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DOLE FOOD COMPANY, INC. and
BARCLAY HOLLANDER CORPORATION

BEFORE THE REGIONAL WATER QUALITY CONTROL BOARD

LOS ANGELES REGION

In the Matter of Los Angeles Regional Water Quality Control Board's ("Regional Board") Notice of Opportunity to Submit Comments on Proposed Draft Order in the Matter of Cleanup and Abatement Order No. R4-2011-0046 Former Kast Property Tank Farm (SCP No. 1230, Site ID No. 2040330, File No. 11-043).	**DECLARATION OF CHARLES R. FAUST, Ph.D., P.G.**

DECLARATION OF CHARLES R. FAUST, Ph.D., P.G.

I, Charles R. Faust, declare as follows:

1. I am Principal Hydrogeologist and President of the GEO operating unit of Tetra Tech, Inc. ("Tetra Tech"). I was retained by Gibson, Dunn & Crutcher LLP ("Gibson Dunn"), on behalf of their client Dole Food Company, Inc. ("Dole Food") and its wholly owned subsidiary Barclay Hollander Corporation ("Barclay"). The following facts are within my personal knowledge and if called as a witness I could and would testify competently thereto. This Declaration relates to Dole Food's and Barclay's response to the Los Angeles Regional Water Quality Control Board's ("Regional Board") Notice of Opportunity to Submit Comments on Proposed Draft Order in the Matter of Cleanup and Abatement Order No. R4-2011-0046 Former Kast Property Tank Farm (SCP No. 1230, Site ID No. 2040330, File No. 11-043) ("Draft Order").

Introduction

2. I was retained to review and evaluate the letter, dated June 16, 2014 addressed to Ms. Deanne Miller of Morgan, Lewis and Bockius LLP, prepared by Thomas Johnson, PG, CHG, of Thomas Johnson Associates, on behalf of Shell Oil Company ("Shell"), and the June 16, 2014 letter addressed to Dr. Teklewold Ayalew, PG of the California Regional Water Quality Control Board, prepared by Douglas J. Weimer of Shell Oil Products US, both submitted as part of Shell's

June 16, 2014 comments on the Draft Order. I have prepared a report in response to Shell's comments, a true and correct copy of which is attached as Exhibit A ("Report"). That Report provides a detailed description of the scope of the questions I was asked to address, the opinions I have formed in response to those questions, and an analysis of my reasons for reaching those conclusions.

Qualifications

Of particular significance to my opinions that follow, are my academic training and experience related to subsurface hydrocarbon contamination.

3. I received my B.S. in Geological Sciences (1967) and my Ph.D. in Geology (1976) from the Pennsylvania State University (Penn State). At the times of my attendance, Penn State was one of a few universities that offered undergraduate and graduate level courses in hydrogeology, I took all available hydrogeology courses offered and my advisor for my Ph.D. thesis was the professor who taught most of these courses. My Ph.D. thesis research dealt with simulation of steam/water geothermal reservoirs, so as part of my graduate level course work I completed four graduate level courses from the Department of Petroleum Engineering related to simulation and analysis of petroleum reservoirs. Thus, I am personally familiar with available academic training during the period of site development and in the few years afterward.

4. Since 1980, I have worked on numerous site characterization and remediation projects at hazardous waste sites and sites impacted with petroleum hydrocarbons. In addition, to work at such sites over 34 years, I have also been active in research on subsurface fate and transport of non-aqueous phase liquids (NAPL), such as petroleum hydrocarbons. During the 1980's, I authored two technical articles on simulation (computer modeling) of NAPL that were published in Water Resources Research (a peer reviewed scientific journal). For the United States Environmental Protection Agency I authored two guidance documents that addressed topics relevant to my opinions. The first document provided early guidance on groundwater protection requirements of the Resource Conservation and Recovery Act regulations enacted in 1980. The second document provided guidance on the recovery of free product (hydrocarbons) at leaking underground storage tank sites. In order to develop the referenced guidance documents it was necessary for me to research the state of practice and technology available for site characterization, storage assessment, and remediation of sites where hydrocarbons were either stored or leaked to the subsurface.

5. A more complete summary of my background is in my Curriculum Vitae, which is attached to my Report.

I declare under penalty of perjury under the laws of the State of California and of the United States of America that the foregoing is true and correct.

Executed this 30th day of June 2014 at Sterling, Virginia

Charles R. Faust

Charles R. Faust, PhD, PG

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EXHIBIT A

Report of Charles R. Faust, Ph.D., P.G. in Response to Letter Report by Thomas Johnson Dated June 16, 2014

I am an expert in hydrogeology. One of my subspecialties is the subsurface transport of hydrocarbons in groundwater and the unsaturated zone. I earned a Ph.D. in Geology in 1976 and a Bachelor of Science in Geological Sciences in 1967, both from the Pennsylvania State University. I served with the United Stated Geological Survey from 1971 to 1979, and I have been President of the GEO division and Chief Hydrogeologist of Tetra Tech, Inc. since 1996, where I currently have responsibility for all of the projects in my field generated by our offices in 12 states, in which I supervise over 150 individuals. I have had many challenging assignments involving transport of hydrocarbons in groundwater and the unsaturated zone, including a role as Principal Investigator at the Love Canal Superfund Site; Principal Investigator for an RI/FS at a DNAPL-contaminated former manufactured gas plant site in Buffalo, New York; Principal Investigator for another manufactured gas plant site in Washington, D.C.; and Principal Investigator for development of an EPA guidance document for the recovery of free product (hydrocarbons) at sites where underground storage tanks have leaked into soil and groundwater. During my career of more than 40 years, I have examined all significant aspects of determining how subsurface hydrocarbons move through groundwater and the unsaturated zone from both a theoretical (developing mathematical models) and practical (actual field investigations) perspective.

I was retained by Gibson, Dunn & Crutcher LLP to consult based upon the following assumed set of facts. There is a controversy before the Los Angeles Regional Water Quality Board concerning the former Kast Property, now located in Carson, California where an affiliate of Shell Oil Company operated an oil storage facility from the 1920's to the 1960's (the "Site"). Shell sold the Site to a predecessor of Barclay Hollander Corporation ("Barclay") in 1966, which developed the property for residential housing and sold it under the name "Carousel." There were three large reservoirs on the Site when Shell operated it, and Shell used those reservoirs for storage of oil or oil-related products. After the developer entered escrow to acquire the Site, it began the work of dismantling the three reservoirs and filling in the space previously occupied by the reservoirs to make the Site ready for building homes. In 2008-2009, high concentrations of petroleum hydrocarbons were discovered on the Site, and the Regional Board ordered Shell to undertake a full investigation. The Regional Board has issued a cleanup and abatement order requiring Shell to remediate the Site, but more recently, it circulated for public comments a draft of a revised order ("Draft Order"), which, if adopted, would name Barclay to join Shell as a responsible party.

One question being considered by the Regional Board is the source of petroleum hydrocarbons found in shallow fill soil above the former reservoir bottoms. Waterstone Environmental, Inc. ("Waterstone"), which was retained by Gibson, Dunn & Crutcher LLP, has submitted to the Regional Board a Technical Response to the Draft Order dated January 21, 2014 ("Waterstone Technical Response"), in which Waterstone offers the opinion that the petroleum hydrocarbons found in fill soil placed above the former reservoir bottoms migrated upward from the contaminants that previously had been resting beneath the reservoir bottoms. On June 16, 2014, Shell submitted documents challenging this theory, including a letter from a technical expert, Thomas Johnson. Because of my knowledge, training, and experience solving problems concerning the movements of subsurface hydrocarbons in groundwater and the unsaturated zone, I have been asked to review and comment on Mr. Johnson's criticisms of Waterstone's hypothesis.

Mr. Johnson Mischaracterizes Waterstone's Conclusions Regarding Upward Migration at the Site

In his letter, Mr. Johnson criticizes Waterstone's conclusions related to upward migration of petroleum constituents in shallow soils at the Site. Specifically, Mr. Johnson asserts that:

> "Waterstone's alleged hypothesis of upward migration of petroleum hydrocarbons from deeper soils by capillary rise as the only cause of petroleum hydrocarbons in shallow soils at the Site is not scientifically valid. If the theory were valid, there would be a much more uniform distribution in soils of increasing petroleum hydrocarbons with depth across the Site. This uniform distribution of petroleum hydrocarbons in soil has not been observed at the Site."

(See Johnson Letter Report at p. 4). Waterstone, however, does not conclude that "upward migration of petroleum hydrocarbons from deeper soils by capillary rise [is] the only cause of petroleum hydrocarbons in shallow soils at the Site." Rather, the Waterstone report presents an assessment of the distribution of hydrocarbons in soil below the Site, discusses observations of upward migration at similar reservoirs demolished at the Wilmington Complex Refinery, and discusses the role of capillary and buoyancy forces in combination that can cause upward migration of hydrocarbons in the natural setting of the Site. Mr. Johnson does not address the full set of data or the complex set of dynamic forces that affect the movements of hydrocarbons in soil below the Site, and therefore, he did not provide adequate context for his comments on Waterstone's analyses or conclusions.

Mr. Johnson's Analysis Fails to Account for Differences between Laboratory and Site Conditions

Hydrocarbons in soil can be present in a separate phase liquid, in a gaseous phase, adsorbed to the solid phase, and dissolved in the aqueous phase. Liquid hydrocarbons having a density less than that of water are often referred to as Light Non Aqueous Phase Liquid ("LNAPL"). LNAPL will move in response to viscous forces, capillary forces, and gravitational forces. The viscous forces are produced by moving groundwater (or vadose zone water) in contact with the LNAPL. Gravitational forces are exhibited by downward migration of LNAPL through the unsaturated zone and by accumulation of LNAPL at the capillary fringe of the water table. Capillary forces are important in that they represent the tendency of the porous medium (soil) to attract the wetting fluid (water) and repel the nonwetting fluid (LNAPL) and the gas phase. Capillary forces in combination with viscous and gravity forces can result in upward and lateral migration of hydrocarbons (for example the smear zone of hydrocarbons above and below a water table that rises and falls seasonally).

The capillary rise discussed by Mr. Johnson reflects the effects of capillary forces acting in an ideal (laboratory) setting. The capillary rise measurements are made in the absence of viscous forces, in the vertical direction only, and in homogeneous soils. At the Site, the soil is heterogeneous and viscous forces (caused by water moving through soil) are dynamic (rainfall events, dry seasons, and residential irrigation). In such a setting, upward and lateral migration of LNAPL will occur when the shallow soils become saturated with water. The resulting migration is not limited to the distances of laboratory capillary rise measurements and is controlled by capillary, gravitational, and dynamic forces.

Capillary pressure relationships for soils are related to capillary rise measurements. Both capillary rise and capillary pressure increase with decreasing pore size. The capillary conditions affect the configuration and amounts of trapped LNAPL in soil through which hydrocarbons have moved. As noted by USEPA (1995), field observations demonstrate the effects of capillary forces on LNAPL migration. LNAPL is observed to move preferentially through coarse-grained materials (sands and gravels) rather than through fine-grained materials (silts and clays). In heterogeneous soils like those at the Site, a complex distribution (highly non-uniform) of hydrocarbons is expected.

Mr. Johnson's Conclusion about the Lack of Uniformity in Hydrocarbon Distribution at the Site Ignores the Significance of Heterogeneity and Multiple Forces that Cause Hydrocarbons to Move through Soil

Mr. Johnson concludes that for upward migration of hydrocarbons to occur at the Site (or for his description of the Waterstone hypothesis to be valid), one would expect "a much more uniform distribution in soils of increasing petroleum hydrocarbons with depth across the Site." (See Johnson Letter Report at p. 4). This conclusion ignores the significance of heterogeneity and the forces (including capillary forces) that cause hydrocarbons to move through soil. The combined forces acting on any free hydrocarbons that were present below the reservoir floors and below the berms (not disturbed by grading) after the reservoirs were demolished and filled would redistribute those hydrocarbons in the adjacent and overlying fill material. The pattern would be complex due to heterogeneous soil conditions that have been documented in logs of more than 2,400 borings conducted at the Site. The migration pathways of the free hydrocarbons generally would not be straight up, but rather tend to follow the path of least of resistance through the coarser-grains soils in a zigzag pattern, which is consistent with the distribution of hydrocarbons found at the Site in the reservoir fill.

Mr. Johnson's Conclusion Regarding the Lack of Opportunity for Migration through Trenches Punched in Reservoir Floors Ignores Lateral Movements

Mr. Johnson states:

> "Since the trenches through the concrete reservoir floors were reportedly only 8 inches wide and 15 feet apart, it is completely unrealistic to suggest that all the petroleum contamination in these soils migrated upward from beneath the concrete floors."

(See Johnson Letter Report at p. 3). Waterstone did not suggest that "all the petroleum contamination in these soils" migrated upward from beneath the floors. Also, for petroleum that did migrate from beneath the floors, a 15-foot spread between the trenches is not "unrealistic." Lateral migration over distances of much more than 15 feet can occur under the influence of dynamic viscous forces acting after and during periods of high recharge. In fact, significant lateral migration has occurred on the west side of Reservoir 5 and is evident more than 50 feet from the reservoir floor (see Figure 6.2 of Appendix B, Weimer Letter Report). Periods of high recharge include, for example, high-rainfall events that take place over a few days (typically during the winter months in Southern California) and irrigation (such as watering grass and gardens). Finally, because high recharge events have occurred many times over the nearly 50 years since the Site was developed, cumulative net migration of hydrocarbons has been greater horizontally and vertically than would have occurred due to a single high-recharge event.

I declare under penalty of perjury under the laws of the State of California and the United States of America that the foregoing is true and correct. Executed on June 30, 2014 at Sterling, Virginia.

Charles R. Faust

Charles R. Faust, Ph.D., P.G.

ATTACHMENT 1

RESUME

TETRA TECH

Charles R. Faust, Ph.D., P.G.

President, Principal Hydrogeologist

Experienced in all phases of hydrogeological and environmental investigations and analysis. Areas of expertise and specialization include: site characterization, aquifer testing, and computer simulation of groundwater flow, contaminant transport, multiphase fluid flow, and heat transport. Applications have included groundwater resource development, hazardous waste site investigations, geothermal system evaluations, radioactive waste storage, and groundwater clean-up and remediation.

Authority on analysis and computer simulation of groundwater and geothermal systems and the migration of contaminants in the subsurface. Author of more than 20 peer reviewed technical papers and numerous other reports and publications related to areas of expertise. Provides expert technical review, expert witness testimony, litigation support and regulatory compliance services for clients throughout the United States. Knowledgeable in U.S. EPA environmental programs (RCRA, CERCLA, UST and VIC) as well as many state environmental programs. Served on water resource advisory committee as vice chairman for Loudoun County, VA.

As President of Tetra Tech GEO, has responsibility for conduct and performance of scientific, engineering, and regulatory projects throughout the company with offices in twelve states and more than 150 professionals and support staff and technicians. As principal investigator, oversees data collection, data management computer modeling and analysis. Projects involve various types of chemicals (organic and inorganic) and radionuclides. Geologic settings include all regions of the United States and various subsurface materials including shallow soils and weathered zones, unconsolidated formations, sedimentary, igneous, crystalline bedrock, karst, and glacial deposits.

EXPERIENCE

DNAPL Contaminated Site, Buffalo, New York – Principal Investigator for a PRP funded RI/FS at a former manufactured gas plant site. Delineated contamination in soils, groundwater, and surface water; designed and evaluated alternative remedial measures, including barrier wall technology; and provided expert witness and negotiation support with the State of New York and non participating PRPs.

DNAPL Contaminated Site, Washington, DC – Principal Investigator supporting a comprehensive remedial site investigation, and design and construction of a free product recovery system at a former manufactured gas plant site.

Superfund Landfill, Missouri – Project Manager for groundwater modeling, hydrogeologic analysis, and expert testimony for remediation activities. Performed innovative and detailed assessment of the flow relationships between an aquifer and river using three-dimensional flow and transport models.

Love Canal, Niagara Falls, New York – Principal Investigator for modeling and analysis of DNAPL flow and transport at the Love Canal Superfund Site. Modeling supported analysis of remedial alternatives, including consideration of slurry and concrete barrier walls, clay and synthetic membrane landfill covers, and French drain leachate collection systems.

Education:

Ph.D., Geology, The Pennsylvania State University, 1976

B.S., Geology, Department of Geosciences, The Pennsylvania State University, 1967

Registrations/Certifications:

Certified Professional Geologist, VA

Certified Professional Geologist, PA

Awards:

Honor Societies and Awards:
ASCE 1985 Wesley W. Horner Award
Penn State Alumni Fellow
P.D. Krynine Research Fund Award
Phi Kappa Phi
Fellow Geological Society of America
U.S. Navy Achievement Medal

Office:

Sterling, Virginia

Years of Experience:

Forty

Years with Tetra Tech:

Thirty-four

DNAPL Contaminated Site, West Virginia – Principal Investigator supporting a comprehensive remedial investigation at a former manufactured gas plant site, contaminated soil removal action, baseline risk assessment, and preparation of a project closure strategy based on identified risk to human health and groundwater remediation technical impracticability.

Industrial Facility, southeastern Pennsylvania – Principal Investigator for design of a groundwater recovery system at a RCRA regulated facility. Supervised field studies (well installation, surface geophysics, aquifer testing, and sampling). Designed extraction system and wrote supporting documents for submittal to USEPA, the Pennsylvania DER, and the Delaware River Basin Commission. System is operating at design capacity.

Confidential Client, Delaware – Principal Investigator for a RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS). The RFI activities included well installation, sampling, soil gas surveys, tracer tests, aquifer tests, and groundwater modeling. The CMS evaluated soil and groundwater remediation alternatives. A "no action" with monitoring alternative was recommended. The RFI and CMS reports were approved by USEPA, and the "no action" with monitoring plan was adopted by USEPA for the site.

DOE’s Savannah River Site, South Carolina – Developed a three dimensional groundwater flow and solute transport code called FTWORK. This code simulates groundwater flow through large, complex, multilayered, fully saturated, porous hydrogeologic systems. Transport mechanisms include advection, dispersion, adsorption, and decay. We documented the model, and have extensively applied it at this site and elsewhere. The model is in the public domain and is used by other consultants and engineering companies.

Confidential Client – Developed SWANFLOW (Simultaneous Water and Non Aqueous Phase Flow), a finite difference model that simulates the flow of water and an immiscible non aqueous phase liquid (NAPL) in and below the vadose zone. This model was constructed for applications such as: hazardous waste migration analyses, groundwater restoration, and fuel spills and leaks. We documented the model for USEPA and support the model through a users group.

Whitmoyer Laboratories Site, Pennsylvania – Principal Investigator for a PRP funded Remedial Design/Remedial Action for the groundwater operable unit. The groundwater remedy will address arsenic contamination in a limestone and dolomite aquifer.

Superfund Site, Michigan – Principal Investigator for the design of a groundwater extraction system at a NPL site. The design of the system was based on the site Consent Order concept. A groundwater flow model was calibrated to site hydrogeological conditions and used to optimize the location, size and depths of drains and recharge trenches.

Two Superfund Site, southern New Jersey – Principal Investigator for groundwater investigations in the Pinelands area. Among other activities, numerical models for flow and solute transport were used to evaluate the potential for future contamination migration. The computer models were also used to evaluate groundwater pumping strategies.

NPL Site, Medley, Florida – Principal Investigator for stabilization of PCB and lead impacted soil and the analysis of the effectiveness of this remedy. Work included oversight of USEPA=s RI/FS contractor on behalf of a PRP. A groundwater model was developed to establish monitoring action levels for the selected remedy (stabilization of PCB and lead contaminated soil). The model derived action levels were incorporated in the consent order for the site. The remedy was implemented and continued monitoring conducted by GeoTrans has shown the remedy to be effective.

Consolidated Edison, New York – Project Manager for modeling and analysis of the effects of a hypothetical nuclear reactor core melt down. This included analysis of groundwater flow, heat transport, and radionuclide migration.

Confidential Client, Qatif Area, Saudi Arabia – Principal Investigator for groundwater and solute transport modeling to assess irrigation improvements. Groundwater modeling was used to define impacts including future water levels and consequent effects on well and spring production, pump settings, and migration of poor quality groundwater.

Confidential Client, Jemez Mountains, New Mexico – Project Manager for computer modeling for impact assessment of the hydrologic impact of geothermal energy development, including estimates and prediction of geothermal reservoir history and effects on groundwater outflow to downstream users.

IBM Corporation, Manassas, Virginia – Conducted a groundwater contamination investigation and remedial program. The purpose of the study was to characterize the fracture flow system underlying the area and to assess the extent of groundwater and soil water contamination by VOCs, primarily TCE. Performed groundwater modeling to assess the transport time and areal extent of contamination and to predict future temporal and spatial migration of the plume.

BCM, Inc., Lipari Landfill, New Jersey – Principal Investigator for conceptual design analysis of various remedial measures. Provided support to PRP for negotiation and litigation activities with the USEPA. Numerical groundwater models were applied to help interpret and predict the behavior of groundwater flow and convective contaminant transport. The results were incorporated into the engineering decisions regarding remedial measures.

Confidential Client, New Jersey – Principal Investigator for an owner funded Remedial Investigation/Feasibility Study under a consent order and ECRA. Soil and groundwater contamination from volatile chemicals and mercury are the primary concerns at the site.

Confidential Client, Washington D.C. – Principal Investigator for groundwater/remedial action study at a former manufactured gas site. This project includes characterization of shallow and deep flow systems, design of a recovery well system, and localized soil sampling and analysis for PCB. The results of this investigation will be used to implement remediation and treatment of contaminated groundwater.

PREVIOUS WORK HISTORY

Tetra Tech GEO, Sterling, Virginia, (1996 – Present), *President and Principal Hydrogeologist*
Tetra Tech GEO, Sterling, Virginia (1979 – 1996), *Vice President and Principal Hydrogeologist*
U.S. Geological Survey, Water Resources Division, Northeastern Region, Reston, Virginia, (1971 – 1979), *Hydrologist*
U.S. Navy, Active Duty, (1968-1970), *Lieutenant Junior Grade*

PUBLICATIONS:

Articles in Refereed Journals:

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14. Faust, C.R., and J.W. Mercer, l980. Ground water modeling: Recent developments, Ground Water, l8(6):596-577.

15. Mercer, J.W., and C.R. Faust, l980. Ground water modeling: Applications, Ground Water, l8(5):486-497.

16. Mercer, J.W., S.P. Larson, and C.R. Faust, l980. Simulation of saltwater interface motion, Ground Water, 18(4):374-385.

17. Faust, C.R., and J.W. Mercer, l980. Ground water modeling: Numerical models, Ground Water, l8(4):395-409.

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