Phase II Environmental Site Assessment (ESA)

Former W2 Service Station
Chalan Pale Arnold Road (Middle Road)
Village of Puerto Rico
Island of Saipan
Commonwealth of the Northern Mariana Islands

Prepared For:

Bureau of Environmental and Coastal Quality
Gualo Rai Center
Chalan Pale Arnold - Middle Road
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December 15, 2015

EARTH
EXPLORATION
ENVIRONMENT

December 15, 2015

Mr. Frank Rabauliman, Director
Commonwealth of the Northern Mariana Islands
Bureau of Environmental and Costal Quality
Division of Environmental Quality
Gualo Rai Center
P.O. Box 501304, Saipan, MP 96950

Attention: Ms. Reina Camacho, Manager, Pesticide and Storage Tank Branch

RE: Former W2 Service Station, *Phase II Environmental Site Assessment (ESA)*

Dear Mr. Rabauliman,

MegAnnum, Inc. provides CNMI Bureau of Environmental and Coastal Quality (BECQ) with the following *Phase II Environmental Site Assessment (ESA)* prepared for the former W2 Service Station, Village of Puerto Rico, Island of Saipan, Commonwealth of the Northern Mariana Islands. The following report presents our methodology, opinions, findings, conclusions, and recommendations regarding environmental conditions at the Site.

Kind regards,

MegAnnum, Inc.

Mark R. Merline
Principal Environmental Scientist/Geologist
President

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ACRONYMS USED IN REPORT

AST	Aboveground Storage Tank
ASTM	American Society for Testing Materials
BECQ	Bureau of Environmental and Costal Quality
BTEX	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
CNMI	Commonwealth of the Northern Mariana Islands
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
ESL	Environmental Screening Levels
JSA	Job Safety Analysis
MDL	Method Detection Limit
MTBE	Methyl Tert-Butyl Ether
NFA	No Further Action
PPB	Parts Per Billion (ppb)
PPM	Parts Per Million (ppm)
RBCA	Risk Based Corrective Action
REC	Recognized Environmental Condition
TPH	Total Petroleum Hydrocarbons
TSM	Tailgate Safety Meeting
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank

EXECUTIVE SUMMARY

MegAnnum, Inc. (MegAnnum) was contracted by the CNMI Bureau of Environmental and Coastal Quality (BECQ) to conduct a *Phase II Environmental Site Assessment (ESA)* at the former W2 Service Station, Village of Puerto Rico, Island of Saipan, Commonwealth of the Northern Mariana Islands (CNMI). The former W2 Service Station is located along Chalan Pale Arnold Road (Middle Road) on Lot No. 023D26 and is heretofore referred to as the "Site". The *Phase II ESA* was conducted in accordance with Contract No. 590213-OC, the *Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP),* and additional correspondence with the BECQ.

The purpose of the *Phase II ESA* was to access the subsurface soil and groundwater with respect to the two temporary abandoned underground storage tanks (USTs) and the one removed UST located at the Site. The *Phase II ESA* was conducted as part of final UST closure activities for the Site.

Site History & Background

The Site previously operated as an automobile service station from approximately 1984 until at least 1994. Three USTs were originally installed at the Site in 1984, including one 4,000-gallon gasoline UST, one 3,000-gallon gasoline UST, and one 2,000-gallon diesel UST. The three USTs were connected with one pump island located on the southwest portion of the Site. The 4,000-gallon UST and 3,000-gallon UST were previously owned by the former service station operator, who is no longer in business. The 4,000-gallon UST and 3,000-gallon UST are still located on the northern portion of the Site and are identified as UST #1 and UST #2, respectively. The USTs are currently out-of-use and considered "temporary abandoned". The 2,000-gallon UST was previously owned by Mobil Oil Micronesia, Inc. On September 22, 1993, the 2,000-gallon diesel UST was decommissioned and removed from the northwest adjoining easement to the Site.

In 1993, tank tightness tests and an environmental investigation were conducted at the Site by Unitek Environmental Consultants, Inc. The 4,000-gallon UST reportedly failed a tank tightness test, and six groundwater monitoring wells were subsequently installed at the Site. Elevated benzene, toluene, ethyl benzene, total xylenes (BTEX) and total petroleum hydrocarbons (TPH) gasoline were measured within the groundwater samples collected from the monitoring wells. A release from the Site was reported to the CNMI Division of Environmental Quality (DEQ) at that time.

Current Use of the Site

A single-story commercial building is located on the northeast portion of the Site and is utilized as a machine shop. A two-story commercial office and residential apartment building are located on the southern portion of the Site. The shop and office space are leased to the company identified as "AutoMarine".

Out-of-Use USTs and Existing Groundwater Monitoring Wells

There is one fill port located on each UST. Both USTs appear to be constructed of steel. The base of UST #1 is located approximately 8.91 feet below ground surface and approximately 1-foot below the underlying groundwater table. Approximately 3 inches of water was measured on the inside of UST #1, or approximately 52 gallons. The base of UST #2 is located approximately 8.75 feet below ground surface and approximately 1-foot below the underlying groundwater table. Approximately 1.5-inches of product and 1-inch of water of water were measured inside UST #2, or approximately 25 gallons of product and 9 gallons of water.

MegAnnum located four of the six groundwater monitoring wells originally installed at the Site in 1993. The other two monitoring wells may have been destroyed or covered during the subsequent removal of the 2,000-gallon UST or the widening of Chalan Pale Arnold Road (Middle Road) in the 1990s. For clarification purposes, MegAnnum renamed the four existing monitoring wells located at the Site as MW-1, MW-2, MW-3, and MW-4.

Pacific Basin Environmental Screening Levels (ESLs) and Potential Exposure Pathways

The ultimate objective is to assess the potential risk to human health and the environment and, if necessary, remediate any impacted soil and groundwater to a standard that no longer represents a risk to human health or the environment and meets the requirements of the BECQ. To achieve this, MegAnnum referenced the Pacific Basin Environmental Screening Levels (ESLs) based on unrestricted land use and also commercial/industrial land use where groundwater is a current or potential source of drinking water[1].

The potential contaminate migration and exposure pathways for receptors regarding potentially impacted soil and groundwater considered as part of this assessment are:

- Groundwater Ingestion (potable drinking water or dermal contact);
- Soil Ingestion (dust inhalation or dermal contact);
- Potential impact to aquatic habitats (discharges to surface water);
- Intrusion of subsurface vapors into residential buildings;

Groundwater ingestion, soil ingestion, and impact to aquatic habitats were eliminated as potential exposure pathways. However, given the presence Light Non-Aqueous Phase Liquid (LNAPL) within monitoring well MW-1, further assessment is recommended to determine if potential indoor vapor intrusion receptor pathways exist at the Site or on the adjoining properties.

Phase II Environmental Site Assessment (ESA)

Prior to mobilizing drilling equipment to the Site, MegAnnum obtained the required permits from the BECQ Division of Environmental Quality (DEQ) and the BECQ Coastal Resource Management (CRM) to drill five soil borings. On November 13, 2015, under the supervision of MegAnnum, GeoTesting completed the installation of five soil borings (SB-1 through SB-5). On November 14, 2015, the general site features and the four existing groundwater monitoring wells were surveyed for location and top-of-casing elevations by Meridian Land Surveying LLC.

On November 15, 2015, MegAnnum collected groundwater samples from the four monitoring wells (MW-1 through MW-4) following USEPA guidelines for low-flow groundwater sampling. Prior to purging and sampling, MegAnnum checked the monitoring wells for Light Non-Aqueous Phase Liquid (LNAPL), which is commonly referred to as “free product”, using a Geotech™ product/water interface meter. Approximately 0.1875 inch (4.76 millimeters) of LNAPL was measured within monitoring well MW-1. No LNAPL was measured within the other three monitoring wells. The groundwater was measured and calculated to flow in a western direction towards Tanapag Lagoon at an approximate gradient of 0.0026 feet/foot.

[1] Brewer, Roger PhD. Fall 2012 – Revised April 2013. Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater - Pacific Basin Edition, “Tier I Environmental Screening Levels (ESLs), Unrestricted Land Use and Commercial/Industrial Land Use, Shallow Soil (<3M bgs), Groundwater is a Current or Potential Source of Drinking Water (Table A).”

Laboratory Analytical Results

A total of ten soil samples were collected as part of the Phase II ESA and submitted to Eurofins Calscience, Inc. (Eurofins), a USEPA certified and independent commercial laboratory located in Garden Grove, California. There were no BTEX, MTBE, TPH gasoline, TPH diesel, and lead constituents measured within any of the ten soil samples exceeding the referenced Pacific Basin ESLs.

The four groundwater samples collected from the monitoring wells were also submitted to Eurofins. There were no BTEX and MTBE constituents measured within any of the four groundwater samples exceeding the referenced Pacific Basin ESLs. However, there were TPH gasoline and TPH diesel constituents measured within all four groundwater sample exceeding the referenced Pacific Basin ESLs (100 µg/L). The TPH gasoline constituent levels ranged from 670 µg/L to 4,100 µg/L. The TPH diesel constituent levels ranged from 700 µg/L to 4,100 µg/L. Lead constituents were also measured within the groundwater sample collected from monitoring well MW-3 (6.79 µg/L), slightly exceeding the referenced Pacific Basin ESL (2.5 µg/L).

Recommendations

MegAnnum recommends the following activities be completed at the Site:

1. The remaining product and water contained within the 4,000-gallon underground storage tank (UST) and the 3,000-gallon UST should be fully removed, as these tanks are considered "temporary abandoned". In addition, the USTs should be thoroughly rinsed. All product and oily water removed from the USTs should be disposed of in accordance with applicable BECQ regulations.

2. The base of both USTs are located approximately 1-foot below the underlying groundwater table. The physical position of the USTs within the groundwater aquifer could impede future remedial efforts conducted at the Site. Therefore, MegAnnum recommends that the 4,000-gallon UST and 3,000-gallon UST be removed from the Site instead of in-place permanent abandonment. Potential UST removal activities will be difficult due to the adjoining access roadway for the southeast adjoining properties and the business operations of the current building occupant AutoMarine.

3. Since the impacted groundwater plume is not delineated, MegAnnum recommends that additional groundwater monitoring wells be installed at the Site and on the adjoining properties. Given the presence of TPH diesel constituents within the groundwater samples recently collected from the Site, future laboratory analysis should include BTEX, MTBE, lead, TPH-gasoline, TPH-diesel, and polycyclic aromatic hydrocarbons (PAHs).

4. Light Non-Aqueous Phase Liquid (LNAPL) recovery efforts should be initiated within monitoring well MW-1.

5. Further assessment should be conducted to determine if potential indoor vapor intrusion receptor pathways are located at the Site or on the adjoining properties.

1.0 INTRODUCTION

MegAnnum, Inc. (MegAnnum) was contracted by the CNMI Bureau of Environmental and Coastal Quality (BECQ) to conduct a *Phase II Environmental Site Assessment (ESA)* at the former W2 Service Station, Village of Puerto Rico, Island of Saipan, Commonwealth of the Northern Mariana Islands (CNMI). The former W2 Service Station is located along Chalan Pale Arnold Road (Middle Road) on Lot No. 023D26 and is heretofore referred to as the "Site". The *Phase II ESA* was conducted in accordance with Contract No. 590213-OC, the *Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP)*, and additional correspondence with the BECQ.

1.1 PURPOSE

The purpose of the *Phase II ESA* was to access the subsurface soil and groundwater with respect to the two temporary abandoned underground storage tanks (USTs) and one removed UST located at the Site. The *Phase II ESA* was conducted as part of final UST closure activities for the Site.

1.2 SCOPE OF SERVICES AND METHODOLOGY

MegAnnum's scope of services for this project consisted of the following:

- Provide a description of the Site and project area including current land uses;
- Provide a general description of the topography, soils, geology, and groundwater flow direction;
- Review environmental information pertaining to the Site, including the previous UST removal activities and environmental investigations conducted;
- Develop a Conceptual Site Model regarding the Site;
- Inspect the interior of the two temporary abandoned USTs located at the Site;
- Install five soil borings located adjacent to the two temporary abandoned USTs and one removed UST located at the Site;
- Collect representative soil samples during the soil boring activities;
- Survey the Site for general features, the soil boring locations, and the existing four groundwater monitoring wells for top-of-casing elevations;
- Collect representative groundwater samples from the existing four monitoring wells using U.S. Environmental Protection Agency (USEPA) low-flow sampling procedures;
- Submit the collected soil and groundwater samples to Eurofins Calscience, Inc. for laboratory analysis of benzene, toluene, ethyl-benzene, total xylenes (BTEX), methyl tert butyl ether (MTBE), total petroleum hydrocarbons (TPH) gasoline, TPH diesel, and lead;
- Evaluate field observations and laboratory analytical results;
- Evaluate the petroleum hydrocarbon constituent levels and their corresponding referenced Pacific Basin Environmental Screening Levels (ESLs);
- Discuss the findings and conclusions;
- Provide recommendations for the Site;

MegAnnum conducted a *Phase II ESA* at the Site in accordance with standard environmental industry practices, including the general scope/limitations of the following publications:

- ASTM International (2002). E 1903-97 Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process;
- ASTM International (2008). E 1689-95 Standard Guide for Developing Conceptual Site Models for Contaminated Sites.

- ASTM International (2010). E 1739-95 Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites.
- Brewer, Roger PhD (Fall 2012 – Revised April 2013). Evaluation of Environmental Hazards at Site with Contaminated Soil and Groundwater, Pacific Basin Edition.

1.3 LIMITATIONS AND EXCEPTIONS

This document and the work performed have been undertaken in good faith, with due diligence and with the expertise, experience, capability, and specialized knowledge necessary to perform the work in a good and workmanlike manner and within all accepted standards pertaining to providers of environmental services within the CNMI at the time of investigation. The evaluation of the geological/hydrogeological conditions at the Site for this investigation is made from a limited number of data points. Subsurface conditions may vary away from these data points. Additional work or sampling at this Site may generate data that could lead to a change of opinion regarding Site conditions. Consequently, no warranty is made, either expressed or implied, regarding the conditions at the Site. For documents cited that were not generated by MegAnnum, the data taken from those documents is used "as is" and is assumed to be accurate. MegAnnum does not guarantee the accuracy of this data and makes no warranties for the referenced work performed nor the inferences or conclusions stated in these documents. MegAnnum does not assume any liability for information that has been misrepresented by others or for items not visible, accessible, or present on the subject property during the time of the investigation.

1.4 REPORT RELIANCE

The interpretations, conclusions, opinions, and recommendations outlined in this report are intended exclusively for the purpose(s) outlined herein and for the designated Site only. This *Phase II Environmental Site Assessment Report* may be distributed and relied upon by the BECQ.

2.0 SITE DESCRIPTION AND BACKGROUND

2.1 LOCATION AND LEGAL DESCRIPTION

The former W2 Service Station is located along Chalan Pale Arnold Road (Middle Road), Village of Puerto Rico, Island of Saipan, CNMI (Figures 1-3 in Appendix A, Photographs 1-4 in Appendix B). The Site consists of approximately 500 square meters of land, which is identified as Lot No. 023D26. The Site is owned by Mr. Juan T. Lizama.

2.2 SITE AND GENERAL VICINITY CHARACTERISTICS

The Site is currently developed for commercial and residential usage. The adjoining properties are currently developed for commercial or residential usage.

2.3 CURRENT USE OF SITE

A single-story commercial building is located on the northeast portion of the Site and is utilized as a machine shop. A two-story commercial office and residential apartment building are located on the southern portion of the Site. The shop and office space are leased to the company identified as "AutoMarine". One temporary abandoned 4,000-gallon UST and one temporary abandoned 3,000-gallon UST are located on the northern portion of Site. The parking lot is used for the storage of AutoMarine's transportation vans and other automobiles awaiting repairs by AutoMarine.

2.4 CURRENT USES OF ADJOINING PROPERTIES

Adjoining properties are defined by ASTM Practice E1527-13 as any real property or properties in which the border is contiguous or partially contiguous with that of the Site. This includes a property that would be contiguous or partially contiguous, but for a road, street or other public thoroughfare separating them.

Northwest	Chalan Pale Arnold Road and its associated approximate 40-foot wide easement comprise the northwest property boundary (Photo 7, Appendix B). The easement area is utilized as a parking lot for AutoMarine's transportation vans and other automobiles awaiting repairs. One 2,000-gallon diesel UST was previously located within this easement, and the UST was removed on September 22, 1993. American Memorial National Park is located across Chalan Pale Arnold Road further to the northwest.
Northeast	An approximate 12 foot wide gravel access roadway comprises the northeast property boundary (Photograph 8, Appendix B). A retail commercial and apartment building is located across the roadway further to the northeast.
Southeast	Commercial and residential properties are located to the southeast of the Site. Access to these properties are provided by the gravel access roadway located to the immediate northeast of the out-of-use USTs.
Southwest	A two-story commercial and residential apartment building is located on the southwest adjoining property (Photographs 9-10, Appendix B). New Grand Market, a retail grocery store, occupies the lower level of the building. Residential apartment units are located on the upper level of the building.

3.0 CONCEPTUAL SITE MODEL (CSM)

The *Conceptual Site Model (CSM)* outlines the Site's history, chemicals of concern, geological setting, hydrogeological setting, receptors, potential contaminate migration, exposure pathways, and environmental screening levels based on existing knowledge. The CSM takes into consideration the potential distributions of contaminants with respect to the properties, behaviors, and fate/transport characteristics of the contaminant in a setting such as that being assessed.

3.1 SITE HISTORY

3.1.1 Historical Usage and Previous Environmental Investigations

The Site previously operated as an automobile service station from approximately 1984 until at least 1994. Three underground storage tanks (USTs) were originally installed at the Site in 1984, including one 4,000-gallon gasoline UST, one 3,000-gallon gasoline UST, and one 2,000-gallon diesel UST. The three USTs were connected with one pump island located on the southwest portion of the Site. The 4,000-gallon UST and 3,000-gallon UST were previously owned by the former service station operator, who is no longer in business. The 2,000-gallon UST was previously owned by Mobil Oil Micronesia, Inc. The locations of the USTs and pump island are outlined on Figure 5 and the survey figure (Appendix A). The 4,000-gallon UST and 3,000-gallon UST are still located on the northern portion of the Site and are identified as UST #1 and UST #2, respectively. The USTs are currently out-of-use and considered "temporary abandoned".

In 1993, tank tightness tests and an environmental investigation were conducted at the Site by Unitek Environmental Consultants, Inc. The 4,000-gallon UST reportedly failed a tank tightness test, and six groundwater monitoring wells were subsequently installed at the Site. Elevated benzene, toluene, ethyl benzene, total xylenes (BTEX) and total petroleum hydrocarbons (TPH) gasoline were measured within the groundwater samples collected from the monitoring wells. A release from the Site was reported to the CNMI Division of Environmental Quality (DEQ) at that time.

On September 22, 1993, the 2,000-gallon diesel UST was decommissioned and removed from the northwest adjoining easement to the Site. A total of three soil samples were collected from the UST excavation area and removed product piping for laboratory analysis of benzene, toluene, ethyl benzene, total xylenes (BTEX) and total petroleum hydrocarbons (TPH) diesel. The BTEX and TPH-diesel constituent levels were measured below the currently referenced Pacific Basin ESLs, as outlined in Section 3.5. A copy of the original *UST Closure Assessment (AET, October 22, 1993)* regarding the former 2,000-gallon UST is included in Appendix D. The report includes a general site map, confirmatory UST removal photographs, and the UST disposal certificate.

3.1.2 Chemicals of Concern

Given the Site's history as a gasoline and diesel storage/dispensing automotive service station, the chemicals of concern for this Site are benzene, toluene, ethyl benzene, total xylenes (BTEX), methyl tert-butyl ether (MTBE), lead, total petroleum hydrocarbons (TPH) gasoline, and TPH diesel. Given the presence of TPH diesel constituents within the groundwater samples recently collected from the Site, future laboratory analysis should include additional analysis for polycyclic aromatic hydrocarbons (PAHs).

3.2 GEOLOGICAL AND HYDROGEOLOGICAL SETTING

3.2.1 Topography

The Site is located at an approximate elevation of 10 feet (3.05 meters) above mean sea level, based upon the recent drilling/survey activities completed at the Site and the 1999 U.S. Geological Survey (USGS) quadrangle map of Saipan (Figure 2, Appendix A). The ground surface of the Site is moderately flat.

3.2.2 Soil/Geological Information

Based on the recent soil boring drilling activities, the shallow subsurface lithology of the Site consists of silty brown clay with some gravel to a depth of approximately 6 feet below ground surface (bgs). A medium-grained, moderately well-sorted, grey sand is present beneath the silty brown clay to a depth of at least 8.5-feet bgs. This brown sand lies unconformably on the Tagpochau Limestone formation at a greater depth.

3.2.3 Surface Water Features and Runoff

Tanapag Lagoon is located approximately 1,024 feet (312 meters) west from the Site. Surface water runoff from the Site either evaporates or drains into the storm water catch basins located to the southwest of the Site.

3.2.4 Groundwater Depth/Gradient

Groundwater is located approximately 7.24 feet below ground surface (bgs) to 7.91 feet bgs. The groundwater was measured and calculated to flow in a western direction towards Tanapag Lagoon at an approximate gradient of 0.0026 feet/foot. The groundwater gradient map is presented as Figure 7 in Appendix A.

3.2.5 Groundwater Usage

All buildings located within a 300-meter radius of the Site are supplied with municipal water provided by Commonwealth Utility Corporation (CUC) or rooftop rain catchment systems. No groundwater production wells are located within a 300-meter radius of the Site or downgradient from the Site.

3.3 RECEPTORS

MegAnnum conducted a receptor survey, including the identification of nearby residential property use, sub-grade building features, schools, day care centers, hospitals, surface water bodies, and water wells.

3.3.1 Residential Buildings

The results of the surrounding receptor survey indicated there are three residential apartment buildings and barracks located within a 50-meter radius of the out-of-use USTs located at the Site.

3.3.2 Sub-grade Building Features

The results of the surrounding receptor survey indicate that no basements or sub-grade building features are located at the Site or within a 50-meter radius of the out-of-use USTs located at the Site.

3.3.3 Sensitive Public Use

The results of the surrounding receptor survey indicate that no schools, day care centers, hospitals, or religious centers are located within a 100-meter radius of the out-of-use USTs located at the Site.

3.3.4 Ecological Receptors

The results of the surrounding sensitive receptor survey indicate that no surface water bodies are located within a 300-meter radius of the out-of-use USTs located at the Site. Tanapag Lagoon is located approximately 1,024 feet (312 meters) west and down gradient from the Site. Tanapag Lagoon is used for commercial and recreational purposes, including boating, swimming, and SCUBA diving, as well as for commercial/residential fishing.

3.3.5 Water Wells

The CNMI BECQ Safe Drinking Water Branch previously identified all groundwater production wells located on Saipan for MegAnnum. There are no permitted groundwater production wells located within a 300-meter radius of the out-of-use USTs located at the Site or down gradient from the Site.

3.4 POTENTIAL EXPOSURE PATHWAYS

The potential contaminate migration and exposure pathways for receptors regarding potentially impacted soil and groundwater considered as part of this assessment are:

- Groundwater Ingestion (potable drinking water or dermal contact);
- Soil Ingestion (dust inhalation or dermal contact);
- Potential impact to aquatic habitats (discharges to surface water);
- Intrusion of subsurface vapors into residential buildings;

Groundwater ingestion and dermal contact pathways currently do not exist because no groundwater production wells are located at the Site or down gradient of the Site. Soil ingestion through dust inhalation and dermal contact pathways did not exist because the Site is completely covered with concrete/asphalt at the ground surface.

No surface water bodies are located at the Site. Tanapag Lagoon is located approximately 1,024 feet (312 meters) west and down gradient from the Site. Tanapag Lagoon is used for commercial and recreational purposes, including boating, swimming, and SCUBA diving, as well as for commercial/residential fishing. Given the large distance between the Site and Tanapag Lagoon, it is unlikely the impacted groundwater identified at the Site poses a significant risk to this ecological receptor.

Light Non-Aqueous Phase Liquid (LNAPL), which is commonly referred to as “free product”, was measured within one groundwater monitoring well (MW-1) located at the Site during the recent groundwater sampling activities. Total petroleum hydrocarbons (TPH) gasoline and TPH diesel constituents were measured above the referenced Pacific Basin Environmental Screening Levels (ESLs) within all four groundwater monitoring wells located at the Site. The impacted groundwater plume is not delineated at this time. Further assessment is recommended to determine if potential indoor vapor intrusion receptor pathways are located at the Site or on the adjoining properties.

3.5 PACIFIC BASIN ENVIRONMENTAL SCREENING LEVELS

The ultimate objective is to assess the potential risk to human health and the environment and, if necessary, remediate any impacted soil and groundwater to a standard that no longer represents a risk to human health or the environment and meets the requirements of the CNMI Bureau of Environmental and Costal Quality (BECQ). To achieve this, MegAnnum referenced the Pacific Basin Environmental Screening Levels (ESLs) based on unrestricted land use and commercial/industrial land use where groundwater is a current or potential source of drinking water[2]. Table 3-1 outlines the referenced screening levels.

The Pacific Basin Tier I ESLs presented are specifically not intended to serve as: 1) a stand-alone decision making tool, 2) guidance for the preparation of baseline environmental risk assessments, 3) a rule to determine if a waste is hazardous under the state, federal, or local regulations, or 4) a rule to determine when the release of hazardous substances must be reported to the overseeing regulatory agency. The screening levels presented in the lookup tables are not regulatory "cleanup standards". The referenced Pacific Basin ESLs are ultimately subject to the discretion of the overseeing regulatory agency (BECQ). In cases where a screening level for a specific chemical is less than the laboratory method reporting limit for that chemical, it is generally accepted to consider the laboratory method reporting limit in place of the screening level.

The screening levels are considered to be conservative. The screening levels based on human health and ecological concerns are well below levels that would cause immediate, acute health effects. The presence of a chemical constituent at concentrations in excess of a screening level does not necessarily indicate that adverse impacts to human health or the environment are occurring; this simply indicates that a potential for adverse risk may exist and that additional evaluation is warranted. The screening levels for chemical constituents that are known to be highly biodegradable in the environment may be excessively conservative for use as final cleanup levels (e.g., many petroleum-related compounds). The use of the screening levels as stand-alone screening criteria or final cleanup levels should be evaluated in terms of overall site conditions, potential environmental hazards, the cost/benefit of developing site-specific cleanup criteria levels, as well as the pros/cons of site remediation versus long-term management. Additional preparation of site-specific human health or ecological risk assessments can be conducted for chemical constituents exceeding the screening levels.

The Pacific Basin ESLs were developed to assist in the rapid identification of common environmental concerns at sites with impacted soil. These concerns include:

- Direct-exposure and threats to human health (ingestion, dermal adsorption, and dust in outdoor air);
- Intrusion of subsurface vapors into buildings;
- Leaching and subsequent impacts to groundwater resources;
- Threats to terrestrial (non-human) habitats;
- Gross contamination (free product, odors, etc.) and general resource degradation concerns;

[2] Brewer, Roger PhD. Fall 2012 – Revised April 2013. Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater - Pacific Basin Edition, "Tier I Environmental Screening Levels (ESLs), Unrestricted Land Use and Commercial/Industrial Land Use, Shallow Soil (<3M bgs), Groundwater is a Current or Potential Source of Drinking Water (Table A)."

Table 3-1
Pacific Basin Environmental Screening Levels (ESLs)

CONSTITUENTS OF CONCERN	**Pacific Basin Environmental Screening Levels (ESLs) Unrestricted Land Use Shallow Soil (Table A)** ***(Groundwater is a Potential Source of Drinking Water)*** **mg/Kg**	**Pacific Basin Environmental Screening Levels (ESLs) Commercial/Industrial Land Use Shallow Soil (Table A)** ***(Groundwater is a Potential Source of Drinking Water)*** **mg/Kg**	**Pacific Basin Environmental Screening Levels (ESLs) Groundwater (Table A)** ***Groundwater is a Potential Source of Drinking Water)*** **µg/L**
Total Petroleum Hydrocarbons (TPH) Gasoline	100	100	100
TPH Diesel	100	100	100
Benzene	0.30	0.30	5
Ethylbenzene	2.1	3.7	30
Toluene	3.2	3.2	40
Total Xylenes	2.1	2.1	20
Methyl Tert-Butyl Ether (MTBE)	0.028	0.028	5
Lead	400	800	2.5

4.0 PHASE II ENVIRONMENTAL SITE ASSESSMENT (ESA)

4.1 PERMITTING, SITE ACCESS, UTILITY CLEARANCES, HEALTH & SAFETY

4.1.1 Permitting

Prior to mobilizing drilling equipment to the Site, MegAnnum and its subcontractor GeoTesting, Inc. (GeoTesting), obtained the required permits from the Bureau of Environmental and Costal Quality (BECQ) Division of Environmental Quality (DEQ) and the BECQ Coastal Resource Management (CRM) to drill five soil borings. A copy of DEQ Earthmoving and Erosion Control Permit No. 2015COM072 and CRM SPIm-2015-X-067 is included in Appendix C.

4.1.2 Site Access Agreement

In June 2015, MegAnnum prepared and requested the property owner, Mr. Juan Lizama, sign a *Site Access Agreement* in order to drill the soil borings and sample the groundwater monitoring wells located at the Site. A copy of the signed *Site Access Agreement* was previously submitted to the BECQ.

4.1.3 Utility Clearances

Prior to mobilizing drilling equipment to the Site, MegAnnum obtained utility clearances from the local utility agencies.

4.1.4 Health & Safety

A tailgate safety meeting was coordinated by MegAnnum with the personnel of GeoTesting prior to the commencement of the field activities. The purpose of the tailgate safety meeting was to discuss proper health and safety procedures, proper drilling procedures, and appropriate safety and sampling protocol.

4.2 UNDERGROUND STORAGE TANK (UST) CONFIRMATION

On November 13, 2015, MegAnnum confirmed the existence of two underground storage tanks (USTs) at the Site. UST #1 is identified as the larger 4,000-gallon UST, and it is the northernmost UST. UST #2 is identified as the smaller 3,000-gallon UST, and it is the southernmost UST. The locations of the USTs are outlined on Figure 5 and the survey figure (Appendix A).

There is one fill port located on each UST (Photographs 5-6, Appendix B). There are no manways located on either UST. The top of each UST fill port is approximately ten feet above mean sea level. Each UST fill port cover was removed, and the interior of each UST was checked for any remaining product and/or water. Both USTs appear to be constructed of steel.

UST #1 is approximately 6.33 feet in diameter with a 2.58-foot long fill port extension pipe. Given the measured diameter and its previously reported 4,000-gallon capacity, UST #1 is likely 17 feet in length. The base of UST #1 is located approximately 8.91 feet below ground surface and approximately 1-foot below the underlying groundwater table. Approximately 3 inches of water was measured on the inside of the UST #1, or approximately 52 gallons. A hypothetical calibration chart for UST #1 was created based on the field measurements, and a copy is included at the end of Appendix C.

UST #2 is approximately 5.75 feet in diameter with a 3-foot long fill port extension pipe. Given the measured diameter and its previously reported 3,000-gallon capacity, UST #2 is likely 15.5 feet in length. The base of UST #2 is located approximately 8.75 feet below ground surface and approximately 1-foot

below the underlying groundwater table. Approximately 1.5-inches of product and 1-inch of water of water were measured inside UST #2, or approximately 25 gallons of product and 9 gallons of water. A hypothetical calibration chart for UST #2 was created based on the field measurements, and a copy is included at the end of Appendix C.

4.3 SOIL BORING DRILLING

On November 13, 2015, under the supervision of MegAnnum, GeoTesting completed the installation of five soil borings (SB-1 through SB-5). The soil boring locations are outlined in Table 4-1 and on Figure 5 in Appendix A. The soil borings were installed using a truck-mounted drilling rig equipped with 8-inch diameter, hollow stem augers to a depth of seven feet bgs. The collected soil samples were characterized using the *ASTM D2487-11 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)* and Munsell's Soil Color Charts. The drilling well logs for the five soil borings are included in Appendix C.

Table 4-1
Locations of Soil Borings

Soil Boring Identification	Drilling Method	Location	Total Depth
SB-1	8-inch Hollow Stem Auger	Northwest of UST 2	7 feet boring depth with 8.5 feet sampling depth
SB-2	8-inch Hollow Stem Auger	Southwest of UST 2 and adjacent to former pump island	7 feet boring depth with 8.5 feet sampling depth
SB-3	8-inch Hollow Stem Auger	Adjacent to former diesel UST excavation area	7 feet boring depth with 8.5 feet sampling depth
SB-4	8-inch Hollow Stem Auger	Southeast of the UST #1 & UST #2	7 feet boring depth with 8.5 feet sampling depth
SB-5	8-inch Hollow Stem Auger	Northeast of the UST 1	7 feet boring depth with 8.5 feet sampling depth

4.4 MONITORING WELL DEVELOPMENT & SURVEYING

4.4.1 Monitoring Well Identification

MegAnnum located four of the six groundwater monitoring wells originally installed at the Site in 1993. The other two monitoring wells may have been destroyed or covered during the subsequent removal of the 2,000-gallon UST or the widening of Chalan Pale Arnold Road (Middle Road) in the 1990s. For clarification purposes, MegAnnum renamed the four existing monitoring wells located at the Site as MW-1, MW-2, MW-3, and MW-4.

4.4.2 Monitoring Well Development

Because the four existing groundwater monitoring wells had not been sampled since approximately 1993, the monitoring wells were developed utilizing a surge block, bailer, and Geotech's Geosquirt™ 12V DC Purge Pump. The monitoring wells were developed until the majority of suspended fine particles were removed from the groundwater. All purge water removed from the monitoring wells was containerized within one 55-gallon, DOT-approved drum and staged at the Site.

4.4.3 Monitoring Well Survey

On November 14, 2015, the four existing groundwater monitoring wells were surveyed for location and top-of-casing elevations by Meridian Land Surveying LLC, a certified CNMI survey company (Alfred K. Pangelinan, CNMI Registered Professional Land Surveyor, Certificate No. 4). In addition, Meridian Land Surveyors surveyed the locations of the soil borings, the UST manways, building footprint, lot boundaries, nearby roadways/easements, and other general features of the Site. A copy of the survey map with the UST locations, monitoring wells, and soil borings is included at the end of Appendix A.

4.4.4 Groundwater Elevation and Flow Direction

On November 15, 2015, prior to purging and sampling, MegAnnum checked the monitoring wells for Light Non-Aqueous Phase Liquid (LNAPL), which is commonly referred to as "free product", using a Geotech™ product/water interface meter. The groundwater depth within each monitoring well was then measured within 0.01 of a foot. Approximately 0.1875 inch (4.76 millimeters) of LNAPL was measured in monitoring well MW-1. No LNAPL was measured within other three monitoring wells at the Site. The groundwater was measured and calculated to flow in a western direction towards Tanapag Lagoon at an approximate gradient of 0.0026 feet/foot. A groundwater gradient map is presented as Figure 7 in Appendix A. The top-of-casing and groundwater elevations are outlined in Table 4-2.

Table 4-2 Monitoring Well and Groundwater Table Elevations

Well Identification	Date	Well Collar Elevation (feet above MSL)	Total Well Depth (feet)	Depth to LNAPL (feet)	Depth to Ground Water (feet)	Groundwater Elevation (feet above MSL)
MW-1	11/15/15	10.224	22.62	7.91	7.94	2.314
MW-2	11/15/15	10.026	19.91	No LNAPL Measured	7.80	2.226
MW-3	11/15/15	9.960	19.73	No LNAPL Measured	7.77	2.190
MW-4	11/15/15	9.388	13.29	No LNAPL Measured	7.24	2.148

4.5 MEDIA SAMPLING AND METHOLOGY

4.5.1 Soil Sampling

During the installation of soil borings with the mobile drilling rig, soil samples were collected with a hammer-driven, 18-inch long, split-spoon sampler equipped with three 6-inch soil sleeves. The soil samples were collected from the following subsurface intervals until the underlying groundwater was encountered: 2.0-3.5 feet below ground surface (bgs) and 7.0-8.5 feet bgs. The split-spoon sampling device, hand auger, and slide-hammer soil sampling tool were thoroughly cleaned in tap water, scrubbed with Alconox solution, then rinsed with tap and deionized water before and between uses to prevent cross contamination. Disposable Nitrile gloves were also worn during the sampling activities and changed between sampling activities to prevent cross contamination.

All soil samples were collected and containerized within 6-inch brass soil sleeves. The ends of the brass sleeve were covered with teflon sheeting, capped with tight-fitting plastic end-caps, and then placed into a resealable plastic (Ziploc™ type) bag. Immediately after collection, each soil sample was labeled with an

identification number and the date/time of collection, and chilled to approximately 4° Celsius in an insulated ice chest.

Soil samples were also collected from the split spoon sampling device using a Terra Core® syringe per SW-846 Method 5035. Upon placing the soil samples into the pre-weighed 40 mL VOA vials containing sodium bisulfate or methanol preservatives, significant effervesce occurred due to the calcareous composition of the soil located at the Site. Per SW-846 Method 5035, as an alternative preservation method, distilled water can be used in place of the sodium bisulfate and methanol preservatives, but the VOAs must be subsequently frozen. Based on MegAnnum's previous sampling experience, the VOAs would not remain frozen given the transit time from Saipan to the U.S. mainland laboratory. Therefore, MegAnnum utilized standard soil collection procedures with 6-inch brass soil sleeves as noted above.

4.5.2 Soil PID Field Screening

Upon completion of collection/storage of a representative soil sample, MegAnnum personnel conducted field-screening activities for potential volatile hydrocarbons utilizing a photoionization detector (PID) meter. Prior to use, the PID meter (Ion Science PhoCheck® Tiger) was calibrated using a calibration gas standard. Additional soil cuttings from the corresponding soil sample location were collected, placed within a new plastic bag, and subsequently sealed. The soil cuttings were further disaggregated within the bag and allowed to warm for a few minutes. Once condensation had collected on the inside of the bag headspace area, the intake probe of PID meter was carefully inserted through a small hole in the bag. The concentration of the volatile hydrocarbon constituents was indicated on the PID display screen and recorded within a field notebook. The PID field-screening readings measured during the sampling activities are outlined in Table 4-3.

Table 4-3 PID Soil Sample Field-Screening

Soil Sample Identification	*Date Field Screened*	*Depth Below Ground Surface (bgs) in Feet*	*PID Reading (Parts Per Million)*
SB-1	11/13/15	2.0-3.5 feet bgs	0.0
SB-1	11/13/15	7.0-8.5 feet bgs	0.1
SB-2	11/13/15	2.0-3.5 feet bgs	0.0
SB-2	11/13/15	7.0-8.5 feet bgs	5.2
SB-3	11/13/15	2.0-3.5 feet bgs	4.3
SB-3	11/13/15	7.0-8.5 feet bgs	7.9
SB-4	11/13/15	2.0-3.5 feet bgs	0.0
SB-4	11/13/15	7.0-8.5 feet bgs	10.1
SB-5	11/13/15	2.0-3.5 feet bgs	0.1
SB-5	11/13/15	7.0-8.5 feet bgs	55

4.5.3 Groundwater Sampling

On November 15, 2015, MegAnnum personnel mobilized groundwater sampling equipment to the Site and followed U.S. Environmental Protection Agency (USEPA)[3] guidelines for low-flow groundwater sampling of the four monitoring wells. Purging was conducted at flow rates of approximately 0.1 – 0.5 liters per minute to minimize drawdown, which was monitored using the water level meter. Purging continued until field parameters (pH, temperature, and conductivity) had stabilized. Stabilization was

[3] Puls, Robert W. and Barcelon, Michael J., April 1996, U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response, Ground Water Issue EPA/540/S-95/504 "Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures."

reached when three successive readings were within ± 0.1 pH, + 3% conductivity, and ± 3% temperature. All field meters were calibrated prior to purging according to manufacturer's guidelines.

After parameter readings had stabilized, the flow rate was reduced to minimize aeration and loss of volatiles. A hydrochloric acid (HCL) preserved 40ml VOA vial was opened and held under the flow stream. The water was introduced very gently to reduce agitation and to avoid introducing air bubbles. The vial was filled completely to form a meniscus (the curved upper surface of a liquid formed by surface tension). This procedure was repeated to collect a backup sample, one 1-liter unpreserved amber bottle, and one 0.5-liter plastic bottle (HNO_3 preserved). Immediately after collection, each sample was labeled with an identification number and the date/time of collection, and chilled to approximately 4° Celsius in an insulated ice chest.

The pump and electrical leads were decontaminated between each well purging by washing the exterior with a solution of Alconox and pumping at least 10 gallons of solution through the pump. The pump and electrical leads were then rinsed with tap water and deionized water. Disposable plastic tubing was connected to the pump and then placed within each monitoring well, and the plastic tubing was disposed of after each use. Disposable Nitrile gloves were also worn during the sampling activities and changed between sampling activities to prevent cross contamination.

4.5.4 Investigative Derived Waste

Investigation derived waste (IDW) was generated during the groundwater sampling activities. The purge water from the monitoring wells was containerized within one 55-gallon, DOT-approved drum and staged at the Site. The purge water will be removed from the Site by GRESCO or South Pacific Petroleum for final disposal in January 2016. A very limited amount of soil cuttings was generated from the drilling activities. These soil cutting were immediately mixed with cement and placed back into the same soil boring as part of the boring abandonment activities.

4.6 LABORATORY ANALYSIS

4.6.1 Soil Laboratory Analysis

A total of ten soil samples were collected as part of the *Phase II ESA* and submitted to Eurofins Calscience, Inc. (Eurofins), a USEPA certified and independent commercial laboratory located in Garden Grove, California. The soil samples were shipped by Federal Express under strict chain-of-custody procedures and Eurofins's U.S. Department of Agriculture, Animal and Plant Health Inspection Service Permit. All soil samples were analyzed for the following constituents by the indicated USEPA laboratory analytical methods:

- benzene, toluene, ethyl-benzene, and total xylenes (BTEX), EPA Method 8260B;
- methyl tert-butyl ether (MTBE), EPA 8260B;
- total petroleum hydrocarbons (TPH) gasoline, EPA Method 8015B(M);
- total petroleum hydrocarbons (TPH) diesel, EPA Method 8015B(M);
- lead, EPA Method 6010B;

The laboratory analytical results and sample specific detection limits are outlined in the summary Tables 1-2 and the Eurofins' certified laboratory report #15-11-1401 (Appendix E). The sample cooler was received by the laboratory on November 19, 2015 at approximately 3.3 degrees Celsius. The samples were received chilled and extracted by the laboratory within the standard laboratory method holding time. MegAnnum reviewed the associated Eurofins QA/QC data contained in the laboratory reports and found

that it met standard specifications. It is the opinion of MegAnnum that the laboratory analytical data is considered appropriate for use, and the data can be relied upon.

4.6.2 Groundwater Laboratory Analysis

The four groundwater samples collected from the monitoring wells were submitted to Eurofins Calscience, Inc. (Eurofins), a USEPA certified and independent commercial laboratory located in Garden Grove, California. The groundwater samples were shipped by Federal Express under strict chain-of-custody procedures. The groundwater samples were analyzed for the following constituents by the indicated USEPA laboratory analytical methods:

- benzene, toluene, ethyl-benzene, and total xylenes (BTEX), EPA Method 8260B;
- methyl tert-butyl ether (MTBE), EPA 8260B;
- total petroleum hydrocarbons (TPH) gasoline, EPA Method 8015B(M);
- total petroleum hydrocarbons (TPH) diesel, EPA Method 8015B(M);
- lead, EPA Method 6010B

The laboratory analytical results and sample specific detection limits are outlined in the summary Table 3 and Eurofins' certified laboratory report #15-11-1401 (Appendix E). The sample cooler was received by the laboratory on November 19, 2015 at approximately 3.3 degrees Celsius. The samples were received chilled and extracted by the laboratory within the standard laboratory method holding time. MegAnnum reviewed the associated Eurofins QA/QC data contained in the laboratory reports and found that it met standard specifications. It is the opinion of MegAnnum that the laboratory analytical data is considered appropriate for use, and the data can be relied upon.

5.0 DISCUSSION OF FINDINGS AND CONCLUSIONS

The Site previously operated as an automobile service station from approximately 1984 until at least 1994. Three USTs were originally installed at the Site in 1984, including one 4,000-gallon gasoline UST, one 3,000-gallon gasoline UST, and one 2,000-gallon diesel UST. The 4,000-gallon UST and 3,000-gallon UST are still located on the northern portion of the Site. The USTs are currently out-of-use and considered "temporary abandoned". The 4,000-gallon UST and 3,000-gallon UST were previously owned by the former service station operator, who is no longer in business. The 2,000-gallon UST was previously owned by Mobil Oil Micronesia, Inc. On September 22, 1993, the 2,000-gallon diesel UST was decommissioned and removed from the northwest adjoining easement to the Site. From the historical data reviewed, it appears the 2,000-gallon UST was properly closed in accordance with the CNMI Division of Environmental Quality (DEQ) regulations at that time.

Approximately 3 inches of water was measured on the inside of the 4,000-gallon UST, or approximately 52 gallons. Approximately 1.5-inches of product and 1-inch of water were measured inside the 3,000-gallon UST, or approximately 25 gallons of product and 9 gallons of water. Approximately 0.1875 inch (4.76 millimeters) of Light Non-Aqueous Phase Liquid (LNAPL), which is commonly referred to as "free product", was measured within monitoring well MW-1. No LNAPL was measured within the other three monitoring wells.

There were no BTEX, MTBE, TPH gasoline, TPH diesel, and lead constituents measured within any of the ten soil samples exceeding the referenced Pacific Basin Environmental Screening Levels (ESLs). There were no BTEX and MTBE constituents measured within any of the four groundwater samples exceeding the referenced Pacific Basin ESLs. However, there were TPH gasoline and TPH diesel constituents measured within all four groundwater samples exceeding the referenced Pacific Basin ESLs (100 µg/L). The TPH gasoline constituent levels ranged from 670 µg/L to 4,100 µg/L. The TPH diesel constituent levels ranged from 700 µg/L to 4,100 µg/L. Lead constituents were also measured within the groundwater sample collected from monitoring well MW-3 (6.79 µg/L), slightly exceeding the referenced Pacific Basin ESLs (2.5 µg/L).

The impacted groundwater plume is not delineated at the Site. The impacted groundwater plume may extend onto the adjoining properties and/or beneath the Site building.

6.0 RECOMMENDATIONS

MegAnnum recommends the following activities be completed at the Site:

1. The remaining product and water contained within the 4,000-gallon underground storage tank (UST) and the 3,000-gallon UST should be fully removed, as these tanks are considered "temporary abandoned". In addition, the USTs should be thoroughly rinsed. All product and oily water removed from the USTs should be disposed of in accordance with applicable BECQ regulations.

2. The base of both USTs are located approximately 1-foot below the underlying groundwater table. The physical position of the USTs within the groundwater aquifer could impede future remedial efforts conducted at the Site. Therefore, MegAnnum recommends that the 4,000-gallon UST and 3,000-gallon UST be removed from the Site instead of in-place permanent abandonment. Potential UST removal activities will be difficult due to the adjoining access roadway for the southeast adjoining properties and the business operations of the current building occupant AutoMarine.

3. Since the impacted groundwater plume is not delineated, MegAnnum recommends that additional groundwater monitoring wells be installed at the Site and on the adjoining properties. Given the presence of TPH diesel constituents within the groundwater samples recently collected from the Site, future laboratory analysis should include BTEX, MTBE, lead, TPH-gasoline, TPH-diesel, and polycyclic aromatic hydrocarbons (PAHs).

4. Light Non-Aqueous Phase Liquid (LNAPL) recovery efforts should be initiated within monitoring well MW-1.

5. Further assessment should be conducted to determine if potential indoor vapor intrusion receptor pathways are located at the Site or on the adjoining properties.

7.0 SIGNATURES AND QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONAL

7.1 SIGNATURES AND CERTIFICATIONS

I declare that, to the best of my professional knowledge and belief, I meet the definition of environmental professional as defined in Section §312.10 of 40 Code of Federal Regulations [C.F.R.] Part 312.

This report was prepared by:

Mark R. Merline
Principal Scientist/Geologist

7.2 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONAL

This report was prepared by the following MegAnnum personnel:

Mark Merline, MegAnnum's qualified environmental professional, as defined by ASTM E 1527-13 and in Section §312.10 of 40 Code of Federal Regulations [C.F.R.] Part 312., has more than 21 years of experience in the assessment and remediation of impacted properties and compliance with environmental regulations. He has a B.S. in Geology from the Michigan State University. His experience covers the assessment of hundreds of commercial/industrial properties, UST sites, and petroleum storage/distribution facilities located in several states and numerous Micronesian islands. Mr. Merline is highly knowledgeable of federal, state, and local environmental regulations and standards.

8.0 REFERENCES

ASTM International (2008). E 1689-95 Standard Guide for Developing Conceptual Site Models for Contaminated Sites.

ASTM International (2010). E 1739-95 Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites.

ASTM International (2002). E 1903-97 Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process.

ASTM International. D2487-11 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System). 2011.

Brewer, Roger PhD. Evaluation of Environmental Hazards at Site with Contaminated Soil and Groundwater, Pacific Basin Edition. Fall 2012 – Revised April 2013.