BLYMYER
ENGINEERS, INC.

RO 210

April 6, 2004
BEI Job No. 202016

Mr. Scott Seery
Alameda County Health Care Services Agency
Environmental Protection Division
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: Remedial Action Plan
Dolan Property
6393 Scarlett Court
Dublin, California
ACHCSA Site # 4322

Dear Mr. Seery:

Blymyer Engineers, Inc. is pleased to submit this Remedial Action Plan (RAP) on behalf of Mr. Michael Fitzpatrick, Executor of the Estate of Michael Dolan. Mr. Fitzpatrick recently placed the subject property (Figure 1) on the market for sale. Towards that effort, the Estate is in the process of undertaking remedial actions related to the former underground storage tank (UST).

1.0 Background

1.1 Prior Work

An approximately 600-gallon UST was removed in February 1990 from the subject site (Figure 2). Although the UST had reportedly stored diesel more recently, soil and groundwater samples collected for laboratory analysis indicated that the principal contaminant of concern at the site was gasoline. Files maintained by the Alameda County Health Care Service Agency (ACHCSA) do not contain waste manifests for the disposal of soil, although a *Uniform Hazardous Waste Manifest* is present documenting the disposal of a 600-gallon UST. This could suggest that contaminated soil may not have been removed from the site; however, previously installed soil bore B-3 appears to document relatively clean UST backfill to a depth of 8 feet below grade surface (bgs), overlaying impacted native soil.

In October 1990, five soil bores were installed at the site, and soil and grab groundwater samples were collected. Additional delineation work was conducted in November 1991, when groundwater monitoring wells MW-1 through MW-4 were installed to a depth of 20 feet bgs. Soil and groundwater samples were collected. In November 1992, 14 additional soil bores were installed, and soil and grab groundwater samples were collected from selected bore locations. Although there were several data gaps in the perimeter zone of soil and groundwater delineation, the soil and groundwater

1829 CLEMENT AVENUE ALAMEDA, CA 94501•1395 PHONE 510•521•3773 FAX 510•865•2594

plumes were largely defined as a result of this investigation. The groundwater plume did not appear to extend offsite; however, a thin free-phase layer was present immediately adjacent to the former UST basin, and at a location approximately 40 feet to the east (B-8). Additional wells were proposed to fill the existing gaps in data around the perimeter of the plume, and to monitor the lateral extent of impacted groundwater and free-phase. As a consequence, in March 1995, wells MW-5 and MW-6 were installed to a depth of 10 feet bgs.

Intermittent groundwater sample collection or groundwater monitoring has occurred at the facility since 1991. In an August 1998 letter, the ACHCSA suggested that a health risk analysis or the installation of an oxygen release compound (ORC) might be appropriate for the site. The ACHCSA also stated in the August 1998 letter that groundwater sampling of wells MW-1, MW-3, MW-5, and MW-6 could be discontinued, that the sampling interval could be decreased to a semiannual basis, and requested resumption of groundwater monitoring of wells MW-2 and MW-4.

1.2 Recent Groundwater Monitoring

In May 2002, Blymyer Engineers was retained by Mr. Michael Fitzpatrick, on behalf of Mr. Michael Dolan, to conduct semiannual groundwater sampling of wells MW-2 and MW-4, and to conduct a file review to help determine the next appropriate step at the site.

In May 2002, Blymyer Engineers relocated and rehabilitated the wells at the site. Well MW-5 required the most extensive rehabilitation work, and will require resurveying due to a change in well casing elevation. In June 2002, wells MW-2 and MW-4 were sampled, while depth to groundwater was measured in all of the wells (Table I). Except for a slight increase in benzene in groundwater from well MW-4, the concentration of all analytes in the two wells decreased from the previous sampling event in August 1997 (Table II). Based upon a review of the results, the ACHCSA recommended that well MW-5 be incorporated into the sampling program, that Total Petroleum Hydrocarbons (TPH) as diesel be included in the analytical suite, and that quarterly groundwater monitoring resume in order that contaminant concentrations and contaminant trends could be quickly generated for a recommended health risk assessment.

Two additional quarters of sampling were completed prior to the death of Mr. Dolan. Groundwater monitoring has been on hold since about January 2003 as the Estate has become established. During the most recent groundwater monitoring event in December 2002, analysis for fuel oxygenates was conducted by EPA Method 8260B. All fuel oxygenates were found to be non-detectable at good limits of detection. Consequently, all sporadic occurrences of methyl tert-butyl ether (MTBE) previously detected at the site have been attributed to 3-methyl-pentane, another gasoline-related compound. This suggests that the release predates the use of MTBE and other fuel oxygenates as gasoline additives. All previously available groundwater data from the site has been tabulated on Tables I, II, IIB, and III.

1.3 Recent Geoprobe Investigation

A workplan for the installation of Geoprobe® soil bores was submitted to the ACHCSA on June 13, 2003. The intent of the work was to provide additional delineation of the extent of impacted soil around the location of the former UST. On June 16, 2003, the case manager at the ACHCSA (Mr. Scott Seery, personal communication) noted that it was unlikely that a timely response would be received due to the work load at the ACHCSA, and noted that if a response was not issued 60 days after receipt, regulations stated that the workplan should be considered approved. Consequently, field work commenced on September 13, 2003, without having received a response from the ACHCSA.

Blymyer Engineers installed nine soil bores (SB-A through SB-I) at the site to augment data previously collected. The bores were installed up to approximately 20 feet bgs at the site on September 16, 2003 (Figure 2). Groundwater was initially encountered in each bore between depths of 8 to 16 feet bgs, but field stabilized at higher elevations depending on the length of time the bore was allowed to remain open. Soil samples were selected for laboratory analysis based upon elevated photoionization detector (PID) readings and proximity to the soil-water interface. Soil samples were sent to a California-certified laboratory for analysis of Total Petroleum Hydrocarbons (TPH) as gasoline and TPH as diesel by Modified EPA Method 8015; benzene, toluene, ethylbenzene, and total xylenes (BTEX), and MTBE by EPA Method 8021B; and total lead by EPA Method Standard Method (SM) 7010. Analytical results for the soil samples are summarized in Tables IV and V.

The soil bore program further refined the known lateral and vertical extent of soil impacted by the petroleum release. TPH as gasoline ranged from a low of non-detectable up to 2,600 mg/Kg, and TPH as diesel ranged from non-detectable up to 1,500 mg/Kg (Table IV). In general, the concentration of TPH as diesel is lower than the concentration of TPH as gasoline, and it is assumed that the concentration largely represents the heavier hydrocarbons within the gasoline hydrocarbon range, or represents a highly weathered gasoline product that has been in the environment for an extended period of time. It should be noted however that the laboratory included notes that oil range hydrocarbon compounds are present, in bores SB-C, SB-H, and SB-I. Because the former UST is last reported to have stored diesel fuel these notes can also indicate the weathering of a relatively smaller diesel fuel release component. These bores are in reasonably close proximity to the former UST basin, and may suggest that other hydrocarbon compounds may have also been used in the vicinity and were potentially released at the site. The potential use and release of these other heavier hydrocarbons appears to be reasonably well constrained by the data in the vicinity of the former UST basin.

The concentration of benzene ranged from non-detectable to 19 mg/Kg; toluene from non-detectable to 45 mg/Kg; ethylbenzene from non-detectable to 51 mg/Kg; and total xylenes from non-detectable to 110 mg/Kg. MTBE was not detected at generally good limits of detection. In general, the concentration of total xylenes is higher than the concentration of benzene, and suggests the preferential degradation of benzene over total xylenes, but again can also suggest some use of diesel fuel at the site.

The removal of the UST in 1990, shortly after the increased use of MTBE in gasoline (beginning around 1986), and the lack of detectable MTBE in soil (and in groundwater, see Table III) indicated that the use of a lead additive should be evaluated in the analytical program. As a consequence, 7 soil samples, selected based on elevated PID responses, were submitted to the laboratory. Lead was non-detectable at 3 mg/Kg in all but one sample. In soil sample SB-I-8.25 lead was present at a concentration of 7.6 mg/Kg, below all regulatory thresholds of concern (Table V).

The data collected indicate that the lateral and vertical extent of impacted soil at the site have been adequately delineated to relatively low concentrations, and the limits further refined for the purposes of determining appropriate remedial actions. Additionally, comparison to the San Francisco Bay Regional Water Quality Control Board (RWQCB) Environmental Screening Level (ESL) look-up tables indicate that contaminant values in soil that exceed the established commercial / industrial land use values are centered about the former UST basin.

1.4 Site Conditions

The elongate, approximately rectangular 6.5 acre property is located in the city of Dublin, Alameda County, California (Figure 1) and consists of two adjoining parcels. It is situated in a commercial district of the city, and is bounded on the south and southwest by Scarlett Court, on the west and east by commercial buildings, and to the north by Dublin Boulevard. Scarlett Court parallels and borders to the north the off-ramp from westbound Interstate 580, at the Dougherty Road and Hopyard Road exit. The site is predominately paved with asphalt, with smaller concrete slabs in the southwestern portion of the property. The western parcel is currently leased by six commercial occupants, while the eastern parcel is vacant. The current study area is located in the extreme southwestern portion of the site.

2.0 Regional Water Quality Control Board ESL

In July 2003, the RWQCB revised and updated the *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater* document. It contains a series of tables that provide the generic Tier 1 look-up concentrations for soil and groundwater for a wide variety of contaminants under residential and under commercial / industrial land-use settings for a potential drinking water, and a potential non-drinking water resource. The Zone 7 Water Agency has previously stated that near surface groundwater at this site can be considered to be non-drinking water. The RWQCB has additionally incorporated generic nuisance thresholds (visual or odor) into the tables of the referenced document. Blymyer Engineers has found that for hydrocarbon releases, proceeding to Tier 2 risk evaluation is not warranted, as the incorporation of the generic nuisance thresholds is an automatic limiting factor (i.e., even when all Chemicals of Concern are below calculated site specific risk-based concentrations, nuisance thresholds are typically exceeded). Consequently, due to the proposed future land use, onsite residual concentrations have been compared to the RWQCB ESL values for the Commercial / Industrial land use setting. These values are listed at the bottom of Tables II, IIB, III, IV, and V. There are two values for each contaminant, based on depth of the impacted soil. Analytical results over the ESLs for the Commercial / Industrial land use setting, the current land usage, are shaded in each table.

2.1 Site Remedial Goals

Blymyer Engineers proposes to use the values established by the RWQCB ESL look-up tables as the remedial goals for soil and groundwater the site. These goals will be acceptable to the RWQCB and to the ACHCSA.

3.0 Remedial Action Plan Evaluation

Blymyer Engineers has previously recommended that alternative remedial options be evaluated. Based on the data, these options included:

- Excavation of the worst-case contaminant concentrations, with augmentation with ORC, or
- Lance injection of ORC with relatively longer term groundwater monitoring to verify the success of the technique.

Selection of an appropriate remedial action plan is dependent on the site geology, hydrology, and contaminant distribution. These are discussed further in the following sections.

3.1 Site Geology, Hydrogeology, and Contaminant Distribution

In the vicinity of the UST, the upper soil stratigraphy at the site is highly variable. In general, the paved surface is underlain by a dark olive grey (a discoloration of the soil typically indicating a release of petroleum) silty clay to an approximate depth of 3 to 4 feet bgs; however, multiple older and recent soil bores (MW-1, MW-2, MW-4, MW-6, B-13, SB-A, SB-F, and SB-G) revealed either a silty fine grained sand, or a medium to course grained well-graded sand directly under the thin pavement section. This sand was also generally an olive grey color. In the bores that contained the upper clay, a relatively poorly graded sand (fine to medium or medium to course grained) was encountered beneath the clay. This sand unit ranged between 0.5 and 3.5 feet in thickness, and its thickness varied on the thickness of the overlaying clay. Regardless of the composition of the upper 4 to 5 feet bgs, a generally black to greenish gray silty clay was present in the majority of soil bores beneath that depth. In older bore logs, when this clay contained a higher percentage of sand, this clay was a greenish color, again likely the result of the petroleum release. The silty clay, in general, extended to a depth of approximately 8 to 9 feet bgs, but in soil bores MW-1, MW-2, MW-4, SB-D, SB-E, and SB-F, the clay extended up to depths between 12 and 16 feet bgs. In general, beneath the silty clay, a series of 1- to 3-foot-thick units of silty to clayey sands were interbedded with 1- to 3-foot-thick silty clay units to the total depth explored (20 feet bgs).

During the recent investigation, groundwater was initially encountered, in general, in each bore at a depth of approximately 8 feet bgs; however, if a thicker section of clay was present at a bore location, the presence of groundwater was found initially to be as deep as 16 feet bgs. Groundwater field stabilized at higher elevations depending on the length of time the bore was allowed to remain open. At any particular bore location, clayey units were generally moist above and below groundwater. As would be expected, each of the sand units below groundwater were wet. Additionally each of the sand units below groundwater yielded higher PID readings than the adjacent clay unit, and at multiple bore locations higher PID readings were yielded by the deeper, rather than the shallower, sand units in the interbedded clay and sand unit section below the approximate depth of 8 to 9 feet bgs. In general, the highest PID readings at a bore location were at a depth of 16 to 18 feet bgs, up to 10 feet below groundwater. This is assumed to indicate that groundwater was much lower during the drought years and allowed the petroleum release to migrate downwards through soil. Excluding wells MW-1 through MW-4, older soil bores were only explored to an approximate depth of 9 to 11.5 feet bgs; however, soil bores MW-2 and MW-4 yielded higher PID readings in the deeper portion of the bore. Based on the elevated residual contaminant concentrations documented in deeper soil samples from bores SB-B, SB-C, and SB-I, and the elevated PID responses in soil from bores SB-D, SB-F, MW-2, and MW-4, it is judged likely that elevated residual concentrations may also underlay older soil bores B-2, B-3, and B-4.

It should be noted that in general, the interpreted olive green discoloration of the soils decreased with distance from the former UST basin, and with depth in the silty clay sections of a particular soil bore. Closer to the former UST basin the soils at a depth of 19 to 20 feet bgs became light brown in color. This is interpreted to represent the lower extent of impacted soil adjacent to the release location. It should be noted that the olive green color extended to the bottom of the bore at the location of SB-I. Additionally isolated globules of free product were noted in each of the sandy units, but not in the clayey units, of soil bore SB-I, to the maximum depth explored (20 feet bgs).

3.2 Proposed Remedial Actions

Although the UST has been removed, the continued presence of up to 30 mg/L of TPH in the groundwater sample collected from well MW-2 in December 2002 indicates a significant residual source remains in soil adjacent to this location. The presence of free phase globules in soil bore SB-I up to 19 feet bgs further documents a significant residual source in soil. As a consequence, remedial actions need to address the residual source as an initial action. According to Regenesis, the manufacturer of ORC, the presence of free-phase hydrocarbons precludes the use of ORC, at least until the free-phase has been removed. Consequently, the most logical method to remove the free-phase residual source from multiple water-bearing units is excavation. Because removal by excavation will require construction dewatering to reach free-phase containing soil located at a depth of approximately 19 feet bgs (up to 11 feet below the groundwater piezometric surface), a potentially significant reduction in groundwater plume concentrations may be achieved in each of the water-bearing sandy layers found beneath the site as groundwater is pumped from the excavation. As groundwater flows back towards the excavation, the core of the groundwater plume may be largely removed.

The proposed limits of excavation intended to remove soil impacted above the RWQCB ESL for soil in a commercial / industrial land use setting are depicted in Figure 3. One difficulty encountered during data review was the age difference between the older and more recent soil and groundwater analytical data. The older analytical data indicates that the extent of the contaminant plume was much larger in the past, whereas more recent data has indicated a decrease in the region of impact that surrounds the former UST location. This would be expected with removal of the primary source (the UST), and the presumed degradation of hydrocarbons through natural processes. This was also one of the reasons to conduct the recent Geoprobe investigation, in order to collect additional analytical data for soil. However, as a consequence, identifying the area of excavation is somewhat problematic. Two excavation limits are depicted on Figure 3, a reasoned worst-case and a reasoned best-case limit, and these limits are largely dependant on the differences in the two sets of data. Thus, there is a potential for the area to increase, or decrease, from the limits depicted on Figure 3.

3.3 Evaluation of Additional Remedial Actions

The areas estimated to require excavation, under the most likely best-case and most likely worst-case excavation scenarios, are marginally different in limit (Figure 3). As previously recommended, Blymyer Engineers has evaluated the use of ORC at the site to address residual concentrations in groundwater and soil at the site. Using Regenesis supplied software and standard calculations for an excavation scenario, Blymyer Engineers calculated that approximately 3,036 pounds of ORC should be admixed with the backfill materials in order to mitigate residual hydrocarbon concentrations at the site (i.e. both inside and outside the excavation area). At a total materials cost of approximately $30,000 (inclusive of a 10% markup), Blymyer Engineers does not believe the additional cost for admixing ORC into excavation backfill is warranted, as backfill materials will obviously be below the RWQCB ESLs. These calculations were based on a worst-case excavation scenario and the assumption that the excavation will be successful in removing soil impacted above the RWQCB ESL concentrations within the excavation. Blymyer Engineers additionally evaluated the lance injection scenario using the Regenesis software to address residual concentrations in soil and groundwater surrounding the assumed successful excavation. Using more conservative calculation inputs, the Regenesis software indicates that approximately 930 pounds of ORC should be injected. However, Blymyer Engineers proposes to eliminate drilling contractor costs for injection by admixing the ORC injection volume into the excavation backfill, with the intent that the oxygen will be carried towards the residual concentrations once the groundwater gradient becomes reestablished following the excavation. At a total materials cost of approximately $10,300 (inclusive of a 10% markup), Blymyer Engineers believes the additional cost for admixing ORC into excavation backfill is appropriate. In order to document the effect of the source removal, and the use of ORC on the residual concentrations in groundwater, and thus soil, groundwater should be monitored on a quarterly basis for a minimum of one full year after the remedial activities are competed.

4.0 Remedial Action Plan

4.1 Selected Remedial Technology

The results of the subsurface investigations indicate that the most significant impact to the subsurface by petroleum constituents will be found in close proximity to the former location of the UST. Based on these data, the following remedial actions are proposed:

- remove soil containing residual free-phase petroleum by excavation,
- destroy well MW-2 during remedial activities,
- remove other petroleum-impacted soil to the designated RWQCB ESLs by excavation,
- remove the core of the groundwater plume by construction dewatering,
- properly dispose of hydrocarbon-impacted soil that contains contaminant concentrations above ESL goals,
- introduce ORC material into excavation backfill,
- segregate and potentially reuse (above groundwater) soil impacted below shallow soil ESL goals,
- properly dispose of extracted groundwater,
- install a 4-inch diameter well in the excavation in order to monitor groundwater concentrations in the core of any residual plume, and
- monitor groundwater on a quarterly basis for a minimum of one year after remedial actions.

4.2 Health and Safety Plan

The remedial excavation contractor will be required to prepare a site-specific health and safety plan for the work. The health and safety plan will also be required to conform with the requirements of 29 CFR 1910.120(b)(4) and any applicable state or local regulations and guidelines. The contractor will be responsible for the health and safety of all persons in the work zones designated in their health and safety plan. Their health and safety plan will include provisions for the following tasks:

- Excavation and stockpiling of petroleum-contaminated soil,
- Loading, transportation, and disposal of petroleum-contaminated soil,
- Construction dewatering and temporary storage of petroleum-impacted groundwater,
- Disposal of petroleum-impacted groundwater, and
- Handling and application of the ORC material.

4.3 Destruction of Groundwater Monitoring Well MW-2

A permit will be obtained from the Zone 7 Water Agency for the destruction of well MW-2. The total depth of well MW-2 is 20 feet, while the planned excavation depth is 19 feet. Consequently, it is intended that well MW-2 will be properly destroyed and abandoned by remedial excavation.

4.4 Analytical Methods and Sampling Plan

After completion of the remedial excavation, soil samples will be collected to verify the removal of soil with concentrations above the ESL goals. The sampling may be done in phases should the excavation require a phased approach. Soil samples will be analyzed for TPH as gasoline and TPH as diesel by EPA Method 8015 and BTEX and MTBE by EPA Method 8020. Previous soil sampling for lead has indicated that lead is not a concern at this site (Table V). Previous soil and groundwater sampling for fuel oxygenates has indicated that fuel oxygenates are not a concern at this site (Table II and IV). Consequently, no additional soil samples for lead or fuel oxygenates are proposed. All soil samples will be collected in accordance with standard industry practices.

For the purposes of generating a request for proposal (RFP) for excavation services, it will be assumed that the worst-case limits of excavation will be required. Excavation bottom samples will be collected unless precluded by the presence of groundwater. An estimated minimum of 12 excavation sidewall soil samples will be collected from native soil. One soil sample will be collected for every 20 feet of excavation sidewall length. Soil samples will additionally be collected at the direction of regulatory personnel and at any location that exhibits evidence of petroleum contamination where contaminated soil will not be excavated, such as in close proximity to utilities or structures.

Soil from each sampling location in the excavations will be collected using the excavator bucket. Prior to sampling, a small amount of soil from the excavator bucket will be placed in an unused, resealable plastic bag for headspace analysis. Each plastic bag will be immediately sealed and left in the sun or inside a warm environment for approximately 15 minutes to allow for the volatilization of any organic vapors in the soil into the headspace. After the specified time elapses, the probe of a PID, which will be calibrated daily to an isobutylene gas standard, will be quickly inserted into the resealable bag and the maximum detected organic vapor reading will be noted.

Soil samples for laboratory analysis will be collected by scraping away the first 3 inches of overlying soil in the excavator bucket. The soil sample will then be collected from this location by using a nitrile-gloved hand and a decontaminated trowel, or by directly pushing a brass liner into the soil in the excavator bucket. Each soil sample will be placed into brass liners, covered with Teflon® sheets, and sealed with adhesiveless silicon tape. The soil samples will be labeled, placed in an ice-chilled cooler, and shipped with proper chain-of-custody documentation to a certified analytical laboratory.

4.5 Introduce ORC into backfill material

ORC will be mixed into the excavation backfill according to Regenesis excavation mixing specifications (Appendix A). Specifically, the ORC will be mixed as a slurry (63% solids) into pea gravel or drain rock backfill under the Regenesis "Type 1" scenario. One benefit of the use of a thick slurry is that the material can be mixed into the backfill below the level of groundwater, and it will remain in place. Because the ORC slurry will remain in place, rather than floating on the surface of groundwater should it be applied as a dry powder, the released oxygen will be better distributed through out the full depth of the excavation. It is intended that the ORC will be mixed with the self compacting pea gravel or drain rock along the upgradient (northern) edge of the excavation in order to allow for the reestablished natural groundwater gradient to transport the released oxygen as it responds to hydrologic conditions at the site.

4.6 Install a 4-Inch Diameter Groundwater Monitoring Well

A 4-inch diameter well will be installed in the southern area of the remedial excavation in order to monitor any residual impact to groundwater, and to verify a decreasing contaminant concentration trend. The 4-inch diameter will accord several additional remedial actions should further efforts be warranted.

Existing wells MW-1 through MW-4 are 20 feet in depth, and are screened from 5 to 20 feet bgs. Blymyer Engineers proposes to match those construction specifics in the proposed 4-inch diameter well. A double casing will be used to encase the upper 5 feet of the well in order to provide for a surface seal as required by the state. The lower approximately 3.5 of that seal will be hydrated bentonite clay, and the upper approximately 1.5 feet will be cement surrounding a surface completed well box.

4.7 Materials Handling

Impacted soil will be stored on-site in temporary stockpiles pending disposal characterization and disposal acceptance. The stockpiles will be placed over and under heavy plastic sheeting to control volatile organics and dust emission from the stockpile. Depending on the results of the stockpile characterization, disposal options will be evaluated (reuse, landfill, etc.) for cost effectiveness and long-term liability.

Impacted groundwater will be stored on-site in temporary aboveground storage tanks (ASTs) pending disposal characterization and disposal acceptance. It is anticipated that one to two 20,000-gallon open top ASTs will be required. Disposal to the local sanitary sewer district or offsite sources will be investigated for cost effectiveness.

The resulting excavation will be backfilled with a clean, imported self-compacting fill (pea gravel or drain rock) to bring the excavation to a minimum of one foot above groundwater (the stabilized groundwater level is at an estimated 8 feet bgs). A civil engineering fabric will be placed over the completed pea gravel or drain rock backfill. The upper approximately 7 feet of the excavation will be backfilled with previously excavated soil documented to contain residual concentrations of hydrocarbons below the ESL goals, or clean, imported, compactable fill. The fill will be placed in a maximum of one-foot lifts, and will be compacted to a relative density of 90%. Due to planned site demolition activities, the excavation will not be in a paved area in the near future. Consequently, the upper one foot will be capped with base rock and compacted to a relative density of 90% pending site redevelopment. A compaction report by a geotechnical consultant will be used to document that the backfill achieved this minimum level of compaction.

4.8 Quarterly Groundwater Monitoring

Quarterly groundwater monitoring should be conducted for a minimum of one year in order to verify the success of the remedial excavation. The new 4-inch diameter well, existing groundwater wells, as well as the perimeter of the excavation should be surveyed horizontally and vertically by a licenced surveyor in order to place the data into the GeoTracker reporting system maintained by the State Water Resources Control Board. At a minimum, all groundwater wells should be incorporated in the initial sampling event, as well as the final event, and the analytical program should include TPH as gasoline, TPH as diesel, and BTEX, by appropriate analytical methods. Additional recommendations can be made thereafter, if warranted.

5.0 Reporting and Schedule

5.1 Final Remedial Excavation Report

A final report will be prepared for submission to the ACHCSA which will document all work performed, including summaries of data, and conclusions and recommendations for further work, if required.

5.2 Quarterly Groundwater Monitoring Reports

Quarterly groundwater monitoring reports will be prepared for submission to the ACHCSA and will document all quarterly work performed, and will included summaries of data, conclusions, and recommendations for further work, if required.

5.3 Schedule

In order to maintain a potential for reimbursement by the UST Cleanup Fund, a minimum of three competitive bids will be obtained for the remedial excavation work, upon receipt of approval of this RAP. It is anticipated that generation of the request for proposal and subsequent bid review will require approximately 4 weeks. Subsequent acceptance by the Estate of Michael Dolan is estimated to require approximately 2 weeks. Excavation is anticipated to be completed within approximately 6 to 8 weeks of selection of the excavation contractor. Generation of the final report will require approximately 2 to 4 weeks. Remedial activity progress reports are not anticipated to be required unless unforeseen circumstances are encountered that prevent the Estate from meeting this schedule. Quarterly groundwater monitoring and sampling reports should be submitted on an approximately quarterly schedule thereafter.

We will await your approval of this RAP. If you should have any questions, please call Mark Detterman at (510) 521-3773.

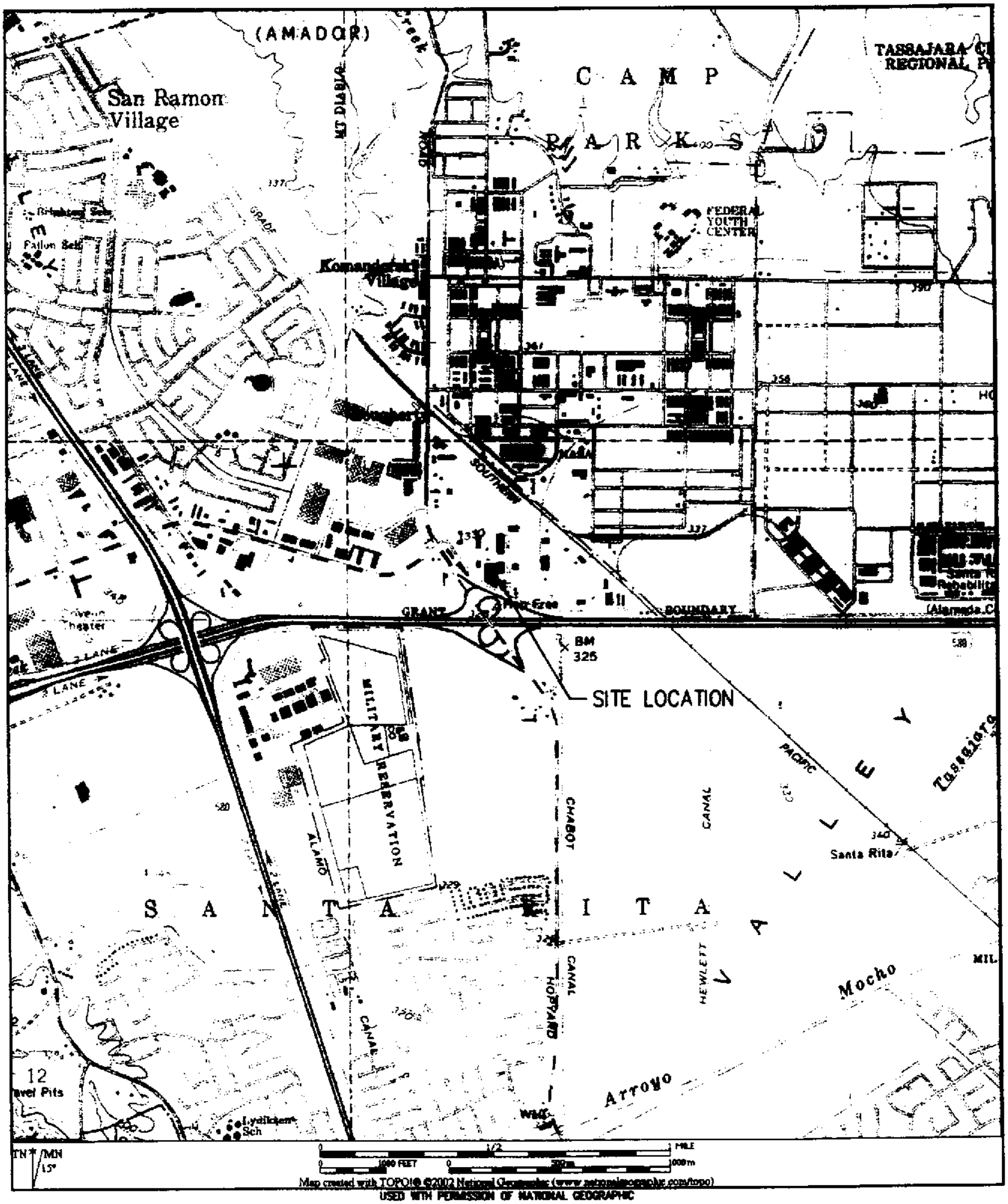
Sincerely,

By:
Mark E. Detterman, C.E.G. 1788
Senior Geologist

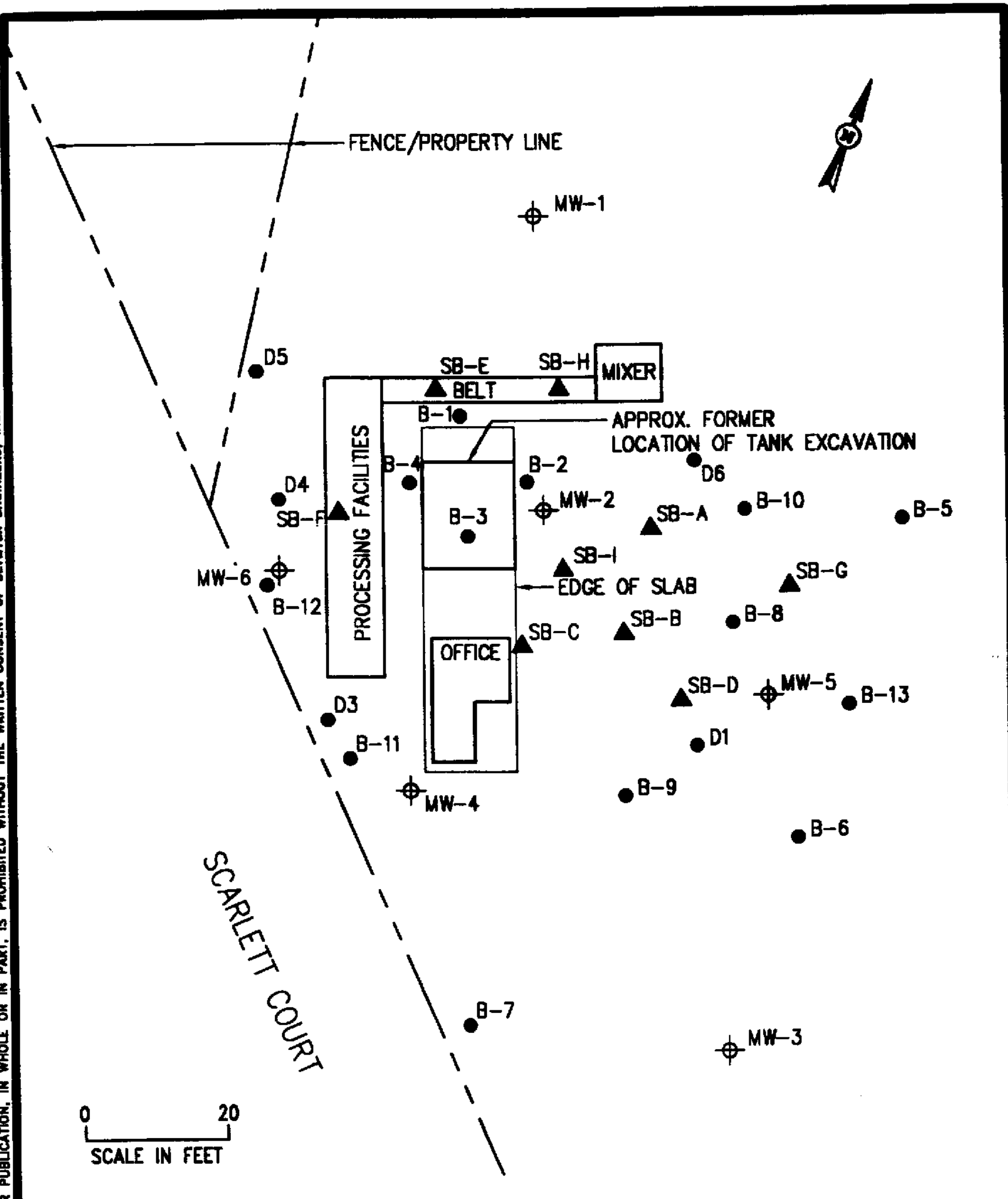
And:
Michael S. Lewis
Vice President, Technical Services

Enclosures:	Table I:	Summary of Groundwater Elevation Measurements
	Table II:	Summary of Groundwater Sample Hydrocarbon Analytical Results
	Table IIB:	Summary of Miscellaneous Groundwater Sample Hydrocarbon Analytical Results
	Table III:	Summary of Groundwater Sample Fuel Oxygenate Analytical Results
	Table IV:	Summary of Soil Sample Hydrocarbon Analytical Results
	Table V:	Summary of Miscellaneous Soil Sample Analytical Results
	Figure 1:	Site Location Map
	Figure 2:	Soil Bore and Monitoring Well Location Plan
	Figure 3:	Approximate Remedial Excavation Limits
	Appendix A:	Regenesis *Oxygen Release Compound (ORC) Installation Instructions*

c. Mr. Michael Fitzpatrick, Executor, Estate of Michael Dolan
Peter MacDonald, Esq.

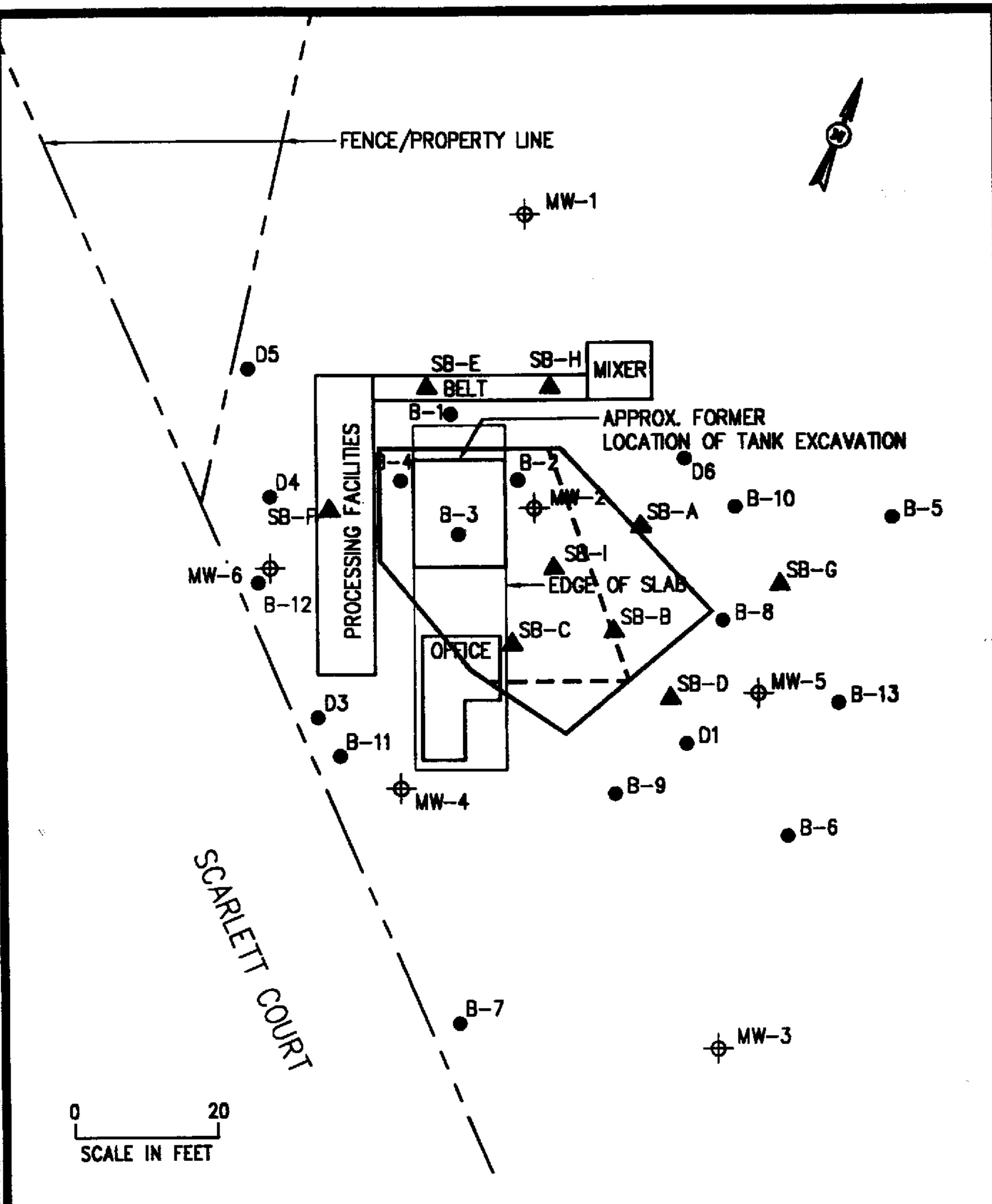


BLYMYER ENGINEERS, INC.		LEGEND	SITE LOCATION MAP	FIGURE
BEI JOB NO.	DATE	-	FORMER DOLAN RENTAL PROPERTY 6393 SCARLETT COURT DUBLIN, CA	1
202016	6-27-02			



BASED ON SITE PLAN GENERATED BY AQUA SCIENCE ENGINEERS, INC.

BLYMYER ENGINEERS, INC.		LEGEND	SOIL BORE AND MONITORING WELL LOCATION PLAN	FIGURE
BEI JOB NO. 202016	DATE 10-10-03	⊕ GROUNDWATER MONITORING WELL ● SOIL BORE (BY OTHERS) ▲ GEOPROBE SOIL BORE	FORMER DOLAN RENTAL PROPERTY 6393 SCARLETT COURT DUBLIN, CA	2



BASED ON SITE PLAN GENERATED BY AQUA SCIENCE ENGINEERS, INC.

BLYMYER ENGINEERS, INC.

BEI JOB NO.	DATE
202016	3-18-04

LEGEND

- GROUNDWATER MONITORING WELL
- SOIL BORE (BY OTHERS)
- GEOPROBE SOIL BORE
- EST. BEST CASE LIMITS OF EXCAVATION
- EST. WORST CASE LIMITS OF EXCAVATION

APPROXIMATE REMEDIAL EXCAVATION LIMITS
FORMER DOLAN RENTAL PROPERTY
6393 SCARLETT COURT
DUBLIN, CA

FIGURE 3

Table I, Summary of Groundwater Elevation Measurements
BEI Job No. 202016, Dolan Rentals
6393 Scarlett Court, Dublin, California

Well ID	Date	TOC Elevation (feet)	Depth to Water (feet)	Water Surface Elevation (feet)
MW-1	11/27/91	326.61	4.82	321.79
	9/30/92		5.34	321.27
	4/7/94		3.38	323.23
	8/12/94		4.23	322.38
	11/29/94		3.44	323.17
	3/21/95		1.00	325.61
	5/22/95		2.20	324.41
	8/24/95		3.45	323.16
	2/12/96		1.95	324.66
	8/6/97		3.60	323.01
	6/6/02*		2.89	323.72
	9/23/02		3.48	323.13
	12/13/02		3.18	323.43
MW-2	11/27/91	326.67	4.92	321.75
	9/30/92		5.42	321.25
	4/7/94		3.48	323.19
	8/12/94		4.18	322.49
	11/29/94		3.76	322.91
	3/21/95		1.25	325.42
	5/22/95		2.20	324.41
	8/24/95		3.57	323.10
	2/12/96		2.60	324.07
	2/5/97		1.72	324.95
	8/6/97		3.72	322.95
	6/6/02*		3.46	323.21
	9/23/02		4.14	322.53
	12/13/02		3.45	323.22

Table I, Summary of Groundwater Elevation Measurements
BEI Job No. 202016, Dolan Rentals
6393 Starlett Court, Dublin, California

Well ID	Date	TOC Elevation (feet)	Depth to Water (feet)	Water Surface Elevation (feet)
MW-3	11/27/91	326.58	4.96	321.62
	9/30/92		5.46	321.12
	4/7/94		3.66	322.92
	8/12/94		4.37	322.21
	11/29/94		3.60	322.98
	3/21/95		1.62	324.96
	5/22/95		2.73	323.85
	8/24/95		3.76	322.82
	2/12/96		2.45	324.13
	2/5/97		1.99	324.59
	8/6/97		3.83	322.75
	6/6/02*		3.66	322.92
	9/23/02		4.66	321.92
	12/13/02		3.66	322.92
MW-4	11/27/91	326.92	5.26	321.66
	9/30/92		5.78	321.14
	4/7/94		4.02	322.90
	8/12/94		4.81	322.11
	11/29/94		4.39	322.53
	3/21/95		1.80	325.12
	5/22/95		3.07	323.85
	8/24/95		4.09	322.83
	2/12/96		2.80	324.12
	2/5/97		2.32	324.60
	8/6/97		4.14	322.78
	6/6/02*		3.76	323.16
	9/23/02		4.14	322.78
	12/13/02		3.90	323.02

Table I, Summary of Groundwater Elevation Measurements
BEI Job No. 202016, Dolan Rentals
6393 Scarlett Court, Dublin, California

Well ID	Date	TOC Elevation (feet)	Depth to Water (feet)	Water Surface Elevation (feet)
MW-5	3/21/95	326.50	2.10	324.40
	5/22/95		2.93	323.57
	8/24/95		1.57	324.93
	2/12/96		2.78	323.72
	2/5/97		2.24	324.26
	8/6/97		3.02	323.48
	6/6/02*	**	2.79	NM
	9/23/02		3.07	NM
	12/13/02		3.14	NM
MW-6	3/21/95	327.23	3.24	323.99
	5/22/95		4.70	322.53
	8/24/95		4.95	322.28
	2/12/96		4.50	322.73
	2/5/97		3.68	323.55
	8/6/97		4.79	322.44
	6/6/02*		4.81	322.42
	9/23/02		5.10	322.13
	12/13/02		4.88	322.35

Notes: TOC = Top of casing
* = Initial data set collected under direction of Blymyer Engineers, Inc.
** = Surveyed elevation not yet available
NM = Not measured

Elevations in feet above mean sea level

Table II, Summary of Groundwater Sample Hydrocarbon Analytical Results
BEI Job No. 202016, Dolan Rentals
6393 Scarlett Court, Dublin, California

Sample ID	Date	Modified EPA Method 8015 (μg/L)		EPA Method 8020 or 8021B (μg/L)				
		TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
MW-1	11/27/91	<50	NA	<0.3	<0.3	<0.3	<0.3	NA
	9/30/92	<50	NA	<0.3	<0.3	<0.3	<0.3	NA
	4/7/94	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
	8/12/94	<50	NA	**1**	**1**	<0.3	<2	NA
	11/29/94	<50	NA	<0.5	<0.5	<0.5	<2	NA
	3/21/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	5/22/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	8/24/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	2/12/96	<50	NA	<0.5	<0.5	<0.5	<2	NA
	6/6/02*	NA	NA	NA	NA	NA	NA	NA
	9/23/02	NA	NA	NA	NA	NA	NA	NA
	12/13/02	NA	NA	NA	NA	NA	NA	NA
MW-2	11/27/91	**170,000**	NA	**24,000**	**13,000**	**3,500**	**16,000**	NA
	9/30/92	**120,000**	NA	**24,000**	**15,000**	**3,800**	**17,000**	NA
	4/7/94	**120,000**	NA	**21,000**	**14,000**	**4,300**	**21,000**	NA
	8/12/94	**140,000**	NA	**17,000**	**10,000**	**4,300**	**18,000**	NA
	11/29/94	**90,000**	NA	**17,000**	**7,500**	**3,400**	**15,000**	NA
	3/21/95	**83,000**	NA	**17,000**	**8,000**	**3,800**	**17,000**	NA
	5/22/95	**82,000**	NA	**14,000**	**6,000**	**4,000**	**16,000**	NA
	8/24/95	**86,000**	NA	**13,000**	**8,100**	**3,700**	**16,000**	NA
	2/12/96	**78,000**	NA	**15,000**	**8,100**	**4,200**	**18,000**	NA
	2/5/97	**58,000**	NA	**11,000**	**6,900**	**3,500**	**15,000**	**480**
	8/6/97	**66,000**	NA	**7,000**	**9,200**	**3,500**	**16,000**	<500
	6/6/02*	**25,000** [a]	NA	**2,900**	**50**	**2,700**	**2,200**	<250
	9/23/02	**14,000** [b]	**4,300** [c]	**2,700**	**81**	**2,100**	**1,800**	<250
	12/13/02	**26,900**	**4,000** [c]	**1,120**	**91.0**	**1,480**	**2,370**	**197** [d]

Table II, Summary of Groundwater Sample Hydrocarbon Analytical Results
BEI Job No. 202016, Dolan Rentals
6393 Scarlett Court, Dublin, Califorain

Sample ID	Date	Modified EPA Method 8015 (µg/L)		EPA Method 8020 or 8021B (µg/L)				
		TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
MW-3	11/27/91	<50	NA	<0.3	<0.3	<0.3	<0.3	NA
	9/30/92	<50	NA	<0.3	<0.3	<0.3	<0.3	NA
	4/7/94	<50	NA	**2.5**	**5.5**	**0.9**	**5.1**	NA
	8/12/94	<50	NA	<0.5	<0.5	<0.3	<2	NA
	11/29/94	<50	NA	<0.5	<0.5	<0.5	<2	NA
	3/21/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	5/22/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	8/24/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	2/12/96	<50	NA	<0.5	<0.5	<0.5	<2	NA
	2/5/97	<50	NA	<0.5	<0.5	<0.5	<0.5	<5
	6/6/02*	NA	NA	NA	NA	NA	NA	NA
	9/23/02	NA	NA	NA	NA	NA	NA	NA
	12/13/02	NA	NA	NA	NA	NA	NA	NA
MW-4	11/27/91	**11,000**	NA	**100**	**0.7**	**250**	**330**	NA
	9/30/92	**380**	NA	**3.5**	**2.4**	**8.9**	**3.4**	NA
	4/7/94	**1,100**	NA	**61**	**5.5**	**17**	**12**	NA
	8/12/94	**1,000**	NA	**3**	**1**	**8**	**4**	NA
	11/29/94	**1,100**	NA	**2**	**<0.5**	**10**	**6**	NA
	3/21/95	**1,400**	NA	**200**	**5**	**66**	**18**	NA
	5/22/95	**1,200**	NA	**60**	**1**	**12**	**8**	NA
	8/24/95	**400**	NA	**1**	<0.5	**1**	<2	NA
	2/12/96	**1,500**	NA	**130**	<0.5	**120**	**51**	NA
	2/5/97	**1,200**	NA	**250**	**4.9**	**94**	**12**	**16**
	8/6/97	**330**	NA	**1.5**	<0.5	<0.5	<0.5	<5
	6/6/02*	<50	NA	**1.7**	<0.5	<0.5	<0.5	<2.5
	9/23/02	<50	<48	<0.5	**1.3**	<0.5	<0.5	<2.5
	12/13/02	<50	**86** [c]	<0.5	<0.5	<0.5	<1.5	<0.5

Table II, Summary of Groundwater Sample Hydrocarbon Analytical Results
BEI Job No. 202016, Dolan Rentals
6393 Scarlett Court, Dublin, California

Sample ID	Date	Modified EPA Method 8015 (μg/L)		EPA Method 8020 or 8021B (μg/L)				
		TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
MW-5	3/21/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	5/22/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	8/24/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	2/12/96	<50	NA	<0.5	<0.5	<0.5	<2	NA
	2/5/97	<50	NA	<0.5	<0.5	<0.5	<0.5	<5
	6/6/02*	NA	NA	NA	NA	NA	NA	NA
	9/23/02	<50	**310** [c]	<0.5	<0.5	<0.5	<0.5	<2.5
	12/13/02	<50	**97** [c]	<0.5	<0.5	<0.5	<1.5	**0.720** [d]
MW-6	3/21/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	5/22/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	8/24/95	<50	NA	<0.5	<0.5	<0.5	<2	NA
	2/12/96	<50	NA	<0.5	<0.5	<0.5	<2	NA
	2/5/97	<50	NA	<0.5	<0.5	<0.5	<0.5	<5
	6/6/02*	NA	NA	NA	NA	NA	NA	NA
	9/23/02	NA	NA	NA	NA	NA	NA	NA
	12/13/02	NA	NA	NA	NA	NA	NA	NA
RWQCB Groundwater ESL: Groundwater is Not a Current or Potential Drinking Water Resource (Table F-1b)		500	640	46	130	290	13	1,800
RWQCB Indoor Air ESL: Groundwater is Not a Current or Potential Drinking Water Resource (Table E-1a)		NV	NV	530	500,000	14,000	150,000	24,000

Table II, Continued; Summary of Groundwater Sample Hydrocarbon Analytical Results

Notes:	μg/L	=	Micrograms per liter
	TPH	=	Total Petroleum Hydrocarbons
	MTBE	=	Methyl *tert*-butyl ether
	NA	=	Not analyzed
	<x	=	Less than the analytical detection limit (x)
	EPA	=	Environmental Protection Agency
	a	=	Laboratory note indicates the result is an unidentified hydrocarbon within the C6 to C10 range.
	b	=	Laboratory note indicates the result is gasoline within the C6 to C10 range.
	c	=	Laboratory note indicates the result is a hydrocarbon within the diesel range but that it does not represent the pattern of the requested fuel.
	d	=	MTBE analysis by EPA Method 8260B yielded a non-detectable concentration at a detection limit of 0.50 μg/L. See Table III.
	*	=	Initial data set collected under direction of Blymyer Engineers, Inc.
	NV	=	No value established

Bold results indicate detectable analyte concentrations.
Shaded results indicate analyte concentrations above the respective RWQCB ESL value.

Table IIB, Summary of Miscellaneous Groundwater Sample Hydrocarbon Analytical Results
BEI Job No. 202016, Dolan Rentals
6393 Scarlett Court, Dublin, California

Sample ID	Date	Modified EPA Method 8015 (μg/L)		EPA Method 8020 (μg/L)				
		TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
D1	10/3/90	**22,000**	NA	**250**	<30	**750**	**880**	NA
D3	10/3/90	**110,000**	NA	**600**	**200**	**800**	**1,000**	NA
D4	10/3/90	**15,000**	NA	**1,300**	<30	**700**	**1,000**	NA
D5	10/3/90	**420**	NA	**2.4**	<0.3	**14**	**4.2**	NA
D6	10/3/90	**320,000**	NA	**4,000**	**4,400**	**3,700**	**10,000**	NA
B-1	11/4/92	**Free Product**						
B-2	11/4/92	**Free Product**						
B-3	11/4/92	NA	NA	NA	NA	NA	NA	NA
B-4	11/4/92	**Free Product**						
B-5	11/4/92	<50	NA	<0.3	<0.3	<0.3	<0.3	NA
B-6	11/4/92	<50	NA	<0.3	<0.3	<0.3	<0.3	NA
B-7	11/4/92	<50	NA	<0.3	<0.3	<0.3	<0.3	NA
B-8	11/4/92	**Free Product**						
B-9	11/4/92	**170**	NA	**1.7**	<0.3	**2.4**	**1.4**	NA

Table IIB, Summary of Miscellaneous Groundwater Sample Hydrocarbon Analytical Results
BEI Job No. 202016, Dolan Rentals
6393 Scarlett Court, Dublin, California

Sample ID	Date	Modified EPA Method 8015 (μg/L)		EPA Method 8020 (μg/L)				
		TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
B-10	11/4/92	**7,800**	NA	**48**	**19**	**190**	**150**	NA
B-11	11/14/92	<50	NA	<0.3	<0.3	<0.3	<0.3	NA
B-12	11/14/92	<50	NA	<0.3	<0.3	<0.3	<0.3	NA
B-13	12/10/92	<50	NA	<0.3	<0.3	<0.3	<0.3	NA
RWQCB Groundwater ESL: Groundwater is Not a Current or Potential Drinking Water Resource (Table F-1b)		500	640	46	130	290	13	1,800
RWQCB Indoor Air ESL: Groundwater is Not a Current or Potential Drinking Water Resource (Table E-1a)		NV	NV	530	500,000	14,000	150,000	24,000

Table IIB, continued; Summary of Miscellaneous Groundwater Sample Hydrocarbon Analytical Results

Notes:	μg/L	=	Micrograms per liter
	TPH	=	Total Petroleum Hydrocarbons
	MTBE	=	Methyl *tert*-butyl ether
	NA	=	Not analyzed
	<x	=	Less than the analytical detection limit (x)
	EPA	=	Environmental Protection Agency
	N/A	=	Not applicable

Bold results indicate detectable analyte concentrations.
Shaded results indicate analyte concentrations above the respective RWQCB ESL value.

Table III, Summary of Groundwater Sample Fuel Oxygenate Analytical Results BEI Job No. 202016, Dolan Rentals 6393 Scarlett Court, Dublin, California						
Sample ID	Date	EPA Method 8260B				
		TBE (μg/L)	MTBE (μg/L)	DIPE (μg/L)	ETBE (μg/L)	TAME (μg/L)
MW-2	12/13/02	<2,000	<0.50	<0.50	<0.50	<0.50
RWQCB Groundwater ESL: Groundwater is Not a Current or Potential Drinking Water Resource (Table F-1b)		18,000	1,800	NV	NV	NV
RWQCB Indoor Air ESL: Groundwater is Not a Current or Potential Drinking Water Resource (Table E-1a)		NV	24,000	NV	NV	NV

Notes: TBE = *tert*-Butyl Alcohol
MTBE = Methyl *tert*-butyl Ether
DIPE = Di-isopropyl Ether
ETBE = Ethyl *tert*-Butyl Ether
TAME = Methyl *tert*-Amyl Ether
(μg/L) = Milligrams per liter
NV = No value

Table IV, Summary of Soil Sample Hydrocarbon Analytical Results
BEI Job No. 202016, Dolan Rentals
6393 Scarlett Court, Dublin, California

Sample ID	Depth (ft)	Date	Modified EPA Method 8015 (mg/Kg)		EPA Method 8020 or 8021B (mg/Kg)				
			TPH as Gas	TPH as Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
East of 600 gal tank	7	2/5/90	**740**	**1,100** [a]	**14**	**35**	**23**	**110**	NA
Dirt pile (composite)	---	2/6/90	**1,700**	**2,000** [a, b]	**15**	**78**	**37**	**210**	NA
D1-10*	11.0	10/3/90	**0.60**	NA	<0.005	<0.005	<0.005	<0.005	NA
MW1-4A	11.0	11/22/91	<1	NA	<0.003	<0.003	<0.003	<0.003	NA
MW2-4A	11.0	11/22/91	**140**	NA	**1.7**	**3.6**	**2.6**	**14**	NA
MW3-4A	11.0	11/22/91	<1	NA	<0.003	**0.005**	<0.003	<0.003	NA
MW4-2A	11.0	11/22/91	<1	NA	<0.003	**0.006**	**0.005**	<0.003	NA
B-1	5.0	11/3/92	**23**	NA	**0.13**	**0.033**	**1.4**	**0.038**	NA
B-1	10.0	11/3/92	**36**	NA	**0.095**	**0.030**	**0.69**	**1.7**	NA
B-2	5.0	11/3/92	**34**	NA	**0.28**	**1.4**	**0.63**	**4.1**	NA
B-2	10.0	11/3/92	**40**	NA	**1.3**	**0.63**	**0.98**	**4.8**	NA
B-3	5.0	11/3/92	<1	NA	<0.003	**0.004**	<0.003	**0.008**	NA
B-3	10.0	11/3/92	**42**	NA	**1.1**	**0.13**	**0.86**	**4.7**	NA

Table IV, Summary of Soil Sample Hydrocarbon Analytical Results
BEI Job No. 202016, Dolan Rentals
6393 Scarlett Court, Dublin, California

Sample ID	Depth (ft)	Date	Modified EPA Method 8015 (mg/Kg)		EPA Method 8020 or 8021B (mg/Kg)				
			TPH as Gas	TPH as Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
B-4	5.0	11/3/92	**470**	NA	**2.3**	**8.6**	**6.6**	**38**	NA
B-4	10.0	11/3/92	**23**	NA	**0.89**	**0.22**	**0.47**	**2.3**	NA
SB-A-3.5	3.5	9/16/03	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05
SB-B-7.5	7.5	9/16/03	**5.9** [a]	**1.4** [b]	**0.024**	**0.17**	**0.098**	**0.019**	<0.05
SB-B-17	17	9/16/03	**49** [a]	**10** [b]	**0.022**	**0.17**	**0.30**	**0.67**	<0.05
SB-C-8.5	8.5	9/16/03	**150** [a]	**32** [b c d]	**3.1**	**1.2**	**2.4**	**11**	<0.50
SB-C-18	18	9/16/03	**640** [a]	**180** [b c d]	**9.9**	**7.1**	**11**	**42**	<2.5
SB-D-10	10	9/16/03	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05
SB-D-13	13	9/16/03	**5.2** [a]	**2.9** [b d]	**0.014**	**0.040**	**0.088**	**0.046**	<0.05
SB-E-13.5	13.5	9/16/03	**1.7** [a]	**2.6** [c d]	<0.005	**0.036**	<0.005	<0.005	<0.05
SB-F-17.75	17.75	9/16/03	**210** [a]	**62** [b c]	**0.27**	**0.56**	**2.1**	**1.0**	<5.0
SB-G-8	8	9/16/03	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05
SB-H-12	12	9/16/03	**65** [a]	**12** [b c d]	<0.025	**0.64**	**0.37**	**0.11**	<0.25
SB-I-3.5	3.5	9/16/03	**2,600** [a]	**1,500** [b c]	**3.1**	**3.4**	**51**	**20**	<10

Table IV, Summary of Soil Sample Hydrocarbon Analytical Results
BEI Job No. 202016, Dolan Rentals
6393 Scarlett Court, Dublin, California

Sample ID	Depth (ft)	Date	Modified EPA Method 8015 (mg/Kg)		EPA Method 8020 or 8021B (mg/Kg)				
			TPH as Gas	TPH as Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
SB-I-8.25	8.25	9/16/03	**1,600** [a]	**260** [b c]	**19**	**45**	**33**	**110**	<10
SB-I-13.5	13.5	9/16/03	**430** [a]	**110** [b c d]	**11**	**14**	**8.7**	**35**	<10
RWQCB ESL Commercial / Industrial Land Use; **Shallow Soils** (<3m); Groundwater is Not a Current or Potential Drinking Water Resource (Table B-2)			400	500	0.38	9.3	13	1.5	5.6
RWQCB ESL Commercial / Industrial Land Use; **Deep Soils** (>3m); Groundwater is Not a Current or Potential Drinking Water Resource (Table D-2)			400	500	0.5	9.3	13	1.5	5.6

Notes:
ft = feet
mg/Kg = Milligrams per kilogram
TPH = Total Petroleum Hydrocarbons
MTBE = Methyl *tert*-butyl ether
NA = Not analyzed
<x = Less than the analytical detection limit (x)
* = Depth mismarked in field.
EPA = Environmental Protection Agency
[a] = Laboratory note indicates an unmodified or weakly modified gasoline pattern.
[b] = Laboratory note indicates gasoline range compounds are significant.
[c] = Laboratory note indicates diesel range compounds are significant, with no recognizable pattern.
[d] = Laboratory note indicates oil range compounds are significant.

Bold results indicate detectable analyte concentrations.
Shaded results indicate analyte concentrations above the respective *commercial* RWQCB ESL value.

Table V, Summary of Miscellaneous Soil Sample Analytical Results BEI Job No. 202016, Dolan Rentals 6393 Scarlett Court, Dublin, California		
Sample ID	Date	Method SW 7010 (mg/Kg)
		Total Lead
SB-B-7.5	9/16/03	<3.0
SB-B-17	9/16/03	<3.0
SB-C-18	9/16/03	<3.0
SB-F-17.75	9/16/03	<3.0
SB-I-3.5	9/16/03	<3.0
SB-I-8.25	9/16/03	**7.6**
SB-I-13.5	9/16/03	<3.0
RWQCB ESL Commercial / Industrial Land Use; **Shallow Soils** (<3m) Groundwater is Not a Current or Potential Drinking Water Resource (Table B-2)		750
RWQCB ESL Commercial / Industrial Land Use; **Deep Soils** (>3m); Groundwater is Not a Current or Potential Drinking Water Resource (Table D-2)		750

Notes: mg/Kg = Milligrams per kilogram
<x = Less than the analytical detection limit (x)

Bold results indicate detectable analyte concentrations.
Shaded results indicate analyte concentrations above the RWQCB ESL values.

Appendix A

Regenesis

Oxygen Release Compound (ORC) Installation Instructions

REGENESIS

Oxygen Release Compound (ORC®) Installation Instructions

(Excavation Applications)

SAFETY:

Pure ORC is shipped to you as a fine powder, which is rated at -325 mesh (passes through a 44 micron screen). It is considered to be a mild oxidizer and as such should be handled with care while in the field. Field personnel should take precautions while applying the pure ORC. Typically, the operator should work up wind of the product as well as use appropriate safety equipment. These would include eye, respiratory protection and gloves as deemed appropriate by exposure duration and field conditions.

Although two options are discussed, application of ORC should never be applied by personnel within the tank excavation, unless proper shoring or sidewall cutback is in place.

GENERAL GUIDELINES:

ORC can be applied in a dry powder form or as a slurry. Field conditions dictate which form of ORC can be used most effectively.

Installation of ORC should be within the tank excavation floor and/or in an adequate backfill section thickness to account for the anticipated groundwater "smear zone".

Maximum treatment effect is obtained when ORC is mixed as thoroughly as possible within the backfill material. The more dispersed the ORC slurry/powder within the excavation backfill, the more effective the treatment.

The quantity of ORC to be used is generally calculated prior to moving into the field for installation. Generally it is applied at a rate of between 0.1% and 1.0% by weight of the soil matrix. The following illustrates a dilute application rate calculation:

> Use a weight/weight percent of ORC/backfill material to ensure distribution of the ORC into the desired aquifer section. For example: a 0.15% weight of ORC to weight of backfill for the standard ORC weight (30 pounds) per container calculates as follows: 30 lb. ORC/0.15% = 20,000 lbs. of soil matrix. Thus, to achieve a 0.15% mixture of ORC in the backfill material, 30 lb. of pure ORC should be mixed into 10 tons (20,000 lbs. ÷2,000 lbs./ton) of backfill, or approximately 7 - 10 cubic yards of soil depending on field conditions. Professional judgment should be used to select the appropriate soil mass per cubic yard for designing each site treatment.

CHOOSING THE FORM OF INSTALLATION:

Pure ORC is shipped to you in a powder form. Weather conditions (especially wind) may have a direct effect on the application of ORC as a tank backfill amendment.

Application of the dry powder may be difficult in windy conditions. To counter the effects of wind (and the subsequent potential loss of ORC), Regenesis recommends that a water source or a spray tank be on-site to wet down the ORC and the backfill material as ORC is applied.

Application of ORC in a slurry format is a very effective method and eliminates the wind issue.

Four somewhat different installation conditions can be encountered in the field:

- ORC in a pea gravel back-fill. ("Type 1")
- ORC in a soil back-fill. ("Type 2")
- ORC mixed in native soil in the bottom of a tank pit. ("Type 3")
- ORC installed in soil under standing water in the bottom of a tank pit. ("Type 4")

A single tank pit excavation can include more than one of these conditions, depending on the site and extent of treatment. Instructions for each condition are discussed separately in the following sections. After the installation instructions are detailed instructions for mixing the slurry, if that is the option chosen.

INSTALLATION INSTRUCTIONS:

"Type 1," ORC in a Pea Gravel Back-fill

The easiest method for installing ORC in pea gravel back-fill is to mix the ORC in the material in a backhoe or skiploader bucket before placing it in the excavation.

- **Dry Powder method**

Into each scoop of back-fill material add the appropriate portion of ORC being installed. Generally, it is advisable to moisten the material in the bucket to reduce wind blown ORC loss. Excessive winds make this method not feasible.

After mixing the dry powder in the bucket, it is dumped into the bottom of the excavation. The backhoe bucket can be used for further mixing in the excavation.

- **Slurry method**

Mix a 63% solids slurry of ORC and water (see "Steps to make ORC slurry). This relatively thick slurry is used to help keep the ORC dispersed through the pea gravel, even when it contacts water in the bottom of the excavation during installation. It is generally desirable to avoid having the ORC run down through the pea gravel and collect in the bottom of the excavation. The thick slurry addresses this issue.

In each scoop of back-fill material, add the appropriate amount of ORC slurry. Pre-mix the materials in the backhoe bucket After mixing, dump the slurry and back-fill into the bottom of the excavation. The backhoe bucket can be used for further mixing in the excavation.

If the slurry method is being used, observe the physical behavior of the ORC in the fill material. If the ORC collects at the bottom of the back-fill material, increase the percent solids content by reducing the amount of water being used to make the slurry.

"Type 2," ORC in a Soil Back-fill

Follow the instructions for the pea gravel back-fill method, except:

If the slurry method is being used, the solids content should be reduced. Typically a 50% solids is appropriate, although soil conditions sometimes dictate lower solids contents (see "Steps to make ORC slurry").

" Type 3," ORC Mixed in Native Soil in the Bottom of the Tank Pit

When ORC is added to the bottom of a tank pit it may be done by backhoe or injection. CAUTION: Personnel should never work within the tank excavation, unless proper shoring or sidewall cutback is in place.

- **Backhoe method**

A skilled backhoe operator can distribute the ORC around the bottom of the tank excavation and, using the bucket, mix it thoroughly. If there are no winds, it may be possible to:

1. Put the dry ORC powder in the backhoe bucket,
2. Lower it to the bottom of the pit,
3. Gently deposit the ORC evenly on the remaining soil,
4. Use the bucket to mix the powder into the soil,
5. To mitigate dusting, if necessary, spray water into the excavation during the process.

An alternative backhoe method is to use a 50% (or less) solids ORC slurry (see "Steps to make ORC slurry) in place of the dry powder. This eliminates the dusting problem, and in some cases enhances the even distribution of ORC into the soil. Observe the slurry mixing behavior in the bottom of the excavation, and adjust the water content of the slurry to optimize mixing, if necessary.

- **Injection method**

If available, a pump and root feeder may be used to inject an ORC slurry into the excavation floor. This may require a more dilute slurry mix, and care should be taken to assure that the solids do not settle out of the slurry prior to injection.

" Type 4." ORC installed in standing water in the bottom of a tank pit

Application of ORC into tank excavations with standing water requires the operator apply ORC in a slurry form. ORC powder application in this scenario is not advised because a portion of the ORC particle fraction is not likely to pass through the surface tension of the standing water. Caution: Personnel should never work within the tank excavation, unless proper shoring or sidewall cutback is in place.

- **Backhoe method**

A skilled backhoe operator can distribute the ORC slurry within the excavation, and mix it into the soil underlying the standing water with the bucket. Steps for installation:

1. Mix a high solids content ORC slurry (63% solids). See ("Steps to make ORC slurry").
2. Pour slurry into the backhoe bucket.
3. Lower the bucket to the standing water level in the excavation, and deposit the slurry as evenly as possible across the excavation floor. The dense slurry (63%solids is 1.6 grams per ml) will tend to make the majority of the slurry sink quickly to the bottom of the water layer.
4. Use the bucket to mix the slurry into the soil.
5. Water in the vicinity of the ORC slurry will often turn white and milky, since some of the ORC is dispersed within the standing water. This provides additional dispersion within the standing water and back-fill material as it is added to the excavation.

- **Injection method**

If available, a pump and root feeder may be used to inject an ORC slurry into the soil in an excavation. This may require a more dilute slurry mix, and care should be taken to assure that the solids do not settle out of the slurry prior to injection.

MIXING ORC SLURRY:

ORC powder is shipped to you in pre-measured batches. Each batch is contained in a plastic bag which is shipped in a 5-gallon bucket.

Remove the pre-measured ORC bag from the 5-gallon bucket and open
Measure and pour the appropriate amount of water from the following table into the 5 gallon bucket

Slurry Solids Content (%)	Pounds of ORC	Gallons of Water
63%	30 lbs.	2.1 gal. (2 gal. + 2 cups)
50%	30 lbs.	3.6 gal. (3 gal + 2 1/2 qts.)

Add the entire ORC pre-measured bag to the water (30 pounds). If the slurry solids contents of less than 50% are desired, the quantity of ORC per batch mixed in the bucket must be reduced. For example, a bucket containing four gallons of water would require 22.4 pounds of ORC to make a 40% solids slurry, and 16.6 pounds of ORC to make a 33% slurry.

Use an appropriate mixing device to thoroughly mix ORC and water. Regenesis

recommends use of a 0.5 Horsepower (minimum) hand held drill with a "jiffy mixer" or stucco mixer. A common paint paddle can be used to scrape the bottom and sides of the container to ensure thorough mixing. Standard environmental slurry mixers may also be used.
After mixing, small amounts of water can be added to adjust the consistency of the slurry.
When slurries are used, the early batches should be observed in the process of mixing with the soil. Each site can vary, due to soil type and moisture content. Based on professional judgment, additional water can be added to subsequent slurry batches.

ORC slurry should be used ASAP; if the ORC slurry has been standing more than 15 minutes, it should be remixed immediately before using. Do not let stand more than 30 minutes without stirring. Otherwise, the slurry will begin to harden into a weak cement.

For direct assistance or answers to any questions you may have regarding these instructions, contact Regenesis Technical Services at 949-366-8000.

REGENESIS, 2002
www.regenesis.com