at concentrations that are protective of aquatic receptors, are provided in Table 2.

e. **Basis for Soil Cleanup Goals**: The soil cleanup goals for the site are summarized in Table 3. Soil cleanup goals are specific to this site and are based on evaluations of site soil conditions and the potential for chemicals to leach from soils into groundwater and surface water. Remediation to these levels is intended to minimize leaching of contaminants from soil sources into groundwater, minimize runoff of contaminants to surface water, and result in an acceptable level of risk to human and ecological receptors.

23. **Future Changes to Cleanup Goals:** The goals of remedial actions performed at this site are 1) to reduce risk to human health and to ecological receptors and 2) to restore the beneficial uses of groundwater and surface water within and adjacent to the site. If full restoration of beneficial uses is not technologically or economically achievable within a reasonable period of time, UTC may request modification to the cleanup goals or establishment of a non-attainment area (i.e., a limited groundwater containment zone where water quality objectives are exceeded). Conversely, if new technical information indicates that cleanup goals can be surpassed, or if water quality standards are revised to a lower concentration, the Water Board may determine that further cleanup actions should be taken.

24. **Water Reclamation**: California Water Code (CWC) Section 13512 declares that it is the Legislature's intention for the State to encourage the development of water reclamation facilities so that reclaimed water may be made available to help meet the growing water demands of the State. State Water Board Resolution No. 88-160 allows discharges of extracted, treated groundwater from site cleanups to surface waters only if it has been demonstrated that neither reclamation nor discharge to the sanitary sewer is technically and economically feasible.

Consistent with State policy, treated effluent has been used extensively throughout the site. Water reuse was formerly authorized under Water Reclamation Requirements Order No. 91-006. At times in the past (such as during extended droughts), treated groundwater was also used (as permitted in Order No. 91-006) for dust control at nearby offsite areas such as the County motorcycle park on Metcalf Road and for dust control and soil compaction during construction of the Silver Creek Country Club. Order No. R2-2004-0032 rescinded Order No. 91-006 and prohibited the offsite use of reclaimed water; however onsite reuse for spray irrigation and dust control was allowed.

Groundwater that has been treated at the CGTS is discharged to Pond 2130 for storage prior to onsite reuse. Water from this pond is sampled periodically to provide control over the quality of reclaimed water that is used for beneficial purposes. This Order maintains the prohibition against the offsite use of reclaimed water (Prohibition A.3) but allows onsite reuse of reclaimed water to continue. UTC currently uses treated effluent from the CGTS for various purposes such as dust control, landscape irrigation, and pasture irrigation. In addition, treated effluent can also be transferred to Pond 2120.

25. **Basis for 13304 Order:** CWC Section 13304 authorizes the Water Board to issue orders requiring a discharger to cleanup and abate waste where the discharger has caused or permitted waste to be discharged or deposited where it is or probably will be discharged into waters of the State and creates or threatens to create a condition of pollution or nuisance.

26. **Cost Recovery:** Pursuant to CWC Section 13304, the Discharger is hereby notified that the Water Board is entitled to, and may seek reimbursement for, all reasonable costs actually incurred by the Water Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action required by this Order.

27. **CEQA:** The Santa Clara County Planning Department prepared and certified a Final Environmental Impact Report (FEIR) (State Clearinghouse Number 2006102114) on December 14, 2007, for UTC's San Jose Facility Site Closure Program, which includes the remedial actions required by this Order. The FEIR concludes the Program, with mitigation, will not have any significant environmental impacts. The Water Board has considered the FEIR and finds that with respect to environmental impacts associated with the cleanup that are within the Water Board's jurisdiction, they have been mitigated to less than significant levels.

28. **Notification:** The Water Board has notified the Discharger and all interested agencies and persons of its intent under CWC Section 13304 to prescribe Site Cleanup Requirements for the Discharger and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

29. **Public Hearing:** The Water Board, at a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, pursuant to CWC Section 13304, that the Discharger (or its agents, successors, or assigns) shall continue to cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The storage or treatment of wastes or materials in a manner that will degrade groundwater or surface water quality or adversely affect beneficial uses of the waters of the State is prohibited.

2. Activities associated with subsurface investigation and cleanup efforts that could cause significant migration of wastes or hazardous substances are prohibited.

3. The use of reclaimed water from the site (e.g., treated effluent from the CGTS) shall not be discharged or applied for any purpose outside the site's property boundaries.

4. Subsurface migration of residual pollutants from onsite source areas into previously unimpacted waters of the State is prohibited.

5. Following implementation and operation of remedies pursuant to this Order, further discharge of contaminated groundwater into creeks and other surface waters will be prohibited. Specifically, no concentrations of contaminants in excess of the associated drinking water standard shall be allowed in surface waters or groundwater on the site. In addition, concentrations of contaminants above the method detection limit at offsite sample location C-29a will be prohibited. Prior to completion of approved remedies, occasional exceedance of target surface water cleanup goals that is not the result of a new release may be considered unavoidable and shall not be subject to issuance of notices of violation by the Water Board.

B. REMEDIAL ACTION PLAN AND GOALS

1. **Implement Remedial Action Plan**: The Discharger shall implement the SFRAP described in Finding 20. Proposed changes to specific elements of the Cleanup Plan must be submitted in writing to Water Board staff and must be approved in writing before implementation.

2. **Groundwater Cleanup Goals:** The cleanup goals specified in Table 1 apply to groundwater onsite and outside the site's property boundaries in areas that have been impacted by migration from the site. It is understood that groundwater remediation is a lengthy process and full attainment of groundwater cleanup goals in contaminant source areas and within onsite plumes will not be achieved for many years. The Discharger shall implement and operate the approved final remedies in a good faith effort to achieve the cleanup standards in all monitoring wells following substantial completion of final remedies implemented pursuant to this Order. The Discharger must periodically evaluate the effectiveness of the final remedies and must demonstrate steady progress towards attainment of the cleanup goals, as specified in Task 6. Should the implemented remedies prove ineffective, alternative remedies shall be evaluated to determine if cleanup can be expedited through other technologies.

3. **Surface Water Cleanup Goals**: The cleanup goals specified in Table 1 apply to surface waters in drainages and streams onsite and outside the site's property boundaries in areas that could be impacted by migration from the site. Surface water standards are the same as for groundwater, except for five chemicals (chlorobenzene, phenol, 1,1,1-TCA, xylenes, and TPH-diesel) that have more stringent standards for surface water to protect aquatic fauna. Interim discharge limits for VOCs in surface water for the site have been provided in Table 2 and shall apply until groundwater cleanup standards are achieved.

4. **Soil Cleanup Goals:** Soil cleanup goals, specified in Table 3, apply throughout the site and are based on protection of water quality, human health, and ecologic receptors. The cleanup goal for perchlorate in surface soil is based on protection of surface water quality and therefore is applicable in a contributing watershed as long as concentrations in surface water exceed cleanup goals. The cleanup goal for perchlorate in subsurface soil (2 to 6 feet bgs) is based on ecologic risk assessments. The cleanup goal for perchlorate in deeper subsurface soil (greater than 6 feet bgs) is based on human health risk assessment.

Table 1. Groundwater/Surface Water Cleanup Goals
United Technologies Corporation
San Jose Site

Chemical	Groundwater/Surface Water Cleanup Goal (µg/L) [a, b]
Benzene	1
Chlorobenzene	50 (25 for surface water [d])
Chloroform	100
Carbon tetrachloride	0.5
1,1-Dichloroethene	6
1,1-Dichloroethane	5
cis-1,2-Dichloroethene	6
1,2-Dichloroethane	0.5
1,4-Dioxane	1
Freon 11	150
Freon 113	1,200
Methylene chloride (Dichloromethane)	5
Tetrachloroethene (PCE)	5
Perchlorate	6[c]
Phenol	4,200 (1,300 for surface water [d])
Polychlorinated biphenyls (PCBs)	0.5
Total Petroleum Hydrocarbons as diesel (TPH-diesel)	1,000 (200 for surface water [d])
Trichloroethene	5
1,1,1-Trichloroethane	200 (60 for surface water [d])
Toluene	150
Vinyl chloride	0.5
Xylenes	1,750 (13 for surface water [d])

Notes for Table 1:

a. µg/L = micrograms per liter
b Groundwater cleanup goals are set at the primary MCL or drinking water standard for each chemical. For chemicals that do not have an established MCL, the California provisional action level or Public Health Goal (PHG) is used as the cleanup goal.
c The California Environmental Protection Agency established the MCL of 6 µg/L for perchlorate in October 2007. This MCL was based on a PHG of 6 µg/L established in 2004 by the Office of Environmental Health Hazard Assessment (OEHHA). In January 2011, OEHHA issued a draft technical document supporting a revised PHG of 1 µg/L. Currently the perchlorate MCL remains at 6 µg/L.
d For most chemicals, the surface water cleanup goals are the same as for groundwater. To protect aquatic life, surface water cleanup goals for chlorobenzene, phenol, 1,1,1-TCA, xylenes, and TPH-diesel are set lower than drinking water goals.

Table 2. Aquatic Toxicity-Based Surface Water Interim Discharge Limits

United Technologies Corporation
San Jose Site

Analyte	Test Species	Toxicity[1]	Uncertainty Factor (UF)[1,2]	Surface Water Cleanup Goal (µg/L)[3]	Surface Water IDLs[4,5] (µg/L)
1,1,1-Trichloroethane	Fish (common carp)	Subchronic 14-day NOAEL(6) for growth of **7,700 µg/L**	**20x** (2x subchronic to chronic NOAEL; 10x acute to chronic; 10x fish to amphibian)	60	385
1,1-Dichloroethane	Amphibian (northwestern salamander larvae)	12 day subchronic LC_{50}(7) of **2,500 µg/L**	**20x** (10x LC50 to NOAEL; 2x subchronic to chronic)	5	130
1,1-Dichloroethene	Fish (bluegill and fathead minnow)	Subchronic LC_{50} values all equal to **29,000 µg/L**	**200x** (10x LC50 to NOAEL; 2x subchronic to chronic; 10x fish to amphibian)	6	150
Carbon Disulfide	Fish (zebra danio)	Subchronic NOEC(8) for multiple endpoints range from 778 to 3,200 µg/L, 10-day NOEC for development **2,500 µg/L**	**20x** (2x subchronic to chronic NOEC; 10x fish to amphibian)	300	125
Cis-1,2-Dichloroethene	Fish (fathead minnow)	Acute NOAEL of **100,000 µg/L**	**100x** (10x acute to chronic; 10x fish to amphibian).	6	1,000
Tetrachloroethene (PCE)	Fish (fathead minnow)	Chronic NOAEL of **500 µg/L**	**10x** (fish to amphibian)	5	50
Trichloroethene (TCE)	Amphibian (African clawed frog)	Acute 96-hr LOAEL(9) of 24,200 µg/L; Acute LOAEL (growth) **9,000 µg/L**	**50x** (5x LOAEL to NOAEL, 10x acute to chronic)	5	180

Notes for Table 2:

1. **Bold font** indicates value used to derive interim discharge limit.
2. The UFs selected for this Environmental Risk Assessment are as follows:
   LC50 to NOAEL = 10x LOAEL to NOAEL = 5x Acute to Chronic = 10x Subchronic to Chronic = 2x
3. µg/L = micrograms per liter
4. IDL – Interim Discharge Limit
5. IDL values will apply to onsite surface water until groundwater cleanup goals in Table 1 are met.
6. NOAEL = no observable adverse effects level
7. LC_{50} = lethal concentration to 50% of the test population
8. NOEC = no observable effect concentration
9. LOAEL = lowest observable adverse effects level

Table 3. Soil Cleanup Goals
United Technologies Corporation
San Jose Site

Exposure Depths	**Soil Perchlorate[a] Cleanup Goal for Protection of Surface Water** **0.138[b] (mg/kg)[c]**	**Soil Perchlorate Cleanup Goal for Protection of Ecological Receptors** **1.9[d] (mg/kg)**	**Soil Perchlorate Cleanup Goal for Protection of Human Receptors** **55[e] (mg/kg)**
Surface soil 0 – 2 ft bgs[f]	x	x	x
Subsurface soil 2 – 6 ft bgs)		x	x
Subsurface soil 6 – 10 ft bgs)			x
TPH (gasoline and diesel ranges)	NA[g]	NA[g]	NA[g]

Notes for Table 3:

a. For chemicals other than perchlorate and TPH-gasoline and TPH-diesel, UTC will conduct a forward risk assessment following the approved methodology described in the RAWP, and the Water Board will determine if the calculated risks are acceptable.
b. The risk-based surface soil cleanup goal for the protection of surface water using the area-weighted area approach proposed and approved by the Water Board in the SFRAP and Revised RAWP is 0.138 mg/kg; this goal applies from 0 to 2 feet bgs.
c. mg/kg = milligrams per kilogram
d. The ecological risk-based soil cleanup goal proposed and approved in the SFRAP and 2010 Revised RAWP is 1.9 mg/kg; this goal applies from 0 to 6 feet bgs.
e. The human exposure risk-based subsurface soil cleanup goal proposed and approved in the SFRAP and Revised RAWP is 55 mg/kg; this goal applies from 0 to 10 feet bgs.
f. bgs = below ground surface
g. Total Petroleum Hydrocarbons (TPH) for both the gasoline and diesel ranges will be evaluated based on the individual constituents present (e.g., benzene, toluene, ethylbenzene, total xylenes, and polycyclic aromatic hydrocarbons) which account for TPH toxicity (because no reliable toxicity values for TPH fractions are available to assess).

C. TASKS

The Discharger shall complete the following tasks (not necessarily in listed order) under terms of this Order:

1. REMEDIATION ACTIVITIES

1a. 2011 SITE CHARACTERIZATION REPORT

COMPLETION DATE: JULY 30, 2012

Submit a technical report acceptable to the Executive Officer that summarizes the site investigation activities that occurred throughout 2011. This report will describe the investigation activities, including the soil sampling and remediation that was completed as necessary beneath building slabs during the demolition activities.

1b. 2011 SOIL EXCAVATION COMPLETION REPORT

COMPLETION DATE: JULY 30, 2012

Submit a technical report acceptable to the Executive Officer that summarizes the soil excavation activities that were completed in 2011.

1c. EVALUATION OF CVOC EXTRACTION IN UPPER SHINGLE VALLEY

COMPLETION DATE: SEPTEMBER 30, 2012

Submit a technical report acceptable to the Executive Officer evaluating whether groundwater extraction can be increased in Upper Shingle Valley CVOC plumes during the winter and spring without causing dewatering of Shingle Creek and whether such increased extraction would provide significant additional environmental protection. If feasible and beneficial, groundwater extraction should be increased when groundwater elevations are high to intercept and capture additional CVOC mass prior to discharge to surface water.

1d. WORKPLAN FOR STATION 0470 SOIL EXCAVATION

COMPLETION DATE: JUNE 30, 2013

Submit a technical report acceptable to the Executive Officer that describes the soil excavation activities that will be completed at Station 0470.

1e. COMPLETION REPORT FOR STATION 0470 SOIL EXCAVATION

COMPLETION DATE: MARCH 30, 2014

Submit a technical report acceptable to the Executive Officer that contains a summary of the soil excavation activities associated with Station 0470.

1f. WORKPLAN(S) FOR INSTALLATION OF BIOREMEDIATION TRENCHES OR TREATMENT ZONES

COMPLETION DATE: MAY 15 of the year work is to be performed

Submit technical reports acceptable to the Executive Officer that describe the ISBIO trenches or treatment zones that will be constructed to reduce the discharge of contaminants from groundwater to surface water bodies. Separate workplans may be submitted, on a schedule of approximately one per year, for each ISBIO location proposed in the SFRAP, until all trenches are installed.

1g. **COMPLETION REPORT(S) FOR BIOREMEDIATION TRENCHES OR TREATMENT ZONES**

COMPLETION DATE: MARCH 30 of the year following the implementation of the scope of work described in the Workplan

Submit a technical report acceptable to the Executive Officer that contains a summary of the ISBIO trenches or treatment zones that are constructed to address the groundwater to surface water pathway. Separate reports may be submitted, on a schedule of approximately one per year, for each bioremediation trench installed.

1h. **OPERATION AND MAINTENANCE OF CENTRALIZED GROUNDWATER TREATMENT SYSTEM**

The Discharger shall operate the CGTS until groundwater cleanup goals are achieved or until the Executive Officer determines that operation is no longer required for attainment of the cleanup goals specified in Table 1. The Discharger shall maintain hydraulic capture of groundwater plumes through groundwater pumping and maintain proper operation of the CGTS and related wells, piping, and infrastructure. The Discharger shall routinely report the performance of the CGTS by providing the volume of groundwater treated and the mass of chemicals removed by the CGTS in each semi-annual Environmental Monitoring Report (EMR), as described in Section 3.d. of the Self-Monitoring Program (Attachment 1).

2. FINAL RISK ASSESSMENT

COMPLETION DATE: DECEMBER 15, 2012

Submit a technical report acceptable to the Executive Officer that contains an evaluation of human health and ecologic risks associated with residual concentrations of perchlorate, VOCs, and other COPCs remaining in soil and groundwater after implementation of final remedial actions.

3. RISK MANAGEMENT PLAN

COMPLETION DATE: MARCH 30, 2013

Submit a risk management plan acceptable to the Executive Officer that provides a strategy for effectively managing residual risks after final remedies have been implemented. The report shall recommend evaluation of additional remedial technologies if any unacceptable risk is found to remain, or if residual risks cannot be adequately managed through institutional controls.

4. FIVE-YEAR STATUS REPORT AND EFFECTIVENESS EVALUATION

COMPLETION DATE: APRIL 30, 2015, and every five years thereafter

Submit a technical report acceptable to the Executive Officer that includes:

a) a summary of the results of any soil or groundwater investigations performed during the prior five-year period;
b) a tabular summary of analytical environmental data collected during the five-year period;
c) a summary of the progress made towards achieving site cleanup goals during this time (i.e., an estimate of the mass of chemicals removed, reductions in groundwater and surface water contaminant concentrations, goals that have been achieved, etc.); and
d) an evaluation of the effectiveness of the remedial measures that were implemented during the prior five-year period.

If the final cleanup goals established in this Order (Table 1) have not been achieved during the five-year reporting period, this report shall also contain:

e) an evaluation and recommendations for alternative remedial measures that may be implemented to expedite the attainment of final cleanup goals; and
f) an estimate of the time required to achieve the cleanup goals and a determination of whether attainment of cleanup goals is technically or economically feasible within a reasonable period of time.

5. GROUNDWATER EXTRACTION CURTAILMENT

5a. PROPOSAL TO CURTAIL GROUNDWATER EXTRACTION

COMPLETION DATE: 90 days prior to proposed extraction well pumping curtailment

Submit a technical report and implementation schedule acceptable to the Executive Officer containing a proposal for curtailing pumping from groundwater extraction well(s) and the criteria used to justify such curtailment. Curtailment of groundwater extraction may include, but is not limited to, final shutdown of the system, phased approach to shutdown, pulsed pumping, or a significant change in pumping rates. The report shall include the rationale for curtailment or modifying the system. This report shall also include data to show that cleanup goals for COPCs have been achieved and have stabilized or are stabilizing and that the potential for contaminant levels rising above cleanup goals is minimal. This report shall also include an evaluation of the potential for contaminants to migrate into the creeks' surface or subsurface flow and downward to the Santa Clara Formation aquifers.

All significant system modifications to the extraction and treatment systems are subject to approval by the Executive Officer. This requirement may be waived by the Executive Officer if deemed appropriate. Significant system modifications do not include routine maintenance activities or replacement of system components with generally similar equipment.

5b. COMPLETION OF EXTRACTION WELL CURTAILMENT

COMPLETION DATE**:** According to schedule in task 4a approved by the Executive Officer

Submit a technical report acceptable to the Executive Officer documenting completion of the necessary tasks identified in the technical report submitted for Task 4a.

6. EVALUATION OF NEW HEALTH CRITERIA

COMPLETION DATE: 90 days after request made by the Executive Officer

Submit a technical report acceptable to the Executive Officer containing an evaluation of how the final cleanup plan and cleanup goals would be affected if the concentrations listed in Tables 1 and 3 are changed as a result of promulgation of revised drinking water goals, MCLs or action levels, or other health-based criteria.

7. EVALUATION OF NEW TECHNICAL INFORMATION

COMPLETION DATE: 90 days after request made by the Executive Officer

Submit a technical report acceptable to the Executive Officer that contains an evaluation of new technical and economic information indicating that cleanup goals or cleanup technologies in some areas may be considered for revision. Such technical reports shall not be required unless the Executive Officer determines that such new information indicates a reasonable possibility that the Order may need to be changed.

8. DELAYED COMPLIANCE

If the Discharger is delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, the Discharger shall notify the Executive Officer and the Water Board may consider revision to this Order.

D. WATER RECLAMATION SPECIFICATIONS

1. **Limits:** Reclaimed water (i.e., groundwater that has been extracted and treated at the CGTS) that is applied for beneficial uses onsite shall not exceed the numeric limits specified in Table 4:

Table 4. Reclaimed Water Limits
United Technologies Corporation
San Jose Site

Constituent	Instantaneous Maximum Limit (µg/L)	Analytical Method
VOCs Vinyl Chloride Benzene All others, per constituent	 0.5 0.5 5.0	U.S. EPA Method 8260, 8021 or equivalent
Semi Volatile Organic Compounds PCBs All others, per constituent	 0.5 5.0	U.S. EPA Method 8270, 8081, 8082 or equivalent
TPH	50	U.S. EPA Method 8015 or equivalent
Perchlorate	6.0	U.S. EPA Method 314.0 or equivalent

2. **Runoff Control:** Reclaimed water shall not be allowed to escape from authorized application areas by airborne spray or by surface runoff. The Discharger shall employ best management practices to prevent surface runoff at application areas.

3. **Application Limitations:** No reclaimed water shall be applied during rainfall, or when soils are saturated to a point where runoff is likely to occur, with the exception of times when significant runoff causes the freeboard at Pond 2130 to be less than two feet and threatens shutdown of the groundwater treatment system(s) and Station 0706 treatment system. In this instance, reclaimed water may be applied at designated reuse areas to create

additional storage capacity for treated groundwater, thereby preventing the shutdown of the groundwater extraction system(s) and the treatment unit at Station 0706.

4. **Public Contact:** Adequate measures shall be taken to minimize public contact with reclaimed water and to inform the public by placing legible, conspicuous warning signs at adequate spacing around Pond 2130 and reclaimed water application areas.

5. **Cross Connection:** There shall be no cross-connection between potable water supply and any piping containing treated groundwater.

6. **Freeboard:** The storage ponds shall be operated to have a minimum of two feet of freeboard to reduce this risk of overflows.

7. **Violation Notification:** In the event that the Discharger is unable to comply with any of the specifications that apply to groundwater reclamation, the Discharger shall notify the Water Board by telephone or email within 24 hours of the incident and confirm it in writing within one week of the telephone notification.

8. **Change in Reclamation**: In accordance with CWC Section 13260, the Discharger shall file a report with the Water Board of any material change or proposed change in the character, location, or volume of the reclaimed water.

9. **No Consumption:** Under no circumstances shall reclaimed water be used for public consumption.

10. **Vehicle Signs:** Vehicles used for carrying or spraying the reclaimed water shall be identified as such with legible signs.

E. **PROVISIONS**

1. **No Nuisance:** The storage, handling, treatment, or disposal of contaminated soil or groundwater, including groundwater reclamation, shall not create a nuisance as defined in CWC Section 13050(m).

2. **Good Operation and Maintenance:** The Discharger shall operate and maintain in good working order, and operate efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order, including groundwater reclamation.

3. **Cost Recovery:** The Discharger shall be liable, pursuant to CWC Section 13304, to the Water Board for all reasonable costs actually incurred by the Water Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Order. If the site addressed by this Order is enrolled in a Water Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the Discharger over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures for that program.

4. **Access to Site and Records:** In accordance with CWC Section 13267(c), the Discharger shall permit the Water Board or its authorized representative:

   a. Entry upon premises in which any contamination source exists, or may potentially exist, or in which any required records are kept that are relevant to this Order.

   b. Access to copy any records that must be kept under the requirements of this Order.

c. Inspection of any monitoring or remediation facilities installed in response to this Order.

d. Sampling of any groundwater or soil that is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the Discharger.

5. **Self-Monitoring Program:** The Discharger shall implement the Self-Monitoring Program (SMP) attached to this Order, or as amended by the Executive Officer. The Discharger shall submit Environmental Monitoring Reports (EMR), in accordance with the SMP, that summarize and interpret the monitoring data collected during the previous monitoring period. The EMR reports shall also include a summary of the results of any investigations conducted during the period covered, provide notice of any unusual results from environmental monitoring, and summarize any remedial actions implemented during the monitoring period. The EMR shall include, in a separate section, all monitoring data required by DTSC for all waste management units regulated under the RCRA Post-Closure Permit. The EMRs shall be submitted in accordance with the schedule provided in the SMP.

   The Discharger may request changes to the SMP and the EMR for the following year. The request for changes must be submitted no later than October 15 of the preceding year. Any changes to the SMP and the EMR must be approved by the Executive Officer prior to implementation. The Executive Officer may require changes to the SMP and the EMR at his/her discretion, based on a need for additional monitoring data to make regulatory decisions regarding site cleanup of protection of human health and the environment.

6. **Contractor/Consultant Qualifications:** All technical documents shall be signed by and stamped with the seal of a California professional geologist, a California certified engineering geologist, or a California registered civil engineer.

7. **Lab Qualifications:** All samples shall be analyzed by State-certified laboratories or laboratories accepted by the Water Board using approved U.S. EPA methods for the type of analysis to be performed or other methods approved by the Water Board. All laboratories shall maintain quality assurance/quality control records for Water Board review. This provision does not apply to analyses that can only reasonably be performed onsite (e.g., temperature).

8. **Document Distribution:** Copies of all correspondence, reports, and documents pertaining to compliance with this Order shall be provided in full, to the following agencies:

   a. Santa Clara Valley Water District
   b. DTSC (Project Manager and Geologist)

   The Discharger shall provide copies of cover letters, title pages, table of contents, and the executive summaries of the above compliance reports (except for the annual progress reports and workplans for soil or groundwater remediation, which shall be submitted in full) to the following agencies:

   a. Santa Clara County Department of Environmental Health

   The Executive Officer may modify this distribution list as needed.

9. **Reporting of Changed Owner or Operator:** The Discharger shall file a technical report on any changes in site occupancy and ownership associated with the site described in this Order.

10. **Reporting of Hazardous Substance Release:** Other than natural migration and transport within the site of hazardous substances that are site-related COPCs and are known or are later established to occur in site media due to historic releases, if any other hazardous substance is discharged in or on any waters of the State, or discharged and deposited where it is, or probably will be discharged in or on any waters of the State, the Discharger shall report such discharge to this Water Board, by calling (510) 622-2300 during regular office hours (Monday through Friday, 8:00 AM to 5:00 PM).

    A written report shall be filed with the Water Board within five (5) working days. The report shall describe the nature of the quantity involved, duration of incident, cause of release, estimated size of affected area, nature of effect, corrective actions taken or planned, and persons/agencies notified.

    This reporting is in addition to the reporting to the California Emergency Management Agency required pursuant to the Health and Safety Code.

11. **Rescission of Existing Orders:** This Order rescinds and supersedes Order No. R2-2004-0032.

12. **Periodic SCR Review:** The Water Board will review this Order periodically and may revise its requirements when necessary.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on March 14, 2012.

Digitally signed by Bruce Wolfe
Date: 2012.03.15 14:52:44 -07'00'

Bruce H. Wolfe
Executive Officer

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FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ORDER MAY SUBJECT YOU TO ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO: IMPOSITION OF ADMINISTRATIVE CIVIL LIABILITY UNDER WATER CODE SECTIONS 13268 OR 13350, OR REFERRAL TO THE ATTORNEY GENERAL FOR INJUNCTIVE RELIEF OR CIVIL OR CRIMINAL LIABILITY

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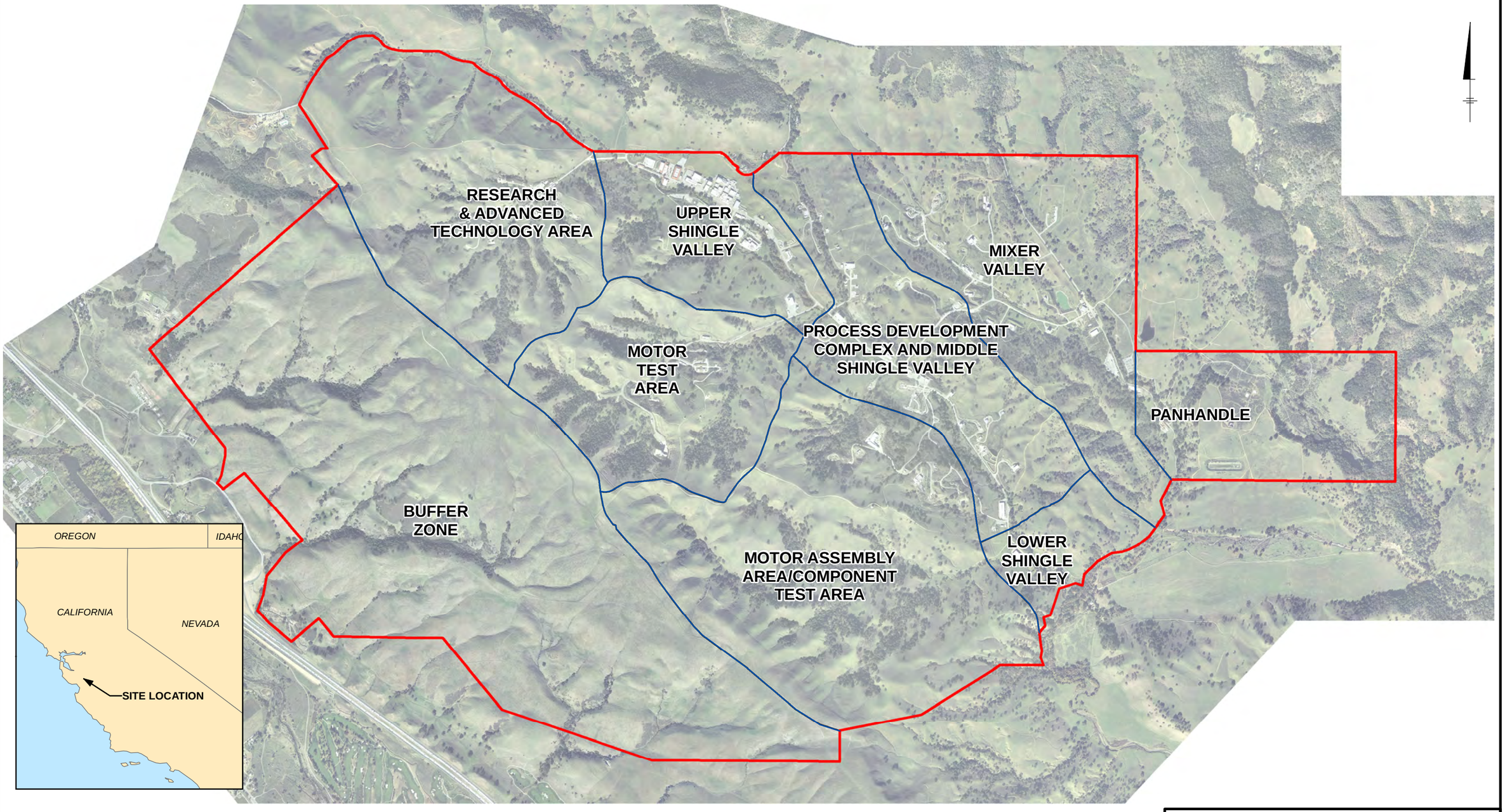
Attachments: Figure 1 – Regional Site Map
Figure 2 – Proposed Deed Restriction Areas
Figure 3 – Features and Stations at the UTC San Jose Site
Figure 4 – Surface Water Monitoring Locations
Figure 5 – Groundwater Monitoring Locations
Self-Monitoring Program



NOTE:

1. COLOR ORTHOPHOTO FLOWN BY HJW GEOSPATIAL OF OAKLAND, CA, FALL 2004.

0 2,000 4,000 Feet

GRAPHIC SCALE

UNITED TECHNOLOGIES CORPORATION/
PRATT & WHITNEY ROCKETDYNE
SAN JOSE, CALIFORNIA

UTC SCR ORDER

REGIONAL SITE MAP

ARCADIS

FIGURE
1

CITY: CLE DIV/GROUP: SER/IM DB: L.Greene LD: PIC: PM: TM: TR:
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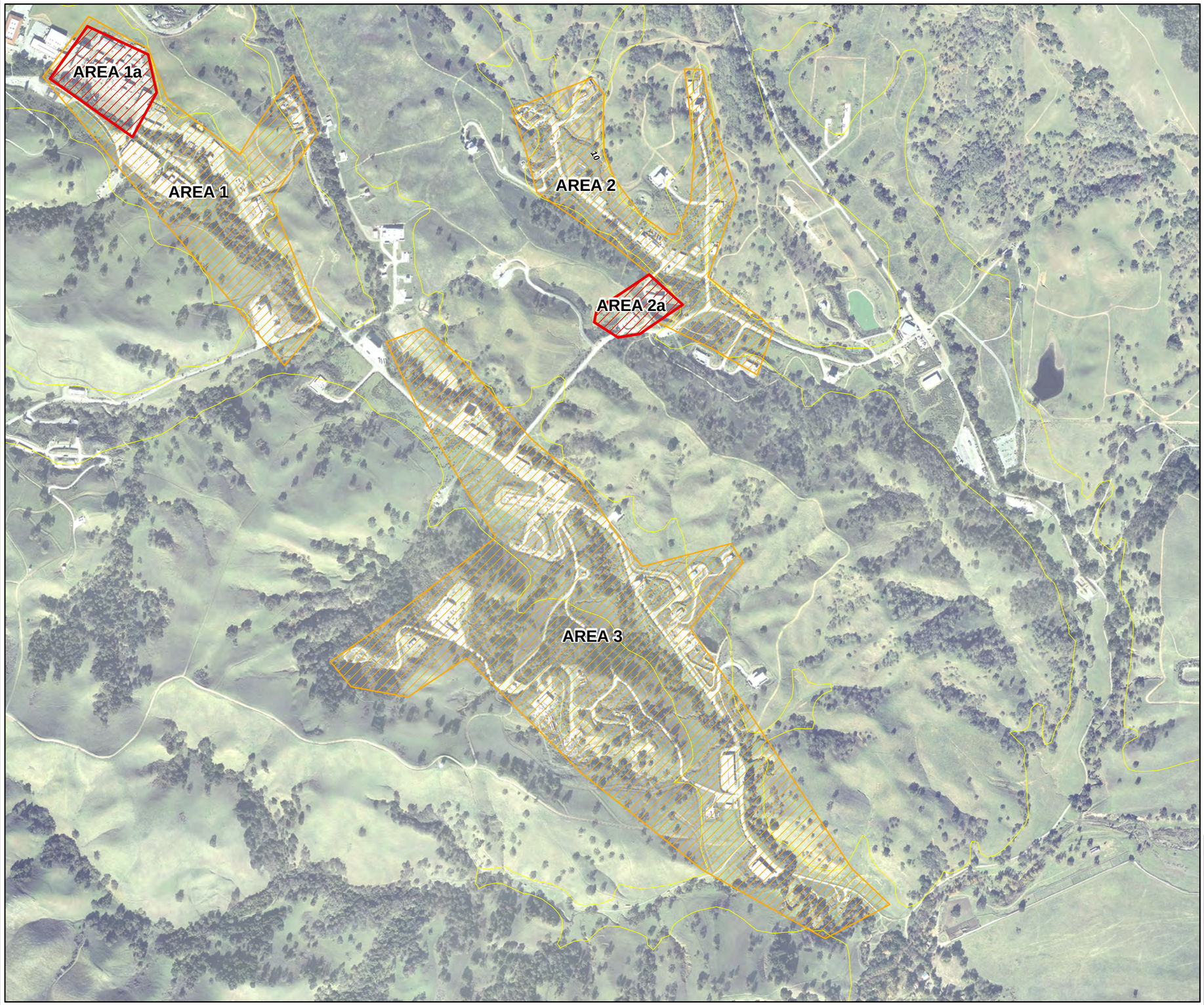

LEGEND:

- DEED RESTRICTION - COMMERCIAL/INDUSTRIAL USE
- DEED RESTRICTION - ENGINEERING CONTROLS
- ALLUVIUM

0 1,200 2,400 Feet

GRAPHIC SCALE

UNITED TECHNOLOGIES CORPORATION/
PRATT & WHITNEY ROCKETDYNE
SAN JOSE, CALIFORNIA

UTC SCR ORDER

PROPOSED DEED RESTRICTION AREAS

ARCADIS

FIGURE
2

CITY: CLE DIV/GROUP: SER/IM DB: L.Greene LD: PIC: PM: TM: TR:
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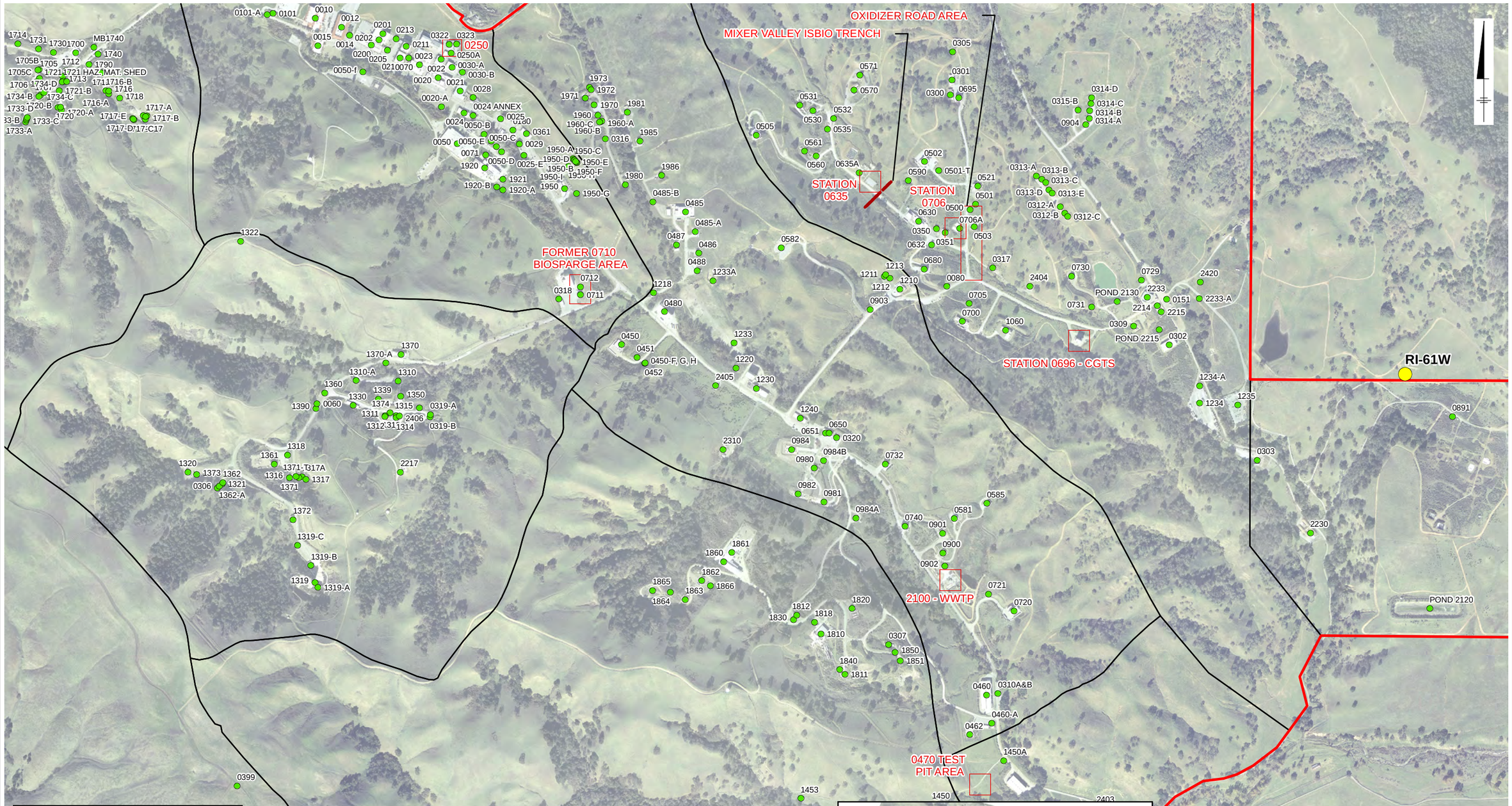


LEGEND:

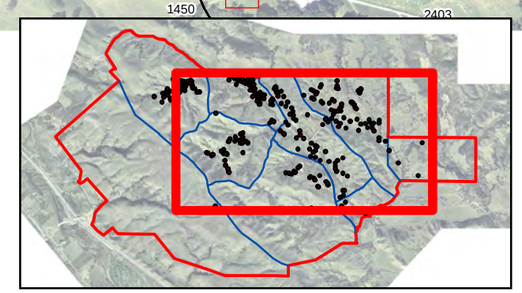
STATION LOCATIONS

0 1,000 2,000 Feet

GRAPHIC SCALE

NOTE:

1. COLOR ORTHOPHOTO FLOWN BY HJW GEOSPATIAL OF OAKLAND, CA, FALL 2004.



UNITED TECHNOLOGIES CORPORATION/
PRATT & WHITNEY ROCKETDYNE
SAN JOSE, CALIFORNIA

UTC SCR ORDER

FEATURES AND STATIONS AT THE UTC SAN JOSE SITE

ARCADIS

FIGURE 3

CITY: CLE DIV/GROUP: SER/IM DB: L.Greene LD: PIC: PM: TM: TR:
B0039837.0000.00001
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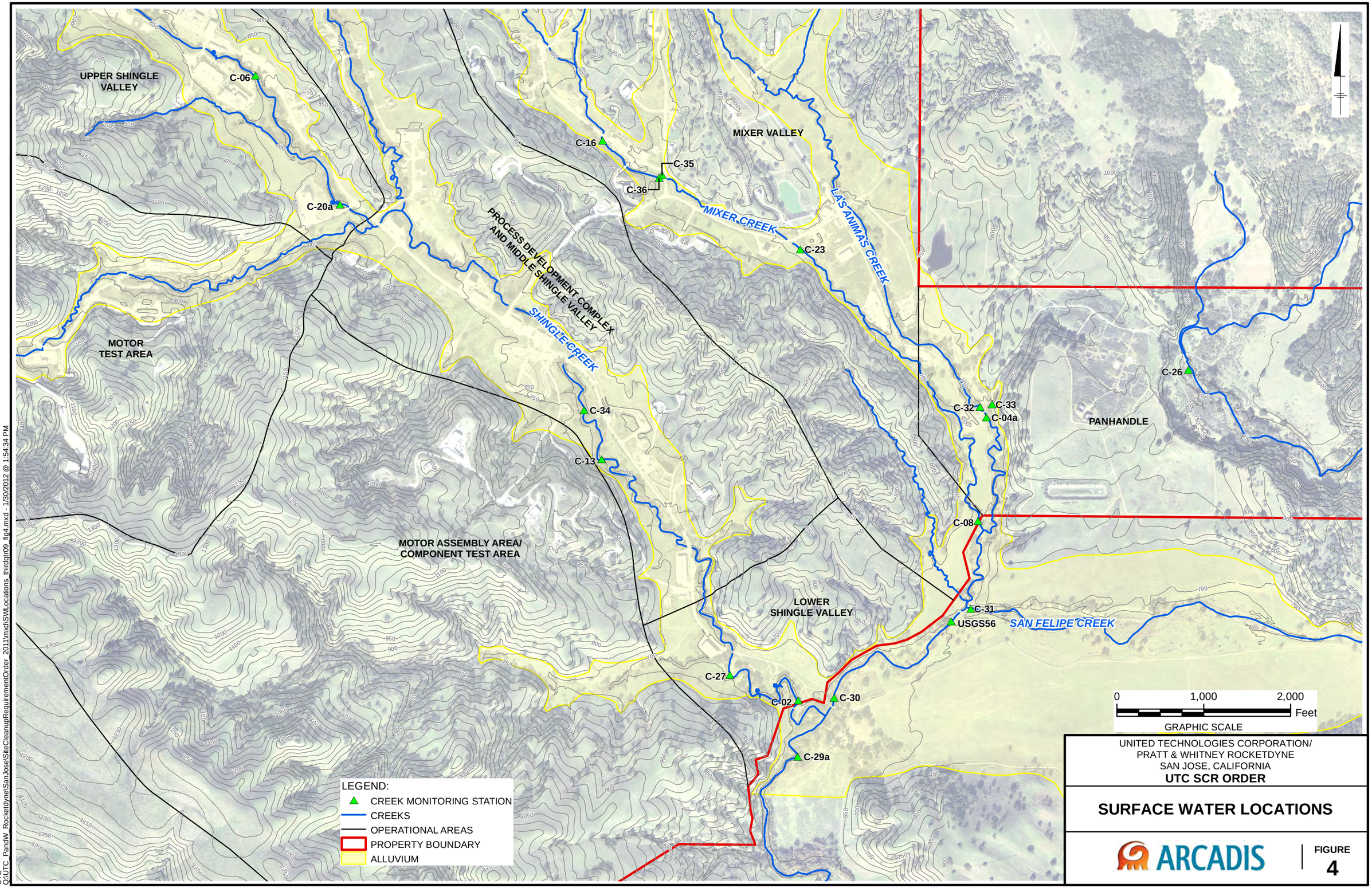

UNITED TECHNOLOGIES CORPORATION/
PRATT & WHITNEY ROCKETDYNE
SAN JOSE, CALIFORNIA
UTC SCR ORDER

SURFACE WATER LOCATIONS

ARCADIS

FIGURE
4

CITY: CLE DIV/GROUP: IM DB: L.GREE LD: PIC: PM: TM: TR:
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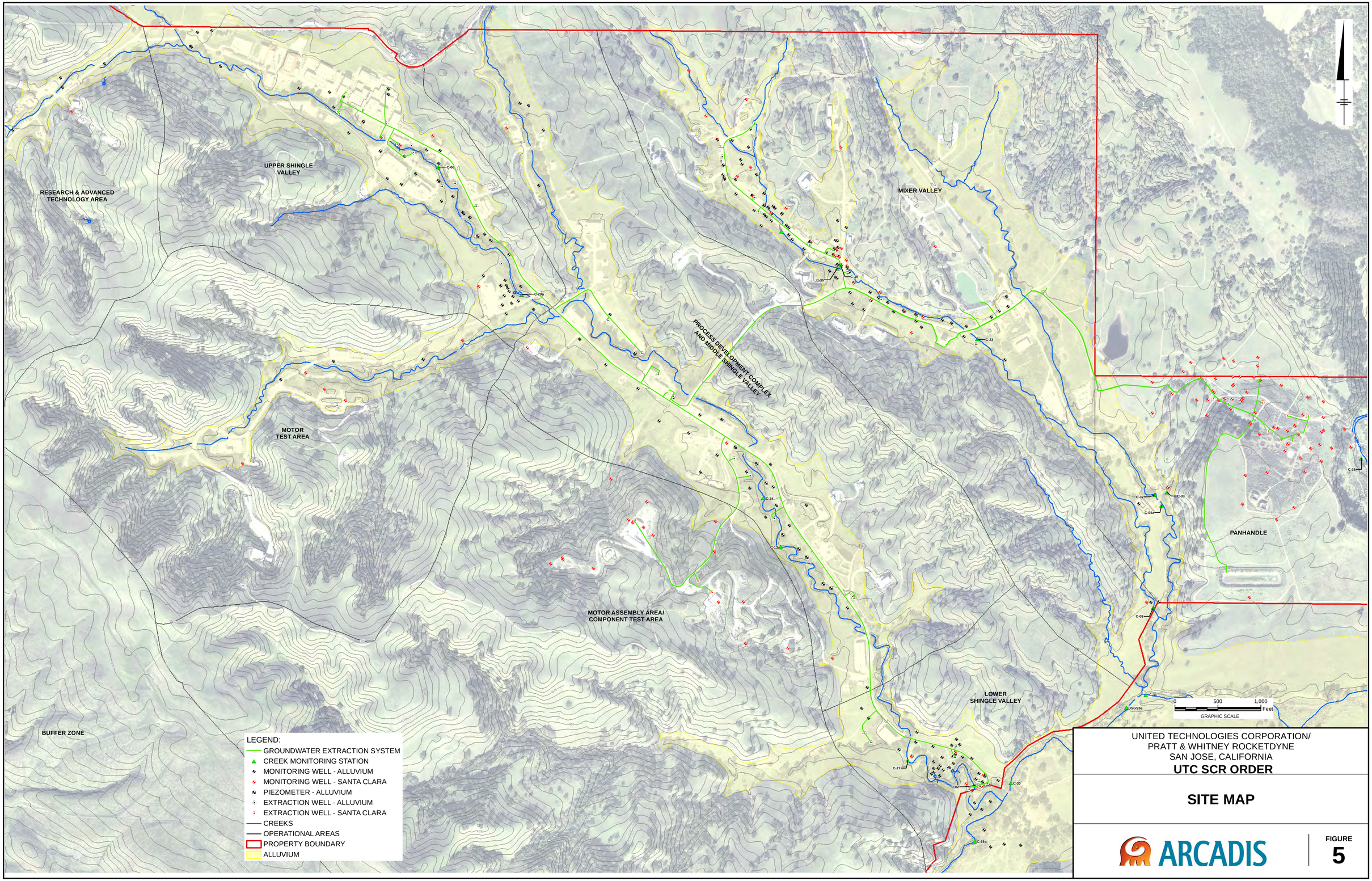

UNITED TECHNOLOGIES CORPORATION/
PRATT & WHITNEY ROCKETDYNE
SAN JOSE, CALIFORNIA

UTC SCR ORDER

SITE MAP

ARCADIS

FIGURE
5

CLEVELAND LGREENE
UTC SAN JOSE
Q:\UTC_PanW_Rocketdyne\SanJose\SiteCleanupRequirementOrder_2011\mxd\AllWells_noLabels_fig5.mxd - 1/12/2012 @ 10:21:43 AM

SELF-MONITORING PROGRAM for:

UNITED TECHNOLOGIES CORPORATION

for the property located at:

600 METCALF ROAD
SANTA CLARA COUNTY

1. **Authority and Purpose**: The Water Board requests the technical reports required in this Self-Monitoring Program (SMP) pursuant to CWC sections 13267 and 13304. This SMP is intended to document compliance with Order No. R2-2012-0019 (Site Cleanup Requirements).

2. **Monitoring**: The Discharger shall measure groundwater elevations in monitoring wells and shall collect and analyze representative samples of groundwater, surface water, and reclaimed water according to this SMP.

3. **Monitoring Reports**: The Discharger shall submit semi-annual Environmental Monitoring Reports (EMR) to the Water Board by August 1 and February 1 following the wet and dry semi-annual groundwater monitoring events each year, respectively. The semi-annual EMR that will be submitted by August 1 will be referred to as the "Annual Report." This will be the larger of the two reports and will contain the tabulated data and data figures. The Annual Report shall include:

   a. Transmittal Letter: The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem(s). The letter shall be signed by the Discharger's principal executive officer or his/her duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the Annual Report is true and correct to the best of the official's knowledge.

   b. Groundwater Elevations: Groundwater elevations are measured once a year during the wet season sampling; therefore, the Annual Report shall present the groundwater elevation data in tabular form. The Annual Report shall also include a groundwater elevation map or maps. Historical groundwater elevations (for the past five years) shall be included in tabular form with each Annual Report.

   c. Groundwater Analyses: Groundwater monitoring wells will be sampled according to a schedule and program as indicated in Table 1. Newly installed wells shall be sampled on a frequency appropriate for the purpose of the well, typically quarterly, for the first year. The appropriate U.S. EPA methods, pH, and turbidity tests shall be required for all new monitoring and extraction wells. Other tests shall be required for some wells, depending on the well location. Groundwater sampling data from the current year shall be presented in tabular form, and key monitoring data shall be presented on site figures showing the monitoring well locations. The Annual Report shall indicate the analytical methods used, detection limits obtained for each reported constituent, and a summary of quality assurance/quality control data. Historical groundwater sampling results for the past five years shall also be included in tabular form. Supporting data, such as laboratory data sheets, need not be included in the report but must be available upon request (however, see "Record Keeping" below).

   d. Groundwater Extraction and Treatment: The Annual Report shall include groundwater extraction results for the CGTS in tabular form, expressed in gallons per month, and the total groundwater volume for the year. The Annual Report shall also include contaminant removal results from the CGTS for the year, expressed in units of chemical mass, as well as historical mass removal results for the CGTS for the previous five years.

e. Status Report: The Annual Report shall describe relevant work completed during the reporting period (e.g., site investigation, remedial measures) and work planned for the following year.

4. **RCRA Post-Closure Compliance Monitoring:** Scheduled monitoring of groundwater at closed RCRA Surface Impoundments 0250, 0635, and 0706, and the former OBF is required under RCRA Post-Closure. This portion of the monitoring program is administered by DTSC. The sampling and analysis program proposed for the closed RCRA units is summarized in Tables 1 and 2. Point of Compliance (POC) wells for former Surface Impoundments 0250, 0635, and 0706 are shown in Table 1. The POC wells and proposed sampling schedule for the former OBF are described in the *OBF Closure Plan* and provided in Table 2. Once DTSC reviews the Closure Report for the Hydrolysis Treatment Facility (HTF; former Station 0503) and makes a determination on whether the former Station 0503 will be entered into post closure care, the post-closure compliance monitoring will be provided to the Water Board and included in the SMP.

   The groundwater monitoring plan for the units under the RCRA Post-Closure Permit will include, at a minimum, those analyses and the frequency of analyses for wells listed in Table 1. UTC will report the results of the RCRA sampling on an annual basis in a specific section of the annual monitoring reports. The RCRA post-closure monitoring program can only be changed with concurrence from DTSC. Other parts of the monitoring program performed under the SMP can be changed by the Water Board without concurrence from DTSC.

5. **Miscellaneous Requirements:**

   a. Well depths shall be determined on an annual basis and compared to the depth of the well as constructed. If greater than 25 percent of the well screen is covered, the Discharger shall redevelop and clear the screened interval before the next sampling event.

   b. Chemical detection limits shall be lower than cleanup goals established in the Order, unless it is technically impractical to achieve detection limits lower than cleanup goals.

6. **Violation Reports**: Other than exceedance of cleanup goals for soil, surface water, and groundwater prior to substantial completion and operation of remedies pursuant to this Order, if the Discharger violates requirements in the Site Cleanup Requirements, then the Discharger shall notify the Water Board office by telephone or email as soon as practicable once the Discharger has knowledge of the violation. Water Board staff may, depending on violation severity, require the Discharger to submit a separate technical report on the violation within five working days of telephone/email notification.

7. **Other Reports**: The Discharger shall notify the Water Board in writing prior to any site activities that have the potential to cause further migration of contaminants or that would provide new opportunities for site investigation.

8. **Record Keeping**: The Discharger or his/her agent shall retain data generated for the above reports, including lab results and QA/QC data, for a minimum of five years after origination and shall make them available to the Water Board if requested.

9. **SMP Revisions**: Revisions to the SMP may be ordered by the Executive Officer, either on his/her own initiative or at the request of the Discharger. Prior to making SMP revisions, the Executive Officer will consider the burden, including costs, of associated self-monitoring reports relative to the benefits to be obtained from these reports.

Attachment: Tables 1, 2 and 3

Table 1. Site-Wide Groundwater Monitoring Program
United Technologies Corporation
San Jose Site

Well ID	Operational Unit	Perchlorate Frequency	VOCs Frequency	1,4-Dioxane Frequency	Other Analyses
0024 TRENCH	USV	2YR	2YR	2YR	
1230E	MSV	2YR	2YR		
13R-01	RAT	2YR	2YR		
17N-04B	MIX	2YR	2YR		
17N-04R	MIX	2YR			
17N-07	MIX	A		A	
17N-08B	MIX	2YR			
18P-01B	USV		2YR		
18P-01E	USV	A	2YR	2YR	
18P-01R	USV	2A	2A		A 6010, 9010
18P-02	USV	2A	2A	A	A 6010, 9010
18P-03R	USV	2YR	2YR	2YR	
18P-04A	USV	2YR	2YR	2YR	
18P-08E	USV	2YR	2YR	2YR	
18P-09E	USV	2YR	2YR	2YR	
18P-11E	USV	2YR	2YR	2YR	
18P-25E	USV	2YR	2YR	2YR	
19B-01E	USV	2YR	2YR	2YR	
19B-13E	USV	2YR	2YR	2YR	
19B-14E	USV	A	2YR	2YR	
19B-15	USV	A		A	
19C-12E	USV	2YR	2YR	2YR	
19C-13E	USV	2YR	2YR		
19G-22	USV		2YR		2YR 8310, 8015M
19H-01	USV		2YR		2YR 8310, 8015M
19H-06E	MSV	A	2YR	2YR	
19H-07E	MSV	A	2YR	2YR	
19R-10	MAA		2YR		
19R-13	MAA		2YR		
19R-17	MAA		2YR	2YR	
20C-06B	MIX	2YR	2YR		
20C-07	MIX	A	A		
20C-11	MIX	2YR			
20C-13	MIX	2A	2A		A 8081
20C-14	MIX	2A	2A		A 8081
20C-17	MIX	2A	2A		A 8081
20C-19	MIX	2YR			

Well ID	Operational Unit	Perchlorate Frequency	VOCs Frequency	1,4-Dioxane Frequency	Other Analyses
20C-22	MIX	2YR	2YR		
20C-23	MIX	A	2YR	A	
20C-25	MIX	2A	2A	A	
20C-26	MIX	A	2YR		
20C-27	MIX	A	2YR	2YR	
20C-35	MIX	2A	2A		
20C-38E	MIX	A	A	A	
20C-39	MIX	A	A		
20C-44	MIX	2A			2A 353.2, 9060
20C-45	MIX	2A			2A 353.2, 9060
20C-46	MIX	2A			2A 353.2, 9060
20C-47	MIX	2A			2A 353.2, 9060
20D-02	MIX	2YR	2YR		
20D-03	MIX	2YR	2YR		
20D-08	MIX	2YR	2YR	2YR	
20D-09	MIX	2YR	2YR		
20D-10	MIX	A			
20D-11	MIX	A	2YR	2YR	
20D-18	MIX	A		A	
20D-19	MIX	A		A	
20D-20	MIX	A		A	
20D-21	MIX	A			
20F-11	MIX	A	2YR	A	
20G-05	MIX	3YR	2YR		
20G-07	MIX	A			
20G-12	MIX	A	2YR	2YR	
20G-13	MIX	A	2YR	2YR	
20G-14	MIX	A	2YR		
20G-15	MIX	2A	2A	A	
20G-20	MIX	2YR	2YR		
20G-22	MIX	A	A	A	
20G-23	MIX	2YR			
20J-01	MIX	A			
20L-01	MSV	2YR	2YR		
20M-04E	MSV	2YR	2YR	2YR	
20M-08E	MSV	A	2YR	2YR	
20M-12	MSV	A			
20M-15E	MSV	A	A	2YR	
20N-04	CTA		2YR	2YR	
20N-05	CTA		2YR	2YR	
20P-01	MSV	A			

Well ID	Operational Unit	Perchlorate Frequency	VOCs Frequency	1,4-Dioxane Frequency	Other Analyses
20P-06	MSV	2YR			
20P-07E	MSV	2YR	2YR	2YR	
20P-08	MSV	2YR			
20P-10E	MSV	A	2YR	2YR	
29C-04	CTA		2YR		
29G-02	LSV	A	2YR	2YR	
29G-03	LSV	A	2YR	2YR	
AI-06	USV	2A	2A		A 6010, 9010
BC-02W	PAN	2YR	2YR	2YR	
BC-03W	PAN	2A	2A		
BP-02	PAN	A	A		
EV-16	LSV	A	2YR	2YR	
EV-21E	LSV	A	2YR	2YR	
EV-28	LSV	2YR	2YR	2YR	
EV-29	LSV	2A	2YR	A	
EV-43E	LSV	2A	A	A	
EV-44E	LSV	2A	2A		
EV-45E	LSV	2A	A	A	
EV-47	LSV	A	A	A	
EV-48E	LSV	2A	2A	2A	
EV-49E	LSV	2A	2A	2A	
LMV-01	MIX	A			
LMV-02	MIX	A			
LMV-03B	MIX	A			
MTA-09	MTA	2YR	2YR		
OS-03	OFF	2A	2A	2A	
OS-05	OFF	2A	2A	2A	
OS-07	OFF	2A	2A	2A	
OS-08	OFF	2A	2A	2A	
OS-09	OFF	2A	2A	2A	
RI-03W	PAN	2A	2A	A	3YR 6010, 8082, 8270, 9010
RI-04W	PAN	A	2YR	2YR	
RI-05W	PAN	2A	2A		3YR 6010, 8082, 8270, 9010
RI-06W	PAN	A	2YR	2YR	
RI-07W	PAN	A	2YR	2YR	
RI-09W	PAN	2YR	2YR	2YR	
RI-10W	PAN	A	A		
RI-11W	PAN	A	2YR	2YR	

Well ID	Operational Unit	Perchlorate Frequency	VOCs Frequency	1,4-Dioxane Frequency	Other Analyses
RI-12W	PAN	2A	2A		5YR 6010, 8082, 8270, 9010
RI-13W	PAN	A			
RI-16W	PAN	2A	2A		5YR 6010, 8082, 8270, 9010
RI-17AW	PAN	2A	2A		5YR 6010, 8082, 8270, 9010
RI-19W	PAN	2A	2A		5YR 6010, 8082, 8270, 9010
RI-20W	PAN	2YR	2YR		
RI-21W	PAN	2YR	2YR		
RI-25W	PAN	2A	2A		3YR 6010, 8082, 8270, 9010
RI-30W	PAN	2A	2A		3YR 6010, 8082, 8270, 9010
RI-32W	PAN	2A	2A	A	3YR 6010, 8082, 8270, 9010
RI-33W	PAN	2YR	2YR	A	
RI-35W	PAN	A	A	A	
RI-43W	PAN	A	A		
RI-44W	PAN	A	2YR		
RI-45W	PAN	2A	2A	A	3YR 6010, 8082, 8270, 9010
RI-46W	PAN	2A	2A	A	3YR 6010, 8082, 8270, 9010
RI-47W	PAN	2YR	2YR		
RI-48W	PAN	2YR	2YR		
RI-49W	PAN	A	2YR		
RI-51W	PAN	2A	2A	A	3YR 6010, 8082, 8270, 9010
RI-53W	PAN	2YR	2YR	2YR	
RI-54W	PAN	2A	2A	A	3YR 6010, 8082, 8270, 9010
RI-55W	PAN	A	2YR	2YR	

Well ID	Operational Unit	Perchlorate Frequency	VOCs Frequency	1,4-Dioxane Frequency	Other Analyses
RI-56W	PAN	2YR	2YR	2YR	
RI-59W	PAN	A		A	
RI-60W	PAN	2A	2A		3YR 6010, 8082, 8270, 9010
RI-61W	PAN	2A	2A		3YR 6010, 8082, 8270, 9010
RI-62W	PAN	2A	2A	2A	
RI-63W	PAN	2A	2A	2A	
RI-64W	PAN	2A	2A	2A	
RI-65W	PAN	2A	2A	2A	
RI-67W	PAN	2A	2A		
RI-68W	PAN	2A	2A		
RI-69W	PAN	2A	2A		
RI-70W	PAN	2A	2A		
RI-71W	PAN	2A	2A		
RI-72W	PAN	2A	2A		
RI-73W	PAN	2A	2A		
RI-74W	PAN	Q	Q	Q	
RI-75W	PAN	Q	Q	Q	
RI-76W	PAN	Q	Q	Q	
RI-77W	PAN	Q	Q	Q	
RI-78W	PAN	Q	Q	Q	
SMPA-01	MSV	A	2YR	2YR	

Notes for Table 1:

1. CTA = Component Test Area
2. LSV = Lower Shingle Valley
3. MAA = Motor Assembly Area
4. MIX = Mixer Valley
5. MSV = Middle Shingle Valley
6. MTA = Motor Test Area
7. OFF = Offsite
8. PAN = Panhandle
9. RAT = Research and Advanced Technology
10. USV = Upper Shingle Valley
11. UPZ = Upper Perched Zone
12. LUZ = Lower Unconfined Zone
13. LCZ = Lower Confined Zone
14. Other Analyses = Frequency of additional analytical scans for chemicals of concern.
15. 2A = Semi-Annual Sampling Frequency
16. A = Annual Sampling Frequency
17. 2YR = Biennial Sampling Frequency
18. 3 YR = Every 3 Years Sampling Frequency
19. 5YR = Every 5 Years Sampling Frequency
20. Each analytical method employed must be able to attain a laboratory reporting limit at or below the cleanup level set for each chemical in Table 1 of the Site Cleanup Requirements Order.

Table 2. RCRA Post-Closure Groundwater Monitoring Plan – Stations 0250, 0635, and 0706
United Technologies Corporation
San Jose Site

RCRA Unit	RCRA Well ID	COPC	Frequency	USEPA Method [(a)]
0250	18P-01R*	Perchlorate	Semi-annually	314.0
	18P-01R*	17 CAM Metals	Annually	6010
	18P-01R*	VOCs	Semi-annually	8260
	18P-01R*	Total Cyanides	Annually	9010
	18P-02	Perchlorate	Semi-annually	314.0
	18P-02	17 CAM Metals	Annually	6010
	18P-02	VOCs	Semi-annually	8260
	18P-02	Total Cyanides	Annually	9010
	AI-06	Perchlorate	Semi-annually	314.0
	AI-06	17 CAM Metals	Annually	6010
	AI-06	VOCs	Semi-annually	8260
	AI-06	Total Cyanides	Annually	9010
0635	20C-13	Perchlorate	Semi-annually	314.0
	20C-13	OC Pesticides	Annually	8081A
	20C-13	VOCs	Semi-annually	8260
	20C-14*	Perchlorate	Semi-annually	314.0
	20C-14*	OC Pesticides	Annually	8081A
	20C-14*	VOCs	Semi-annually	8260
	20C-17	Perchlorate	Semi-annually	314.0
	20C-17	OC Pesticides	Annually	8081A
	20C-17	VOCs	Semi-annually	8260
0706	20C-25	Perchlorate	Semi-annually	314.0
	20C-25	VOCs	Semi-annually	8260
	20C-35*	Perchlorate	Semi-annually	314.0
	20C-35*	VOCs	Semi-annually	8260
	20G-15	Perchlorate	Semi-annually	314.0
	20G-15	VOCs	Semi-annually	8260

Notes for Table 2:

a. The analytical method must be able to attain a laboratory reporting limit at or below the cleanup level set for each chemical in Table 1 of the Site Cleanup Requirements Order.
1. * indicates a Point of Compliance (POC) well
2. COPC = Chemical of potential concern
3. OC Pesticides = organochlorine pesticides
4. 17 CAM Metals = California Assessment Manual metals
5. RCRA = Resource Conservation and Recovery Act
6. USEPA = U.S. Environmental Protection Agency
7. VOCs = volatile organic compounds

Table 3. Post-Closure Groundwater Monitoring Network - OBF
United Technologies Corporation
San Jose Site

Well ID	Monitoring Purpose	Frequency[(a)]	Chemical of Concern	USEPA Method[(b)]
Upper Perched Zone				
RI-05W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-12W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-13W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-43W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-54W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
Lower Unconfined Zone				
RI-19W	Vertical Migration Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270

Note: All wells will be analyzed for Appendix IX analytes every 5 years.

Well ID	Monitoring Purpose	Frequency[a]	Chemical of Concern	USEPA Method[b]
Lower Unconfined Zone (continued)				
RI-25W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-30W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-32W	Plume Source Area Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-45W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-46W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-49W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-51W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-53W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270

Well ID	Monitoring Purpose	Frequency[(a)]	Chemical of Concern	USEPA Method[(b)]
Lower Unconfined Zone (continued)				
RI-60W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-61W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
RI-67W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 3 years	17 CAM Metals	6010
			SVOCs	8270
Lower Confined Zone				
BC-02W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
BC-03W	Vertical Migration Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 5 years	17 CAM Metals	6010
			SVOCs	8270
RI-16W	Vertical Migration Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 5 years	17 CAM Metals	6010
			SVOCs	8270
RI-17AW	Vertical Migration Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
		every 5 years	17 CAM Metals	6010
			SVOCs	8270
RI-68W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
RI-69W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM
RI-70W	Plume Boundary Monitoring	semi-annually	Perchlorate	314.0
			VOCs	8260
			1,4-dioxane	8260B SIM

Notes for Table 3:

a. All wells will be analyzed for Appendix IX analytes every 5 years.
b. The analytical method must be able to attain a laboratory reporting limit at or below the cleanup level set for each chemical in Table 1 of the Site Cleanup Requirements Order.
1. USEPA = U.S. Environmental Protection Agency
2. 17 CAM Metals = California Assessment Manual metals
4. VOCs = volatile organic compounds
5. SVOCs = semi-volatile organic compounds
6. SIM = selective ion mode