Delaware River Basin Commission (DRBC)
Consolidated Administrative Hearing on
Grandfathered Exploration Wells

Prepared for:

Delaware Riverkeeper Network
and
Damascus Citizens for Sustainability

Prepared by:

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State of Pennsylvania, PG-003690-E

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1. Executive Summary

Demicco & Associates, LLC has been retained by the Delaware Riverkeeper Network and Damascus Citizens for Sustainability to provide expert review and opinion on the Delaware River Basin Commission's (DRBC) decision to exclude 11 Pennsylvania state permitted wells from DRBC review of exploratory wells under its June 12, 2010 and July 23, 2010 Supplemental Determinations. The decision to exclude the 11 wells has resulted in the Consolidated Administrative Hearings on actions of the DRBC relative to exploration wells being drilled into the Marcellus Shale. Specifically the Hearing will address DRBC decisions to:

- Regulate so-called "exploratory wells" and subject them to DRBC's temporary moratorium (challenge brought by Northern Wayne County Property Owners' Alliance, joined by Newfield and Hess Corporation as interested parties)
- Exclude certain state-permitted wells from DRBC review of exploratory wells, (challenge brought by the Delaware Riverkeeper Network (DRN) and the Damascus Citizens for Sustainability (DCS))

The findings in this report are based on the material provided by DRN and DCS included within the references presented at the end of the report. Should additional materials and reports be disclosed as part of the Hearing process the findings and conclusions in this report are subject to revision.

Conclusion 1 - Grandfathering

In our opinion, the 11 wells listed as grandfathered exploration wells do not meet the DRBC criteria of exploration well due to the lack of an appropriate certification of Intent by Well Operator to Plug the Well. The Marcellus Shale in sections of Wayne County,

PA may exceed the average thickness of the shale unit throughout much of the rest of the state and vertical wells can expose a significant volume of Marcellus shale for gas production. True exploration wells would be sealed and decommissioned immediately upon completion.

Conclusion 2 – Exploratory Drilling Impacts

Drilling of exploratory holes can, with lack of regulatory oversight, cause as much if not more harm to the water resources of the Delaware River Basin than a properly permitted and installed nontraditional horizontal well. Specific problems with exploratory drilling are the apparent dominance of air rotary drilling techniques to increase speed of drilling and decrease the cost of drilling. Air rotary drilling uses generally uses either naturally occurring ground water or a source of potable water and compressed air to remove the rock cuttings from the borehole as well as cooling the compression air hammer drill bit. When extensive fractures are encountered during air rotary drilling, large volumes of ground water approaching 1000 gpm can be blown from the borehole. Extensive fracturing will also cause problems with borehole stability and resulting problems with achieving a proper grout seal. Grout seals are the single most important element to protecting ground water resources from contamination as presented within this report.

Conclusion 3 – Water Resource Impacts

Damage to ground water resources can occur through both negative impacts on quantity and quality. The month long process of drilling may exceed the 100,000 gallons per day (gpd), 3.1 million gallon per month (mgm) threshold for an allocation permit if numerous fractures are encountered during air rotary drilling. Again, adequate and complete grouting of the gas well from the principal fresh water aquifers is critical to protect the water resources. Leakage along the grout wall can promote vertical upward movement of low quality water if over pressure from deeper zones in the well creates an upward gradient. Large movement of gas and deep brine fluids into shallow zones will have

negative water quality impacts on both water resource wells and streams. However, vertical downward leakage of freshwater into newly exposed and opened fracture zones from air rotary drilling can remove fresh water from the shallow aquifer zones. Loss of fresh water to deeper portions of the aquifer would diminish summer base flow to headwater streams. The increased runoff from site construction and road construction will also have a negative impact on the quantity summer base flow by decreasing the amount of rainfall that would normally reach the ground water.

Conclusion 4 – Exploratory Well and Grouting Efficiency

The drilling of the stated "exploratory" hole is done predominantly by air rotary methods based on the examined documents obtained to date. This results in an underbalanced borehole at depth where formation pressure exceeds borehole pressure. When formation pressure exceeds borehole pressure water, petroleum and gas, if present in the formation enter into the borehole and are brought up to the surface. The result is even greater strain on the borehole increasing the importance of properly grouting the well. Regulatory changes are currently being proposed in Pennsylvania indicating the inadequacies of the current regulatory procedures. Air rotary drilled wells, if drilled quicklywithout maintaining directionality, will potentially drift off vertical. The rapidly varying rock types encountered in Pennsylvania will create an uneven borehole with a wide borehole where soft shale is easily removed and a narrower borehole when passing through hard sandstones. Both the verticality (i.e. deviations from a purely vertical bore) and uneven borehole width will have negative impacts on the efficiency of the grout installation. It should be noted that State of Pennsylvania requires only a 1 inch grout diameter, whereas the State of New Jersey, where gas wells are not being drilled, requires a two inch diameter grout seal on any borehole annulus (eg. water, oil, geothermal, water, etc.).

The four issues described above result in an overall summary conclusion. It is my opinion, given with a reasonable degree of scientific certainty, that the grandfathering of these so-called exploratory wells is not protective of the Special Protection Waters of the

Delaware River Basin due to lack of regulatory review by DRBC, reliance on outdated and inadequate drilling regulations that are currently undergoing modification, and uncertainty in proper development of grout seals with the use of air rotary exploration drilling into an over-pressurized geologic zone.

2. Introduction

The primary topic of this expert report focuses on water resource issues, specifically possible water usage and water resource contamination which can occur during exploratory drilling operations. Mr. Peter Demicco is the author of this report and has over 28 years in ground water resource development including water well design, water resource and allocation permitting, ground water recharge wells, and deep geothermal wells. Part of his experience includes several years of appointment to the New Jersey Well Drillers Licensing Board for the New Jersey Department of Environmental Protection. Mr. Demicco is also a registered geologist in the State Of Pennsylvania. His curriculum vita is attached to this report (Exhibit 1).

2.1 Discussion of Drilling Techniques

The first topic of the presentation will include a discussion of drilling techniques including background experience in both mud and air rotary drilling. Volumes of water needed vary based on drilling techniques and conditions encountered during drilling. In addition, air rotary drilling can result in large volumes of water production when fracture zones are encountered along with borehole stability issues. The quality of this water will vary with depth of materials encountered with naturally occurring contaminants and radionuclides increasing with depth.

2.2 Discussion of Well Grouting

The second topic is the potential long term impacts that can occur if casing or grout failure occurs from unexpected drilling conditions or improper grouting. Grout and casing failure are jointly caused by rock shearing and pressure changes in the formation. These impacts range from casing deformation to breakdown of the grout

seal, both often occur together. The breakdown of the grout seal potentially leads to migration of water from one aquifer zone to another, vertical upward movement of naturally occurring non-potable water into potable zones and vertical downward movement of aquifer water into a non-potable zone. The latter condition would potentially result in diminished aquifer resources and potentially have a negative effect on stream base flow. In addition, migration of water even within potable aquifer zones can have negative consequences. The most common example of this is migration of water with dissolved oxygen into an anoxic zone containing specific minerals, most notably pyrite. With the introduction of oxygen into such zones, dissolution of pyrite will result in water with low pH and high iron and either elevated sulfate or sulfide concentrations. Arsenic contamination can occur as arsenic is known to be a secondary element in iron pyrite.

Multiple reports and publications were reviewed for this opinion. The documents most germane to this report are presented as exhibits attached to this report. Several background documents also reviewed for this report include the followings:

- PaDEP's existing Chapter 78 Oil and Gas Well Regulations
- PaDEP's proposed amendments to Chapter 78 Oil and Gas Regulations in the Pa Bulletin (July 10, 2010)
- DRBC's May 19, 2009 Executive Director Determination (EDD)
- DRBC's June 14, 2010 Supplemental Executive Director Determination (SEDD)
- DRBC's July 23,2010 Amendment to Supplemental Executive Director Determination
- DRBC's Delaware River Basin Code: 18 CFR Part 410

3.0 Background Geology

A cursory overview of the geology of Wayne County is needed in the context of drilling. The background overview of the geology has been obtained from "Ground water in Northeastern Pennsylvania" by S. W. Lohman. (1937; 2nd printing, 1957). Exhibit 2 presents an updated review of the stratigraphy of northeastern Pennsylvania from Frank Fletcher. Generally, the Upper Devonian rocks of the Catskill Continental Group are the dominant bedrock unit below any glacial deposits. The Catskill Group consists of various non-marine sandstone, shale and conglomerate units. These rock units were largely deposited in fluvial (i.e. riverine) environments. The rocks exhibit the fining upward characteristics of the classic fluvial sequence. The fining upward sequence starts with coarse sandstones and some conglomerates channel deposits at the base with finer grained river overbank siltstone and shale at the top of the sequence. These cycles repeat throughout most of the sequence of unit.

Wells drilled into the Catskill Group produces abundant water for nearly all domestic needs (Lohman, 1957). This geologic group is the most important water bearing unit in Wayne County and provides not only domestic and other human needs, but provides a large part of the base flow to local surface waters along with flows from surficial glacial deposits. The sandstones form the largest water bearing group of sediments. The Catskill Group can range in thickness from 1,800 feet thick in Susquehanna County in the north to over 6,000 feet in Carbon County (see Lohman, 1957).

Beneath the Catskill Group non-marine units are marginal marine units of the Portage Group dominated in this area by the Trimmers Rock Formation. These marine units contain typically coarsening upward deposits of off shore deltaic deposition. Soft shale from deep water environments forms the basal units and, as the delta builds out into the shallow seas, coarser and cleaner sandstones are deposited near the top of the

sequence. This Group is not considered an aquifer in Wayne County due to depth, probable salt and hydrogen sulfate concentrations. This Group, as with the Catskill Group will exhibit rapidly varying drilling conditions. The unit is roughly 1,500 feet thick in the eastern part of northeast Pennsylvania thickening to 3,000 feet westward into Luzerne County (see Lohman, 1957).

The Hamilton Group, which includes the upper Hamilton Formation (see Lohman, 1957 for an in depth discussion of stratigraphy) and lower Marcellus Shale, underlies the Portage Group. The Hamilton Formation represents shallower marine waters than the depositional environment of the Marcellus Shale. In the Hamilton Formation, beds of fossiliferous olive-gray to dark grey sandy shale and sandstone with locally thin beds of calcareous shale to coral limestone and coquinite can be found (see Lohman, 1957). This unit is on the order of 1,100 to 1,600 feet thick (see Lohman, 1957). The Marcellus Shale is a gray to black shale with some fine sand in locations and contains pyrite indicative of the anoxic environment that resulted in the formation of natural gas. The thickness of the Marcellus Shale is on the order of 700 to 900 feet in the eastern counties of northeast Pennsylvania, including Wayne County) decreasing to 400 feet in the western counties of northeastern Pennsylvania (see Lohman, 1957).

The Onondaga Formation, a cherty limestone, underlies the Marcellus Shale in the northeastern portion of Pennsylvania. This formation has been listed as the target formation by some drilling operations presumably to ensure that the full thickness of the Marcellus Shale has been penetrated.

Each of the 11 grandfathered wells will have to be drilled through this highly variable geologic column. The amount of the Catskill Group penetrated will vary the most depending on location of the well.

4.0 Well Permits

Several well permits and related documents were reviewed including the Docket NO. D-2009-18-1 on the Stone Energy Corporation Matoushek 1 Well (Exhibit 3). Only this Docket provided any details on the actual drilling of an gas well into the Marcellus Shale. The other exploratory well permits reviewed had some details on specific aspects of the drilling including the MSDS sheets for material to be brought on-site, the "Preparedness, Prevention, and Contingency Plan, Wayne County Field, Wayne County, Pennsylvania" report, and site construction details. (see Exhibit 4, Woodland Mgmt Partners 11: Exhibit, 5 HL Rutledge 11; and Exhibit 6, VE Crum 11). However, the permits were completely silent on the actual drilling methods, well construction methods and the critically important grouting methods. It is important to note that the materials and grouting techniques will not vary greatly from an exploratory hole to a production well.

The Stone Energy Corporation, Matoushek 1 well was reported in the Docket (Exhibit 3) to be drilled by air rotary methods to the top of the Marcellus Shale, and then the Marcellus Shale was cored using a 3 percent potassium chloride solution. Air rotary drilling is different than mud rotary drilling in that air and chemicals are used as the fluid to cool the drilling bit, lift the cuttings from the hole, and lubricate the drill column. Usually foaming agents are used with air rotary drilling. The borehole should be underbalanced in this process, in other words the pressure of water and gas in the formation should be greater than the pressure created by the air compressor. As a result, oil, gas and brine ground waters will be pulled up to the ground surface during this type of drilling. Air drilling should be significantly faster than mud rotary through the use of air hammer drilling bits and with less deterioration and damage to the drill bit. However, there is a greater risk of well blowout if overpressurized (i.e. greater than atmospheric pressure at the depth of the overpressure area) zones are encountered as the borehole is advanced.

As stated above, the other permits (the grandfathered exploratory well permits) were silent on drilling method(s), so there is no information available to evaluate the risks associated with the drilling technique that will be used on these wells. A discussion of drilling methods should be mandatory in these permits. -. Typically, mud rotary drilling would be used to drill through the gas producing Marcellus shale.

Several other significant differences with air rotary drilling versus mud rotary exist. The compressed air injected during drilling also lifts the water encountered in borehole and surrounding fractures to the surface. Air drilled wells can remove significant volumes of water during the drilling process. Exhibit 7 presents a set of e-mails discussing the volume of discharge to the Valley Joint Sewerage Authority. Significant volumes of water are reported to have been removed during drilling of the Matoushek well.

Where large fractures are encountered, borehole collapse can occur further enhancing the water flow and slowing drilling. A mud cake is not formed on the borehole of an air drilled well to diminish water movement into or out of fracture zones. As a result air drilling allows for greater movement of water between fracture zones during drilling. On occasion, I have observed drillers of geothermal wells stop and grout up sections of failing rock before drilling deeper. Conventional wisdom was that very few high water yielding fractures existed below 500 feet. Again, I have seen yields close to 800 gpm being blown from fractures zones below 1000 feet deep. Bottom line, during the month long drilling process using air rotary, the potential exists to withdraw more than 100,000 gallons per day on average, or 3.1 million gallons for the month.

It is not unusual for air drilled wells to have significant deviation from the vertical in areas of nearly flat lying to slightly dipping bedrock (Dr. Greg Herman, New Jersey Geological Survey, 2005). Dip is the angle from the horizontal of the bedding plane of the rock. Typically, the drill bit may follow the near vertical (but not completely

vertical) fractures in the rock mass. This is also a concern when rocks of very different characteristics are adjacent to one another as is the case in Wayne County, PA. Typically, a very ragged borehole will result with zones of collapsed fractured sandstone.

Problems with the verticality and variability of the borehole will potentially result in grouting difficulties. Questions on the integrity of the grout seal arise when the casing to be grouted may lie up against one side of the borehole. Centralizers may not align the well properly in a rough borehole. In addition, Pennsylvania requires only 1 inch diameter of grout whereas New Jersey requires 2 inches of grout. Since details on well drilling and construction are absent in the permit papers, how is the issue of the casing grout going to be reviewed and documented during drilling? The PaDEP regulations do not appear to require disclosure of drilling method on the permit application. However, DRBC has not required this information on any of the 11 exploratory well sites to know potential drilling risks at the 11 sites and have a better inventory of chemicals stored at these sites to conduct mud rotary drilling before allowing these 11 "grandfathered" wells to proceed. In my opinion, these data are necessary to evaluate potential impacts to the water resources of the basin.

Grouting at the depth of the production casing occurs with only 1¼ inch of grout on either side of the casing. This assumes that the casing is centered, the hole is truly vertical and the drill bit drilling the 8-inch borehole had not been worn down significantly. The potentially rapidly varying casing pressures that occur if test fracking or test gas production occurs may shear the grout and even the casing (Dusseault, et al, 2001). If grout failure occurs at this interval, high pressure gas and fluids could reach up to the surface and conductor casings via the ungrouted portion of the borehole. At the shallower depths, the higher pressures could damage the surface and conductor casings allowing further upward migration of gas and fluids into the aquifer zones above.

The significant issue with these wells is the pressures placed on the grout seals and casings. Experience even in the water industry has led to field observations of grout mixtures that have excess water to improve pumping characteristics. The result is a grout subject to shrinkage, a situation that could prove disastrous in high and overpressured environments such as the Marcellus shale in the Delaware River Basin. Skimping on the grout seal may be an inevitable problem that has been the cause of well blowouts. Again, the result is vertical upward migration of gas and fluids into the area of the surface and conductor casings and eventually into the aquifers above.

The PaDEP regulations do not appear to require disclosure of drilling method on the permit application. However, DRBC has not required this information on any of the 11 exploratory well sites to know potential drilling risks at the 11 sites and have a better inventory of chemicals stored at these sites to conduct mud rotary drilling before allowing these 11 "grandfathered" wells to proceed. In my opinion, these data are necessary to evaluate potential impacts to the water resources of the basin.

In summary, in my opinion, water use and resource losses can be an issue with exploratory wells. Drilling and grouting plans for any well must be fully developed prior to any drilling activities and, because these 11 exploratory wells are going unregulated by the DRBC, there is no review of these plans and procedures and no basis for any conclusion by the executive director of DRBC that the drilling of these exploratory wells will not have a substantial effect on the water resources in the Special Protection Waters of the Delaware River Basin.

The opinions expressed in this report are stated to a reasonable degree of scientific and professional certainty.

5. References

Dusseault, M. B., Gray, M. N., and Nawrocki, P. A., 2000, Why oil wells leak: Cement behavior and long-term consequences: SPE International Oil and Gas Conference and Exhibition; Bejing, China, November, 2000.

Dusseault, M. B., Bruno, M. S., and Barrera, John., 2001, Casing shear; casues, cases, cures: SPE Drilling and Completion, March, 2001, pages 98 – 107.

Herman, G. C., 2005, Joints and veins in the Newark basin, New Jersey, in regional tectonic perspective: in Gates, A. E., editor, Newark Basin – View from the 21st Century, 22nd Annual Meeting of the Geological Association of New Jersey, College of New Jersey, Ewing, New Jersey, p. 75-116.

Lohman, S. W., 1957, Ground water in northeastern Pennsylvania: Pennsylvania Topographic and Geologic Survey Bulletin W 4, Harrisburg, Pennsylvania, 2nd printing, 312 pages.

Exhibit 1

PETER M. DEMICCO, P.G.

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Education

M.S. Geology, University of Delaware, 1982
B.S. Geology and Geophysics, University of Connecticut, 1980

Registrations

Registered Professional Geologist, State of Delaware, #S40000406
Registered Professional Geologist, State of Pennsylvania, #PG-003690-E
Certified Professional Geologist, State of Virginia, #2801001817.
Certified Geologist, American Institute Professional Geologist, #7160

Technical/Professional Expertise

Water Resource Evaluations
Water Well Design and Aquifer Testing
Aquifer Storage and Recovery (ASR) Systems
Wastewater Recharge Systems
Groundwater Flow Modeling
Analysis of Fractured Rock Groundwater Flow
Remediation of Petroleum and Chlorinated VOC sites

Capabilities

Aquifer Testing and Well Hydraulics
Wastewater Infiltration Analysis and Modeling
Groundwater-Surface Water Interaction
Regional Watershed Hydraulic Analysis
Well Design and Redevelopment
Groundwater Flow and Solute Transport Modeling
Groundwater Geochemistry Analyses
Design of Hydraulic Controls for Remedial Recovery System
In-ground Iron and Manganese Removal

Professional Profile

Mr. Peter Demicco is the Principal Hydrogeologist and President of Demicco & Associates, LLC. Mr. Demicco has over 30 years of experience in the fields of water supply and ground water remediation.

Mr. Demicco's technical expertise in water resource development includes Groundwater Resource Planning, Water Allocation permits for municipal and industrial water users, Aquifer

Storage and Recovery (ASR) projects, extensive single and multiple well aquifer testing projects, ground water flow modeling for well head protection, regional water resource planning, surface water induced infiltration projects and in-ground iron and manganese removal projects. Mr. Demicco has also evaluated sites for the installation of high capacity horizontal collector wells and has conducted extended 30-day aquifer tests for the evaluation of induced infiltration. Major projects have included analysis of ground water recharge, surface water runoff, and stream base flow to evaluate impacts of development on stream hydrology.

Mr. Demicco's experience includes analysis of water reuse projects primarily focusing on the recharge of waste water for municipalities and public and private utilities. This work has focused on large volume rapid infiltration basins for disposal projects up to 1.5 Million Gallons per Day (MGD). These projects include ground water flow models of the mounding effects beneath the basins, evaluation of geochemistry changes within the aquifer, and seasonal changes in aquifer water elevations.

Mr. Demicco's consulting management experience has included oversight of over 50 major water allocation projects from single wells to multiple well installations. Mr. Demicco has managed many projects related to NJDEP critical aquifers in both Critical Areas 1 and 2. His experience includes one of the only alternative water supply plans approved in Critical Area 2. He has extensive experience in interfacing with the NJDEP Bureau of Water Allocation and the Bureau of Safe Drinking Water. His project works includes consulting for municipal planning and health boards.

Mr. Demicco's expertise also extends to ground water remediation of both water supply systems and industrial site remediation. He has managed projects on nitrate and VOC contamination of municipal and industrial wells, as well as remedial investigations and remedial action projects under NJDEP Technical Requirements for Site Remediation. Mr. Demicco has assisted clients in developing natural attenuation remedial action plans and groundwater Classification Exception Areas (CEA). Mr. Demicco also has managed multi-discipline teams in remedial projects related to NJDEP ACO, ISRA and UST programs, and federal EPA Superfund Program.

Project Experience

Water Resource Evaluations

- Provided single and multiple well aquifer tests, regional analysis of aquifer impacts and public testimony for a new water supply system in Gloucester County, New Jersey in the PRM Aquifer System. Analysis included reviews and comments on a regional model of the PRM aquifer produced by the U. S. Geological Survey.

- As Professional Geologist, provided oversight for the expansion of a major water purveyor in the State of Delaware. Projects include the development of a new 2.0 million gallon per day (MGD) well site in west-central New Castle County, technical assistance for new well exploration in both New Castle, Kent Counties and Sussex Counties, development of a water supply system in multiple aquifers for an estimated 5 to 6 MGD needed for development in Southern New Castle County, assistance with 72-hour allocation permit aquifer tests and well efficiency step tests, and technical assistance with ASR sites in New Castle County.

- Oversaw multiple Horizontal Collector Well test and individual site tests for a 45 MGD facility at a nuclear power facility along the Mississippi River in the State of Mississippi. Site testing involved the evaluation of induced infiltration for estimating yield of individual collector well sites along the banks of the Mississippi River. The multiple well test involved operating three collector wells at steady rates and then testing the fourth new collector well for a 96 hour period. Report preparation included estimating total well yield with all four horizontal collector wells operating at low-river stage.

- Provided Expert Witness testimony for a legal case involving a municipal zoning ordinance on domestic water supply well and septic systems on appropriate housing density. The court case focused on regional ground water recharge rates and nitrate dilution of septic system discharge.

- Well Redevelopment and evaluation of sand production from a 1300 foot deep Potomac-Raritan-Magothy well in Jackson Township, New Jersey. Project included location of the sand producing interval of the screen. Different techniques of redevelopment applied to reduce sand production from the interval identified as producing sand.

- Project Geologist for development of new water resources for Henrico County, Virginia. Reviewed available surface and ground water resources, evaluated existing well system, development of well maintenance criteria, and selection of sites for new ground water exploration.

Waste Water Recharge

- Ground water flow model for waste water disposal of a 400 home subdivision in Sussex County Delaware using the USGS Modflow model and the Surfact unsaturated flow package. The results of the model were uses to obtain regulatory approval for a subsurface drip irrigation system through modeling of the potential mounding beneath each site. The project included small scale well tests to evaluate shallow subsurface hydraulic conductivity of the sediment as part of the inputs to the model.

- Analysis of waste water disposal for a 1.5 MGD expansion of a municipal wastewater system in southern New Castle County, Delaware. Analysis included detailed hydraulic analysis for 40 to 60 rapid infiltration basins including seasonal high ground water mounding analysis and detailed geochemistry of the recharge-ground water interaction. A Modflow model of seasonal high ground water elevations is currently underway.

- Analysis of several rapid infiltration basins for residential developments in New Castle and Sussex Counties, Delaware for expansion and permitted capacity increases. These projects focused on analysis of seasonal high ground water elevations due to expanded capacities through ground water flow modeling.

Water Allocation

- Project Manager of an extended 30-day aquifer test to prove induced infiltration from the Delaware River for acquisition of an Alternative Water Source in NJDEP Critical Area 2, Potomac-Raritan-Magothy Aquifer. This project included NJDEP approval of the aquifer test plan and oversight by U.S. Geological Survey of the testing procedures and final hydrogeologic report.

- Developed Aquifer Testing Plan, production well location and design and 72-hour aquifer tests for a major new water supply in Cecil County Maryland. Project included the modification of the water appropriation permit for these new sources in the Potomac Group Aquifer.

- Project Manager of the development and allocation permitting of a new 3.5 MGD well field in southern New Castle County, Delaware in the Potomac Formation aquifer. Oversight of the project included evaluation of 7 new well installations, 72 hour aquifer testing, and computer modeling to illustrate the overall impact of the new wells on the future productivity of the aquifer system. The allocation permit included analysis of regional impacts using a MODFLOW model and public testimony at the permit hearing.

- Project Manager for a project involving the transfer of roughly 10 MGD of water allocation rights between two industrial clients in NJDEP Critical Area No. 1. The project focus was the regulatory oversight and obtaining of approvals needed to secure transfer the diversion permits. Previous work at both sites included extended aquifer testing and analysis for induced infiltration to increase diversion permits in Critical Area 1.

- Submittal of several hydrogeologic reports and allocation permit applications for golf courses most recently including Baltusrol, Shore Gate and Suburban Golf Clubs. Also provided oversight to East Amwell Township Planning Board and Board of Health on the application for the Ridge at Back Brook golf course.

- Prepared and provided public testimony for a new water supply system for Aqua New Jersey in Woolwich Township, New Jersey. Work included a multiple well stress test and extensive investigation of impact of the proposed new wells on existing users and on contaminated sites. Public testimony included comment on USGS regional ground water flow model for this region of New Jersey.

Aquifer Storage and Recovery

- Technical oversight and field testing on ASR demonstration project in New Castle County, Delaware at two (2) facilities in the upper and lower Potomac Aquifer. Reviews for the project included well design criteria, review and modification to groundwater geochemistry cycle testing, conduct the field geochemical testing, regulatory compliance issues, elevated iron levels in the receiving aquifer, and salt water intrusion in the receiving aquifer from existing use of the well field. Currently, this project includes on-going review of compliance monitoring results for geochemical changes in the aquifer, well plugging and MODFLOW modeling of the migration of the injected water.

- Planning, development and testing of a new ASR system in NJDEP Critical Area 1 in Lakewood, New Jersey using an existing Englishtown Aquifer well. Project is through field-testing and is currently waiting regulatory approvals from the Bureaus of Water Allocation, Safe Drinking Water, and Nonpoint Pollution Control. The project included aquifer yield testing, development of a Ground Water Protection Plan and field and laboratory testing of water quality through three injection and recovery test cycles. The project also included geochemical modeling of the injected and recovered water using the U. S. Geological Survey model PHREEQC.

- Review of maintenance procedures for the existing ASR system in Brick Township, New Jersey. Work included development of a monitoring plan for water quality collection on recovery, geochemical modeling using PHREEQC and suggestions on modification of backwash frequency and injected water quality to reduce precipitation of calcite in the well screen, pump and recovered water transmission lines. On-going work will include further analysis of iron levels and approval from NJDEP Bureau of Safe Drinking Water for direct discharge of most of the recovered water to the distribution system without retreatment.

- Technical oversight on the preliminary feasibility and aquifer testing for a new ASR system in New Jersey Critical Area No. 2. Primary focus of this study was the geochemical evaluation of mixing surface source water and aquifer waters. This project included an economic assessment of ASR versus development costs of new water supply wells, regulatory approvals for test drilling and recharges test cycles.

- Technical oversight and field analysis for an ASR system operation and maintenance plan in Critical Area No. 1 of New Jersey in the PRM Aquifer. The ASR system was not being utilized due to on-going issues with the levels of iron in the recovered water. Primary issues were compliance with NJDEP Bureau of Safe Drinking Water, developing a maintenance plan for the ASR well, and monitoring water quality of recovered water.

- Project Manager for the evaluation of an existing ASR system in the Cohansey and Kirkwood Aquifer systems in Coastal New Jersey to improve system maintenance and operational to prevent damage to the system wells by over-pressure during recharge cycles. Work included cycle testing of geochemical reaction and rates of plugging on four existing wells. Work was concluded in the late 1980's with operation and maintenance plan for the recharge wells.

Ground Water Modeling

- Project Manager for a ground water flow and contaminant transport model for a EPA Superfund site in Region 2. The project included developing a MODFLOW and MT3D model for the design of a ground water treatment system. The model included several cleanup scenarios from natural attenuation to a 1 MGD recovery system. Oversight on the project included personnel from EPA Region II and the U.S. Geological Survey.

- Project Manager on a groundwater MODFLOW model of a petroleum facility. The goals of the project were to evaluate maximum petroleum recovery while minimizing ground water pumping and maintaining hydraulic control.

- Project Manager on an evaluation of induced infiltration into a water table aquifer in central New Jersey to increase the facility's water allocation in NJDEP Critical Area No. 1. The goal of the project was to evaluate the maximum sustainable yield of the water table aquifer from within the property boundaries of the facility with a minimum of new well installations.

- Project Manager for a ground water flow model projecting capture and recovery volumes of ground water contaminants in a fractured rock aquifer in central New York State. The goal of the project was to estimate the minimum rates of recovery needed for complete plume recovery and estimate the impact of ground recovery on flow gradients beneath the landfill contaminant source.

NJDEP Spill Fund Sites

- Project Manager on a diesel fuel remediation project that included RI and RA phases of work under a NJDEP ACO. Project included obtaining a NJPDES permit for discharge to ground water as part of the site remediation. The project also included the installation of a multiple well recovery system with free product recovery equipment and development of an iron removal step in the treatment system. Project required regular compliance monitoring sampling and reporting.

- Project Manager on a DNAPL investigation and recovery well installation with treatment system at an industrial facility in Newark, New Jersey. The DNAPL investigation led to a detailed investigation of site geology as the DNAPL migrated from an outwash sand and gravel into a glacial till. A small lacustrine sand unit within the till become the conduit of migration of the DNAPL and recovery well installation focused on the mapping the lacustrine unit.

Publications

Demicco, P. M., Price, B. C., and Penman, R. E., 2010, Well field resource optimization, six years of successful aquifer storage and recovery (ASR) cycles for the Delaware Coastal Plain: Sixth International Conference on Sustainable Water Environment, University of Delaware, Newark, Delaware, 10 p.

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Demicco, P. M., 1982, "Hydrogeology of the Southern Half of the Marydel Quadrangle, Delaware": Unpublished Masters Thesis, University of Delaware, 124p.

Record of Employment

2007 – Present	Director of Ground Water Resources, Artesian Water Company, Newark, Delaware and Demicco & Associates, LLP.
1999 – 2007	President and Principal Hydrogeologist, Demicco & Associates, Inc., Pittstown, NJ
1998 – 1999	Principal Geoscientist, McLaren/Hart, Inc., Warren, NJ.
1998 – 1998	Supervising Geoscientist, McLaren/Hart, Inc., Warren, NJ.
1989 – 1998	District and Technical Manager, Ground Water Associates, Inc., Bridge-water, NJ
1988 – 1989	Environmental Scientist, JCP&L Environmental Affairs Dept., Morristown, NJ
1987 – 1988	Project Manager, The Earth Technology Corporation, Somerset, NJ
1985 – 1987	Sr. Project Hydrogeologist, Ground Water Associates, Inc., Bridgewater, NJ
1983 – 1985	Project Hydrogeologist, Ground Water Associates, Inc., Westerville, OH
1982	Geologist, Delaware Geological Survey, Newark, DE
1980 – 1982	Teaching Assistant/Instructor, University of Delaware

Exhibit 2

A Stratigraphic Framework for the Catskill Facies, Southeastern New York and Northeastern Pennsylvania

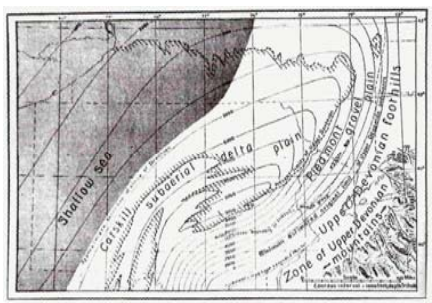
Frank W. Fletcher, 4 Thompson Court, Reedville, VA, ffletcher@rivnet.net

ACKNOWLEDGEMENTS

I am profoundly indebted to Jon D. Inners, Robert G. Sutton, and Donald L. Woodrow for their friendship and their insights and good counsel regarding Catskill rocks over the years. "No man is an island, . . ."

THE CATSKILL DELTA

JOSEPH BARRELL wrote the first comprehensive description of the thick wedge of Middle and Upper Devonian clastic rocks known as the Catskill Delta in 1913. Since that time the stratigraphy, sedimentology, and paleontology of these rocks have been the subject of countless publications, including two notable overviews: Shepps (ed.), 1963, and Woodrow and Sevon (ed.), 1985. The stratigraphic relations of the Catskill Delta are well illustrated on correlation charts published by the geologic surveys of New York (Rickard, 1975) and Pennsylvania (Berg and others, 1983).



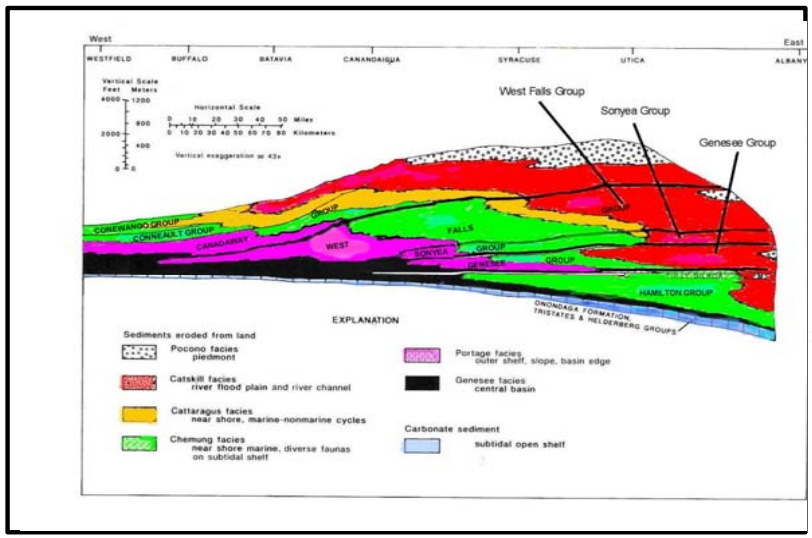
Joseph Barrell's paleogeographic map of the Catskill Delta (Barrell, 1913)

The sedimentary sequence of the Catskill Delta consists six major clastic facies, representing six discrete environments of deposition associated with the filling of the Appalachian foreland basin during the Devonian Period.

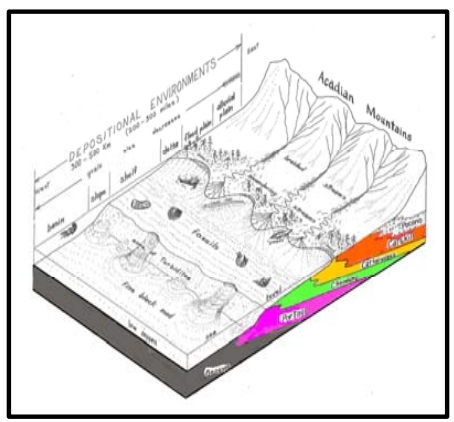
Facies	Typical Lithology	Depositional Environment
Pocono	conglomerate and coarse-grained sandstone	alluvial fan
Catskill	interbedded red and gray sandstone and shale, land plant fossils	alluvial plain
Cattaragus	gray and green shale, siltstone, and sandstone	shoreline
Chemung	gray shale, siltstone, and fine- to medium-grained sandstone	shelf
Portage	dark gray shale and siltstone	slope
Genesee	black shale	basin floor

Table illustrating the facies of the Catskill delta, together with the associated rock types and depositional environments.

***"Any geologist who has followed this series of rocks from central New York eastward to the Catskills, and then along their eastern slope into Pennsylvania, knows very well that red beds appear at different horizons in various parts of the area, and also realizes the utter impossibility of indicating the same approximate horizon by drawing a line through the lowest red beds."* C. S. Prosser, 1894.**



Representational cross section of Catskill facies east to west across New York state (modified from Isachsen and others, 2000).



Isometric diagram of the facies and depositional environments of the Catskill Delta (modified from Isachsen and others, 2000).

TIME AND ROCK

► The entire Middle and Upper Devonian sequence is thickest in eastern New York and thins progressively westward.

► The coarser, non-marine facies, Pocono and Catskill, predominate in eastern New York, while the finer-grained, shoreline and marine facies, Cattaragus, Chemung. Portage, and Genesee, make up an increasingly greater proportion of the sequence westward across the state.

► Tongues of black and dark gray shale of the Genesee facies extend eastward from the Lake Erie region, first splitting the non-marine Portage and Chemung facies of central New York and then the non-marine Catskill facies of eastern New York, where the are evidence of marine transgression.

►The tongues of black and dark gray shale have been employed to sub-divide the facies into four groups. Because the anoxic muds that formed each tongue of black and dark gray shale were deposited everywhere in the Appalachian foreland basin at nearly the same time, the shales may be viewed as time horizons.

► To trace a single group, such as the Sonyea Group, from the Catskill Mountains westward to Lake Erie is to pass from one *magnafacies* to another and to cross the Devonian depositional basin from alluvial fans, to alluvial plain, to shoreline, to shelf, to slope, to basin floor, respectively.

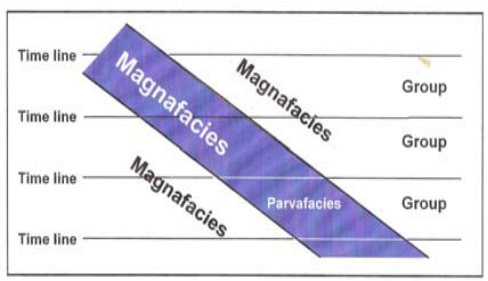


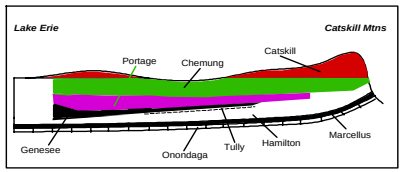
Diagram illustrating the magnafacies concept.

Stratigraphic Explorations
The Search for a Paradigm

***paradigm**: a set of assumptions, concepts, values and practices that constitutes a way of viewing reality for the community that shares them, especially in an intellectual discipline.*

PRESENT AT THE CREATION

During the first Geological Survey of New York (1836-1843), WILLIAM W. MATHER employed the name *Catskill* to denote the red strata found in the Catskill Mountains. Together with his colleagues James Hall and Lardner Vanuxem, Mather assembled one of the famous rock sequences of the eastern United States: (in ascending order) Genesee, Portage, Chemung, and Catskill.



"Layer-cake" model of the New York Middle and Upper Devonian.

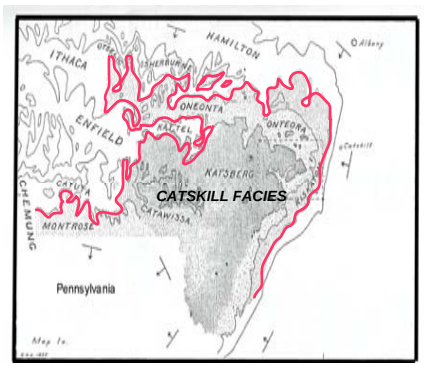
In Pennsylvania 19th Century geologists also recognized a "layer-cake" model for the Genesee, Portage, Chemung, and Catskill sequence; although debates about Portage-Chemung relationships raged into the 20th Century. I. C. WHITE (1881, 1882) subdivided the Catskill in northeastern Pennsylvania into eight "members." White believed that the boundary between the Chemung and Catskill occurred at the same stratigraphic level everywhere in the region, and that the younger units were stacked up in order above it. He did not, however, illustrate these subdivisions on his geologic maps of Susquehanna, Wayne and Pike Counties, which displayed only vast expanses of the "Catskill formation."

I. C. White's geologic map of Wayne County, Pennsylvania.

MULTIPLE WORKING HYPOTHESES

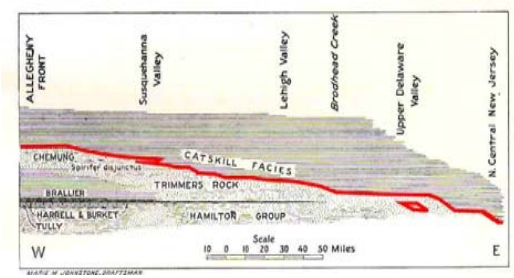
Although revision of Upper Devonian stratigraphy had already begun by the beginning of the 20th century, not until the 1930's did geologists fully understand that the Genesee, Portage, Chemung, and Catskill rocks of New York did not lie one above another in a stacked sequence but were inter-tonguing facies. Chief among the pioneers of the new paradigm were George H. Chadwick and G. Arthur Cooper in New York and Bradford Willard in Pennsylvania

CHADWICK proposed a radical division of the Catskill red beds into several chronostratigraphic units. Although his terminology was later abandoned, he produced the first geologic map showing individual Catskill formations and their marine equivalents in southeastern New York. He also drew attention to serious errors in I. C. White's Catskill stratigraphy, pointing out that it was "scrambled."



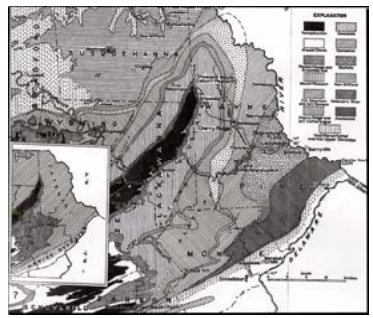
Chadwick's geologic map of southeastern New York (modified from Chadwick, 1936).

WILLARD (1939) lucidly documented the facies changes of Devonian rocks across Pennsylvania and the Upper Devonian lithologies involved in the Catskill offlap.



Schematic east-to-west cross section of the Catskill offlap (modified from Willard, 1939.

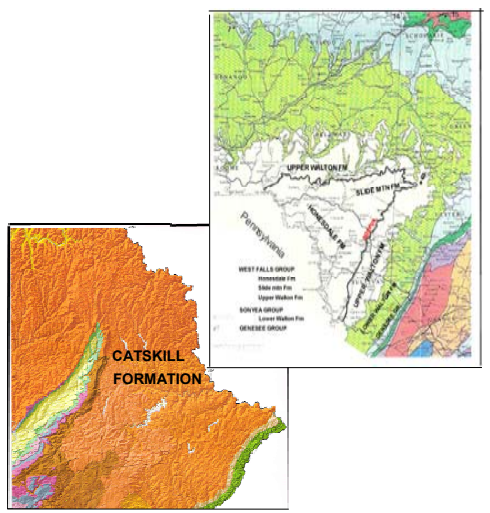
But in northeastern Pennsylvania, Willard adopted much of White's flawed stratigraphic column and terminology and, like White, pictured the subdivisions of the Catskill as discrete layers stacked up like pancakes. Willard further confused the geologic picture by constructing a geologic map that displays these (fictitious) units as concentric bands about the Lackawanna syncline.



Willard's geologic map of northeastern Pennsylvania (Willard, 1938).

The publication of STATE GEOLOGIC MAPS, in New York (Fisher and others, 1970) and Pennsylvania (Berg and others, 1980), brought forth two very different views of the Catskill sequence. The authors of the *Geologic Map of New York State* divided the Catskill facies into five time-rock units totaling over 3,500 feet and mapped these across of broad region of southeastern New York. The geologists of the Pennsylvania Geologic Survey, however, illustrated this series of rocks throughout northeastern Pennsylvania as a single, monochromatic formation.

Geologic map of southeastern New York (modified from Rogers and others, 1990).



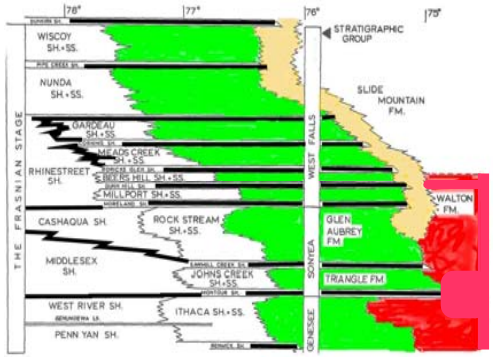
Geologic map of northeastern Pennsylvania (modified from Miles, 2003).

Middle and Upper Devonian Stratigraphy of the Upper Delaware River Valley

"The key to unraveling the complex facies that occur in this part of the Devonian has proven to be the tracing of the black or dark gray shale tongues that persist eastward across the major facies boundaries." L.V. Rickard, 1975

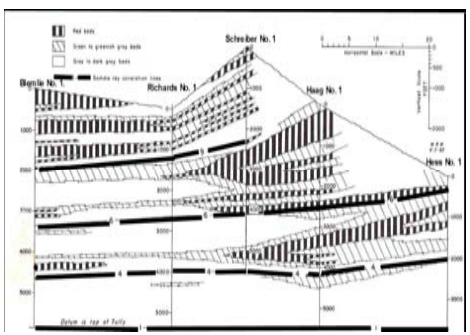
SUBDIVIDING THE CATSKILL FACIES

WALLACE DEWITT, JR. and GEORGE W. COLTON of the USGS and ROBERT G. SUTTON and his students at The University of Rochester demonstrated that the black and dark gray shale tongues split the Portage and Chemung (marine) facies of south-central New York and form the basis for the defining the principal rock units (groups)--the Genesee, Sonyea, and West Falls Groups of the Upper Devonian Frasnian Stage (see Rickard, 1975). Sutton (1963) traced dark gray shales of the Rhinestreet Formation eastward into the Walton Formation of the Catskill facies.



The Frasnian stratigraphic record of south-central New York (modified from Sutton and McGhee, 1983, after Rickard, 1975).

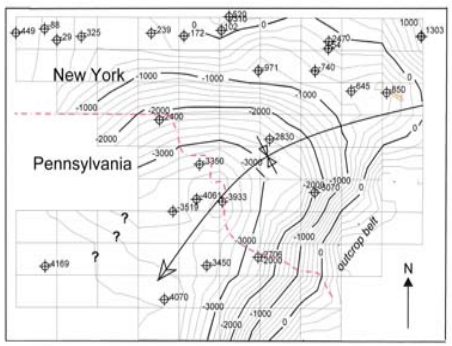
FRANK W. FLETCHER and DONALD L. WOODROW (1964, 1970, and 2002) identified dark gray shale tongues of the Middlesex and Rhinestreet Formations among Catskill strata in exploratory gas wells and in outcrop at several localities in northeastern Pennsylvania. WALTER R. WAGNER (1963) of the Pennsylvania Geologic Survey, employing lithic and gamma-neutron logs of five gas wells, traced dark shale horizons in the subsurface through the Catskill facies of northeastern Pennsylvania.



Stratigraphic relation of red beds to gamma ray correlation lines within the Catskill facies of northeastern Pennsylvania (modified from Wagner, 1963). See profile D-E of the index map.

A STRATIGRAPHIC FRAMEWORK FOR THE INTERPRETATION OF CATSKILL SEQUENCES AND PALEOENVIRONMENTS

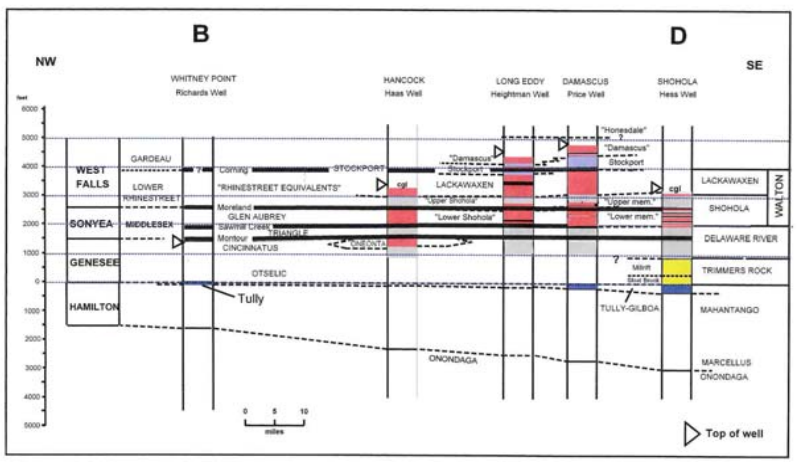
Employing well data from Rickard (1989), a structure contour map of the top of the Tully-Gilboa interval, shown below, was constructed for this study. The map illustrates a broad syncline underlying a large portion of southeastern New York and plunging toward the southwest into northeastern Pennsylvania. Further, it demonstrates that the regional strike of the Upper Devonian strata of Delaware County (N.Y.) and northern Wayne County (Pa.) is roughly east to west, fully perpendicular to the strike orientation indicated by Willard and displayed on his geologic map. Evidently, any structural influence that the Lackawanna syncline may have on the rocks of the region is largely local.



Computer-generated, contour map of the top of the Tully-Gilboa interval in southeastern N. Y. and northeastern Pa. (contours in feet).

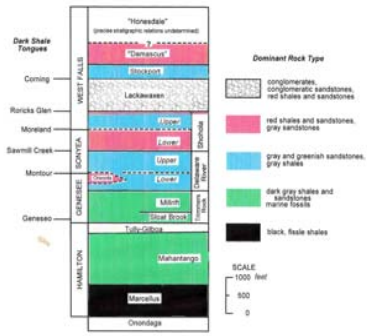
Index map to wells and profiles.

The current study of the Catskill facies in the upper Delaware River valley utilized subsurface information derived from a reexamination of lithic logs originally described by Fletcher (1964) and augmented by additional data from Fletcher and Woodrow (1970) and Rickard (1975, 1989). The cross section displayed below demonstrates that more than 5,000 feet of rock overlie the Tully-Gilboa in this region. The sequence includes strata belonging to the Genesee, Sonyea, and West Falls Groups.



Cross section from Whitney Point (Broome County), N. Y. to Shohola (Pike County), Pa. illustrating the stratigraphic intervals of the post-Tully (Late Devonian) sequence. Stratigraphic nomenclature for the rocks of the Shohola region is based on Fletcher and Woodrow, 1970), while the nomenclature of the Whitney Point rocks is after Rickard, 1975.

Dark gray shale tongues, representing members of the Geneseo, Middlesex, and Rhinestreet Formations, extend south-eastward from the Upper Devonian marine facies in Broome County, N. Y. and provide a basis for extending the Genesee, Sonyea, and West Falls Groups from south-central New York to eastern Pike County, Pennsylvania.



Stratigraphic column illustrating the Middle and Upper Devonian units of southeastern New York and northeastern Pennsylvania.

The Lackawaxen Formation represents the westward extension of the Slide Mountain Formation, which caps the highest peaks of the Catskill Mountains, and is the non-marine equivalent of the Rhinestreet shales. The Stockport Formation can be correlated with the Gardeau Formation, while the "Damascus" and "Honesdale" intervals are correlatives of the Nunda and Wiscoy Formations.

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Exhibit 3

This DRAFT Docket has been prepared for the purposes of the scheduled public hearing and may be substantially modified as a result of the public hearing process prior to Commission action.
2/9/2010

DOCKET NO. D-2009-18-1

DELAWARE RIVER BASIN COMMISSION

Special Protection Waters

Stone Energy Corporation, Matoushek 1 Well Site
Shale Gas Exploration and Development Project
Clinton Township, Wayne County, Pennsylvania

PROCEEDINGS

This docket is issued in response to an Application submitted to the Delaware River Basin Commission (DRBC or Commission) by Stone Energy Corporation (Stone) on February 13, 2009 for review and approval of a Marcellus Shale natural gas exploration and development project referred to as the Stone-Matoushek Site (Well Site or Well Pad) which contains a single vertical shale gas well referred to as the Matoushek 1 Well (M1) in Clinton Township, Wayne County, Pennsylvania. On March 14, 2008, the Pennsylvania Department of Environmental Protection (PADEP) Oil and Gas Management Program approved its oil and gas Well Permit for the well (Well Permit No. 37-127-20006-00).

The Application was reviewed for approval under Section 3.8 of the *Delaware River Basin Compact*. The Wayne County Planning Commission and Clinton Township have been notified of pending action on this docket. A public hearing on this project was held by the DRBC on February 24, 2010.

A. DESCRIPTION

1. Purpose. The purpose of this project is for the approval of natural gas exploration and development activities of the M1 well from the Marcellus Shale Formation.

2. Natural Gas Well Location. The existing M1 well is located at latitude 41° 41' 6.39" North and longitude 75 ° 21' 58.21" West on the north central portion of an approximate 116-acre parcel (Tax Map Parcel Number 06-1-0212-0016) in Clinton Township, Wayne County, Pennsylvania. The M1 well is situated in the central portion of an approximate 250 foot by 300 foot existing well pad constructed in an agricultural

field between Bethany Turnpike (SR 670) to the north, Johnson Creek Road to the west, and Creamton Drive (SR 247) to the east and the south in Clinton Township, Wayne County, Pennsylvania. The well site is located approximately 0.8 miles southwest of Red Schoolhouse Corner (the intersection of Bethany Turnpike and Creamton Drive).

The M1 well is located in the outcrop area of the Upper Devonian-age Catskill Formation in the Johnson Creek and West Branch Lackawaxen River watersheds in Clinton Township, Wayne County, Pennsylvania. The surficial material at the site is mapped as Wisconsin Till.

3. **Area Served.** This Docket applies to natural gas exploration and development activities only to the M1 well located on the Well Site. For the purpose of this docket, natural gas exploration and development activities include or are associated with: Well site and associated access road construction, air rotary/mud rotary natural gas well drilling, natural gas well construction and testing, support vehicle tire cleaning, dust control on access roads, storage of fresh water, hydraulic fracturing well stimulation, hydraulic fracturing chemical storage, flow-back water storage, transport and disposal of all domestic and non-domestic wastewaters and site reclamation on the well pad surrounding the M1 well. Any additional wells proposed at the M1 well site or any property leased by Stone requires separate DRBC docket approval.

4. **Definitions**.

Conductor casing- A short length of large-diameter pipe used to stabilize the upper portion of the borehole.

Domestic wastewater- Sanitary waste collected in portable self-contained toilets.

Drill cuttings- Rock cuttings and related mineral residues generated during the drilling of an oil or gas well.

Flowback- Return of fluids used in the stimulation process to the surface. While a large proportion of flowback returns to the surface shortly after hydraulically fracturing a well, flowback may return to the surface along with produced water over the production life of the well.

Natural gas exploration and development activities- All activities necessary for the development of and extraction of natural gas including but not limited to well pad and associated access road construction, air rotary/mud rotary natural gas well drilling, natural gas well construction and testing, support vehicle tire cleaning, dust control on access roads, storage of fresh water, hydraulic fracturing well stimulation, hydraulic fracturing chemical storage, flow-back water storage, transport and disposal of all domestic and non-domestic wastewaters, and site reclamation.

Non-Domestic wastewater- Brines, produced water, hydraulic fracturing flowback and any water containing brines, drilling muds, stimulation fluids, well servicing fluids, oil, production fluids or drilling fluids, and cement mixer or cement truck washout water.

Produced water- Water and other fluids brought to the surface during production of oil or gas.

Production casing- A string of pipe other than surface casing and coal protective casing which is run for the purpose of confining or conducting hydrocarbons and associated fluids from one or more producing horizons to the surface.

Surface casing- A string of pipe which extends from the surface and that segregates and protects fresh groundwater and stabilizes the hole.

Tophole water- Water that is brought to the surface while drilling through the strata containing fresh groundwater and water that is fresh groundwater or water that is from a body of surface water. Tophole water may contain drill cuttings typical of the formation being penetrated but is not polluted or contaminated by additives, brine, oil or man induced conditions.

Well site- The area occupied by the equipment or facilities necessary for or incidental to the drilling, production or plugging of a well.

5. Physical Features.

a. Site Description. The M1 well site is located in the Glaciated Low Plateau Section of the Appalachian Plateaus Physiographic Province. This area is characterized by rounded hills and valleys of low to moderate relief. The well pad is located in the northern portion of an open field with wooded areas to the north and west of the drilling site. Access to the drilling site is provided by an improved existing farm road located along the perimeter of the open area with an entrance to Creamton Road.

The drilling site is located on a crest of a low-relief ridge at an approximate elevation of 1,545 feet above mean sea level (MSL). Drainage at the drilling site slopes west toward Johnson Creek, located approximately 3,000 feet from the drilling site, and south toward an unnamed tributary of the West Branch Lackawaxen River, located approximately 1,400 feet from the drilling site. Slopes in the immediate area surrounding the drilling site range from approximately 2 to 4 percent. Based on U.S. Fish and Wildlife Service (FWS) National Wetlands Inventory database, the closest mapped wetlands are located at the headwaters of the unnamed tributary of West Branch Lackawaxen River, approximately ¼ mile east of the well location. The well location conforms to the setback limitations from existing buildings, water wells, streams, springs, bodies of water, and wetlands greater than 1 acre in size as required by Pennsylvania Oil and Gas Act Chapter 2 Section 601.205 *Well Location Restrictions*.

b. Well Pad and Well Description. The existing well pad is an approximate 250 foot by 300 foot level area containing an existing well and a lined fresh water impoundment. The perimeter of the well pad contains an earthen berm. The pad area and access roads were first stripped of topsoil to expose firm sub-base material. The topsoil has been stockpiled around the well pad. Coarse aggregate was used where additional stabilization was necessary. In order to control runoff and minimize soil erosion, a diversion swale was constructed on the upslope (north) side of the drilling pad and filter fabric fencing was used on the down-slope sides of the well pad. The docket holder indicated that design and construction of the drilling pad incorporated non-structural and structural best management practices (BMPs). BMP's utilized at the site included siting the well/disturbed area outside of sensitive and special value features and minimizing total disturbed area during clearing, grading, and grubbing. Structural BMP's included, silt fencing, road stabilization with geosynthetics and coarse aggregate, seeding and mulching, straw bail barriers, and temporary drains and swales. The Erosion and Sediment Control Plan was posted at the entrance of the site during well construction.

The M1 well is a vertical well drilled between May 9, 2008 and June 2, 2008 to a total depth of 8,350 feet below ground surface for the purpose of natural gas extraction. The well was air drilled from the ground surface to a depth just above the Marcellus Shale. The Marcellus Shale was cored with 3 % potassium chloride (KCl) water. Drilling muds were not used in the construction of the well. The deepest freshwater was encountered in the Devonian-age Catskill Formation at a depth of approximately 665 feet. Drill cuttings and fluids were captured in a lined drill pit excavated in the drilling pad in proximity to the well. Tanks were used to store tophole water during the drilling of the gas well. After drilling, the cuttings were solidified by mixing with cement and disposed of in the lined drill pit in accordance with PA Code § 78.61.

The M1 well log included as part of the Application indicates that the well was constructed in accordance with PADEP Chapter 78 Subchapter D regulations. The well contains a total of three (3) strings of nested casing (conductor casing, surface casing, and production casing). The conductor casing (13 3/8-inch diameter) was installed in a 17 ½ inch borehole and extends from the ground surface to a depth of 710 feet. The entire annular space was filled with cement. The surface casing (9 5/8-inch diameter) was placed in a 12 ¼-inch diameter borehole and extends from the ground surface to a depth of 1,964 feet. The entire length of the annular space was filled with cement. The surface casing was pressure tested to a maximum pressure of 1,500 pounds per square inch (psi) for 5 minutes. The purpose of the pressure test is to ensure the integrity of the cemented surface casing to effectively isolate fresh water bearing zones from the wellbore prior to drilling through deeper, non-fresh water or other fluid-bearing zones. The production casing (5 ½-inch diameter) was placed in an approximate 8-inch diameter borehole from the ground surface to a depth of 8,350 feet (bottom of the drilled well). The annular space was filled with cement from the production casing seat at 8,350 feet up to a depth of 5,500 feet.

The M1 well and well site were constructed in accordance with PA Chapter 78 and PADEP Permit No. 37-127-20006-00.

c. Access Roads. An improved existing farm road was used to access the well site containing M1. The improved access road is approximately 30 feet in width and 1,200 feet in length and stabilized with compacted crushed stone aggregate. Silt fencing was installed along the length of the road. The total acreage of the access road is approximately 0.8 acres.

d. Drill Cuttings and Water Containment/Disposal. During drilling, drilling fluids and cuttings were contained in a drill pit excavated and maintained in accordance with PA Chapter 78 Subchapter C. The water generated during drilling was removed from the drill pit and disposed of at Valley Joint Sewer Authority in Athens, PA. The drill cuttings were solidified and disposed of in the M1 Well drilling pit in accordance with the requirements of PA Chapter 78 Subchapter C.

e. Water Source/Water Storage Facility. The docket holder will only utilize water from the DRBC approved surface water withdrawal located on the West Branch Lackawaxen River (WBLR) to support the natural gas exploration and development project at the M1 well. The surface water withdrawal project (Docket No. D-2009-13-1) is being processed concurrently with the M1 Well docket. Fresh water used for site activities will be stored in a 0.8 million gallon capacity, lined, earthen impoundment constructed and maintained in accordance with PA Chapter 78.

f. Onsite Chemical Storage Facilities. All chemicals, fuels, lubricants, etc. required for natural gas exploration and development at the site will be properly stored on the well pad in accordance with the Preparedness Prevention and Contingency Plan (PPC Plan) as required by 25 PA Code Chapters 91.34 and 78.55.

g. Wastewater Containment, Sampling, Transport, Treatment and Disposal.

i. Non-Domestic Wastewater. Non-domestic wastewater shall be stored on site in a manner to prevent its release except in accordance with this docket. Approximately 6,200 barrels of non-domestic wastewater and top-hole water generated during the drilling of the well was removed from the drill pit via vacuum-truck and transported to a disposal facility. Stone informed the Commission that hydraulic fracturing flowback generated from additional work at the site shall be transferred to steel tanks for storage, reuse, or disposal. As such, the use of steel tanks for non-domestic wastewater storage is required at the M1 Well Site as stated in Condition No II.u. in the Decision Section of this docket. The docket holder is encouraged to reuse the flow-back water for well stimulation in accordance with Condition II.m. in the Decision section of this docket. Non-domestic wastewater that cannot be reused for well stimulation will be removed from the site via tanker truck and conveyed to treatment and disposal facilities approved by the DRBC (if in the DRB and subject to Commission approval) as

well as by the applicable state/Federal agency (if inside or outside of the DRB). No on-site discharge of such non-domestic wastewaters, other than as allowed in this docket is permitted.

ii. Domestic Wastewater. Domestic wastewater shall be stored on site in portable self-contained toilets and in a manner to prevent its release onsite. All domestic wastewater shall be conveyed to treatment and disposal facilities approved by the DRBC (if in the DRB and subject to Commission approval) as well as by the applicable state/Federal agency (if inside or outside of the DRB).

iii. Sampling and Record Keeping. Prior to removal from the M1 Well Site, all non-domestic wastewater shall be sampled and the results recorded in accordance with the Operation Plan required by Condition No. II.e. in the Decision section of this docket. Samples shall be representative of the non-domestic wastewater that shall be transported to the DRBC and State-approved off-site treatment and disposal facility. The chemical analysis of non-domestic wastewater must include the following: acidity, alkalinity (total as $CaCO_3$), aluminum, ammonia nitrogen, arsenic, barium, benzene, beryllium, biochemical oxygen demand, boron, bromide, cadmium, calcium, chemical oxygen demand, chlorides, chromium, cobalt, copper, ethylene glycol, gross alpha, gross beta, hardness (total as $CaCO_3$), iron-dissolved, iron-total, lead, lithium, magnesium, manganese, MBAS (surfactants), mercury, molybdenum, nickel, nitrite-nitrate nitrogen, oil & grease, pH, phenolics (total), radium-226, radium-228, selenium, silver, sodium, specific conductance, strontium, sulfates, thorium, toluene, total dissolved solids, total kjeldahl nitrogen, total suspended solids, uranium, and zinc. Domestic wastewater can be transported offsite without sampling; however, it may be subject to sampling at or by the treatment facility.

iv. Wastewater Treatment and Disposal. All wastewater, domestic and non- domestic shall be conveyed to the treatment facility designated in the M1 Well Site Operation Plan or as otherwise approved in writing by the DRBC Water Resource Branch Manager as well as by the applicable state/Federal agency (if inside or outside of the DRB).

h. Supporting Ancillary Facilities. The proposed ancillary facilities include Stone's WBLR surface water withdrawal point and the off-site wastewater treatment facilities that will accept the domestic and non-domestic wastewater. Additional facilities will be required to convey and process the natural gas from M1 Well Site including pipelines, compressor stations, separators/liquid storage tanks, etc, however, the locations of these facilities have not been specified.

i. Cost. The overall cost of this project is estimated to be $3,000,000.00.

B. FINDINGS

This docket is issued in response to an Application submitted to the Delaware River Basin Commission (DRBC or Commission) by Stone Energy Corporation (Stone) for review and approval of a natural gas exploration and development project at its M1 Well site in Clinton Township, Wayne County, Pennsylvania. The Commission recognizes that each natural gas well also will be subject to the review of the environmental agency of a signatory state in which the project is located. The Commission staff coordinates with and, where feasible, will utilize the review process and approvals of the applicable state or federal agency to minimize duplication of effort and redundant requirements imposed on project sponsors.

On June 6, 2008 the Executive Director of the DRBC issued a determination to Stone by certified letter that natural gas exploration and development at the M1 Well site may have substantial impacts on the water resources of the Delaware River Basin (DRB). As such, the DRBC requested that an Application for the M1 Well Site be submitted to the Commission for review and approval.

Stone drilled and cased the M1 well without Commission approval. On December 10, 2008, a settlement agreement between Stone and the Commission required Stone to submit an application to the DRBC for review and approval of the well and to pay a fine as specified in the settlement agreement.

On February 13, 2009, Stone submitted an application to the Commission for approval of the M1 Well. Additional information pertaining to the Application was submitted to the Commission on June 11, 2009.

On May 19, 2009, the Executive Director issued the "*Determination of the Executive Director Concerning Natural Gas Extraction Activities In Shale Formations Within The Drainage Area of Special Protection Waters*" that clarified which natural gas related activities require Commission review and approval (EDD).

SPECIAL PROTECTION WATERS

The project is located in the area of the Delaware River Basin that is designated by the Commission as Special Protection Waters (SPW) as set forth in the DRBC *Water Quality Regulations* (WQR). The SPW designation and associated regulations are designed to protect waters with exceptional value including without limitations existing high water quality in applicable areas of the Delaware River Basin. Article 3.10.3A.2.e.1). and 2). of the *WQR, Administrative Manual - Part III*, requires that projects subject to review under Section 3.8 of the Compact that are located in the drainage area of Special Protection Waters must submit for approval a Non-Point Source Pollution Control Plan (NPSPCP) that controls the new or increased non-point source loads generated within the portion of the docket holder's service area which is also located within the drainage area of Special Protection Waters.

The M1 Well Site is located within the drainage area to SPW. Therefore, the NPSPCP plan requirement is applicable to this project. This project includes the constructed well pad (completed), well drilling (completed), and well stimulation through hydraulic fracturing. Water necessary for the well stimulation at the M1 Well Site is being processed concurrently with this docket (Docket No. D-2009-013-1). The docket holder submitted a general NPSPCP with the Application. However, no additional site construction activities, well stimulation, or water staging approved by this docket shall take place at the M1 Well Site until a site specific NPSPCP including measures to control stormwater both during and post construction on the site has been submitted to the Commission and approved by the Executive Director and any other necessary federal, state, and local authorizations have been issued.

WATER STORAGE

Water brought to the M1 Well Site from the Commission-approved West Branch Lackawaxen River site will be stored in a lined impoundment constructed and maintained in accordance with PADEP Chapter 78. Under no circumstances shall any material other than surface water originating from a Commission-approved source or precipitation be stored or be allowed to enter the impoundment. If water in this storage facility or the storage facility comes into contact with hydraulic fracturing chemicals, flow back water, or other chemicals and contaminants, all water in the storage facility shall be considered non-domestic wastewater and handled as discussed below.

Unused water from any of the docket holder's Commission approved M1 well natural gas development and extraction site activities in the DRB may be transported to and used at other Commission-approved well pads targeting shale formations controlled by the docket holder in the DRB, with the written approval of the Executive Director. Such transfers shall also be reported to the Commission.

No water, fracturing fluids, flowback water, or otherwise (e.g. cement mixer wash-out, truck wash water, etc.) shall be discharged to waters of the DRB except in accordance with written approvals from the Executive Director and/or the appropriate state agency (Condition II.g. in the Decision section of this docket).

WELL STIMULATION

The docket holder has indicated that the vertical Marcellus shale gas well at the M1 Well Site will be stimulated for production through slick-water hydraulic fracturing. The docket holder has advised the Commission that the well stimulation will involve the injection of approximately 1.0 million gallons (mg) of water with propping agents (i.e. sand of various grain sizes) and hydraulic fracturing additives through the steel production casing into the Marcellus Shale formation underlying the lease holding(s) at approximately 8,200 feet below land surface (elevation 6,655 feet below mean sea level).

The injection will occur at the M1 Well over a period of approximately three days at injection pressures from 5,500 pounds per square inch (psi) to 7,000 psi. Injection of the hydraulic fracturing additives and solutions detailed in the Application into the target formation is acceptable to the Commission as the M1 well was installed by the docket holder in accordance with PA Chapter 78 Subsection D, and approved by the PADEP in Permit No. 37-127-20006-00.

WASTEWATER

Flowback Water

Following well stimulation, Stone estimates that approximately 30% of the estimated 1.0 million gallons of water used for hydraulic fracturing will be returned to the surface as flowback. Flowback from the M1 Well will be piped from the wellhead directly into steel frac tanks for temporary storage on the M1 Well Site, in accordance with Condition II.u. in the Decision Section of this docket.

Treatment and Reuse of On-site Generated Wastewaters

Treatment and reuse of onsite generated non-domestic wastewaters is not proposed at this site. However, the docket holder is encouraged to use the flowback water for well stimulation in accordance with Condition II.m. in the Decision section of this docket.

Recovered fracturing fluids may be recycled for use in natural gas well stimulation activities at the docket holder's Commission-approved natural gas well pads in the DRB with written approval of the Executive Director. Any reuse shall also be reported to the Commission in accordance with the reporting requirements in the Decision Section of this docket. Otherwise, no recovered fracturing fluids shall be used for any purpose other than hydraulic fracturing at natural gas wells targeting shale formations.

Wastewater Disposal

The docket holder has indicated that all non-domestic wastewater including flowback water will be removed from the site via tanker truck and conveyed to treatment and disposal facilities located outside of the DRB. Such disposal is an exportation of wastewater subject to review and approval under Article 2.3 of the Commission's Water Code. Currently, there are no wastewater treatment and disposal facilities within the DRB that are approved to accept these non-domestic wastewaters. In addition docket Condition No. II.m. in the Decision section of this docket requires the docket holder to implement a continuous program to encourage water conservation in all types of use within the facilities served by this docket including the reuse and recycling of flowback waters. The Decision section of this docket also contains conditions concerning the offsite disposal location and the tracking and reporting of non-domestic wastewaters transported from the project site. Therefore, the Commission staff recommends approval of the proposed exportation of non-domestic wastewater. No on-site discharge of such non-domestic wastewaters, other than as allowed in this docket is permitted. Any such

discharge shall be reported to the Project Review Section of the DRBC in accordance with Condition No. II.q. in the Decision Section of this docket.

The docket holder has indicated that domestic wastewater shall be collected in portable, self-contained toilets. When necessary, the toilets will be transported to the sewage treatment facility approved in the Operation Plan (described below). No on-site discharge of such domestic wastewaters is permitted.

The project is designed to conform to the requirements of the *Water Code* and *Water Quality Regulations* of the DRBC.

The natural gas well associated with this project was designed and constructed to conform to the casing and cementing requirements of Sections 78.81-.87 of the PADEP Oil and Gas Regulations. It has been determined by the Commission that these casing and cementing requirements satisfy the Basinwide Groundwater Requirements located in Section 3.40 of the Commission's Water Quality Regulations. These casing construction requirements are designed to sufficiently protect the designated uses of the ground waters of the Delaware River Basin.

The cuttings generated during drilling of the M1 well were solidified and buried in a lined pit on-site in accordance with PA Chapter 78 regulations. Non-domestic wastewater generated during drilling of the M1 well was removed from the site and disposed of at Valley Joint Sewer Authority in Athens, PA.

The DRBC estimates that the well stimulation through hydraulic fracturing, results in a consumptive water use of 100 percent of the total water used. The DRBC definition of consumptive use is defined in Article 5.5.1.D of the *Administrative Manual – Part III – Basin Regulations – Water Supply Charges.*

M1 WELL SITE OPERATION PLAN

In accordance with Condition II.e. of the Decision section of the docket, at least 45 days prior to the scheduled initiation of any activity at the M1 Well Site, the docket holder shall submit an Operation Plan (OP) for the M1 Well Site to the Executive Director. The OP shall include the specifics of the site operations, detailing at a minimum, the procedures necessary to comply with the conditions in the Decision section of this docket. In accordance with Condition II.e., no additional construction or natural gas development and extraction activities at the M1 Well Site is permitted until the OP is approved in writing by the Executive Director. The following shall also be included in the M1 Well Site Operations Plan:

Pre-Alteration Groundwater Quality Survey Plan. Prior to initiation of hydraulic fracturing at the M1 Well, the docket holder will submit a pre-hydraulic fracturing groundwater quality survey plan, receive Executive Director approval, and conduct the groundwater quality survey. The plan shall include an inventory and the locations of any

artificial penetrations including groundwater wells within a 1,000 ft radius of the project well. If no existing wells are identified within this distance, the search radius should be extended up to 2,000 feet from the gas well. The plan shall indicate the proposed sampling procedures to be conducted at a representative number of identified wells spaced around the proposed natural gas well. Prior to hydraulic fracturing at the M1 Well, water samples shall be collected and the samples submitted to a PADEP-certified laboratory for analysis of the following parameters: acidity, alkalinity (total as CaCO3), aluminum, ammonia nitrogen, arsenic, barium, benzene, beryllium, boron, bromide, cadmium, calcium, chlorides, chromium, cobalt, copper, ethylene glycol, gross alpha, gross beta, hardness (total as CaCO3), iron-dissolved, iron-total, lead, lithium, magnesium, manganese, MBAS (surfactants), mercury, molybdenum, nickel, nitrite-nitrate nitrogen, oil & grease, pH, phenolics (total), radium-226, radium-228, selenium, silver, sodium, specific conductance, strontium, sulfates, thorium, toluene, total dissolved solids, total kjeldahl nitrogen, total suspended solids, uranium, and zinc.

Wastewater Storage and Handling Details. The OP shall include the details of how domestic and non-domestic wastewater will be stored and handled on the project site.

Wastewater Disposal Locations. The OP shall include a list of the treatment sites where these domestic and non-domestic wastewaters will be disposed. The facility locations, state permit numbers, and acceptance agreements shall be included in the OP.

Measuring, Recording, and Records Maintenance System. The docket holder shall develop and submit with the OP a measuring, recording, and records maintenance system. The measuring, recording, and records maintenance system will include the proposed means with which to measure and record the amount of all water transported to the site by truck or any other means, the amount of water used at the site, the amount of water and fracturing fluids/ chemicals used in the natural gas well stimulation process, the amount of flowback recovered after stimulation, the amount and chemical composition of non-domestic wastewaters produced and stored at the site, and the amount and chemical composition of non-domestic wastewaters transported off-site for treatment and disposal. The method of sampling and analysis of non-domestic wastewater shall also be detailed in this plan. Measuring and record keeping activities shall be required for all non-domestic wastewater including produced water and flowback separated from the natural gas during the operational life of the natural gas well. The system will also record the truck number, license plate number and disposal location for each truck load of non-domestic wastewater transported off site.

Reporting System. The docket holder shall include in the OP the method for complying with the reporting requirements in accordance with docket conditions II.k. and II.l. in the decision section of the docket.

Preparedness Prevention and Contingency Plan (PPC Plan). The docket holder shall submit with the OP the PPC Plan that is required for Oil & Gas Wells as outlined in 25 PA Code Chapters 91.34 and 78.55.

The project does not conflict with the Comprehensive Plan and is designed to prevent substantial adverse impact on the water resources related environment, while sustaining the current and future water uses and development of the water resources of the Basin.

C. DECISION

I. Effective on the approval date for Docket No. D-2009-18-1 the project and the appurtenant facilities described in the Section A "Description" shall be added to the Natural Gas Database maintained by the DRBC.

II. The project and appurtenant facilities as described in the Section A "Description" are approved pursuant to Section 3.8 of the *Compact*, subject to the following conditions:

a. Docket approval is subject to all conditions, requirements, and limitations imposed by the PADEP in Well Drilling Permit No. 37-127-20006-00, and such conditions, requirements, and limitations are incorporated herein, unless they are less stringent than the Commission's.

b. The lease holding, well pad site, and natural gas well, and operational records shall be available at all times for inspection by the DRBC.

c. The docket holder shall submit a Non-Point Source Pollution Control Plan (NPSPCP) for the M1 Well Site in accordance with Section 3.10.3.A.2.e, of the DRBC Water Quality Regulations to the Executive Director of the DRBC at least 45 working days prior to the scheduled initiation of any additional site clearing or construction at the well pad site. The NPSPCP and erosion and sedimentation control plan shall be designed in accordance with the more stringent of Commission and PADEP requirements. Prior to commencing any site clearing or construction work at the M1 Well Site, the docket holder shall obtain Executive Director's written approval for the NPSPCP, as well as, any other necessary federal, state, and local authorizations. The NPSPCP shall describe erosion and sedimentation controls to be implemented at the site and shall include measures to control stormwater both during and post construction. The post-construction portion of the plan shall describe the final site conditions including a pre- and post-construction project hydrograph analysis, permanent facilities, equipment, access roads, and all sediment and erosion and stormwater control structures necessary after final site restoration has been achieved.

d. Sound practices of excavation, backfill and reseeding shall be followed at the well pad site and any associated appurtenances to minimize erosion and prevent non-point source pollutants from leaving the site. The docket holder shall abide by all state and local erosion and sediment control and storm water management control legislation.

e. **M1 WELL SITE OPERATION PLAN (OP).** As described in the Findings section of this docket, the docket holder shall submit the OP for approval in writing by the Executive Director. No activities other than those required to maintain or correct existing erosion and sedimentation controls shall be conducted at the M1 Well Site until the OP plan has been approved. The OP plan shall include the following:

i. Pre-alteration groundwater quality survey plan.

ii. Wastewater storage and handling details.

iii. Wastewater disposal locations.

iv. Measuring, Recording, and Records Maintenance System.

v. Reporting system.

vi. Preparedness Prevention and Contingency Plan (PPC Plan).

f. The docket holder shall demonstrate to the satisfaction of the Commission that all surface waters that are withdrawn for the purposes of hydraulic fracturing this well including, but not limited to flow-back fluids, produced brines, and drilling fluids have been treated and disposed of in accordance with applicable state and federal law.

g. No unused water withdrawn from the source approved for use at this well site, fresh or otherwise shall be discharged to waters of the DRB without the written approval of the DRBC and the appropriate state agency. All domestic and non-domestic wastewaters shall be treated at an approved treatment and discharge facility as provided for in the OP in Condition II.e. above.

h. Nothing herein shall be construed to exempt the docket holder from obtaining all necessary permits and/or approvals from other State, Federal or local government agencies having jurisdiction over this project or activities conducted under this project.

i. Upon completion of construction of the approved project, the docket holder shall submit a statement to the DRBC, signed by the docket holder's engineer or other responsible agent, advising the Commission that the construction has been completed in compliance with the approved plans, giving the final construction cost of the approved project and the date the project is placed in operation.

j. This docket approval shall expire three years from date below unless prior thereto the docket holder has commenced operation of the subject project or has expended substantial funds (in relation to the cost of the project) in reliance upon this docket approval.

k. The project natural gas well hydraulic fracturing volume and flow-back discharge volume shall be metered with an automatic continuous recording device

or equivalent that measures to within 5 percent of actual flow. An exception to the 5 percent performance standard, but no greater than 10 percent, may be granted if maintenance of the 5 percent performance is not technically feasible or economically practicable. A record of hydraulic fracturing stimulation volume and flow-back discharge volume from the project natural gas well shall be maintained, and monthly totals shall be reported to the DRBC after completion of natural gas well stimulation activities and shall be available at any time to the Commission if requested by the Executive Director.

l. The volume of all non-domestic wastewaters removed from the M1 Well Site shall be recorded and maintained and monthly totals shall be reported to the DRBC in accordance with the approved OP.

m. The docket holder shall implement to the satisfaction of the Commission, the continuous program to encourage water conservation in all types of use within the facilities served by this docket approval. This includes the reuse and recycling of flow-back waters to the greatest extent possible at the site. The docket holder will report to the Commission on the actions taken pursuant to this program and the impact of those actions as requested by the Commission.

n. No brines, flowback, produced waters or any other waste shall be used for any well, well pad site, or lease area not contained within this docket unless approved in writing by the Executive Director.

o. A complete application for the renewal of this docket, or a notice of intent to cease the operations (withdrawal, discharge, etc.) approved by this docket by the expiration date, must be submitted to the DRBC at least 12 months prior to the expiration date below (unless permission has been granted by the DRBC for submission at a later date), using the appropriate DRBC application form. In the event that a timely and complete application for renewal has been submitted and the DRBC is unable, through no fault of the docket holder, to reissue the docket before the expiration date below, the terms and conditions of this docket will remain fully effective and enforceable against the docket holder pending the grant or denial of the application for docket approval.

p. The issuance of this docket approval shall not create any private or proprietary rights in the water of the Basin, and the Commission reserves the rights to amend, alter or rescind any actions taken hereunder in order to insure the proper control, use and management of the water resources of the Basin.

q. The docket holder shall report to the Commission Project Review Section Supervisor any violation of the docket conditions within 48-hours of the occurrence or upon the docket holder becoming aware of the violation. In addition, the docket holder shall report in writing any violations of the approved operations plan or any other docket conditions to the DRBC Project Review Section Supervisor within three days of reporting the incident. The docket holder shall also provide a written explanation of the causes of the violation within 30 days of the violation and shall set forth the

action(s) the docket holder has taken to correct the violation and protect against a future violation.

r. If the monitoring required herein, or any other data or information demonstrates that the operation of this project significantly affects or interferes with any designated uses of ground or surface water, or if the docket holder receives a complaint regarding this project, the docket holder shall immediately notify the Executive Director of any complaints and unless excused by the Executive Director, shall investigate such complaints. The docket holder shall direct phone call notifications of complaints involving water resources to the DRBC Project Review Section at 609-883-9500, extension 216. Oral notification must always be followed up in writing directed to the Executive Director. In addition, the docket holder shall provide written notification to all potentially impacted users of wells or surface water users of the docket holder's responsibilities under this condition. Any ground or surface water user which is substantially adversely affected, rendered dry or otherwise diminished as a result of the docket holder's project withdrawal, shall be repaired, replaced or otherwise mitigated at the expense of the docket holder. A report of investigation and/or mitigation plan prepared by a hydrologist shall be submitted to the Executive Director as soon as practicable or within the time frame directed by the Executive Director. The Executive Director shall make the final determination regarding the validity of such complaints, the scope or sufficiency of such investigations, and the extent of appropriate mitigation measures, if required.

s. The Executive Director may modify or suspend this approval or any condition thereof, or require mitigating measures pending additional review, if in the Executive Director's judgment such modification or suspension is required to protect the water resources of the Basin.

t. For the duration of any drought emergency declared by either Pennsylvania or the Commission, water service or use by the docket holder pursuant to this approval shall be subject to the prohibition of those nonessential uses specified by the Governor of Pennsylvania, the Pennsylvania Emergency Management Council, PADEP, or the Commonwealth Drought Coordinator to the extent that they may be applicable, and to any other emergency resolutions or orders adopted hereafter by the Commission.

u. All non-domestic wastewaters including, but not limited to, brines, flow-back water, produced waters, etc. must be temporarily stored on-site in steel, water-tight tanks at a minimum unless the docket holder has received written approval from the Executive Director to use an alternative method of storage. All wastewaters will be removed from the site in accordance with the approved OP.

v. The Commission has determined that the review of the reports and requests for modifications and approvals developed under the above docket and any amendments or changes thereto will continue to cause the Commission to expend exceptional efforts and costs. As such, Commission staff will continue to maintain a record of all time and expenses associated with the post-docket approval reviews of the project and associated deliverables. A fee in the amount of 100% of these costs will be

assessed on a quarterly basis. In the event of a docket amendment or renewal, the larger of actual project review costs or the calculated project review fee will be charged.

w. The docket holder and any other person aggrieved by a reviewable action or decision taken by the Executive Director or Commission pursuant to this docket may seek an administrative hearing pursuant to Articles 5 and 6 of the Commission's *Rules of Practice and Procedure,* and after exhausting all administrative remedies may seek judicial review pursuant to Article 6, section 2.6.10 of the *Rules of Practice and Procedure* and section 15.1(p) of the Commission's *Compac*t.

BY THE COMMISSION

APPROVAL DATE: , 2010

EXPIRATION DATE: , 2020

Exhibit 4

COPY

5500-FM-OG0001A Rev. 11/2007

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

WELL PERMIT

DEP USE ONLY	
Permittee's eFACTS ID: 277879	Auth ID: 830957
Watershed Name: Hollister Creek	Quality HQ:

Permittee	OGO.#	Permit Number	Date Issued
NEWFIELD APPALACHIA PA LLC	OGO-67425	37-127-20017-00	05/27/2010

Address	Farm Name & Well Number	Well Serial #
363 N SAN HOUSTON PKWY E	WOODLAND MGMT PARTNERS 1 1	
SUITE 2020	Municipality: Damascus / County: Wayne	
HOUSTON, TX 77060-2424	7½' Quadrangle Name: Callicoon / Map Section #: 7	
Phone: (281) 847-6031 / Project #:	Latitude: 41-45-57.2000 / Longitude: -75-6-33.8000	
Surf Elev at Site: 1193 feet / Anticipated Total Depth: 8350 feet / Well Type: GS	Offset distances referenced to NE corner of map section. South 9393 feet West 7108 feet	

This permit covering the well operator and well location shown above is evidence of permission granted to conduct activities in accordance with the Oil and Gas Act and the Oil and Gas Conservation Law, if the well is subject to that act and any rules and regulations promulgated thereunder, subject to the conditions contained herein and in accordance with the application submitted for this permit. This permit does not convey any property rights.

This permit and the permittee's authority to conduct the activities authorized by this permit are conditioned upon operator's compliance with applicable law and regulations.

Notification must be given to the district oil and gas inspector, the surface landowner and political subdivision of the date well drilling will begin at least 24 hours prior to commencement of drilling activities.

The permittee hereby authorizes and consents to allow, without delay, employees or agents of the Department to have access to and to inspect all areas upon presentation of appropriate credentials, without advance notice or a search warrant. This includes any property, facility, operation or activity governed by the Oil and Gas Act, the Oil and Gas Conservation Law, the Coal and Gas Resource Coordination Act and other statutes applicable to oil and gas activities administered by the Department. The authorization and consent shall include consent to the Department to collect samples of wastewaters or gases, to take photographs, to perform measurements, surveys, and other tests, to inspect any monitoring equipment, to inspect the methods of operation and disposal, and to inspect and copy documents required by the Department to be maintained. The authorization and consent includes consent to the Department to examine books, papers, and records pertinent to any matter under investigation pursuant to the Oil and Gas Act or pertinent to a determination of whether the operator is in compliance with the above referenced statutes. This condition in no way limits any other powers granted to the Department under the Oil and Gas Act and other statutes, rules and regulations applicable to these activities as administered by the Department.

This permit does not relieve the operator from the obligation to comply with the Clean Streams Law and all statutes, rules and regulations administered by the Department.

Special Permit Conditions:

This permit expires 05/27/2011 unless drilling is commenced on or before that date and prosecuted with due diligence.

S. Craig Lobb
Regional Oil and Gas Program Manager

Stephen Watson
Oil & Gas Inspector

2 Public Square
Wilkes-Barre, PA 18711-0790

570-826-2320
Telephone

5500-PM-OG0001 Rev. 10/2009

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL & GAS MANAGEMENT PROGRAM

DEP USE ONLY	
AUTH #	CNC
Check # 1064287	Amount $ 1500

1250
200
50
$1500

PERMIT APPLICATION FOR DRILLING OR ALTERING A WELL

DEP USE ONLY			
Notes	OGO # 67425	Objection Date - Do not issue before:	Well Permit # 127-20017
	Bond # 12382	5/3/10	Special Cond. A B C D E F
	C: 4/13/10 nms 5/3/10 JC	Date Approved:	Watershed Name: Hollister Creek
	INV: 5-27-10	5/11/10 Kath	Designation: (HQ) EV

Please read instructions before you begin filling in this form.

Applicant (Operator) Name	DEP Client ID#	Phone	FAX	Check if new address.
Newfield Appalachia PA LLC	277879	281-847-6031	281-847-6160	☐
Mailing Address (Street or PO Box)	**City**	**State**	**Zip +4**	**Country (if not USA)**
363 N. Sam Houston Pkwy E. Suite 2020	Houston	TX	77060-2424	

(Well) Farm Name	Well #	Serial #
Woodland Management Partners	1-1	

County	Municipality	Project # (from DEP)
WAYNE	DAMASCUS	

If you are applying for a permit to redrill, drill deeper, or alter a well that was previously permitted or registered, *or for a well site that was previously permitted but not drilled*, check this box ☐ and enter the permit or registration number here:

If applying for a permit to rework an existing well not registered or permitted, check this box ☐ and enter date drilled, if known: _____ (see instructions)

PNDI Attached: ☒ Any "hit" must include accepted mitigation plan from applicable agency.

PERMIT TYPE Check applicable.
Application is to:
- ☒ Drill a new well
- ☐ Deepen a well
- ☐ Redrill a well
- ☐ Alter a well
- ☐ E&S Control Module
- ☐ Other (specify)

TYPE OF WELL Check one.
- ☐ Gas
- ☐ Oil
- ☐ Comb. (gas & oil)
- ☐ Injection, recovery
- ☐ Injection, disposal
- ☐ Coalbed Methane
- ☐ Gas Storage
- ☒ Other (specify)

vertical test well

APPLICATION FEE Check applicable.
- ☐ Marcellus Well: Non-Vertical
- ☐ Marcellus Well: Vertical
- ☐ Non-Marcellus Well: Non-Vertical
- ☒ Non-Marcellus Well: Vertical
- ☐ $200 (Home Use Well)
- ☐ $500 E&S Fee
- ☐ $ 0 (Rehab orphan)
- ☒ Vertical: Length 8350 ft.
- ☐ Marcellus: Length _____ ft.
- ☐ Non-Vertical: Length _____ ft.

Total Application Fee $ 1500

COORDINATION WITH REGULATIONS AND OTHER PERMITS	Yes	No
1. Will the well be subject to the Oil and Gas Conservation Law? If "No," go to 2).	☒	☐
a. If "Yes" to #1, is the well at least 330 feet from outside lease or unit boundary?	☒	☐
b. Does the location fall within an area covered by a spacing order?	☐	☒
2. Will the well penetrate a workable coal seam? If "No," include justification and supporting documentation.	☐	☒
3. If the well will penetrate a workable coal seam, and the well is a "non-conservation" gas well, does the location comply with the distance requirements of Section 7 of the Coal and Gas Resource Coordination Act? (At least 1,000 feet from all existing wells).	☐	☐
a. If "No," is the required exception request attached? (Check here if re-working an existing well: ☐ N/A)	☐	☐
4. Will the well be drilled at a location where the coal has been removed?	☐	☒
5. Will the well be drilled through an active (operating or projected) coalmine, or within 1,000 feet of the boundary?	☐	☒
a. If "Yes," print the names of: Mine: _____ Operator: _____		
6. Will the well penetrate or be within 2,000 feet of an active gas storage reservoir boundary?	☐	☒
a. If Yes, print the names of: Storage Field: _____ Operator: _____		
7. Is the proposed well location within the permitted area of a landfill?	☐	☒
8. Will the well site be within 100 feet (measured horizontally) of a stream, spring or body of water identified on the most current 7½' topographic map?	☐	☒
a. If "Yes," is a request for a waiver (form 5500-FM-OG0057), and E&S control plan attached?	☐	☐
9. Will the well site be within 100 feet of a wetland or in a wetland?	☐	☒
a. Is the well site within 100 feet of a wetland greater than one acre in size?	☐	☐
If yes, is a waiver request (form 5500-FM-OG0057) and E&S control plan attached?	☐	☐
10. Will the well be drilled within 200 feet (horizontally) from any existing building or an existing water supply?	☐	☒
a. If "Yes," is written consent from the owner attached?	☐	☐
b. If written consent is not attached, is a variance request (form 5500-FM-OG0058) attached?	☐	☐

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NORTHWEST REGIONAL OFFICE

	Yes	No
11. Will the well be located where it may impact a public resource as outlined in the "Coordination of a Well Location with Public Resources" form 5500-PM-OG0076? If yes, attach a completed copy of the form.	☐	☒
12. Is the well site in a Special Protection High Quality (HQ) or Exceptional Value (EV) watershed?	☒	☐
13. Is this well part of a development where you need an Earth Disturbance Permit for Oil and Gas Activities disturbing more than 5 acres? If yes, attach a completed Erosion Sediment and Stormwater Control Module or list the number and date of the ESCGP-1 Approval. _____	☐	☒

DEP USE ONLY
Date Stamps/Notes
Auth 830957
Site 733315
Clnt 277879
APS 717958
Acct 676721
PF 729777
SF 1012951

Signature of Applicant The person signing this form attests that they have the authority to submit this application on behalf of the applicant, and that the information, including all related submissions, is true and accurate to the best of their knowledge.

Signature of Person Authorized to Submit Application	(Print or Type)	Name of Signer: DONALD F. SLEETH Title: Drilling Manager	Date 4-6-10
Donald F. Sleeth			

Application Preparer/Contact: BETSY COLLINS Phone: 412-921-8250

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL & GAS MANAGEMENT PROGRAM

Farm Name - Well #	
Woodland Management Partners-Well #1-1	
Applicant Name	DEP ID#
Newfield Appalachia PA LLC	277879
DEP USE ONLY	APS #

PERMIT APPLICATION FOR DRILLING OR ALTERING A WELL

Page 2 --- Record of Notification / Written Consent

List the following: surface landowner; all landowners or water purveyors whose water supplies are within 1,000 feet of this proposed well location; gas storage operator if within 2000 feet; all coal owners and lessees of all underlying workable coal seams; operators of underground coal mines at the proposed location; and coal operators with a deep mine within 1,000 feet. Mark the boxes, "X," which show the parties' interests. Use additional forms if you need more space. You are required to notify each of these parties.		Surface Landowner	Coal Owner	Coal Lessee	Coal Mine Operator	Gas Storage Operator	Within 1,000 feet: Surf Owner with Water	Within 1,000 feet: Water Purveyor	Within 1,000 feet: Coal Mine Operator	Notification: Certified Mail Dates: Sent	Notification: Certified Mail Dates: Return Receipt	Notification: Address Affidavit	Notification: Written Consent
Name: Donald and Marie Hartnett	Address: 841A Calicoon Rd. Damascus, PA 18415-3514						X			3/25/10	3/29/10		
Name: Woodland Management Partners	Address: 308 Egypt Rd. Tafton, PA 18464	X											X
Name: Alfred Cimino	Address: 124 Monroe St, Apt. 1 Archibald, PA 18403-1818						X			3/25/10	4/1/10		
Name: Leon N Clouse, Sr.	Address: PO Box 241 Stanhope, NJ 07874-0241						X						X
Name:	Address:												
Name:	Address:												
Name:	Address:												

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NORTHWEST REGIONAL OFFICE

Optional: Signature below indicates the party's approval of the well location, and waives the 15-day objection period. Check applicable box.

☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
Surface Landowner at proposed location	Date	Coal Operator within 1,000 feet of proposed location	Date
Surface Landowner at proposed location	Date	Gas Storage Operator within 2,000 feet	Date

Signature below indicates written consent. Check applicable box.

Owner of: ☑ water supply, or ☐ building within 200 feet	Date: 3/6/10
Address (of above): Leon N Clouse	
Owner of: ☐ water supply, or ☐ building within 200 feet	Date
Address (of above)	

4-27-2010

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL & GAS MANAGEMENT PROGRAM

Farm Name - Well #	
Woodland Management Partners-Well #1-1	
Applicant Name	DEP ID#
Newfield Appalachia PA LLC	277879
DEP USE ONLY	APS #

PERMIT APPLICATION FOR DRILLING OR ALTERING A WELL

Page 2 — Record of Notification / Written Consent

List the following: surface landowner; all landowners or water purveyors whose water supplies are within 1,000 feet of this proposed well location; gas storage operator if within 2000 feet; all coal owners and lessees of all underlying workable coal seams; operators of underground coal mines at the proposed location; and coal operators with a deep mine within 1,000 feet. Mark the boxes, "X," which show the parties' interests. Use additional forms if you need more space. You are required to notify each of these parties.

		Surface Landowner	Coal Owner	Coal Lessee	Coal Mine Operator	Gas Storage Operator	Within 1,000 feet: Surf Owner with Water	Within 1,000 feet: Water Purveyor	Within 1,000 feet: Coal Mine Operator	Notification: Certified Mail Dates: Sent	Notification: Certified Mail Dates: Return Receipt	Notification: Address Affidavit	Notification: Written Consent
Name: Donald and Marie Hartnett	Address: 841A Calicoon Rd. Damascus, PA 18415-3514						X			3/25/10	3/29/10		
Name: Woodland Management Partners	Address: 308 Egypt Rd. Tafton, PA 18464	X											X
Name: Alfred Cimino	Address: 124 Monroe St, Apt. 1 Archibald, PA 18403-1818						X			3/25/10	4/1/10		
Name: Leon N Clouse, Sr.	Address: PO Box 241 Stanhope, NJ 07874-0241						X						X
Name:	Address:												
Name:	Address:												
Name:	Address:												

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Optional: Signature below indicates the party's approval of the well location, and waives the 15-day objection period. Check applicable box.

☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
Surface Landowner at proposed location WOODLAND MANAGEMENT PARTNERS LP	Date 3/4/2010	Coal Operator within 1,000 feet of proposed location	Date
Surface Landowner at proposed location WOODLAND M&T SERVICES, INC General Partner Richard L. Hartnett PRESIDENT	Date	Gas Storage Operator within 2,000 feet	Date

Signature below indicates written consent. Check applicable box.

Owner of: ☐ water supply, or ☐ building within 200 feet	Date
Address (of above)	
Owner of: ☐ water supply, or ☐ building within 200 feet	Date
Address (of above)	

1827-20017

5500-PM-OG0002-DWG Rev. 09/2008

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Oil and Gas Management Program
WELL LOCATION PLAT

DEP USE ONLY

DEP Application Tracking #
Permit # 127-20017
Project #

G: 5/5/10
C:

Denotes location of well on topo map.

Well is located on topo map 9,393 feet south of latitude 41 ° 37 ' 30 "

True Latitude: NORTH
41 ° 45 ' 57.2 "

True Longitude: WEST
75 ° 06 ' 33.8 "

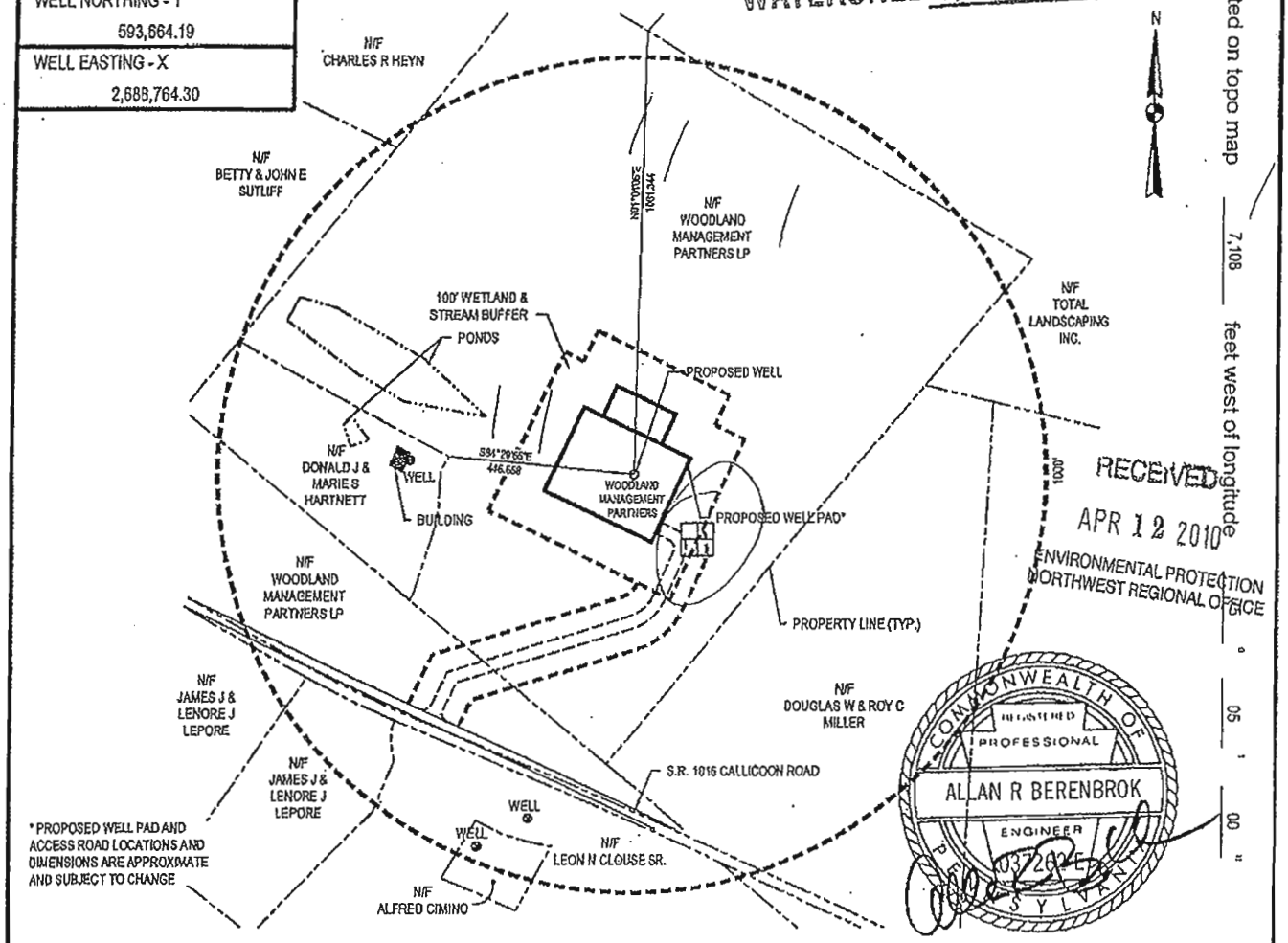
WELL NORTHING - Y
593,664.19

WELL EASTING - X
2,688,764.30

HQ

WATERSHED Hollister Creek

Well is located on topo map 7,108 feet west of longitude



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NORTHWEST REGIONAL OFFICE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
ALLAN R BERENBROK
ENGINEER
037292E

Surveyor or Engineer: TETRA TECH | Phone #: (412) 921-8873 | Dwg. #: 1 | Date: 4/6/2010 | Scale: 1" = 400' | Tract Acreage:

Lat. & Long Metadata Method GPS Accuracy +/- 1 ft. Datum NAD83		Elevation Metadata Method GPS Accuracy +/- 1 ft. Datum NAD83	Survey Date Jan. 2010
Applicant / Well Operator Name: Newfield Appalachia PA LLC		Well (Farm) Name: Woodland Management Partners	Well # 1-1 / Serial #
Address: 363 N. Sam Houston Parkway E., Suite 2020, Houston, TX 77060		County - Code: Wayne	Municipality: Damascus / Well Type: Vertical Test
Surface Landowner / Lessor: Woodland Management Partners		USGS 7 1/2 Quadrangle Map Name: Callicoon, PA	Map Section: 7 / Surface Elevation: 1193 ft.
Target Formation(s): Onondaga		Angle & Course of Deviation (Drilling): N/A	Anticipated Total Depth: TVD 8,350 ft. / TMD 8,350 ft.

Surface Owner of Water Purveyor within 1000'	Approximate Distance to Water Supply within 1000'	Owner, Lessee, Operator of Coal Seams	Name of Coal Seam Owner, Lessee, Operator
Donald and Marie Hartnett	N86d 22' 34"W 537'	N/A	N/A
Leon N. Clouse Sr.	S16d 46' 23"W 862'	N/A	N/A
Alfred Cimino	S22d 36' 51"W 965'	N/A	N/A
		N/A	N/A

R:_Marcellus State Projects\Newfield\20673 - Newfield Wells\Well Pad Permits\Permit Drawings\WMP Well Pad Plat Exhibit A.dwg PIT BEN.HOPPE 4/6/2010 10:54:04 AM

5500-PM-OG0002 Rev. 9/2008

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DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

WELL LOCATION PLAT

(Attachment, if needed)

DEP USE ONLY	Auth ID #: 127-20017

Use only if you need additional space for listings.

Applicant / Well Operator Name	DEP ID#	Well (Farm) Name	Well #	Serial #

Surface Owner or Water Purveyor with a Water Supply within 1000 feet	Approximate Course and Distance to Water Supply	Owner, Lessee, or Operator of Workable Coal Seam	Name of Coal Seam Owned, Leased or Operated

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5500-FM-OG0001A Rev. 11/2007

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

WELL PERMIT

DEP USE ONLY	
Permittee's eFACTS ID: 277879	Auth ID: 830957
Watershed Name: Hollister Creek	Quality HQ:

Permittee	OGO.#	Permit Number	Date Issued
NEWFIELD APPALACHIA PA LLC	OGO-67425	37-127-20017-00	05/27/2010

Address	Farm Name & Well Number	Well Serial #
363 N SAN HOUSTON PKWY E	WOODLAND MGMT PARTNERS 1 1	
SUITE 2020	Municipality: Damascus / County: Wayne	
HOUSTON, TX 77060-2424	7½' Quadrangle Name: Callicoon / Map Section #: 7	

Phone	Project #	Latitude	Longitude
(281) 847-6031		41-45-57.2000	-75-6-33.8000

Surf Elev at Site	Anticipated Total Depth	Well Type	Offset distances referenced to NE corner of map section.
1193 feet	8350 feet	GS	South 9393 feet West 7108 feet

This permit covering the well operator and well location shown above is evidence of permission granted to conduct activities in accordance with the Oil and Gas Act and the Oil and Gas Conservation Law, if the well is subject to that act and any rules and regulations promulgated thereunder, subject to the conditions contained herein and in accordance with the application submitted for this permit. This permit does not convey any property rights.

This permit and the permittee's authority to conduct the activities authorized by this permit are conditioned upon operator's compliance with applicable law and regulations.

Notification must be given to the district oil and gas inspector, the surface landowner and political subdivision of the date well drilling will begin at least 24 hours prior to commencement of drilling activities.

The permittee hereby authorizes and consents to allow, without delay, employees or agents of the Department to have access to and to inspect all areas upon presentation of appropriate credentials, without advance notice or a search warrant. This includes any property, facility, operation or activity governed by the Oil and Gas Act, the Oil and Gas Conservation Law, the Coal and Gas Resource Coordination Act and other statutes applicable to oil and gas activities administered by the Department. The authorization and consent shall include consent to the Department to collect samples of wastewaters or gases, to take photographs, to perform measurements, surveys, and other tests, to inspect any monitoring equipment, to inspect the methods of operation and disposal, and to inspect and copy documents required by the Department to be maintained. The authorization and consent includes consent to the Department to examine books, papers, and records pertinent to any matter under investigation pursuant to the Oil and Gas Act or pertinent to a determination of whether the operator is in compliance with the above referenced statutes. This condition in no way limits any other powers granted to the Department under the Oil and Gas Act and other statutes, rules and regulations applicable to these activities as administered by the Department.

This permit does not relieve the operator from the obligation to comply with the Clean Streams Law and all statutes, rules and regulations administered by the Department.

Special Permit Conditions:

This permit expires 05/27/2011 unless drilling is commenced on or before that date and prosecuted with due diligence.

S. Craig Lobb
Regional Oil and Gas Program Manager

Stephen Watson
Oil & Gas Inspector

2 Public Square
Wilkes-Barre, PA 18711-0790

570-826-2320
Telephone

5500-PM-OG0001 Rev. 10/2009

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL & GAS MANAGEMENT PROGRAM

DEP USE ONLY	
AUTH #	CNC
Check # 1064289	Amount $ 1500

1050
200
50
$1500

PERMIT APPLICATION FOR DRILLING OR ALTERING A WELL

DEP USE ONLY

Notes	OGO # 67425	Objection Date - Do not issue before: 5/3/10	Well Permit # 127-20017
	Bond # 12382		Special Cond. A B C D E F
	C: 4/13/10 n/m 5/3/10 SC	Date Approved: 5/11/10 [signature]	Watershed Name: HOLLISTER CREEK
	INV: 5-27-10		Designation: HQ (circled) EV

Please read instructions before you begin filling in this form.

Applicant (Operator) Name	DEP Client ID#	Phone	FAX	Check if new address. ☐
Newfield Appalachia PA LLC	277879	281-847-6031	281-847-6160	
Mailing Address (Street or PO Box)	City	State	Zip +4	Country (if not USA)
363 N. Sam Houston Pkwy E. Suite 2020	Houston	TX	77060-2424	

(Well) Farm Name	Well #	Serial #
Woodland Management Partners	1-1	

County	Municipality	Project # (from DEP)
WAYNE	DAMASCUS	

If you are applying for a permit to redrill, drill deeper, or alter a well that was previously permitted or registered, *or for a well site that was previously permitted but not drilled*, check this box ☐ and enter the permit or registration number here:

If applying for a permit to rework an existing well not registered or permitted, check this box ☐ and enter date drilled, if known:__________ (see instructions)

PNDI Attached: ☒ Any "hit" must include accepted mitigation plan from applicable agency.

PERMIT TYPE
Check applicable.
Application is to:
- ☒ Drill a new well
- ☐ Deepen a well
- ☐ Redrill a well
- ☐ Alter a well
- ☐ E&S Control Module
- ☐ Other (specify)

TYPE OF WELL
Check one.
- ☐ Gas
- ☐ Oil
- ☐ Comb. (gas & oil)
- ☐ Injection, recovery
- ☐ Injection, disposal
- ☐ Coalbed Methane
- ☐ Gas Storage
- ☒ Other (specify) vertical test well

APPLICATION FEE
Check applicable.
- ☐ Marcellus Well: Non-Vertical
- ☐ Marcellus Well: Vertical
- ☐ Non-Marcellus Well: Non-Vertical
- ☒ Non-Marcellus Well: Vertical
- ☐ $200 (Home Use Well)
- ☐ $500 E&S Fee
- ☐ $ 0 (Rehab orphan)
- ☒ Vertical: Length 8350 ft.
- ☐ Marcellus: Length ____ ft.
- ☐ Non-Vertical: Length ____ ft.

Total Application Fee $ 1500

COORDINATION WITH REGULATIONS AND OTHER PERMITS	Yes	No	DEP USE ONLY
1. Will the well be subject to the Oil and Gas Conservation Law? If "No," go to 2).	☒	☐	Date Stamps/Notes
a. If "Yes" to #1, is the well at least 330 feet from outside lease or unit boundary?	☒	☐	Auth 830957
b. Does the location fall within an area covered by a spacing order?	☐	☒	Site 733315
2. Will the well penetrate a workable coal seam? If "No," include justification and supporting documentation.	☐	☒	Clnt 277879
3. If the well will penetrate a workable coal seam, and the well is a "non-conservation" gas well, does the location comply with the distance requirements of Section 7 of the Coal and Gas Resource Coordination Act? (At least 1,000 feet from all existing wells).	☐	☐	APS 717958
a. If "No," is the required exception request attached? (Check here if re-working an existing well: ☐ N/A)	☐	☐	Acct 676721
4. Will the well be drilled at a location where the coal has been removed?	☐	☒	
5. Will the well be drilled through an active (operating or projected) coalmine, or within 1,000 feet of the boundary?	☐	☒	PF 729777
a. If "Yes," print the names of: Mine: ______ Operator: ______			SF 1012151
6. Will the well penetrate or be within 2,000 feet of an active gas storage reservoir boundary?	☐	☒	
a. If Yes, print the names of: Storage Field: ______ Operator: ______			
7. Is the proposed well location within the permitted area of a landfill?	☐	☒	
8. Will the well site be within 100 feet (measured horizontally) of a stream, spring or body of water identified on the most current 7½' topographic map?	☐	☒	
a. If "Yes," is a request for a waiver (form 5500-FM-OG0057), and E&S control plan attached?	☐	☐	
9. Will the well site be within 100 feet of a wetland or in a wetland?	☐	☒	
a. Is the well site within 100 feet of a wetland greater than one acre in size?	☐	☐	
If yes, is a waiver request (form 5500-FM-OG0057) and E&S control plan attached?	☐	☐	
10. Will the well be drilled within 200 feet (horizontally) from any existing building or an existing water supply?	☐	☒	
a. If "Yes," is written consent from the owner attached?	☐	☐	
b. If written consent is not attached, is a variance request (form 5500-FM-OG0058) attached?	☐	☐	Yes / No
11. Will the well be located where it may impact a public resource as outlined in the "Coordination of a Well Location with Public Resources" form 5500-PM-OG0076? If yes, attach a competed copy of the form.			☐ Yes ☒ No
12. Is the well site in a Special Protection High Quality (HQ) or Exceptional Value (EV) watershed?			☒ Yes ☐ No
13. Is this well part of a development where you need an Earth Disturbance Permit for Oil and Gas Activities disturbing more than 5 acres? If yes, attach a completed Erosion Sediment and Stormwater Control Module or list the number and date of the ESCGP-1 Approval. ______			☐ Yes ☒ No

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NORTHWEST REGIONAL OFFICE

Signature of Applicant — The person signing this form attests that they have the authority to submit this application on behalf of the applicant, and that the information, including all related submissions, is true and accurate to the best of their knowledge.

Signature of Person Authorized to Submit Application	(Print or Type)	Name of Signer: DONALD F. SLEETH / Title: Drilling Manager	Date
[signature]			4-6-10

Application Preparer/Contact: BETSY COLLINS Phone: 412-921-8250

5500-PM-OG0001 Rev. 10/2009

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

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DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL & GAS MANAGEMENT PROGRAM

Farm Name - Well #	
Woodland Management Partners-Well #1-1	
Applicant Name	DEP ID#
Newfield Appalachia PA LLC	277879
DEP USE ONLY	APS #

PERMIT APPLICATION FOR DRILLING OR ALTERING A WELL

Page 2 --- Record of Notification / Written Consent

List the following: surface landowner; all landowners or water purveyors whose water supplies are within 1,000 feet of this proposed well location; gas storage operator if within 2000 feet; all coal owners and lessees of all underlying workable coal seams; operators of underground coal mines at the proposed location; and coal operators with a deep mine within 1,000 feet. Mark the boxes, "X," which show the parties' interests. Use additional forms if you need more space. You are required to notify each of these parties.		Surface Landowner	Coal Owner	Coal Lessee	Coal Mine Operator	Gas Storage Operator	Within 1,000 feet: Surf Owner with Water	Within 1,000 feet: Water Purveyor	Within 1,000 feet: Coal Mine Operator	Notification: Certified Mail Dates: Sent	Notification: Certified Mail Dates: Return Receipt	Notification: Address Affidavit	Notification: Written Consent
Name: Donald and Marie Hartnett	Address: 841A Calicoon Rd. Damascus, PA 18415-3514						X			3/25/10	3/29/10		
Name: Woodland Management Partners	Address: 308 Egypt Rd. Tafton, PA 18464	X											X
Name: Alfred Cimino	Address: 124 Monroe St, Apt. 1 Archibald, PA 18403-1818						X			3/25/10	4/1/10		
Name: Leon N Clouse, Sr.	Address: PO Box 241 Stanhope, NJ 07874-0241						X						X
Name:	Address:												
Name:	Address:												
Name:	Address:												

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APR 12 2010
ENVIRONMENTAL PROTECTION
NORTHWEST REGIONAL OFFICE

Optional: Signature below indicates the party's approval of the well location, and waives the 15-day objection period. Check applicable box.			
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
Surface Landowner at proposed location	Date	Coal Operator within 1,000 feet of proposed location	Date
Surface Landowner at proposed location	Date	Gas Storage Operator within 2,000 feet	Date

Signature below indicates written consent. Check applicable box.	
Owner of: ☑ water supply, or ☐ building within 200 feet	Date
Address (of above) Leon N Clouse	3/6/10
Owner of: ☐ water supply, or ☐ building within 200 feet	Date
Address (of above)	

1007-27-1

5500-PM-OG0001 Rev. 10/2009

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL & GAS MANAGEMENT PROGRAM

Farm Name - Well #	
Woodland Management Partners-Well #1-1	
Applicant Name	DEP ID#
Newfield Appalachia PA LLC	277879
DEP USE ONLY	APS #

127-20017

PERMIT APPLICATION FOR DRILLING OR ALTERING A WELL

Page 2 — Record of Notification / Written Consent

List the following: surface landowner; all landowners or water purveyors whose water supplies are within 1,000 feet of this proposed well location; gas storage operator if within 2000 feet; all coal owners and lessees of all underlying workable coal seams; operators of underground coal mines at the proposed location; and coal operators with a deep mine within 1,000 feet. Mark the boxes, "X," which show the parties' interests. Use additional forms if you need more space. You are required to notify each of these parties.

Name	Address	Surface Landowner	Coal Owner	Coal Lessee	Coal Mine Operator	Gas Storage Operator	Within 1,000 feet: Surf Owner with Water	Within 1,000 feet: Water Purveyor	Within 1,000 feet: Coal Mine Operator	Notification – Certified Mail Dates: Sent	Notification – Certified Mail Dates: Return Receipt	Address Affidavit	Written Consent
Donald and Marie Hartnett	841A Calicoon Rd. Damascus, PA 18415-3514						X			3/25/10	3/29/10		
Woodland Management Partners	308 Egypt Rd. Tafton, PA 18464	X											X
Alfred Cimino	124 Monroe St, Apt. 1 Archibald, PA 18403-1818						X			3/25/10	4/1/10		
Leon N Clouse, Sr.	PO Box 241 Stanhope, NJ 07874-0241						X						X

Note the means and attach proof.

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APR 12 2010
ENVIRONMENTAL PROTECTION
NORTHWEST REGIONAL OFFICE

Optional: Signature below indicates the party's approval of the well location, and waives the 15-day objection period. Check applicable box.

☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
☐ Water Purveyor or ☐ Landowner with water supply within 1,000 ft.	Date	Coal ☐ Operator, ☐ Owner, or ☐ Lessee	Date
Surface Landowner at proposed location WOODLAND MANAGEMENT PARTNERS LP	Date 3/4/2010	Coal Operator within 1,000 feet of proposed location	Date
Surface Landowner at proposed location WOODLAND MGT SERVICES, INC General Partner [signature] PRESIDENT	Date	Gas Storage Operator within 2,000 feet	Date

Signature below indicates written consent. Check applicable box.

Owner of: ☐ water supply, or ☐ building within 200 feet	Date
Address (of above)	
Owner of: ☐ water supply, or ☐ building within 200 feet	Date
Address (of above)	

5500-PM-OG0002-DWG Rev. 09/2008

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Oil and Gas Management Program

WELL LOCATION PLAT

DEP USE ONLY
DEP Application Tracking #
Permit # 127-20017
Project #
G: JL 5/3/10
C:

Denotes location of well on topo map.

True Latitude: NORTH
41 ° 45 ' 57.2 "

True Longitude: WEST
75 ° 06 ' 33.8 "

WELL NORTHING - Y
593,664.19

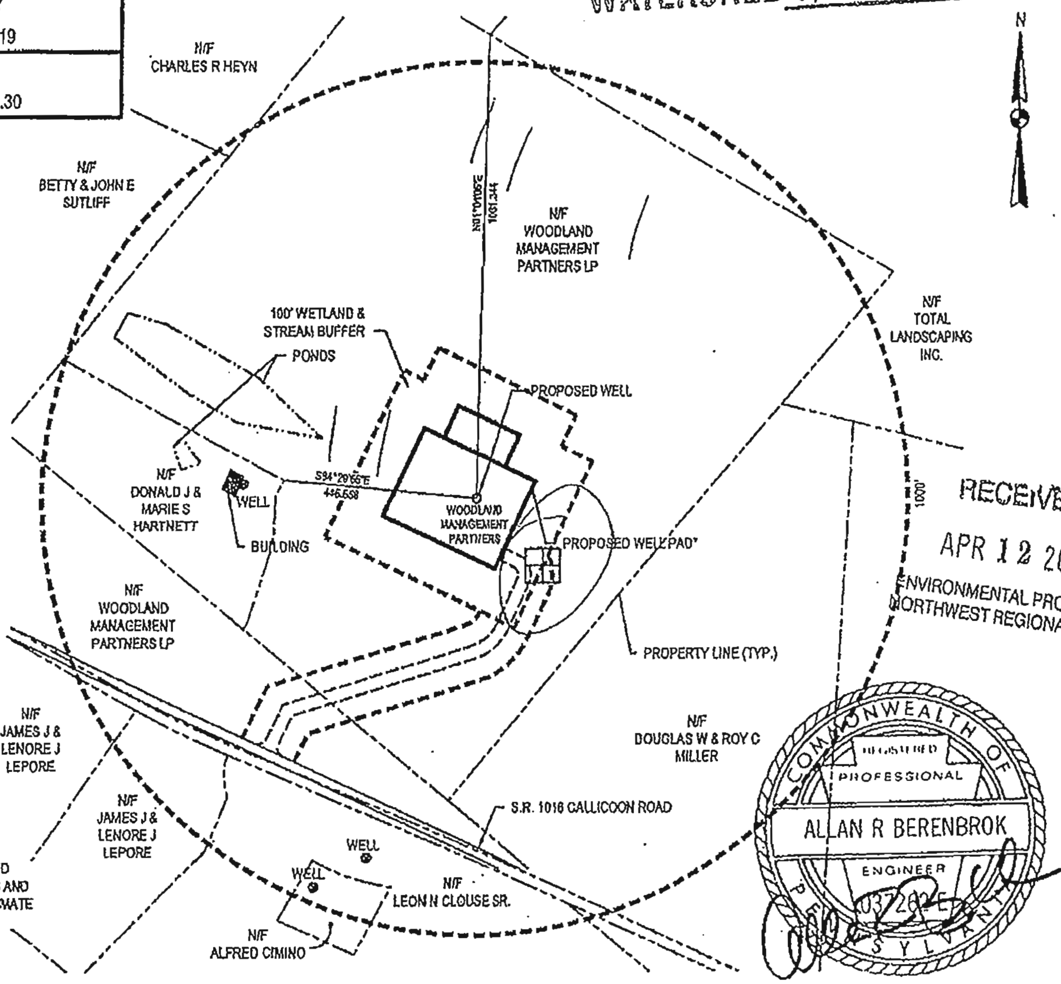
WELL EASTING - X
2,688,764.30

Well is located on topo map 9,393 feet south of latitude 41 ° 37 ' 30 "

Well is located on topo map 7,108 feet west of longitude 75 ° 05 ' 00 "

HQ

WATERSHED Hollister Creek



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COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
ALLAN R BERENBROK
ENGINEER

Surveyor or Engineer TETRA TECH Phone # (412) 921-8873 Dwg. # 1 Date 4/6/2010 Scale 1" = 400' Tract Acreage

Lat & Long Metadata Method GPS Accuracy +/- 1 ft. Datum NAD83	Elevation Metadata Method GPS Accuracy +/- 1 ft. Datum NAD83 Survey Date Jan. 2010
Applicant / Well Operator Name: Newfield Appalachia PA LLC	Well (Farm) Name: Woodland Management Partners; Well #: 1-1; Serial #:
Address: 363 N. Sam Houston Parkway E., Suite 2020, Houston, TX 77060	County - Code: Wayne; Municipality: Damascus; Well Type: Vertical Test
Surface Landowner / Lessor: Woodland Management Partners	USGS 7 1/2 Quadrangle Map Name: Callicoon, PA; Map Section: 7; Surface Elevation: 1193 ft.
Target Formation(s): Onondaga	Angle & Course of Deviation (Drilling): N/A; Anticipated Total Depth: TVD 8,350 ft. TMD 8,350 ft.

Surface Owner of Water Supply Within 1000 ft.	Approximate Course & Distance to Water Supply	Owner or Lessee of Operated Workable Coal Seam	Name of Coal Seam(s) Owned/Leased/Operated
Donald and Marie Hartnett	N86d 22' 34"W 537'	N/A	N/A
Leon N. Clouse Sr.	S16d 46' 23"W 862'	N/A	N/A
Alfred Cimino	S22d 36' 51"W 965'	N/A	N/A
		N/A	N/A

R:_Marcellus Shale Projects\Newfield\0267 - Newfield Wells\Well Plat Permits\Permit Drawings\WMP Well Pad Plat Exhibit A.dwg PIT BEN.HOPPE 4/6/2010 10:54:04 AM

5500-PM-OG0002 Rev. 9/2008

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

WELL LOCATION PLAT

(Attachment, if needed)

DEP USE ONLY	Auth ID #: 127-20017

Use only if you need additional space for listings.

Applicant / Well Operator Name	DEP ID#	Well (Farm) Name	Well #	Serial #

Surface Owner or Water Purveyor with a Water Supply within 1000 feet	Approximate Course and Distance to Water Supply	Owner, Lessee, or Operator of Workable Coal Seam	Name of Coal Seam Owned, Leased or Operated

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NORTHWEST REGIONAL OFFICE

HIGHWAY OCCUPANCY PERMIT

PENNDOT

PERMIT NO.	04043824
ORGANIZATION	046
DATE ISSUED	051010
PERMIT FEES	25.00
ACCOUNT NO.	
COUNTY	63
TOWNSHIP/BORO	206

1

DESCRIPTION	512	
STATE ROUTE NO.	1016	
SEGMENT(S)	0090	0090
OFFSET TO OFFSET	0470	0470

2

DESCRIPTION		
STATE ROUTE NO.		
SEGMENT(S)		
OFFSET TO OFFSET		

3

DESCRIPTION		
STATE ROUTE NO.		
SEGMENT(S)		
OFFSET TO OFFSET		

4

TOWNSHIP/BORO		
DESCRIPTION		
STATE ROUTE NO.		
SEGMENT(S)		
OFFSET TO OFFSET		

PERMITTEE: WOODLAND MANAGEMENT PARTNERS LP

ADDRESS: 308 EGYPT ROAD

POST OFFICE: TAFTON PA ZIP CODE: 18464-

COUNTY: WAYNE

TOWNSHIP/BORO: DAMASCUS

BOND/AGREEMENT NUMBER:

ALL WORK UNDER THIS PERMIT MAY BE STARTED ON: 05/10/10

AND SHALL BE COMPLETED ON OR BEFORE: 05/10/11

Immediately upon completion of the work, Permittee shall notify the permit office where application was made. Subject to all the conditions, restrictions, and regulations prescribed by the Pennsylvania Department of Transportation, (see in particular 67 Pa. Code, Chapter 203/212, 441 and 459) and subject to the plans, special conditions, or restrictions herein set forth or attached hereto. This permit shall be located at the work site and shall be available for inspection by any police officer or department representative.

DESCRIPTION OF WORK

INSTALL MINIMUM USE DRIVEWAY WITH DRAINAGE FACILITIES AT SR 1016 SEG 0090 OFFSET 0470 TO SEG 0090 OFFSET 0470
THIS PERMIT AUTHORIZES WORK ONLY IN DEPARTMENT HIGHWAY RIGHT OF WAY.
IT IS THE PERMITTEE'S RESPONSIBILITY TO KEEP VEGETATION TRIMMED IN ORDER TO MAINTAIN MINIMUM SIGHT DISTANCE. NO OBJECTS MAY BE PLACED WITHIN THE LINE OF SIGHT.
SHOULDERS MUST BE RESTORED IN ACCORDANCE WITH APPROPRIATE SECTION OF PUB. 408 AND ROADWAY CONSTRUCTION STANDARD RC-25.
SURFACE DRAINAGE MAY NOT BE DIRECTED ONTO STATE HIGHWAY RIGHT OF WAY.
PERMITTEE MUST MAINTAIN ACCESS FROM THE PAVEMENT EDGE TO AT LEAST 20 FEET OUTSIDE THE HIGHWAY RIGHT OF WAY.
ALL DISTURBED AREAS OUTSIDE THE PAVEMENT OR SHOULDER SHALL BE RESTORED TO A CONDITION AT LEAST EQUAL TO THAT WHICH EXISTED BEFORE THE START OF WORK.
MINIMUM WORK ZONE TRAFFIC CONTROL TO BE IN ACCORDANCE WITH PUB. 213, FIGURE(S): 5, 7, & 10A. SEE PUB 212 FOR ADDITIONAL DETAILS.
DRAINAGE INSTALLED BY THIS PERMIT IS THE RESPONSIBILITY OF THE PERMITTEE TO CONTINUALLY MAINTAIN OR REPLACE. DEPARTMENT MUST BE NOTIFIED IN WRITING UPON COMPLETION OF WORK.

THIS PERMIT IS NOT VALID UNTIL SIGNED BY THE DISTRICT ENGINEER OR HIS AUTHORIZED REPRESENTATIVE

Acknowledgement of Completion

Permitted work has been completed.

Date _____ By _____

For ALLEN D. BIEHLER, P.E. 5/3/10

Secretary of Transportation

GEORGE ROBERTS, P.E., D.E.

District Executive

PERMITTEE

APPLICATION FOR MINIMUM USE DRIVEWAY

A Minimum Use Driveway Is A Residential Or Other Driveway Which Is Expected To Be Used By Not More Than 25 Vehicles Per Day (i.e. 50 A.D.T)

PENNDOT

APPL. NO. 075293

SEE PUBLICATION 312 GUIDE

APPLICANT/PROPERTY OWNER		
Woodland Management Partners, LP		
ADDRESS: 308 Egypt Road		
POST OFFICE: Tafton PA		ZIP CODE: 18464
PHONE: 570-857-1072	FEE: 25.00	CHECK NO.: 5049

LOCATION OF PROPOSED DRIVEWAY

County: Wayne 63

Township/Boro: Damascus 206

Route No.: S.R. 1016 (Callicoon Rd)

Name of Nearest Intersection: Little Equinunk Creek

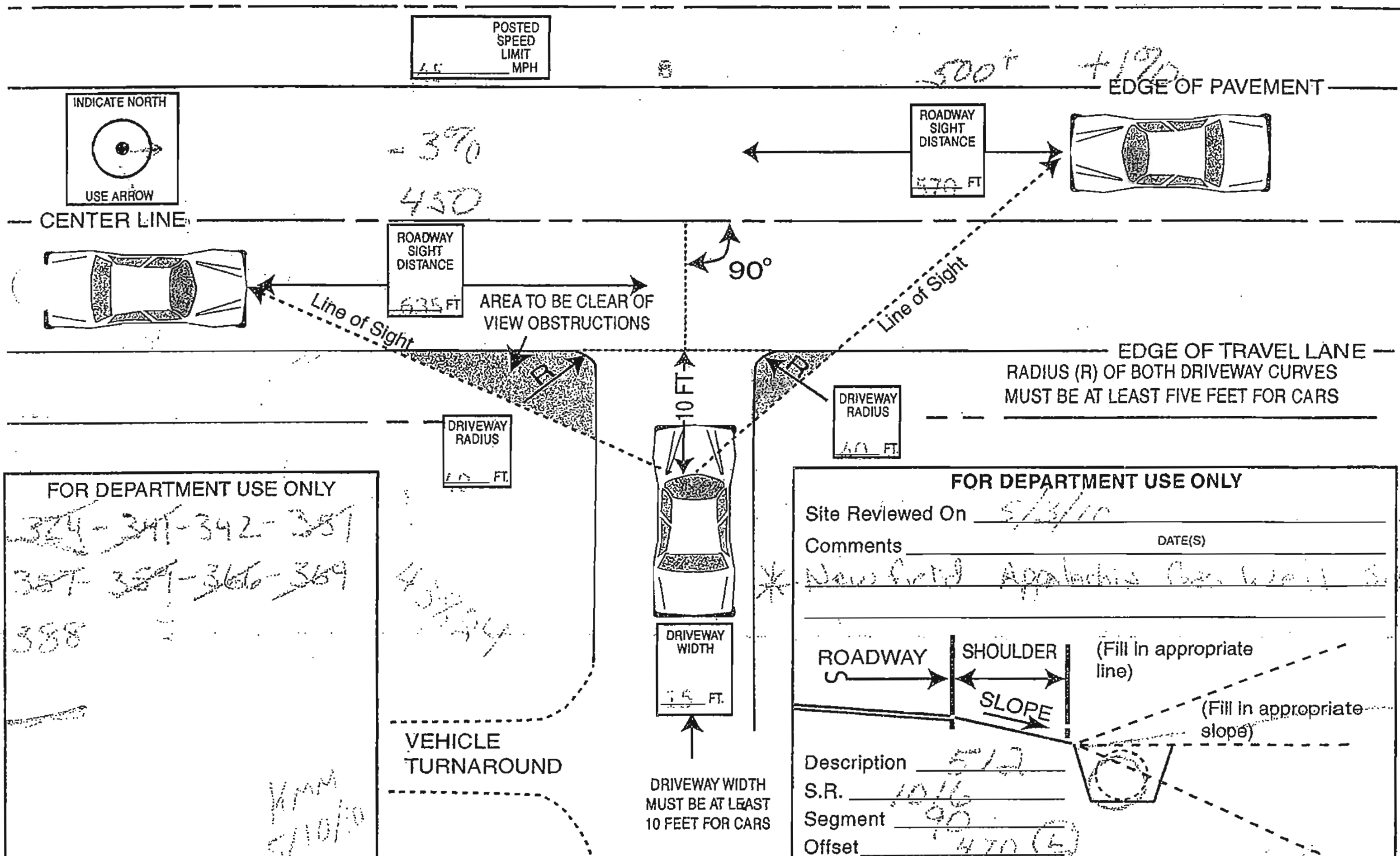
Distance to Nearest Intersection in Feet: 3520 ft.

APPLICATION IS MADE TO

☒ CONSTRUCT A NEW DRIVEWAY ☐ ALTER AN EXISTING DRIVEWAY

DATE WORK SCHEDULED TO BEGIN: May 15, 2010

DATE WORK SCHEDULED TO BE COMPLETED: August 31, 2010



FOR DEPARTMENT USE ONLY

324-341-342-387
387-389-366-369
358

KMM 5/10/10

FOR DEPARTMENT USE ONLY

Site Reviewed On: 5/3/10 (DATE(S))

Comments: * New Cent Appalachia Gas Well Site

Description: 572

S.R.: 1016

Segment: 90

Offset: 470 (L)

Field Viewed By: [signature] (SIGNATURE) [date] (DATE)

Is any portion of the property reserved for a person with a disability or a severely disabled veteran? ☐ YES ☒ NO

Under and subject to all the conditions, restrictions and regulations prescribed by the Pennsylvania Department of Transportation and the issued Permit, Form M-945P.

The applicant certifies that all statements contained herein are true and correct.

By X [signature] (SIGNATURE(S)) 4/14/2010 (DATE)

Visit our website at: www.dot.state.pa.us

ROADWAY USE AND
MAINTENANCE AGREEMENT

AND NOW THIS 21 day of June, 2010, it is agreed by and between Damascus Township, Wayne County, Pennsylvania, by and through its Board of Supervisors and New Field Exploration, a duly formed corporation with its principal place of residence at 363 Sam Houston, Houston, TX, (jointly "the Parties") to enter into this agreement regarding the use and maintenance of township roadways necessary for transportation and travel of equipment and personnel to and from oil and gas wells on various leaseholds within the Township;

WHEREAS, Damascus Township, (Hereinafter reference to as the "Township") has control and jurisdiction of various Township owned roadways with its boundaries; and

WHEREAS, the NewField (Hereinafter referred to as the "Operator"), is the owner of certain oil and gas leaseholds in Wayne County, Pennsylvania; and

WHEREAS, the Township and Operator are desirous of entering into a formal agreement for the use of Township roadways for the purposes of providing ingress, regress and egress to various leaseholds for which excess traffic and equipment transportation is necessary for the development of said oil and gas wells on said leaseholds, and

WHEREAS, the Township and Operator are desirous of addressing the excess road maintenance costs and expenditures necessary for and incurring from construction, drilling and completion stages of gas and oil operations utilizing said Township roadways.

NOW THEREFORE, in consideration of a faithful performance of each party of mutual covenants and promises hereinafter set forth, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged as follows:

1. The Operator agrees to identify those Township roads or portions of roads to be used by its vehicles and equipment prior to the commencement of operations.

2. After receiving from the Operator a list of such roads, the Parties agree to jointly inspect the pertinent roadways promptly to determine the road structure, its condition and the existence of any buried utility lines, and to depict any surface characteristics. Operator will prepare a pre-use road inspection report documenting the road conditions and characteristics.

3. The Operator agrees to restore any affected roadways to a condition equal or better than the pre-use condition of said road(s) within 180 days of the conclusion of Operator's use, weather permitting; provided that Operator's liability shall be limited to only that portion of the cost of repair and restoration which exceeds normal and routine maintenance, costs, and which is caused by the Operator's vehicles and equipment.

4. In the event that the pre-use condition of any roadway requires or warrants repaving or improvements prior to use, the Operator shall be liable for such improvements only to the extent that the parties agree that such improvements would reduce damage caused by the Operator's use, and agree on ratably sharing the costs of such improvements.

5. In the event that the Township incurs additional costs associated with maintenance of said roadway as a direct result of the Operator's activities (including those of their agents, employees and contractors), including dust suppression needed during peak activity periods, the Township will provide prior notice of such additional maintenance needed, and if possible, obtain a cost estimate, and deliver the same to the Operator. Operator will only be liable for such maintenance costs to the extent that the parties agree that such maintenance is necessary and that the parties shall share the costs.

6. The Operator agrees to reimburse the Township for reasonable additional costs agreed upon in a reasonable and prompt period of time, but not to exceed forty-five (45) days.

7. Upon completion of all improvements called for in the final inspection report, the Operator shall submit a certification of the improvements made to the Township, and such certification shall be deemed approved unless the Township gives

written notice of objections to the certification within ten days of receipt of the certification.

8. Upon conclusion of the drilling activities anticipated by this Agreement, both parties will promptly inspect the roadways utilized and make a determination as to what, if any, improvements or maintenance need to be performed by the Operator to discharge the obligations required by this Agreement. This final report then shall be deemed to be a complete list of improvements needed to discharge this Agreement, binding upon all parties.

9. In the event that future drilling activities occur utilizing the same or part of a Township roadway(s) previously improved by virtue of this agreement, then the future contemplated activities shall cause the provisions of this agreement to resume as if said roadway(s) were being initially contemplated, with a new pre-use road inspection report, and such follow up requirements as previously herein set forth.

10. The Operator shall be given the option of having any agreed upon repair work performed by a contractor of its choice.

11. This Agreement is entered into in lieu of the Township incurring the cost and inconvenience of implementing a state compliant road bonding system and shall survive any future creation of any such system as to the Operator and remain the operative relationship between the Township and the Operator until terminated by the mutual agreement of the Township and the Operator.

12. This agreement shall be binding upon the successors and assigns of the parties hereto and shall be deemed to be a covenant running with the roads described above. This agreement shall not be transferred or assigned by the Operator without the consent in writing of the Township, which consent will not be unreasonably withheld.

IN WITNESS WHEREOF, this instrument has been executed by the undersigned the R. Production Manager, this 21 day of June, 2010.

TOWNSHIP:

Damascus Township Supervisors

By: _____

By: _____

By: _____

OPERATOR:

New Field Exploration

(Company Name)

By: _____

Company Representative

DAMASCUS TOWNSHIP, WAYNE COUNTY, PA.

ROAD INSPECTION REPORT

PRINT NAME: _____ DATE: _____

SIGN: _____ COMPANY: _____

[ ] PRE- INSPECTION

[ ] POST INSPECTION

[ ] VIDEO RECORD: [ ] YES

[ ] NO

ROAD CONDITION: _____

_____

_____

ROAD SURFACE: ACP \ ASBC \ CRUDE \ GRAVEL:

_____

DRAINAGE [CENTERLINE, CULVERTS, APPROACHES] :

_____

_____

_____

SIGNAGE: _____

_____

EXISTING DUST CONTROL: [ ] YES

[ ] NO: _____

OTHER FACTORS EFFECTING THE ROADWAY: _____

_____

_____

WILL THE COMPANY PROVIDE A GRADER TO MAINTAIN THE DRIVING SURFACE? YES [ ] OR NO [ ]

COMMENTS: _____

_____

PREPAREDNESS, PREVENTION, AND CONTINGENCY PLAN
WAYNE COUNTY FIELD
WAYNE COUNTY, PENNSYLVANIA

Prepared for:

NEWFIELD APPALACHIA PA LLC
363 N. Sam Houston Pkwy E., Suite 2020
Houston, TX 77060

Prepared by:

TETRA TECH NUS INC
116 N. Washington Avenue
Scranton, PA 18503

May 2010

TABLE OF CONTENTS

LIST OF APPENDICES

1.0 DESCRIPTION OF FACILITY

1.1 DESCRIPTION OF THE INDUSTRIAL OR COMMERCIAL ACTIVITY

Newfield Appalachia PA LLC (Newfield) is a natural gas exploration company with operations planned for Wayne County, Pennsylvania. Operations will involve natural gas exploration of the Marcellus Shale formation, which will include site preparation, drilling, and well development and production activities. Wastes generated during these activities will be typical for gas drilling operations and will include drill cuttings, produced water, drilling and frac fluids, waste oil, municipal waste and trash. No hazardous waste is expected to be generated at the Newfield sites.

Newfield is currently in the exploratory phase of operations, which will require construction activities for new natural gas well pads and access roads.

This Prevention, Preparedness and Control (PPC) Plan applies to all well sites in Wayne County, Pa.

The attached map (Figure 1) in Appendix B shows the area covered under this PPC Plan Figure 2 is the required 7.5 topographic map of the specific well site. The proposed Site Plan (Figure 3) shows the site layout, the well site boundaries, material storage areas, waste storage areas, dike drains and drainage that leads away from the well site, and the entrances and exits to the well site.

During the different stages of site preparation, construction, drilling, well development and production, the site will store various fuels, oils and chemicals on-site. A chemical and container inventory for the specific well site is located in Table 1 of Appendix C.

1.2 DESCRIPTION OF EXISTING EMERGENCY RESPONSE PLANS

This is a new facility and this plan has been prepared prior to construction of the well pad. There are no previous emergency response plans.

A separate Spill Prevention Control and Countermeasure (SPCC) Plan will be prepared for each facility meeting the requirements defined in 40 CFR§112.

1.3 MATERIAL AND WASTE INVENTORY

Information in this section is used to evaluate the prevention, containment, mitigation, cleanup, and disposal measures which would be used in the event of a spill, discharge, explosion, or fire. Oils, chemicals and other hazardous materials anticipated to be used and stored at the facility during site preparation and construction, drilling, well development and production are listed in Table 1.

MSDS's will be maintained onsite for chemicals and compounds used at the facility in accordance with the Occupational Safety and Health Administration (OSHA) worker right-to-know requirements, as appropriate.

1.4 POLLUTION INCIDENT HISTORY

Newfield has not had any reportable incidents for this facility.

1.5 IMPLEMENTATION SCHEDULE FOR PLAN ELEMENTS NOT CURRENTLY IN PLACE

All plan elements are in place.

1.6 PURPOSE AND IMPLEMENTATION OF PPC PLAN

Newfield has developed and will implement this PPC Plan for effective action to minimize and abate hazards to human health and the environment from fire, explosion, and emission or discharge of pollutants to air, soil, surface water or groundwater. This plan was prepared to satisfy the requirements set forth in 25 PA Code Section 78.

The Drilling Manager serves as the Primary Emergency Coordinator and is responsible for the preparation and implementation of the PPC Plan. The PPC Plan has been prepared and implemented in general accordance with Pennsylvania Department of Environmental Protection (PADEP) guidelines, and will be submitted to PADEP for approval at such time as the PADEP may prescribe.

This PPC Plan identifies and describes any arrangements with police departments, fire departments, hospitals, contractors, and state, county, and local emergency response teams to coordinate emergency services.

The PPC Plan lists names, addresses and phone numbers of all persons identified to act as Emergency Coordinator. One person is named as the Primary Emergency Coordinator and others are listed in the order in which they will assume responsibility as alternates. The PPC Plan also includes a list of emergency equipment at the facility, the location and a physical description of emergency equipment, and a brief outline of emergency equipment capabilities.

1.7 PLAN REVISIONS

This PPC Plan will be reviewed and amended, annually, or whenever:

- Applicable PADEP regulations are revised;
- The plan fails in an emergency;
- The list of Emergency Coordinators changes;
- The list of emergency equipment changes; and
- Construction, operation, maintenance, or other circumstances change in a manner that materially increases the potential for fires, explosions, or releases of toxic or hazardous constituents; or which changes the response necessary in an emergency.

2.0 IMPLEMENTATION OF PPC PLAN

2.1 ORGANIZATIONAL STRUCTURE OF FACILITY FOR IMPLEMENTATION

The Drilling Manager has been designated as the Primary Emergency Coordinator. The Primary Emergency Coordinator is responsible for the following:

- Coordination of spill cleanup activities;
- Notification of appropriate authorities; and
- Tank and chemical storage area inspections.

The Drilling Manager has administrative responsibility for updating, maintaining, and implementing this PPC Plan. Specifically, these responsibilities include:

- Identification of materials and wastes handled during site operation (inventory);
- Identification of potential spill sources (risk assessment);
- Establishment of spill reporting procedures;
- Coordination of the visual inspection program;
- Review of past incidents, spills, and countermeasures employed;
- Coordination and implementation of the PPC Plan goals;
- Training/educational programs and updates;
- Ensuring periodic review of the PPC Plan for adequacy and appropriateness;
- Administration and institution of appropriate changes at regular intervals;
- Review of new construction and process changes relative to the PPC Plan;
- Evaluation of PPC Plan effectiveness prior to, during and subsequent to its implementation; and
- Instituting improvements to the PPC Plan.

The Production Manager is designated as Secondary Emergency Coordinator, and, in the absence of the Drilling Manager, will assume the role of emergency coordinator for emergencies. The Secondary Emergency Coordinator will report directly to the Primary Emergency Coordinator in matters regarding this plan, and can assist with implementing the above-listed items.

2.2 LIST OF EMERGENCY COORDINATORS

As required by 25 PA Code 265.55, there will be at least one employee, either on the construction site or on call, with the responsibility for coordinating emergency response measures. The Primary and Secondary Emergency Coordinators will be thoroughly familiar with this PPC Plan, site operations and activities, the location and characteristics of materials and wastes, the location of the facility's records, and the layout of the facility. The Emergency Coordinators have the authority to commit the resources necessary to carry out the PPC Plan and for coordinating emergency response measures. In the event of a spill or release, one of the Emergency Coordinators will be immediately notified. The following individuals have been designated to act as Emergency Coordinators:

Primary Emergency Coordinator

Name: Don Sleeth
Title: Drilling Manager
Office: 281-674-2501
Cell: 281-974-0051

Secondary Emergency Coordinator

Name: Jack Cochran
Title: Production Manager
Office: 814-437-2344
Cell: 814-671-1557

2.3 DUTIES AND RESPONSIBILITIES OF THE EMERGENCY COORDINATOR

As required by 25 PA Code 265.56 and the PPC Plan Guidance Documents, whenever there is an imminent or actual emergency situation, the Emergency Coordinator or his designee must immediately:

1. Notify all facility personnel.

2. Notify appropriate state or local agencies with designated response roles and contracted emergency response companies if additional assistance is required.

3. Identify the problem. Is it a physical emergency such as a fire, explosion, or spill? Is it a natural disaster such as a flood, tornado, or other severe weather? Is it a social emergency such as a bomb threat, riot, or vandalism?

4. Assess the health or environmental hazards and how this problem or condition will affect employees or its affect on the surrounding community.

5. Take all reasonable measures to stabilize the situation. The Emergency Coordinator will take all reasonable measures to ensure that the fire, explosion, emission, or discharge does not reoccur or spread to other materials at the site. These measures can include, when appropriate, stopping operations, collecting and containing released materials or wastes, and removing or isolating containers.

Whenever there is an emission, discharge, fire, or explosion, the Emergency Coordinator or his designee must immediately attempt to identify the character, exact source, amount, and aerial extent of emitted or discharged materials. He/she may do this by observation, by review of facility records or manifests, and, if necessary, by instrumental and chemical analysis. Concurrently, the Emergency Coordinator or his designee must assess possible hazards to human health or the environment that may result from emission, discharge, fire, or explosion. This assessment must consider both direct and indirect effects of the emission, discharge, fire, or explosion.

If the Emergency Coordinator determines that the facility has had an emission, discharge, fire, or explosion which would threaten human health or the environment (beyond the limits of the site) and if evacuation of local areas may be advisable, he/she must immediately notify the applicable local authorities (police, fire, etc.); he/she must also immediately notify the PADEP by telephone at (800) 541-2050 (24-hour number), PADEP Northeast Region at (570) 826-2511 (24-hrs), the National Response Center at (800) 424-8802, Wayne County Emergency Management Agency (EMA) at (570) 253-1622, and the Pennsylvania Emergency Management Agency at (717) 651-2001, and report the following information:

- Name of the person reporting the incident;
- Name and location of the facility;
- Telephone number where the person reporting the spill can be reached;
- Date, time, and location of the incident;
- A brief description of the incident, nature of the materials involved, extent of any injuries, and possible hazards to human health or the environment;
- The estimated quantity of the materials spilled; and
- The extent of contamination of land, water, or air, if known.

If spills or discharges of a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substance in greater than reportable quantities has occurred, the Emergency Coordinator must notify DEP at (800) 541-2050 and the National Response Center at (800) 424-8802 and report the above information. For an offsite release (spill or discharge) of a reportable quantity of a CERCLA hazardous substance or a Superfund Amendments and Reauthorization Act Extremely Hazardous Substance, the Emergency Coordinator must immediately notify the National Response Center at (800) 424-8802 and report the above information.

If a release occurs from a storage tank which enters a water supply or which threatens the water supply of downstream users, the Emergency Coordinator must immediately notify the Wayne County EMA (570) 253-1622, the Pennsylvania Emergency Management Agency at (717) 651-2001, and DEP at (800) 541-2050. If appropriate, the Emergency Coordinator may assist the Emergency Management Agencies in notifying the downstream water users. The priorities for notification will be by closest proximity to the release site.

During an emergency, the Emergency Coordinator will take all reasonable measures necessary to ensure that fire, explosion, emission, or discharge do not occur, recur, or spread to other materials at the facility. These shall include, where applicable, stopping facility operations, collecting and containing released materials, and removing or isolating containers. If the facility stops operations in response to a fire, explosion, emission, or discharge, the Emergency Coordinator must ensure that adequate monitoring is conducted for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment whenever this is appropriate.

The Emergency Coordinator will oversee and direct facility personnel in the performance of their responsibilities for addressing the emergency situation. Immediately following an emergency, the Emergency Coordinator (with PADEP approval) must provide for treating, storing, or disposing residues, contaminated soil, etc., from an emission, discharge, fire, or explosion at the construction site. The Emergency Coordinator must ensure that in the affected areas of the facility, no material incompatible with the emitted or discharged residues is processed, stored, treated, or disposed until cleanup procedures are completed and that all emergency equipment utilized in implementation of the PPC Plan is cleaned and fit for its intended use before operations are resumed. Newfield will notify PADEP and the appropriate State or local

authorities that the facility is in compliance before operations are resumed in the affected areas of the facility. Newfield will note the time, date and details of an incident that requires implementing the PPC Plan.

Within 15 days after the incident, Newfield will submit a written report on the incident to PADEP and the U.S. Environmental Protection Agency regional administrator. The report must be submitted to:

Director - Bureau of Water Quality Management
Pennsylvania Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110

Regional Administrator
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103

Director - PADEP Northeast Office
Pennsylvania Department of Environmental Protection
2 Public Square
Wilkes-Barre, PA 18711

The report should include the following information:

- Name, address, and telephone number of the individual filing the report;
- Name, address, and telephone number of the facility;
- Date, time, type, and location of incident;
- A brief description of the circumstances causing the incident;
- Description and estimated quantity (by weight) of materials or wastes involved;
- The extent of injuries, if any;
- An assessment of actual or potential threat to human health or the environment and assessment of contamination of land, water, or air, where applicable;
- Estimated quantity and disposition of recovered materials or wastes that resulted from the incident; and
- A description of what actions Newfield intends to take to prevent a similar occurrence in the future.

2.4 CHAIN OF COMMAND

Facility personnel must report emergency situations to the Emergency Coordinators. A Chain of Command flow chart (Table 5, Appendix C) has been developed and should be implemented during an emergency. The Emergency Response Chain of Command flow chart will be posted

next to all telephones onsite, posted in areas where potential emergency situations could arise, and placed in onsite company vehicles, as appropriate.

2.5 DISTRIBUTION OF THIS PPC PLAN

A copy of this PPC Plan and subsequent revisions will be distributed to:

- Drilling Manager (Primary Emergency Coordinator)
- Production Manager (Secondary Emergency Coordinator)

The PPC Plan will be reviewed and amended, if necessary, based on the criteria described earlier in Section 1.7.

3.0 SPILL AND LEAK PREVENTION AND RESPONSE

The site will be maintained and operated to minimize the possibility of a fire, explosion or discharge of oils, hazardous materials or their constituents to air, soil, surface water or groundwater which could threaten human health or the environment, in accordance with the requirements of 25 PA Code Section 265.31.

3.1 PRE-RELEASE PLANNING

The following sections discuss specific locations where the potential exists for accidental spills of oils and/or chemicals. The controls that are in place to minimize the potential for an uncontrolled release to the environment are also discussed. In the event that an uncontrolled spill of hazardous substances occurs, the procedures described in Section 4.0 will be followed.

To enhance spill prevention at the facility, great care will be exercised in handling oil and other materials covered in this PPC Plan. Any unusual conditions observed by any employees or contractors will be reported to one of the Emergency Response Coordinators. Management personnel whose responsibilities include involvement with the materials discussed in this document will also be familiar with this plan and the procedures recommended for spill prevention.

Spill Prevention Measures: Procedures that are to be followed to prevent and/or minimize oil spills at the Newfield facility include:

- ASTs and/or containers will be stored in secondary containment with sufficient volume;
- ASTs and regulated material containers will be visually inspected weekly for leaks;
- Special care will be taken when transferring regulated materials to prevent product loss;
- Regulated materials will be stored in a manner that minimizes the potential for contact with stormwater;
- Absorbent and spill control materials shall be maintained on-site for emergency use;

- Emergency response personnel will be familiar with procedures to follow in the case of a spill; and

- In cases where there may be leaking equipment or operations where oil or oil-related compounds are leaked, spilled, or otherwise released, containment booms or absorbent materials shall be used and equipment shall be repaired.

In the event that an uncontrolled spill of oil or a hazardous material occurs, the procedures described in Section 4.0 will be followed. Responses should be coordinated with federal, state and local agencies as appropriate.

3.2 MATERIAL COMPATIBILITY

The majority of materials received on-site in totes, drums, pails or other small containers are stored in the containers supplied by the manufacturer.

Construction materials used for the ASTs have been selected and designed to be compatible with the materials that are being stored and are typical for the natural gas industry.

3.3 INSPECTIONS AND MONITORING PROGRAM

Operating equipment will be inspected daily, and a copy of the inspection and maintenance form is included in Appendix A. Employees are responsible for detecting and reporting potential problems on the inspection and maintenance form.

Storage tank inspections will be conducted weekly and include evaluation of the following: pumps, valves, and fittings for leaks; the tank condition for evidence of corrosion; secondary containment; evidence of spilled materials; and effectiveness of housekeeping practices.

Completed inspection forms and inspection reports will be maintained in the Primary Emergency Coordinator's office. Noncompliance issues identified during the comprehensive site evaluation will be addressed in a timely manner. If additional control measures are required, implementation of the measures will generally occur within 90 days of the site evaluation. Compliance issues that require revisions to the PPC Plan (description of additional pollutant sources, measures, or controls) will be incorporated into the plan within approximately 15 days of the site evaluation.

Stormwater Management System: Stormwater inspections will include an evaluation of best management practices (BMPs), where appropriate. In accordance with the erosion and sedimentation control plan prepared for the site, erosion and sedimentation control (ESC) measures will be implemented where there is the potential for sediment or soil particles to impact stormwater quality. Repairs will be made, as necessary, following the site inspection.

Storage Tanks and Drum Storage Areas: Tanks and drum storage areas will be accessed daily. Spills or leaks that may occur will be contained by secondary containment and noted as part of routine facility operations. To enhance the daily observations, periodic inspections will be performed for the tank and drum storage areas as described in Table 2. The inspections will include observation of spill and/or leaks and observations of the condition of associated secondary containment structures. Records for the inspections will be maintained in the Primary Emergency Coordinator's office.

3.4 PREVENTIVE MAINTENANCE

Newfield will ensure that preventative maintenance of operating machinery on each construction site is performed regularly.

3.5 HOUSEKEEPING PROGRAM

The Newfield Construction Manager will be responsible for general construction site housekeeping. Specific steps taken under this program will include:

- Debris and/or sediment removal, as necessary.
- Regular refuse pickup and disposal.
- Proper filling and emptying of storage containers, tanks, and equipment to minimize spill potential.
- Periodic review of good housekeeping procedures in the employee-training program.

Once completed, the Production Manager will have overall responsibility for housekeeping at the facility. Newfield currently does not anticipate that bulk quantities of hazardous waste materials will be stored at the facility.

3.6 SECURITY

The facility is not fully fenced but is located in a remote location with limited access except via the site access road. The facility is normally manned during drilling and well development.

Flow and drain valves are locked and in the off position when in non-operational or non-standby status. The starter controls for each oil pump are locked in the off position when in non-operating or non-standby status. Master flow/drain valves are all located on the Facility and monitored by staff.

Any loading/unloading connections of facility piping is capped or blind flanged when not in service or is in standby service for an extended amount of time.

The facility has lighting sufficient for detection of spills during nighttime operations. Consideration has been given to: (a) discovery of spills occurring during hours of darkness, both by operating personnel, if present, and by non-operating personnel, and (b) prevention of spills occurring through acts of vandalism.

3.7 EXTERNAL FACTOR PLANNING

External factors are not anticipated to increase the risk of a spill or release that would impact human safety or the environment. Power outages, adverse weather conditions, or employee strikes could result in discontinuation of earth moving, drilling or well preparation activities. The Emergency Coordinator will monitor operations and initiate their orderly shutdown when necessary.

Access road conditions may be impacted by adverse weather conditions, possibly increasing the risk of a release of materials being delivered or removed. Truck drivers should report poor road conditions to the Construction or Drilling Manager. If conditions deteriorate to where they may impact safe movement of materials, the construction or Drilling Manager will review the conditions and initiate repairs or road closure as deemed necessary.

3.8 EMPLOYEE TRAINING PROGRAM

Newfield's employee training program enables employees to understand the processes and materials with which they are working, the safety and health hazards, the practices for preventing spills, and the procedures for responding properly and rapidly to spills. It also familiarizes personnel with emergency procedures.

All Newfield employees receive job specific training. Emergency Coordinators, Well Tenders, and other oil or hazardous material handling employees receive annual training on the facility's PPC and SPCC plans.

Job specific training includes preventive maintenance, inspection and monitoring activities, shut down procedures and housekeeping practices. PPC training will include spill/release recognition, initial response, initial notifications and follow-up. The training program is designed to ensure that personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment systems including, where applicable: procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment; key parameters for automatic cut-off systems; communications and alarms systems; response to fires and explosions; site evacuation procedures; and shutdown of operations.

Annual right-to-know training for all facility employees is conducted relevant to the materials present at the facility. Employees will be given detailed instructions regarding the materials and wastes with which they are working; including safety and health hazards, handling methods, proper disposal procedures, and emergency procedures. The location of MSDS's for on-site materials will be identified to all employees.

Training records will be maintained at the facility and in the employee's personnel file.

4.0 COUNTERMEASURES

4.1 COUNTERMEASURES TO BE UNDERTAKEN BY FACILITY

The following sections present general spill response practices to be implemented at the Newfield facility, as appropriate.

4.1.1 Spill Clean-Up Procedures - General

Incidental spills should be contained and cleaned up when discovered per the employees job related training. Clean up material should be placed into a marked container and the Construction or Drilling Manager notified appropriately.

For large spills or spills of oils or hazardous materials which may reach surface water or impact the environment, the employee who first discovers the spill should contact the Emergency Coordinator. He should then work to contain and clean-up the spill.

Spill clean-up involves three steps: containment, removal, and disposal. In the event of a spill, it is very important that the material be contained to the maximum extent possible in order to minimize the effect of the spill and the cost of clean-up. **NOTE: ANY SHEEN ON A WATERBODY (STREAM, RIVER, OR WETLAND) IS A REPORTABLE RELEASE.** Once the spill is contained, the spilled material and contaminated material must be collected and physically removed from the area

4.1.2 Spill Clean-Up Procedures - Specific

The employee should do the following:

- Contain the spill to the smallest area possible using absorbent materials, earthen dikes or other diversion or containment structures. Stormwater collection structures will be either blocked or pumped.
- Block off the area to prevent traffic or employees from entering the area.
- For oils and other organic materials, apply a non-reactive sorbent material, such as Oil-Dri or Kitty Litter, to the spill.
- In the case of a spill of acids hazardous waste, check the MSDS and then neutralize with lime or soda ash if appropriate.
- If a leaking tank is involved, stop liquid flows as appropriate and dike the tank area with earth or absorbent material.

- If a leaking pail, drum or other small container is involved, place it in an over-pack container.
- Clean up spilled material and place it in a marked container.
- Work with the emergency coordinator to properly store the material and arrange for proper disposal

4.1.3 Fire or Explosion

In the case of a fire or explosion, the local fire department should be notified by calling 911. Employees may attempt to extinguish fires using handheld fire extinguishers based upon their job training.

The Emergency Coordinator will determine if evacuation per section 4.4 is required.

4.2 COUNTERMEASURES TO BE UNDERTAKEN BY CONTRACTORS

The following list shows area emergency response contractors to contact should the facility require outside help.

Company: Minuteman Spill Response, Inc.
Address: P.O. Box 10
Mifflinville, PA 18631
Telephone Number: 570-759-3658
Response Time: Approximately 2 to 3 hrs
Equipment and Services: Hazardous Materials Emergency Response

4.3 INTERNAL AND EXTERNAL COMMUNICATIONS AND ALARM SYSTEM

This section describes the internal communications or alarm used to provide immediate emergency instruction (voice or signal) to installation personnel, and the external communications or alarm system used to summon emergency assistance from local police or fire departments.

Newfield facilities in Wayne County are remote and generally do not have land-line telephone systems or alarm systems. The primary means of communication is via voice or mobile telephones. Mobile phones are provided to the Drilling and Production Managers (Primary and Secondary Emergency Coordinators).

Fire, police, and emergency service can be summoned by calling the 911 or per the numbers listed in Table 3.

4.4 EVACUATION PLAN

In the unlikely event that the site must be evacuated, the Emergency Coordinator will alert personnel to re-group at the pre-designated location for attendance taking. The Emergency Coordinator is responsible to verify that all site workers are accounted for during an evacuation. Periodic drills will be conducted, if deemed necessary, to evaluate the effectiveness of this evacuation plan.

If an emergency situation requires evacuation of personnel, the Emergency Coordinator will implement the following evacuation procedures:

1. The Emergency Coordinator will provide evacuation instructions to facility personnel via the construction site communications network, as appropriate.

2. Personnel evacuation will typically proceed as follows:

   a. If downwind of incident: Evacuate via the most accessible route perpendicular to the prevailing wind direction.
   b. If upwind of incident: Evacuate in an upwind direction.

3. Personnel will reassemble at the public road at the facility entrance as shown on Figure 3 or an alternate assembly point identified by the Emergency Coordinator, that is upwind of the incident location, and remain at this location until the Emergency Coordinator has accounted for all personnel.

4. The names of employees and the destination of employees transported to hospitals, etc. for treatment will be recorded by the Emergency Coordinator, first aid personnel or fire officials.

Once on public roadways, evacuation routes are left up to the individual.

4.5 EMERGENCY EQUIPMENT AVAILABLE FOR RESPONSE

This section provides a list of available emergency equipment, and procedures for maintenance and decontamination of emergency equipment. Newfield's emergency equipment at the facility will allow personnel to respond safely and quickly to emergency situations. Equipment will be inspected and maintained by Construction Manager to assure recommended quantities are available and its proper operation in time of emergency. After an emergency, equipment will be decontaminated, cleaned, and re-fit for its intended use before normal operations resume.

The Newfield facility will be equipped with the following emergency response equipment:

(1) Mobile telephones are provided to the Drilling and Production Mangers and are immediately available at the scene of operations for summoning emergency assistance from local police departments, fire departments or State or local emergency response teams.

(2) Portable fire extinguishers, fire control equipment, spill control equipment and decontamination equipment. This equipment is detailed in Table 4 of Appendix C.

5.0 EMERGENCY SPILL CONTROL NETWORK

5.1 ARRANGEMENTS WITH LOCAL EMERGENCY RESPONSE AGENCIES AND HOSPITALS

This section provides a list of local emergency response agencies and hospitals, and associated phone numbers. Arrangements can be made, as appropriate, to inform local emergency response agencies and hospitals concerning the type of materials handled at the Newfield facility and the potential need for services.

If appropriate, arrangements can be made to designate who will be the primary emergency response agency and who will provide support services during emergencies. Efforts can be made to familiarize police, fire departments, emergency response teams, and the Wayne County Emergency Management Agency (EMA) Coordinator with the layout of the site, the properties and dangers associated with any hazardous materials handled, places where personnel would normally be working, entrances to roads inside the site, and potential evacuation routes.

If considered appropriate by Newfield's Emergency Coordinator, agreements with hospitals and emergency response agencies can be made and included in the periodic updating or amending of the PPC Plan. The agreements and/or arrangements include efforts to familiarize area agencies and emergency responders with facility operations and potential emergency operations. The following agencies can be contacted and provided with a copy of this PPC Plan, at the discretion of the Newfield Emergency Coordinator.

- Local fire companies;
- Local county emergency response personnel;
- Local ambulance personnel; and
- Local hospital.

Table 3 lists local emergency response agencies to be contacted in the event of an emergency or reportable spill. In the unlikely event that a widespread emergency exists, the Wayne County EMA would be contacted first, and the Coordinator in turn could contact appropriate emergency response agencies through their communications network.

The Wayne County Emergency Management Agency can be contacted at (570) 253-1622. Routing of injured persons will be performed by emergency medical services personnel based on the number and type of injuries requiring treatment. The emergency medical services coordinator may be provided with a copy of this PPC Plan to assist in planning. The nearest hospitals are Catskill Regional Medical Hospital in Callicoon, New York, and Wayne County Memorial Hospital in Honesdale, Pennsylvania. The nearest fire departments are Callicoon Fire District in Callicoon, New York, Protection Engine Co No. 3 in Honesdale, Pennsylvania, and Narrowsburg Fire Department, in Narrowsburg, New York. The nearest police departments are the Honesdale Police Department, located in Honesdale, Pennsylvania, and Waymart Police Department in Honesdale Pennsylvania. All emergency response departments shall be reached through the 911 system.

5.2 NOTIFICATION LISTS

If the Emergency Coordinator determines that the facility has had an emission, discharge, fire, or explosion that could threaten human health or the environment, he will contact and report as necessary his findings to the appropriate agencies listed in Table 3. When calling any of the agencies listed in Table 3, the following information should be available for reporting to the identified agencies:

- Company name and location;
- Name of person reporting the spill, title, and telephone number;
- The type of material released;
- Estimated or exact (if known) quantity of material released (i.e., gallons, pounds, etc.);
- A brief description of the incident, including type of incident, nature of hazardous material involvement, and possible hazards to human health and the environment outside the facility;
- Probable source and location of the spill source;
- Date and time of the spill;
- Location of entry point into surface water and amount reaching the waterway (if applicable);
- The name of the receiving water and the downstream water bodies of which it is a tributary;
- Confirmation that release has been stopped or, if not, when will it be stopped;
- Mitigation/containment actions initiated;
- Direction of material movement;

- Potential population affected by the release;
- Name of person to contact on behalf of the company who will be at the scene and will be directing response measures;
- Telephone number where the on-scene coordinator can be reached; and
- The extent of injuries, if any.

A reporting form is attached in Appendix D for use by the Emergency Coordinator.

A written report including the above listed information, and other information that may be required by the applicable regulations (see 25 PA Code Section 265.56) regarding the spilled material, will need to be transmitted within 15 days to the following agencies:

U.S. Environmental Protection Agency
Region III
Spill Response Section
1650 Arch Street
Philadelphia, PA 19103

Pennsylvania Department of Environmental Protection
Bureau of Water Quality Management
2 Public Square
Wilkes-Barre, Pennsylvania 18711

6.0 WASTE DISPOSAL PRACTICES

Produced water will be removed periodically from the tanks at each well site and transported by a licensed residual waste hauler to a permitted disposal facility. Other wastes generated onsite will include used hydraulic oil that will be reclaimed from operating equipment and transported offsite for recycling. All wastes will be disposed in accordance with applicable local, state, and federal regulations.

7.0 STORMWATER MANAGEMENT PRACTICES

Newfield implements several Best Management Practices (BMPs) at each well site to reduce the potential for stormwater runoff of suspended solids and other contaminants. These BMPs include routine visual inspections, preventive maintenance, good housekeeping, and management of stormwater run-on and runoff. Routine inspection and monitoring, preventive maintenance, and good housekeeping programs are discussed in Sections 3.3, 3.4, and 3.5 of this PPC Plan. These programs prevent accidental releases of contaminants and reduce contaminant migrations via stormwater discharges. Stormwater management activities are discussed in Section 3.1 of this PPC Plan. The certification statement regarding the evaluation of discharges and confirmation that they will be comprised solely of stormwater is presented at the beginning of this Plan. Potential "significant sources of non-stormwater at the site" may include condensate, brine, hydraulic oil drums and tanks, gasoline and diesel fuel. Storage areas for these significant sources will be inspected on a daily basis.

8.0 SEDIMENT AND EROSION PREVENTION

Erosion and sedimentation controls are managed in accordance with PADEP requirements. Copies of the site E&S Plan are available at the Newfield office in Honesdale, PA and at each well site.

APPENDIX A

INSPECTION FORMS

NEWFIELD APPALACHIA PA LLC
Weekly Facility Inspection Form

Facility:	Inspector Name:
Date of Inspection:	

Instructions: Indicate yes or no. If no, record observations describing the specific equipment and discrepancy.

Aboveground Storage Tanks		
• Equipment appears adequately supported	Yes ☐	No ☐
• No evidence of active or past leaks from equipment, piping, connections, vales, vents, etc.	Yes ☐	No ☐
• Coating condition appears satisfactory	Yes ☐	No ☐
• Corrosion appears acceptable	Yes ☐	No ☐
• Level gauages/alarms are operative	Yes ☐	No ☐
• Containers are labeled	Yes ☐	No ☐
Observations:		

Processing Equipment		
• Equipment appears adequately supported	Yes ☐	No ☐
• No evidence of active or past leaks from equipment, piping, connections, vales, vents, etc.	Yes ☐	No ☐
• Coating condition appears satisfactory	Yes ☐	No ☐
• Corrosion appears acceptable	Yes ☐	No ☐
Observations:		

Other Facility Equipment is Checked for: ❖ No evidence of active or past leaks ❖ Condition of equipment appears to be satisfactory (i.e., not damaged, deteriorated, or worn), and ❖ Corrosion appears to be acceptable.		
• Wellheads	Yes ☐	No ☐
• Gathering systems	Yes ☐	No ☐
• Well test stations	Yes ☐	No ☐
• Traps/Sumps	Yes ☐	No ☐
• Drainage systems and nearby ditches	Yes ☐	No ☐
• Applicable flowlines including right-of-way areas	Yes ☐	No ☐
• Containment systems	Yes ☐	No ☐
• Facility piping	Yes ☐	No ☐
Observations:		

NEWFIELD APPALACHIA PA LLC
Weekly Facility Inspection Form

Secondary Containment		
• Passive containment (berm) has adequate capacity and integrity as intended	Yes ☐	No ☐
• Active containment measures are adequate	Yes ☐	No ☐
• No evidence of active or past leaks (i.e., staining, sheen)	Yes ☐	No ☐
• Any valves are closed and plugged	Yes ☐	No ☐
• Active containment is free from a significant quantity of rain/snow	Yes ☐	No ☐
Observations:		

Security		
• Lighting is adequate to observe leaks, spills, and vandalism	Yes ☐	No ☐
• Pumps, valves, nozzles are locked	Yes ☐	No ☐
Observations:		

Spill Response		
• Spill response kits are stocked and located in readily accessible areas	Yes ☐	No ☐
Observations:		

Signature:	Date:

E&S INSPECTION FORM

The E&S plan contains a maintenance program which provides for inspection of BMPs (Best Management Practices such as filter sock, vegetation, construction entrances, etc.) on a weekly basis and after each measurable rainfall event, including the repair of BMPs to ensure effective and efficient operation. The maintenance program for both the temporary and permanent erosion and sediment control BMPs, including disposal of materials removed from the BMPs or project area, has been included in the narrative. The type of maintenance, such as cleanout, repair, replacement, regrading, re-stabilizing, etc. for each of the BMPs is included in the plan. **NOTE: This inspection report must be kept up to date and onsite.**

INSPECTION DATE	INITIALS	RAINFALL OR WEEKLY?	LOCATION OF E&S CONTROL(S)	CONDITION NOTED	CORRECTIVE MEASURES TAKEN

Facility: _____ **Inspector:** _____ **Signed:** _____ **Date:** _____

Print *Signature*

Tank Truck Loading and Unloading Checklist

Date: _____ Material being loaded/unloaded: _____

Driver/Loader present during loading or unloading of material _____
(signature)

_____ Current volume in storage tank was checked prior to loading.

_____ Fill hose inspected for condition prior to loading.

_____ Wheel chocks in place prior to loading.

_____ Tanker valve(s) were inspected for leakage prior to filling and departure.

_____ The loading of the tanker was monitored.

_____ Hoses were replaced and capped after loading.

_____ No material was spilled onto the containment pad or ground.

- These forms must be completed for every tank truck shipment and must be filed in the facility PPC Plan.
- All spills should be immediately reported to at least one of the following Newfield personnel:

Don Sleeth
Drilling Manager
Office: 281-674-2501
Cell: 281-974-0051

Jack Cochran
Production Manager
Office: 814-437-2344
Cell: 814-671-1557

Burl Eakle
Cell: 918-448-1296

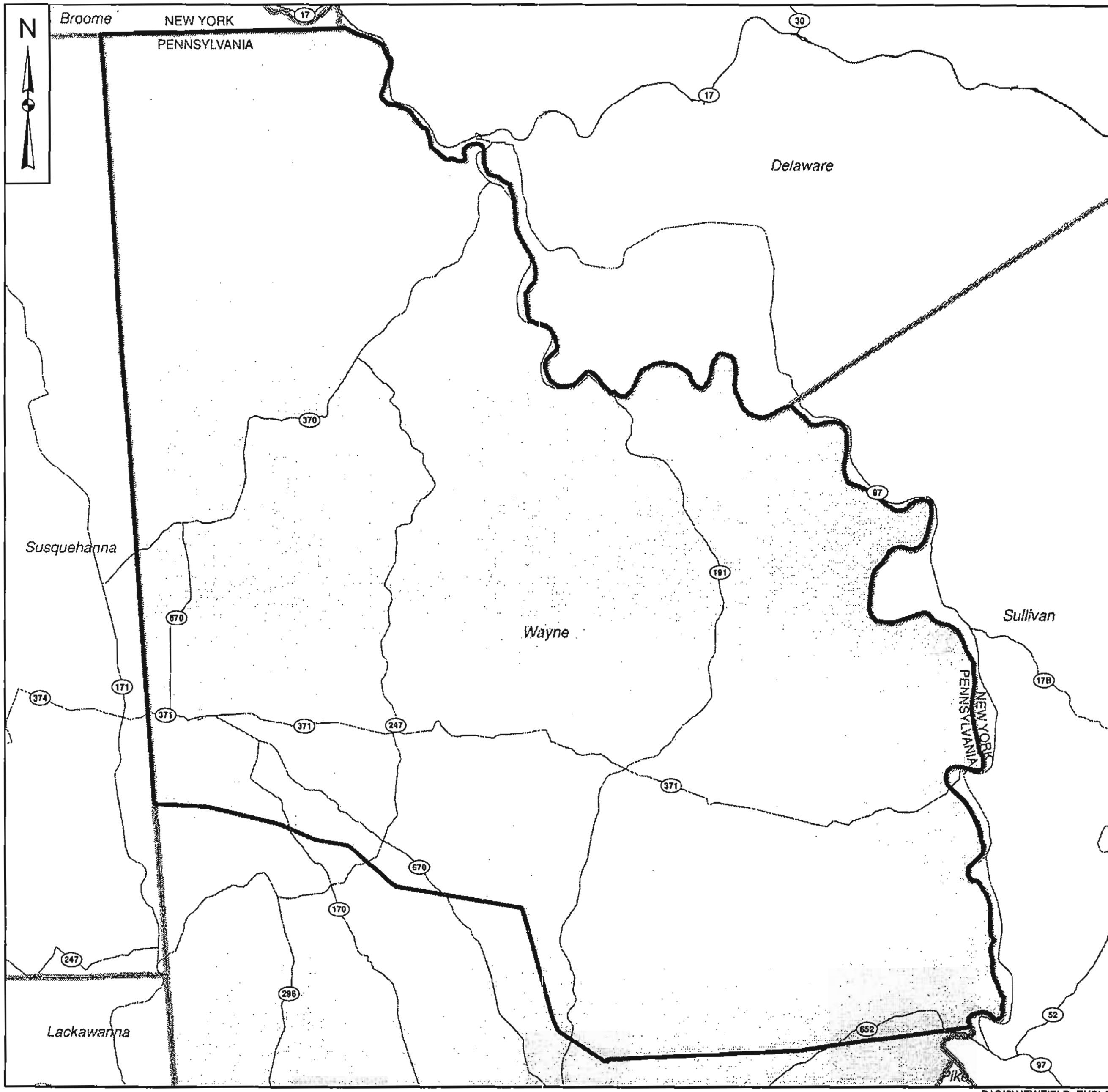
Delivery Information

Invoice No. _____

Load No. _____

Company _____

APPENDIX B
FIGURES



TETRA TECH

Figure 1
Well Field Map
Newfield Exploration Company

Legend

- Road (E)
- County (E)
- Wayne County (E)
- Lease Area (N)

Sources:
(E) - Indicates the data was provided by ESRI.
(N) - Indicates the data was provided by Newfield Exploration Company

4 2 0 4 Miles

Drawn By: S. PAXTON 04/20/10
Checked By: A. STRASSNER 04/20/10
Approved By:

Contract Number: 112C02679

P:\GIS\NEWFIELD_EXPLORATION\MAPDOCS\MXD\PPC_PLAN_WELL_FIELD_MAP.MXD 04/20/10 SP

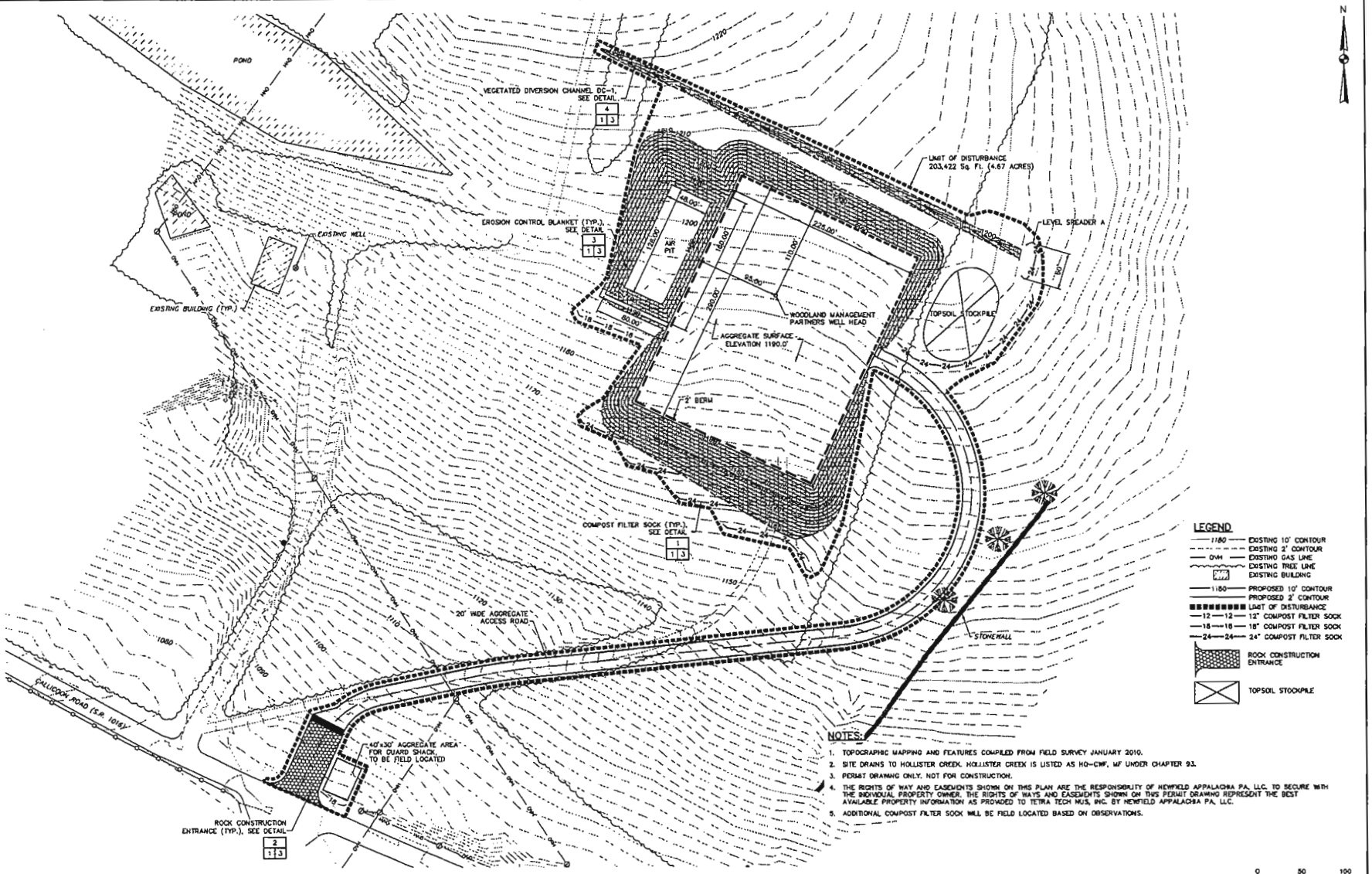
TETRA TECH
WWW.TETRATECH.COM
661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

NEWFIELD APPALACHIA PA, LLC
WAYNE COUNTY, PENNSYLVANIA
WOODLAND MANAGEMENT PARTNERS
WELL PAD
LOCATION MAP

SCALE: 1" = 2000'

DATE:	3/4/10
PROJECT NO.:	112C02568
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	RAL
SHEET: 1 OF 2	

FIGURE 2



NOTES:

1. TOPOGRAPHIC MAPPING AND FEATURES COMPILED FROM FIELD SURVEY JANUARY 2010.
2. SITE DRAINS TO HOLLISTER CREEK. HOLLISTER CREEK IS LISTED AS HQ-CWF, MF UNDER CHAPTER 93.
3. PERMIT DRAWING ONLY. NOT FOR CONSTRUCTION.
4. THE RIGHTS OF WAY AND EASEMENTS SHOWN ON THIS PLAN ARE THE RESPONSIBILITY OF NEWFIELD APPALACHIA PA, LLC. TO SECURE WITH THE INDIVIDUAL PROPERTY OWNER. THE RIGHTS OF WAYS AND EASEMENTS SHOWN ON THIS PERMIT DRAWING REPRESENT THE BEST AVAILABLE PROPERTY INFORMATION AS PROVIDED TO TETRA TECH NUS, INC. BY NEWFIELD APPALACHIA PA, LLC.
5. ADDITIONAL COMPOST FILTER SOCK WILL BE FIELD LOCATED BASED ON OBSERVATIONS.

0 50 100
SCALE: 1" = 50'

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE - FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

WOODLAND MANAGEMENT PARTNERS WELL PAD
EROSION & SEDIMENT CONTROL PLAN

SCALE: 1" = 50'

DATE:	5/6/10
PROJECT NO.:	112C02879
DESIGNED BY:	RL
DRAWN BY:	BH
CHECKED BY:	RL
SHEET:	1 OF 7

FIGURE 3

APPENDIX C
TABLES

TABLE 1

LIST OF MATERIALS & WASTES

CONSTUCTION

POLLUTIONAL MATERIAL	VOLUME OR QUANTITY	LOCATION ONSITE	SPILL CONTAINMENT MATERIALS ONSITE/LOCATION
Diesel Fuel	250 gallons	Well Pad	Sorbent pads; shovels/Gang box
Lubricants	180 gallons	Well Pad	Sorbent pads; shovels/Gang box
OIL ABSORBANT	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
Trash & Debris	2,000 lbs	Well Pad	Sorbent pads; shovels/Gang box

DRILLING

POLLUTIONAL MATERIAL	VOLUME OR QUANTITY	LOCATION ONSITE	SPILL CONTAINMENT MATERIALS ONSITE/LOCATION
Diesel Fuel	2000 gallons	Well Pad	Sorbent pads; shovels/Gang box
Lubricants	320 gallons	Well Pad	Sorbent pads; shovels/Gang box
DURATONE HT	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
GELTONE V	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
Lime	7,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
OIL ABSORBANT	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
Base Fluid	300 bbl	Well Pad	Sorbent pads; shovels/Gang box
Rig Wash	2,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
Calcium Chloride (CaCl-)	4,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
RHEMOD L	1,770 lbs	Well Pad	Sorbent pads; shovels/Gang box
LE SUPERMUL	8,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
BARACARB 25, 50 (2 pallets each)	12,600 lbs	Well Pad	Sorbent pads; shovels/Gang box
WALNUT	2,400 lbs	Well Pad	Sorbent pads; shovels/Gang box
DRILTREAT	1,900 lbs	Well Pad	Sorbent pads; shovels/Gang box
Liquid Mud	1,500 bbl	Well Pad	Sorbent pads; shovels/Gang box
BAROID REGULAR / **BAROID BULK (barite)	125,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
Trash & Debris	2,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
Drill Cuttings	100,000 lbs	Air Pit	Sorbent pads; shovels/Gang box
Cement	130,000 lbs	Well Pad	Sorbent pads; shovels/Gang box

TABLE 2

INSPECTION AND MONITORING ACTIVITIES

Activity	Frequency
Erosion and Sedimentation Control Measures	Weekly or after a significant rain event
Aboveground Storage Tanks	Daily
Drum Storage Areas	Daily
Best Management Practices (BMPs)	Per BMP requirements
Dust Control Measures	Daily
Preparedness, Prevention, and Contingency (PPC) Plan Compliance Evaluation Inspections and Update of PPC Plan, as Appropriate	Annually

TABLE 3
AGENCY NOTIFICATION LIST

The following agencies are to be contacted, as appropriate, in the event of an emergency, accident, or chemical release.

Agency	Telephone No.
PADEP Northeast Regional Office	570-826-2511
PADEP Southcentral Office (Harrisburg)	877-333-1904
Pennsylvania Emergency Management Agency	717-651-2001
Police Department	9-1-1
Volunteer Fire Department	9-1-1
U.S. Environmental Protection Agency	215-814-5700
U.S. Coast Guard National Response Center	800-424-8802
U.S. Coast Guard (local)	570-421-1191
Pennsylvania Fish and Boat Commission	814-445-8974
Chemical Transportation Emergency Center:	
* Chemical Exposure Information	800-424-9300

LOCAL EMERGENCY RESPONSE:

Fire Department –	9-1-1
Callicoon Fire District in Callicoon, New York, Protection Engine Co No. 3 in Honesdale, Pennsylvania Narrowsburg Fire Department, in Narrowsburg, New York.	
Police Department –	9-1-1
Honesdale Police Department, Honesdale, Pennsylvania Waymart Police Department, Honesdale Pennsylvania	
Hospitals-Wayne County Memorial Hospital, Honesdale, Pennsylvania	570-251-6672
Catskill Regional Medical Hospital in Callicoon, New York	845-887-5530
Local Emergency Management	
Wayne County EMA	570-253-1622

TABLE 4

On-Site Emergency Response Equipment

On-Site Emergency Response Equipment
Fire Extinguishers
Tyvek Suits
Nitrile Gloves
Hearing Protection
Particulate Adsorbent
Absorbent Pads
Shovels
Earth Moving Equipment
Decontamination Equipment

TABLE 5
CHAIN OF COMMAND

Primary Emergency Coordinator

Don Sleeth
Drilling Manager
Office: 281-674-2501
Cell: 281-974-0051

Secondary Emergency Coordinator

Jack Cochran
Production Manager
Office: 814-437-2344
Cell: 814-671-1557

Construction Manager
Burl Eakle
Cell: 918-448-1296

Offsite Emergency Response Contractors

Company: Minuteman Spill Response, Inc.
Telephone Number: 800-905-7788

APPENDIX D
REPORTING FORM

Spill Response Notification Form

GENERAL REPORTING INFORMATION
Prepared _____ (First) (M.I.) (Last) (Position)
Daytime phone: (xxx) xxx-xxxx Evening phone: (xxx) xxx-xxxx
Newfield Appalachia PA LLC (Company) (Address) (City) (State) (Zip)
Calling for responsible party? Yes Were materials discharged? Yes Confidential? No
Meeting Federal obligations to report: Yes
INCIDENT DESCRIPTION
Source and/or cause:
Date of Incident:Time of Incident:
Incident Location/Address
Nearest City: XXXX, PA XXXXX (XXXXXXX County)
Distance from City: In city limits Direction from City: In city limits
Facility Oil Storage Capacity: XXXXXX gallons
Container Type:Container Capacity: (gals)
Facility Latitude: xx° xx' xx" Longitude xx° xx' xx"
MATERIAL
Name (or CHRIS Code):
Discharged Quantity (Units): Discharged to Water (Units):
RESPONSE ACTION
Actions taken to correct, control or mitigate incident:
IMPACT
No. of Injuries: No. of Deaths: Other:
Evacuation (Y/N): Damage (Y/N): Amount ($):
Medium Affected: Description: Additional Information:
AGENCY NOTIFIED
NRC 800-424-8802 Date: Time: Contact:
PADEP (570) 826-2511 Date: Time: Contact:
USCG Date: Time: Contact:
Other Date: Time: Contact:
ADDITIONAL INFORMATION:

APPENDIX E
MSDS SHEETS

MATERIAL SAFETY DATA SHEET

Diesel Fuel (All Types) **MSDS No. 9909**

EMERGENCY OVERVIEW
CAUTION!
OSHA/NFPA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT
EFFECTS CENTRAL NERVOUS SYSTEM
HARMFUL OR FATAL IF SWALLOWED
Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation (rash). Long-term, repeated exposure may cause skin cancer.
If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).

NFPA 704 (Section 16)

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800) 424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732) 750-6000
MSDS INTERNET WEBSITE: www.hess.com (See Environment, Health, Safety & Social Responsibility)

SYNONYMS: Ultra Low Sulfur Diesel (ULSD); Low Sulfur Diesel; Motor Vehicle Diesel Fuel; Diesel Fuel #2; Dyed Diesel Fuel; Non-Road, Locomotive and Marine Diesel Fuel; Tax-exempt Diesel Fuel

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and CHEMICAL INFORMATION ON INGREDIENTS

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Diesel Fuel (68476-34-6)	100
Naphthalene (91-20-3)	Typically < 0.01

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher. Diesel fuel may be dyed (red) for tax purposes. May contain a multifunctional additive.

3. HAZARDS IDENTIFICATION

EYES
Contact with liquid or vapor may cause mild irritation.

SKIN
May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11 Toxicological Information.

IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A). NIOSH regards whole diesel fuel exhaust particulates as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	> 125 °F (> 52 °C) minimum PMCC
AUTOIGNITION POINT:	494 °F (257 °C)
OSHA/NFPA FLAMMABILITY CLASS:	2 (COMBUSTIBLE)
LOWER EXPLOSIVE LIMIT (%):	0.6
UPPER EXPLOSIVE LIMIT (%):	7.5

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

FIRE FIGHTING INSTRUCTIONS

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Diesel fuel, and in particular low and ultra low sulfur diesel fuel, has the capability of accumulating a static electrical charge of sufficient energy to cause a fire/explosion in the presence of lower flashpoint products such as gasoline. The accumulation of such a static charge occurs as the diesel flows through pipelines, filters, nozzles and various work tasks such as tank/container filling, splash loading, tank cleaning; product sampling; tank gauging; cleaning, mixing, vacuum truck operations, switch loading, and product agitation. There is a greater potential for static charge accumulation in cold temperature, low humidity conditions.

Documents such as 29 CFR OSHA 1910.106 "Flammable and Combustible Liquids, NFPA 77 Recommended Practice on Static Electricity, API 2003 "Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents and ASTM D4865 "Standard Guide for Generation and Dissipation of Static

Electricity in Petroleum Fuel Systems" address special precautions and design requirements involving loading rates, grounding, bonding, filter installation, conductivity additives and especially the hazards associated with "switch loading." ["Switch Loading" is when a higher flash point product (such as diesel) is loaded into tanks previously containing a low flash point product (such as gasoline) and the electrical charge generated during loading of the diesel results in a static ignition of the vapor from the previous cargo (gasoline).]

Note: When conductivity additives are used or are necessary the product should achieve 25 picosiemens/meter or greater at the handling temperature.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Components (CAS No.)	Source	Exposure Limits TWA/STEL	Note
Diesel Fuel: (68476-34-6)	OSHA ACGIH	5 mg/m, as mineral oil mist 100 mg/m^3 (as totally hydrocarbon vapor) TWA	A3, skin
Naphthalene (91-20-3)	OSHA ACGIH	10 ppm TWA 10 ppm TWA / 15 ppm STEL	A4, Skin

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

Clear, straw-yellow liquid. Dyed fuel oil will be red or reddish-colored.

ODOR

Mild, petroleum distillate odor

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	320 to 690 oF (160 to 366 °C)
VAPOR PRESSURE:	0.009 psia @ 70 °F (21 °C)
VAPOR DENSITY (air = 1):	> 1.0
SPECIFIC GRAVITY (H_2O = 1):	0.83 to 0.88 @ 60 °F (16 °C)
PERCENT VOLATILES:	100 %
EVAPORATION RATE:	Slow; varies with conditions
SOLUBILITY (H_2O):	Negligible

10. STABILITY and REACTIVITY

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers; Viton ®; Fluorel ®

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY

Acute dermal LD50 (rabbits): > 5 ml/kg
Acute oral LD50 (rats): 9 ml/kg
Primary dermal irritation: extremely irritating (rabbits)
Draize eye irritation: non-irritating (rabbits)
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY

Carcinogenic: OSHA: NO IARC: NO NTP: NO ACGIH: A3

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

MUTAGENICITY (genetic effects)

This material has been positive in a mutagenicity study.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME:	Diesel Fuel	Placard (International Only):
HAZARD CLASS and PACKING GROUP:	3, PG III	
DOT IDENTIFICATION NUMBER:	NA 1993 (Domestic) UN 1202 (International)	
DOT SHIPPING LABEL:	None	

Use Combustible Placard if shipping in bulk domestically

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the *de minimis* levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

CALIFORNIA PROPOSITON 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Diesel Engine Exhaust (no CAS Number listed)	10/01/1990

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 3 (Combustible Liquid) and Class D, Division 2, Subdivision B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING

HEALTH:	0
FIRE:	2
REACTIVITY:	0

Refer to NFPA 704 "Identification of the Fire Hazards of Materials" for further information

HMIS® HAZARD RATING

HEALTH:	1 *	* Chronic
FIRE:	2	
PHYSICAL:	0	

SUPERSEDES MSDS DATED: 02/28/2001

ABBREVIATIONS:

AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute (212) 642-4900
API	American Petroleum Institute (202) 682-8000
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
DOT	U.S. Department of Transportation [General info: (800) 467-4922]
EPA	U.S. Environmental Protection Agency
HMIS	Hazardous Materials Information System
IARC	International Agency For Research On Cancer
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Canadian Workplace Hazardous Materials Information System

MATERIAL SAFETY DATA SHEET

Review Date: 04/23/2007

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: PENNZOIL™ LONG-LIFE™ Motor Oil (All Grades)

MSDS NUMBER: 614348LU - 1
PRODUCT CODE(S): 5071324, 5071325, 5071326, 5071369, 5071371

MANUFACTURER
SOPUS Products
P.O. Box 4427
Houston, TX. 77210-4427

TELEPHONE NUMBERS
Spill Information: (877) 242-7400
Health Information: (877) 504-9351
MSDS Assistance Number: (877) 276-7285

SECTION 2 PRODUCT/INGREDIENTS

INGREDIENTS	CAS#	CONCENTRATION
Heavy Duty Motor Oil		
Highly refined petroleum oils	Mixture	90 - 99 %volume
Zinc Dialkyldithiophosphate	68649-42-3	1 - 5 %volume
Proprietary additives	Mixture	1 - 5 %volume

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Appearance & Odor: Bright and clear liquid. Mild odor.
Health Hazards: No known immediate health hazards.
Physical Hazards: No known physical hazards.
NFPA Rating (Health, Fire, Reactivity): 0, 1, 0
Hazard Rating: Least - 0 Slight - 1 Moderate - 2 High - 3 Extreme - 4

Inhalation:
Inhalation of vapors (generated at high temperatures only) or oil mist may cause mild irritation of the nose, throat, and respiratory tract.

Eye Irritation:
Lubricating oils are generally considered no more than minimally irritating to the eyes.

Skin Contact:
May cause slight irritation of the skin. If irritation occurs, a temporary burning sensation and minor redness and/or swelling may result.

Ingestion:

Lubricating oils are generally no more than slightly toxic if swallowed.

Other Health Effects:
The International Agency for Research on Cancer (IARC) has determined there is sufficient evidence for the carcinogenicity in experimental animals of used gasoline motor oils. Handling procedures and safety precautions in the MSDS should be followed to minimize exposure to the used product.

Signs and Symptoms:
Irritation as noted above.

Aggravated Medical Conditions:
Pre-existing eye, skin and respiratory disorders may be aggravated by exposure to this product.

For additional health information, refer to section 11.

SECTION 4 FIRST AID MEASURES

Inhalation:
Remove victim to fresh air and provide oxygen if breathing is difficult. Get medical attention. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.

Skin:
Remove contaminated clothing and shoes and wipe excess from skin. Flush skin with water, then wash with soap and water. If irritation occurs, get medical attention. Do not reuse clothing until cleaned. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

Eye:
Flush with water. If irritation occurs, get medical attention.

Ingestion:
Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical attention.

Note to Physician:
In general, emesis induction is unnecessary in high viscosity, low volatility products such as oils and greases.

SECTION 5 FIRE FIGHTING MEASURES

Flash Point [Method]: >400 °F/>204.44 °C [Pensky-Martens Closed Cup]

Extinguishing Media:
Material will float and can be re-ignited on surface of water. Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames. Do not use a direct stream of water.

Fire Fighting Instructions:
Do not enter confined fire space without full bunker gear (helmet with face shield, bunker coats, gloves and rubber boots), including a positive pressure, NIOSH approved, self-contained breathing apparatus. This material is non-flammable.

Unusual Fire Hazards:
Material may ignite when preheated.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures:
May burn although not readily ignitable.

Wear appropriate personal protective equipment when cleaning up spills. Refer to Section 8.

Spill Management:
FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

Place in container for proper disposal. Remove contaminated soil to remove contaminated trace residues. Dispose of in same manner as material.

Reporting:
CERCLA: Product is covered by EPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) petroleum exclusion. Releases to air, land, or water are not reportable under CERCLA (Superfund).

CWA: This product is an oil as defined under Section 311 of EPA's Clean Water Act (CWA). Spills into or leading to surface waters that cause a sheen must be reported to the National Response Center, 1-800-424-8802.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures:
Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet. Launder contaminated clothing before reuse. Properly dispose of contaminated leather articles such as shoes or belts that cannot be decontaminated. Avoid heat, open flames, including pilot lights, and strong oxidizing agents. Use explosion-proof ventilation to prevent vapor accumulation. Ground all handling equipment to prevent sparking.

Storage:
Do not store in open or unlabeled containers. Store in a cool, dry place with adequate ventilation. Keep away from open flames and high temperatures.

Container Warnings:
Keep containers closed when not in use. Containers, even those that have been emptied, can contain explosive vapors. Do not cut, drill, grind, weld or perform similar operations on or near containers.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical	Limit	TWA	STEL	Ceiling	Notation
Oil mist, mineral	ACGIH TLV	5 mg/m3	10 mg/m3		
Oil mist, mineral	OSHA PEL	5 mg/m3			

Exposure Controls

Provide adequate ventilation to control airborne concentrations below the exposure guidelines/limits.

Personal Protection

Personal protective equipment (PPE) selections vary based on potential exposure conditions such as handling practices, concentration and ventilation. Information on the selection of eye, skin and respiratory protection for use with this material is provided below.

Eye Protection:
Chemical Goggles, or Safety glasses with side shields

Skin Protection:
Use protective clothing which is chemically resistant to this material. Selection of protective clothing depends on potential exposure conditions and may include gloves, boots, suits and other items. The selection(s) should take into account such factors as job task, type of exposure and durability requirements.

Published literature, test data and/or glove and clothing manufacturers indicate the best protection is provided by:
Neoprene, or Nitrile Rubber

Respiratory Protection:
If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Types of respirator(s) to be considered in the selection process include:
For Mist: Air Purifying, R or P style NIOSH approved respirator.
For Vapors: Air Purifying, R or P style prefilter & organic cartridge, NIOSH approved respirator. Self-contained breathing apparatus for use in environments with unknown concentrations or emergency situations.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Bright and clear liquid. Mild odor.
Substance Chemical Family: Petroleum Hydrocarbon

Flash Point	> 400 °F [Pensky-Martens Closed Cup]	**Pour Point**	-20 °F
Solubility (in Water)	Insoluble	**Specific Gravity**	0.88 - 0.89
Stability	Stable	**Viscosity**	103 cSt @ 40 °C

SECTION 10 REACTIVITY AND STABILITY

Stability:
Material is stable under normal conditions.

Conditions to Avoid:
Avoid heat and open flames.

Materials to Avoid:
Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products:

Thermal decomposition products are highly dependent on combustion conditions. A complex mixture of airborne solids, liquids and gases will evolve when this material undergoes pyrolysis or combustion. Aldehydes, Carbon Monoxide, Carbon Dioxide, Hydrogen Sulfide, Ketones, Nitrogen Oxidesand other unidentified organic compounds may be formed upon combustion.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute Toxicity

TEST	Result	OSHA Classification	Material Tested
Dermal LD50	>5.0 g/kg(Rabbit)	Non-Toxic	Based on components(s)
Oral LD50	>5.0 g/kg(Rat)	Non-Toxic	Based on components(s)

Carcinogenicity Classification

Chemical Name	NTP	IARC	ACGIH	OSHA
Heavy Duty Motor Oil	No	Not Reviewed by IARC	Not Reviewed	No

SECTION 12 ECOLOGICAL INFORMATION

Environmental Impact Summary:
There is no ecological data available for this product. However, this product is an oil. It is persistent and does not readily biodegrade. However, it does not bioaccumulate.

SECTION 13 DISPOSAL CONSIDERATIONS

RCRA Information:

Under RCRA, it is the responsibility of the user of the material to determine, at the time of the disposal, whether the material meets RCRA criteria for hazardous waste. This is because material uses, transformations, mixtures, processes, etc. may affect the classification. Refer to the latest EPA, state and local regulations regarding proper disposal.

SECTION 14 TRANSPORT INFORMATION

US Department of Transportation Classification
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.

International Air Transport Association
Not regulated under IATA rules.

International Maritime Organization Classification
Not regulated under International Maritime Organization rules.

SECTION 15 REGULATORY INFORMATION

Federal Regulatory Status

OSHA Classification:
Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Ozone Depleting Substances (40 CFR 82 Clean Air Act):
This material does not contain nor was it directly manufactured with any Class I or Class II ozone depleting substances.

Superfund Amendment & Reauthorization Act (SARA) Title III:
There are no components in this product on the SARA 302 list.

SARA Hazard Categories (311/312):

Immediate Health	Delayed Health	Fire	Pressure	Reactivity
NO	NO	NO	NO	NO

SARA Toxic Release Inventory (TRI) (313):
Zinc compounds

Toxic Substances Control Act (TSCA) Status:
All component(s) of this material is(are) listed on the EPA/TSCA Inventory of Chemical Substances.

Other Chemical Inventories:
Component(s) of this material is (are) listed on the Australian AICS, Canadian DSL, Chinese Inventory, European EINECS, Korean Inventory, Philippines PICCS,

State Regulation

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

SECTION 16 OTHER INFORMATION

Revision#: 1
Review Date: 04/23/2007
Revision Date: 12/19/2006
Revisions since last change (discussion): This Material Safety Data Sheet (MSDS) has been reviewed to fully comply with the guidance contained in the ANSI MSDS standard (ANSI Z400.1-2003). We encourage you to take the opportunity to read the MSDS and review the information contained therein.

SECTION 17 LABEL INFORMATION

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT. THIS LABEL COMPLIES WITH THE REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) FOR USE IN THE WORKPLACE. THIS LABEL IS NOT INTENDED TO BE USED WITH PACKAGING INTENDED FOR SALE TO CONSUMERS AND MAY NOT CONFORM WITH THE REQUIREMENTS OF THE CONSUMER PRODUCT SAFETY ACT OR OTHER RELATED REGULATORY REQUIREMENTS.

PRODUCT CODE(S): 5071324, 5071325, 5071326, 5071369, 5071371

PENNZOIL™ LONG-LIFE™ Motor Oil (All Grades)

ATTENTION!

PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE OIL ACNE OR DERMATITIS. USED GASOLINE ENGINE OIL HAS BEEN SHOWN TO CAUSE CANCER IN LABORATORY ANIMALS.

Precautionary Measures:
Avoid prolonged or repeated contact with eyes, skin and clothing. Avoid breathing of vapors, fumes, or mist. Use only with adequate ventilation. Wash thoroughly after handling.

FIRST AID

Inhalation: If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.
Skin Contact: Remove contaminated clothing and shoes and wipe excess from skin. Flush skin with water, then wash with soap and water. If irritation occurs, get medical attention. Do not reuse clothing until cleaned. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.
Eye Contact: Flush with water. If irritation occurs, get medical attention.
Ingestion: Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical attention.

FIRE

In case of fire, Use water fog, 'alcohol foam', dry chemical or carbon dioxide (CO_2) to extinguish flames. Do not use a direct stream of water. Material will float and can be re-ignited on surface of water.

SPILL OR LEAK

Dike and contain spill.
FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

CONTAINS: Highly refined petroleum oils, Mixture; Zinc Dialkyldithiophosphate, 68649-42-3; Proprietary additives, Mixture

NFPA Rating (Health, Fire, Reactivity): 0, 1, 0

TRANSPORTATION

US Department of Transportation Classification
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **LE SUPERMUL**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: LE SUPERMUL
Synonyms: None
Chemical Family: Blend
Application: Emulsifier

Manufacturer/Supplier

Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Diethylene glycol monobutyl ether	112-34-5	1 - 5%	Not applicable	Not applicable
Ethylene glycol monobutyl ether	111-76-2	1 - 5%	20 ppm	50 ppm

3. HAZARDS IDENTIFICATION

Hazard Overview

May cause eye and skin irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation

If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes

In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion

Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

Notes to Physician

Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	> 200**Min:** > 200
Flash Point/Range (C):	> 100**Min:** > 93
Flash Point Method:	PMCC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Use water spray to cool fire exposed surfaces. Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 2, Flammability 1, Reactivity 0
HMIS Ratings: Flammability 1, Reactivity 0, Health 2

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.

Storage Information Store away from oxidizers. Keep container closed when not in use. Product has a shelf life of 36 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Organic vapor respirator.
In high concentrations, supplied air respirator or a self-contained breathing apparatus.

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	Amber
Odor:	Mild
pH:	2.6
Specific Gravity @ 20 C (Water=1):	0.924
Density @ 20 C (lbs./gallon):	7.7
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	20
Freezing Point/Range (C):	-6.6
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	280-300
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	May cause abdominal pain, vomiting, nausea, and diarrhea. May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression.
Aggravated Medical Conditions	Lung disorders. Skin disorders.
Chronic Effects/Carcinogenicity	Prolonged or repeated exposure may cause reproductive system damage. Repeated overexposure may cause liver and kidney effects.

Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BAROID® OIL ABSORBENT**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BAROID® OIL ABSORBENT
Synonyms: None
Chemical Family: Mineral
Application: Suspending Agent

Manufacturer/Supplier

Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Magnesium silicate	1343-90-4	60 - 100%	Not applicable	Not applicable
Crystalline silica, quartz	14808-60-7	2-6	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Granules
Color:	Gray to tan
Odor:	Odorless
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	2.6
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	32-38
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact None known.

Eye Contact May cause eye irritation.

Ingestion May be harmful if swallowed.

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not applicable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	Product contains one or more components not listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **RHEMOD L**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: RHEMOD L
Synonyms: None
Chemical Family: Tall oil fatty acid
Application: Viscosifier

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Fatty acids, C18-unsatd., trimers	68937-90-6	10 - 30%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and skin irritation. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	518
Flash Point/Range (C):	270
Flash Point Method:	COC
Autoignition Temperature (F):	> 425
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 1, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Wash hands after use.
Storage Information	Store in a cool, dry location. Product has a shelf life of 36 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Not normally needed. But if significant exposures are possible then the following respirator is recommended: Organic vapor respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Dark
Odor:	Fatty acid
pH:	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity @ 20 C (Water=1):	0.96
Density @ 20 C (lbs./gallon):	8
Bulk Density @ 20 C (lbs/ft3):	57.30
Boiling Point/Range (F):	> 572
Boiling Point/Range (C):	> 300
Freezing Point/Range (F):	< -4
Freezing Point/Range (C):	< 25
Vapor Pressure @ 20 C (mmHg):	< 0.001
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate=1):	0
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	1849 @ 25C
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid None known.

Incompatibility (Materials to Avoid) None known.

Hazardous Decomposition Products Carbon monoxide and carbon dioxide.

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye and skin contact.

Inhalation May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

Skin Contact May cause skin irritation.

Eye Contact May cause mild eye irritation.

Ingestion Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.

Aggravated Medical Conditions Skin disorders.

Chronic Effects/Carcinogenicity No data available to indicate product or components present at greater than 1% are chronic health hazards.

Other Information None known.

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BAROID® RIG WASH**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BAROID® RIG WASH
Synonyms: None
Chemical Family: Blend
Application: Surfactant

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Isopropanol	67-63-0	1 - 5%	200 ppm	400 ppm

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin Wash with soap and water. Get medical attention if irritation persists. Remove contaminated clothing and launder before reuse.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion If swallowed dilute with 1-2 glasses of milk or water and then induce vomiting.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined**Min:** > 220
Flash Point/Range (C):	Not Determined**Min:** > 104
Flash Point Method:	COC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.

Storage Information Store away from oxidizers. Keep container closed when not in use. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Organic vapor respirator.

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Clear blue
Odor:	Slight Alcohol
pH:	9.5

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity @ 20 C (Water=1):	1.025
Density @ 20 C (lbs./gallon):	8.5
Bulk Density @ 20 C (lbs/ft3):	63.6
Boiling Point/Range (F):	> 212
Boiling Point/Range (C):	> 100
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid None known.

Incompatibility (Materials to Avoid) Strong oxidizers.

Hazardous Decomposition Products Oxides of sulfur. Carbon monoxide and carbon dioxide.

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

Skin Contact May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression.

Aggravated Medical Conditions Skin disorders.

Chronic Effects/Carcinogenicity No data available to indicate product or components present at greater than 1% are chronic health hazards.

Other Information None known.

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product contains toxic chemical(s) listed below which is(are) subject to the reporting requirements of Section 313 of Title III of SARA and 40 CFR Part 372: Glycol Ethers//34398-01-1 Isopropanol//67-63-0
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **FWCA CEMENT ADDITIVE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: FWCA CEMENT ADDITIVE
Synonyms: None
Chemical Family: Polysaccharide
Application: Free Water Control Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Cellulose derivative		60 - 100%	10 mg/m^3	15 mg/m^3

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation. Airborne dust may be explosive.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	770
Autoignition Temperature (C):	410
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Health 0, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust.

Storage information Store away from oxidizers. Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White
Odor:	Characteristic

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	6.5
Specific Gravity @ 20 C (Water=1):	1.39
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	32
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	<5
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Forms gel
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	>600

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Aldehydes. Carboxylic acids. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mild eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined

Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HALAD® 322 CEMENT ADDITIVE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HALAD® 322 CEMENT ADDITIVE
Synonyms: None
Chemical Family: Blend
Application: Cement Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Sodium formate	141-53-7	1 - 5%	Not applicable	Not applicable
Cellulose derivative		10 - 30%	10 mg/m^3	15 mg/m^3

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation. Airborne dust may be explosive.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Health 0, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust.

Storage Information Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Red
Odor:	Odorless

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.28
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	35.2
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Partially soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	>600

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of sulfur. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined

Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HALAD® 344 CEMENT ADDITIVE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HALAD® 344 CEMENT ADDITIVE
Synonyms: None
Chemical Family: Polymer
Application: Fluid Loss Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Modified acrylamide copolymer		60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water spray, dry chemical, or foam.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 1, Reactivity 0
HMIS Ratings: Health 1, Flammability 1, Physical Hazard 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust. Do not swallow. Avoid contact with eyes, skin, or clothing.

Storage Information Store in a cool, dry location. Store away from oxidizers. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Dust/mist respirator. (95%)

Hand Protection Nitrile gloves. Polyvinylchloride gloves. Neoprene gloves. Rubber gloves. Butyl rubber gloves. Cloth gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Powder

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	White to off white
Odor:	Odorless
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.37
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	25-35
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	18
Freezing Point/Range (C):	-8
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	<5
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	>600

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide. Oxides of sulfur.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	Prolonged or repeated contact may cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	No adverse health effects are expected from swallowing.
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined

Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	BOD(28 Day): 3% of COD
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM48: 2000 mg/l (Arcatia tonsa)
Acute Crustaceans Toxicity:	TLM48: > 1000 mg/l (Daphnia magna)
Acute Algae Toxicity:	EC50: 3300 mg/l (Skeletonema costatum)
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

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END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HR-5**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HR-5
Synonyms: None
Chemical Family: Lignosulfonate
Application: Cement Retarder

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Modifed lignosulfonate		60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 0, Reactivity 0
HMIS Ratings: Health 1, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.

Storage Information Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Black
Odor:	Molasses
pH:	9.5-10.3
Specific Gravity @ 20 C (Water=1):	1.32

9. PHYSICAL AND CHEMICAL PROPERTIES

Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	29.8
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	25
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of sulfur.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mechanical irritation to eye.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM96: > 1000 ppm (Crangon crangon)
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

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*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HR-601**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HR-601
Synonyms: None
Chemical Family: Lignosulfonate
Application: Cement Retarder

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Modifed lignosulfonate		60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Lower (oz./ft3):	0.2
Flammability Limits in Air - Upper (%):	Not Determined
Flammability Limits in Air - Upper (oz./ft3):	3.5

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Decomposition in fire may produce toxic gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 1, Reactivity 0
HMIS Ratings:	Health 1, Flammability 1, Physical Hazard 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.
Storage Information	Store away from oxidizers. Store in a cool, dry location. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Not normally needed. But if significant exposures are possible then the following respirator is recommended: Dust/mist respirator. (95%)
Hand Protection	Normal work gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Brown
Odor:	Woody
pH:	7.8
Specific Gravity @ 20 C (Water=1):	1.08
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	30.5
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of sulfur. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mechanical irritation to eye.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	

Oral Toxicity:	LD50: > 5000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM48: > 1000 mg/l (Daphnia magna)
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **KCL POTASSIUM CHLORIDE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: KCL POTASSIUM CHLORIDE
Synonyms: None
Chemical Family: Inorganic Salt
Application: Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Potassium chloride	7447-40-7	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Health 1, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Avoid breathing vapors.
Storage Information	Store in a cool, dry location. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Dust/mist respirator. (95%)
Hand Protection	Normal work gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Dust proof goggles.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White to gray
Odor:	Odorless
pH:	9.2
Specific Gravity @ 20 C (Water=1):	1.99
Density @ 20 C (lbs./gallon):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Bulk Density @ 20 C (lbs/ft3):	72.8
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	25.5
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	74.55

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	May cause moderate skin irritation.
Eye Contact	May cause severe eye irritation.
Ingestion	Irritation of the mouth, throat, and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: > 5000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM96: 100-330 ppm (Crangon crangon)
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **POZ STANDARD CEMENT 50/50**

Revision Date: 05-Jan-2009

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: POZ STANDARD CEMENT 50/50
Synonyms: None
Chemical Family: Cement
Application: Cement

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Fly ash	68131-74-8	30 - 60%	Not applicable	Not applicable
Bentonite	1302-78-9	1 - 5%	Not applicable	Not applicable
Portland cement	65997-15-1	30 - 60%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	1 - 5%	0.025 mg/m^3	10 mg/m^3 %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	None - does not burn.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Health 1*, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Gray
Odor:	Odorless
pH:	12.4
Specific Gravity @ 20 C (Water=1):	Not Determined
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Not Determined
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure

Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact

Can dry skin. May cause an allergic skin reaction. May cause alkali burns with confined contact.

Eye Contact

May cause severe eye irritation.

Ingestion

None known

Aggravated Medical Conditions

Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not applicable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	E Corrosive Material D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **CEMENT - CLASS H - PREMIUM**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: CEMENT - CLASS H - PREMIUM
Synonyms: None
Chemical Family: Cement
Application: Cement

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Portland cement	65997-15-1	60 - 100%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	<3	0.025 mg/m^3	10 mg/m^3 %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	None - does not burn.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Gray
Odor:	Odorless
pH:	12.4
Specific Gravity @ 20 C (Water=1):	3.15
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	94
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	0.5
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Keep away from any contact with water.
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact Can dry skin. May cause an allergic skin reaction. May cause alkali burns with confined contact.

Eye Contact May cause severe eye irritation.

Ingestion None known

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not applicable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	E Corrosive Material D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BARACARB® 25**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BARACARB® 25
Synonyms: None
Chemical Family: Mineral
Application: Bridging Agent

Manufacturer/Supplier

Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Crystalline silica, quartz	14808-60-7	0 - 1%	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2
Limestone	1317-65-3	60 - 100%	10 mg/m^3	15 mg/m^3

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 0, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store away from acids. Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid Powder
Color:	White
Odor:	Odorless
pH:	8-9
Specific Gravity @ 20 C (Water=1):	2.7
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	168
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong acids.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion None known

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: LD50: > 5000 mg/kg (Rat)

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM96: >1,000,000 ppm (Mysidopsis bahia) SPP @ 178.5 ppb
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BARACARB® 50**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BARACARB® 50
Synonyms: None
Chemical Family: Mineral
Application: Bridging Agent

Manufacturer/Supplier

Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Limestone	1317-65-3	60 - 100%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	0 - 1%	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 0, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store away from acids. Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid Powder
Color:	White
Odor:	Odorless
pH:	8-9
Specific Gravity @ 20 C (Water=1):	2.7
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	72-112
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong acids.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion None known

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: LD50: > 5000 mg/kg (Rat)

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: TLM96: >1,000,000 ppm (Mysidopsis bahia) SPP @ 178.5 ppb
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BAROID®**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BAROID®
Synonyms: None
Chemical Family: Mineral
Application: Weight Additive

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Barium sulfate	7727-43-7	60 - 100%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	1 - 5%	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation. May be harmful if swallowed.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Pink to tan to gray
Odor:	Odorless
pH:	8-9-
Specific Gravity @ 20 C (Water=1):	4.2
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	100- 155
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	233.4

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact None known.

Eye Contact May cause mild eye irritation.

Ingestion May produce nervous system effects such as feeling of weakness, unsteady walk, and dilation of blood vessels. May affect the heart and cardiovascular system.

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not applicable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM96: 7500 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity:	TLM96: > 1,000,000 ppm (Mysidopsis bahia) SPP @ 132.6 ppb
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **LIME**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: LIME
Synonyms: None
Chemical Family: Inorganic
Application: pH Control

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Calcium hydroxide	1305-62-0	60 - 100%	5 mg/m^3	15 mg/m^3

3. HAZARDS IDENTIFICATION

Hazard Overview
May cause eye and skin burns. May cause respiratory irritation. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation
If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin
Wash with soap and water. Get medical attention if irritation persists. Remove contaminated clothing and launder before reuse.

Eyes
In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion
Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician
Not Applicable

5. FIRE FIGHTING MEASURES

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not Determined
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.
Storage Information	Store away from acids. Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Dust/mist respirator. (95%)
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White
Odor:	Odorless
pH:	12.2
Specific Gravity @ 20 C (Water=1):	2.24
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	75
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	0.2
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	74.1

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong acids.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	Causes severe skin irritation. May cause skin burns on prolonged contact.
Eye Contact	Causes severe eye irritation May cause eye burns.
Ingestion	Irritation of the mouth, throat, and stomach.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 7340 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: TLM96: 100-500 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity: TLM96: 478,520 ppm (Mysidopsis bahia) SPP @ 8 ppb
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Empty container completely. Transport with all closures in place. Return for reuse or dispose in a sanitary landfill according to national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **WALNUT HULLS**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: WALNUT HULLS
Synonyms: None
Chemical Family: Nut Hulls
Application: Loss Circulation Material

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Walnut hulls	Mixture	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye irritation.

4. FIRST AID MEASURES

Inhalation Under normal conditions, first aid procedures are not required.

Skin Under normal conditions, first aid procedures are not required.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Lower (oz./ft3):	0.07
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust.

Storage Information Store away from oxidizers. Store in a dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Safety glasses.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Brown
Odor:	Characteristic

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.1
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mild eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined

Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Biodegradable

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: TLM96: > 1,000,000 ppm (Mysidopsis bahia) SPP @ 10 ppb
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

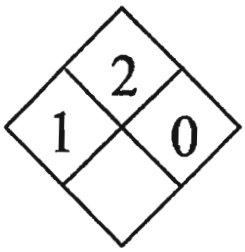
16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

INTEGRITY
INDUSTRIES INC.



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MATERIAL SAFETY DATA SHEET

****

SECTION I - MANUFACTURER

Integrity Industries, Inc.
2710 E. Corral St.
Kingsville, Texas 78363
Emergency Phone: (361) 595-5561

Revised Date: 06/05/2008
Supercedes: new

THIS DOCUMENT IS PREPARED PURSUANT TO THE OSHA HAZARDOUS COMMUNICATION STANDARD (29 CFR 1910.1200). ALSO, OTHER SUBSTANCE NOT DEEMED "HAZARDOUS" PER THIS MSDS MAY BE LISTED.

SECTION II - MATERIAL IDENTIFICATION

Trade Name: **SYNVERT Base Oil**
Synonyms/Other Designations: Synthetic Drilling Fluid / Polymer Suspension Base
Placard: Not Applicable
Hazard(s): non-hazardous

Component	CAS Number	Weight
Paraffin/Olefin blend	Mixture	100%

SECTION III - PHYSICAL & CHEMICAL DATA

Boiling Point: IBP > 300 °F
Specific Gravity (H2O=1): 0.766
Vapor Density (Air=1): n/a
Appearance: Clear, oily liquid

Pour Point: ND
Vapor Pressure (mm Hg @ 68 °F): 0.135
Solubility in H2O: Insoluble
Viscosity (cSt @104 °F): 1.4

SECTION IV - REACTIVITY

Stability: Stable
Incompatibility: Heat, sparks, open flame. May react with strong acids/strong oxidizing agents, chlorates, nitrates, peroxides.
Hazardous Decomposition Products: Oxides of carbon. Hazardous Polymerizations: will not occur

SECTION V - FIRE & EXPLOSION DATA

Flash Point (ASTM D-93): > 200 °F
Autoignition: n/a
Extinguishing Media: Water spray, Dry Chemical, Foam, CO2
Special Fire Fighting Procedures: Respirators/eye protection and full firefighting protective gear.
Unusual Fire Hazards: Remove containers from source of heat.

SECTION VI - EMERGENCY & FIRST AID DATA

Inhalation: Move to well ventilated area; if breathing difficulties persist after 15 minutes seek medical assistance.
Eye Contact: Wash eye thoroughly for 15 minutes; if irritation persists seek medical assistance.
Skin Contact: Wash affected area with soap & water for 15 minutes; if irritation persists seek medical assistance.
Ingestion: Do not induce vomiting and seek medical advice.

SECTION VII - HEALTH HAZARDS DATA

Acute: May irritate eyes, skin, respiratory, & gastrointestinal tract. Chronic: Repeated/prolonged skin contact may irritate/redden skin, progressing to dermatitis.

SECTION VIII - SPILL & DISPOSAL DATA

Accidental Spill Procedures: Absorb in inert material and dispose of according to local, state & federal regulations. Spill into water should be contained to avoid runoff into waterways.
Handling & Storage: Keep container closed and store in cool dry place. Emptied container still contains material which may ignite with explosive violence if exposed to open flame.

SECTION IX - SPECIAL PROTECTION DATA

Respiratory Protection: Respirator in confined areas.
Ventilation: Desired Exhaust: Mechanical
Protective Gloves: Solvent/chemical resistant gloves
Eye Protection: Safety glasses, goggles.
Other Protection: As required to avoid skin contact.

SECTION X - TRANSPORT INFORMATION

The following may not apply to all shipping situations. Consult 49 CFR for more mode-specific or quantity-specific data.
DOT Proper Shipping Name: Not regulated
DOT Hazard Class or Division: Not regulated
DOT Identification Number: N/A
DOT Packaging Group: III
Type Label(s) Required. none
Placard: Not applicable
*For Limited Quantity requirements see DOT regulation 49 CFR.

SECTION XI - DISCLAIMERS

* SOME INFORMATION PROVIDED HEREIN WAS DRAWN FROM SOURCES OTHER THAN INTEGRITY INDUSTRIES.
THE INFORMATION PROVIDED HEREIN IS BELIEVED BY INTEGRITY INDUSTRIES, INC. TO BE CORRECT & RELIABLE; NO EXPRESSED OR IMPLIED WARRANTY IS PROVIDED HOWEVER.
* INTEGRITY INDUSTRIES, INC. ASSUMES NO RESPONSIBILITY AND DENIES ALL LIABILITY FOR ANY LOSS, DAMAGE, OR EXPENSE CONNECTED WITH CUSTOMERS' METHOD OF HANDLING, STORAGE, USE, AND DISPOSAL OF THIS PRODUCT.
* THE MSDS INFORMATION PROVIDED HEREIN IS APPLICABLE ONLY TO THIS PRODUCT.

TABLE 3
AGENCY NOTIFICATION LIST

The following agencies are to be contacted, as appropriate, in the event of an emergency, accident, or chemical release.

Agency	Telephone No.
PADEP Northeast Regional Office	570-826-2511
PADEP Southcentral Office (Harrisburg)	877-333-1904
Pennsylvania Emergency Management Agency	717-651-2001
Police Department	9-1-1
Volunteer Fire Department	9-1-1
U.S. Environmental Protection Agency	215-814-5700
U.S. Coast Guard National Response Center	800-424-8802
U.S. Coast Guard (local)	570-421-1191
Pennsylvania Fish and Boat Commission	814-445-8974
Chemical Transportation Emergency Center:	
* Chemical Exposure Information	800-424-9300

LOCAL EMERGENCY RESPONSE:

Fire Department – Wayne County Company #3,13, 21, 28, 43, and 65	9-1-1
Police Department – PSP, Honesdale, Pennsylvania	9-1-1
Hospitals/Ambulances-	
Damascus Township Ambulance, Pennsylvania MT Pleasant Ambulance Northern Wayne Ambulance Mobile 504	9-1-1
Wayne County Memorial Hospital, Honesdale, Pennsylvania	570-251-6672
CMC – Trauma Center, Scranton, Pennsylvania	570-969-8128
Catskill Regional Medical Hospital in Callicoon, New York	845-887-5530
Local Emergency Management	
Wayne County EMA	570-253-1622

Exhibit 5

5500-FM-OG0001A Rev. 11/2007

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

COPY

CORRECTED WELL PERMIT

DEP USE ONLY	
Permittee's eFACTS ID: 277879	Auth ID: 825419
Watershed Name	Quality

Permittee	OGO.#	Permit Number	Date Issued
NEWFIELD APPALACHIA PA LLC	OGO-67425	37-127-20012-	04/29/2010

Address	Farm Name & Well Number	Well Serial #
363 N SAM HOUSTON PKWY E STE 2020	HL RUTLEDGE 1 1	
	Municipality: Damascus	County: Wayne
HOUSTON, TX 77060-2424	7½ ' Quadrangle Name: Galilee	Map Section #: 2

Phone	Project #	Latitude	Longitude
(281) 847-6031		41-43-43.2000	-75-11-32.1000

Surf Elev at Site	Anticipated Total Depth	Well Type	Offset distances referenced to NE corner of map section.
1440 feet	8350 feet	TE	South 7820 feet West 6983 feet

This permit covering the well operator and well location shown above is evidence of permission granted to conduct activities in accordance with the Oil and Gas Act and the Oil and Gas Conservation Law, if the well is subject to that act and any rules and regulations promulgated thereunder, subject to the conditions contained herein and in accordance with the application submitted for this permit. This permit does not convey any property rights.

This permit and the permittee's authority to conduct the activities authorized by this permit are conditioned upon operator's compliance with applicable law and regulations.

Notification must be given to the district oil and gas inspector, the surface landowner and political subdivision of the date well drilling will begin at least 24 hours prior to commencement of drilling activities.

The permittee hereby authorizes and consents to allow, without delay, employees or agents of the Department to have access to and to inspect all areas upon presentation of appropriate credentials, without advance notice or a search warrant. This includes any property, facility, operation or activity governed by the Oil and Gas Act, the Oil and Gas Conservation Law, the Coal and Gas Resource Coordination Act and other statutes applicable to oil and gas activities administered by the Department. The authorization and consent shall include consent to the Department to collect samples of wastewaters or gases, to take photographs, to perform measurements, surveys, and other tests, to inspect any monitoring equipment, to inspect the methods of operation and disposal, and to inspect and copy documents required by the Department to be maintained. The authorization and consent includes consent to the Department to examine books, papers, and records pertinent to any matter under investigation pursuant to the Oil and Gas Act or pertinent to a determination of whether the operator is in compliance with the above referenced statutes. This condition in no way limits any other powers granted to the Department under the Oil and Gas Act and other statutes, rules and regulations applicable to these activities as administered by the Department.

This permit does not relieve the operator from the obligation to comply with the Clean Streams Law and all statutes, rules and regulations administered by the Department.

Special Permit Conditions:

This permit expires **04/29/2011** unless drilling is commenced on or before that date and prosecuted with due diligence.

S. Craig Lobb
Regional Oil and Gas Program Manager

Stephen Watson
Oil & Gas Inspector

2 Public Square
Wilkes-Barre, PA 18711-0790

570-826-2320
Telephone

5500-FM-OG0001A Rev. 11/2007

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

DEP USE ONLY	
Permittee's eFACTS ID: 277879	Auth ID: 825419
Watershed Name: N. Branch Culkins Creek	Quality HQ

WELL PERMIT COPY

Permittee	OGO.#	Permit Number	Date Issued
NEWFIELD APPALACHIA PA LLC	OGO-67425	37-127-20012-	04/29/2010

Address	Farm Name & Well Number	Well Serial #
363 N SAM HOUSTON PKWY E STE 2020	HL RUTLEDGE 1 1	
	Municipality: Damascus	County: Wayne
HOUSTON, TX 77060-2424	7½ ' Quadrangle Name: Galilee	Map Section #: 2

Phone	Project #	Latitude	Longitude
(281) 847-6031		41-43-43.2000	-75-11-32.1000

Surf Elev at Site	Anticipated Total Depth	Well Type	Offset distances referenced to NE corner of map section.
1440 feet	8350 feet	GS	South 7820 feet West 6983 feet

This permit covering the well operator and well location shown above is evidence of permission granted to conduct activities in accordance with the Oil and Gas Act and the Oil and Gas Conservation Law, if the well is subject to that act and any rules and regulations promulgated thereunder, subject to the conditions contained herein and in accordance with the application submitted for this permit. This permit does not convey any property rights.

This permit and the permittee's authority to conduct the activities authorized by this permit are conditioned upon operator's compliance with applicable law and regulations.

Notification must be given to the district oil and gas inspector, the surface landowner and political subdivision of the date well drilling will begin at least 24 hours prior to commencement of drilling activities.

The permittee hereby authorizes and consents to allow, without delay, employees or agents of the Department to have access to and to inspect all areas upon presentation of appropriate credentials, without advance notice or a search warrant. This includes any property, facility, operation or activity governed by the Oil and Gas Act, the Oil and Gas Conservation Law, the Coal and Gas Resource Coordination Act and other statutes applicable to oil and gas activities administered by the Department. The authorization and consent shall include consent to the Department to collect samples of wastewaters or gases, to take photographs, to perform measurements, surveys, and other tests, to inspect any monitoring equipment, to inspect the methods of operation and disposal, and to inspect and copy documents required by the Department to be maintained. The authorization and consent includes consent to the Department to examine books, papers, and records pertinent to any matter under investigation pursuant to the Oil and Gas Act or pertinent to a determination of whether the operator is in compliance with the above referenced statutes. This condition in no way limits any other powers granted to the Department under the Oil and Gas Act and other statutes, rules and regulations applicable to these activities as administered by the Department.

This permit does not relieve the operator from the obligation to comply with the Clean Streams Law and all statutes, rules and regulations administered by the Department.

Special Permit Conditions:

This permit expires **04/29/2011** unless drilling is commenced on or before that date and prosecuted with due diligence.

Stacy Gustafson, for S. Craig Lobins
Regional Oil and Gas Program Manager

Stephen Watson
Oil & Gas Inspector

2 Public Square
Wilkes-Barre, PA 18711-0790

570-826-2320
Telephone

5500-FM-OG0004 Rev. 1/2010

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

COPY

DEP USE ONLY	
Site ID	Primary Fac ID 728266
Client Id 277879	Subfacility Id

Well Record and Completion Report

ll Operator	DEP ID#	Well API # (Permit / Reg)	Project Number	Acres
NEWFIELD APPALACHIA PA LLC	277879	37-127-20012-		

Address	Well Farm Name & Well #	Serial #
363 N SAM HOUSTON PKWY E STE 2020,	HL RUTLEDGE 1 1	

City	State	Zip Code	County	Municipality
HOUSTON	TX	77060-2424	Wayne	Damascus

Phone	Fax	USGS 7.5 min. quadrangle map
(281) 847-6031		Galilee

Check all that apply: ☐ Original Well Record ☐ Original Completion Report ☐ Amended Well Record ☐ Amended Completion Report

WELL RECORD Also complete the Log of Formations on back (page 2)

Well Type ☐ Gas ☐ Oil ☐ Combination Oil & Gas ☐ Injection ☐ Storage ☐ Disposal

Drilling Method ☐ Rotary – Air ☐ Rotary – Mud ☐ Cable Tool

Date Drilling Started	Date Drilling Completed	Surface Elevation	Total Depth – Driller	Total Depth - Logger
		ft.	ft.	ft.

Casing and Tubing

Cement returned on surface casing? ☐ Yes ☐ No

Cement returned on coal protective casing? ☐ Yes ☐ No ☐ N/A

Hole Size	Pipe Size	Wt.	Thread / Weld	Amount in Well (ft)	*Material Behind Pipe* Type and Amount	*Packer / Hardware / Centralizers* Type	Size	Depth	Date Run

COMPLETION REPORT

Perforation Record

Date	Interval Perforated From	To

Stimulation Record

Date	Interval Treated	*Fluid* Type	Amount	*Propping Agent* Type	Amount	Average Injection

Natural Open Flow	Natural Rock Pressure	Hours	Days
After Treatment Open Flow	After Treatment Rock Pressure	Hours	Days

Well Service Companies -- Provide the name, address, and phone number of all well service companies involved.

Name	Name	Name
Address	Address	Address
City - State – Zip	City - State – Zip	City - State – Zip
Phone	Phone	Phone

5500-FM-OG0004 Rev. 1/2010

LOG OF FORMATIONS

Well API#: 37-127-20012--

(If you will need more space than this page, please photocopy the blank form before filling it in.)

Formation Name or Type	Top (feet)	Bottom (feet)	Gas at (feet)	Oil at (feet)	Water at (fresh / brine; ft.)	Source of Data

I do hereby certify to the best of my knowledge, information and belief that the well identified on this Well Record and Completion Report has been properly cased and cemented in accordance with the requirements of 25 Pa. Code Chapter 78 and any conditions contained in the permit for this well. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator's Signature

Title: Date:

DEP USE ONLY

Reviewed by: Date:

Comments:

5500-FM-OG0075 Rev. 8/2001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

Well Site Restoration Report

DEP USE ONLY	
Site ID	Primary Fac ID: 728266
Client Id: 277879	Subfacility Id

A. Operator and Well Information

Please read instructions on back before completing this form.

Well Operator: NEWFIELD APPALACHIA PA LLC	DEP ID#: 277879	Well API # (Permit / Reg): 37-127-20012-	
Address: 363 N SAM HOUSTON PKWY E STE 2020,		Well Farm Name & Well #: HL RUTLEDGE 1 1	Serial #
City: HOUSTON	State: TX / Zip Code: 77060-2424	County: Wayne	Municipality: Damascus
Phone: (281) 847-6031	Fax		

B. Land Application of Tophole Water

Date applied	pH
Volume (bbls)	Spec. cond. (µmhos/cm)

C. Off-site Waste Disposal

Type: ☐ Driling Fluid (803) Amount: bbls

☐ Fracing Fluid (804) bbls

☐ Other, specify: Qty: bbls or tons

Method of disposal or reuse

☐ Sewage Treatment Plant (10)
☐ Disposal Well (04)
☐ Brine Treatment Plant (12)
☐ Landfill (05)
☐ Other (08)

Facility Information

Name | Permit #

Hauler Information

Name

Address

City | State | Zip Code

D. On-site Disposal – Drill Cuttings or Waste

Location of center of disposal area in relation to the well:

Course: degrees | Distance: feet

Describe the **material disposed**, including additives.

Specify disposal method

☐ Unlined pit, complete Section E.
☐ Lined pit, complete Section E.
☐ Land application, complete Section F.
☐ Dusting
☐ Solidification
☐ Other

E. Pit Disposal

Describe pit closure procedures.

Subbase, material: Thickness: inches

Pit liner, material: Thickness: mils

Pit dimensions (feet) Length: Width: Depth:

F. Land Application

Area: Length: feet Width: feet

Waste-to-soil ratio (by volume):

Chemical analysis of waste

Cadmium (Cd)	ppm	Nickel (Ni)	ppm
Copper (Cu)	ppm	Zinc (Zn)	ppm
Chromium (Cr)	ppm	Oil and Grease	%
Lead (Pb)	ppm	Spec. Cond.	µmhos/cm
Mercury (Hg)	ppm		

Well Operator's Signature

Title: Date:

DEP USE ONLY

Reviewed by: Date:

Comments:

Instructions for Well Site Restoration Report

Form 5500-FM-OG0075

Use this form to file the Well Site Restoration Report as required under 25 Pa. Code § 78.65(3). This report is to be filed with the department within 60 days after the restoration of the well site.

Section A. Operator and Well Information

Enter the name, address and telephone number of the well operator/permittee.

Provide the requested well information.

Section B. Land Application Of Tophole Water

Land application of tophole water must be performed in accordance with 25 Pa. Code § 78.60.

Provide the date(s) when tophole water was applied to the land, the estimated volume discharged, and the pH and specific conductance readings of the tophole water.

Section C. Off-site Waste Disposal

If disposing of residual waste off-site, complete this section.

Check the box next to each type of waste taken off-site for disposal. More than one box may be checked. Identify the number of barrels of drilling or fracing fluid removed. If checking "other", identify the waste and show the amount in either barrels or tons. Circle the appropriate unit of measurement.

Check the box next to the type of facility or site receiving the waste. Provide the name and permit number of the facility.

Provide the name and address of the person or company hauling the waste.

Section D. On-site Disposal – Drill Cuttings or Waste

If disposing of drill cuttings and/or residual waste on-site in accordance with 25 Pa. Code § 78.61 (Disposal of drill cuttings), § 78.62 (Disposal of residual waste—pits), or § 78.63 (Disposal of residual waste—land application), complete this section.

Locate the approximate center of the disposal area by giving the course in degrees and the distance in feet from the wellhead.

Describe the types of materials that were disposed on-site. Include drill cuttings above the surface casing seat, drill cuttings below the surface casing seat, cement returns, drilling muds, frac sands, and any other material that is being disposed on-site. Indicate any additives that were in the materials being disposed.

Additives are usually present to modify the performance of cement, drilling muds or frac sands. An example might be salt or oil in drilling muds.

Check the box next to the on-site disposal methods used. If "other" is checked, briefly describe the method of disposal.

Section E. Pit Disposal

If disposing of drill cuttings under 25 Pa. Code § 78.61 (Disposal of drill cuttings) complete the pit dimensions part of this section. If disposing of drill cuttings and/or residual waste under 25 Pa. Code § 78.62 (Disposal of residual waste—pits), complete all of this section.

Describe the procedures used to close the pit. The procedures should conform to requirements in 25 Pa. Code § 78.62.

Describe the type of material and thickness used for the subbase and pit liner. The manufacturer should be identified when describing the type of material used for the pit liner.

Provide the dimensions of the pit, giving the appropriate length, width, and depth in feet.

Section F. Land Application

If disposing of drill cuttings and/or residual waste including contaminated drill cuttings under 25 Pa. Code § 78.63, complete this section.

Provide the approximate length and width of the land application area in feet. Indicate the ratio of waste to soil by volume. As an example, if a 3-inch layer of waste was mixed into a 6-inch layer of soil the ratio would be 1/2. In no case may the ratio exceed 1/1.

Complete the chemical analysis information if it is requested by the department. The analysis is to be performed on the waste soil mixture after land application has occurred. See the guidelines for land application in the "Oil and Gas Operators Manual" for taking samples and for analysis methods.

If more room is needed to complete any section, provide the information on 8 ½" by 11" sheets of paper and attach to this form. Indicate the sections the information applies to.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHWEST REGIONAL OFFICE

Dear Operator:

Enclosed please find well permit(s) issued for drilling or altering a well. Developing this resource in a safe and environmentally protective manner is of utmost importance. As you may be aware, there have been several recent incidences where water supplies have been affected by natural gas migration. In order to prevent future impacts to the Commonwealth's water resources and provide a mechanism for ensuring public safety, the Department is providing the following information as a reminder of the cementing requirements for oil and gas wells.

Cementing

Properly cementing the casing of a well is critical to protecting water resources, preventing gas migration, and ensuring well integrity. If the casing is improperly cemented or if insufficient cement is used, such as when cement is not returned to the surface, the operator should notify the Department pursuant to 25 Pa. Code § 78.86.

In addition, when cementing surface casing, 25 Pa. Code § 78.85 states that the cement must be allowed to set for at least 8 hours *and* until the cement attains a compressive strength of at least 350 psi. While the cement is setting, the casing must not be disturbed. This includes any activity that may cause movement or pressure changes to the casing or the cement sheath surrounding the casing. After the cement is set, care must be taken when drilling through the plug to prevent damaging the seal at the casing seat. Disturbing the casing while cement is setting or damaging the seal at the casing seat may provide a mechanism for gas and other fluids to escape from the well and contaminate groundwater and water supplies. If this occurs, the operator must notify the Department.

In addition, the Department also reminds you of the following reporting requirements for oil and gas wells.

Reporting

1. Pursuant to Section 212(b) of the Oil and Gas Act and Section 78.122(a) of Chapter 78 of the Oil and Gas Regulations, a **Well Record** must be submitted to the Department within thirty (30) days of cessation of drilling or altering a well.

2. Pursuant to Section 212(b) of the Oil and Gas Act and Section 78.122(b) of Chapter 78 of the Oil and Gas Regulations, a **Completion Report** must be submitted to the Department within thirty (30) days of completion of the well. A copy of the Well Record and Completion Report is enclosed with this letter. This is a newly revised form which requires the operator to certify that the well has been cased and cemented according to the requirements of 25 Pa. Code Chapter 78. Well Record and Completion Report forms that do not contain this certification will not be accepted by the Department. Additional copies of this form can be obtained from the Department's eLibrary at http://www.elibrary.dep.state.pa.us/dsweb/View/Collection-9841

3. Pursuant to Section 212(a) of the Oil and Gas Act, a report specifying the well status and production on the most well-specific basis available is to be provided to the Department. Section 78.121 of Chapter 78 details the reporting time frames required for various well types, waste reporting, and the acceptable format for the **Well and Waste Production Report** submissions.

4. Also note that pursuant to Section 212(b) of the Oil and Gas Act, the Department has the authority to request and does hereby request you submit a digital copy on CD of **ALL Well Logs** (temperature, electrical, radioactive, gamma ray, neutron, induction, resistivity, multi-arm caliper, acoustic, optical, etc.) that have been run on this well.

The above records and logs are to be submitted to the Department of Environmental Protections, Oil and Gas Management, 230 Chestnut St., Meadville, Pa 16335-3481 to the attention of the Regional Oil and Gas Manager.

Thank you for your cooperation in this matter.

Sincerely,

S. Craig Lobins
Regional Manager
Oil and Gas Management

Please note that the most recent revision of the Application for Drilling or Altering a Well must be submitted with all drilling applications. Please check the website below for the most recent revisions for all forms.
http://www.dep.state.pa.us/dep/deputate/minres/oilgas/o_gforms.htm

The Erosion,Sediment& Storm water Control Module is no longer being accepted for ESCGP-1 applications. Please submit the complete ESCGP-1 application for any projects. The most recent revisions must be submitted along with the application fee of $500.00

RUTLEDGE WELL PAD
NEWFIELD APPALACHIA PA LLC.

DAMASCUS TOWNSHIP, WAYNE COUNTY, PENNSYLVANIA

EROSION & SEDIMENT CONTROL PLAN

MAY 2010

DRAWING INDEX	
No.	DRAWING TITLE
C-1	EROSION & SEDIMENT CONTROL PLAN
C-2	EROSION & SEDIMENT CONTROL NOTES
C-3	EROSION & SEDIMENT CONTROL DETAILS
C-4	STAKEOUT & SITE GEOMETRY PLAN
C-5	SITE SECTIONS
C-6	CONSTRUCTION DETAILS & BID QUANTITIES
C-7	CONSTRUCTION SPECIFICATIONS

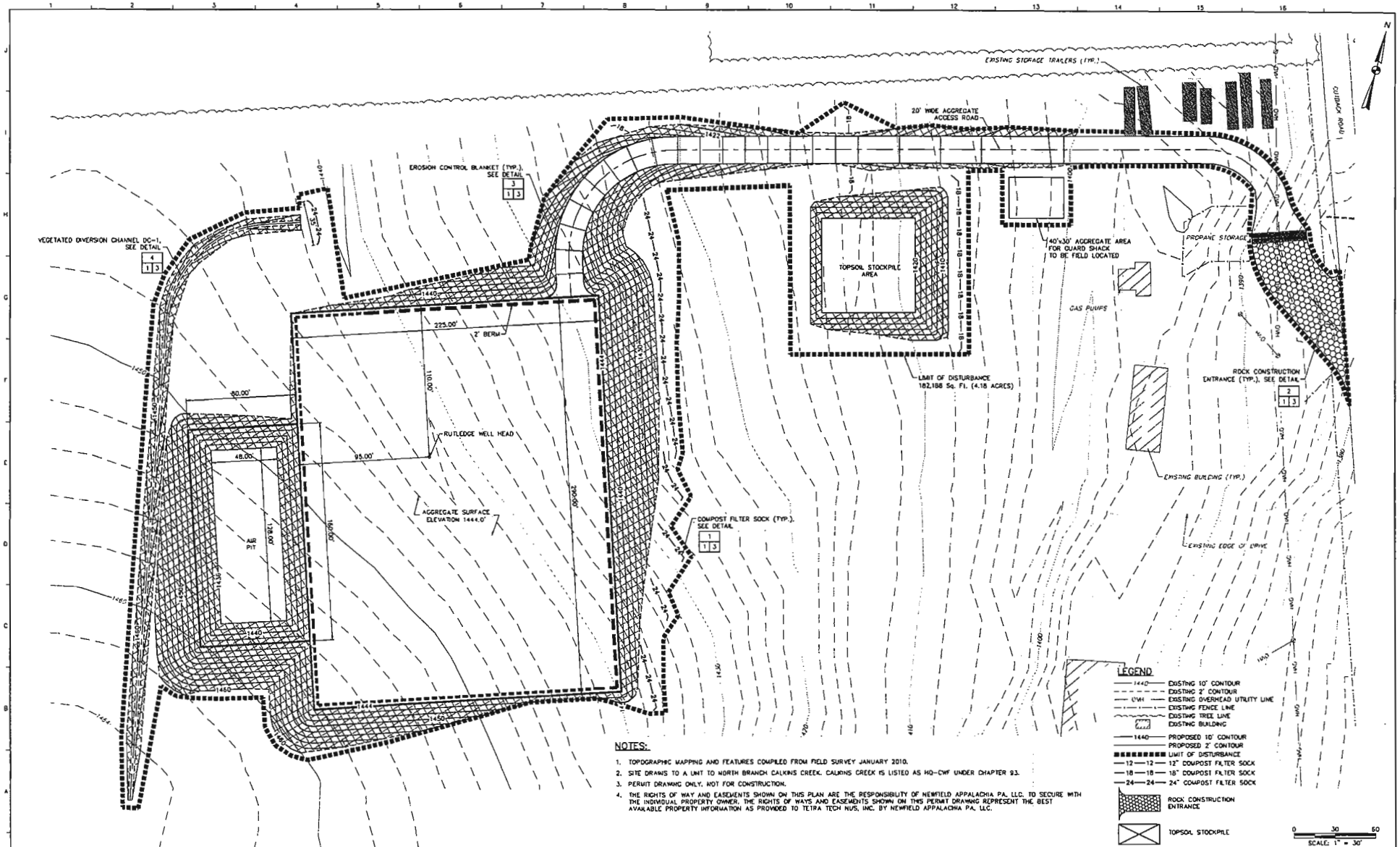
TETRA TECH

complex world | CLEAR SOLUTIONS™

661 ANDERSEN DRIVE – FOSTER PLAZA VII, PITTSBURGH, PA 15220
TEL: (412) 921-7090 | FAX: (412) 921-4040

LOCATION MAP
GALILEE, PA. – USGS 7.5' QUADRANGLE
RUTLEDGE WELL PAD
WAYNE COUNTY, PENNSYLVANIA
SCALE: 1" = 2000'

0 2000 4000
SCALE: 1" = 2000'



NOTES:

1. TOPOGRAPHIC MAPPING AND FEATURES COMPILED FROM FIELD SURVEY JANUARY 2010.
2. SITE DRAINS TO A UNT TO NORTH BRANCH CALKINS CREEK. CALKINS CREEK IS LISTED AS HQ-CWF UNDER CHAPTER 93.
3. PERMIT DRAWING ONLY, NOT FOR CONSTRUCTION.
4. THE RIGHTS OF WAY AND EASEMENTS SHOWN ON THIS PLAN ARE THE RESPONSIBILITY OF NEWFIELD APPALACHIA PA, LLC. TO SECURE WITH THE INDIVIDUAL PROPERTY OWNER. THE RIGHTS OF WAYS AND EASEMENTS SHOWN ON THIS PERMIT DRAWING REPRESENT THE BEST AVAILABLE PROPERTY INFORMATION AS PROVIDED TO TETRA TECH NUS, INC. BY NEWFIELD APPALACHIA PA, LLC.

LEGEND

- 1440 — EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- OHH — EXISTING OVERHEAD UTILITY LINE
- EXISTING FENCE LINE
- EXISTING TREE LINE
- EXISTING BUILDING
- 1440 — PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- LIMIT OF DISTURBANCE
- 12 — 12 — 12" COMPOST FILTER SOCK
- 18 — 18 — 18" COMPOST FILTER SOCK
- 24 — 24 — 24" COMPOST FILTER SOCK
- ROCK CONSTRUCTION ENTRANCE
- TOPSOIL STOCKPILE

SCALE: 1" = 30'

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE - FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

RUTLEDGE WELL PAD
EROSION & SEDIMENT CONTROL PLAN

SCALE: 1" = 30'

DATE:	5/6/10
PROJECT NO.:	112C02679
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	1 OF 7

C-1

STANDARD EROSION AND SEDIMENT CONTROL PLAN NOTES

1. STOCKPILE HEIGHTS MUST NOT EXCEED 35 FEET. STOCKPILE SLOPES MUST BE 2:1 OR FLATTER.
2. THE OPERATOR SHALL ASSURE THAT THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS PROPERLY IMPLEMENTED.
3. UNTIL THE SITE ACHIEVES FINAL STABILIZATION, THE OPERATOR SHALL ASSURE THAT THE BEST MANAGEMENT PRACTICES ARE IMPLEMENTED, INSPECTED, OPERATED, AND MAINTAINED. THE OPERATOR SHALL MAINTAIN AND MAKE AVAILABLE TO DEPARTMENT OF ENVIRONMENTAL PROTECTION, WRITTEN INSPECTION LOGS. ALL MAINTENANCE WORK, INCLUDING CLEANING, REPAIR, REPLACEMENT, REGRADING, AND RESTABILIZATION SHALL BE PERFORMED IMMEDIATELY UPON DISCOVERY OF DEFICIENCY.
4. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE THROUGH A SEDIMENT CONTROL BMP, SUCH AS A PUMPED WATER FILTER BAG DISCHARGING OVER NON-DISTURBED AREAS.
5. THE CONTRACTOR SHALL REVIEW THE PROVISIONS OF THE APPENDIX B4, EROSION CONTROL RULES AND REGULATIONS, TITLE 25, PART 1, DEPARTMENT OF ENVIRONMENTAL PROTECTION, SUBPART C, PROTECTION OF NATURAL RESOURCES, ARTICLE III, WATER RESOURCES, CHAPTER 102, EROSION CONTROL.
6. A COPY OF THE EROSION AND SEDIMENT CONTROL PLAN MUST BE ON THE PROJECT SITE AT ALL TIMES.
7. EROSION AND SEDIMENT BMPS MUST BE CONSTRUCTED, STABILIZED, AND FUNCTIONAL BEFORE SITE DISTURBANCE BEGINS WITHIN THE TRIBUTARY AREAS OF THOSE BMPS.
8. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPS CONTROLS SHALL BE REMOVED. AREAS DISTURBED DURING REMOVAL OF THE BMPS MUST BE STABILIZED IMMEDIATELY.
9. AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS.
10. AT LEAST 3 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES SHALL NOTIFY THE PENNSYLVANIA ONE CALL SYSTEM AT 1-800-242-1776 FOR BURIED UTILITIES LOCATIONS.
11. IN A TIMELY MANNER AFTER EARTH DISTURBANCE ACTIVITIES CEASE, THE OPERATOR SHALL STABILIZE ANY AREAS DISTURBED BY THE ACTIVITIES. DURING NON-GERMINATING PERIODS, MULCH MUST BE APPLIED AT THE SPECIFIED RATES. DISTURBED AREAS WHICH ARE NOT AT FINISHED GRADE AND WHICH WILL BE REDISTURBED WITHIN 1 YEAR MUST BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY VEGETATIVE STABILIZATION SPECIFICATIONS. DISTURBED AREAS WHICH ARE AT FINISHED GRADE OR WHICH WILL NOT BE REDISTURBED WITHIN 1 YEAR MUST BE STABILIZED IN ACCORDANCE WITH THE PERMANENT VEGETATIVE STABILIZATION SPECIFICATIONS.
12. AT STREAM CROSSINGS, 50' BUFFER AREAS SHOULD BE MAINTAINED. ON BUFFERS, CLEARING, SOD DISTURBANCES, EXCAVATION, AND EQUIPMENT TRAFFIC SHOULD BE MINIMIZED. ACTIVITIES SHOULD AS STACKING LOGS, BURNING CLEARED BRUSH, DISCHARGING RAINWATER FROM TRENCHES, WELDING PIPE SECTIONS, REFUELING AND MAINTAINING EQUIPMENT SHOULD BE ACCOMPLISHED OUTSIDE OF BUFFERS.
13. MULCH OR EROSION CONTROL BLANKETS MUST BE INSTALLED ON ALL SLOPES 3:1 AND STEEPER.
14. SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES.
15. THE OPERATOR SHALL REMOVE FROM THE SITE, RECYCLE, OR DISPOSE OF ALL BUILDING MATERIALS AND WASTES IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1 ET SEQ., AND 287.1 ET SEQ. THE CONTRACTOR SHALL NOT ILLEGALLY BURY, DUMP, OR DISCHARGE ANY BUILDING MATERIAL OR WASTES AT THE SITE.

TEMPORARY EROSION AND SEDIMENT CONTROLS
INSPECTION AND MAINTENANCE SCHEDULE

BMP	INSPECTION FREQUENCY	MAINTENANCE TO BE PERFORMED
COMPOST FILTER SOCK	WEEKLY AND AFTER RAINFALL EVENTS	MAINTENANCE SHALL BE PERFORMED AS NEEDED. SEDIMENT SHALL BE REMOVED ONCE IT HAS ACCUMULATED TO ONE HALF THE ORIGINAL HEIGHT OF THE BARRIER. COMPOST FILTER SOCK SHALL BE REPLACED WHENEVER IT HAS DETERIORATED TO SUCH AN EXTENT THAT THE EFFECTIVENESS OF COMPOST FILTER SOCK IS REDUCED. COMPOST FILTER SOCKS SHALL REMAIN IN PLACE UNTIL DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED. ALL SEDIMENT ACCUMULATION AT THE COMPOST FILTER SOCK SHALL BE REMOVED AND PROPERLY DISPOSED OF BEFORE THE COMPOST FILTER SOCK IS REMOVED.
ROCK CONSTRUCTION ENTRANCE	DAILY	CONTRACTOR SHALL MAINTAIN/REPLACE MATERIAL AS NEEDED THROUGHOUT CONSTRUCTION TO MAINTAIN MINIMUM THICKNESS DURING USE OF ACCESS ROAD. A STOCKPILE OF ROCK WILL MAINTAINED ON SITE FOR THIS PURPOSE
MULCH STABILIZATION PEG AND TWINE	WEEKLY AND AFTER RAINFALL EVENTS	REPLACE MULCH, PEGS AND TWINE AS REQUIRED. RESTORE SEEDING IN AFFECTED AREA IF NECESSARY.

REVEGETATION

A. TEMPORARY GRASS COVER SHALL BE ESTABLISHED IN THE FOLLOWING AREAS:

1. WHERE SOIL STOCKPILES ARE TO BE EXPOSED FOR A PERIOD GREATER THAN THIRTY (30) DAYS, THE STOCKPILE SHALL BE SEEDED.
2. WHERE VEGETATIVE FILTERS MUST BE ESTABLISHED BELOW FILTER BAGS, A MINIMUM DISTANCE OF 10 FT SHALL BE SEEDED DOWNSLOPE OF THE TRAP OUTLET. TEMPORARY COVER - SEED MIXTURE FOR TEMPORARY COVER SHALL CONSIST OF 100% ANNUAL RYEGRASS. SEED SHALL BE APPLIED AT THE RATE OF 40 LB/ACRE OR AS RECOMMENDED BY A LOCAL RECOGNIZED SEED SUPPLIER APPROVED BY THE OWNER'S REPRESENTATIVE. PRIOR TO SEEDING, APPLY 1 TON OF AGRICULTURAL GRADE LIMESTONE PER ACRE PLUS FERTILIZER AT THE RATE OF 15-30-30 LB. PER ACRE AND WORK INTO SOIL.

B. PERMANENT COVER:

RECOMMENDED PERMANENT SEED MIXTURES
COOL AND WARM SEASON GRASS

MIXTURE NUMBER	SEASON	SEASON [SEEDING RATE LB/AC.]
1	COOL	TALL FESCUE*[79], OR FINE FESCUE[46], PLUS REDTOP[4], OR PERENNIAL RYEGRASS[19], PLUS BIRDSFOOT TREFOIL[8]
2	COOL	BIRDSFOOT TREFOIL[8], PLUS TALL FESCUE*[40]
3	COOL	ORCHARDGRASS[26], OR SMOOTH BROMEGRASS[33], PLUS BIRDSFOOT TREFOIL[8]
4	WARM	FLATPEA[27], PLUS TALL FESCUE*[26], OR PERENNIAL RYEGRASS[25]
5	WARM	DEERTOUNGE[21], PLUS BIRDSFOOT TREFOIL[8]
6	WARM	SWITCHGRASS[15], OR BIG BLUESTEM[15], PLUS BIRDSFOOT TREFOIL[8]

RECOMMENDED PERMANENT SEED MIXTURES
FOR STABILIZING DISTURBED AREAS

SITE CONDITION	SEED MIXTURE
CUT SLOPES & FILLS (NOT MOWED)	
WELL-DRAINED	2, 4 OR 6
VARIABLE DRAINAGE	2
CUT SLOPES & FILLS (MOWED)	1
CUT SLOPES & FILLS (GRAZED/HAY)	1, 2 OR 3
GULLIES & ERODABLE AREAS	2 OR 6
EROSION CONTROL BMP'S	
CHANNELS, DRAINAGE DITCHES, TRAP EMBANKMENTS, ETC.	1 OR 2
FOR HAY OR SILAGE	2 OR 3
RIGHT-OF-WAY	
WELL-DRAINED	4 OR 6
VARIABLE DRAINAGE	2
WELL-DRAINED AREAS FOR GRAZING/HAY	2 OR 3
STRIP MINED AREAS	
SPOILS, WASTE AREAS, FLY ASH, SLAG, ETC. (LIME TO SOIL TEST)	2, 4 OR 5
FOR GRAZING/HAY	2, 3 OR 6

CONSTRUCTION SEQUENCE

REFER TO THE E&SC PLAN DRAWINGS FOR THE LOCATION OF THE PROPOSED WORK AND THE ASSOCIATED BMPS. A GENERALIZED CONSTRUCTION SEQUENCE IS PROVIDED BELOW. THE CONSTRUCTION SEQUENCE IS INTENDED TO PROVIDE A GENERAL COURSE OF ACTION IN ORDER TO CONFORM TO THE APPLICABLE REGULATORY AGENCY REQUIREMENTS FOR TEMPORARY AND PERMANENT SOIL EROSION AND SEDIMENTATION CONTROL. ALL NECESSARY PARTS FOR PROPER AND COMPLETE EXECUTION OF WORK PERTAINING TO THIS PLAN, WHETHER SPECIFICALLY MENTIONED OR NOT, ARE TO BE PERFORMED BY THE CONTRACTOR. IT IS NOT INTENDED THAT THE DRAWINGS AND THIS REPORT SHOW EVERY DETAILED PIECE OF MATERIAL OR EQUIPMENT. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS LISTED IN THIS SECTION. THE CONTRACTOR MAY BE REQUIRED TO ALTER CONTROLS BASED ON EFFECTIVENESS OF CONTROLS OR DIFFERING CONDITIONS ENCOUNTERED IN THE FIELD.

1. LOCATE STAGING AREAS AND ACCESS POINTS INCLUDING CONSTRUCTION ENTRANCES. INSTALL COMPOST FILTER SOCKS DOWN SLOPE OF THESE AREAS.
2. INSTALL ROCK CONSTRUCTION ENTRANCE. REFER TO THE ROCK CONSTRUCTION ENTRANCE DETAIL ON DRAWINGS FOR SUGGESTED DIMENSIONS.
3. INSTALL COMPOST FILTER SOCKS ALONG THE PERIMETERS OF THE SITE AS SHOWN ON THE CONSTRUCTION DRAWINGS.
4. INSTALL THE DIVERSION CHANNEL AROUND THE PROJECT AREA AND INSTALL 24" COMPOST FILTER SOCK AT CHANNEL DISCHARGE LOCATION. LOCATIONS ARE MARKED ON PLAN SHEET C-1.
5. CLEAR AND GRUB THE SITE.
6. STRIP AND STOCKPILE TOPSOIL. CONSTRUCT STOCKPILES AS SHOWN IN THE DETAILS ON THE CONSTRUCTION DRAWINGS.
7. MINIMIZE TOTAL AREA OF DISTURBANCE. MAINTAIN ALL TEMPORARY SOIL STOCKPILES WITHIN EXISTING SOIL EROSION AND SEDIMENT CONTROLS.
8. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE.
9. INSTALL EROSION CONTROL BLANKET ON ALL SLOPES GREATER THAN 3:1 AS SHOWN ON THE CONSTRUCTION DRAWINGS.
10. AS FINAL GRADES ARE REACHED, IMMEDIATELY SEED AND MULCH DISTURBED AREAS OR PREPARE FOR AGGREGATE PAVING ON ACCESS ROAD OR PAD AREA.
11. MAINTAIN ALL EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70% PERENNIAL VEGETATIVE COVER AND AGGREGATE STABILIZATION IS ESTABLISHED.
12. REMOVE ALL SOIL AND EROSION SEDIMENT CONTROL MEASURES UPON ESTABLISHMENT OF A UNIFORM 70% VEGETATIVE COVER AND AGGREGATE STABILIZATION OVER THE DISTURBED AREA. RE-GRADE AND REVEGETATE AREAS DISTURBED DURING THE REMOVAL OF THE SOIL EROSION AND SEDIMENT CONTROLS. REMOVE ALL SOIL AND EROSION SEDIMENT CONTROL MEASURES UPON ESTABLISHMENT OF A UNIFORM 70% VEGETATIVE COVER AND AGGREGATE STABILIZATION OVER THE DISTURBED AREA. RE-GRADE AND REVEGETATE AREAS DISTURBED DURING THE REMOVAL OF THE SOIL EROSION AND SEDIMENT CONTROLS.
13. WITHIN 9 MONTHS FROM THE COMPLETION OF DRILLING, RESTORE SITE AS PER SECTION 3.6 (SITE RESTORATION) OF THIS E&S PLAN.

SITE RESTORATION

AREAS AT FINAL GRADE ARE TO BE SEEDED, MULCHED AND STABILIZED IMMEDIATELY AS SPECIFIED ABOVE. WITHIN NINE MONTHS AFTER COMPLETION OF DRILLING THE WELL, THE OIL AND GAS WELL OWNER OR OPERATOR MUST RESTORE THE LAND SURFACE WITHIN THE AREA DISTURBED IN SITING, DRILLING, COMPLETING AND PRODUCING THE WELL. THIS INCLUDES:

a. REMOVING OR FILLING THE PIT USED TO CONTAIN PRODUCED FLUIDS OR INDUSTRIAL WASTES AND DRILL CUTTINGS. PROCEDURES FOR PROPER WASTE HANDLING AND DISPOSAL SHALL BE IN ACCORDANCE WITH DEP ACCEPTED PRACTICES AND STANDARDS.

b. REMOVING ALL DRILLING SUPPLIES NOT NEEDED FOR PRODUCTION. DRILLING SUPPLIES AND EQUIPMENT NOT NEEDED FOR PRODUCTION MAY BE STORED AT THE WELL SITE IF THE EXPRESS WRITTEN CONSENT OF THE SURFACE LANDOWNER IS OBTAINED.

c. REMOVING ALL DRILLING SUPPLIES NOT NEEDED FOR PRODUCTION. DRILLING SUPPLIES AND EQUIPMENT NOT NEEDED FOR PRODUCTION MAY BE STORED AT THE WELL SITE IF THE EXPRESS WRITTEN CONSENT OF THE SURFACE LANDOWNER IS OBTAINED.

d. IMPLEMENT TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES TO MINIMIZE THE POTENTIAL FOR ACCELERATED EROSION AND SEDIMENTATION DUE TO EARTH DISTURBANCES NECESSARY FOR SITE RESTORATION. THESE AREAS ARE TO BE SEEDED AND MULCHED UPON COMPLETION

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MARK	DATE	DESCRIPTION	BY

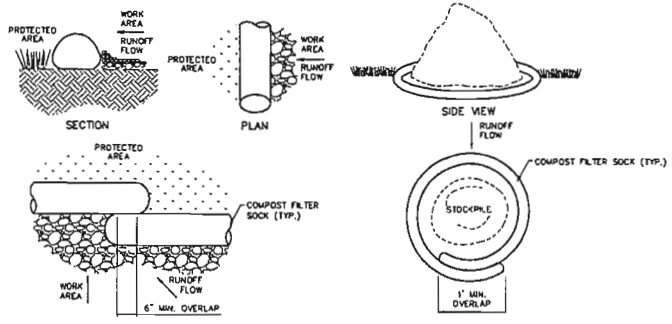
NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

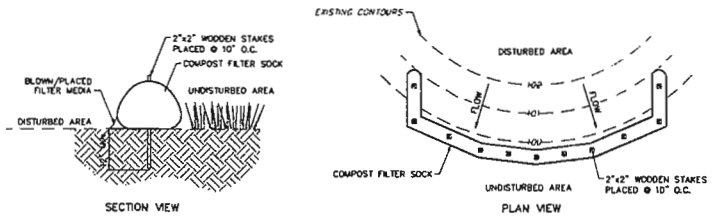
RUTLEDGE WELL PAD
EROSION & SEDIMENT CONTROL NOTES

SCALE: NOT TO SCALE

DATE:	5/6/10
PROJECT NO.:	112C02679
DESIGNED BY:	ARB
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	2 OF 7

C-2





COMPOST STANDARDS	
ORGANIC MATTER CONTENT	80%-100% (DRY WEIGHT BASIS)
ORGANIC	FIBROUS & ELONGATED
pH	5.5-8.0
MOISTURE CONTENT	35%-55%
PARTICLE SIZE	98% PASS THROUGH 1" SCREEN
SOLUBLE SALT CONCENTRATION	5.0 dS MAXIMUM

MAXIMUM SLOPE LENGTHS FOR COMPOST FILTER SOCK			
% SLOPE	12" DIAMETER	18" DIAMETER	24" DIAMETER
2 (OR LESS)	150	500	1000
5	100	250	550
10	50	150	325
15	35	100	215
20	25	70	175
25	20	55	135
30	15	45	100
35	15	40	85
40	15	35	75
45	10	30	60
50	10	25	50

COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY 18" DIAMETER SOCK SHALL NOT EXCEED THAT SHOWN ON ABOVE TABLE FOR REINFORCED SILT FENCE. MAXIMUM SLOPE LENGTH FOR A 24" DIAMTERE SOCK SHALL NOT EXCEED THAT FOR SUPER SILT FENCE.

TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.

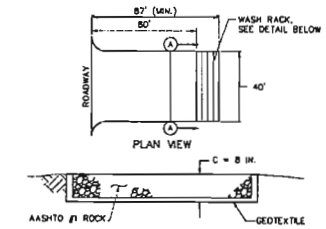
ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.

SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

BIODEGRADABLE FILTER SOCK SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

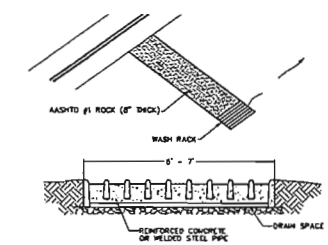
UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

COMPOST FILTER SOCK | 1 | 1 | 3
NOT TO SCALE



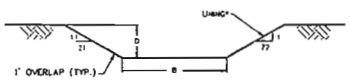
MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.

ROCK CONSTRUCTION ENTRANCE | 2 | 1 | 3
NOT TO SCALE



MAINTENANCE:
ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FUTHER USE OF THE RACK. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.

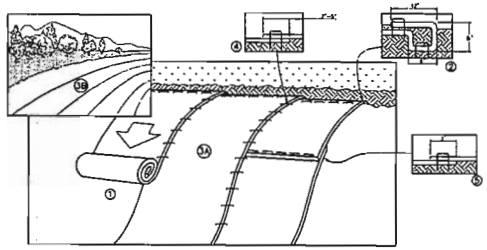
WASH RACK DETAIL
NOT TO SCALE



CHANNEL NO.	BOTTOM WIDTH B (FT)	DEPTH D (FT)	Z1 (FT)	Z2 (FT)	LINING*
DC-1	2.0	1.5	2:1	2:1	VEGETATED

* SEE MANUFACTURER'S LINING INSTALLATION DETAIL FOR STAPLE PATTERNS, AND VEGETATION STABILIZATION SPECIFICATIONS FOR SOIL AMENDMENTS, SEED MIXTURES, AND MULCHING INFORMATION.

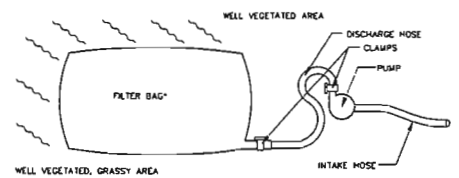
VEGETATED CHANNELS | 4 | 1 | 3
NOT TO SCALE

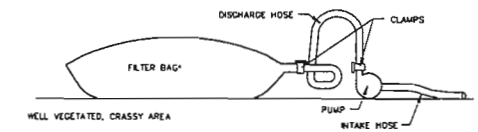


NOTES:

1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
   NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5 CM - 12.5 CM) OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE RECP's WIDTH.
   NOTE:
   *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 8" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.

EROSION CONTROL BLANKET - SLOPE INSTALLATION | 3 | 1 | 3
NOT TO SCALE





NOTES:

1. FILTER SHALL BE MADE OF NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE-STITCHED "J" SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS.
2. SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FULL.
3. BAGS SHALL BE LOCATED IN WELL VEGETATED (GRASSY) AREAS, AND DISCHARGE INTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
5. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.

PUMPED WATER FILTER BAG
NOT TO SCALE

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MARK	DATE	DESCRIPTION	BY

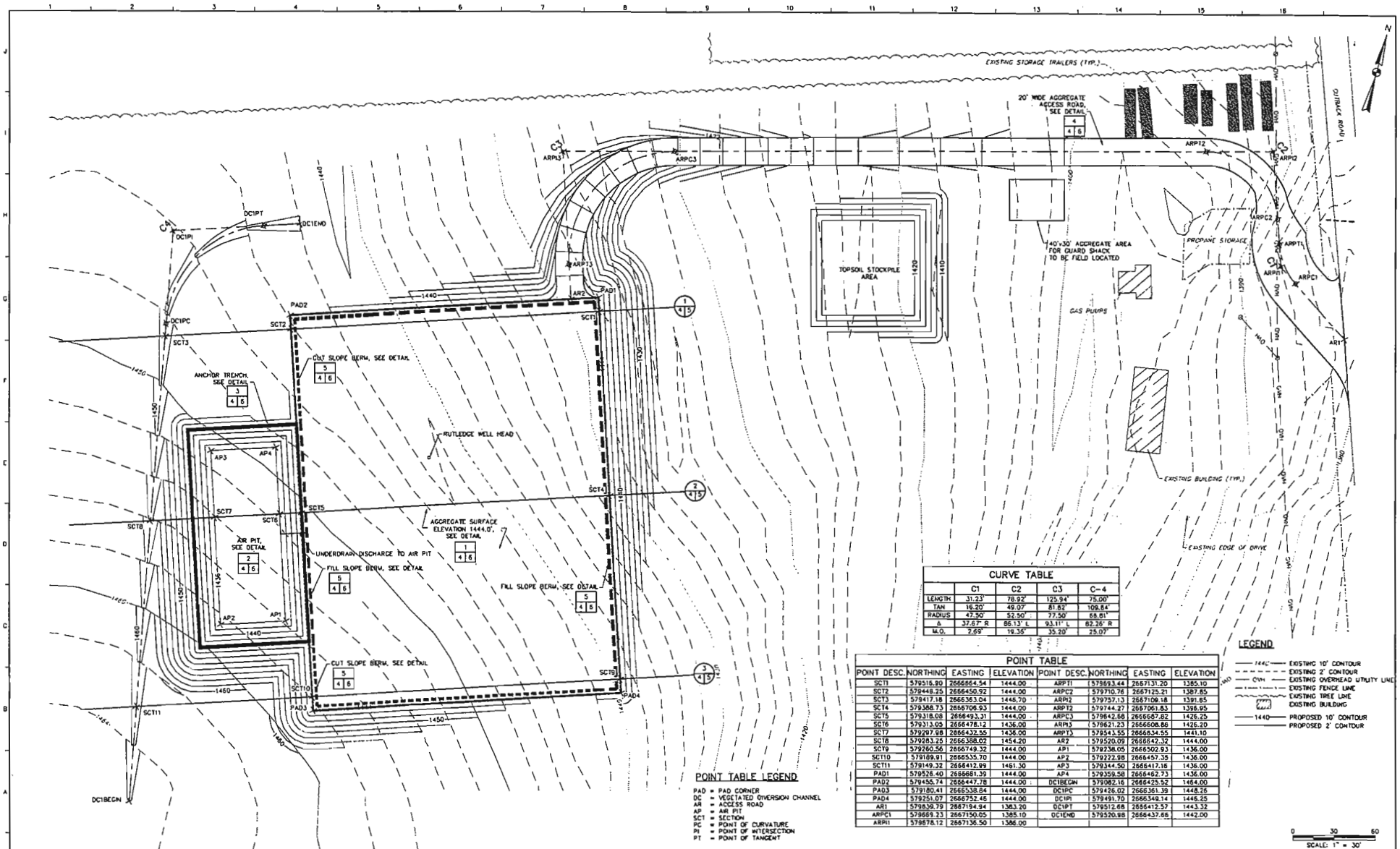
NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

RUTLEDGE WELL PAD
EROSION & SEDIMENT CONTROL DETAILS

SCALE: AS NOTED

DATE:	5/6/10
PROJECT NO.:	112C02679
DESIGNED BY:	ARB
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	7 OF 7

C-3



CURVE TABLE				
	C1	C2	C3	C-4
LENGTH	31.23'	78.92'	125.94'	75.00'
TAN	16.20'	49.07'	81.82'	109.84'
RADIUS	47.50'	52.50'	77.50'	68.81'
Δ	37.67° R	86.13° L	93.11° L	62.26° R
M.O.	2.69'	19.35'	35.20'	25.07'

POINT TABLE							
POINT DESC.	NORTHING	EASTING	ELEVATION	POINT DESC.	NORTHING	EASTING	ELEVATION
SCT1	579516.80	2666864.54	1444.00	ARPT1	579593.44	2667131.20	1385.10
SCT2	579448.25	2666450.92	1444.00	ARPC2	579710.76	2667125.21	1387.85
SCT3	579417.18	2666363.04	1446.70	ARPI2	579757.13	2667109.18	1391.85
SCT4	579388.73	2666706.93	1444.00	ARPT2	579744.27	2667061.83	1396.95
SCT5	579318.08	2666493.31	1444.00	ARPC3	579642.66	2666667.82	1426.25
SCT6	579313.05	2666478.12	1436.00	ARPI3	579621.23	2666608.86	1426.20
SCT7	579297.98	2666432.55	1436.00	ARPT3	579543.55	2666634.55	1441.10
SCT8	579283.25	2666388.02	1454.20	AR2	579520.09	2666642.32	1444.00
SCT9	579260.56	2666749.32	1444.00	AP1	579238.05	2666502.93	1436.00
SCT10	579189.91	2666535.70	1444.00	AP2	579222.98	2666457.35	1436.00
SCT11	579149.32	2666412.99	1461.30	AP3	579344.50	2666417.16	1436.00
PAD1	579528.40	2666681.39	1444.00	AP4	579359.58	2666462.73	1436.00
PAD2	579455.74	2666447.78	1444.00	DC1BEGIN	579082.16	2666425.52	1464.00
PAD3	579180.41	2666538.84	1444.00	DC1PC	579426.02	2666361.39	1448.26
PAD4	579251.07	2666752.45	1444.00	DC1PI	579491.70	2666349.14	1446.25
AR1	579838.79	2667194.94	1383.20	DC1PT	579512.68	2666412.57	1443.32
ARPC1	579669.23	2667150.05	1385.10	DC1END	579520.98	2666437.66	1442.00
ARPI1	579678.12	2667136.50	1386.00				

POINT TABLE LEGEND

PAD = PAD CORNER
DC = VEGETATED DIVERSION CHANNEL
AR = ACCESS ROAD
AP = AIR PIT
SCT = SECTION
PC = POINT OF CURVATURE
PI = POINT OF INTERSECTION
PT = POINT OF TANGENT

LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING OVERHEAD UTILITY LINE
- EXISTING FENCE LINE
- EXISTING TREE LINE
- EXISTING BUILDING
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR

SCALE: 1" = 30'

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MARK	DATE	DESCRIPTION	BY

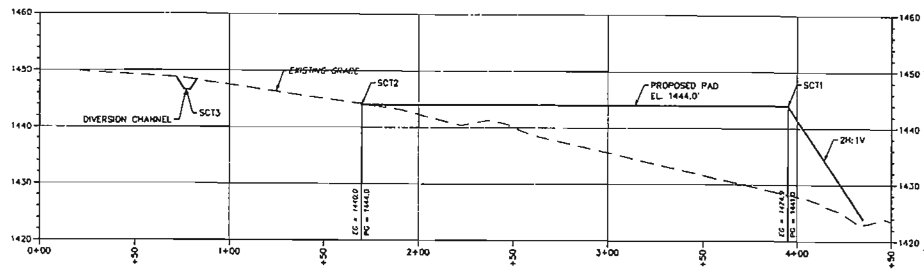
NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

RUTLEDGE WELL PAD
STAKEOUT & SITE GEOMETRY PLAN

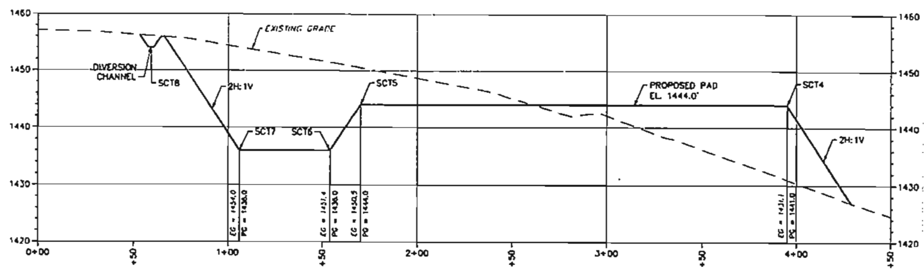
SCALE: 1" = 30'

DATE:	5/6/10
PROJECT NO.:	112C02679
DESIGNED BY:	ARB
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	4 OF 7

C-4



SECTION (1 / 4 5)
SCALE: HORIZ: 1" = 30'
VERT: 1" = 10'



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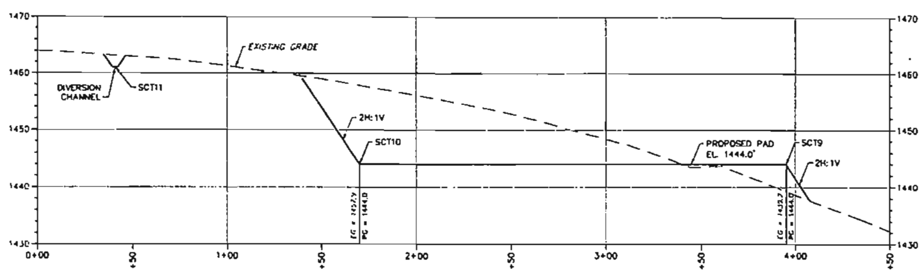

SECTION (3 / 4 5)
SCALE: HORIZ: 1" = 30'
VERT: 1" = 10'

SCALE: 1" = 30'
SCALE: 1" = 10'

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MARK	DATE	DESCRIPTION	BY

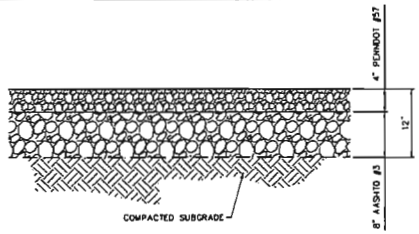
NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

RUTLEDGE WELL PAD SITE SECTIONS

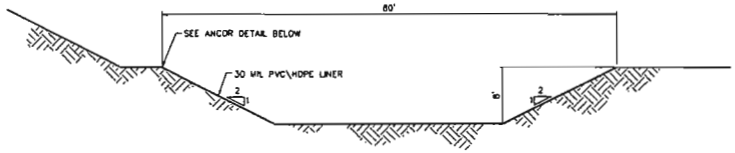
SCALE: AS NOTED

DATE:	5/6/10
PROJECT NO.:	112C02679
DESIGNED BY:	ARB
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	5 OF 7

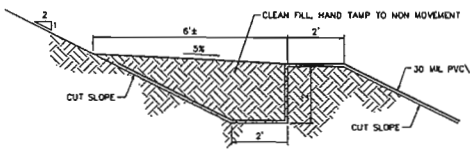
C-5



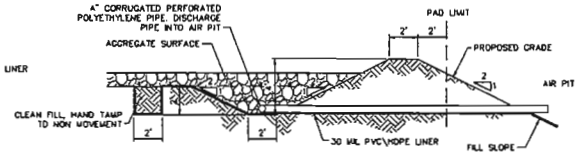
AGGREGATE SURFACE FOR WELL PAD & ACCESS ROAD [1 | 4 | 6]
NOT TO SCALE



AIR PIT DETAIL [2 | 4 | 6]
NOT TO SCALE

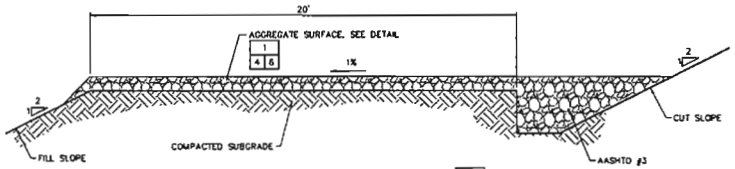


CUT SLOPE INSTALLATION

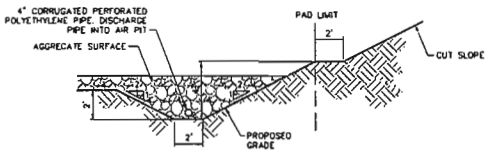


FILL SLOPE INSTALLATION

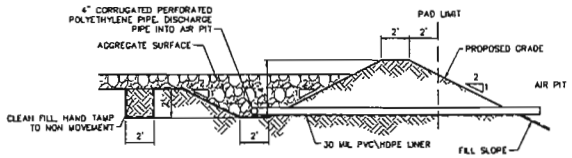
ANCHOR TRENCH DETAIL [3 | 4 | 6]
NOT TO SCALE



20' WIDE AGGREGATE ACCESS ROAD DETAIL [4 | 4 | 6]
NOT TO SCALE



CUT SLOPE INSTALLATION



FILL SLOPE INSTALLATION

BERM DETAIL [5 | 4 | 6]
NOT TO SCALE

PROJECT BID QUANTITIES

ITEM	DESCRIPTION	UNITS	QUANTITY
1	MOBILIZATION/DE-MOBILIZATION	LUMP SUM	1
2	CLEARING & GRUBBING	ACRE	4.08
3	STRIP & STOCKPILE TOPSOIL	CUBIC YARD	2,000
4	COMPOST FILTER SOCK - 12" DIAMETER	LINEAR FOOT	0
5	COMPOST FILTER SOCK - 18" DIAMETER	LINEAR FOOT	200
6	COMPOST FILTER SOCK - 24" DIAMETER	LINEAR FOOT	390
7	AGGREGATE FOR WELL PAD, ACCESS ROAD & 30'x40' GUARD SHACK AREA	CUBIC YARD	2,870
8	ROCK CONSTRUCTION ENTRANCE	EACH	1
9	EARTHWORK (INCLUDES ACCESS ROAD, WELL PAD & DIVERSION DITCHES)	CUBIC YARD	15,750
10	ROCK CUT	CUBIC YARD	N/A
11	TEMPORARY SEED, SUPPLEMENTS & MULCH	ACRE	1.11
12	RIPRAP	CUBIC YARD	10
13	EROSION CONTROL BLANKET	SQUARE YARD	5,400
14	TIRE WASH RACK	EACH	1
15	30 MIL PIT LINER	SQUARE YARD	3,000
16	4" CORRUGATED POLYETHYLENE PIPE	LINEAR FOOT	1,050
17	SITE RESTORATION - AGGREGATE REMOVAL, SPREADING TOPSOIL, PERMANENT SEEDING	LUMP SUM	N/A
18	TEMPORARY CHAIN LINK FENCE DURING CONSTRUCTION	LINEAR FOOT	N/A
19	CULVERT PIPE FOR ACCESS ROAD CROSSING	LINEAR FOOT	N/A
20	MAINTENANCE AND REPAIR OF EROSION CONTROL DEVICES	LUMP SUM	1

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MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

RUTLEDGE WELL PAD
CONSTRUCTION DETAILS & BID QUANTITIES

SCALE: AS NOTED

DATE:	5/5/10
PROJECT NO.:	112C02879
DESIGNED BY:	ARB
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	6 OF 7

C-6

GENERAL

CONSTRUCTION ACTIVITIES WILL BE PERFORMED IN ACCORDANCE WITH PENN DOT PUBLICATION 408 SPECIFICATIONS – LATEST EDITION. THE FOLLOWING CONSTRUCTION OPERATIONS ARE INCLUDED IN THE BID PACKAGE FOR THE SITE AND ARE SUMMARIZED BELOW. SHOULD A CONFLICT BE DISCOVERED, CONTACT THE OWNER FOR A FINAL DECISION. THE OWNER IS DEFINED AS NEWFIELD APPALACHIA PA LLC.

THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND OR MANUFACTURERS MATERIAL CATALOG CUTS TO THE OWNER FOR REVIEW.

THE CONTRACT TERMS AND CONDITIONS SHALL BE IN ACCORDANCE WITH THE GENERAL AND SPECIAL PROVISIONS AND THE AGREEMENT AS PROVIDED BY THE OWNER.

TECHNICAL SPECIFICATIONS

1.0 CLEARING AND GRUBBING –

1.1 DESCRIPTION

REMOVAL OF TOPSOIL TO THE LIMITS OF GRADING AND STOCKPILE ON SITE AT A LOCATION DESIGNATED BY THE OWNER.

REMOVAL OF ORGANIC MATERIAL TO THE LIMITS OF GRADING AND DISPOSE OF OFF SITE

REMOVAL OF TRASH OR DEBRIS WITHIN THE GRADING LIMITS

1.2 CONSTRUCTION

INSTALL EROSION AND SEDIMENT CONTROL FEATURES PRIOR TO THE START OF CLEARING AND GRUBBING OPERATIONS

CUT TREES AND SHRUBS AND DISPOSE OF OFFSITE UNLESS DIRECTED BY THE OWNER

BURNING IS NOT PERMITTED

REMOVE STUMPS WITHIN THE GRADING AREA TO A DEPTH AT LEAST 2 FEET BELOW THE SUBGRADE ELEVATION AND OR SLOPE ELEVATIONS

DO NOT DAMAGE TREES OR AREAS BEYOND THE LIMIT OF GRADING. DAMAGES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

2.0 EROSION AND SEDIMENT CONTROLS

2.1 DESCRIPTION

PROVIDE, FURNISH, INSTALL AND MAINTAIN THE EROSION AND SEDIMENT CONTROL DEVICES IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND OR THE APPROVED EROSION AND SEDIMENT CONTROL PLAN

2.2 MATERIAL

COMPOST FILTER SOCKS SHALL BE COMMERCIALLY MADE USING 5 MIL CONTINUOUS HDPE FILAMENT WOVEN INTO A TUBULAR MESH NETTING WITH 3/8 INCH WOVEN OPENINGS. COMPOST FILTER SOCK DIAMETERS ARE 12 INCH, 18 INCH AND 24 INCHES.

COMPOST – SEE SHEET C-3

WOODEN STAKES – 2 INCH BY 2 INCH BY 42 INCH

ROCK CONSTRUCTION ENTRANCE

AASHTO #1 LIMESTONE IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION703 – AGGREGATE

GEOTEXTILE – CLASS 4 SEPARATION IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 735

TRUCK WASH RACK

CONCRETE IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 704 CEMENT CONCRETE – CLASS C.

WELDED STEEL PIPE – MINIMUM 4 INCH DIAMETER

EROSION BLANKET

100% BIODEGRADABLE EROSION CONTROL BLANKET, MACHINE-PRODUCED MAT OF 100% COCONUT FIBER WITH A FUNCTIONAL LONGEVITY OF UP TO 24 MONTHS.

THE BLANKET SHALL BE OF CONSISTENT THICKNESS WITH THE COCONUT EVENLY DISTRIBUTED OVER THE ENTIRE AREA OF THE MAT. THE BLANKET SHALL BE COVERED ON THE TOP AND BOTTOM SIDES WITH 100% BIODEGRADABLE WOVEN, NATURAL, ORGANIC FIBER NETTING. THE TOP NETTING SHALL CONSIST OF MACHINE DIRECTIONAL STRANDS FORMED FROM TWO INTERTWINED YARNS WITH CROSS DIRECTIONAL STRANDS INTERWOVEN THROUGH THE TWISTED MACHINE STRANDS TO FORM AN APPROXIMATE 0.50 X 1.00 (1.27 X 2.54 CM) MESH. THE BLANKET SHALL BE SEWN TOGETHER ON 1.50 INCH (3.81 CM) CENTERS WITH DEGRADABLE THREAD.

MATERIAL SHALL MEET REQUIREMENTS ESTABLISHED BY THE EROSION CONTROL TECHNOLOGY COUNCIL (ECTC).

MATERIAL CONTENT

MATRIX – 100 PERCENT COCONUT FIBER 0.5 LBS/YD2

NETTINGS – 100 PERCENT BIODEGRADABLE ORGANIC JUTE FIBER 9.3 LB/1000 FT2

THREAD – BIODEGRADABLE

TEMPORARY SEED AND MULCH

SEE SHEET C-2

PENNDOT PUBLICATION 408 SECTION 805 – MULCHING – HAY, STRAW OR WOOD FIBER

RIP RAP

IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 850 – ROCK LINING, R-4

2.3 CONSTRUCTION

INSTALL THE ROCK CONSTRUCTION ENTRANCE AND TIRE WASH FACILITY PRIOR TO THE START OF EARTHWORK OPERATIONS. MAINTAIN THE ROCK THICKNESS BY ADDING ROCK FROM AN ADJACENT STOCKPILE.

REMOVE SEDIMENT DEPOSITS ON A DAILY BASIS FROM THE ROCK ENTRANCE AND PUBLIC STREETS AND RETURN THE SEDIMENT TO THE CONSTRUCTION SITE.

INSTALL FILTER SOCKS AT THE LOCATIONS SHOWN ON THE CONTRACT DRAWINGS IN ACCORDANCE WITH THE DIAMETER SPECIFIED.

INSTALL 2 INCH BY 2 INCH WOODEN STAKE AT TEN FEET ON CENTER THROUGH THE FILTER SOCK.

INSTALL EROSION BLANKET UPON COMPLETION OF EARTH DISTURBANCE AND EMBANKMENT CONSTRUCTION. APPLY TEMPORARY SEED AND MULCH.

MAINTENANCE AND REPAIR:

INSPECT AND REPAIR DAMAGED OR DISLODGED EROSION AND SEDIMENT CONTROL DEVICES. INSPECT THE CONTROL DEVICES AFTER EACH RAIN EVENT AND OR AT A MINIMUM OF WEEKLY. IMMEDIATELY REPAIR, RE-STAKE, EXTEND OR REPLACE DAMAGED CONTROL DEVICES.

REMOVE SEDIMENT BUILD UP OR DEBRIS WHEN THE BUILD UP REACHES ONE HALF THE HEIGHT OF THE CONTROL DEVICE. DISPOSE OF THE SOIL MATERIAL ON SITE. DISPOSE OF TRASH AND DEBRIS OFF SITE.

INSTALL ROCK LINING AT THE LINES AND GRADES INDICATED ON THE CONTRACT DRAWINGS.

3.0 DEMOLITION

3.1 DESCRIPTION

REMOVAL OF BUILDINGS, WALLS, STRUCTURES AS INDICATED ON THE CONTRACT DRAWINGS.

3.2 CONSTRUCTION

REMOVE AND DISPOSE OF OFF SITE BUILDINGS, WALLS, STRUCTURES AS INDICATED.

ONSITE DISPOSAL IS NOT PERMITTED.

4.0 EARTHWORK – EXCAVATION AND EMBANKMENT

4.1 DESCRIPTION

EXCAVATE SOIL AND ROCK TO THE LINES AND GRADES INDICATED ON THE CONTRACT DRAWINGS.

CONSTRUCT EMBANKMENTS TO THE LINES AND GRADES INDICATED ON THE CONTRACT DRAWINGS.

4.2 CONSTRUCTION

EXCAVATE SOIL AND ROCK BY MECHANICAL MEANS.

BLASTING IS NOT PERMITTED.

PREPARED THE EMBANKMENT FOUNDATION AREA IN ACCORDANCE WITH SECTION 1.0 CLEARING AND GRUBBING.

PLACE SOIL MATERIAL IN NOT MORE THAN EIGHT INCH LOOSE LIFTS FOR THE FULL WIDTH AND COMPACT TO NOT LESS THAN 95% OF ASTM D698 STANDARD PROCTOR. THE CONTRACTOR SHALL SAMPLE, TEST AND SUBMIT THE RESULTS TO THE OWNER PRIOR TO THE START OF EMBANKMENT OPERATIONS. MAINTAIN SOIL OPTIMUM MOISTURE WITHIN PLUS OR MINUS TWO PERCENTAGE POINTS.

DO NOT PLACE SOIL MATERIAL THAT IS FROZEN, WET OR CONTAINING OBJECTIONABLE MATERIAL.

PLACE ROCK MATERIAL IN UNIFORM LAYERS. MAXIMUM ROCK SIZE PERMITTED IN THE EMBANKMENT IS EIGHT INCHES IN ANY DIMENSION.

PREPARE THE PAD SUBGRADE AND ACCESS ROAD SUBGRADE BY COMPACTING THE TOP TWO FEET OF THE EMBANKMENT OR CUT SURFACE TO 100% OF ASTM D698 STANDARD PROCTOR.

SHOULD NON RIPABLE ROCK BE ENCOUNTERED, IMMEDIATELY CONTACT THE OWNER FOR DIRECTION ON EXCAVATION.

5.0 PIT LINER

5.1 DESCRIPTION

FURNISH, PROVIDE AND INSTALL A 30 MIL PVC LINER AND ANCHOR SYSTEM IN THE PIT AREA AS INDICATED ON THE CONTRACT DRAWINGS.

5.2 MATERIAL – 30 MIL PVC

5.2.1

CERTIFIED PROPERTIES	TEST METHOD	REQUIREMENT
THICKNESS ±5%	ASTM D 5199	.030"
TENSILE – LB. FORCE/IN. WIDTH, MIN.	ASTM D 882	73
ELONGATION AT BREAK (% MIN.)	ASTM D 882	380
100% MODULUS– LB. FORCE/IN. WIDTH, MIN.	ASTM D 882	30
TEAR STRENGTH (LB./IN., MIN.)	ASTM D 1004	8
DIMENSIONAL STABILITY (% CHANGE MAX.)	ASTM D 1204	3
IMPACT COLD CRACK (C)	ASTM D 1790	-29
INDEX PROPERTIES		
SPECIFIC GRAVITY (MIN.)	ASTM D 792	1.20
WATER EXTRACTION (% MAX.)	ASTM D 1239	0.15
VOLATILE LOSS (% MAX.)	ASTM D 1203(A)	0.70
RESISTANCE TO SOIL BURIAL (% CHANGE MAX.)	ASTM G 160	
1. BREAKING FACTOR		5
2. ELONGATION AT BREAK		20
3. MODULUS AT 100% ELONGATION		20
HYDROSTATIC RESISTANCE (PSI, MIN.)	ASTM D 751(A)	100
PLASTICIZER MIN. AVE. MOLECULAR WEIGHT	ASTM D 2124	400

5.3 CONSTRUCTION

INSTALL PVC LINER TO THE LINE AND GRADE OF THE PIT.

THERMAL WELD THE SEAMS.

OVERLAP THE PERIMETER AND ANCHOR THE EDGES WITH SOIL TO STABILIZE THE LINER FROM PULLING, TEARING, FLOATING AND MOVEMENT DURING FILLING OPERATIONS.

PROVIDE TO THE OWNER AN INSPECTION REPORT OF SEAM WELDS AND INTEGRITY OF THE LINER INSTALLATION.

6.1 CULVERT PIPE

6.1.1 DESCRIPTION

FURNISH, PROVIDE AND INSTALL DUCTILE IRON OR WELDED STEEL CULVERT PIPE AT ROAD CROSSINGS AT THE DIAMETER, LINE AND GRADE INDICATED ON THE CONTRACT DRAWINGS.

6.1.2 MATERIAL

WELDED STEEL CULVERT PIPE IN ACCORDANCE WITH AS3, TYPE S.

DUCTILE IRON PIPE IN ACCORDANCE WITH ASTM A716

6.1.3 CONSTRUCTION

INSTALL AND MAINTAIN CULVERT PIPE DURING CONSTRUCTION. KEEP THE PIPE CLEAR OF DEBRIS AND SEDIMENT BUILDUP.

6.2 UNDERDRAIN PIPE

6.2.1 DESCRIPTION

FURNISH, PROVIDE AND INSTALL HIGH DENSITY CORRUGATED POLYETHYLENE (PE) PIPE AT LOCATIONS INDICATED ON THE CONTRACT DRAWINGS.

6.2.2 MATERIAL

HIGH DENSITY CORRUGATED POLYETHYLENE (PE) PIPE IN ACCORDANCE WITH AASHTO M 252 (PIPES 4 INCHES THROUGH 10 INCHES).

6.2.3 CONSTRUCTION

INSTALL PIPE ON A 4 INCH LAYER OF AGGREGATE AND HAND PLACE THE AGGREGATE AROUND THE PIPE.

7.0 WELL PAD AND ACCESS ROAD

7.1 DESCRIPTION

PROVIDE, FURNISH AND INSTALL AGGREGATE FOR THE WELL PAD SURFACE AND THE ACCESS ROAD SURFACE.

7.2 MATERIAL

AGGREGATE IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 703 AGGREGATE

SIX INCHES OF AASHTO # 3

SIX INCHES OF PENNDOT # 57

PERFORATED CORRUGATED POLYETHYLENE CULVERT UNDERDRAIN PIPE

FOUR INCH DIAMETER IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 601 – PIPE CULVERTS

7.3 CONSTRUCTION

COMPACT AND SHAPE SUBGRADE TO THE LINES AND GRADES ON THE CONTRACT DRAWINGS.

COMPACT THE SUBGRADE TO 100% OF ASTM D698 STANDARD PROCTOR. REMOVE AND REPLACE ANY SUBGRADE THAT IS SOFT OR DISPLAYS VISUAL MOVEMENT WITH CLEAN FILL.

INSTALL THE AGGREGATE IN TWO LIFTS. COMPACT LIFTS TO NON-MOVEMENT.

INSTALL THE CORRUGATED CULVERT PIPE TO THE LINE AND GRADE SHOWN ON THE CONTRACT DRAWINGS.

8.0 SITE RESTORATION

8.1 DESCRIPTION

UPON COMPLETION OF THE WELL DRILLING AND AT THE NOTIFICATION BY THE OWNER, RETURN TO THE SITE AND REMOVE AND DISPOSE OF LOOSE AGGREGATE, COVER THE SITE WITH TOPSOIL FROM THE CURRENT STOCKPILE AND APPLY PERMANENT SEED, SUPPLEMENTS AND MULCH.

8.2 MATERIAL

TOPSOIL FROM THE EXISTING STOCKPILE

PERMANENT SEED AND SOIL SUPPLEMENTS SEE SHEET C-2

MULCH IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 805 – MULCHING – HAY, STRAW OR WOOD FIBER

8.3 CONSTRUCTION

REMOVE AND DISPOSE OF OFF SITE LOOSE AGGREGATE FROM THE WELL PAD.

SPREAD TOPSOIL EVENLY ACROSS THE WELL PAD AND APPLY PERMANENT SEED, SOIL SUPPLEMENTS AND MULCH

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

RUTLEDGE WELL PAD
CONSTRUCTION SPECIFICATIONS

SCALE: AS NOTED

DATE:	5/6/10
PROJECT NO.:	112002679
DESIGNED BY:	ARB
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	7 OF 7

C-7

M-945P (12/93)

AUDIT CONTROL NO. 711723

COMMONWEALTH OF PENNSYLVANIA

HIGHWAY OCCUPANCY PERMIT

Permit No	04016278
Organization	046
Date Issued	090195
Permit Fees	25.00
Account No.	
County	63
Township/Boro	206

PERMITTEE: HAROLD & JEANNE RUTLEDGE
ADDRESS: R R 1 BOX 220
POST OFFICE: EQUINUNK PA ZIP CODE 18417-

County WAYNE

Township/Boro DAMASCUS

Bond/Agreement Number

	①	②	③	④
Township/Boro				
Description	511			
State Route No.	1025			
Segment(s)	0050 / 0050			
Offset To Offset	1584 / 1584			

ALL WORK UNDER THIS PERMIT MAY BE STARTED ON 09/01/95

AND SHALL BE COMPLETED ON OR BEFORE 09/01/96

Immediately upon completion of the work, Permittee shall notify the permit office where application was made. Subject to all the conditions, restrictions, and regulations prescribed by the Pennsylvania Department of Transportation, (see in particular 67 Pa. Code, Chapter 203, 441 and 459) and subject to the plans, special conditions, or restrictions herein set forth or attached hereto. This permit shall be located at the work site and shall be available for inspection by any police officer or department representative.

DESCRIPTION OF WORK

INSTALL MINIMUM USE DRIVEWAY AT
SR 1025 SEG 0050 OFFSET 1584 TO SEG 0050 OFFSET 1584
THIS PERMIT AUTHORIZES WORK ONLY IN DEPARTMENT HIGHWAY RIGHT OF WAY. SURFACE DRAINAGE MAY NOT BE DIRECTED ONTO STATE RIGHT OF WAY.
IT IS THE PERMITTEE'S RESPONSIBILITY TO KEEP VEGETATION TRIMMED IN ORDER TO MAINTAIN MINIMUM SIGHT DISTANCE. NO OBJECTS MAY BE PLACED WITHIN THE LINE OF SIGHT.
MINIMUM WORK ZONE TRAFFIC CONTROL TO BE IN ACCORDANCE WITH PUB 203 FIGURE(S) 5, 7, 10A.
PLANS DEPICTING THE HIGHWAY OCCUPANCY ARE FILED AS PUBLIC DOCUMENTS IN THE DEPARTMENT OF TRANSPORTATION, ENGINEERING DISTRICT 4-0 PERMIT OFFICE.
ALL DISTURBED AREAS OUTSIDE THE PAVEMENT OR SHOULDER SHALL BE RESTORED TO A CONDITION AT LEAST EQUAL TO THAT WHICH EXISTED BEFORE THE START OF WORK.
SHOULDERS MUST BE RESTORED IN ACCORDANCE WITH APPROPRIATE SECTION OF PUB. 408 AND ROADWAY CONSTRUCTION STANDARD RC-25.
DEPARTMENT MUST BE NOTIFIED IN WRITING UPON COMPLETION OF WORK.
X
X
X

THIS PERMIT IS NOT VALID UNTIL SIGNED BY THE DISTRICT ENGINEER OR HIS AUTHORIZED REPRESENTATIVE

Acknowledgment of Completion
Permitted work has been completed
Date 9-10-96 By [signature]

[signature]
FOR BRADLEY L. MALLORY
SECRETARY OF TRANSPORTATION

BY CHARLES M. MATTEI, P.E.
DISTRICT ENGINEER

RECORDING COPY/COUNTY COMPLETION REPORT

M-950A (10/93)
Central Permit Office

APPLICATION FOR MINIMUM USE DRIVEWAY

A Minimum Use Driveway Is a Residential or Other Driveway Which Is Expected to Be Used By Not More Than 25 Vehicles Per Day (i.e. 50 A.D.T)

READ INSTRUCTIONS ON REVERSE

APPL. NO. 948295

Applicant / Property Owner: Harold + Jeanne Ruttedge

Address: RR 1 Box 228 Equinunk Pa

Post Office: EQuinunk

Zip Code: 18417

Phone: 224-4776

Fee: 25.00

Check No.: 919

LOCATION OF PROPOSED DRIVEWAY

County: Wayne (63)

Township/Boro: Damascus (206)

Route No.: SR 1025

Name of Nearest Intersection: SR 1012 / SR 1025

Distance to Nearest Intersection in Feet: 1725 FT

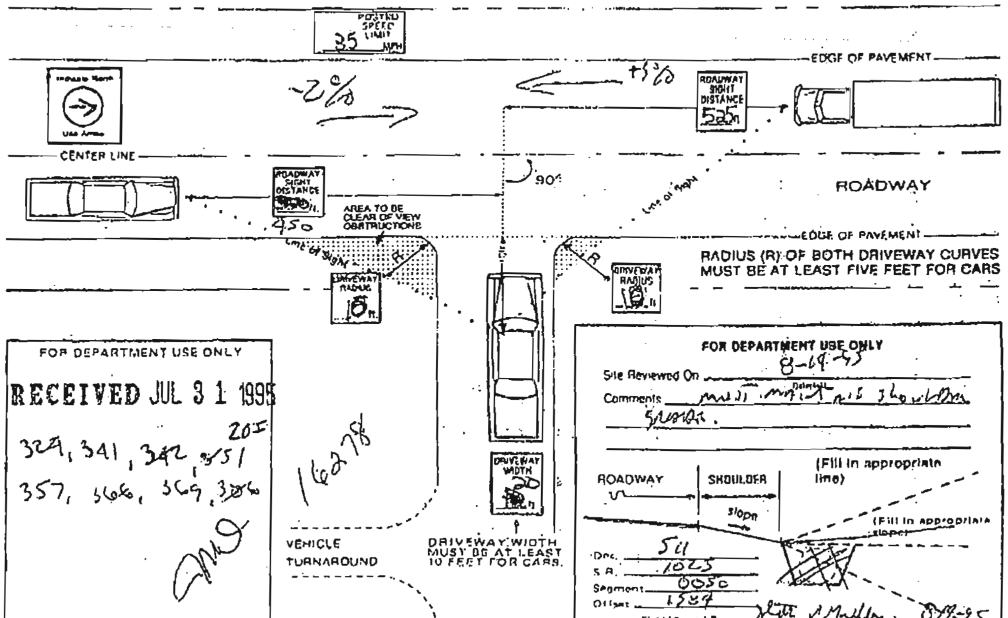
APPLICATION IS MADE TO

☒ CONSTRUCT A NEW DRIVEWAY ☐ ALTER AN EXISTING DRIVEWAY

DATE WORK SCHEDULED TO BEGIN: 9-95

DATE WORK SCHEDULED TO BE COMPLETED: 10-95

For the purpose of measuring sight distance, the drivers' eye height shall be 3.50 feet above the proposed access surface and highway pavement surface and the vehicles' height shall be 4.25 feet above the proposed access surface and highway pavement surface.



FOR DEPARTMENT USE ONLY

RECEIVED JUL 3 1 1995

324, 341, 342, 205, 351
357, 366, 369, 386

FOR DEPARTMENT USE ONLY

Site Reviewed On: 8-14-95

Comments: must meet nil shoulder slope.

ROADWAY | SHOULDER | (Fill in appropriate line)

Slope (Fill in appropriate slope)

Dec.: 54
S.R.: 1025
Segment: 0050
Offset: 1584

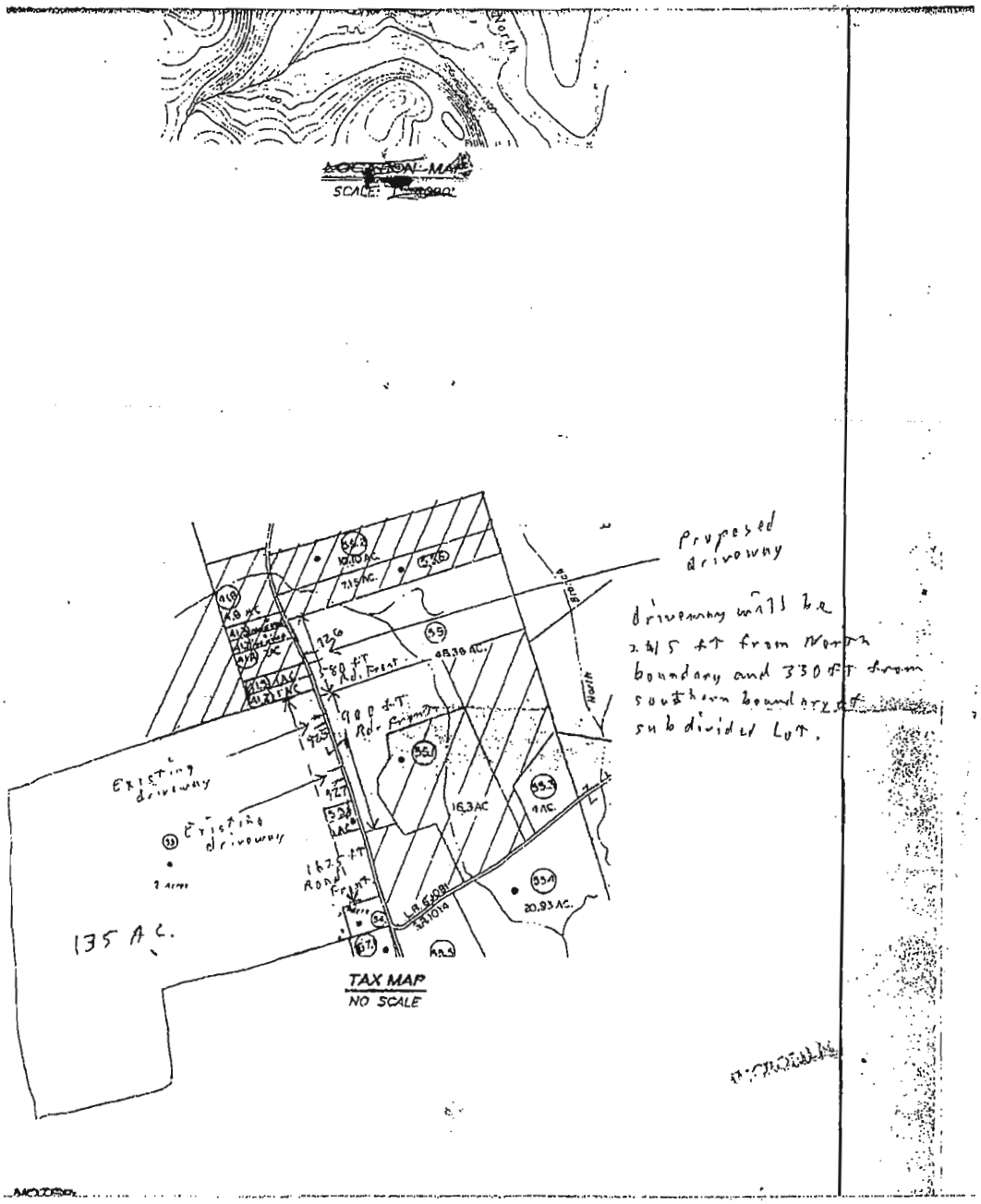
Field Viewed By: [signature] 8-14-95

Under and subject to all the conditions, restrictions and regulations prescribed by the Pennsylvania Department of Transportation and on the issued Permit, Form M-945P.

The applicant certifies that all statements contained herein are true and correct

By X Harold R. Ruttedge / Jeanne D. Ruttedge (SIGNATURE(S)) 7/25/95 (DATE)

HAVE YOU READ INSTRUCTIONS ON REVERSE?
HAVE YOU COMPLETED ALL BLANKS?


North
SCALE
Proposed driveway
driveway will be 245 ft from North boundary and 330 ft from southern boundary of sub divided Lot.
Existing driveway
Existing driveway
135 A.C.
16.3AC
20.93 AC.
TAX MAP
NO SCALE

M-945P (12/93)

AUDIT CONTROL NO. 711724

COMMONWEALTH OF PENNSYLVANIA

HIGHWAY OCCUPANCY PERMIT

Permit No.	04016279
Organization	046
Date Issued	090195
Permit Fees	35.00
Account No.	
County	64
Township/Boro	206

PERMITTEE: HAROLD & JEANNE RUTLEDGE

ADDRESS: R R 1 BOX 228

POST OFFICE: EQUINUNK PA ZIP CODE: 18417-

County: WAYNE

Township/Boro: DAMASCUS

Bond/Agreement Number:

ALL WORK UNDER THIS PERMIT MAY BE STARTED ON: 09/01/95

AND SHALL BE COMPLETED ON OR BEFORE: 09/01/96

Immediately upon completion of the work, Permittee shall notify the permit office where application was made. Subject to all the conditions, restrictions, and regulations prescribed by the Pennsylvania Department of Transportation, (see in particular 67 Pa. Code, Chapter 203, 441 and 459) and subject to the plans, special conditions, or restrictions herein set forth or attached hereto. This permit shall be located at the work site and shall be available for inspection by any police officer or department representative.

	1	2	3	4
Description	512			
State Route No.	1025			
Segment(s)	0050			
Offset To Offset	1056			
Township/Boro				

DESCRIPTION OF WORK

INSTALL MINIMUN USE DRIVEWAY WITH DRAINAGE FACILITIES AT SR 1025 SEG 0050 OFFSET 1056 TO SEG 0050 OFFSET 1056
DRAINAGE INSTALLED BY THIS PERMIT IS THE RESPONSIBILITY OF THE PERMITTEE TO CONTINUALLY MAINTAIN OR REPLACE.
THIS PERMIT AUTHORIZES WORK ONLY IN DEPARTMENT HIGHWAY RIGHT OF WAY.
IT IS THE PERMITTEE'S RESPONSIBILITY TO KEEP VEGETATION TRIMMED IN ORDER TO MAINTAIN MINIMUM SIGHT DISTANCE. NO OBJECTS MAYBE PLACED WITHIN THE LINE OF SIGHT.
MINIMUM WORK ZONE TRAFFIC CONTROL TO BE IN ACCORDANCE WITH PUB. 203 FIGURE(S) 5, 7, 10A.
PLANS DEPICTING THE HIGHWAY OCCUPANCY ARE FILED AS PUBLIC DOCUMENTS IN THE DEPARTMENT OF TRANSPORTATION, ENGINEERING DISTRICT 4-0 PERMIT OFFICE.
ALL DISTURBED AREAS OUTSIDE THE PAVEMENT OR SHOULDER SHALL BE RESTORED TO A CONDITION AT LEAST EQUAL TO THAT WHICH EXISTED BEFORE THE START OF WORK.
SHOULDERS MUST BE RESTORED IN ACCORDANCE WITH APPROPRIATE SECTION OF PUB. 408 AND ROADWAY CONSTRUCTION STANDARD RC-25.
DEPARTMENT MUST BE NOTIFIED IN WRITING UPON COMPLETION OF WORK.
X
X

THIS PERMIT IS NOT VALID UNTIL SIGNED BY THE DISTRICT ENGINEER OR HIS AUTHORIZED REPRESENTATIVE

Acknowledgment of Completion

Permitted work has been completed

Date 9-30-96 By Stephen L. Mullen

FOR BRADLEY L. MALLORY
SECRETARY OF TRANSPORTATION

BY CHARLES M. MATTEI, P.E.
DISTRICT ENGINEER

RECORDING COPY/COUNTY COMPLETION REPORT

M-950A (10/92)
Central Permit Office

APPLICATION FOR MINIMUM USE DRIVEWAY

A Minimum Use Driveway is a Residential or Other Driveway Which is Expected to Be Used By Not More Than 25 Vehicles Per Day (i.e. 50 A.D.T.)

READ INSTRUCTIONS ON REVERSE

APPL. NO 545297

Applicant / Property Owner	Harold + Jeanne Rutledge
Address	RR1 Box 228 Equinunk Pa
Post Office	Equinunk
Zip Code	18417
Phone	224-4776
Fee	25.00
Check No	919

LOCATION OF PROPOSED DRIVEWAY

County: Wayne (63)

Township/Boro: Damascus (206)

Route No.: SR 1025

Name of Nearest Intersection: SR 1014 / SR 1025

Distance to Nearest Intersection in Feet: 925 feet

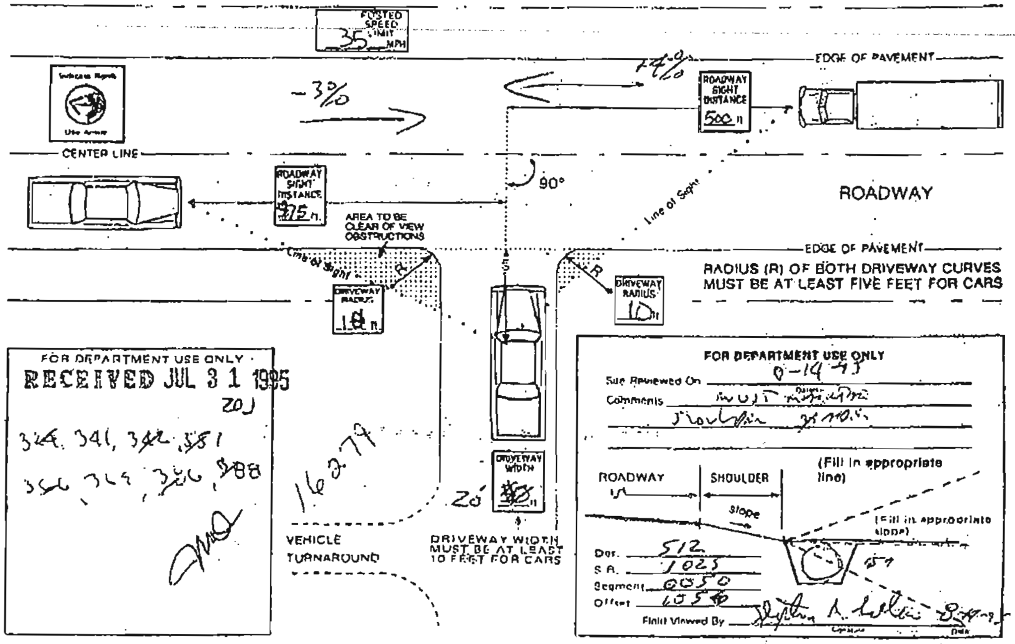
APPLICATION IS MADE TO

☐ CONSTRUCT A NEW DRIVEWAY ☐ ALTER AN EXISTING DRIVEWAY

DATE WORK SCHEDULED TO BEGIN ______

DATE WORK SCHEDULED TO BE COMPLETED ______

For the purpose of measuring sight distance, the drivers' eye height shall be 3.50 feet above the proposed access surface and highway pavement surface and the vehicles' height shall be 4.25 feet above the proposed access surface and highway pavement surface.



FOR DEPARTMENT USE ONLY

RECEIVED JUL 3 1 1995

20J

324, 341, 342, 351

356, 369, 386, 388

FOR DEPARTMENT USE ONLY

Site Reviewed On: 8-14-95

Comments: [illegible]

ROADWAY | SHOULDER | (Fill in appropriate line)

Slope (Fill in appropriate slope)

Dst. 512

S.R. 1025

Segment 0050

Offset 1056

Field Viewed By [illegible] Date 8-[illegible]

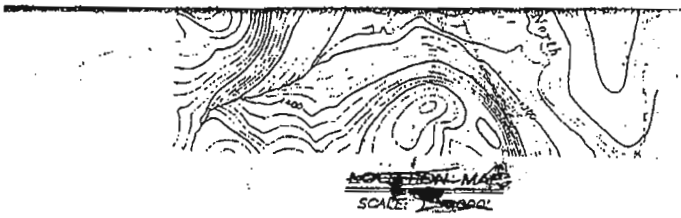
Under and subject to all the conditions, restrictions and regulations prescribed by the Pennsylvania Department of Transportation and on the issued Permit, Form M-945P.

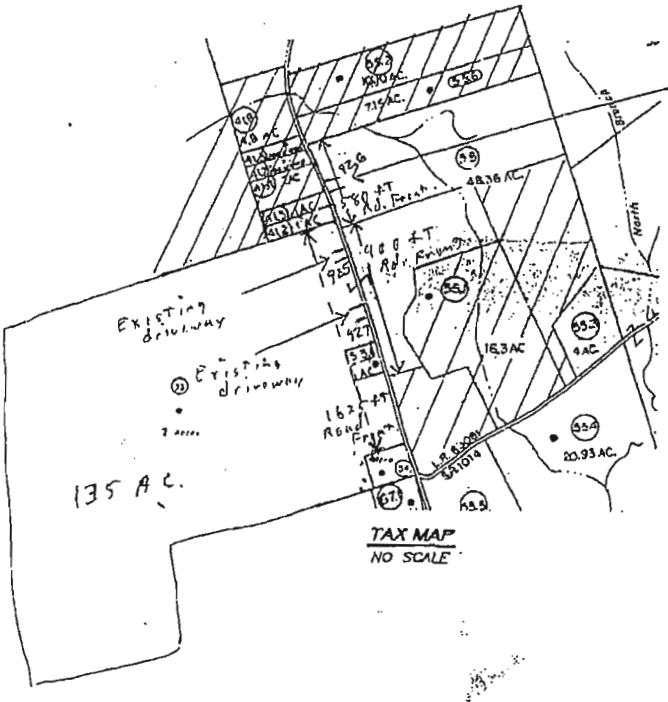
The applicant certifies that all statements contained herein are true and correct.

By X Harold E. Rutledge / Jeanne S. Rutledge (SIGNATURE(S)) 7/25/95 (DATE)

HAVE YOU READ INSTRUCTIONS ON REVERSE?
HAVE YOU COMPLETED ALL BLANKS?

DISTRICT PERMIT OFFICE – ORIGINAL APPLICATION





proposed driveway

driveway will be 245 ft from North boundary and 330 ft from southern boundary of sub divided Lot.

MICROFILM

NOTES

M-946P (12/93)

AUDIT CONTROL NO. 711725

COMMONWEALTH OF PENNSYLVANIA

HIGHWAY OCCUPANCY PERMIT

Permit No.	04016280
Organization	046
Date Issued	090195
Permit Fees	25.00
Account No.	
County	63
Township/Boro	206

PERMITTEE: HAROLD & JEANNE RUTLEDGE

ADDRESS: R R 1 BOX 226

POST OFFICE: EQUINUNK PA ZIP CODE: 18417-

County: WAYNE

Township/Boro: DAMASCUS

Bond/Agreement Number:

ALL WORK UNDER THIS PERMIT MAY BE STARTED ON: 09/01/95

AND SHALL BE COMPLETED ON OR BEFORE: 09/01/96

Immediately upon completion of the work, Permittee shall notify the permit office where application was made. Subject to all the conditions, restrictions, and regulations prescribed by the Pennsylvania Department of Transportation, (see in particular 67 Pa. Code, Chapter 203, 441 and 459) and subject to the plans, special conditions, or restrictions herein set forth or attached hereto, This permit shall be located at the work site and shall be available for inspection by any police officer or department representative.

(1) Description	511	
State Route No.	1025	
Segment(s)	0050	0050
Offset To Offset	2000	2000
(2) Description		
State Route No.		
Segment(s)		
Offset To Offset		
(3) Description		
State Route No.		
Segment(s)		
Offset To Offset		
(4) Township/Boro		
Description		
State Route No.		
Segment(s)		
Offset To Offset		

DESCRIPTION OF WORK

INSTALL MINIMUM USE DRIVEWAY AT
SR 1025 SEG 0050 OFFSET 2000 TO SEG 0050 OFFSET 2000
THIS PERMIT AUTHORIZES WORK ONLY IN DEPARTMENT HIGHWAY RIGHT OF WAY. SURFACE DRAINAGE MAY NOT BE DIRECTED ONTO STATE RIGHT OF WAY.
IT IS THE PERMITTEE'S RESPONSIBILITY TO KEEP VEGETATION TRIMMED IN ORDER TO MAINTAIN MINIMUM SIGHT DISTANCE. NO OBJECTS MAY BE PLACED WITHIN THE LINE OF SIGHT.
MINIMUM WORK ZONE TRAFFIC CONTROL TO BE IN ACCORDANCE WITH PUB. 203 FIGURE(S) 5, 7, 10A.
PLANS DEPICTING THE HIGHWAY OCCUPANCY ARE FILED AS PUBLIC DOCUMENTS IN THE DEPARTMENT OF TRANSPORTATION, ENGINEERING DISTRICT 4-0 PERMIT OFFICE.
ALL DISTURBED AREAS OUTSIDE THE PAVEMENT OR SHOULDER SHALL BE RESTORED TO A CONDITION AT LEAST EQUAL TO THAT WHICH EXISTED BEFORE THE START OF WORK.
SHOULDERS MUST BE RESTORED IN ACCORDANCE WITH APPROPRIATE SECTION OF PUB. 408 AND ROADWAY CONSTRUCTION STANDARD RC-25.
DEPARTMENT MUST BE NOTIFIED IN WRITING UPON COMPLETION OF WORK.
X
X
X

THIS PERMIT IS NOT VALID UNTIL SIGNED BY THE DISTRICT ENGINEER OR HIS AUTHORIZED REPRESENTATIVE

Acknowledgment of Completion

Permitted work has been completed

Date 9-30-96 By Stephen L Miller

FOR BRADLEY L. MALLORY
SECRETARY OF TRANSPORTATION

BY CHARLES N. MATTEI, P.E.
DISTRICT ENGINEER

RECORDING COUNTY COMPLETION REPORT

M-950A (10/93)
Central Permit Office

APPLICATION FOR MINIMUM USE DRIVEWAY

A Minimum Use Driveway is a Residential or Other Driveway Which Is Expected to Be Used By Not More Than 25 Vehicles Per Day (i.e. 50 A.D.T.)

READ INSTRUCTIONS ON REVERSE

APPL. NO. 548298

Applicant / Property Owner: Harold + Jeanne Ruttedge
Address: RR 1 Box 228 Equinunk Pa
Post Office: Equinunk
Zip Code: 18417
Phone: 224-4776
Fee: 25.00
Check No.: 919

LOCATION OF PROPOSED DRIVEWAY

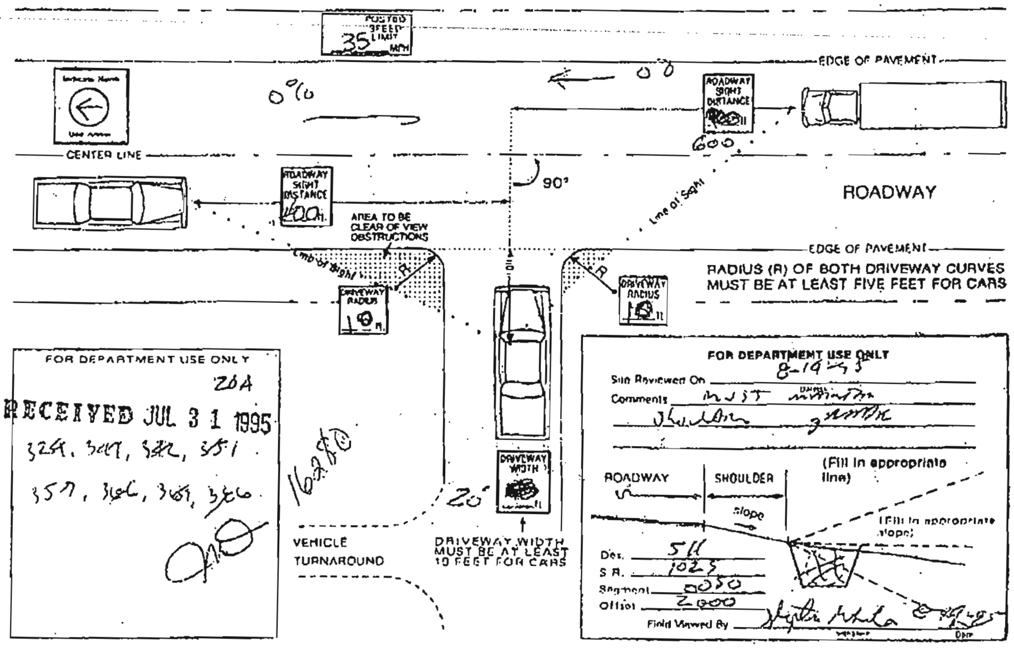
County: Wayne (63)
Township/Boro: Damascus (2d)
Route No.: SR 1025
Name of Nearest Intersection: SR1014 / SR 1025
Distance to Nearest Intersection In Feet: 1325 ft

APPLICATION IS MADE TO

☐ CONSTRUCT A NEW DRIVEWAY ☐ ALTER AN EXISTING DRIVEWAY

DATE WORK SCHEDULED TO BEGIN ______
DATE WORK SCHEDULED TO BE COMPLETED ______

For the purpose of measuring sight distance, the drivers' eye height shall be 3.50 feet above the proposed access surface and highway pavement surface and the vehicles' height shall be 4.25 feet above the proposed access surface and highway pavement surface.



FOR DEPARTMENT USE ONLY
2dA
RECEIVED JUL 31 1995
329, 347, 342, 351
357, 366, 368, 386

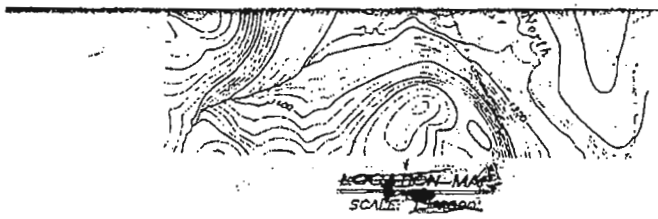
FOR DEPARTMENT USE ONLY
Site Reviewed On: 8-14-95
Comments: must
ROADWAY | SHOULDER | (Fill in appropriate line)
slope
(Fill in appropriate slope)
Dist. 54
S.R. 1025
Segment 0030
Offset 2000
Field Viewed By ______ Date

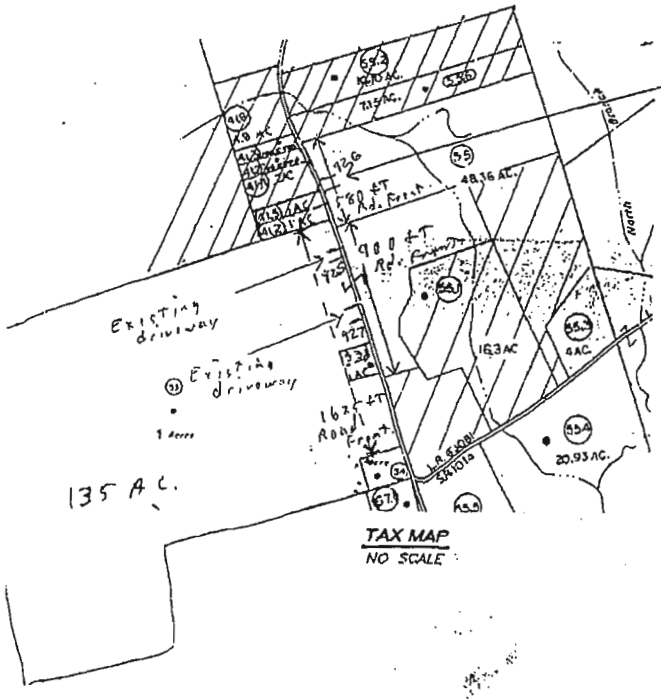
Under and subject to all the conditions, restrictions and regulations prescribed by the Pennsylvania Department of Transportation and on the issued Permit, Form M-945P.

The applicant certifies that all statements contained herein are true and correct.

By X Harold L. Ruttedge / Jeanne G. Ruttedge — SIGNATURE(S)   7/25/95 — DATE

HAVE YOU READ INSTRUCTIONS ON REVERSE?
HAVE YOU COMPLETED ALL BLANKS?





Proposed driveway

driveway will be 245 ± FT from North boundary and 330 ± FT from southern boundary of subdivided Lot.

Driveway Address for the Rutledge 1-1 Well Site

Address was assigned by GIS and is on file with county Emergency Management office and 911 dispatch.

Rutledge 1-1
455 Rutledgedale Rd
Equinunk PA, 18417

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

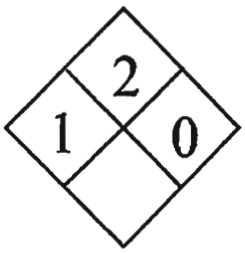
For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

INTEGRITY INDUSTRIES INC.



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MATERIAL SAFETY DATA SHEET

****

SECTION I - MANUFACTURER

Integrity Industries, Inc.
2710 E. Corral St.
Kingsville, Texas 78363
Emergency Phone: (361) 595-5561

Revised Date: 06/05/2008
Supercedes: new

THIS DOCUMENT IS PREPARED PURSUANT TO THE OSHA HAZARDOUS COMMUNICATION STANDARD (29 CFR 1910.1200). ALSO, OTHER SUBSTANCE NOT DEEMED "HAZARDOUS" PER THIS MSDS MAY BE LISTED.

SECTION II - MATERIAL IDENTIFICATION

Trade Name: **SYNVERT Base Oil**
Synonyms/Other Designations: Synthetic Drilling Fluid / Polymer Suspension Base
Placard: Not Applicable
Hazard(s): non-hazardous

Component	CAS Number	Weight
Paraffin/Olefin blend	Mixture	100%

SECTION III - PHYSICAL & CHEMICAL DATA

Boiling Point: IBP > 300 °F
Specific Gravity (H2O=1): 0.766
Vapor Density (Air=1): n/a
Appearance: Clear, oily liquid

Pour Point: ND
Vapor Pressure (mm Hg @ 68 °F): 0.135
Solubility in H2O: Insoluble
Viscosity (cSt @104 °F): 1.4

SECTION IV - REACTIVITY

Stability: Stable
Incompatibility: Heat, sparks, open flame. May react with strong acids/strong oxidizing agents, chlorates, nitrates, peroxides.
Hazardous Decomposition Products: Oxides of carbon. Hazardous Polymerizations: will not occur

SECTION V - FIRE & EXPLOSION DATA

Flash Point (ASTM D-93): > 200 °F
Autoignition: n/a
Extinguishing Media: Water spray, Dry Chemical, Foam, CO2
Special Fire Fighting Procedures: Respirators/eye protection and full firefighting protective gear.
Unusual Fire Hazards: Remove containers from source of heat.

SECTION VI - EMERGENCY & FIRST AID DATA

Inhalation: Move to well ventilated area; if breathing difficulties persist after 15 minutes seek medical assistance.
Eye Contact: Wash eye thoroughly for 15 minutes; if irritation persists seek medical assistance.
Skin Contact: Wash affected area with soap & water for 15 minutes; if irritation persists seek medical assistance.
Ingestion: Do not induce vomiting and seek medical advice.

SECTION VII - HEALTH HAZARDS DATA

Acute: May irritate eyes, skin, respiratory, & gastrointestinal tract. Chronic: Repeated/prolonged skin contact may irritate/redden skin, progressing to dermatitis.

SECTION VIII - SPILL & DISPOSAL DATA

Accidental Spill Procedures: Absorb in inert material and dispose of according to local, state & federal regulations. Spill into water should be contained to avoid runoff into waterways.
Handling & Storage: Keep container closed and store in cool dry place. Emptied container still contains material which may ignite with explosive violence if exposed to open flame.

SECTION IX - SPECIAL PROTECTION DATA

Respiratory Protection: Respirator in confined areas.
Ventilation: Desired Exhaust: Mechanical
Protective Gloves: Solvent/chemical resistant gloves
Eye Protection: Safety glasses, goggles.
Other Protection: As required to avoid skin contact.

SECTION X - TRANSPORT INFORMATION

The following may not apply to all shipping situations. Consult 49 CFR for more mode-specific or quantity-specific data.
DOT Proper Shipping Name: Not regulated
DOT Hazard Class or Division: Not regulated
DOT Identification Number: N/A
DOT Packaging Group: III
Type Label(s) Required. none
Placard: Not applicable
*For Limited Quantity requirements see DOT regulation 49 CFR.

SECTION XI - DISCLAIMERS

* SOME INFORMATION PROVIDED HEREIN WAS DRAWN FROM SOURCES OTHER THAN INTEGRITY INDUSTRIES.
THE INFORMATION PROVIDED HEREIN IS BELIEVED BY INTEGRITY INDUSTRIES, INC. TO BE CORRECT & RELIABLE; NO EXPRESSED OR IMPLIED WARRANTY IS PROVIDED HOWEVER.
* INTEGRITY INDUSTRIES, INC. ASSUMES NO RESPONSIBILITY AND DENIES ALL LIABILITY FOR ANY LOSS, DAMAGE, OR EXPENSE CONNECTED WITH CUSTOMERS' METHOD OF HANDLING, STORAGE, USE, AND DISPOSAL OF THIS PRODUCT.
* THE MSDS INFORMATION PROVIDED HEREIN IS APPLICABLE ONLY TO THIS PRODUCT.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BARACARB® 50**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BARACARB® 50
Synonyms: None
Chemical Family: Mineral
Application: Bridging Agent

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Limestone	1317-65-3	60 - 100%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	0 - 1%	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 0, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store away from acids. Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid Powder
Color:	White
Odor:	Odorless
pH:	8-9
Specific Gravity @ 20 C (Water=1):	2.7
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	72-112
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong acids.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion None known

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: LD50: > 5000 mg/kg (Rat)

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect: Not determined

Carcinogenicity Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: TLM96: >1,000,000 ppm (Mysidopsis bahia) SPP @ 178.5 ppb
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BAROID®**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BAROID®
Synonyms: None
Chemical Family: Mineral
Application: Weight Additive

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Barium sulfate	7727-43-7	60 - 100%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	1 - 5%	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation. May be harmful if swallowed.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Pink to tan to gray
Odor:	Odorless
pH:	8-9-
Specific Gravity @ 20 C (Water=1):	4.2
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	100- 155
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	233.4

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact None known.

Eye Contact May cause mild eye irritation.

Ingestion May produce nervous system effects such as feeling of weakness, unsteady walk, and dilation of blood vessels. May affect the heart and cardiovascular system.

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not applicable

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM96: 7500 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity:	TLM96: > 1,000,000 ppm (Mysidopsis bahia) SPP @ 132.6 ppb
Acute Algae Toxicity:	Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **LIME**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: LIME
Synonyms: None
Chemical Family: Inorganic
Application: pH Control

Manufacturer/Supplier

Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Calcium hydroxide	1305-62-0	60 - 100%	5 mg/m^3	15 mg/m^3

3. HAZARDS IDENTIFICATION

Hazard Overview

May cause eye and skin burns. May cause respiratory irritation. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation

If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin

Wash with soap and water. Get medical attention if irritation persists. Remove contaminated clothing and launder before reuse.

Eyes

In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion

Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician

Not Applicable

5. FIRE FIGHTING MEASURES

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media All standard firefighting media.

Special Exposure Hazards Not applicable.

Special Protective Equipment for Fire-Fighters Not Determined

NFPA Ratings: Health 1, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.

Storage Information Store away from acids. Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Dust/mist respirator. (95%)

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White
Odor:	Odorless
pH:	12.2
Specific Gravity @ 20 C (Water=1):	2.24
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	75
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	0.2
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	74.1

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong acids.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	Causes severe skin irritation. May cause skin burns on prolonged contact.
Eye Contact	Causes severe eye irritation May cause eye burns.
Ingestion	Irritation of the mouth, throat, and stomach.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 7340 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: TLM96: 100-500 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity: TLM96: 478,520 ppm (Mysidopsis bahia) SPP @ 8 ppb
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Empty container completely. Transport with all closures in place. Return for reuse or dispose in a sanitary landfill according to national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **WALNUT HULLS**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: WALNUT HULLS
Synonyms: None
Chemical Family: Nut Hulls
Application: Loss Circulation Material

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Walnut hulls	Mixture	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye irritation.

4. FIRST AID MEASURES

Inhalation Under normal conditions, first aid procedures are not required.

Skin Under normal conditions, first aid procedures are not required.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Lower (oz./ft3):	0.07
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust.

Storage Information Store away from oxidizers. Store in a dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Safety glasses.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Brown
Odor:	Characteristic

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.1
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mild eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined

Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Biodegradable

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: TLM96: > 1,000,000 ppm (Mysidopsis bahia) SPP @ 10 ppb
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

PREPAREDNESS, PREVENTION, AND CONTINGENCY PLAN
WAYNE COUNTY FIELD
WAYNE COUNTY, PENNSYLVANIA

Prepared for:

NEWFIELD APPALACHIA PA LLC
363 N. Sam Houston Pkwy E., Suite 2020
Houston, TX 77060

Prepared by:

TETRA TECH NUS INC
116 N. Washington Avenue
Scranton, PA 18503

May 2010

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LIST OF APPENDICES

1.0 DESCRIPTION OF FACILITY

1.1 DESCRIPTION OF THE INDUSTRIAL OR COMMERCIAL ACTIVITY

Newfield Appalachia PA LLC (Newfield) is a natural gas exploration company with operations planned for Wayne County, Pennsylvania. Operations will involve natural gas exploration of the Marcellus Shale formation, which will include site preparation, drilling, and well development and production activities. Wastes generated during these activities will be typical for gas drilling operations and will include drill cuttings, produced water, drilling and frac fluids, waste oil, municipal waste and trash. No hazardous waste is expected to be generated at the Newfield sites.

Newfield is currently in the exploratory phase of operations, which will require construction activities for new natural gas well pads and access roads.

This Prevention, Preparedness and Control (PPC) Plan applies to all well sites in Wayne County, Pa.

The attached map (Figure 1) in Appendix B shows the area covered under this PPC Plan Figure 2 is the required 7.5 topographic map of the specific well site. The proposed Site Plan (Figure 3) shows the site layout, the well site boundaries, material storage areas, waste storage areas, dike drains and drainage that leads away from the well site, and the entrances and exits to the well site.

During the different stages of site preparation, construction, drilling, well development and production, the site will store various fuels, oils and chemicals on-site. A chemical and container inventory for the specific well site is located in Table 1 of Appendix C.

1.2 DESCRIPTION OF EXISTING EMERGENCY RESPONSE PLANS

This is a new facility and this plan has been prepared prior to construction of the well pad. There are no previous emergency response plans.

A separate Spill Prevention Control and Countermeasure (SPCC) Plan will be prepared for each facility meeting the requirements defined in 40 CFR§112.

1.3 MATERIAL AND WASTE INVENTORY

Information in this section is used to evaluate the prevention, containment, mitigation, cleanup, and disposal measures which would be used in the event of a spill, discharge, explosion, or fire. Oils, chemicals and other hazardous materials anticipated to be used and stored at the facility during site preparation and construction, drilling, well development and production are listed in Table 1.

MSDS's will be maintained onsite for chemicals and compounds used at the facility in accordance with the Occupational Safety and Health Administration (OSHA) worker right-to-know requirements, as appropriate.

1.4 POLLUTION INCIDENT HISTORY

Newfield has not had any reportable incidents for this facility.

1.5 IMPLEMENTATION SCHEDULE FOR PLAN ELEMENTS NOT CURRENTLY IN PLACE

All plan elements are in place.

1.6 PURPOSE AND IMPLEMENTATION OF PPC PLAN

Newfield has developed and will implement this PPC Plan for effective action to minimize and abate hazards to human health and the environment from fire, explosion, and emission or discharge of pollutants to air, soil, surface water or groundwater. This plan was prepared to satisfy the requirements set forth in 25 PA Code Section 78.

The Drilling Manager serves as the Primary Emergency Coordinator and is responsible for the preparation and implementation of the PPC Plan. The PPC Plan has been prepared and implemented in general accordance with Pennsylvania Department of Environmental Protection (PADEP) guidelines, and will be submitted to PADEP for approval at such time as the PADEP may prescribe.

This PPC Plan identifies and describes any arrangements with police departments, fire departments, hospitals, contractors, and state, county, and local emergency response teams to coordinate emergency services.

The PPC Plan lists names, addresses and phone numbers of all persons identified to act as Emergency Coordinator. One person is named as the Primary Emergency Coordinator and others are listed in the order in which they will assume responsibility as alternates. The PPC Plan also includes a list of emergency equipment at the facility, the location and a physical description of emergency equipment, and a brief outline of emergency equipment capabilities.

1.7 PLAN REVISIONS

This PPC Plan will be reviewed and amended, annually, or whenever:

- Applicable PADEP regulations are revised;
- The plan fails in an emergency;
- The list of Emergency Coordinators changes;
- The list of emergency equipment changes; and
- Construction, operation, maintenance, or other circumstances change in a manner that materially increases the potential for fires, explosions, or releases of toxic or hazardous constituents; or which changes the response necessary in an emergency.

2.0 IMPLEMENTATION OF PPC PLAN

2.1 ORGANIZATIONAL STRUCTURE OF FACILITY FOR IMPLEMENTATION

The Drilling Manager has been designated as the Primary Emergency Coordinator. The Primary Emergency Coordinator is responsible for the following:

- Coordination of spill cleanup activities;
- Notification of appropriate authorities; and
- Tank and chemical storage area inspections.

The Drilling Manager has administrative responsibility for updating, maintaining, and implementing this PPC Plan. Specifically, these responsibilities include:

- Identification of materials and wastes handled during site operation (inventory);
- Identification of potential spill sources (risk assessment);
- Establishment of spill reporting procedures;
- Coordination of the visual inspection program;
- Review of past incidents, spills, and countermeasures employed;
- Coordination and implementation of the PPC Plan goals;
- Training/educational programs and updates;
- Ensuring periodic review of the PPC Plan for adequacy and appropriateness;
- Administration and institution of appropriate changes at regular intervals;
- Review of new construction and process changes relative to the PPC Plan;
- Evaluation of PPC Plan effectiveness prior to, during and subsequent to its implementation; and
- Instituting improvements to the PPC Plan.

The Production Manager is designated as Secondary Emergency Coordinator, and, in the absence of the Drilling Manager, will assume the role of emergency coordinator for emergencies. The Secondary Emergency Coordinator will report directly to the Primary Emergency Coordinator in matters regarding this plan, and can assist with implementing the above-listed items.

2.2 LIST OF EMERGENCY COORDINATORS

As required by 25 PA Code 265.55, there will be at least one employee, either on the construction site or on call, with the responsibility for coordinating emergency response measures. The Primary and Secondary Emergency Coordinators will be thoroughly familiar with this PPC Plan, site operations and activities, the location and characteristics of materials and wastes, the location of the facility's records, and the layout of the facility. The Emergency Coordinators have the authority to commit the resources necessary to carry out the PPC Plan and for coordinating emergency response measures. In the event of a spill or release, one of the Emergency Coordinators will be immediately notified. The following individuals have been designated to act as Emergency Coordinators:

Primary Emergency Coordinator

Name: Don Sleeth
Title: Drilling Manager
Office: 281-674-2501
Cell: 281-974-0051

Secondary Emergency Coordinator

Name: Jack Cochran
Title: Production Manager
Office: 814-437-2344
Cell: 814-671-1557

2.3 DUTIES AND RESPONSIBILITIES OF THE EMERGENCY COORDINATOR

As required by 25 PA Code 265.56 and the PPC Plan Guidance Documents, whenever there is an imminent or actual emergency situation, the Emergency Coordinator or his designee must immediately:

1. Notify all facility personnel.

2. Notify appropriate state or local agencies with designated response roles and contracted emergency response companies if additional assistance is required.

3. Identify the problem. Is it a physical emergency such as a fire, explosion, or spill? Is it a natural disaster such as a flood, tornado, or other severe weather? Is it a social emergency such as a bomb threat, riot, or vandalism?

4. Assess the health or environmental hazards and how this problem or condition will affect employees or its affect on the surrounding community.

5. Take all reasonable measures to stabilize the situation. The Emergency Coordinator will take all reasonable measures to ensure that the fire, explosion, emission, or discharge does not reoccur or spread to other materials at the site. These measures can include, when appropriate, stopping operations, collecting and containing released materials or wastes, and removing or isolating containers.

Whenever there is an emission, discharge, fire, or explosion, the Emergency Coordinator or his designee must immediately attempt to identify the character, exact source, amount, and aerial extent of emitted or discharged materials. He/she may do this by observation, by review of facility records or manifests, and, if necessary, by instrumental and chemical analysis. Concurrently, the Emergency Coordinator or his designee must assess possible hazards to human health or the environment that may result from emission, discharge, fire, or explosion. This assessment must consider both direct and indirect effects of the emission, discharge, fire, or explosion.

If the Emergency Coordinator determines that the facility has had an emission, discharge, fire, or explosion which would threaten human health or the environment (beyond the limits of the site) and if evacuation of local areas may be advisable, he/she must immediately notify the applicable local authorities (police, fire, etc.); he/she must also immediately notify the PADEP by telephone at (800) 541-2050 (24-hour number), PADEP Northeast Region at (570) 826-2511 (24-hrs), the National Response Center at (800) 424-8802, Wayne County Emergency Management Agency (EMA) at (570) 253-1622, and the Pennsylvania Emergency Management Agency at (717) 651-2001, and report the following information:

- Name of the person reporting the incident;
- Name and location of the facility;
- Telephone number where the person reporting the spill can be reached;
- Date, time, and location of the incident;
- A brief description of the incident, nature of the materials involved, extent of any injuries, and possible hazards to human health or the environment;
- The estimated quantity of the materials spilled; and
- The extent of contamination of land, water, or air, if known.

If spills or discharges of a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substance in greater than reportable quantities has occurred, the Emergency Coordinator must notify DEP at (800) 541-2050 and the National Response Center at (800) 424-8802 and report the above information. For an offsite release (spill or discharge) of a reportable quantity of a CERCLA hazardous substance or a Superfund Amendments and Reauthorization Act Extremely Hazardous Substance, the Emergency Coordinator must immediately notify the National Response Center at (800) 424-8802 and report the above information.

If a release occurs from a storage tank which enters a water supply or which threatens the water supply of downstream users, the Emergency Coordinator must immediately notify the Wayne County EMA (570) 253-1622, the Pennsylvania Emergency Management Agency at (717) 651-2001, and DEP at (800) 541-2050. If appropriate, the Emergency Coordinator may assist the Emergency Management Agencies in notifying the downstream water users. The priorities for notification will be by closest proximity to the release site.

During an emergency, the Emergency Coordinator will take all reasonable measures necessary to ensure that fire, explosion, emission, or discharge do not occur, recur, or spread to other materials at the facility. These shall include, where applicable, stopping facility operations, collecting and containing released materials, and removing or isolating containers. If the facility stops operations in response to a fire, explosion, emission, or discharge, the Emergency Coordinator must ensure that adequate monitoring is conducted for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment whenever this is appropriate.

The Emergency Coordinator will oversee and direct facility personnel in the performance of their responsibilities for addressing the emergency situation. Immediately following an emergency, the Emergency Coordinator (with PADEP approval) must provide for treating, storing, or disposing residues, contaminated soil, etc., from an emission, discharge, fire, or explosion at the construction site. The Emergency Coordinator must ensure that in the affected areas of the facility, no material incompatible with the emitted or discharged residues is processed, stored, treated, or disposed until cleanup procedures are completed and that all emergency equipment utilized in implementation of the PPC Plan is cleaned and fit for its intended use before operations are resumed. Newfield will notify PADEP and the appropriate State or local

authorities that the facility is in compliance before operations are resumed in the affected areas of the facility. Newfield will note the time, date and details of an incident that requires implementing the PPC Plan.

Within 15 days after the incident, Newfield will submit a written report on the incident to PADEP and the U.S. Environmental Protection Agency regional administrator. The report must be submitted to:

Director - Bureau of Water Quality Management
Pennsylvania Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110

Regional Administrator
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103

Director - PADEP Northeast Office
Pennsylvania Department of Environmental Protection
2 Public Square
Wilkes-Barre, PA 18711

The report should include the following information:

- Name, address, and telephone number of the individual filing the report;
- Name, address, and telephone number of the facility;
- Date, time, type, and location of incident;
- A brief description of the circumstances causing the incident;
- Description and estimated quantity (by weight) of materials or wastes involved;
- The extent of injuries, if any;
- An assessment of actual or potential threat to human health or the environment and assessment of contamination of land, water, or air, where applicable;
- Estimated quantity and disposition of recovered materials or wastes that resulted from the incident; and
- A description of what actions Newfield intends to take to prevent a similar occurrence in the future.

2.4 CHAIN OF COMMAND

Facility personnel must report emergency situations to the Emergency Coordinators. A Chain of Command flow chart (Table 5, Appendix C) has been developed and should be implemented during an emergency. The Emergency Response Chain of Command flow chart will be posted

next to all telephones onsite, posted in areas where potential emergency situations could arise, and placed in onsite company vehicles, as appropriate.

2.5 DISTRIBUTION OF THIS PPC PLAN

A copy of this PPC Plan and subsequent revisions will be distributed to:

- Drilling Manager (Primary Emergency Coordinator)
- Production Manager (Secondary Emergency Coordinator)

The PPC Plan will be reviewed and amended, if necessary, based on the criteria described earlier in Section 1.7.

3.0 SPILL AND LEAK PREVENTION AND RESPONSE

The site will be maintained and operated to minimize the possibility of a fire, explosion or discharge of oils, hazardous materials or their constituents to air, soil, surface water or groundwater which could threaten human health or the environment, in accordance with the requirements of 25 PA Code Section 265.31.

3.1 PRE-RELEASE PLANNING

The following sections discuss specific locations where the potential exists for accidental spills of oils and/or chemicals. The controls that are in place to minimize the potential for an uncontrolled release to the environment are also discussed. In the event that an uncontrolled spill of hazardous substances occurs, the procedures described in Section 4.0 will be followed.

To enhance spill prevention at the facility, great care will be exercised in handling oil and other materials covered in this PPC Plan. Any unusual conditions observed by any employees or contractors will be reported to one of the Emergency Response Coordinators. Management personnel whose responsibilities include involvement with the materials discussed in this document will also be familiar with this plan and the procedures recommended for spill prevention.

Spill Prevention Measures: Procedures that are to be followed to prevent and/or minimize oil spills at the Newfield facility include:

- ASTs and/or containers will be stored in secondary containment with sufficient volume;
- ASTs and regulated material containers will be visually inspected weekly for leaks;
- Special care will be taken when transferring regulated materials to prevent product loss;
- Regulated materials will be stored in a manner that minimizes the potential for contact with stormwater;
- Absorbent and spill control materials shall be maintained on-site for emergency use;

- Emergency response personnel will be familiar with procedures to follow in the case of a spill; and

- In cases where there may be leaking equipment or operations where oil or oil-related compounds are leaked, spilled, or otherwise released, containment booms or absorbent materials shall be used and equipment shall be repaired.

In the event that an uncontrolled spill of oil or a hazardous material occurs, the procedures described in Section 4.0 will be followed. Responses should be coordinated with federal, state and local agencies as appropriate.

3.2 MATERIAL COMPATIBILITY

The majority of materials received on-site in totes, drums, pails or other small containers are stored in the containers supplied by the manufacturer.

Construction materials used for the ASTs have been selected and designed to be compatible with the materials that are being stored and are typical for the natural gas industry.

3.3 INSPECTIONS AND MONITORING PROGRAM

Operating equipment will be inspected daily, and a copy of the inspection and maintenance form is included in Appendix A. Employees are responsible for detecting and reporting potential problems on the inspection and maintenance form.

Storage tank inspections will be conducted weekly and include evaluation of the following: pumps, valves, and fittings for leaks; the tank condition for evidence of corrosion; secondary containment; evidence of spilled materials; and effectiveness of housekeeping practices.

Completed inspection forms and inspection reports will be maintained in the Primary Emergency Coordinator's office. Noncompliance issues identified during the comprehensive site evaluation will be addressed in a timely manner. If additional control measures are required, implementation of the measures will generally occur within 90 days of the site evaluation. Compliance issues that require revisions to the PPC Plan (description of additional pollutant sources, measures, or controls) will be incorporated into the plan within approximately 15 days of the site evaluation.

Stormwater Management System: Stormwater inspections will include an evaluation of best management practices (BMPs), where appropriate. In accordance with the erosion and sedimentation control plan prepared for the site, erosion and sedimentation control (ESC) measures will be implemented where there is the potential for sediment or soil particles to impact stormwater quality. Repairs will be made, as necessary, following the site inspection.

Storage Tanks and Drum Storage Areas: Tanks and drum storage areas will be accessed daily. Spills or leaks that may occur will be contained by secondary containment and noted as part of routine facility operations. To enhance the daily observations, periodic inspections will be performed for the tank and drum storage areas as described in Table 2. The inspections will include observation of spill and/or leaks and observations of the condition of associated secondary containment structures. Records for the inspections will be maintained in the Primary Emergency Coordinator's office.

3.4 PREVENTIVE MAINTENANCE

Newfield will ensure that preventative maintenance of operating machinery on each construction site is performed regularly.

3.5 HOUSEKEEPING PROGRAM

The Newfield Construction Manager will be responsible for general construction site housekeeping. Specific steps taken under this program will include:

- Debris and/or sediment removal, as necessary.
- Regular refuse pickup and disposal.
- Proper filling and emptying of storage containers, tanks, and equipment to minimize spill potential.
- Periodic review of good housekeeping procedures in the employee-training program.

Once completed, the Production Manager will have overall responsibility for housekeeping at the facility. Newfield currently does not anticipate that bulk quantities of hazardous waste materials will be stored at the facility.

3.6 SECURITY

The facility is not fully fenced but is located in a remote location with limited access except via the site access road. The facility is normally manned during drilling and well development.

Flow and drain valves are locked and in the off position when in non-operational or non-standby status. The starter controls for each oil pump are locked in the off position when in non-operating or non-standby status. Master flow/drain valves are all located on the Facility and monitored by staff.

Any loading/unloading connections of facility piping is capped or blind flanged when not in service or is in standby service for an extended amount of time.

The facility has lighting sufficient for detection of spills during nighttime operations. Consideration has been given to: (a) discovery of spills occurring during hours of darkness, both by operating personnel, if present, and by non-operating personnel, and (b) prevention of spills occurring through acts of vandalism.

3.7 EXTERNAL FACTOR PLANNING

External factors are not anticipated to increase the risk of a spill or release that would impact human safety or the environment. Power outages, adverse weather conditions, or employee strikes could result in discontinuation of earth moving, drilling or well preparation activities. The Emergency Coordinator will monitor operations and initiate their orderly shutdown when necessary.

Access road conditions may be impacted by adverse weather conditions, possibly increasing the risk of a release of materials being delivered or removed. Truck drivers should report poor road conditions to the Construction or Drilling Manager. If conditions deteriorate to where they may impact safe movement of materials, the construction or Drilling Manager will review the conditions and initiate repairs or road closure as deemed necessary.

3.8 EMPLOYEE TRAINING PROGRAM

Newfield's employee training program enables employees to understand the processes and materials with which they are working, the safety and health hazards, the practices for preventing spills, and the procedures for responding properly and rapidly to spills. It also familiarizes personnel with emergency procedures.

All Newfield employees receive job specific training. Emergency Coordinators, Well Tenders, and other oil or hazardous material handling employees receive annual training on the facility's PPC and SPCC plans.

Job specific training includes preventive maintenance, inspection and monitoring activities, shut down procedures and housekeeping practices. PPC training will include spill/release recognition, initial response, initial notifications and follow-up. The training program is designed to ensure that personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment systems including, where applicable: procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment; key parameters for automatic cut-off systems; communications and alarms systems; response to fires and explosions; site evacuation procedures; and shutdown of operations.

Annual right-to-know training for all facility employees is conducted relevant to the materials present at the facility. Employees will be given detailed instructions regarding the materials and wastes with which they are working; including safety and health hazards, handling methods, proper disposal procedures, and emergency procedures. The location of MSDS's for on-site materials will be identified to all employees.

Training records will be maintained at the facility and in the employee's personnel file.

4.0 COUNTERMEASURES

4.1 COUNTERMEASURES TO BE UNDERTAKEN BY FACILITY

The following sections present general spill response practices to be implemented at the Newfield facility, as appropriate.

4.1.1 Spill Clean-Up Procedures - General

Incidental spills should be contained and cleaned up when discovered per the employees job related training. Clean up material should be placed into a marked container and the Construction or Drilling Manager notified appropriately.

For large spills or spills of oils or hazardous materials which may reach surface water or impact the environment, the employee who first discovers the spill should contact the Emergency Coordinator. He should then work to contain and clean-up the spill.

Spill clean-up involves three steps: containment, removal, and disposal. In the event of a spill, it is very important that the material be contained to the maximum extent possible in order to minimize the effect of the spill and the cost of clean-up. **NOTE: ANY SHEEN ON A WATERBODY (STREAM, RIVER, OR WETLAND) IS A REPORTABLE RELEASE.** Once the spill is contained, the spilled material and contaminated material must be collected and physically removed from the area

4.1.2 Spill Clean-Up Procedures - Specific

The employee should do the following:

- Contain the spill to the smallest area possible using absorbent materials, earthen dikes or other diversion or containment structures. Stormwater collection structures will be either blocked or pumped.
- Block off the area to prevent traffic or employees from entering the area.
- For oils and other organic materials, apply a non-reactive sorbent material, such as Oil-Dri or Kitty Litter, to the spill.
- In the case of a spill of acids hazardous waste, check the MSDS and then neutralize with lime or soda ash if appropriate.
- If a leaking tank is involved, stop liquid flows as appropriate and dike the tank area with earth or absorbent material.

- If a leaking pail, drum or other small container is involved, place it in an over-pack container.
- Clean up spilled material and place it in a marked container.
- Work with the emergency coordinator to properly store the material and arrange for proper disposal

4.1.3 Fire or Explosion

In the case of a fire or explosion, the local fire department should be notified by calling 911. Employees may attempt to extinguish fires using handheld fire extinguishers based upon their job training.

The Emergency Coordinator will determine if evacuation per section 4.4 is required.

4.2 COUNTERMEASURES TO BE UNDERTAKEN BY CONTRACTORS

The following list shows area emergency response contractors to contact should the facility require outside help.

Company: Minuteman Spill Response, Inc.
Address: P.O. Box 10
Mifflinville, PA 18631
Telephone Number: 570-759-3658
Response Time: Approximately 2 to 3 hrs
Equipment and Services: Hazardous Materials Emergency Response

4.3 INTERNAL AND EXTERNAL COMMUNICATIONS AND ALARM SYSTEM

This section describes the internal communications or alarm used to provide immediate emergency instruction (voice or signal) to installation personnel, and the external communications or alarm system used to summon emergency assistance from local police or fire departments.

Newfield facilities in Wayne County are remote and generally do not have land-line telephone systems or alarm systems. The primary means of communication is via voice or mobile telephones. Mobile phones are provided to the Drilling and Production Managers (Primary and Secondary Emergency Coordinators).

Fire, police, and emergency service can be summoned by calling the 911 or per the numbers listed in Table 3.

4.4 EVACUATION PLAN

In the unlikely event that the site must be evacuated, the Emergency Coordinator will alert personnel to re-group at the pre-designated location for attendance taking. The Emergency Coordinator is responsible to verify that all site workers are accounted for during an evacuation. Periodic drills will be conducted, if deemed necessary, to evaluate the effectiveness of this evacuation plan.

If an emergency situation requires evacuation of personnel, the Emergency Coordinator will implement the following evacuation procedures:

1. The Emergency Coordinator will provide evacuation instructions to facility personnel via the construction site communications network, as appropriate.

2. Personnel evacuation will typically proceed as follows:

   a. If downwind of incident: Evacuate via the most accessible route perpendicular to the prevailing wind direction.
   b. If upwind of incident: Evacuate in an upwind direction.

3. Personnel will reassemble at the public road at the facility entrance as shown on Figure 3 or an alternate assembly point identified by the Emergency Coordinator, that is upwind of the incident location, and remain at this location until the Emergency Coordinator has accounted for all personnel.

4. The names of employees and the destination of employees transported to hospitals, etc. for treatment will be recorded by the Emergency Coordinator, first aid personnel or fire officials.

Once on public roadways, evacuation routes are left up to the individual.

4.5 EMERGENCY EQUIPMENT AVAILABLE FOR RESPONSE

This section provides a list of available emergency equipment, and procedures for maintenance and decontamination of emergency equipment. Newfield's emergency equipment at the facility will allow personnel to respond safely and quickly to emergency situations. Equipment will be inspected and maintained by Construction Manager to assure recommended quantities are available and its proper operation in time of emergency. After an emergency, equipment will be decontaminated, cleaned, and re-fit for its intended use before normal operations resume.

The Newfield facility will be equipped with the following emergency response equipment:

(1) Mobile telephones are provided to the Drilling and Production Mangers and are immediately available at the scene of operations for summoning emergency assistance from local police departments, fire departments or State or local emergency response teams.

(2) Portable fire extinguishers, fire control equipment, spill control equipment and decontamination equipment. This equipment is detailed in Table 4 of Appendix C.

5.0 EMERGENCY SPILL CONTROL NETWORK

5.1 ARRANGEMENTS WITH LOCAL EMERGENCY RESPONSE AGENCIES AND HOSPITALS

This section provides a list of local emergency response agencies and hospitals, and associated phone numbers. Arrangements can be made, as appropriate, to inform local emergency response agencies and hospitals concerning the type of materials handled at the Newfield facility and the potential need for services.

If appropriate, arrangements can be made to designate who will be the primary emergency response agency and who will provide support services during emergencies. Efforts can be made to familiarize police, fire departments, emergency response teams, and the Wayne County Emergency Management Agency (EMA) Coordinator with the layout of the site, the properties and dangers associated with any hazardous materials handled, places where personnel would normally be working, entrances to roads inside the site, and potential evacuation routes.

If considered appropriate by Newfield's Emergency Coordinator, agreements with hospitals and emergency response agencies can be made and included in the periodic updating or amending of the PPC Plan. The agreements and/or arrangements include efforts to familiarize area agencies and emergency responders with facility operations and potential emergency operations. The following agencies can be contacted and provided with a copy of this PPC Plan, at the discretion of the Newfield Emergency Coordinator.

- Local fire companies;
- Local county emergency response personnel;
- Local ambulance personnel; and
- Local hospital.

Table 3 lists local emergency response agencies to be contacted in the event of an emergency or reportable spill. In the unlikely event that a widespread emergency exists, the Wayne County EMA would be contacted first, and the Coordinator in turn could contact appropriate emergency response agencies through their communications network.

The Wayne County Emergency Management Agency can be contacted at (570) 253-1622. Routing of injured persons will be performed by emergency medical services personnel based on the number and type of injuries requiring treatment. The emergency medical services coordinator may be provided with a copy of this PPC Plan to assist in planning. The nearest hospitals are Catskill Regional Medical Hospital in Callicoon, New York, and Wayne County Memorial Hospital in Honesdale, Pennsylvania. The nearest fire departments are Callicoon Fire District in Callicoon, New York, Protection Engine Co No. 3 in Honesdale, Pennsylvania, and Narrowsburg Fire Department, in Narrowsburg, New York. The nearest police departments are the Honesdale Police Department, located in Honesdale, Pennsylvania, and Waymart Police Department in Honesdale Pennsylvania. All emergency response departments shall be reached through the 911 system.

5.2 NOTIFICATION LISTS

If the Emergency Coordinator determines that the facility has had an emission, discharge, fire, or explosion that could threaten human health or the environment, he will contact and report as necessary his findings to the appropriate agencies listed in Table 3. When calling any of the agencies listed in Table 3, the following information should be available for reporting to the identified agencies:

- Company name and location;
- Name of person reporting the spill, title, and telephone number;
- The type of material released;
- Estimated or exact (if known) quantity of material released (i.e., gallons, pounds, etc.);
- A brief description of the incident, including type of incident, nature of hazardous material involvement, and possible hazards to human health and the environment outside the facility;
- Probable source and location of the spill source;
- Date and time of the spill;
- Location of entry point into surface water and amount reaching the waterway (if applicable);
- The name of the receiving water and the downstream water bodies of which it is a tributary;
- Confirmation that release has been stopped or, if not, when will it be stopped;
- Mitigation/containment actions initiated;
- Direction of material movement;

- Potential population affected by the release;
- Name of person to contact on behalf of the company who will be at the scene and will be directing response measures;
- Telephone number where the on-scene coordinator can be reached; and
- The extent of injuries, if any.

A reporting form is attached in Appendix D for use by the Emergency Coordinator.

A written report including the above listed information, and other information that may be required by the applicable regulations (see 25 PA Code Section 265.56) regarding the spilled material, will need to be transmitted within 15 days to the following agencies:

U.S. Environmental Protection Agency
Region III
Spill Response Section
1650 Arch Street
Philadelphia, PA 19103

Pennsylvania Department of Environmental Protection
Bureau of Water Quality Management
2 Public Square
Wilkes-Barre, Pennsylvania 18711

6.0 WASTE DISPOSAL PRACTICES

Produced water will be removed periodically from the tanks at each well site and transported by a licensed residual waste hauler to a permitted disposal facility. Other wastes generated onsite will include used hydraulic oil that will be reclaimed from operating equipment and transported offsite for recycling. All wastes will be disposed in accordance with applicable local, state, and federal regulations.

7.0 STORMWATER MANAGEMENT PRACTICES

Newfield implements several Best Management Practices (BMPs) at each well site to reduce the potential for stormwater runoff of suspended solids and other contaminants. These BMPs include routine visual inspections, preventive maintenance, good housekeeping, and management of stormwater run-on and runoff. Routine inspection and monitoring, preventive maintenance, and good housekeeping programs are discussed in Sections 3.3, 3.4, and 3.5 of this PPC Plan. These programs prevent accidental releases of contaminants and reduce contaminant migrations via stormwater discharges. Stormwater management activities are discussed in Section 3.1 of this PPC Plan. The certification statement regarding the evaluation of discharges and confirmation that they will be comprised solely of stormwater is presented at the beginning of this Plan. Potential "significant sources of non-stormwater at the site" may include condensate, brine, hydraulic oil drums and tanks, gasoline and diesel fuel. Storage areas for these significant sources will be inspected on a daily basis.

8.0 SEDIMENT AND EROSION PREVENTION

Erosion and sedimentation controls are managed in accordance with PADEP requirements. Copies of the site E&S Plan are available at the Newfield office in Honesdale, PA and at each well site.

APPENDIX A

INSPECTION FORMS

NEWFIELD APPALACHIA PA LLC
Weekly Facility Inspection Form

Facility:	Inspector Name:
Date of Inspection:	

Instructions: Indicate yes or no. If no, record observations describing the specific equipment and discrepancy.

Aboveground Storage Tanks		
• Equipment appears adequately supported	Yes ☐	No ☐
• No evidence of active or past leaks from equipment, piping, connections, vales, vents, etc.	Yes ☐	No ☐
• Coating condition appears satisfactory	Yes ☐	No ☐
• Corrosion appears acceptable	Yes ☐	No ☐
• Level gauages/alarms are operative	Yes ☐	No ☐
• Containers are labeled	Yes ☐	No ☐
Observations:		

Processing Equipment		
• Equipment appears adequately supported	Yes ☐	No ☐
• No evidence of active or past leaks from equipment, piping, connections, vales, vents, etc.	Yes ☐	No ☐
• Coating condition appears satisfactory	Yes ☐	No ☐
• Corrosion appears acceptable	Yes ☐	No ☐
Observations:		

Other Facility Equipment is Checked for: ❖ No evidence of active or past leaks ❖ Condition of equipment appears to be satisfactory (i.e., not damaged, deteriorated, or worn), and ❖ Corrosion appears to be acceptable.		
• Wellheads	Yes ☐	No ☐
• Gathering systems	Yes ☐	No ☐
• Well test stations	Yes ☐	No ☐
• Traps/Sumps	Yes ☐	No ☐
• Drainage systems and nearby ditches	Yes ☐	No ☐
• Applicable flowlines including right-of-way areas	Yes ☐	No ☐
• Containment systems	Yes ☐	No ☐
• Facility piping	Yes ☐	No ☐
Observations:		

NEWFIELD APPALACHIA PA LLC
Weekly Facility Inspection Form

Secondary Containment		
• Passive containment (berm) has adequate capacity and integrity as intended	Yes ☐	No ☐
• Active containment measures are adequate	Yes ☐	No ☐
• No evidence of active or past leaks (i.e., staining, sheen)	Yes ☐	No ☐
• Any valves are closed and plugged	Yes ☐	No ☐
• Active containment is free from a significant quantity of rain/snow	Yes ☐	No ☐
Observations:		

Security		
• Lighting is adequate to observe leaks, spills, and vandalism	Yes ☐	No ☐
• Pumps, valves, nozzles are locked	Yes ☐	No ☐
Observations:		

Spill Response		
• Spill response kits are stocked and located in readily accessible areas	Yes ☐	No ☐
Observations:		

Signature:	Date:

E&S INSPECTION FORM

The E&S plan contains a maintenance program which provides for inspection of BMPs (Best Management Practices such as filter sock, vegetation, construction entrances, etc.) on a weekly basis and after each measurable rainfall event, including the repair of BMPs to ensure effective and efficient operation. The maintenance program for both the temporary and permanent erosion and sediment control BMPs, including disposal of materials removed from the BMPs or project area, has been included in the narrative. The type of maintenance, such as cleanout, repair, replacement, regrading, re-stabilizing, etc. for each of the BMPs is included in the plan. **NOTE: This inspection report must be kept up to date and onsite.**

INSPECTION DATE	INITIALS	RAINFALL OR WEEKLY?	LOCATION OF E&S CONTROL(S)	CONDITION NOTED	CORRECTIVE MEASURES TAKEN

Facility: _____ **Inspector:** _____ **Signed:** _____ **Date:** _____

Print *Signature*

Tank Truck Loading and Unloading Checklist

Date: _____ Material being loaded/unloaded: _____

Driver/Loader present during loading or unloading of material _____
(signature)

_____ Current volume in storage tank was checked prior to loading.

_____ Fill hose inspected for condition prior to loading.

_____ Wheel chocks in place prior to loading.

_____ Tanker valve(s) were inspected for leakage prior to filling and departure.

_____ The loading of the tanker was monitored.

_____ Hoses were replaced and capped after loading.

_____ No material was spilled onto the containment pad or ground.

- These forms must be completed for every tank truck shipment and must be filed in the facility PPC Plan.
- All spills should be immediately reported to at least one of the following Newfield personnel:

Don Sleeth
Drilling Manager
Office: 281-674-2501
Cell: 281-974-0051

Jack Cochran
Production Manager
Office: 814-437-2344
Cell: 814-671-1557

Burl Eakle
Cell: 918-448-1296

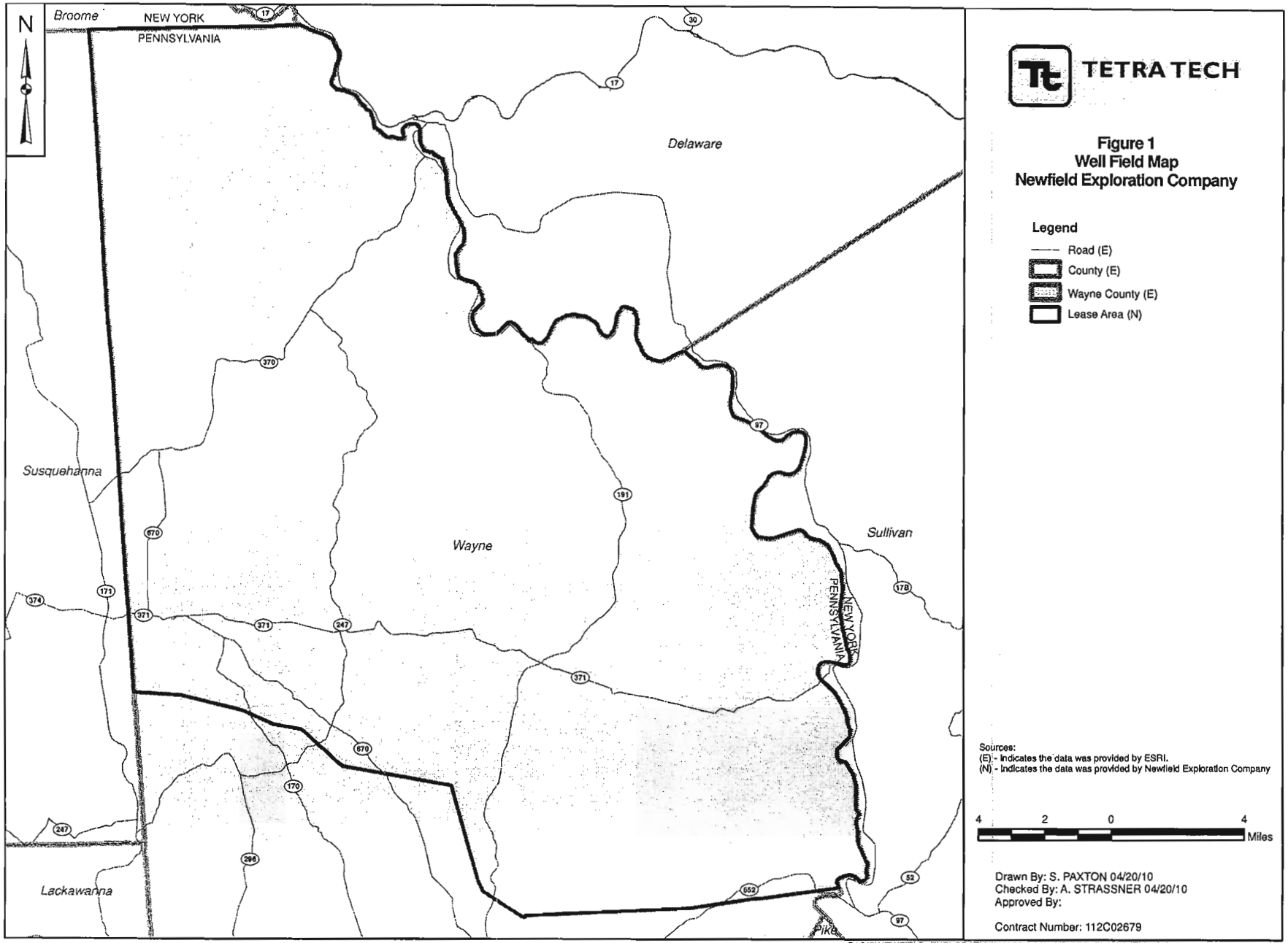
Delivery Information

Invoice No. _____

Load No. _____

Company _____

APPENDIX B
FIGURES


N
Broome
NEW YORK
PENNSYLVANIA
Delaware
Susquehanna
Wayne
Sullivan
Lackawanna
Pike
NEW YORK
PENNSYLVANIA
17
30
370
97
191
670
171
374
371
247
178
170
296
552
52
TETRA TECH
Figure 1
Well Field Map
Newfield Exploration Company
Legend
Road (E)
County (E)
Wayne County (E)
Lease Area (N)
Sources:
(E) - Indicates the data was provided by ESRI.
(N) - Indicates the data was provided by Newfield Exploration Company
4 2 0 4
Miles
Drawn By: S. PAXTON 04/20/10
Checked By: A. STRASSNER 04/20/10
Approved By:
Contract Number: 112C02679
P:\GIS\NEWFIELD_EXPLORATION\MAPDOCS\MXD\PPC_PLAN_WELL_FIELD_MAP.MXD 04/20/10 SP

TETRA TECH

WWW.TETRATECH.COM

661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

NEWFIELD APPALACHIA PA, LLC
WAYNE COUNTY, PENNSYLVANIA

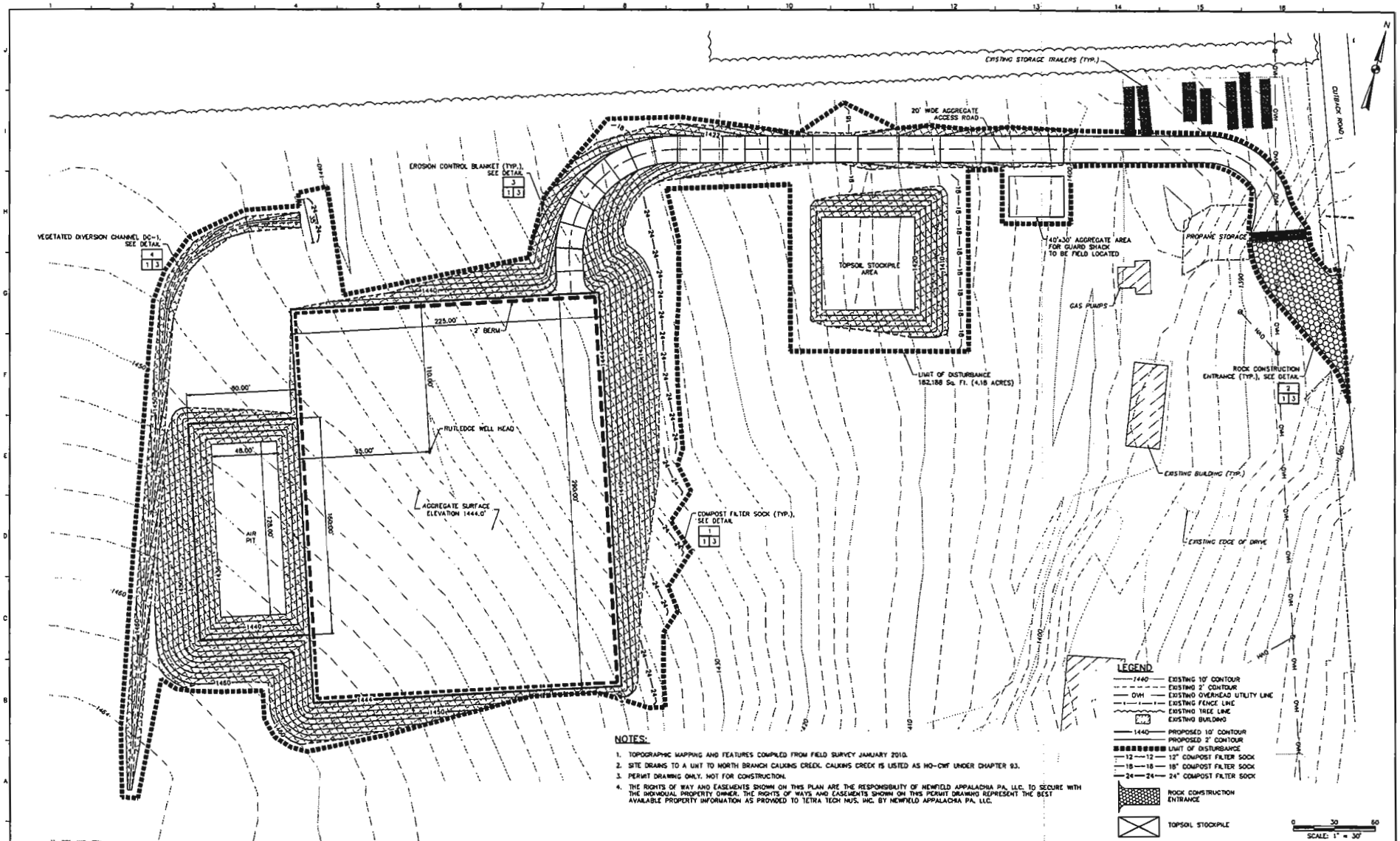
RUTLEDGE WELL PAD
LOCATION MAP

SCALE: 1" = 2000'

DATE:	3/4/10
PROJECT NO.:	112C02568
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	RAL
SHEET:	1 OF 2

FIGURE 2

C:\Documents and Settings\ben.hoppe\My Documents\CAD Work\2568\Rutledge Well\Figures\2568FG001.dwg PIT BEN.HOPPE 3/4/2010 7:46:55 AM



NOTES:

1. TOPOGRAPHIC MAPPING AND FEATURES COMPILED FROM FIELD SURVEY JANUARY 2010.
2. SITE DRAINS TO A UNT TO NORTH BRANCH CAULKINS CREEK. CAULKINS CREEK IS LISTED AS HQ-CWF UNDER CHAPTER 93.
3. PERMIT DRAWING ONLY. NOT FOR CONSTRUCTION.
4. THE RIGHTS OF WAY AND EASEMENTS SHOWN ON THIS PLAN ARE THE RESPONSIBILITY OF NEWFIELD APPALACHIA PA, LLC. TO SECURE WITH THE INDIVIDUAL PROPERTY OWNER. THE RIGHTS OF WAYS AND EASEMENTS SHOWN ON THIS PERMIT DRAWING REPRESENT THE BEST AVAILABLE PROPERTY INFORMATION AS PROVIDED TO TETRA TECH NUS, INC. BY NEWFIELD APPALACHIA PA, LLC.

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE - FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

RUTLEDGE WELL PAD
EROSION & SEDIMENT CONTROL PLAN

SCALE: 1" = 30'

DATE:	5/6/10
PROJECT NO.:	112C02579
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	1 OF 7

FIGURE 3

APPENDIX C
TABLES

TABLE 1

LIST OF MATERIALS & WASTES

CONSTUCTION

POLLUTIONAL MATERIAL	VOLUME OR QUANTITY	LOCATION ONSITE	SPILL CONTAINMENT MATERIALS ONSITE/LOCATION
Diesel Fuel	250 gallons	Well Pad	Sorbent pads; shovels/Gang box
Lubricants	180 gallons	Well Pad	Sorbent pads; shovels/Gang box
OIL ABSORBANT	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
Trash & Debris	2,000 lbs	Well Pad	Sorbent pads; shovels/Gang box

DRILLING

POLLUTIONAL MATERIAL	VOLUME OR QUANTITY	LOCATION ONSITE	SPILL CONTAINMENT MATERIALS ONSITE/LOCATION
Diesel Fuel	2000 gallons	Well Pad	Sorbent pads; shovels/Gang box
Lubricants	320 gallons	Well Pad	Sorbent pads; shovels/Gang box
DURATONE HT	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
GELTONE V	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
Lime	7,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
OIL ABSORBANT	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
Base Fluid	300 bbl	Well Pad	Sorbent pads; shovels/Gang box
Rig Wash	2,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
Calcium Chloride (CaCl-)	4,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
RHEMOD L	1,770 lbs	Well Pad	Sorbent pads; shovels/Gang box
LE SUPERMUL	8,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
BARACARB 25, 50 (2 pallets each)	12,600 lbs	Well Pad	Sorbent pads; shovels/Gang box
WALNUT	2,400 lbs	Well Pad	Sorbent pads; shovels/Gang box
DRILTREAT	1,900 lbs	Well Pad	Sorbent pads; shovels/Gang box
Liquid Mud	1,500 bbl	Well Pad	Sorbent pads; shovels/Gang box
BAROID REGULAR / **BAROID BULK (barite)	125,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
Trash & Debris	2,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
Drill Cuttings	100,000 lbs	Air Pit	Sorbent pads; shovels/Gang box
Cement	130,000 lbs	Well Pad	Sorbent pads; shovels/Gang box

TABLE 2

INSPECTION AND MONITORING ACTIVITIES

Activity	Frequency
Erosion and Sedimentation Control Measures	Weekly or after a significant rain event
Aboveground Storage Tanks	Daily
Drum Storage Areas	Daily
Best Management Practices (BMPs)	Per BMP requirements
Dust Control Measures	Daily
Preparedness, Prevention, and Contingency (PPC) Plan Compliance Evaluation Inspections and Update of PPC Plan, as Appropriate	Annually

TABLE 3
AGENCY NOTIFICATION LIST

The following agencies are to be contacted, as appropriate, in the event of an emergency, accident, or chemical release.

Agency	Telephone No.
PADEP Northeast Regional Office	570-826-2511
PADEP Southcentral Office (Harrisburg)	877-333-1904
Pennsylvania Emergency Management Agency	717-651-2001
Police Department	9-1-1
Volunteer Fire Department	9-1-1
U.S. Environmental Protection Agency	215-814-5700
U.S. Coast Guard National Response Center	800-424-8802
U.S. Coast Guard (local)	570-421-1191
Pennsylvania Fish and Boat Commission	814-445-8974
Chemical Transportation Emergency Center:	
* Chemical Exposure Information	800-424-9300

LOCAL EMERGENCY RESPONSE:

Fire Department – Wayne County Company #3,13, 21, 28, 43, and 65	9-1-1
Police Department – PSP, Honesdale, Pennsylvania	9-1-1
Hospitals/Ambulances-	
Damascus Township Ambulance, Pennsylvania MT Pleasant Ambulance Northern Wayne Ambulance Mobile 504	9-1-1
Wayne County Memorial Hospital, Honesdale, Pennsylvania	570-251-6672
CMC – Trauma Center, Scranton, Pennsylvania	570-969-8128
Catskill Regional Medical Hospital in Callicoon, New York	845-887-5530
Local Emergency Management	
Wayne County EMA	570-253-1622

TABLE 4

On-Site Emergency Response Equipment

On-Site Emergency Response Equipment
Fire Extinguishers
Tyvek Suits
Nitrile Gloves
Hearing Protection
Particulate Adsorbent
Absorbent Pads
Shovels
Earth Moving Equipment
Decontamination Equipment

TABLE 5
CHAIN OF COMMAND

Primary Emergency Coordinator

Don Sleeth
Drilling Manager
Office: 281-674-2501
Cell: 281-974-0051

Secondary Emergency Coordinator

Jack Cochran
Production Manager
Office: 814-437-2344
Cell: 814-671-1557

Construction Manager
Burl Eakle
Cell: 918-448-1296

Offsite Emergency Response Contractors

Company: Minuteman Spill Response, Inc.
Telephone Number: 800-905-7788

APPENDIX D
REPORTING FORM

Spill Response Notification Form

GENERAL REPORTING INFORMATION

Prepared _____
(First) (M.I.) (Last) (Position)

Daytime phone: (xxx) xxx-xxxx Evening phone: (xxx) xxx-xxxx

Newfield Appalachia PA LLC
(Company) (Address) (City) (State) (Zip)

Calling for responsible party? Yes Were materials discharged? Yes Confidential? No

Meeting Federal obligations to report: Yes

INCIDENT DESCRIPTION

Source and/or cause:

Date of Incident:Time of Incident:

Incident Location/Address

Nearest City: XXXX, PA XXXXX (XXXXXXX County)

Distance from City: In city limits Direction from City: In city limits

Facility Oil Storage Capacity: XXXXXX gallons

Container Type:Container Capacity: (gals)

Facility Latitude: xx° xx' xx" Longitude xx° xx' xx"

MATERIAL

Name (or CHRIS Code):

Discharged Quantity (Units): Discharged to Water (Units):

RESPONSE ACTION

Actions taken to correct, control or mitigate incident:

IMPACT

No. of Injuries: No. of Deaths: Other:

Evacuation (Y/N): Damage (Y/N): Amount ($):

Medium Affected: Description: Additional Information:

AGENCY NOTIFIED

NRC 800-424-8802	Date:	Time:	Contact:
PADEP (570) 826-2511	Date:	Time:	Contact:
USCG	Date:	Time:	Contact:
Other	Date:	Time:	Contact:

ADDITIONAL INFORMATION:

APPENDIX E
MSDS SHEETS

MATERIAL SAFETY DATA SHEET

Diesel Fuel (All Types) **MSDS No. 9909**

EMERGENCY OVERVIEW
CAUTION!
OSHA/NFPA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT
EFFECTS CENTRAL NERVOUS SYSTEM
HARMFUL OR FATAL IF SWALLOWED

Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation (rash). Long-term, repeated exposure may cause skin cancer.
If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).

NFPA 704 (Section 16)

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800) 424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732) 750-6000
MSDS INTERNET WEBSITE: www.hess.com (See Environment, Health, Safety & Social Responsibility)

SYNONYMS: Ultra Low Sulfur Diesel (ULSD); Low Sulfur Diesel; Motor Vehicle Diesel Fuel; Diesel Fuel #2; Dyed Diesel Fuel; Non-Road, Locomotive and Marine Diesel Fuel; Tax-exempt Diesel Fuel

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and CHEMICAL INFORMATION ON INGREDIENTS

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Diesel Fuel (68476-34-6)	100
Naphthalene (91-20-3)	Typically < 0.01

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher. Diesel fuel may be dyed (red) for tax purposes. May contain a multifunctional additive.

3. HAZARDS IDENTIFICATION

EYES
Contact with liquid or vapor may cause mild irritation.

SKIN
May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11 Toxicological Information.

IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A). NIOSH regards whole diesel fuel exhaust particulates as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	> 125 °F (> 52 °C) minimum PMCC
AUTOIGNITION POINT:	494 °F (257 °C)
OSHA/NFPA FLAMMABILITY CLASS:	2 (COMBUSTIBLE)
LOWER EXPLOSIVE LIMIT (%):	0.6
UPPER EXPLOSIVE LIMIT (%):	7.5

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

FIRE FIGHTING INSTRUCTIONS

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Diesel fuel, and in particular low and ultra low sulfur diesel fuel, has the capability of accumulating a static electrical charge of sufficient energy to cause a fire/explosion in the presence of lower flashpoint products such as gasoline. The accumulation of such a static charge occurs as the diesel flows through pipelines, filters, nozzles and various work tasks such as tank/container filling, splash loading, tank cleaning; product sampling; tank gauging; cleaning, mixing, vacuum truck operations, switch loading, and product agitation. There is a greater potential for static charge accumulation in cold temperature, low humidity conditions.

Documents such as 29 CFR OSHA 1910.106 "Flammable and Combustible Liquids, NFPA 77 Recommended Practice on Static Electricity, API 2003 "Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents and ASTM D4865 "Standard Guide for Generation and Dissipation of Static

Electricity in Petroleum Fuel Systems" address special precautions and design requirements involving loading rates, grounding, bonding, filter installation, conductivity additives and especially the hazards associated with "switch loading." ["Switch Loading" is when a higher flash point product (such as diesel) is loaded into tanks previously containing a low flash point product (such as gasoline) and the electrical charge generated during loading of the diesel results in a static ignition of the vapor from the previous cargo (gasoline).]

Note: When conductivity additives are used or are necessary the product should achieve 25 picosiemens/meter or greater at the handling temperature.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Components (CAS No.)	Source	Exposure Limits TWA/STEL	Note
Diesel Fuel: (68476-34-6)	OSHA	5 mg/m, as mineral oil mist	
	ACGIH	100 mg/m^3 (as totally hydrocarbon vapor) TWA	A3, skin
Naphthalene (91-20-3)	OSHA	10 ppm TWA	
	ACGIH	10 ppm TWA / 15 ppm STEL	A4, Skin

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION
A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE
Clear, straw-yellow liquid. Dyed fuel oil will be red or reddish-colored.

ODOR
Mild, petroleum distillate odor

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	320 to 690 oF (160 to 366 °C)
VAPOR PRESSURE:	0.009 psia @ 70 °F (21 °C)
VAPOR DENSITY (air = 1):	> 1.0
SPECIFIC GRAVITY (H_2O = 1):	0.83 to 0.88 @ 60 °F (16 °C)
PERCENT VOLATILES:	100 %
EVAPORATION RATE:	Slow; varies with conditions
SOLUBILITY (H_2O):	Negligible

10. STABILITY and REACTIVITY

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers; Viton ®; Fluorel ®

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute dermal LD50 (rabbits): > 5 ml/kg
Acute oral LD50 (rats): 9 ml/kg
Primary dermal irritation: extremely irritating (rabbits)
Draize eye irritation: non-irritating (rabbits)
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenic: OSHA: NO IARC: NO NTP: NO ACGIH: A3

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

MUTAGENICITY (genetic effects)
This material has been positive in a mutagenicity study.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME:	Diesel Fuel	Placard (International Only):
HAZARD CLASS and PACKING GROUP:	3, PG III	
DOT IDENTIFICATION NUMBER:	NA 1993 (Domestic) UN 1202 (International)	
DOT SHIPPING LABEL:	None	

Use Combustible Placard if shipping in bulk domestically

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the *de minimis* levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

CALIFORNIA PROPOSITON 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Diesel Engine Exhaust (no CAS Number listed)	10/01/1990

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 3 (Combustible Liquid) and Class D, Division 2, Subdivision B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING	HEALTH:	0	
	FIRE:	2	
	REACTIVITY:	0	

Refer to NFPA 704 "Identification of the Fire Hazards of Materials" for further information

HMIS® HAZARD RATING	HEALTH:	1 *	* Chronic
	FIRE:	2	
	PHYSICAL:	0	

SUPERSEDES MSDS DATED: 02/28/2001

ABBREVIATIONS:

AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	NTP	National Toxicology Program
AIHA	American Industrial Hygiene Association	OPA	Oil Pollution Act of 1990
ANSI	American National Standards Institute (212) 642-4900	OSHA	U.S. Occupational Safety & Health Administration
API	American Petroleum Institute (202) 682-8000	PEL	Permissible Exposure Limit (OSHA)
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act	RCRA	Resource Conservation and Recovery Act
DOT	U.S. Department of Transportation [General info: (800) 467-4922]	REL	Recommended Exposure Limit (NIOSH)
EPA	U.S. Environmental Protection Agency	SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
HMIS	Hazardous Materials Information System	SCBA	Self-Contained Breathing Apparatus
IARC	International Agency For Research On Cancer	SPCC	Spill Prevention, Control, and Countermeasures
MSHA	Mine Safety and Health Administration	STEL	Short-Term Exposure Limit (generally 15 minutes)
NFPA	National Fire Protection Association (617)770-3000	TLV	Threshold Limit Value (ACGIH)
NIOSH	National Institute of Occupational Safety and Health	TSCA	Toxic Substances Control Act
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)	TWA	Time Weighted Average (8 hr.)
		WEEL	Workplace Environmental Exposure Level (AIHA)
		WHMIS	Canadian Workplace Hazardous Materials Information System

MATERIAL SAFETY DATA SHEET

Review Date: 04/23/2007

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: PENNZOIL™ LONG-LIFE™ Motor Oil (All Grades)

MSDS NUMBER: 614348LU - 1
PRODUCT CODE(S): 5071324, 5071325, 5071326, 5071369, 5071371

MANUFACTURER
SOPUS Products
P.O. Box 4427
Houston, TX. 77210-4427

TELEPHONE NUMBERS
Spill Information: (877) 242-7400
Health Information: (877) 504-9351
MSDS Assistance Number: (877) 276-7285

SECTION 2 PRODUCT/INGREDIENTS

INGREDIENTS	CAS#	CONCENTRATION
Heavy Duty Motor Oil		
Highly refined petroleum oils	Mixture	90 - 99 %volume
Zinc Dialkyldithiophosphate	68649-42-3	1 - 5 %volume
Proprietary additives	Mixture	1 - 5 %volume

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Appearance & Odor: Bright and clear liquid. Mild odor.
Health Hazards: No known immediate health hazards.
Physical Hazards: No known physical hazards.
NFPA Rating (Health, Fire, Reactivity): 0, 1, 0
Hazard Rating: Least - 0 Slight - 1 Moderate - 2 High - 3 Extreme - 4

Inhalation:
Inhalation of vapors (generated at high temperatures only) or oil mist may cause mild irritation of the nose, throat, and respiratory tract.

Eye Irritation:
Lubricating oils are generally considered no more than minimally irritating to the eyes.

Skin Contact:
May cause slight irritation of the skin. If irritation occurs, a temporary burning sensation and minor redness and/or swelling may result.

Ingestion:

Lubricating oils are generally no more than slightly toxic if swallowed.

Other Health Effects:
The International Agency for Research on Cancer (IARC) has determined there is sufficient evidence for the carcinogenicity in experimental animals of used gasoline motor oils. Handling procedures and safety precautions in the MSDS should be followed to minimize exposure to the used product.

Signs and Symptoms:
Irritation as noted above.

Aggravated Medical Conditions:
Pre-existing eye, skin and respiratory disorders may be aggravated by exposure to this product.

For additional health information, refer to section 11.

SECTION 4 FIRST AID MEASURES

Inhalation:
Remove victim to fresh air and provide oxygen if breathing is difficult. Get medical attention. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.

Skin:
Remove contaminated clothing and shoes and wipe excess from skin. Flush skin with water, then wash with soap and water. If irritation occurs, get medical attention. Do not reuse clothing until cleaned. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

Eye:
Flush with water. If irritation occurs, get medical attention.

Ingestion:
Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical attention.

Note to Physician:
In general, emesis induction is unnecessary in high viscosity, low volatility products such as oils and greases.

SECTION 5 FIRE FIGHTING MEASURES

Flash Point [Method]: >400 °F/>204.44 °C [Pensky-Martens Closed Cup]

Extinguishing Media:
Material will float and can be re-ignited on surface of water. Use water fog, foam, dry chemical or carbon dioxide (CO_2) to extinguish flames. Do not use a direct stream of water.

Fire Fighting Instructions:
Do not enter confined fire space without full bunker gear (helmet with face shield, bunker coats, gloves and rubber boots), including a positive pressure, NIOSH approved, self-contained breathing apparatus. This material is non-flammable.

Unusual Fire Hazards:
Material may ignite when preheated.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures:
May burn although not readily ignitable.

Wear appropriate personal protective equipment when cleaning up spills. Refer to Section 8.

Spill Management:
FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

Place in container for proper disposal. Remove contaminated soil to remove contaminated trace residues. Dispose of in same manner as material.

Reporting:
CERCLA: Product is covered by EPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) petroleum exclusion. Releases to air, land, or water are not reportable under CERCLA (Superfund).

CWA: This product is an oil as defined under Section 311 of EPA's Clean Water Act (CWA). Spills into or leading to surface waters that cause a sheen must be reported to the National Response Center, 1-800-424-8802.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures:
Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet. Launder contaminated clothing before reuse. Properly dispose of contaminated leather articles such as shoes or belts that cannot be decontaminated. Avoid heat, open flames, including pilot lights, and strong oxidizing agents. Use explosion-proof ventilation to prevent vapor accumulation. Ground all handling equipment to prevent sparking.

Storage:
Do not store in open or unlabeled containers. Store in a cool, dry place with adequate ventilation. Keep away from open flames and high temperatures.

Container Warnings:
Keep containers closed when not in use. Containers, even those that have been emptied, can contain explosive vapors. Do not cut, drill, grind, weld or perform similar operations on or near containers.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical	Limit	TWA	STEL	Ceiling	Notation
Oil mist, mineral	ACGIH TLV	5 mg/m3	10 mg/m3		
Oil mist, mineral	OSHA PEL	5 mg/m3			

Exposure Controls

Provide adequate ventilation to control airborne concentrations below the exposure guidelines/limits.

Personal Protection

Personal protective equipment (PPE) selections vary based on potential exposure conditions such as handling practices, concentration and ventilation. Information on the selection of eye, skin and respiratory protection for use with this material is provided below.

Eye Protection:
Chemical Goggles, or Safety glasses with side shields

Skin Protection:
Use protective clothing which is chemically resistant to this material. Selection of protective clothing depends on potential exposure conditions and may include gloves, boots, suits and other items. The selection(s) should take into account such factors as job task, type of exposure and durability requirements.

Published literature, test data and/or glove and clothing manufacturers indicate the best protection is provided by:
Neoprene, or Nitrile Rubber

Respiratory Protection:
If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Types of respirator(s) to be considered in the selection process include:
For Mist: Air Purifying, R or P style NIOSH approved respirator.
For Vapors: Air Purifying, R or P style prefilter & organic cartridge, NIOSH approved respirator. Self-contained breathing apparatus for use in environments with unknown concentrations or emergency situations.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Bright and clear liquid. Mild odor.
Substance Chemical Family: Petroleum Hydrocarbon

Flash Point	> 400 °F [Pensky-Martens Closed Cup]	**Pour Point**	-20 °F
Solubility (in Water)	Insoluble	**Specific Gravity**	0.88 - 0.89
Stability	Stable	**Viscosity**	103 cSt @ 40 °C

SECTION 10 REACTIVITY AND STABILITY

Stability:
Material is stable under normal conditions.

Conditions to Avoid:
Avoid heat and open flames.

Materials to Avoid:
Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products:

Thermal decomposition products are highly dependent on combustion conditions. A complex mixture of airborne solids, liquids and gases will evolve when this material undergoes pyrolysis or combustion. Aldehydes, Carbon Monoxide, Carbon Dioxide, Hydrogen Sulfide, Ketones, Nitrogen Oxidesand other unidentified organic compounds may be formed upon combustion.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute Toxicity

TEST	Result	OSHA Classification	Material Tested
Dermal LD50	>5.0 g/kg(Rabbit)	Non-Toxic	Based on components(s)
Oral LD50	>5.0 g/kg(Rat)	Non-Toxic	Based on components(s)

Carcinogenicity Classification

Chemical Name	NTP	IARC	ACGIH	OSHA
Heavy Duty Motor Oil	No	Not Reviewed by IARC	Not Reviewed	No

SECTION 12 ECOLOGICAL INFORMATION

Environmental Impact Summary:
There is no ecological data available for this product. However, this product is an oil. It is persistent and does not readily biodegrade. However, it does not bioaccumulate.

SECTION 13 DISPOSAL CONSIDERATIONS

RCRA Information:

Under RCRA, it is the responsibility of the user of the material to determine, at the time of the disposal, whether the material meets RCRA criteria for hazardous waste. This is because material uses, transformations, mixtures, processes, etc. may affect the classification. Refer to the latest EPA, state and local regulations regarding proper disposal.

SECTION 14 TRANSPORT INFORMATION

US Department of Transportation Classification
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.

International Air Transport Association
Not regulated under IATA rules.

International Maritime Organization Classification
Not regulated under International Maritime Organization rules.

SECTION 15 REGULATORY INFORMATION

Federal Regulatory Status

OSHA Classification:
Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Ozone Depleting Substances (40 CFR 82 Clean Air Act):
This material does not contain nor was it directly manufactured with any Class I or Class II ozone depleting substances.

Superfund Amendment & Reauthorization Act (SARA) Title III:
There are no components in this product on the SARA 302 list.

SARA Hazard Categories (311/312):

Immediate Health	Delayed Health	Fire	Pressure	Reactivity
NO	NO	NO	NO	NO

SARA Toxic Release Inventory (TRI) (313):
Zinc compounds

Toxic Substances Control Act (TSCA) Status:
All component(s) of this material is(are) listed on the EPA/TSCA Inventory of Chemical Substances.

Other Chemical Inventories:
Component(s) of this material is (are) listed on the Australian AICS, Canadian DSL, Chinese Inventory, European EINECS, Korean Inventory, Philippines PICCS,

State Regulation

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

SECTION 16 OTHER INFORMATION

Revision#: 1
Review Date: 04/23/2007
Revision Date: 12/19/2006
Revisions since last change (discussion): This Material Safety Data Sheet (MSDS) has been reviewed to fully comply with the guidance contained in the ANSI MSDS standard (ANSI Z400.1-2003). We encourage you to take the opportunity to read the MSDS and review the information contained therein.

SECTION 17 LABEL INFORMATION

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT. THIS LABEL COMPLIES WITH THE REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) FOR USE IN THE WORKPLACE. THIS LABEL IS NOT INTENDED TO BE USED WITH PACKAGING INTENDED FOR SALE TO CONSUMERS AND MAY NOT CONFORM WITH THE REQUIREMENTS OF THE CONSUMER PRODUCT SAFETY ACT OR OTHER RELATED REGULATORY REQUIREMENTS.

PRODUCT CODE(S): 5071324, 5071325, 5071326, 5071369, 5071371

PENNZOIL™ LONG-LIFE™ Motor Oil (All Grades)

ATTENTION!

PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE OIL ACNE OR DERMATITIS. USED GASOLINE ENGINE OIL HAS BEEN SHOWN TO CAUSE CANCER IN LABORATORY ANIMALS.

Precautionary Measures:
Avoid prolonged or repeated contact with eyes, skin and clothing. Avoid breathing of vapors, fumes, or mist. Use only with adequate ventilation. Wash thoroughly after handling.

FIRST AID

Inhalation: If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.
Skin Contact: Remove contaminated clothing and shoes and wipe excess from skin. Flush skin with water, then wash with soap and water. If irritation occurs, get medical attention. Do not reuse clothing until cleaned. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.
Eye Contact: Flush with water. If irritation occurs, get medical attention.
Ingestion: Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical attention.

FIRE

In case of fire, Use water fog, 'alcohol foam', dry chemical or carbon dioxide (CO_2) to extinguish flames. Do not use a direct stream of water. Material will float and can be re-ignited on surface of water.

SPILL OR LEAK

Dike and contain spill.
FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

CONTAINS: Highly refined petroleum oils, Mixture; Zinc Dialkyldithiophosphate, 68649-42-3; Proprietary additives, Mixture

NFPA Rating (Health, Fire, Reactivity): 0, 1, 0

TRANSPORTATION

US Department of Transportation Classification
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.

CAUTION: Misuse of empty containers can be hazardous. Empty containers can be hazardous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers might cause fire, explosion or toxic fumes from residues. Do not pressurize or expose to open flames or heat. Keep container closed and drum bungs in place.

Name and Address

SOPUS Products
P.O. Box 4427
Houston, TX 77210-4427

ADMINISTRATIVE INFORMATION	
MANUFACTURER ADDRESS:	SOPUS Products, P.O. Box 4427, Houston, TX. 77210-4427

THE INFORMATION CONTAINED IN THIS DATA SHEET IS BASED ON THE DATA AVAILABLE TO US AT THIS TIME, AND IS BELIEVED TO BE ACCURATE BASED UPON THAT : IT IS PROVIDED INDEPENDENTLY OF ANY SALE OF THE PRODUCT, FOR PURPOSE OF HAZARD COMMUNICATION. IT IS NOT INTENDED TO CONSTITUTE PRODUCT PERFORMANCE INFORMATION, AND NO EXPRESS OR IMPLIED WARRANTY OF ANY KIND IS MADE WITH RESPECT TO THE PRODUCT, UNDERLYING DATA OR THE INFORMATION CONTAINED HEREIN. YOU ARE URGED TO OBTAIN DATA SHEETS FOR ALL PRODUCTS YOU BUY, PROCESS, USE OR DISTRIBUTE, AND ARE ENCOURAGED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED HEREIN.

TO DETERMINE THE APPLICABILITY OR EFFECT OF ANY LAW OR REGULATION WITH RESPECT TO THE PRODUCT, YOU SHOULD CONSULT WITH YOUR LEGAL ADVISOR OR THE APPROPRIATE GOVERNMENT AGENCY. WE WILL NOT PROVIDE ADVICE ON SUCH MATTERS, OR BE RESPONSIBLE FOR ANY INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN. THE UNDERLYING DATA, AND THE INFORMATION PROVIDED HEREIN AS A RESULT OF THAT DATA, IS THE PROPERTY OF SOPUS PRODUCTS AND IS NOT TO BE THE SUBJECT OF SALE OR EXCHANGE WITHOUT THE EXPRESS WRITTEN CONSENT OF SOPUS PRODUCTS.

44815-10737-100R-04/16/2007

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **CALCIUM CHLORIDE - POWDER**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: CALCIUM CHLORIDE - POWDER
Synonyms: None
Chemical Family: Inorganic Salt
Application: Accelerator

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Calcium chloride		60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.
Storage Information	Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Dust/mist respirator. (95%)
Hand Protection	Normal work gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Dust proof goggles.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White
Odor:	Odorless
pH:	10
Specific Gravity @ 20 C (Water=1):	0.83
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	51
Boiling Point/Range (F):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	42
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	147.02

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	May cause skin irritation. May cause skin burns on prolonged contact.
Eye Contact	May cause severe eye irritation. May cause corneal injury.
Ingestion	Causes burns of the mouth, throat and stomach.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 1000 mg/kg (Rat)
Dermal Toxicity:	LD50: > 5000 mg/kg (Rabbit)
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not applicable

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **DRILTREAT®**

Revision Date: 09-Mar-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: DRILTREAT®
Synonyms: None
Chemical Family: Lipid
Application: Oil-wetting Agent

Manufacturer/Supplier
Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Contains no hazardous substances	Mixture	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye irritation.

4. FIRST AID MEASURES

Inhalation Under normal conditions, first aid procedures are not required.

Skin Wash with soap and water.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	400
Flash Point/Range (C):	204
Flash Point Method:	PMCC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing.

Storage Information Store away from oxidizers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally necessary.

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Amber
Odor:	Bean
pH:	6.4-7
Specific Gravity @ 20 C (Water=1):	1.03
Density @ 20 C (lbs./gallon):	8.58
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	32
Freezing Point/Range (C):	0
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Disperses
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	None known.
Skin Contact	None known.
Eye Contact	May cause mild eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Biodegradable

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: TLM96: 497,500 ppm (Mysidopsis bahia) SPP @ 12 ppb
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **DURATONE® HT**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: DURATONE® HT
Synonyms: None
Chemical Family: Blend
Application: Fluid Loss Additive

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Kaolin	1332-58-7	10 - 30%	2 mg/m^3	Not applicable
Nonylphenol	25154-52-3	5 - 10%	Not applicable	Not applicable
Sodium hydroxide	1310-73-2	1 - 5%	2 mg/m^3	2 mg/m^3
Quaternary ammonium compounds		10 - 30%	Not applicable	Not applicable
Crystalline silica, quartz	14808-60-7	1 - 5%	0.025 mg/m^3	10 mg/m^3 %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	608
Autoignition Temperature (C):	320
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 2, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 2*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 12 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Gray to black
Odor:	Odorless
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.8
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	31 uncompacted; 44 compacted
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	< -1 (OECD117)

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight (g/mole): Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong alkalis. Strong acids. Aldehydes. Ketones. Acrylates.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A). Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).
Skin Contact	May cause moderate skin irritation. May cause an allergic skin reaction.
Eye Contact	May cause severe eye irritation.
Ingestion	Irritation of the mouth, throat, and stomach.
Aggravated Medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity:	LD50: > 5000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Ames Test: Negative

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability BOD(28 Day): 9% of COD

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: TLM96: 30 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity: EC50: 370 mg/l (Daphnia magna)

Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product contains toxic chemical(s) listed below which is(are) subject to the reporting requirements of Section 313 of Title III of SARA and 40 CFR Part 372: Aluminum Oxide//1344-28-1
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.

EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **GELTONE® V**

Revision Date: 02-Jun-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: GELTONE® V
Synonyms: None
Chemical Family: Blend
Application: Viscosifier

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Crystalline silica, cristobalite	14464-46-1	0 - 1%	0.025 mg/m^3	1/2 x $\frac{10\ mg/m^3}{\%SiO2 + 2}$
Crystalline silica, tridymite	15468-32-3	0 - 1%	0.05 mg/m^3	1/2 x $\frac{10\ mg/m^3}{\%SiO2 + 2}$
Crystalline silica, quartz	14808-60-7	2-6	0.025 mg/m^3	$\frac{10\ mg/m^3}{\%SiO2 + 2}$
Isopropanol	67-63-0	1 - 5%	200 ppm	400 ppm
Modified bentonite		60 - 100%	Not applicable	Not applicable

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation — If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin — Wash with soap and water. Get medical attention if irritation persists.

Eyes — In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion — Under normal conditions, first aid procedures are not required.

Notes to Physician — Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media — All standard firefighting media.

Special Exposure Hazards — Not applicable.

Special Protective Equipment for Fire-Fighters — Not applicable.

NFPA Ratings: Health 1, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures — Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures — None known.

Procedure for Cleaning / Absorption — Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

Storage Information

Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.

Respiratory Protection

Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.

Hand Protection

Normal work gloves.

Skin Protection

Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

Eye Protection

Wear safety glasses or goggles to protect against exposure.

Other Precautions

None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Powder
Color:	Tan
Odor:	Mild
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.6
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	35- 57
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Miscible in hydrocarbons
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A). Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	Irritation of the mouth, throat, and stomach.
Aggravated Medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity:	LD50: > 5000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.

MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **LE SUPERMUL**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: LE SUPERMUL
Synonyms: None
Chemical Family: Blend
Application: Emulsifier

Manufacturer/Supplier

Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Diethylene glycol monobutyl ether	112-34-5	1 - 5%	Not applicable	Not applicable
Ethylene glycol monobutyl ether	111-76-2	1 - 5%	20 ppm	50 ppm

3. HAZARDS IDENTIFICATION

Hazard Overview

May cause eye and skin irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation

If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes

In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion

Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

Notes to Physician

Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	> 200**Min:** > 200
Flash Point/Range (C):	> 100**Min:** > 93
Flash Point Method:	PMCC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Use water spray to cool fire exposed surfaces. Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 2, Flammability 1, Reactivity 0
HMIS Ratings: Flammability 1, Reactivity 0, Health 2

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.

Storage Information Store away from oxidizers. Keep container closed when not in use. Product has a shelf life of 36 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Organic vapor respirator.
In high concentrations, supplied air respirator or a self-contained breathing apparatus.

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	Amber
Odor:	Mild
pH:	2.6
Specific Gravity @ 20 C (Water=1):	0.924
Density @ 20 C (lbs./gallon):	7.7
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	20
Freezing Point/Range (C):	-6.6
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	280-300
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	May cause abdominal pain, vomiting, nausea, and diarrhea. May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression.
Aggravated Medical Conditions	Lung disorders. Skin disorders.
Chronic Effects/Carcinogenicity	Prolonged or repeated exposure may cause reproductive system damage. Repeated overexposure may cause liver and kidney effects.

Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BAROID® OIL ABSORBENT**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BAROID® OIL ABSORBENT
Synonyms: None
Chemical Family: Mineral
Application: Suspending Agent

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Magnesium silicate	1343-90-4	60 - 100%	Not applicable	Not applicable
Crystalline silica, quartz	14808-60-7	2-6	0.025 mg/m^3	10 mg/m^3 %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Granules
Color:	Gray to tan
Odor:	Odorless
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	2.6
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	32-38
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact None known.

Eye Contact May cause eye irritation.

Ingestion May be harmful if swallowed.

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not applicable

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	Product contains one or more components not listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **RHEMOD L**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: RHEMOD L
Synonyms: None
Chemical Family: Tall oil fatty acid
Application: Viscosifier

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Fatty acids, C18-unsatd., trimers	68937-90-6	10 - 30%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and skin irritation. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	518
Flash Point/Range (C):	270
Flash Point Method:	COC
Autoignition Temperature (F):	> 425
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 1, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Wash hands after use.
Storage Information	Store in a cool, dry location. Product has a shelf life of 36 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Not normally needed. But if significant exposures are possible then the following respirator is recommended: Organic vapor respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Dark
Odor:	Fatty acid
pH:	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity @ 20 C (Water=1):	0.96
Density @ 20 C (lbs./gallon):	8
Bulk Density @ 20 C (lbs/ft3):	57.30
Boiling Point/Range (F):	> 572
Boiling Point/Range (C):	> 300
Freezing Point/Range (F):	< -4
Freezing Point/Range (C):	< 25
Vapor Pressure @ 20 C (mmHg):	< 0.001
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate=1):	0
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	1849 @ 25C
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye and skin contact.
Inhalation	May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause skin irritation.
Eye Contact	May cause mild eye irritation.
Ingestion	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	Not determined

Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BAROID® RIG WASH**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BAROID® RIG WASH
Synonyms: None
Chemical Family: Blend
Application: Surfactant

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Isopropanol	67-63-0	1 - 5%	200 ppm	400 ppm

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin Wash with soap and water. Get medical attention if irritation persists. Remove contaminated clothing and launder before reuse.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion If swallowed dilute with 1-2 glasses of milk or water and then induce vomiting.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined**Min:** > 220
Flash Point/Range (C):	Not Determined**Min:** > 104
Flash Point Method:	COC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.
Storage Information	Store away from oxidizers. Keep container closed when not in use. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	Organic vapor respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Clear blue
Odor:	Slight Alcohol
pH:	9.5

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity @ 20 C (Water=1):	1.025
Density @ 20 C (lbs./gallon):	8.5
Bulk Density @ 20 C (lbs/ft3):	63.6
Boiling Point/Range (F):	> 212
Boiling Point/Range (C):	> 100
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid None known.

Incompatibility (Materials to Avoid) Strong oxidizers.

Hazardous Decomposition Products Oxides of sulfur. Carbon monoxide and carbon dioxide.

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

Skin Contact May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression.

Aggravated Medical Conditions Skin disorders.

Chronic Effects/Carcinogenicity No data available to indicate product or components present at greater than 1% are chronic health hazards.

Other Information None known.

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product contains toxic chemical(s) listed below which is(are) subject to the reporting requirements of Section 313 of Title III of SARA and 40 CFR Part 372: Glycol Ethers//34398-01-1 Isopropanol//67-63-0
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **FWCA CEMENT ADDITIVE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: FWCA CEMENT ADDITIVE
Synonyms: None
Chemical Family: Polysaccharide
Application: Free Water Control Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Cellulose derivative		60 - 100%	10 mg/m^3	15 mg/m^3

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation. Airborne dust may be explosive.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	770
Autoignition Temperature (C):	410
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Health 0, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust.

Storage Information Store away from oxidizers. Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White
Odor:	Characteristic

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	6.5
Specific Gravity @ 20 C (Water=1):	1.39
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	32
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	<5
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Forms gel
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	>600

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Aldehydes. Carboxylic acids. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mild eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined

Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HALAD® 322 CEMENT ADDITIVE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HALAD® 322 CEMENT ADDITIVE
Synonyms: None
Chemical Family: Blend
Application: Cement Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Sodium formate	141-53-7	1 - 5%	Not applicable	Not applicable
Cellulose derivative		10 - 30%	10 mg/m^3	15 mg/m^3

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation. Airborne dust may be explosive.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Health 0, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust.

Storage Information Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Red
Odor:	Odorless

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.28
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	35.2
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Partially soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	>600

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of sulfur. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined

Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HALAD® 344 CEMENT ADDITIVE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HALAD® 344 CEMENT ADDITIVE
Synonyms: None
Chemical Family: Polymer
Application: Fluid Loss Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Modified acrylamide copolymer		60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water spray, dry chemical, or foam.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 1, Reactivity 0
HMIS Ratings: Health 1, Flammability 1, Physical Hazard 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust. Do not swallow. Avoid contact with eyes, skin, or clothing.

Storage Information Store in a cool, dry location. Store away from oxidizers. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Dust/mist respirator. (95%)

Hand Protection Nitrile gloves. Polyvinylchloride gloves. Neoprene gloves. Rubber gloves. Butyl rubber gloves. Cloth gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Powder

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	White to off white
Odor:	Odorless
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.37
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	25-35
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	18
Freezing Point/Range (C):	-8
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	<5
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	>600

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide. Oxides of sulfur.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	Prolonged or repeated contact may cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	No adverse health effects are expected from swallowing.
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined

Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	BOD(28 Day): 3% of COD
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM48: 2000 mg/l (Arcatia tonsa)
Acute Crustaceans Toxicity:	TLM48: > 1000 mg/l (Daphnia magna)
Acute Algae Toxicity:	EC50: 3300 mg/l (Skeletonema costatum)
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HR-5**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HR-5
Synonyms: None
Chemical Family: Lignosulfonate
Application: Cement Retarder

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Modifed lignosulfonate		60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Health 1, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.
Storage Information	Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Not normally needed. But if significant exposures are possible then the following respirator is recommended: Dust/mist respirator. (95%)
Hand Protection	Normal work gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Black
Odor:	Molasses
pH:	9.5-10.3
Specific Gravity @ 20 C (Water=1):	1.32

9. PHYSICAL AND CHEMICAL PROPERTIES

Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	29.8
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	25
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of sulfur.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mechanical irritation to eye.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM96: > 1000 ppm (Crangon crangon)
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HR-601**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HR-601
Synonyms: None
Chemical Family: Lignosulfonate
Application: Cement Retarder

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Modifed lignosulfonate		60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Lower (oz./ft3):	0.2
Flammability Limits in Air - Upper (%):	Not Determined
Flammability Limits in Air - Upper (oz./ft3):	3.5

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 1, Reactivity 0
HMIS Ratings: Health 1, Flammability 1, Physical Hazard 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.

Storage Information Store away from oxidizers. Store in a cool, dry location. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Brown
Odor:	Woody
pH:	7.8
Specific Gravity @ 20 C (Water=1):	1.08
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	30.5
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of sulfur. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mechanical irritation to eye.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: > 5000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM48: > 1000 mg/l (Daphnia magna)
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **KCL POTASSIUM CHLORIDE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: KCL POTASSIUM CHLORIDE
Synonyms: None
Chemical Family: Inorganic Salt
Application: Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Potassium chloride	7447-40-7	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media All standard firefighting media.

Special Exposure Hazards Not applicable.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 0, Reactivity 0
HMIS Ratings: Health 1, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Avoid breathing vapors.

Storage Information Store in a cool, dry location. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Dust proof goggles.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White to gray
Odor:	Odorless
pH:	9.2
Specific Gravity @ 20 C (Water=1):	1.99
Density @ 20 C (lbs./gallon):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Bulk Density @ 20 C (lbs/ft3):	72.8
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	25.5
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	74.55

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	May cause moderate skin irritation.
Eye Contact	May cause severe eye irritation.
Ingestion	Irritation of the mouth, throat, and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: > 5000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM96: 100-330 ppm (Crangon crangon)
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **POZ STANDARD CEMENT 50/50**

Revision Date: 05-Jan-2009

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: POZ STANDARD CEMENT 50/50
Synonyms: None
Chemical Family: Cement
Application: Cement

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Fly ash	68131-74-8	30 - 60%	Not applicable	Not applicable
Bentonite	1302-78-9	1 - 5%	Not applicable	Not applicable
Portland cement	65997-15-1	30 - 60%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	1 - 5%	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	None - does not burn.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Health 1*, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Gray
Odor:	Odorless
pH:	12.4
Specific Gravity @ 20 C (Water=1):	Not Determined
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Not Determined
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact Can dry skin. May cause an allergic skin reaction. May cause alkali burns with confined contact.

Eye Contact May cause severe eye irritation.

Ingestion None known

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not applicable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	E Corrosive Material D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **CEMENT - CLASS H - PREMIUM**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: CEMENT - CLASS H - PREMIUM
Synonyms: None
Chemical Family: Cement
Application: Cement

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Portland cement	65997-15-1	60 - 100%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	<3	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	None - does not burn.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Gray
Odor:	Odorless
pH:	12.4
Specific Gravity @ 20 C (Water=1):	3.15
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	94
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	0.5
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Keep away from any contact with water.
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact Can dry skin. May cause an allergic skin reaction. May cause alkali burns with confined contact.

Eye Contact May cause severe eye irritation.

Ingestion None known

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not applicable

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	E Corrosive Material D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BARACARB® 25**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BARACARB® 25
Synonyms: None
Chemical Family: Mineral
Application: Bridging Agent

Manufacturer/Supplier

Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Crystalline silica, quartz	14808-60-7	0 - 1%	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2
Limestone	1317-65-3	60 - 100%	10 mg/m^3	15 mg/m^3

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 0, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store away from acids. Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid Powder
Color:	White
Odor:	Odorless
pH:	8-9
Specific Gravity @ 20 C (Water=1):	2.7
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	168
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong acids.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion None known

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: LD50: > 5000 mg/kg (Rat)

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM96: >1,000,000 ppm (Mysidopsis bahia) SPP @ 178.5 ppb
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

Exhibit 6

5500-FM-OG0001A Rev. 11/2007

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

COPY

WELL PERMIT

DEP USE ONLY	
Permittee's eFACTS ID: 277879	Auth ID: 827239
Watershed Name: N. Bra Calkins Creek	Quality: HQ

Permittee	OGO.#	Permit Number	Date Issued
NEWFIELD APPALACHIA PA LLC	OGO-67425	37-127-20016-	04/30/2010

Address	Farm Name & Well Number	Well Serial #
363 N SAM HOUSTON PKWY E STE 2020	VE CRUM 1 1	
	Municipality: Damascus / County: Wayne	
HOUSTON, TX 77060-2424	7½ ' Quadrangle Name: Damascus	Map Section #: 5

Phone	Project #	Latitude	Longitude
(281) 847-6031		41-40-37.8900	-75-4-56.7400

Surf Elev at Site	Anticipated Total Depth	Well Type	Offset distances referenced to NE corner of map section.
904 feet	8350 feet	TE	South 11347 feet West 11136 feet

This permit covering the well operator and well location shown above is evidence of permission granted to conduct activities in accordance with the Oil and Gas Act and the Oil and Gas Conservation Law, if the well is subject to that act and any rules and regulations promulgated thereunder, subject to the conditions contained herein and in accordance with the application submitted for this permit. This permit does not convey any property rights.

This permit and the permittee's authority to conduct the activities authorized by this permit are conditioned upon operator's compliance with applicable law and regulations.

Notification must be given to the district oil and gas inspector, the surface landowner and political subdivision of the date well drilling will begin at least 24 hours prior to commencement of drilling activities.

The permittee hereby authorizes and consents to allow, without delay, employees or agents of the Department to have access to and to inspect all areas upon presentation of appropriate credentials, without advance notice or a search warrant. This includes any property, facility, operation or activity governed by the Oil and Gas Act, the Oil and Gas Conservation Law, the Coal and Gas Resource Coordination Act and other statutes applicable to oil and gas activities administered by the Department. The authorization and consent shall include consent to the Department to collect samples of wastewaters or gases, to take photographs, to perform measurements, surveys, and other tests, to inspect any monitoring equipment, to inspect the methods of operation and disposal, and to inspect and copy documents required by the Department to be maintained. The authorization and consent includes consent to the Department to examine books, papers, and records pertinent to any matter under investigation pursuant to the Oil and Gas Act or pertinent to a determination of whether the operator is in compliance with the above referenced statutes. This condition in no way limits any other powers granted to the Department under the Oil and Gas Act and other statutes, rules and regulations applicable to these activities as administered by the Department.

This permit does not relieve the operator from the obligation to comply with the Clean Streams Law and all statutes, rules and regulations administered by the Department.

Special Permit Conditions:

This permit expires **04/30/2011** unless drilling is commenced on or before that date and prosecuted with due diligence.

S. Craig [illegible]
Regional Oil and Gas Program Manager

Stephen Watson
Oil & Gas Inspector

2 Public Square
Wilkes-Barre, PA 18711-0790

570-826-2320
Telephone

5500-FM-OG0004 Rev. 1/2010

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

DEP USE ONLY	
Site ID	Primary Fac ID: 728804
Client Id: 277879	Subfacility Id

Well Record and Completion Report

ll Operator	DEP ID#	Well API # (Permit / Reg)	Project Number	Acres
NEWFIELD APPALACHIA PA LLC	277879	37-127-20016-		

Address	Well Farm Name & Well #	Serial #
363 N SAM HOUSTON PKWY E STE 2020,	VE CRUM 1 1	

City	State	Zip Code	County	Municipality
HOUSTON	TX	77060-2424	Wayne	Damascus

Phone	Fax	USGS 7.5 min. quadrangle map
(281) 847-6031		Damascus

Check all that apply: ☐ Original Well Record ☐ Original Completion Report ☐ Amended Well Record ☐ Amended Completion Report

WELL RECORD Also complete the Log of Formations on back (page 2)

Well Type ☐ Gas ☐ Oil ☐ Combination Oil & Gas ☐ Injection ☐ Storage ☐ Disposal

Drilling Method ☐ Rotary – Air ☐ Rotary – Mud ☐ Cable Tool

Date Drilling Started	Date Drilling Completed	Surface Elevation	Total Depth – Driller	Total Depth - Logger
		ft.	ft.	ft.

Casing and Tubing

Cement returned on surface casing? ☐ Yes ☐ No
Cement returned on coal protective casing? ☐ Yes ☐ No ☐ N/A

Hole Size	Pipe Size	Wt.	Thread / Weld	Amount in Well (ft)	*Material Behind Pipe* Type and Amount	*Packer / Hardware / Centralizers* Type	Size	Depth	Date Run

COMPLETION REPORT

Perforation Record

Date	Interval Perforated From	To

Stimulation Record

Date	Interval Treated	*Fluid* Type	Amount	*Propping Agent* Type	Amount	Average Injection

Natural Open Flow	Natural Rock Pressure	Hours	Days
After Treatment Open Flow	After Treatment Rock Pressure	Hours	Days

Well Service Companies -- Provide the name, address, and phone number of all well service companies involved.

Name	Name	Name
Address	Address	Address
City - State – Zip	City - State – Zip	City - State – Zip
Phone	Phone	Phone

5500-FM-OG0004 Rev. 1/2010

LOG OF FORMATIONS

Well API#: 37-127-20016--

(If you will need more space than this page, please photocopy the blank form before filling it in.)

Formation Name or Type	Top (feet)	Bottom (feet)	Gas at (feet)	Oil at (feet)	Water at (fresh / brine; ft.)	Source of Data

I do hereby certify to the best of my knowledge, information and belief that the well identified on this Well Record and Completion Report has been properly cased and cemented in accordance with the requirements of 25 Pa. Code Chapter 78 and any conditions contained in the permit for this well. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator's Signature

Title: Date:

DEP USE ONLY

Reviewed by: Date:

Comments:

5500-FM-OG0075 Rev. 8/2001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

Well Site Restoration Report

DEP USE ONLY	
Site ID	Primary Fac ID: 728804
Client Id: 277879	Subfacility Id

A. Operator and Well Information

Please read instructions on back before completing this form.

Well Operator: NEWFIELD APPALACHIA PA LLC	DEP ID#: 277879	Well API # (Permit / Reg): 37-127-20016-	
Address: 363 N SAM HOUSTON PKWY E STE 2020,		Well Farm Name & Well #: VE CRUM 1 1	Serial #:
City: HOUSTON	State: TX / Zip Code: 77060-2424	County: Wayne	Municipality: Damascus
Phone: (281) 847-6031	Fax:		

B. Land Application of Tophole Water

Date applied	pH
Volume (bbls)	Spec. cond. (µmhos/cm)

C. Off-site Waste Disposal

Type: ☐ Drilling Fluid (803) **Amount:** bbls

☐ Fracing Fluid (804) bbls

☐ Other, specify: **Qty:** bbls or tons

Method of disposal or reuse

☐ Sewage Treatment Plant (10)
☐ Disposal Well (04)
☐ Brine Treatment Plant (12)
☐ Landfill (05)
☐ Other (08)

Facility Information

Name | Permit #

Hauler Information

Name

Address

City | State | Zip Code

D. On-site Disposal – Drill Cuttings or Waste

Location of center of disposal area in relation to the well:

Course: degrees | Distance: feet

Describe the **material disposed**, including additives.

Specify disposal method

☐ Unlined pit, complete Section E.
☐ Lined pit, complete Section E.
☐ Land application, complete Section F.
☐ Dusting
☐ Solidification
☐ Other

E. Pit Disposal

Describe pit closure procedures.

Subbase, material: Thickness: inches

Pit liner, material: Thickness: mils

Pit dimensions (feet) Length: Width: Depth:

F. Land Application

Area: Length: feet Width: feet

Waste-to-soil ratio (by volume):

Chemical analysis of waste

Cadmium (Cd)	ppm	Nickel (Ni)	ppm
Copper (Cu)	ppm	Zinc (Zn)	ppm
Chromium (Cr)	ppm	Oil and Grease	%
Lead (Pb)	ppm	Spec. Cond.	µmhos/cm
Mercury (Hg)	ppm		

Well Operator's Signature

Title: Date:

DEP USE ONLY

Reviewed by: Date:

Comments:

Instructions for Well Site Restoration Report

Form 5500-FM-OG0075

Use this form to file the Well Site Restoration Report as required under 25 Pa. Code § 78.65(3). This report is to be filed with the department within 60 days after the restoration of the well site.

Section A. Operator and Well Information

Enter the name, address and telephone number of the well operator/permittee.

Provide the requested well information.

Section B. Land Application Of Tophole Water

Land application of tophole water must be performed in accordance with 25 Pa. Code § 78.60.

Provide the date(s) when tophole water was applied to the land, the estimated volume discharged, and the pH and specific conductance readings of the tophole water.

Section C. Off-site Waste Disposal

If disposing of residual waste off-site, complete this section.

Check the box next to each type of waste taken off-site for disposal. More than one box may be checked. Identify the number of barrels of drilling or fracing fluid removed. If checking "other", identify the waste and show the amount in either barrels or tons. Circle the appropriate unit of measurement.

Check the box next to the type of facility or site receiving the waste. Provide the name and permit number of the facility.

Provide the name and address of the person or company hauling the waste.

Section D. On-site Disposal – Drill Cuttings or Waste

If disposing of drill cuttings and/or residual waste on-site in accordance with 25 Pa. Code § 78.61 (Disposal of drill cuttings), § 78.62 (Disposal of residual waste—pits), or § 78.63 (Disposal of residual waste—land application), complete this section.

Locate the approximate center of the disposal area by giving the course in degrees and the distance in feet from the wellhead.

Describe the types of materials that were disposed on-site. Include drill cuttings above the surface casing seat, drill cuttings below the surface casing seat, cement returns, drilling muds, frac sands, and any other material that is being disposed on-site. Indicate any additives that were in the materials being disposed.

Additives are usually present to modify the performance of cement, drilling muds or frac sands. An example might be salt or oil in drilling muds.

Check the box next to the on-site disposal methods used. If "other" is checked, briefly describe the method of disposal.

Section E. Pit Disposal

If disposing of drill cuttings under 25 Pa. Code § 78.61 (Disposal of drill cuttings) complete the pit dimensions part of this section. If disposing of drill cuttings and/or residual waste under 25 Pa. Code § 78.62 (Disposal of residual waste—pits), complete all of this section.

Describe the procedures used to close the pit. The procedures should conform to requirements in 25 Pa. Code § 78.62.

Describe the type of material and thickness used for the subbase and pit liner. The manufacturer should be identified when describing the type of material used for the pit liner.

Provide the dimensions of the pit, giving the appropriate length, width, and depth in feet.

Section F. Land Application

If disposing of drill cuttings and/or residual waste including contaminated drill cuttings under 25 Pa. Code § 78.63, complete this section.

Provide the approximate length and width of the land application area in feet. Indicate the ratio of waste to soil by volume. As an example, if a 3-inch layer of waste was mixed into a 6-inch layer of soil the ratio would be 1/2. In no case may the ratio exceed 1/1.

Complete the chemical analysis information if it is requested by the department. The analysis is to be performed on the waste soil mixture after land application has occurred. See the guidelines for land application in the "Oil and Gas Operators Manual" for taking samples and for analysis methods.

If more room is needed to complete any section, provide the information on 8 ½" by 11" sheets of paper and attach to this form. Indicate the sections the information applies to.

CRUM WELL PAD
NEWFIELD APPALACHIA PA LLC.

DAMASCUS TOWNSHIP, WAYNE COUNTY, PENNSYLVANIA

EROSION & SEDIMENT CONTROL PLAN

JUNE 2010

DRAWING INDEX	
No.	DRAWING TITLE
C-1	EROSION & SEDIMENT CONTROL PLAN
C-2	EROSION & SEDIMENT CONTROL NOTES
C-3	EROSION & SEDIMENT CONTROL DETAILS
C-4	STAKEOUT & SITE GEOMETRY PLAN
C-5	SITE SECTIONS
C-6	CONSTRUCTION DETAILS & BID QUANTITIES
C-7	CONSTRUCTION SPECIFICATIONS

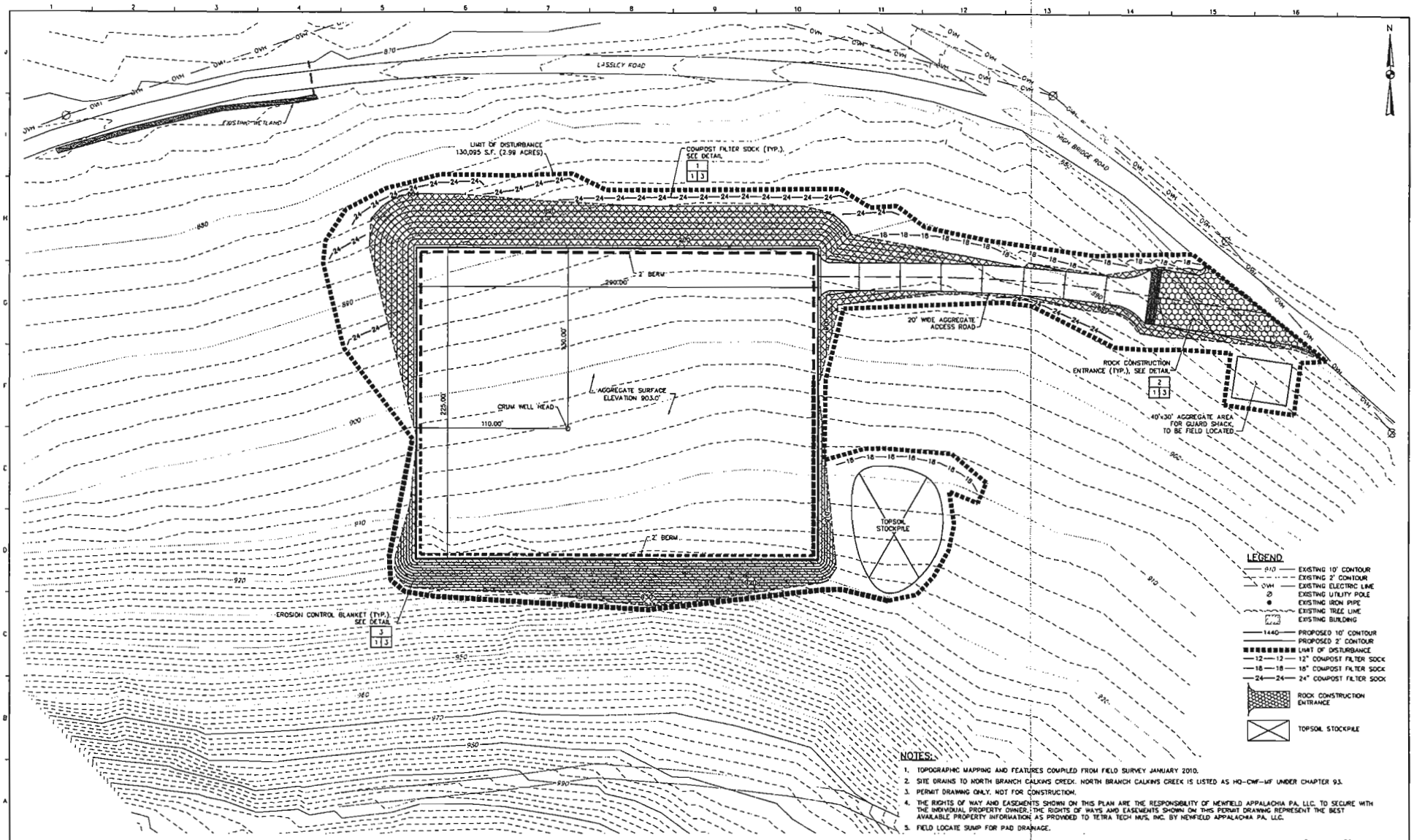
TETRA TECH

complex world | CLEAR SOLUTIONS™

661 ANDERSEN DRIVE – FOSTER PLAZA VII, PITTSBURGH, PA 15220
TEL: (412) 921-7090 | FAX: (412) 921-4040

LOCATION MAP
DAMASCUS, PA. – USGS 7.5' QUADRANGLE
CRUM WELL PAD
WAYNE COUNTY, PENNSYLVANIA
SCALE: 1" = 2000'

0 2000 4000
SCALE: 1" = 2000'



NOTES:

1. TOPOGRAPHIC MAPPING AND FEATURES COMPILED FROM FIELD SURVEY JANUARY 2010.
2. SITE DRAINS TO NORTH BRANCH CALKINS CREEK. NORTH BRANCH CALKINS CREEK IS LISTED AS HQ-CWF-MF UNDER CHAPTER 93.
3. PERMIT DRAWING ONLY. NOT FOR CONSTRUCTION.
4. THE RIGHTS OF WAY AND EASEMENTS SHOWN ON THIS PLAN ARE THE RESPONSIBILITY OF NEWFIELD APPALACHIA PA, LLC. TO SECURE WITH THE INDIVIDUAL PROPERTY OWNER. THE RIGHTS OF WAYS AND EASEMENTS SHOWN ON THIS PERMIT DRAWING REPRESENT THE BEST AVAILABLE PROPERTY INFORMATION AS PROVIDED TO TETRA TECH MUS, INC. BY NEWFIELD APPALACHIA PA, LLC.
5. FIELD LOCATE SUMP FOR PAD DRAINAGE.

SCALE: 1" = 30'

TETRA TECH
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MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

CRUM WELL PAD
EROSION & SEDIMENT CONTROL PLAN

SCALE: 1" = 30'

DATE:	6/15/10
PROJECT NO.:	112C02769
DESIGNED BY:	RAL
DRAWN BY:	BM
CHECKED BY:	ARB
SHEET:	1 OF 7

C-1

STANDARD EROSION AND SEDIMENT CONTROL PLAN NOTES

1. STOCKPILE HEIGHTS MUST NOT EXCEED 35 FEET. STOCKPILE SLOPES MUST BE 2:1 OR FLATTER.
2. THE OPERATOR SHALL ASSURE THAT THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS PROPERLY IMPLEMENTED.
3. UNTIL THE SITE ACHIEVES FINAL STABILIZATION, THE OPERATOR SHALL ASSURE THAT THE BEST MANAGEMENT PRACTICES ARE IMPLEMENTED, INSPECTED, OPERATED, AND MAINTAINED. THE OPERATOR SHALL MAINTAIN AND MAKE AVAILABLE TO DEPARTMENT OF ENVIRONMENTAL PROTECTION, WRITTEN INSPECTION LOGS. ALL MAINTENANCE WORK, INCLUDING CLEANING, REPAIR, REPLACEMENT, REGRADING, AND RESTABILIZATION SHALL BE PERFORMED IMMEDIATELY UPON DISCOVERY OF DEFICIENCY.
4. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE THROUGH A SEDIMENT CONTROL BMP, SUCH AS A PUMPED WATER FILTER BAG DISCHARGING OVER NON-DISTURBED AREAS.
5. THE CONTRACTOR SHALL REVIEW THE PROVISIONS OF THE APPENDIX 64, EROSION CONTROL RULES AND REGULATIONS, TITLE 25, PART I, DEPARTMENT OF ENVIRONMENTAL PROTECTION, SUBPART C, PROTECTION OF NATURAL RESOURCES, ARTICLE III, WATER RESOURCES, CHAPTER 102, EROSION CONTROL.
6. A COPY OF THE EROSION AND SEDIMENT CONTROL PLAN MUST BE ON THE PROJECT SITE AT ALL TIMES.
7. EROSION AND SEDIMENT BMPS MUST BE CONSTRUCTED, STABILIZED, AND FUNCTIONAL BEFORE SITE DISTURBANCE BEGINS WITHIN THE TRIBUTARY AREAS OF THOSE BMPS.
8. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPS CONTROLS SHALL BE REMOVED. AREAS DISTURBED DURING REMOVAL OF THE BMPS MUST BE STABILIZED IMMEDIATELY.
9. AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS.
10. AT LEAST 3 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES SHALL NOTIFY THE PENNSYLVANIA ONE CALL SYSTEM AT 1-800-242-1776 FOR BURIED UTILITIES LOCATIONS.
11. IN A TIMELY MANNER AFTER EARTH DISTURBANCE ACTIVITIES CEASE, THE OPERATOR SHALL STABILIZE ANY AREAS DISTURBED BY THE ACTIVITIES. DURING NON-GERMINATING PERIODS, MULCH MUST BE APPLIED AT THE SPECIFIED RATES. DISTURBED AREAS WHICH ARE NOT AT FINISHED GRADE AND WHICH WILL BE REDISTURBED WITHIN 1 YEAR MUST BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY VEGETATIVE STABILIZATION SPECIFICATIONS. DISTURBED AREAS WHICH ARE AT FINISHED GRADE OR WHICH WILL NOT BE REDISTURBED WITHIN 1 YEAR MUST BE STABILIZED IN ACCORDANCE WITH THE PERMANENT VEGETATIVE STABILIZATION SPECIFICATIONS.
12. AT STREAM CROSSINGS, 50' BUFFER AREAS SHOULD BE MAINTAINED. ON BUFFERS, CLEARING, SOD DISTURBANCES, EXCAVATION, AND EQUIPMENT TRAFFIC SHOULD BE MINIMIZED. ACTIVITIES SHOULD AS STACKING LOGS, BURNING CLEARED BRUSH, DISCHARGING RAINWATER FROM TRENCHES, WELDING PIPE SECTIONS, REFUELING AND MAINTAINING EQUIPMENT SHOULD BE ACCOMPLISHED OUTSIDE OF BUFFERS.
13. MULCH OR EROSION CONTROL BLANKETS MUST BE INSTALLED ON ALL SLOPES 3:1 AND STEEPER.
14. SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES.
15. THE OPERATOR SHALL REMOVE FROM THE SITE, RECYCLE, OR DISPOSE OF ALL BUILDING MATERIALS AND WASTES IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1 ET SEQ., AND 287.1 ET SEQ. THE CONTRACTOR SHALL NOT ILLEGALLY BURY, DUMP, OR DISCHARGE ANY BUILDING MATERIAL OR WASTES AT THE SITE.

TEMPORARY EROSION AND SEDIMENT CONTROLS INSPECTION AND MAINTENANCE SCHEDULE

BMP	INSPECTION FREQUENCY	MAINTENANCE TO BE PERFORMED
COMPOST FILTER SOCK	WEEKLY AND AFTER RAINFALL EVENTS	MAINTENANCE SHALL BE PERFORMED AS NEEDED. SEDIMENT SHALL BE REMOVED ONCE IT HAS ACCUMULATED TO ONE HALF THE ORIGINAL HEIGHT OF THE BARRIER. COMPOST FILTER SOCK SHALL BE REPLACED WHENEVER IT HAS DETERIORATED TO SUCH AN EXTENT THAT THE EFFECTIVENESS OF COMPOST FILTER SOCK IS REDUCED. COMPOST FILTER SOCKS SHALL REMAIN IN PLACE UNTIL DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED. ALL SEDIMENT ACCUMULATION AT THE COMPOST FILTER SOCK SHALL BE REMOVED AND PROPERLY DISPOSED OF BEFORE THE COMPOST FILTER SOCK IS REMOVED.
ROCK CONSTRUCTION ENTRANCE	DAILY	CONTRACTOR SHALL MAINTAIN/REPLACE MATERIAL AS NEEDED THROUGHOUT CONSTRUCTION TO MAINTAIN MINIMUM THICKNESS DURING USE OF ACCESS ROAD. A STOCKPILE OF ROCK WILL BE MAINTAINED ON SITE FOR THIS PURPOSE
MULCH STABILIZATION PEG AND TWINE	WEEKLY AND AFTER RAINFALL EVENTS	REPLACE MULCH, PEGS AND TWINE AS REQUIRED. RESTORE SEEDING IN AFFECTED AREA IF NECESSARY.

REVEGETATION

A. TEMPORARY GRASS COVER SHALL BE ESTABLISHED IN THE FOLLOWING AREAS:

1. WHERE SOIL STOCKPILES ARE TO BE EXPOSED FOR A PERIOD GREATER THAN THIRTY (30) DAYS. THE STOCKPILE SHALL BE SEEDED.
2. WHERE VEGETATIVE FILTERS MUST BE ESTABLISHED BELOW FILTER BAGS, A MINIMUM DISTANCE OF 10 FT SHALL BE SEEDED DOWNSLOPE OF THE TRAP OUTLET. TEMPORARY COVER – SEED MIXTURE FOR TEMPORARY COVER SHALL CONSIST OF 100% ANNUAL RYEGRASS. SEED SHALL BE APPLIED AT THE RATE OF 40 LB/ACRE OR AS RECOMMENDED BY A LOCAL RECOGNIZED SEED SUPPLIER APPROVED BY THE OWNER'S REPRESENTATIVE. PRIOR TO SEEDING, APPLY 1 TON OF AGRICULTURAL GRADE LIMESTONE PER ACRE PLUS FERTILIZER AT THE RATE OF 15-30-30 LB. PER ACRE AND WORK INTO SOIL.

B. PERMANENT COVER:

RECOMMENDED PERMANENT SEED MIXTURES COOL AND WARM SEASON GRASS

MIXTURE NUMBER	SEASON	SEASON [SEEDING RATE LB/AC.]
1	COOL	TALL FESCUE*[79], OR FINE FESCUE[46], PLUS REDTOP[4], OR PERENNIAL RYEGRASS[19], PLUS BIRDSFOOT TREFOIL[8]
2	COOL	BIRDSFOOT TREFOIL[8], PLUS TALL FESCUE*[40]
3	COOL	ORCHARDGRASS[28], OR SMOOTH BROMEGRASS[33], PLUS BIRDSFOOT TREFOIL[8]
4	WARM	FLATPEA[27], PLUS TALL FESCUE*[28], OR PERENNIAL RYEGRASS[25]
5	WARM	DEERTOUNGE[21], PLUS BIRDSFOOT TREFOIL[8]
6	WARM	SWITCHGRASS[15], OR BIG BLUESTEM[15], PLUS BIRDSFOOT TREFOIL[8]

RECOMMENDED PERMANENT SEED MIXTURES FOR STABILIZING DISTURBED AREAS

SITE CONDITION	SEED MIXTURE
CUT SLOPES & FILLS (NOT MOWED)	
WELL-DRAINED	2, 4 OR 6
VARIABLE DRAINAGE	2
CUT SLOPES & FILLS (MOWED)	1
CUT SLOPES & FILLS (GRAZED/HAY)	1, 2 OR 3
GULLIES & ERODABLE AREAS	2 OR 6
EROSION CONTROL BMP'S	
CHANNELS, DRAINAGE DITCHES, TRAP EMBANKMENTS, ETC	1 OR 2
FOR HAY OR SILAGE	2 OR 3
RIGHT-OF-WAY	
WELL-DRAINED	4 OR 6
VARIABLE DRAINAGE	2
WELL-DRAINED AREAS FOR GRAZING/HAY	2 OR 3
STRIP MINED AREAS	
SPOILS, WASTE AREAS, FLY ASH, SLAG, ETC. (LIME TO SOIL TEST)	2, 4 OR 5
FOR GRAZING/HAY	2, 3 OR 8

CONSTRUCTION SEQUENCE

REFER TO THE E&SC PLAN DRAWINGS FOR THE LOCATION OF THE PROPOSED WORK AND THE ASSOCIATED BMPS. A GENERALIZED CONSTRUCTION SEQUENCE IS PROVIDED BELOW. THE CONSTRUCTION SEQUENCE IS INTENDED TO PROVIDE A GENERAL COURSE OF ACTION IN ORDER TO CONFORM TO THE APPLICABLE REGULATORY AGENCY REQUIREMENTS FOR TEMPORARY AND PERMANENT SOIL EROSION AND SEDIMENTATION CONTROL. ALL NECESSARY PARTS FOR PROPER AND COMPLETE EXECUTION OF WORK PERTAINING TO THIS PLAN, WHETHER SPECIFICALLY MENTIONED OR NOT, ARE TO BE PERFORMED BY THE CONTRACTOR. IT IS NOT INTENDED THAT THE DRAWINGS AND THIS REPORT SHOW EVERY DETAILED PIECE OF MATERIAL OR EQUIPMENT. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS LISTED IN THIS SECTION. THE CONTRACTOR MAY BE REQUIRED TO ALTER CONTROLS BASED ON EFFECTIVENESS OF CONTROLS OR DIFFERING CONDITIONS ENCOUNTERED IN THE FIELD.

1. LOCATE STAGING AREAS AND ACCESS POINTS INCLUDING CONSTRUCTION ENTRANCES. INSTALL SEDIMENT BARRIERS DOWN SLOPE OF THESE AREAS.
2. INSTALL ROCK CONSTRUCTION ENTRANCE. REFER TO THE ROCK CONSTRUCTION ENTRANCE DETAIL ON DRAWINGS FOR DIMENSIONS.
3. INSTALL SEDIMENT BARRIERS ALONG THE PERIMETERS OF THE SITE AS SHOWN ON THE CONSTRUCTION DRAWINGS.
4. INSTALL EROSION CONTROL SEDIMENT BASINS, EROSION CONTROL BLANKET, TEMPORARY SLOPE PIPES, CHANNELS AND ROCK APRONS AS SHOWN ON THE EROSION CONTROL PLAN DRAWINGS.
5. CLEAR AND GRUB THE SITE.
6. STRIP AND STOCKPILE TOPSOIL. CONSTRUCT STOCKPILES AS SHOWN IN THE DETAILS ON THE CONSTRUCTION DRAWINGS.
7. MINIMIZE TOTAL AREA OF DISTURBANCE. MAINTAIN ALL TEMPORARY SOIL STOCKPILES WITHIN EXISTING SOIL EROSION AND SEDIMENT CONTROLS.
8. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE.
9. INSTALL EROSION CONTROL BLANKET ON ALL SLOPES GREATER THAN 3:1 AS SHOWN ON THE CONSTRUCTION DRAWINGS.
10. IMMEDIATELY SEED AND MULCH DISTURBED AREAS OR PREPARE FOR AGGREGATE STABILIZATION.
11. MAINTAIN ALL EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70% PERENNIAL VEGETATIVE COVER AND AGGREGATE STABILIZATION IS ESTABLISHED.
12. REMOVE ALL SOIL AND EROSION SEDIMENT CONTROL MEASURES UPON ESTABLISHMENT OF A UNIFORM 70% VEGETATIVE COVER AND AGGREGATE STABILIZATION OVER THE DISTURBED AREA. RE-GRADE AND REVEGETATE AREAS DISTURBED DURING THE REMOVAL OF THE SOIL EROSION AND SEDIMENT CONTROLS. REMOVE ALL SOIL AND EROSION SEDIMENT CONTROL MEASURES UPON ESTABLISHMENT OF A UNIFORM 70% VEGETATIVE COVER AND AGGREGATE STABILIZATION OVER THE DISTURBED AREA. RE-GRADE AND REVEGETATE AREAS DISTURBED DURING THE REMOVAL OF THE SOIL EROSION AND SEDIMENT CONTROLS.

SITE RESTORATION

AREAS AT FINAL GRADE ARE TO BE SEEDED, MULCHED AND STABILIZED IMMEDIATELY AS SPECIFIED ABOVE. WITHIN NINE MONTHS AFTER COMPLETION OF DRILLING THE WELL, THE OIL AND GAS WELL OWNER OR OPERATOR MUST RESTORE THE LAND SURFACE WITHIN THE AREA DISTURBED IN SITING, DRILLING, COMPLETING AND PRODUCING THE WELL. THIS INCLUDES:

a. REMOVING OR FILLING THE PIT USED TO CONTAIN PRODUCED FLUIDS OR INDUSTRIAL WASTES AND DRILL CUTTINGS. PROCEDURES FOR PROPER WASTE HANDLING AND DISPOSAL SHALL BE IN ACCORDANCE WITH DEP ACCEPTED PRACTICES AND STANDARDS.

b. REMOVING ALL DRILLING SUPPLIES NOT NEEDED FOR PRODUCTION. DRILLING SUPPLIES AND EQUIPMENT NOT NEEDED FOR PRODUCTION MAY BE STORED AT THE WELL SITE IF THE EXPRESS WRITTEN CONSENT OF THE SURFACE LANDOWNER IS OBTAINED.

c. IMPLEMENT TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES TO MINIMIZE THE POTENTIAL FOR ACCELERATED EROSION AND SEDIMENTATION DUE TO EARTH DISTURBANCES NECESSARY FOR SITE RESTORATION. THESE AREAS ARE TO BE SEEDED AND MULCHED UPON COMPLETION.

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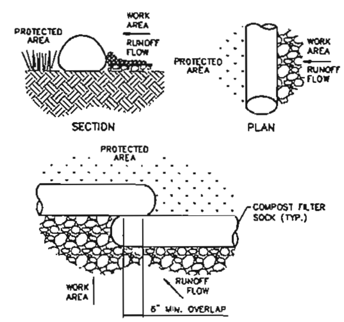
MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

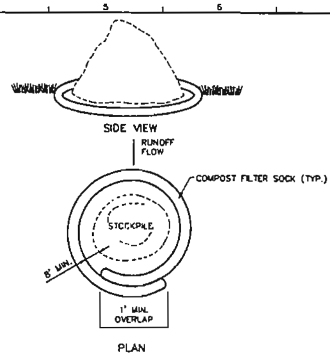
CRUM WELL PAD
EROSION & SEDIMENT CONTROL NOTES
SCALE: NOT TO SCALE

DATE:	6/15/10
PROJECT NO.:	112C02769
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	2 OF 7

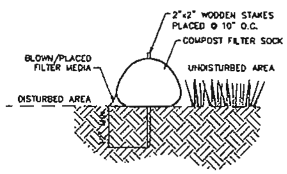
C-2

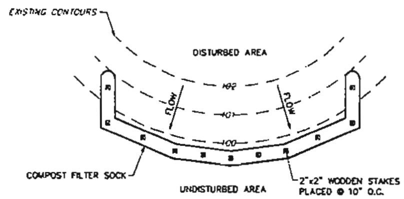


PERIMETER PROTECTION



STOCKPILE CONTAINMENT





COMPOST STANDARDS	
ORGANIC MATTER CONTENT	80%–100% (DRY WEIGHT BASIS)
ORGANIC	FIBROUS & ELONGATED
pH	5.5–8.0
MOISTURE CONTENT	35%–55%
PARTICLE SIZE	98% PASS THROUGH 1" SCREEN
SOLUBLE SALT CONCENTRATION	5.0 dS MAXIMUM

MAXIMUM SLOPE LENGTHS FOR COMPOST FILTER SOCK

% SLOPE	12" DIAMETER	18" DIAMETER	24" DIAMETER
2 (OR LESS)	150	500	1000
5	100	250	550
10	50	150	325
15	35	100	215
20	25	70	175
25	20	55	135
30	15	45	100
35	15	40	85
40	15	35	75
45	10	30	60
50	10	25	50

COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY 18" DIAMETER SOCK SHALL NOT EXCEED THAT SHOWN ON ABOVE TABLE FOR REINFORCED SILT FENCE. MAXIMUM SLOPE LENGTH FOR A 24" DIAMETER SOCK SHALL NOT EXCEED THAT FOR SUPER SILT FENCE.

TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.

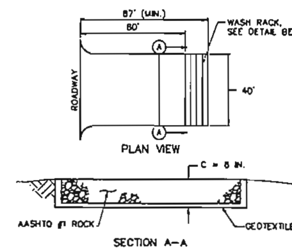
ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.

SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

BIODEGRADABLE FILTER SOCK SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

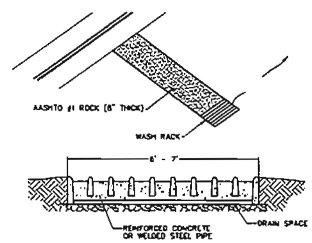
UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

COMPOST FILTER SOCK [1 / 1 3]
NOT TO SCALE



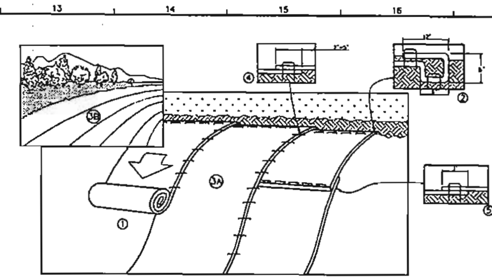
MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.

ROCK CONSTRUCTION ENTRANCE [2 / 1 3]
NOT TO SCALE



MAINTENANCE:
ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FUTHER USE OF THE RACK. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.

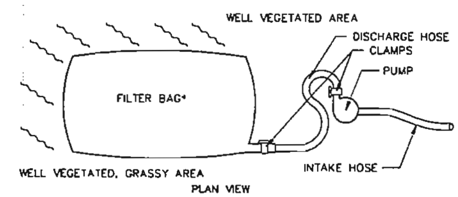
WASH RACK DETAIL
NOT TO SCALE

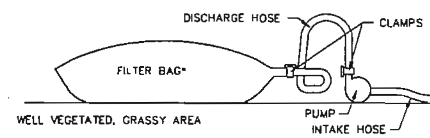


NOTES:

1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
   NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" – 5" (5 CM – 12.5 CM) OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE RECP's WIDTH.
   NOTE:
   *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.

EROSION CONTROL BLANKET – SLOPE INSTALLATION [3 / 1 3]
NOT TO SCALE





NOTES:

1. FILTER SHALL BE MADE OF NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE -STITCHED "J" SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS.
2. SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FULL.
3. BAGS SHALL BE LOCATED IN WELL VEGETATED (GRASSY) AREAS, AND DISCHARGE INTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
5. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.

PUMPED WATER FILTER BAG
NOT TO SCALE

PENNSYLVANIA ONE CALL SYSTEM, INC. 1-800-242-1776 STOP-CALL BEFORE YOU DIG!

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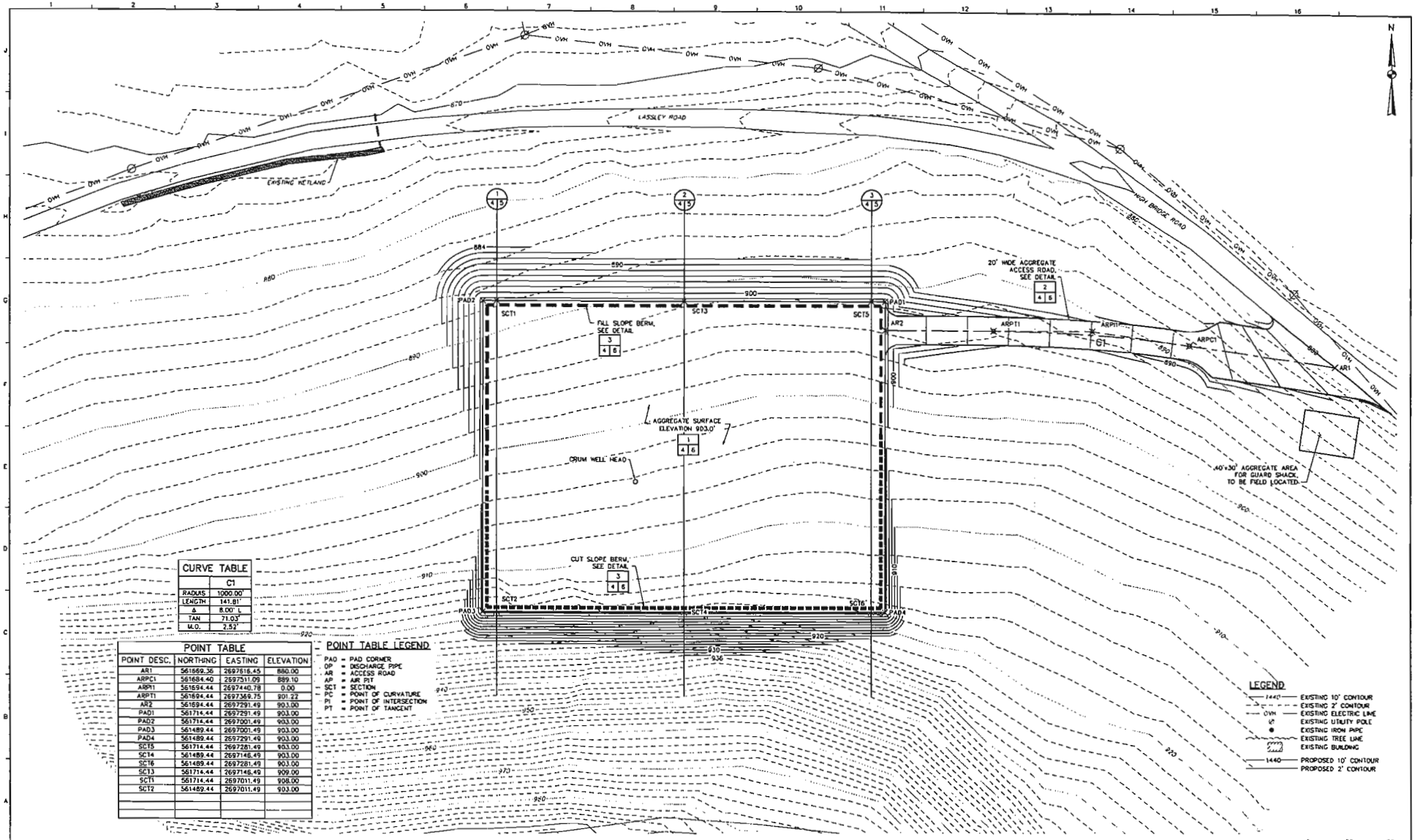
MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

CRUM WELL PAD
EROSION & SEDIMENT CONTROL DETAILS
SCALE: AS NOTED

DATE:	6/15/10
PROJECT NO.:	112C02789
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	3 OF 7

C-3



CURVE TABLE	
	C1
RADIUS	1000.00'
LENGTH	141.81'
Δ	8.00° L
TAN	71.03'
M.O.	2.52'

POINT TABLE			
POINT DESC.	NORTHING	EASTING	ELEVATION
AR1	561659.35	2697516.45	880.00
ARPC1	561684.40	2697511.09	889.10
ARPI1	561694.44	2697440.78	0.00
ARPT1	561694.44	2697369.75	901.22
AR2	561694.44	2697291.49	903.00
PAD1	561714.44	2697291.49	903.00
PAD2	561714.44	2697001.49	903.00
PAD3	561489.44	2697001.49	903.00
PAD4	561489.44	2697291.49	903.00
SCT5	561714.44	2697281.49	903.00
SCT4	561489.44	2697146.49	903.00
SCT6	561489.44	2697281.49	903.00
SCT3	561714.44	2697146.49	909.00
SCT1	561714.44	2697011.49	908.00
SCT2	561489.44	2697011.49	903.00

POINT TABLE LEGEND

- PAD = PAD CORNER
- DP = DISCHARGE PIPE
- AR = ACCESS ROAD
- AP = AIR PIT
- SCT = SECTION
- PC = POINT OF CURVATURE
- PI = POINT OF INTERSECTION
- PT = POINT OF TANGENT

LEGEND

- 1440 — EXISTING 10' CONTOUR
- 1442 — EXISTING 2' CONTOUR
- OVH — EXISTING ELECTRIC LINE
- EXISTING UTILITY POLE
- EXISTING IRON PIPE
- EXISTING TREE LINE
- EXISTING BUILDING
- 1440 — PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR

SCALE: 1" = 30'

PENNSYLVANIA ONE CALL SYSTEM, INC. 1-800-242-1776 SERVICE CENTER — PENNSYLVANIA LAW REQUIRES THREE WORKING DAYS NOTICE BEFORE YOU DIG! CALL BEFORE YOU DIG!

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MARK	DATE	DESCRIPTION	BY

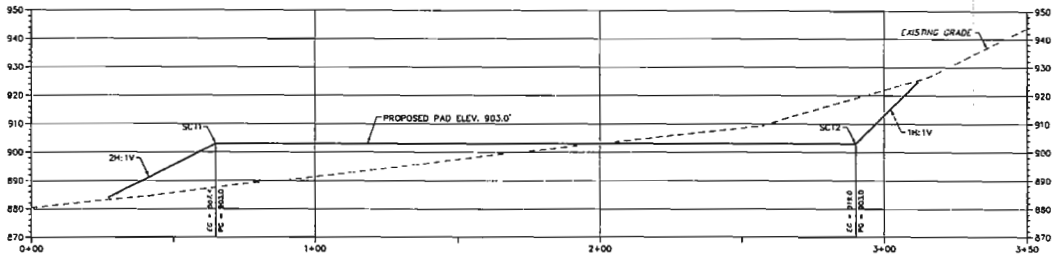
NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

CRUM WELL PAD
STAKEOUT & SITE GEOMETRY PLAN

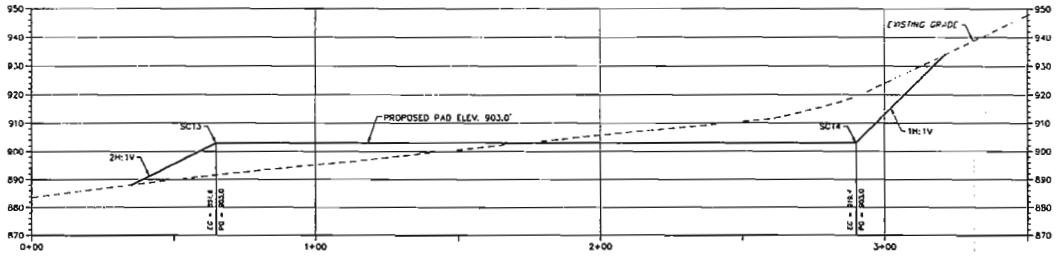
SCALE: 1" = 30'

DATE:	6/15/10
PROJECT NO.:	112C02769
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	4 OF 7

C-4



SECTION (1 / 4|5)
SCALE: HORIZ: 1" = 20'
VERT: 1" = 20'



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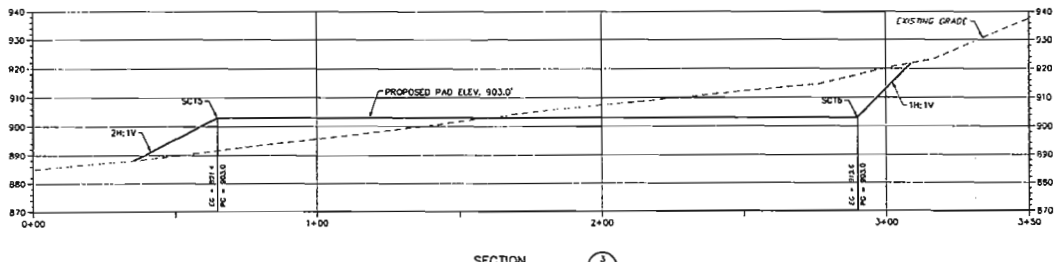

SECTION (3 / 4|5)
SCALE: HORIZ: 1" = 20'
VERT: 1" = 20'

0 20 40
SCALE: 1" = 20'

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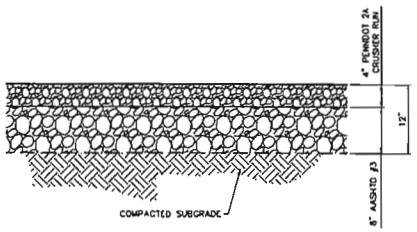
MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

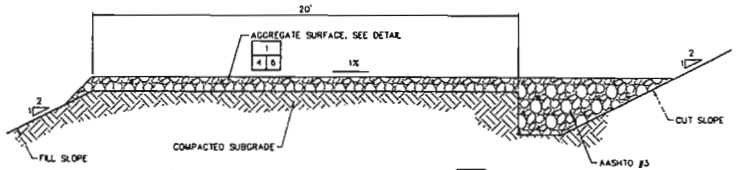
CRUM WELL PAD
SITE SECTIONS
SCALE: 1" = 20'

DATE:	6/15/10
PROJECT NO.:	112C02769
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	5 OF 7

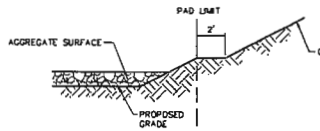
C-5



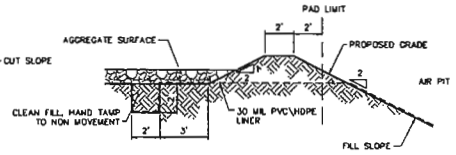
AGGREGATE SURFACE FOR WELL PAD & ACCESS ROAD [1 / 4 6]
NOT TO SCALE



20' WIDE AGGREGATE ACCESS ROAD DETAIL [2 / 4 6]
NOT TO SCALE



CUT SLOPE INSTALLATION



FILL SLOPE INSTALLATION

BERM DETAIL [3 / 4 6]
NOT TO SCALE

PROJECT BID QUANTITIES

ITEM	DESCRIPTION	UNITS	QUANTITY
1	MOBILIZATION/DE-MOBILIZATION	LUMP SUM	1
2	CLEARING & GRUBBING	ACRE	2.99
3	STRIP & STOCKPILE TOPSOIL	CUBIC YARD	2,450
4	COMPOST FILTER SOCK - 12" DIAMETER	LINEAR FOOT	0
5	COMPOST FILTER SOCK - 18" DIAMETER	LINEAR FOOT	360
6	COMPOST FILTER SOCK - 24" DIAMETER	LINEAR FOOT	580
7	AGGREGATE FOR WELL PAD, ACCESS ROAD & 30'x40' GUARD SHACK AREA	CUBIC YARD	2,800
8	ROCK CONSTRUCTION ENTRANCE	EACH	1
9	EARTHWORK (INCLUDES ACCESS ROAD, WELL PAD & DIVERSION DITCHES)	CUBIC YARD	10,700
10	ROCK CUT	CUBIC YARD	N/A
11	TEMPORARY SEED, SUPPLEMENTS & MULCH	ACRE	.061
12	RIPRAP	CUBIC YARD	N/A
13	EROSION CONTROL BLANKET	SQUARE YARD	3,000
14	TIRE WASH RACK	EACH	1
15	SITE RESTORATION - AGGREGATE REMOVAL, SPREADING TOPSOIL, PERMANENT SEEDING	LUMP SUM	N/A
16	TEMPORARY CHAIN LINK FENCE DURING CONSTRUCTION	LINEAR FOOT	N/A
17	CULVERT PIPE FOR ACCESS ROAD CROSSING	LINEAR FOOT	N/A
18	MAINTENANCE AND REPAIR OF EROSION CONTROL DEVICES	LUMP SUM	1

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MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

CRUM WELL PAD
CONSTRUCTION DETAILS & BID QUANTITIES

SCALE: AS NOTED

DATE:	6/15/10
PROJECT NO.:	112C02789
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	6 OF 7

C-6

GENERAL

CONSTRUCTION ACTIVITIES WILL BE PERFORMED IN ACCORDANCE WITH PENN DOT PUBLIGATION 408 SPECIFICATIONS – LATEST EDITION. THE FOLLOWING CONSTRUCTION OPERATIONS ARE INCLUDED IN THE BID PACKAGE FOR THE SITE AND ARE SUMMARIZED BELOW. SHOULD A CONFLICT BE DISCOVERED, CONTACT THE OWNER FOR A FINAL DECISION. THE OWNER IS DEFINED AS NEWFIELD APPALACHIA PA LLC.

THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND OR MANUFACTURERS MATERIAL CATALOG CUTS TO THE OWNER FOR REVIEW.

THE CONTRACT TERMS AND CONDITIONS SHALL BE IN ACCORDANCE WITH THE GENERAL AND SPECIAL PROVISIONS AND THE AGREEMENT AS PROVIDED BY THE OWNER.

TECHNICAL SPECIFICATIONS

1.0 CLEARING AND GRUBBING –

1.1 DESCRIPTION

REMOVAL OF TOPSOIL TO THE LIMITS OF GRADING AND STOCKPILE ON SITE AT A LOCATION DESIGNATED BY THE OWNER.

REMOVAL OF ORGANIC MATERIAL TO THE LIMITS OF GRADING AND DISPOSE OF OFF SITE

REMOVAL OF TRASH OR DEBRIS WITHIN THE GRADING LIMITS

1.2 CONSTRUCTION

INSTALL EROSION AND SEDIMENT CONTROL FEATURES PRIOR TO THE START OF CLEARING AND GRUBBING OPERATIONS

CUT TREES AND SHRUBS AND DISPOSE OF OFFSITE UNLESS DIRECTED BY THE OWNER

BURNING IS NOT PERMITTED

REMOVE STUMPS WITHIN THE GRADING AREA TO A DEPTH AT LEAST 2 FEET BELOW THE SUBGRADE ELEVATION AND OR SLOPE ELEVATIONS

DO NOT DAMAGE TREES OR AREAS BEYOND THE LIMIT OF GRADING. DAMAGES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

2.0 EROSION AND SEDIMENT CONTROLS

2.1 DESCRIPTION

PROVIDE, FURNISH, INSTALL AND MAINTAIN THE EROSION AND SEDIMENT CONTROL DEVICES IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND OR THE APPROVED EROSION AND SEDIMENT CONTROL PLAN

2.2 MATERIAL

COMPOST FILTER SOCKS SHALL BE COMMERCIALLY MADE USING 5 MIL CONTINUOUS HDPE FILAMENT WOVEN INTO A TUBULAR MESH NETTING WITH 3/8 INCH WOVEN OPENINGS. COMPOST FILTER SOCK DIAMETERS ARE 12 INCH, 18 INCH AND 24 INCHES.

COMPOST – SEE SHEET C-3

WOODEN STAKES – 2 INCH BY 2 INCH BY 42 INCH

ROCK CONSTRUCTION ENTRANCE

AASHTO #1 LIMESTONE IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION703 – AGGREGATE

GEOTEXTILE – CLASS 4 SEPARATION IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 735

TRUCK WASH RACK

CONCRETE IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 704 CEMENT CONCRETE – CLASS C.

WELDED STEEL PIPE – MINIMUM 4 INCH DIAMETER

EROSION BLANKET

100% BIODEGRADABLE EROSION CONTROL BLANKET, MACHINE-PRODUCED MAT OF 100% COCONUT FIBER WITH A FUNCTIONAL LONGEVITY OF UP TO 24 MONTHS.

THE BLANKET SHALL BE OF CONSISTENT THICKNESS WITH THE COCONUT EVENLY DISTRIBUTED OVER THE ENTIRE AREA OF THE MAT. THE BLANKET SHALL BE COVERED ON THE TOP AND BOTTOM SIDES WITH 100% BIODEGRADABLE WOVEN, NATURAL, ORGANIC FIBER NETTING. THE TOP NETTING SHALL CONSIST OF MACHINE DIRECTIONAL STRANDS FORMED FROM TWO INTERTWINED YARNS WITH CROSS DIRECTIONAL STRANDS INTERWOVEN THROUGH THE TWISTED MACHINE STRANDS TO FORM AN APPROXIMATE 0.50 X 1.00 (1.27 X 2.54 CM) MESH. THE BLANKET SHALL BE SEWN TOGETHER ON 1.50 INCH (3.81 CM) CENTERS WITH DEGRADABLE THREAD.

MATERIAL SHALL MEET REQUIREMENTS ESTABLISHED BY THE EROSION CONTROL TECHNOLOGY COUNCIL (ECTC).

MATERIAL CONTENT

MATRIX – 100 PERCENT COCONUT FIBER 0.5 LBS/YD2

NETTINGS – 100 PERCENT BIODEGRADABLE ORGANIC JUTE FIBER 9.3 LB/1000 FT2

THREAD – BIODEGRADABLE

TEMPORARY SEED AND MULCH

SEE SHEET C-2

PENNDOT PUBLICATION 408 SECTION 805 – MULCHING – HAY, STRAW OR WOOD FIBER

RIP RAP

IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 850 – ROCK LINING: R-4

2.3 CONSTRUCTION

INSTALL THE ROCK CONSTRUCTION ENTRANCE AND TIRE WASH FACILITY PRIOR TO THE START OF EARTHWORK OPERATIONS. MAINTAIN THE ROCK THICKNESS BY ADDING ROCK FROM AN ADJACENT STOCKPILE.

REMOVE SEDIMENT DEPOSITS ON A DAILY BASIS FROM THE ROCK ENTRANCE AND PUBLIC STREETS AND RETURN THE SEDIMENT TO THE CONSTRUCTION SITE.

INSTALL FILTER SOCKS AT THE LOCATIONS SHOWN ON THE CONTRACT DRAWINGS IN ACCORDANCE WITH THE DIAMETER SPECIFIED.

INSTALL 2 INCH BY 2 INCH WOODEN STAKE AT TEN FEET ON CENTER THROUGH THE FILTER SOCK.

INSTALL EROSION BLANKET UPON COMPLETION OF EARTH DISTURBANCE AND EMBANKMENT CONSTRUCTION. APPLY TEMPORARY SEED AND MULCH.

MAINTENANCE AND REPAIR:

INSPECT AND REPAIR DAMAGED OR DISLODGED EROSION AND SEDIMENT CONTROL DEVICES. INSPECT THE CONTROL DEVICES AFTER EACH RAIN EVENT AND OR AT A MINIMUM OF WEEKLY. IMMEDIATELY REPAIR, RE-STAKE, EXTEND OR REPLACE DAMAGED CONTROL DEVICES.

REMOVE SEDIMENT BUILD UP OR DEBRIS WHEN THE BUILD UP REACHES ONE HALF THE HEIGHT OF THE CONTROL DEVICE. DISPOSE OF THE SOIL MATERIAL ON SITE. DISPOSE OF TRASH AND DEBRIS OFF SITE.

INSTALL ROCK LINING AT THE LINES AND GRADES INDICATED ON THE CONTRACT DRAWINGS.

3.0 DEMOLITION

3.1 DESCRIPTION

REMOVAL OF BUILDINGS, WALLS, STRUCTURES AS INDICATED ON THE CONTRACT DRAWINGS.

3.2 CONSTRUCTION

REMOVE AND DISPOSE OF OFF SITE BUILDINGS, WALLS, STRUCTURES AS INDICATED.

ONSITE DISPOSAL IS NOT PERMITTED.

4.0 EARTHWORK – EXCAVATION AND EMBANKMENT

4.1 DESCRIPTION

EXCAVATE SOIL AND ROCK TO THE LINES AND GRADES INDICATED ON THE CONTRACT DRAWINGS.

CONSTRUCT EMBANKMENTS TO THE LINES AND GRADES INDICATED ON THE CONTRACT DRAWINGS.

4.2 CONSTRUCTION

EXCAVATE SOIL AND ROCK BY MECHANICAL MEANS.

BLASTING IS NOT PERMITTED.

PREPARED THE EMBANKMENT FOUNDATION AREA IN ACCORDANCE WITH SECTION 1.0 CLEARING AND GRUBBING.

PLACE SOIL MATERIAL IN NOT MORE THAN EIGHT INCH LOOSE LIFTS FOR THE FULL WIDTH AND COMPACT TO NOT LESS THAN 95% OF ASTM D698 STANDARD PROCTOR. THE CONTRACTOR SHALL SAMPLE, TEST AND SUBMIT THE RESULTS TO THE OWNER PRIOR TO THE START OF EMBANKMENT OPERATIONS. MAINTAIN SOIL OPTIMUM MOISTURE WITHIN PLUS OR MINUS TWO PERCENTAGE POINTS.

DO NOT PLACE SOIL MATERIAL THAT IS FROZEN, WET OR CONTAINING OBJECTIONABLE MATERIAL.

PLACE ROCK MATERIAL IN UNIFORM LAYERS. MAXIMUM ROCK SIZE PERMITTED IN THE EMBANKMENT IS EIGHT INCHES IN ANY DIMENSION.

PREPARE THE PAD SUBGRADE AND ACCESS ROAD SUBGRADE BY COMPACTING THE TOP TWO FEET OF THE EMBANKMENT OR CUT SURFACE TO 100% OF ASTM D698 STANDARD PROCTOR.

SHOULD NON RIPABLE ROCK BE ENCOUNTERED, IMMEDIATELY CONTACT THE OWNER FOR DIRECTION ON EXCAVATION.

6.0 CULVERT PIPE

6.1.1 DESCRIPTION

FURNISH, PROVIDE AND INSTALL DUCTILE IRON OR WELDED STEEL CULVERT PIPE AT ROAD CROSSINGS AT THE DIAMETER, LINE AND GRADE INDICATED ON THE CONTRACT DRAWINGS.

6.1.2 MATERIAL

WELDED STEEL CULVERT PIPE IN ACCORDANCE WITH A53, TYPE S.

DUCTILE IRON PIPE IN ACCORDANCE WITH ASTM A718

6.1.3 CONSTRUCTION

INSTALL AND MAINTAIN CULVERT PIPE DURING CONSTRUCTION. KEEP THE PIPE CLEAR OF DEBRIS AND SEDIMENT BUILDUP.

7.0 WELL PAD AND ACCESS ROAD

7.1 DESCRIPTION

PROVIDE, FURNISH AND INSTALL AGGREGATE FOR THE WELL PAD SURFACE AND THE ACCESS ROAD SURFACE.

7.2 MATERIAL

AGGREGATE IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 703 AGGREGATE

SIX INCHES OF AASHTO # 3

SIX INCHES OF PENNDOT # 57

PERFORATED CORRUGATED POLYETHYLENE CULVERT UNDERDRAIN PIPE

FOUR INCH DIAMETER IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 801 – PIPE CULVERTS

7.3 CONSTRUCTION

COMPACT AND SHAPE SUBGRADE TO THE LINES AND GRADES ON THE CONTRACT DRAWINGS.

COMPACT THE SUBGRADE TO 100% OF ASTM D698 STANDARD PROCTOR. REMOVE AND REPLACE ANY SUBGRADE THAT IS SOFT OR DISPLAYS VISUAL MOVEMENT WITH CLEAN FILL.

INSTALL THE AGGREGATE IN TWO LIFTS. COMPACT LIFTS TO NON-MOVEMENT.

INSTALL THE CORRUGATED CULVERT PIPE TO THE LINE AND GRADE SHOWN ON THE CONTRACT DRAWINGS.

8.0 SITE RESTORATION

8.1 DESCRIPTION

UPON COMPLETION OF THE WELL DRILLING AND AT THE NOTIFICATION BY THE OWNER, RETURN TO THE SITE AND REMOVE AND DISPOSE OF LOOSE AGGREGATE. COVER THE SITE WITH TOPSOIL FROM THE CURRENT STOCKPILE AND APPLY PERMANENT SEED, SUPPLEMENTS AND MULCH.

8.2 MATERIAL

TOPSOIL FROM THE EXISTING STOCKPILE

PERMANENT SEED AND SOIL SUPPLEMENTS SEE SHEET C-2

MULCH IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 805 – MULCHING – HAY, STRAW OR WOOD FIBER

8.3 CONSTRUCTION

REMOVE AND DISPOSE OF OFF SITE LOOSE AGGREGATE FROM THE WELL PAD.

SPREAD TOPSOIL EVENLY ACROSS THE WELL PAD AND APPLY PERMANENT SEED, SOIL SUPPLEMENTS AND MULCH

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MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

CRUM WELL PAD
CONSTRUCTION SPECIFICATIONS

SCALE: AS NOTED

DATE:	6/15/10
PROJECT NO.:	112C02769
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	7 OF 7

C-7

DAMASCUS TOWNSHIP

WAYNE COUNTY, PENNSYLVANIA

NOTICE OF ACTIVE PERMIT

DRIVEWAY PERMIT

PERMIT NUMBER 3402

ISSUED TO **VERNON D. & ELEANOR B. CRUM**

ISSUED: **05/10/10**

FOR: **ACCESS DRIVEWAY**

PIPE: **YES** DIAM: **18 INCHES**

PIPE OFFSET FROM ROAD CENTERLINE (FT): **20+-**

LOCATION: **NO #** **HIGH BRIDGE ROAD**

CONSTRUCTION MUST BEGIN WITHIN 12 MONTHS OF DATE OF ISSUE.

THIS NOTICE MUST BE POSTED AT THE PROJECT LOCATION WHERE IT IS VISIBLE TO THE PUBLIC.

ZONING OFFICER

DAMASCUS TOWNSHIP ROAD OCCUPANCY PERMIT

DAMASCUS TOWNSHIP, WAYNE COUNTY, PENNSYLVANIA

ISSUED IN ACCORDANCE WITH ATTACHED DOCUMENTS

DATE ISSUED:	**May 10, 2010**				
ISSUED TO:	**VERNON D. & ELEANOR B. CRUM**				
ADDRESS:	**94 LASSLEY ROAD, MILANVILLE, PA 18443**				
LOCATION:	**NO #**	**HIGH BRIDGE ROAD**			**T-636**
PERMIT NO.:	**3402**				
WORK START DATE		**05/10/10**			
WORK MUST BE COMPLETED BEFORE		**05/10/11**			
PERMIT ISSUED FOR USE TYPE:		**ACCESS DRIVEWAY**			
NEAREST INTERSECTING ROAD:		**LASSLEY ROAD**			
DIST. TO NEAREST ROAD:		**250+-**	**FEET**		
DIST. TO NEAREST INTERSECTING DRIVEWAY SAME SIDE				**N/A**	**FEET**
DIST. TO NEAREST INTERSECTING DRIVEWAY OPP SIDE				**50+-**	**FEET**
TOWNSHIP ROAD R.O.W. WIDTH		**33**	**FEET**		
IMPROVED ROADWAY WIDTH		**18**	**FEET**		
APPROX. SIGHT DISTANCE LEFT		**250**	**FEET**		
APPROX. SIGHT DISTANCE RIGHT		**300**	**FEET**		
POSTED SPEED LIMIT:		**N/A**	**MPH**		
PURPOSE OF WORK:		**COMMERCIAL**			
INSTALL CULV. PIPE		**YES**			
MIN. PIPE DIAM		**18**	**INCH**		
MIN. PIPE LENGTH		**60+-**	**FEET**		
OFFSET FROM ROAD CENTER		**20+-**	**FEET MIN.**		
UTILITY OVERHEAD OR UNDERGROUND		**N/A**			
UTILITY PARALLEL OR CROSSING		**N/A**			
UTILITY OFFSET FROM RD CENTER		**N/A**	**FEET**		

STOP – CALL BEFORE YOU DIG!
PENNSYLVNIA LAW REQUIRES
THREE WORKING DAYS NOTICE
Pennsylvania One Call System, Inc.
1-800-242-1776

Out-of-state callers dial 8-1-1

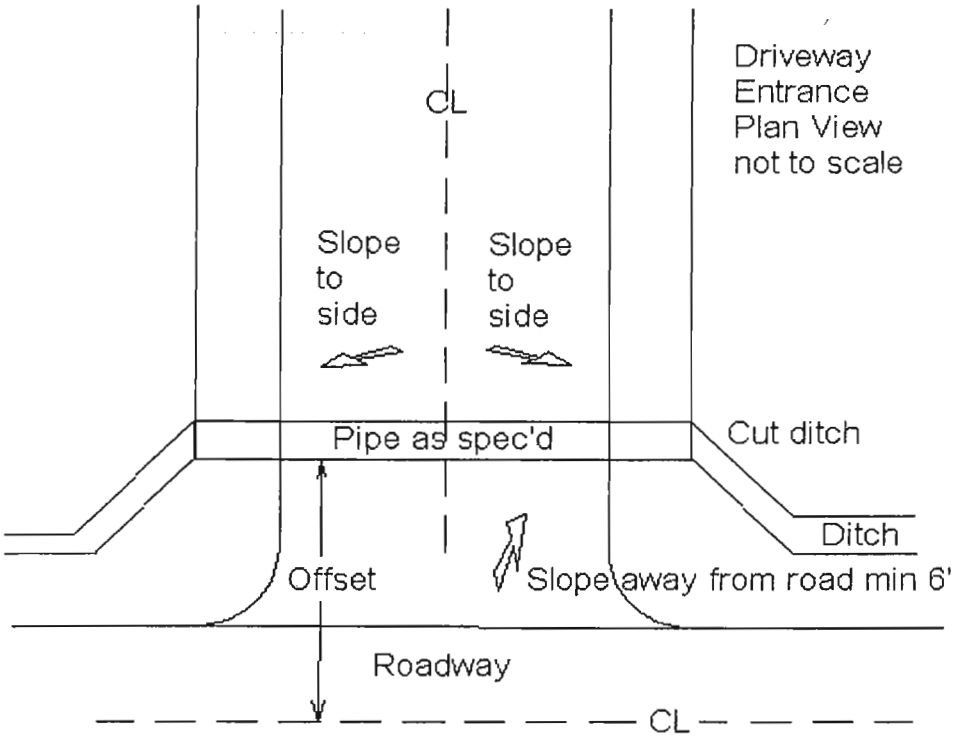
Be prepared to provide exact dig location.

1. **Under and subject to all conditions, restrictions and regulations prescribed by the Township and on the general provisions and specifications, a true copy whereof is attached and made a part hereof, with the same force and effect as if written or printed herein and subject to the special conditions, restrictions and regulations hereinafter set forth.**
2. **Property owner is responsible for clearing of brush, trees and other obstructions to enable and maintain adequate sight distance at all times.**
3. **Property owner is responsible for maintaining any drainage facilities installed to prevent water runoff from eroding or flooding the public roadway, or otherwise creating a nuisance or hazard.**
4. **No parking of any vehicles in a public roadway is allowed.**
5. **Notify Township 48 hours in advance of start of construction for inspection.**
6. **No grading or altering of stormwater drainage allowed without consulting Township.**

APPROVED BY: _____ DATE: 5/26/10

IMPORTANT: 1) The terms and conditions of this permit require the permittee to complete this work by the date specified in the permit. Where permittee fails to complete the work by the time specified the permit will become void. 2) If the permittee applies for a time extension before the epiration date of this permit a 30 day extension will be granted in the form of a supplemental permit. 3) If the work is started and not completed by specified date permittee must notify the Township prior to the expiration date of the permit. 4) The fees are applied to inspections of the site and associated filing of documents by the Township and are not refundable.

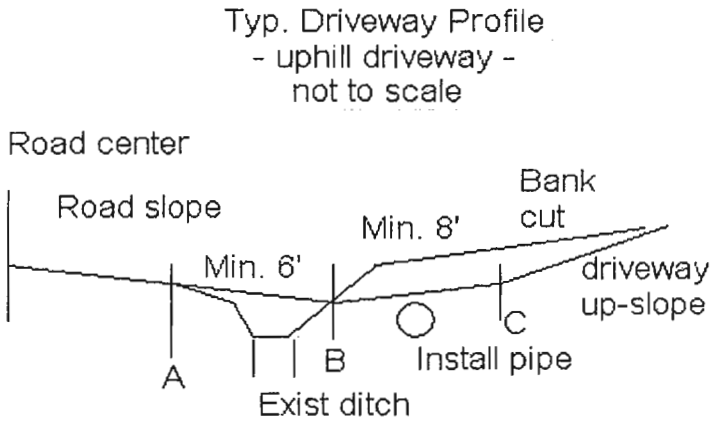
FIGURE 1 - DRIVEWAY ENTRANCE PLAN VIEW



Notes:

1. Driveway must be crowned min 4% from centerline to provide positive drainage.
2. Pipe must be set back (offset) minimum as specified in permit. Further setback to provide adequate cover over the pipe is allowable. 20+- feet from center
3. Minimum recommended pipe cover 12 inches of material.
4. Pipe size must be minimum diameter as specified in permit. 18 inches min.
5. Roadside ditch must be cut to provide flow of stormwater to and from installed pipe.
6. Grade must be downhill from roadway as specified in figure 3 or 4.
7. Runoff from driveway must not reach roadway.
8. No grading or altering of stormwater drainage allowed without consulting Township.

FIGURE 3 - DRIVEWAY PROFILE (TYP) - UPHILL ACCESS



Notes:

1. Driveway must be crowned min 4% from centerline to provide positive drainage.
2. Cut upslope to provide drainage ditch.
3. Driveway ditch must discharge to driveway pipe.
4. Fill downslope side as needed.
5. Runoff must run to sides of driveway surface
6. Runoff must not be allowed to run into township roadway.
7. No grading or altering of stormwater drainage allowed without consulting Township.
8. Minimum recommended pipe cover 12 inches of material.

Driveway Address for the Crum 1-1 Well Site

Address was assigned by GIS and is on file with county Emergency Management office and 911 dispatch.

Crum 1-1
151 High Bridge Rd
Milinville PA 18423

PREPAREDNESS, PREVENTION, AND CONTINGENCY PLAN
WAYNE COUNTY FIELD
WAYNE COUNTY, PENNSYLVANIA

Prepared for:

NEWFIELD APPALACHIA PA LLC
363 N. Sam Houston Pkwy E., Suite 2020
Houston, TX 77060

Prepared by:

TETRA TECH NUS INC
116 N. Washington Avenue
Scranton, PA 18503

May 2010

TABLE OF CONTENTS

LIST OF APPENDICES

1.0 DESCRIPTION OF FACILITY

1.1 DESCRIPTION OF THE INDUSTRIAL OR COMMERCIAL ACTIVITY

Newfield Appalachia PA LLC (Newfield) is a natural gas exploration company with operations planned for Wayne County, Pennsylvania. Operations will involve natural gas exploration of the Marcellus Shale formation, which will include site preparation, drilling, and well development and production activities. Wastes generated during these activities will be typical for gas drilling operations and will include drill cuttings, produced water, drilling and frac fluids, waste oil, municipal waste and trash. No hazardous waste is expected to be generated at the Newfield sites.

Newfield is currently in the exploratory phase of operations, which will require construction activities for new natural gas well pads and access roads.

This Prevention, Preparedness and Control (PPC) Plan applies to all well sites in Wayne County, Pa.

The attached map (Figure 1) in Appendix B shows the area covered under this PPC Plan Figure 2 is the required 7.5 topographic map of the specific well site. The proposed Site Plan (Figure 3) shows the site layout, the well site boundaries, material storage areas, waste storage areas, dike drains and drainage that leads away from the well site, and the entrances and exits to the well site.

During the different stages of site preparation, construction, drilling, well development and production, the site will store various fuels, oils and chemicals on-site. A chemical and container inventory for the specific well site is located in Table 1 of Appendix C.

1.2 DESCRIPTION OF EXISTING EMERGENCY RESPONSE PLANS

This is a new facility and this plan has been prepared prior to construction of the well pad. There are no previous emergency response plans.

A separate Spill Prevention Control and Countermeasure (SPCC) Plan will be prepared for each facility meeting the requirements defined in 40 CFR§112.

1.3 MATERIAL AND WASTE INVENTORY

Information in this section is used to evaluate the prevention, containment, mitigation, cleanup, and disposal measures which would be used in the event of a spill, discharge, explosion, or fire. Oils, chemicals and other hazardous materials anticipated to be used and stored at the facility during site preparation and construction, drilling, well development and production are listed in Table 1.

MSDS's will be maintained onsite for chemicals and compounds used at the facility in accordance with the Occupational Safety and Health Administration (OSHA) worker right-to-know requirements, as appropriate.

1.4 POLLUTION INCIDENT HISTORY

Newfield has not had any reportable incidents for this facility.

1.5 IMPLEMENTATION SCHEDULE FOR PLAN ELEMENTS NOT CURRENTLY IN PLACE

All plan elements are in place.

1.6 PURPOSE AND IMPLEMENTATION OF PPC PLAN

Newfield has developed and will implement this PPC Plan for effective action to minimize and abate hazards to human health and the environment from fire, explosion, and emission or discharge of pollutants to air, soil, surface water or groundwater. This plan was prepared to satisfy the requirements set forth in 25 PA Code Section 78.

The Drilling Manager serves as the Primary Emergency Coordinator and is responsible for the preparation and implementation of the PPC Plan. The PPC Plan has been prepared and implemented in general accordance with Pennsylvania Department of Environmental Protection (PADEP) guidelines, and will be submitted to PADEP for approval at such time as the PADEP may prescribe.

This PPC Plan identifies and describes any arrangements with police departments, fire departments, hospitals, contractors, and state, county, and local emergency response teams to coordinate emergency services.

The PPC Plan lists names, addresses and phone numbers of all persons identified to act as Emergency Coordinator. One person is named as the Primary Emergency Coordinator and others are listed in the order in which they will assume responsibility as alternates. The PPC Plan also includes a list of emergency equipment at the facility, the location and a physical description of emergency equipment, and a brief outline of emergency equipment capabilities.

1.7 PLAN REVISIONS

This PPC Plan will be reviewed and amended, annually, or whenever:

- Applicable PADEP regulations are revised;
- The plan fails in an emergency;
- The list of Emergency Coordinators changes;
- The list of emergency equipment changes; and
- Construction, operation, maintenance, or other circumstances change in a manner that materially increases the potential for fires, explosions, or releases of toxic or hazardous constituents; or which changes the response necessary in an emergency.

2.0 IMPLEMENTATION OF PPC PLAN

2.1 ORGANIZATIONAL STRUCTURE OF FACILITY FOR IMPLEMENTATION

The Drilling Manager has been designated as the Primary Emergency Coordinator. The Primary Emergency Coordinator is responsible for the following:

- Coordination of spill cleanup activities;
- Notification of appropriate authorities; and
- Tank and chemical storage area inspections.

The Drilling Manager has administrative responsibility for updating, maintaining, and implementing this PPC Plan. Specifically, these responsibilities include:

- Identification of materials and wastes handled during site operation (inventory);
- Identification of potential spill sources (risk assessment);
- Establishment of spill reporting procedures;
- Coordination of the visual inspection program;
- Review of past incidents, spills, and countermeasures employed;
- Coordination and implementation of the PPC Plan goals;
- Training/educational programs and updates;
- Ensuring periodic review of the PPC Plan for adequacy and appropriateness;
- Administration and institution of appropriate changes at regular intervals;
- Review of new construction and process changes relative to the PPC Plan;
- Evaluation of PPC Plan effectiveness prior to, during and subsequent to its implementation; and
- Instituting improvements to the PPC Plan.

The Production Manager is designated as Secondary Emergency Coordinator, and, in the absence of the Drilling Manager, will assume the role of emergency coordinator for emergencies. The Secondary Emergency Coordinator will report directly to the Primary Emergency Coordinator in matters regarding this plan, and can assist with implementing the above-listed items.

2.2 LIST OF EMERGENCY COORDINATORS

As required by 25 PA Code 265.55, there will be at least one employee, either on the construction site or on call, with the responsibility for coordinating emergency response measures. The Primary and Secondary Emergency Coordinators will be thoroughly familiar with this PPC Plan, site operations and activities, the location and characteristics of materials and wastes, the location of the facility's records, and the layout of the facility. The Emergency Coordinators have the authority to commit the resources necessary to carry out the PPC Plan and for coordinating emergency response measures. In the event of a spill or release, one of the Emergency Coordinators will be immediately notified. The following individuals have been designated to act as Emergency Coordinators:

Primary Emergency Coordinator

Name: Don Sleeth
Title: Drilling Manager
Office: 281-674-2501
Cell: 281-974-0051

Secondary Emergency Coordinator

Name: Jack Cochran
Title: Production Manager
Office: 814-437-2344
Cell: 814-671-1557

2.3 DUTIES AND RESPONSIBILITIES OF THE EMERGENCY COORDINATOR

As required by 25 PA Code 265.56 and the PPC Plan Guidance Documents, whenever there is an imminent or actual emergency situation, the Emergency Coordinator or his designee must immediately:

1. Notify all facility personnel.

2. Notify appropriate state or local agencies with designated response roles and contracted emergency response companies if additional assistance is required.

3. Identify the problem. Is it a physical emergency such as a fire, explosion, or spill? Is it a natural disaster such as a flood, tornado, or other severe weather? Is it a social emergency such as a bomb threat, riot, or vandalism?

4. Assess the health or environmental hazards and how this problem or condition will affect employees or its affect on the surrounding community.

5. Take all reasonable measures to stabilize the situation. The Emergency Coordinator will take all reasonable measures to ensure that the fire, explosion, emission, or discharge does not reoccur or spread to other materials at the site. These measures can include, when appropriate, stopping operations, collecting and containing released materials or wastes, and removing or isolating containers.

Whenever there is an emission, discharge, fire, or explosion, the Emergency Coordinator or his designee must immediately attempt to identify the character, exact source, amount, and aerial extent of emitted or discharged materials. He/she may do this by observation, by review of facility records or manifests, and, if necessary, by instrumental and chemical analysis. Concurrently, the Emergency Coordinator or his designee must assess possible hazards to human health or the environment that may result from emission, discharge, fire, or explosion. This assessment must consider both direct and indirect effects of the emission, discharge, fire, or explosion.

If the Emergency Coordinator determines that the facility has had an emission, discharge, fire, or explosion which would threaten human health or the environment (beyond the limits of the site) and if evacuation of local areas may be advisable, he/she must immediately notify the applicable local authorities (police, fire, etc.); he/she must also immediately notify the PADEP by telephone at (800) 541-2050 (24-hour number), PADEP Northeast Region at (570) 826-2511 (24-hrs), the National Response Center at (800) 424-8802, Wayne County Emergency Management Agency (EMA) at (570) 253-1622, and the Pennsylvania Emergency Management Agency at (717) 651-2001, and report the following information:

- Name of the person reporting the incident;
- Name and location of the facility;
- Telephone number where the person reporting the spill can be reached;
- Date, time, and location of the incident;
- A brief description of the incident, nature of the materials involved, extent of any injuries, and possible hazards to human health or the environment;
- The estimated quantity of the materials spilled; and
- The extent of contamination of land, water, or air, if known.

If spills or discharges of a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substance in greater than reportable quantities has occurred, the Emergency Coordinator must notify DEP at (800) 541-2050 and the National Response Center at (800) 424-8802 and report the above information. For an offsite release (spill or discharge) of a reportable quantity of a CERCLA hazardous substance or a Superfund Amendments and Reauthorization Act Extremely Hazardous Substance, the Emergency Coordinator must immediately notify the National Response Center at (800) 424-8802 and report the above information.

If a release occurs from a storage tank which enters a water supply or which threatens the water supply of downstream users, the Emergency Coordinator must immediately notify the Wayne County EMA (570) 253-1622, the Pennsylvania Emergency Management Agency at (717) 651-2001, and DEP at (800) 541-2050. If appropriate, the Emergency Coordinator may assist the Emergency Management Agencies in notifying the downstream water users. The priorities for notification will be by closest proximity to the release site.

During an emergency, the Emergency Coordinator will take all reasonable measures necessary to ensure that fire, explosion, emission, or discharge do not occur, recur, or spread to other materials at the facility. These shall include, where applicable, stopping facility operations, collecting and containing released materials, and removing or isolating containers. If the facility stops operations in response to a fire, explosion, emission, or discharge, the Emergency Coordinator must ensure that adequate monitoring is conducted for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment whenever this is appropriate.

The Emergency Coordinator will oversee and direct facility personnel in the performance of their responsibilities for addressing the emergency situation. Immediately following an emergency, the Emergency Coordinator (with PADEP approval) must provide for treating, storing, or disposing residues, contaminated soil, etc., from an emission, discharge, fire, or explosion at the construction site. The Emergency Coordinator must ensure that in the affected areas of the facility, no material incompatible with the emitted or discharged residues is processed, stored, treated, or disposed until cleanup procedures are completed and that all emergency equipment utilized in implementation of the PPC Plan is cleaned and fit for its intended use before operations are resumed. Newfield will notify PADEP and the appropriate State or local

authorities that the facility is in compliance before operations are resumed in the affected areas of the facility. Newfield will note the time, date and details of an incident that requires implementing the PPC Plan.

Within 15 days after the incident, Newfield will submit a written report on the incident to PADEP and the U.S. Environmental Protection Agency regional administrator. The report must be submitted to:

Director - Bureau of Water Quality Management
Pennsylvania Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110

Regional Administrator
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103

Director - PADEP Northeast Office
Pennsylvania Department of Environmental Protection
2 Public Square
Wilkes-Barre, PA 18711

The report should include the following information:

- Name, address, and telephone number of the individual filing the report;
- Name, address, and telephone number of the facility;
- Date, time, type, and location of incident;
- A brief description of the circumstances causing the incident;
- Description and estimated quantity (by weight) of materials or wastes involved;
- The extent of injuries, if any;
- An assessment of actual or potential threat to human health or the environment and assessment of contamination of land, water, or air, where applicable;
- Estimated quantity and disposition of recovered materials or wastes that resulted from the incident; and
- A description of what actions Newfield intends to take to prevent a similar occurrence in the future.

2.4 CHAIN OF COMMAND

Facility personnel must report emergency situations to the Emergency Coordinators. A Chain of Command flow chart (Table 5, Appendix C) has been developed and should be implemented during an emergency. The Emergency Response Chain of Command flow chart will be posted

next to all telephones onsite, posted in areas where potential emergency situations could arise, and placed in onsite company vehicles, as appropriate.

2.5 DISTRIBUTION OF THIS PPC PLAN

A copy of this PPC Plan and subsequent revisions will be distributed to:

- Drilling Manager (Primary Emergency Coordinator)
- Production Manager (Secondary Emergency Coordinator)

The PPC Plan will be reviewed and amended, if necessary, based on the criteria described earlier in Section 1.7.

3.0 SPILL AND LEAK PREVENTION AND RESPONSE

The site will be maintained and operated to minimize the possibility of a fire, explosion or discharge of oils, hazardous materials or their constituents to air, soil, surface water or groundwater which could threaten human health or the environment, in accordance with the requirements of 25 PA Code Section 265.31.

3.1 PRE-RELEASE PLANNING

The following sections discuss specific locations where the potential exists for accidental spills of oils and/or chemicals. The controls that are in place to minimize the potential for an uncontrolled release to the environment are also discussed. In the event that an uncontrolled spill of hazardous substances occurs, the procedures described in Section 4.0 will be followed.

To enhance spill prevention at the facility, great care will be exercised in handling oil and other materials covered in this PPC Plan. Any unusual conditions observed by any employees or contractors will be reported to one of the Emergency Response Coordinators. Management personnel whose responsibilities include involvement with the materials discussed in this document will also be familiar with this plan and the procedures recommended for spill prevention.

Spill Prevention Measures: Procedures that are to be followed to prevent and/or minimize oil spills at the Newfield facility include:

- ASTs and/or containers will be stored in secondary containment with sufficient volume;
- ASTs and regulated material containers will be visually inspected weekly for leaks;
- Special care will be taken when transferring regulated materials to prevent product loss;
- Regulated materials will be stored in a manner that minimizes the potential for contact with stormwater;
- Absorbent and spill control materials shall be maintained on-site for emergency use;

- Emergency response personnel will be familiar with procedures to follow in the case of a spill; and

- In cases where there may be leaking equipment or operations where oil or oil-related compounds are leaked, spilled, or otherwise released, containment booms or absorbent materials shall be used and equipment shall be repaired.

In the event that an uncontrolled spill of oil or a hazardous material occurs, the procedures described in Section 4.0 will be followed. Responses should be coordinated with federal, state and local agencies as appropriate.

3.2 MATERIAL COMPATIBILITY

The majority of materials received on-site in totes, drums, pails or other small containers are stored in the containers supplied by the manufacturer.

Construction materials used for the ASTs have been selected and designed to be compatible with the materials that are being stored and are typical for the natural gas industry.

3.3 INSPECTIONS AND MONITORING PROGRAM

Operating equipment will be inspected daily, and a copy of the inspection and maintenance form is included in Appendix A. Employees are responsible for detecting and reporting potential problems on the inspection and maintenance form.

Storage tank inspections will be conducted weekly and include evaluation of the following: pumps, valves, and fittings for leaks; the tank condition for evidence of corrosion; secondary containment; evidence of spilled materials; and effectiveness of housekeeping practices.

Completed inspection forms and inspection reports will be maintained in the Primary Emergency Coordinator's office. Noncompliance issues identified during the comprehensive site evaluation will be addressed in a timely manner. If additional control measures are required, implementation of the measures will generally occur within 90 days of the site evaluation. Compliance issues that require revisions to the PPC Plan (description of additional pollutant sources, measures, or controls) will be incorporated into the plan within approximately 15 days of the site evaluation.

Stormwater Management System: Stormwater inspections will include an evaluation of best management practices (BMPs), where appropriate. In accordance with the erosion and sedimentation control plan prepared for the site, erosion and sedimentation control (ESC) measures will be implemented where there is the potential for sediment or soil particles to impact stormwater quality. Repairs will be made, as necessary, following the site inspection.

Storage Tanks and Drum Storage Areas: Tanks and drum storage areas will be accessed daily. Spills or leaks that may occur will be contained by secondary containment and noted as part of routine facility operations. To enhance the daily observations, periodic inspections will be performed for the tank and drum storage areas as described in Table 2. The inspections will include observation of spill and/or leaks and observations of the condition of associated secondary containment structures. Records for the inspections will be maintained in the Primary Emergency Coordinator's office.

3.4 PREVENTIVE MAINTENANCE

Newfield will ensure that preventative maintenance of operating machinery on each construction site is performed regularly.

3.5 HOUSEKEEPING PROGRAM

The Newfield Construction Manager will be responsible for general construction site housekeeping. Specific steps taken under this program will include:

- Debris and/or sediment removal, as necessary.
- Regular refuse pickup and disposal.
- Proper filling and emptying of storage containers, tanks, and equipment to minimize spill potential.
- Periodic review of good housekeeping procedures in the employee-training program.

Once completed, the Production Manager will have overall responsibility for housekeeping at the facility. Newfield currently does not anticipate that bulk quantities of hazardous waste materials will be stored at the facility.

3.6 SECURITY

The facility is not fully fenced but is located in a remote location with limited access except via the site access road. The facility is normally manned during drilling and well development.

Flow and drain valves are locked and in the off position when in non-operational or non-standby status. The starter controls for each oil pump are locked in the off position when in non-operating or non-standby status. Master flow/drain valves are all located on the Facility and monitored by staff.

Any loading/unloading connections of facility piping is capped or blind flanged when not in service or is in standby service for an extended amount of time.

The facility has lighting sufficient for detection of spills during nighttime operations. Consideration has been given to: (a) discovery of spills occurring during hours of darkness, both by operating personnel, if present, and by non-operating personnel, and (b) prevention of spills occurring through acts of vandalism.

3.7 EXTERNAL FACTOR PLANNING

External factors are not anticipated to increase the risk of a spill or release that would impact human safety or the environment. Power outages, adverse weather conditions, or employee strikes could result in discontinuation of earth moving, drilling or well preparation activities. The Emergency Coordinator will monitor operations and initiate their orderly shutdown when necessary.

Access road conditions may be impacted by adverse weather conditions, possibly increasing the risk of a release of materials being delivered or removed. Truck drivers should report poor road conditions to the Construction or Drilling Manager. If conditions deteriorate to where they may impact safe movement of materials, the construction or Drilling Manager will review the conditions and initiate repairs or road closure as deemed necessary.

3.8 EMPLOYEE TRAINING PROGRAM

Newfield's employee training program enables employees to understand the processes and materials with which they are working, the safety and health hazards, the practices for preventing spills, and the procedures for responding properly and rapidly to spills. It also familiarizes personnel with emergency procedures.

All Newfield employees receive job specific training. Emergency Coordinators, Well Tenders, and other oil or hazardous material handling employees receive annual training on the facility's PPC and SPCC plans.

Job specific training includes preventive maintenance, inspection and monitoring activities, shut down procedures and housekeeping practices. PPC training will include spill/release recognition, initial response, initial notifications and follow-up. The training program is designed to ensure that personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment systems including, where applicable: procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment; key parameters for automatic cut-off systems; communications and alarms systems; response to fires and explosions; site evacuation procedures; and shutdown of operations.

Annual right-to-know training for all facility employees is conducted relevant to the materials present at the facility. Employees will be given detailed instructions regarding the materials and wastes with which they are working; including safety and health hazards, handling methods, proper disposal procedures, and emergency procedures. The location of MSDS's for on-site materials will be identified to all employees.

Training records will be maintained at the facility and in the employee's personnel file.

4.0 COUNTERMEASURES

4.1 COUNTERMEASURES TO BE UNDERTAKEN BY FACILITY

The following sections present general spill response practices to be implemented at the Newfield facility, as appropriate.

4.1.1 Spill Clean-Up Procedures - General

Incidental spills should be contained and cleaned up when discovered per the employees job related training. Clean up material should be placed into a marked container and the Construction or Drilling Manager notified appropriately.

For large spills or spills of oils or hazardous materials which may reach surface water or impact the environment, the employee who first discovers the spill should contact the Emergency Coordinator. He should then work to contain and clean-up the spill.

Spill clean-up involves three steps: containment, removal, and disposal. In the event of a spill, it is very important that the material be contained to the maximum extent possible in order to minimize the effect of the spill and the cost of clean-up. **NOTE: ANY SHEEN ON A WATERBODY (STREAM, RIVER, OR WETLAND) IS A REPORTABLE RELEASE.** Once the spill is contained, the spilled material and contaminated material must be collected and physically removed from the area

4.1.2 Spill Clean-Up Procedures - Specific

The employee should do the following:

- Contain the spill to the smallest area possible using absorbent materials, earthen dikes or other diversion or containment structures. Stormwater collection structures will be either blocked or pumped.
- Block off the area to prevent traffic or employees from entering the area.
- For oils and other organic materials, apply a non-reactive sorbent material, such as Oil-Dri or Kitty Litter, to the spill.
- In the case of a spill of acids hazardous waste, check the MSDS and then neutralize with lime or soda ash if appropriate.
- If a leaking tank is involved, stop liquid flows as appropriate and dike the tank area with earth or absorbent material.

- If a leaking pail, drum or other small container is involved, place it in an over-pack container.
- Clean up spilled material and place it in a marked container.
- Work with the emergency coordinator to properly store the material and arrange for proper disposal

4.1.3 Fire or Explosion

In the case of a fire or explosion, the local fire department should be notified by calling 911. Employees may attempt to extinguish fires using handheld fire extinguishers based upon their job training.

The Emergency Coordinator will determine if evacuation per section 4.4 is required.

4.2 COUNTERMEASURES TO BE UNDERTAKEN BY CONTRACTORS

The following list shows area emergency response contractors to contact should the facility require outside help.

Company: Minuteman Spill Response, Inc.
Address: P.O. Box 10
Mifflinville, PA 18631
Telephone Number: 570-759-3658
Response Time: Approximately 2 to 3 hrs
Equipment and Services: Hazardous Materials Emergency Response

4.3 INTERNAL AND EXTERNAL COMMUNICATIONS AND ALARM SYSTEM

This section describes the internal communications or alarm used to provide immediate emergency instruction (voice or signal) to installation personnel, and the external communications or alarm system used to summon emergency assistance from local police or fire departments.

Newfield facilities in Wayne County are remote and generally do not have land-line telephone systems or alarm systems. The primary means of communication is via voice or mobile telephones. Mobile phones are provided to the Drilling and Production Managers (Primary and Secondary Emergency Coordinators).

Fire, police, and emergency service can be summoned by calling the 911 or per the numbers listed in Table 3.

4.4 EVACUATION PLAN

In the unlikely event that the site must be evacuated, the Emergency Coordinator will alert personnel to re-group at the pre-designated location for attendance taking. The Emergency Coordinator is responsible to verify that all site workers are accounted for during an evacuation. Periodic drills will be conducted, if deemed necessary, to evaluate the effectiveness of this evacuation plan.

If an emergency situation requires evacuation of personnel, the Emergency Coordinator will implement the following evacuation procedures:

1. The Emergency Coordinator will provide evacuation instructions to facility personnel via the construction site communications network, as appropriate.

2. Personnel evacuation will typically proceed as follows:

   a. If downwind of incident: Evacuate via the most accessible route perpendicular to the prevailing wind direction.
   b. If upwind of incident: Evacuate in an upwind direction.

3. Personnel will reassemble at the public road at the facility entrance as shown on Figure 3 or an alternate assembly point identified by the Emergency Coordinator, that is upwind of the incident location, and remain at this location until the Emergency Coordinator has accounted for all personnel.

4. The names of employees and the destination of employees transported to hospitals, etc. for treatment will be recorded by the Emergency Coordinator, first aid personnel or fire officials.

Once on public roadways, evacuation routes are left up to the individual.

4.5 EMERGENCY EQUIPMENT AVAILABLE FOR RESPONSE

This section provides a list of available emergency equipment, and procedures for maintenance and decontamination of emergency equipment. Newfield's emergency equipment at the facility will allow personnel to respond safely and quickly to emergency situations. Equipment will be inspected and maintained by Construction Manager to assure recommended quantities are available and its proper operation in time of emergency. After an emergency, equipment will be decontaminated, cleaned, and re-fit for its intended use before normal operations resume.

The Newfield facility will be equipped with the following emergency response equipment:

(1) Mobile telephones are provided to the Drilling and Production Mangers and are immediately available at the scene of operations for summoning emergency assistance from local police departments, fire departments or State or local emergency response teams.

(2) Portable fire extinguishers, fire control equipment, spill control equipment and decontamination equipment. This equipment is detailed in Table 4 of Appendix C.

5.0 EMERGENCY SPILL CONTROL NETWORK

5.1 ARRANGEMENTS WITH LOCAL EMERGENCY RESPONSE AGENCIES AND HOSPITALS

This section provides a list of local emergency response agencies and hospitals, and associated phone numbers. Arrangements can be made, as appropriate, to inform local emergency response agencies and hospitals concerning the type of materials handled at the Newfield facility and the potential need for services.

If appropriate, arrangements can be made to designate who will be the primary emergency response agency and who will provide support services during emergencies. Efforts can be made to familiarize police, fire departments, emergency response teams, and the Wayne County Emergency Management Agency (EMA) Coordinator with the layout of the site, the properties and dangers associated with any hazardous materials handled, places where personnel would normally be working, entrances to roads inside the site, and potential evacuation routes.

If considered appropriate by Newfield's Emergency Coordinator, agreements with hospitals and emergency response agencies can be made and included in the periodic updating or amending of the PPC Plan. The agreements and/or arrangements include efforts to familiarize area agencies and emergency responders with facility operations and potential emergency operations. The following agencies can be contacted and provided with a copy of this PPC Plan, at the discretion of the Newfield Emergency Coordinator.

- Local fire companies;
- Local county emergency response personnel;
- Local ambulance personnel; and
- Local hospital.

Table 3 lists local emergency response agencies to be contacted in the event of an emergency or reportable spill. In the unlikely event that a widespread emergency exists, the Wayne County EMA would be contacted first, and the Coordinator in turn could contact appropriate emergency response agencies through their communications network.

The Wayne County Emergency Management Agency can be contacted at (570) 253-1622. Routing of injured persons will be performed by emergency medical services personnel based on the number and type of injuries requiring treatment. The emergency medical services coordinator may be provided with a copy of this PPC Plan to assist in planning. The nearest hospitals are Catskill Regional Medical Hospital in Callicoon, New York, and Wayne County Memorial Hospital in Honesdale, Pennsylvania. The nearest fire departments are Callicoon Fire District in Callicoon, New York, Protection Engine Co No. 3 in Honesdale, Pennsylvania, and Narrowsburg Fire Department, in Narrowsburg, New York. The nearest police departments are the Honesdale Police Department, located in Honesdale, Pennsylvania, and Waymart Police Department in Honesdale Pennsylvania. All emergency response departments shall be reached through the 911 system.

5.2 NOTIFICATION LISTS

If the Emergency Coordinator determines that the facility has had an emission, discharge, fire, or explosion that could threaten human health or the environment, he will contact and report as necessary his findings to the appropriate agencies listed in Table 3. When calling any of the agencies listed in Table 3, the following information should be available for reporting to the identified agencies:

- Company name and location;
- Name of person reporting the spill, title, and telephone number;
- The type of material released;
- Estimated or exact (if known) quantity of material released (i.e., gallons, pounds, etc.);
- A brief description of the incident, including type of incident, nature of hazardous material involvement, and possible hazards to human health and the environment outside the facility;
- Probable source and location of the spill source;
- Date and time of the spill;
- Location of entry point into surface water and amount reaching the waterway (if applicable);
- The name of the receiving water and the downstream water bodies of which it is a tributary;
- Confirmation that release has been stopped or, if not, when will it be stopped;
- Mitigation/containment actions initiated;
- Direction of material movement;

- Potential population affected by the release;
- Name of person to contact on behalf of the company who will be at the scene and will be directing response measures;
- Telephone number where the on-scene coordinator can be reached; and
- The extent of injuries, if any.

A reporting form is attached in Appendix D for use by the Emergency Coordinator.

A written report including the above listed information, and other information that may be required by the applicable regulations (see 25 PA Code Section 265.56) regarding the spilled material, will need to be transmitted within 15 days to the following agencies:

U.S. Environmental Protection Agency
Region III
Spill Response Section
1650 Arch Street
Philadelphia, PA 19103

Pennsylvania Department of Environmental Protection
Bureau of Water Quality Management
2 Public Square
Wilkes-Barre, Pennsylvania 18711

6.0 WASTE DISPOSAL PRACTICES

Produced water will be removed periodically from the tanks at each well site and transported by a licensed residual waste hauler to a permitted disposal facility. Other wastes generated onsite will include used hydraulic oil that will be reclaimed from operating equipment and transported offsite for recycling. All wastes will be disposed in accordance with applicable local, state, and federal regulations.

7.0 STORMWATER MANAGEMENT PRACTICES

Newfield implements several Best Management Practices (BMPs) at each well site to reduce the potential for stormwater runoff of suspended solids and other contaminants. These BMPs include routine visual inspections, preventive maintenance, good housekeeping, and management of stormwater run-on and runoff. Routine inspection and monitoring, preventive maintenance, and good housekeeping programs are discussed in Sections 3.3, 3.4, and 3.5 of this PPC Plan. These programs prevent accidental releases of contaminants and reduce contaminant migrations via stormwater discharges. Stormwater management activities are discussed in Section 3.1 of this PPC Plan. The certification statement regarding the evaluation of discharges and confirmation that they will be comprised solely of stormwater is presented at the beginning of this Plan. Potential "significant sources of non-stormwater at the site" may include condensate, brine, hydraulic oil drums and tanks, gasoline and diesel fuel. Storage areas for these significant sources will be inspected on a daily basis.

8.0 SEDIMENT AND EROSION PREVENTION

Erosion and sedimentation controls are managed in accordance with PADEP requirements. Copies of the site E&S Plan are available at the Newfield office in Honesdale, PA and at each well site.

APPENDIX A

INSPECTION FORMS

NEWFIELD APPALACHIA PA LLC
Weekly Facility Inspection Form

Facility:	Inspector Name:
Date of Inspection:	

Instructions: Indicate yes or no. If no, record observations describing the specific equipment and discrepancy.

Aboveground Storage Tanks		
• Equipment appears adequately supported	Yes ☐	No ☐
• No evidence of active or past leaks from equipment, piping, connections, vales, vents, etc.	Yes ☐	No ☐
• Coating condition appears satisfactory	Yes ☐	No ☐
• Corrosion appears acceptable	Yes ☐	No ☐
• Level gauages/alarms are operative	Yes ☐	No ☐
• Containers are labeled	Yes ☐	No ☐
Observations:		

Processing Equipment		
• Equipment appears adequately supported	Yes ☐	No ☐
• No evidence of active or past leaks from equipment, piping, connections, vales, vents, etc.	Yes ☐	No ☐
	Yes ☐	No ☐
• Coating condition appears satisfactory	Yes ☐	No ☐
• Corrosion appears acceptable		
Observations:		

Other Facility Equipment is Checked for: ❖ No evidence of active or past leaks ❖ Condition of equipment appears to be satisfactory (i.e., not damaged, deteriorated, or worn), and ❖ Corrosion appears to be acceptable.		
• Wellheads	Yes ☐	No ☐
• Gathering systems	Yes ☐	No ☐
• Well test stations	Yes ☐	No ☐
• Traps/Sumps	Yes ☐	No ☐
• Drainage systems and nearby ditches	Yes ☐	No ☐
• Applicable flowlines including right-of-way areas	Yes ☐	No ☐
• Containment systems	Yes ☐	No ☐
• Facility piping	Yes ☐	No ☐
Observations:		

NEWFIELD APPALACHIA PA LLC
Weekly Facility Inspection Form

Secondary Containment		
• Passive containment (berm) has adequate capacity and integrity as intended	Yes ☐	No ☐
• Active containment measures are adequate	Yes ☐	No ☐
• No evidence of active or past leaks (i.e., staining, sheen)	Yes ☐	No ☐
• Any valves are closed and plugged	Yes ☐	No ☐
• Active containment is free from a significant quantity of rain/snow	Yes ☐	No ☐
Observations:		

Security		
• Lighting is adequate to observe leaks, spills, and vandalism	Yes ☐	No ☐
• Pumps, valves, nozzles are locked	Yes ☐	No ☐
Observations:		

Spill Response		
• Spill response kits are stocked and located in readily accessible areas	Yes ☐	No ☐
Observations:		

Signature:	Date:

E&S INSPECTION FORM

The E&S plan contains a maintenance program which provides for inspection of BMPs (Best Management Practices such as filter sock, vegetation, construction entrances, etc.) on a weekly basis and after each measurable rainfall event, including the repair of BMPs to ensure effective and efficient operation. The maintenance program for both the temporary and permanent erosion and sediment control BMPs, including disposal of materials removed from the BMPs or project area, has been included in the narrative. The type of maintenance, such as cleanout, repair, replacement, regrading, re-stabilizing, etc. for each of the BMPs is included in the plan. **NOTE: This inspection report must be kept up to date and onsite.**

INSPECTION DATE	INITIALS	RAINFALL OR WEEKLY?	LOCATION OF E&S CONTROL(S)	CONDITION NOTED	CORRECTIVE MEASURES TAKEN

Facility: _____ **Inspector:** _____ **Signed:** _____ **Date:** _____

Print *Signature*

Tank Truck Loading and Unloading Checklist

Date: _____ Material being loaded/unloaded: _____

Driver/Loader present during loading or unloading of material _____
(signature)

_____ Current volume in storage tank was checked prior to loading.

_____ Fill hose inspected for condition prior to loading.

_____ Wheel chocks in place prior to loading.

_____ Tanker valve(s) were inspected for leakage prior to filling and departure.

_____ The loading of the tanker was monitored.

_____ Hoses were replaced and capped after loading.

_____ No material was spilled onto the containment pad or ground.

- These forms must be completed for every tank truck shipment and must be filed in the facility PPC Plan.
- All spills should be immediately reported to at least one of the following Newfield personnel:

Don Sleeth
Drilling Manager
Office: 281-674-2501
Cell: 281-974-0051

Jack Cochran
Production Manager
Office: 814-437-2344
Cell: 814-671-1557

Burl Eakle
Cell: 918-448-1296

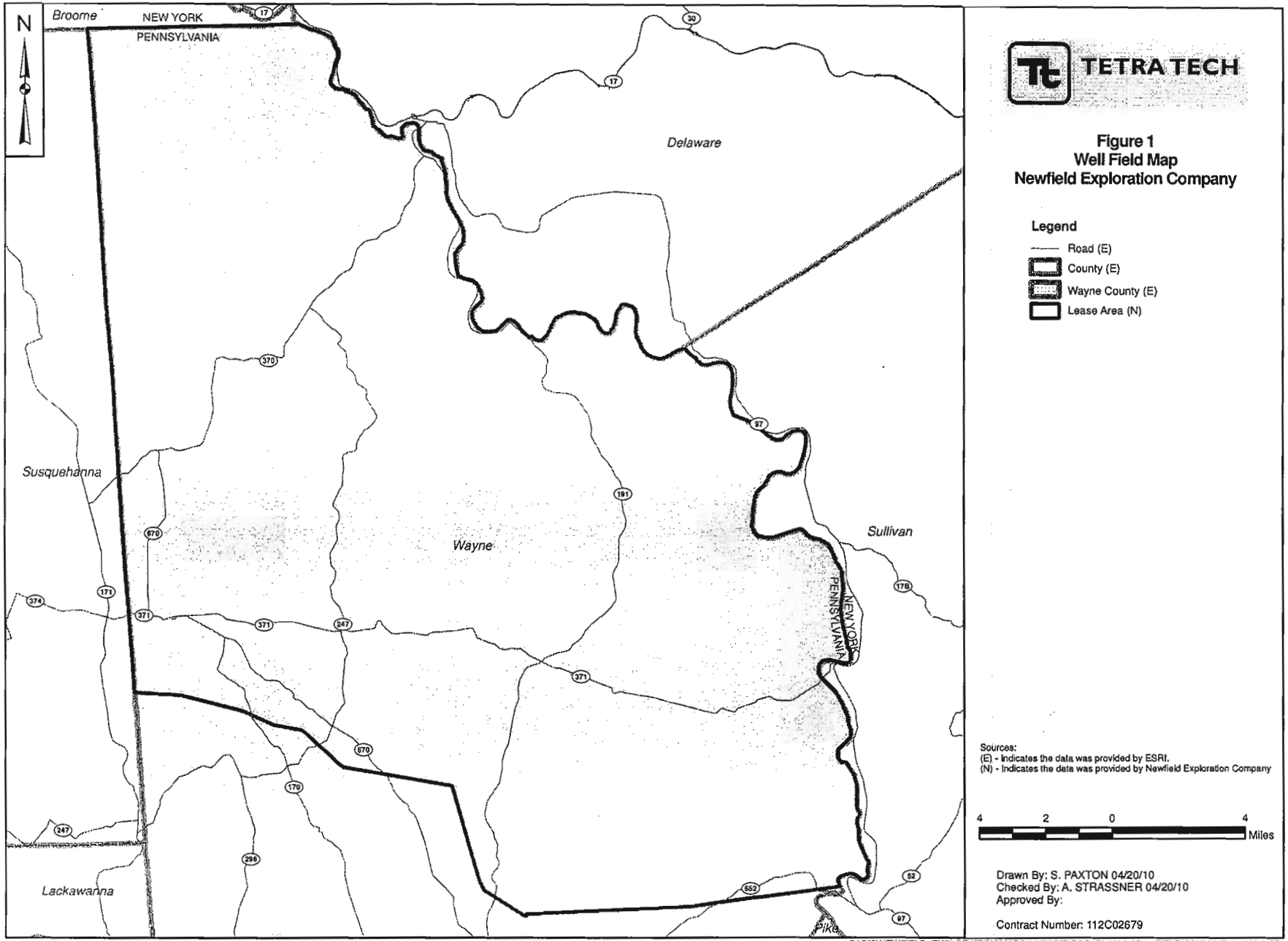
Delivery Information

Invoice No. _____

Load No. _____

Company _____

APPENDIX B
FIGURES



TETRA TECH

Figure 1
Well Field Map
Newfield Exploration Company

Legend

- Road (E)
- County (E)
- Wayne County (E)
- Lease Area (N)

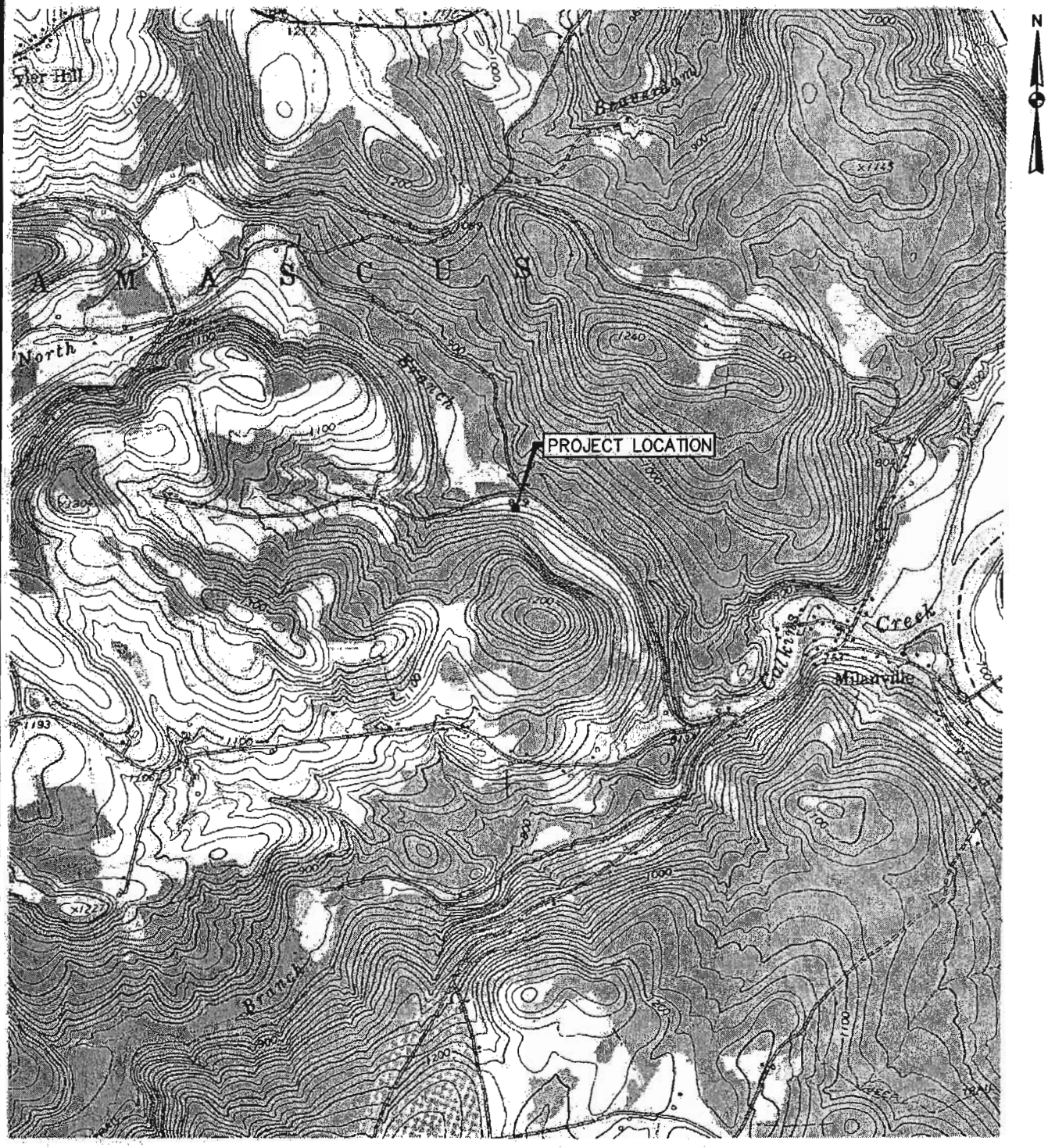
Sources:
(E) - Indicates the data was provided by ESRI.
(N) - Indicates the data was provided by Newfield Exploration Company

4 2 0 4 Miles

Drawn By: S. PAXTON 04/20/10
Checked By: A. STRASSNER 04/20/10
Approved By:

Contract Number: 112C02679

P:\GIS\NEWFIELD_EXPLORATION\MAPDOCS\MXD\PPC_PLAN_WELL_FIELD_MAP.MXD 04/20/10 SP



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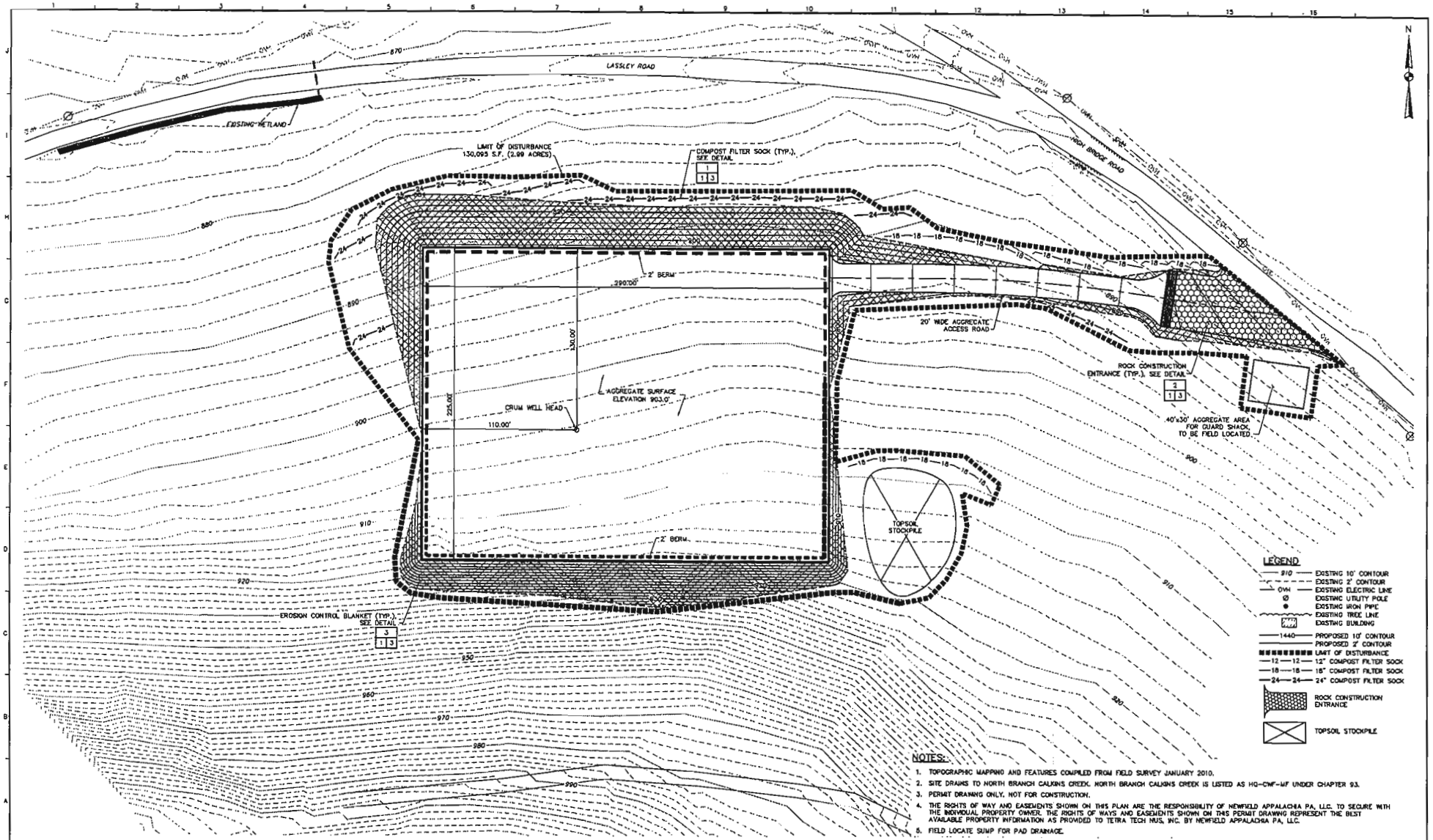
TETRA TECH
WWW.TETRATECH.COM
661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

NEWFIELD EXPLORATION COMPANY
WAYNE COUNTY, PENNSYLVANIA

CRUM WELL PAD
LOCATION MAP
SCALE: 1" = 2000'

DATE:	3/3/10
PROJECT NO.:	112C02568
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	RAL
SHEET: 1 OF 2	

FIGURE 2



NOTES:

1. TOPOGRAPHIC MAPPING AND FEATURES COMPILED FROM FIELD SURVEY JANUARY 2010.
2. SITE DRAINS TO NORTH BRANCH CALKINS CREEK. NORTH BRANCH CALKINS CREEK IS LISTED AS HQ-CWF-MF UNDER CHAPTER 93.
3. PERMIT DRAWING ONLY, NOT FOR CONSTRUCTION.
4. THE RIGHTS OF WAY AND EASEMENTS SHOWN ON THIS PLAN ARE THE RESPONSIBILITY OF NEWFIELD APPALACHIA PA, LLC. TO SECURE WITH THE INDIVIDUAL PROPERTY OWNER. THE RIGHTS OF WAYS AND EASEMENTS SHOWN ON THIS PERMIT DRAWING REPRESENT THE BEST AVAILABLE PROPERTY INFORMATION AS PROVIDED TO TETRA TECH NUS, INC. BY NEWFIELD APPALACHIA PA, LLC.
5. FIELD LOCATE SUMP FOR PAD DRAINAGE.

0 30 60
SCALE: 1" = 30'

TETRA TECH
www.tetratech.com
661 ANDERSON DRIVE - FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

MARK	DATE	DESCRIPTION	BY

NEWFIELD APPALACHIA PA LLC.
WAYNE COUNTY, PENNSYLVANIA

CRUM WELL PAD
EROSION & SEDIMENT CONTROL PLAN

SCALE: 1" = 30'

DATE:	6/15/10
PROJECT NO.:	112C02769
DESIGNED BY:	RAL
DRAWN BY:	BH
CHECKED BY:	ARB
SHEET:	1 OF 7

FIGURE 3

APPENDIX C
TABLES

TABLE 1

LIST OF MATERIALS & WASTES

CONSTUCTION

POLLUTIONAL MATERIAL	VOLUME OR QUANTITY	LOCATION ONSITE	SPILL CONTAINMENT MATERIALS ONSITE/LOCATION
Diesel Fuel	250 gallons	Well Pad	Sorbent pads; shovels/Gang box
Lubricants	180 gallons	Well Pad	Sorbent pads; shovels/Gang box
OIL ABSORBANT	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
Trash & Debris	2,000 lbs	Well Pad	Sorbent pads; shovels/Gang box

DRILLING

POLLUTIONAL MATERIAL	VOLUME OR QUANTITY	LOCATION ONSITE	SPILL CONTAINMENT MATERIALS ONSITE/LOCATION
Diesel Fuel	2000 gallons	Well Pad	Sorbent pads; shovels/Gang box
Lubricants	320 gallons	Well Pad	Sorbent pads; shovels/Gang box
DURATONE HT	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
GELTONE V	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
Lime	7,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
OIL ABSORBANT	2,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
Base Fluid	300 bbl	Well Pad	Sorbent pads; shovels/Gang box
Rig Wash	2,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
Calcium Chloride (CaCl-)	4,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
RHEMOD L	1,770 lbs	Well Pad	Sorbent pads; shovels/Gang box
LE SUPERMUL	8,500 lbs	Well Pad	Sorbent pads; shovels/Gang box
BARACARB 25, 50 (2 pallets each)	12,600 lbs	Well Pad	Sorbent pads; shovels/Gang box
WALNUT	2,400 lbs	Well Pad	Sorbent pads; shovels/Gang box
DRILTREAT	1,900 lbs	Well Pad	Sorbent pads; shovels/Gang box
Liquid Mud	1,500 bbl	Well Pad	Sorbent pads; shovels/Gang box
BAROID REGULAR / **BAROID BULK (barite)	125,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
Trash & Debris	2,000 lbs	Well Pad	Sorbent pads; shovels/Gang box
Drill Cuttings	100,000 lbs	Air Pit	Sorbent pads; shovels/Gang box
Cement	130,000 lbs	Well Pad	Sorbent pads; shovels/Gang box

TABLE 2

INSPECTION AND MONITORING ACTIVITIES

Activity	Frequency
Erosion and Sedimentation Control Measures	Weekly or after a significant rain event
Aboveground Storage Tanks	Daily
Drum Storage Areas	Daily
Best Management Practices (BMPs)	Per BMP requirements
Dust Control Measures	Daily
Preparedness, Prevention, and Contingency (PPC) Plan Compliance Evaluation Inspections and Update of PPC Plan, as Appropriate	Annually

TABLE 3
AGENCY NOTIFICATION LIST

The following agencies are to be contacted, as appropriate, in the event of an emergency, accident, or chemical release.

Agency	Telephone No.
PADEP Northeast Regional Office	570-826-2511
PADEP Southcentral Office (Harrisburg)	877-333-1904
Pennsylvania Emergency Management Agency	717-651-2001
Police Department	9-1-1
Volunteer Fire Department	9-1-1
U.S. Environmental Protection Agency	215-814-5700
U.S. Coast Guard National Response Center	800-424-8802
U.S. Coast Guard (local)	570-421-1191
Pennsylvania Fish and Boat Commission	814-445-8974
Chemical Transportation Emergency Center:	
* Chemical Exposure Information	800-424-9300

LOCAL EMERGENCY RESPONSE:

Fire Department – Callicoon Fire District in Callicoon, New York, Protection Engine Co No. 3 in Honesdale, Pennsylvania Narrowsburg Fire Department, in Narrowsburg, New York.	9-1-1
Police Department – Honesdale Police Department, Honesdale, Pennsylvania Waymart Police Department, Honesdale Pennsylvania	9-1-1
Hospitals-Wayne County Memorial Hospital, Honesdale, Pennsylvania	570-251-6672
Catskill Regional Medical Hospital in Callicoon, New York	845-887-5530
Local Emergency Management Wayne County EMA	570-253-1622

TABLE 4

On-Site Emergency Response Equipment

On-Site Emergency Response Equipment
Fire Extinguishers
Tyvek Suits
Nitrile Gloves
Hearing Protection
Particulate Adsorbent
Absorbent Pads
Shovels
Earth Moving Equipment
Decontamination Equipment

TABLE 5
CHAIN OF COMMAND

Primary Emergency Coordinator

Don Sleeth
Drilling Manager
Office: 281-674-2501
Cell: 281-974-0051

Secondary Emergency Coordinator

Jack Cochran
Production Manager
Office: 814-437-2344
Cell: 814-671-1557

Construction Manager
Burl Eakle
Cell: 918-448-1296

Offsite Emergency Response Contractors

Company: Minuteman Spill Response, Inc.
Telephone Number: 800-905-7788

APPENDIX D
REPORTING FORM

Spill Response Notification Form

GENERAL REPORTING INFORMATION
Prepared _____ (First) (M.I.) (Last) (Position)
Daytime phone: (xxx) xxx-xxxx Evening phone: (xxx) xxx-xxxx
Newfield Appalachia PA LLC _____ (Company) (Address) (City) (State) (Zip)
Calling for responsible party? Yes Were materials discharged? Yes Confidential? No
Meeting Federal obligations to report: Yes
INCIDENT DESCRIPTION
Source and/or cause:
Date of Incident:Time of Incident:
Incident Location/Address
Nearest City: XXXX, PA XXXXX (XXXXXXX County)
Distance from City: In city limits Direction from City: In city limits
Facility Oil Storage Capacity: XXXXXX gallons
Container Type:Container Capacity: (gals)
Facility Latitude: xx° xx' xx" Longitude xx° xx' xx"
MATERIAL
Name (or CHRIS Code):
Discharged Quantity (Units): Discharged to Water (Units):
RESPONSE ACTION
Actions taken to correct, control or mitigate incident:
IMPACT
No. of Injuries: No. of Deaths: Other:
Evacuation (Y/N): Damage (Y/N): Amount ($):
Medium Affected: Description: Additional Information:
AGENCY NOTIFIED
NRC 800-424-8802 Date: Time: Contact:
PADEP (570) 826-2511 Date: Time: Contact:
USCG Date: Time: Contact:
Other Date: Time: Contact:
ADDITIONAL INFORMATION:

APPENDIX E
MSDS SHEETS

MATERIAL SAFETY DATA SHEET

Diesel Fuel (All Types) **MSDS No. 9909**

EMERGENCY OVERVIEW
CAUTION!
OSHA/NFPA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT
EFFECTS CENTRAL NERVOUS SYSTEM
HARMFUL OR FATAL IF SWALLOWED
Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation (rash).
Long-term, repeated exposure may cause skin cancer.
If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).

NFPA 704 (Section 16)

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800) 424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732) 750-6000
MSDS INTERNET WEBSITE: www.hess.com (See Environment, Health, Safety & Social Responsibility)

SYNONYMS: Ultra Low Sulfur Diesel (ULSD); Low Sulfur Diesel; Motor Vehicle Diesel Fuel; Diesel Fuel #2; Dyed Diesel Fuel; Non-Road, Locomotive and Marine Diesel Fuel; Tax-exempt Diesel Fuel

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and CHEMICAL INFORMATION ON INGREDIENTS

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Diesel Fuel (68476-34-6)	100
Naphthalene (91-20-3)	Typically < 0.01

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher. Diesel fuel may be dyed (red) for tax purposes. May contain a multifunctional additive.

3. HAZARDS IDENTIFICATION

EYES
Contact with liquid or vapor may cause mild irritation.

SKIN
May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11 Toxicological Information.

IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A). NIOSH regards whole diesel fuel exhaust particulates as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	> 125 °F (> 52 °C) minimum PMCC
AUTOIGNITION POINT:	494 °F (257 °C)
OSHA/NFPA FLAMMABILITY CLASS:	2 (COMBUSTIBLE)
LOWER EXPLOSIVE LIMIT (%):	0.6
UPPER EXPLOSIVE LIMIT (%):	7.5

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

FIRE FIGHTING INSTRUCTIONS

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Diesel fuel, and in particular low and ultra low sulfur diesel fuel, has the capability of accumulating a static electrical charge of sufficient energy to cause a fire/explosion in the presence of lower flashpoint products such as gasoline. The accumulation of such a static charge occurs as the diesel flows through pipelines, filters, nozzles and various work tasks such as tank/container filling, splash loading, tank cleaning; product sampling; tank gauging; cleaning, mixing, vacuum truck operations, switch loading, and product agitation. There is a greater potential for static charge accumulation in cold temperature, low humidity conditions.

Documents such as 29 CFR OSHA 1910.106 "Flammable and Combustible Liquids, NFPA 77 Recommended Practice on Static Electricity, API 2003 "Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents and ASTM D4865 "Standard Guide for Generation and Dissipation of Static

Electricity in Petroleum Fuel Systems" address special precautions and design requirements involving loading rates, grounding, bonding, filter installation, conductivity additives and especially the hazards associated with "switch loading." ["Switch Loading" is when a higher flash point product (such as diesel) is loaded into tanks previously containing a low flash point product (such as gasoline) and the electrical charge generated during loading of the diesel results in a static ignition of the vapor from the previous cargo (gasoline).]

Note: When conductivity additives are used or are necessary the product should achieve 25 picosiemens/meter or greater at the handling temperature.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Components (CAS No.)	Source	Exposure Limits TWA/STEL	Note
Diesel Fuel: (68476-34-6)	OSHA	5 mg/m, as mineral oil mist	
	ACGIH	100 mg/m^3 (as totally hydrocarbon vapor) TWA	A3, skin
Naphthalene (91-20-3)	OSHA	10 ppm TWA	
	ACGIH	10 ppm TWA / 15 ppm STEL	A4, Skin

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

Clear, straw-yellow liquid. Dyed fuel oil will be red or reddish-colored.

ODOR

Mild, petroleum distillate odor

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	320 to 690 oF (160 to 366 °C)
VAPOR PRESSURE:	0.009 psia @ 70 °F (21 °C)
VAPOR DENSITY (air = 1):	> 1.0
SPECIFIC GRAVITY (H_2O = 1):	0.83 to 0.88 @ 60 °F (16 °C)
PERCENT VOLATILES:	100 %
EVAPORATION RATE:	Slow; varies with conditions
SOLUBILITY (H_2O):	Negligible

10. STABILITY and REACTIVITY

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers; Viton ®; Fluorel ®

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY

Acute dermal LD50 (rabbits): > 5 ml/kg
Acute oral LD50 (rats): 9 ml/kg
Primary dermal irritation: extremely irritating (rabbits)
Draize eye irritation: non-irritating (rabbits)
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY

Carcinogenic: OSHA: NO IARC: NO NTP: NO ACGIH: A3

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

MUTAGENICITY (genetic effects)

This material has been positive in a mutagenicity study.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME:	Diesel Fuel	Placard (International Only):
HAZARD CLASS and PACKING GROUP:	3, PG III	
DOT IDENTIFICATION NUMBER:	NA 1993 (Domestic) UN 1202 (International)	
DOT SHIPPING LABEL:	None	

Use Combustible Placard if shipping in bulk domestically

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the *de minimis* levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

CALIFORNIA PROPOSITON 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Diesel Engine Exhaust (no CAS Number listed)	10/01/1990

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 3 (Combustible Liquid) and Class D, Division 2, Subdivision B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING

HEALTH:	0
FIRE:	2
REACTIVITY:	0

Refer to NFPA 704 "Identification of the Fire Hazards of Materials" for further information

HMIS® HAZARD RATING

HEALTH:	1 *	* Chronic
FIRE:	2	
PHYSICAL:	0	

SUPERSEDES MSDS DATED: 02/28/2001

ABBREVIATIONS:

AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute (212) 642-4900
API	American Petroleum Institute (202) 682-8000
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
DOT	U.S. Department of Transportation [General info: (800) 467-4922]
EPA	U.S. Environmental Protection Agency
HMIS	Hazardous Materials Information System
IARC	International Agency For Research On Cancer
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Canadian Workplace Hazardous Materials Information System

MATERIAL SAFETY DATA SHEET

Review Date: 04/23/2007

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: PENNZOIL™ LONG-LIFE™ Motor Oil (All Grades)

MSDS NUMBER: 614348LU - 1
PRODUCT CODE(S): 5071324, 5071325, 5071326, 5071369, 5071371

MANUFACTURER
SOPUS Products
P.O. Box 4427
Houston, TX. 77210-4427

TELEPHONE NUMBERS
Spill Information: (877) 242-7400
Health Information: (877) 504-9351
MSDS Assistance Number: (877) 276-7285

SECTION 2 PRODUCT/INGREDIENTS

INGREDIENTS	CAS#	CONCENTRATION
Heavy Duty Motor Oil		
Highly refined petroleum oils	Mixture	90 - 99 %volume
Zinc Dialkyldithiophosphate	68649-42-3	1 - 5 %volume
Proprietary additives	Mixture	1 - 5 %volume

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Appearance & Odor: Bright and clear liquid. Mild odor.
Health Hazards: No known immediate health hazards.
Physical Hazards: No known physical hazards.
NFPA Rating (Health, Fire, Reactivity): 0, 1, 0
Hazard Rating: Least - 0 Slight - 1 Moderate - 2 High - 3 Extreme - 4

Inhalation:
Inhalation of vapors (generated at high temperatures only) or oil mist may cause mild irritation of the nose, throat, and respiratory tract.

Eye Irritation:
Lubricating oils are generally considered no more than minimally irritating to the eyes.

Skin Contact:
May cause slight irritation of the skin. If irritation occurs, a temporary burning sensation and minor redness and/or swelling may result.

Ingestion:

Lubricating oils are generally no more than slightly toxic if swallowed.

Other Health Effects:
The International Agency for Research on Cancer (IARC) has determined there is sufficient evidence for the carcinogenicity in experimental animals of used gasoline motor oils. Handling procedures and safety precautions in the MSDS should be followed to minimize exposure to the used product.

Signs and Symptoms:
Irritation as noted above.

Aggravated Medical Conditions:
Pre-existing eye, skin and respiratory disorders may be aggravated by exposure to this product.

For additional health information, refer to section 11.

SECTION 4 FIRST AID MEASURES

Inhalation:
Remove victim to fresh air and provide oxygen if breathing is difficult. Get medical attention. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.

Skin:
Remove contaminated clothing and shoes and wipe excess from skin. Flush skin with water, then wash with soap and water. If irritation occurs, get medical attention. Do not reuse clothing until cleaned. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

Eye:
Flush with water. If irritation occurs, get medical attention.

Ingestion:
Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical attention.

Note to Physician:
In general, emesis induction is unnecessary in high viscosity, low volatility products such as oils and greases.

SECTION 5 FIRE FIGHTING MEASURES

Flash Point [Method]: >400 °F/>204.44 °C [Pensky-Martens Closed Cup]

Extinguishing Media:
Material will float and can be re-ignited on surface of water. Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames. Do not use a direct stream of water.

Fire Fighting Instructions:
Do not enter confined fire space without full bunker gear (helmet with face shield, bunker coats, gloves and rubber boots), including a positive pressure, NIOSH approved, self-contained breathing apparatus. This material is non-flammable.

Unusual Fire Hazards:
Material may ignite when preheated.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures:
May burn although not readily ignitable.

Wear appropriate personal protective equipment when cleaning up spills. Refer to Section 8.

Spill Management:
FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

Place in container for proper disposal. Remove contaminated soil to remove contaminated trace residues. Dispose of in same manner as material.

Reporting:
CERCLA: Product is covered by EPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) petroleum exclusion. Releases to air, land, or water are not reportable under CERCLA (Superfund).

CWA: This product is an oil as defined under Section 311 of EPA's Clean Water Act (CWA). Spills into or leading to surface waters that cause a sheen must be reported to the National Response Center, 1-800-424-8802.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures:
Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet. Launder contaminated clothing before reuse. Properly dispose of contaminated leather articles such as shoes or belts that cannot be decontaminated. Avoid heat, open flames, including pilot lights, and strong oxidizing agents. Use explosion-proof ventilation to prevent vapor accumulation. Ground all handling equipment to prevent sparking.

Storage:
Do not store in open or unlabeled containers. Store in a cool, dry place with adequate ventilation. Keep away from open flames and high temperatures.

Container Warnings:
Keep containers closed when not in use. Containers, even those that have been emptied, can contain explosive vapors. Do not cut, drill, grind, weld or perform similar operations on or near containers.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical	Limit	TWA	STEL	Ceiling	Notation
Oil mist, mineral	ACGIH TLV	5 mg/m3	10 mg/m3		
Oil mist, mineral	OSHA PEL	5 mg/m3			

Exposure Controls

Provide adequate ventilation to control airborne concentrations below the exposure guidelines/limits.

Personal Protection

Personal protective equipment (PPE) selections vary based on potential exposure conditions such as handling practices, concentration and ventilation. Information on the selection of eye, skin and respiratory protection for use with this material is provided below.

Eye Protection:
Chemical Goggles, or Safety glasses with side shields

Skin Protection:
Use protective clothing which is chemically resistant to this material. Selection of protective clothing depends on potential exposure conditions and may include gloves, boots, suits and other items. The selection(s) should take into account such factors as job task, type of exposure and durability requirements.

Published literature, test data and/or glove and clothing manufacturers indicate the best protection is provided by:
Neoprene, or Nitrile Rubber

Respiratory Protection:
If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Types of respirator(s) to be considered in the selection process include:
For Mist: Air Purifying, R or P style NIOSH approved respirator.
For Vapors: Air Purifying, R or P style prefilter & organic cartridge, NIOSH approved respirator. Self-contained breathing apparatus for use in environments with unknown concentrations or emergency situations.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Bright and clear liquid. Mild odor.
Substance Chemical Family: Petroleum Hydrocarbon

Flash Point	> 400 °F [Pensky-Martens Closed Cup]	**Pour Point**	-20 °F
Solubility (in Water)	Insoluble	**Specific Gravity**	0.88 - 0.89
Stability	Stable	**Viscosity**	103 cSt @ 40 °C

SECTION 10 REACTIVITY AND STABILITY

Stability:
Material is stable under normal conditions.

Conditions to Avoid:
Avoid heat and open flames.

Materials to Avoid:
Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products:

Thermal decomposition products are highly dependent on combustion conditions. A complex mixture of airborne solids, liquids and gases will evolve when this material undergoes pyrolysis or combustion. Aldehydes, Carbon Monoxide, Carbon Dioxide, Hydrogen Sulfide, Ketones, Nitrogen Oxidesand other unidentified organic compounds may be formed upon combustion.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute Toxicity

TEST	Result	OSHA Classification	Material Tested
Dermal LD50	>5.0 g/kg(Rabbit)	Non-Toxic	Based on components(s)
Oral LD50	>5.0 g/kg(Rat)	Non-Toxic	Based on components(s)

Carcinogenicity Classification

Chemical Name	NTP	IARC	ACGIH	OSHA
Heavy Duty Motor Oil	No	Not Reviewed by IARC	Not Reviewed	No

SECTION 12 ECOLOGICAL INFORMATION

Environmental Impact Summary:
There is no ecological data available for this product. However, this product is an oil. It is persistent and does not readily biodegrade. However, it does not bioaccumulate.

SECTION 13 DISPOSAL CONSIDERATIONS

RCRA Information:

Under RCRA, it is the responsibility of the user of the material to determine, at the time of the disposal, whether the material meets RCRA criteria for hazardous waste. This is because material uses, transformations, mixtures, processes, etc. may affect the classification. Refer to the latest EPA, state and local regulations regarding proper disposal.

SECTION 14 TRANSPORT INFORMATION

US Department of Transportation Classification
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.

International Air Transport Association
Not regulated under IATA rules.

International Maritime Organization Classification
Not regulated under International Maritime Organization rules.

SECTION 15 REGULATORY INFORMATION

Federal Regulatory Status

OSHA Classification:
Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Ozone Depleting Substances (40 CFR 82 Clean Air Act):
This material does not contain nor was it directly manufactured with any Class I or Class II ozone depleting substances.

Superfund Amendment & Reauthorization Act (SARA) Title III:
There are no components in this product on the SARA 302 list.

SARA Hazard Categories (311/312):

Immediate Health	Delayed Health	Fire	Pressure	Reactivity
NO	NO	NO	NO	NO

SARA Toxic Release Inventory (TRI) (313):
Zinc compounds

Toxic Substances Control Act (TSCA) Status:
All component(s) of this material is(are) listed on the EPA/TSCA Inventory of Chemical Substances.

Other Chemical Inventories:
Component(s) of this material is (are) listed on the Australian AICS, Canadian DSL, Chinese Inventory, European EINECS, Korean Inventory, Philippines PICCS,

State Regulation

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

SECTION 16 OTHER INFORMATION

Revision#: 1
Review Date: 04/23/2007
Revision Date: 12/19/2006
Revisions since last change (discussion): This Material Safety Data Sheet (MSDS) has been reviewed to fully comply with the guidance contained in the ANSI MSDS standard (ANSI Z400.1-2003). We encourage you to take the opportunity to read the MSDS and review the information contained therein.

SECTION 17 LABEL INFORMATION

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT. THIS LABEL COMPLIES WITH THE REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) FOR USE IN THE WORKPLACE. THIS LABEL IS NOT INTENDED TO BE USED WITH PACKAGING INTENDED FOR SALE TO CONSUMERS AND MAY NOT CONFORM WITH THE REQUIREMENTS OF THE CONSUMER PRODUCT SAFETY ACT OR OTHER RELATED REGULATORY REQUIREMENTS.

PRODUCT CODE(S): 5071324, 5071325, 5071326, 5071369, 5071371

PENNZOIL™ LONG-LIFE™ Motor Oil (All Grades)

ATTENTION!

PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE OIL ACNE OR DERMATITIS. USED GASOLINE ENGINE OIL HAS BEEN SHOWN TO CAUSE CANCER IN LABORATORY ANIMALS.

Precautionary Measures:
Avoid prolonged or repeated contact with eyes, skin and clothing. Avoid breathing of vapors, fumes, or mist. Use only with adequate ventilation. Wash thoroughly after handling.

FIRST AID

Inhalation: If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.
Skin Contact: Remove contaminated clothing and shoes and wipe excess from skin. Flush skin with water, then wash with soap and water. If irritation occurs, get medical attention. Do not reuse clothing until cleaned. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.
Eye Contact: Flush with water. If irritation occurs, get medical attention.
Ingestion: Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical attention.

FIRE

In case of fire, Use water fog, 'alcohol foam', dry chemical or carbon dioxide (CO_2) to extinguish flames. Do not use a direct stream of water. Material will float and can be re-ignited on surface of water.

SPILL OR LEAK

Dike and contain spill.
FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

CONTAINS: Highly refined petroleum oils, Mixture; Zinc Dialkyldithiophosphate, 68649-42-3; Proprietary additives, Mixture

NFPA Rating (Health, Fire, Reactivity): 0, 1, 0

TRANSPORTATION

US Department of Transportation Classification
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.

CAUTION: Misuse of empty containers can be hazardous. Empty containers can be hazardous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers might cause fire, explosion or toxic fumes from residues. Do not pressurize or expose to open flames or heat. Keep container closed and drum bungs in place.

Name and Address

SOPUS Products
P.O. Box 4427
Houston, TX 77210-4427

ADMINISTRATIVE INFORMATION	
MANUFACTURER ADDRESS:	SOPUS Products, P.O. Box 4427, Houston, TX. 77210-4427.

THE INFORMATION CONTAINED IN THIS DATA SHEET IS BASED ON THE DATA AVAILABLE TO US AT THIS TIME, AND IS BELIEVED TO BE ACCURATE BASED UPON THAT : IT IS PROVIDED INDEPENDENTLY OF ANY SALE OF THE PRODUCT, FOR PURPOSE OF HAZARD COMMUNICATION. IT IS NOT INTENDED TO CONSTITUTE PRODUCT PERFORMANCE INFORMATION, AND NO EXPRESS OR IMPLIED WARRANTY OF ANY KIND IS MADE WITH RESPECT TO THE PRODUCT, UNDERLYING DATA OR THE INFORMATION CONTAINED HEREIN. YOU ARE URGED TO OBTAIN DATA SHEETS FOR ALL PRODUCTS YOU BUY, PROCESS, USE OR DISTRIBUTE, AND ARE ENCOURAGED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED HEREIN.

TO DETERMINE THE APPLICABILITY OR EFFECT OF ANY LAW OR REGULATION WITH RESPECT TO THE PRODUCT, YOU SHOULD CONSULT WITH YOUR LEGAL ADVISOR OR THE APPROPRIATE GOVERNMENT AGENCY. WE WILL NOT PROVIDE ADVICE ON SUCH MATTERS, OR BE RESPONSIBLE FOR ANY INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN. THE UNDERLYING DATA, AND THE INFORMATION PROVIDED HEREIN AS A RESULT OF THAT DATA, IS THE PROPERTY OF SOPUS PRODUCTS AND IS NOT TO BE THE SUBJECT OF SALE OR EXCHANGE WITHOUT THE EXPRESS WRITTEN CONSENT OF SOPUS PRODUCTS.

44815-10737-100R-04/16/2007

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **CALCIUM CHLORIDE - POWDER**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: CALCIUM CHLORIDE - POWDER
Synonyms: None
Chemical Family: Inorganic Salt
Application: Accelerator

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Calcium chloride		60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.
Storage Information	Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Dust/mist respirator. (95%)
Hand Protection	Normal work gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Dust proof goggles.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White
Odor:	Odorless
pH:	10
Specific Gravity @ 20 C (Water=1):	0.83
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	51
Boiling Point/Range (F):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	42
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	147.02

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	May cause skin irritation. May cause skin burns on prolonged contact.
Eye Contact	May cause severe eye irritation. May cause corneal injury.
Ingestion	Causes burns of the mouth, throat and stomach.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 1000 mg/kg (Rat)
Dermal Toxicity:	LD50: > 5000 mg/kg (Rabbit)
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not applicable

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **DRILTREAT®**

Revision Date: 09-Mar-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: DRILTREAT®
Synonyms: None
Chemical Family: Lipid
Application: Oil-wetting Agent

Manufacturer/Supplier

Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Contains no hazardous substances	Mixture	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye irritation.

4. FIRST AID MEASURES

Inhalation Under normal conditions, first aid procedures are not required.

Skin Wash with soap and water.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	400
Flash Point/Range (C):	204
Flash Point Method:	PMCC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire-fighting personnel.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing.

Storage Information Store away from oxidizers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally necessary.

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Amber
Odor:	Bean
pH:	6.4-7
Specific Gravity @ 20 C (Water=1):	1.03
Density @ 20 C (lbs./gallon):	8.58
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	32
Freezing Point/Range (C):	0
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Disperses
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	None known.
Skin Contact	None known.
Eye Contact	May cause mild eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Biodegradable

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: TLM96: 497,500 ppm (Mysidopsis bahia) SPP @ 12 ppb
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **DURATONE® HT**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: DURATONE® HT
Synonyms: None
Chemical Family: Blend
Application: Fluid Loss Additive

Manufacturer/Supplier

Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Kaolin	1332-58-7	10 - 30%	2 mg/m^3	Not applicable
Nonylphenol	25154-52-3	5 - 10%	Not applicable	Not applicable
Sodium hydroxide	1310-73-2	1 - 5%	2 mg/m^3	2 mg/m^3
Quaternary ammonium compounds		10 - 30%	Not applicable	Not applicable
Crystalline silica, quartz	14808-60-7	1 - 5%	0.025 mg/m^3	10 mg/m^3 %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation — If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin — Wash with soap and water. Get medical attention if irritation persists.

Eyes — In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion — Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician — Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	608
Autoignition Temperature (C):	320
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media — Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards — Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters — Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 2, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 2*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures — Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures — Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 12 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Gray to black
Odor:	Odorless
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.8
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	31 uncompacted; 44 compacted
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	< -1 (OECD117)

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight (g/mole): Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong alkalis. Strong acids. Aldehydes. Ketones. Acrylates.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A). Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).
Skin Contact	May cause moderate skin irritation. May cause an allergic skin reaction.
Eye Contact	May cause severe eye irritation.
Ingestion	Irritation of the mouth, throat, and stomach.
Aggravated Medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity:	LD50: > 5000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Ames Test: Negative

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability BOD(28 Day): 9% of COD

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: TLM96: 30 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity: EC50: 370 mg/l (Daphnia magna)

Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product contains toxic chemical(s) listed below which is(are) subject to the reporting requirements of Section 313 of Title III of SARA and 40 CFR Part 372: Aluminum Oxide//1344-28-1
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.

EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **GELTONE® V**

Revision Date: 02-Jun-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: GELTONE® V
Synonyms: None
Chemical Family: Blend
Application: Viscosifier

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Crystalline silica, cristobalite	14464-46-1	0 - 1%	0.025 mg/m^3	1/2 x $\frac{10 \text{ mg/m}^3}{\%SiO2 + 2}$
Crystalline silica, tridymite	15468-32-3	0 - 1%	0.05 mg/m^3	1/2 x $\frac{10 \text{ mg/m}^3}{\%SiO2 + 2}$
Crystalline silica, quartz	14808-60-7	2-6	0.025 mg/m^3	$\frac{10 \text{ mg/m}^3}{\%SiO2 + 2}$
Isopropanol	67-63-0	1 - 5%	200 ppm	400 ppm
Modified bentonite		60 - 100%	Not applicable	Not applicable

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation — If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin — Wash with soap and water. Get medical attention if irritation persists.

Eyes — In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion — Under normal conditions, first aid procedures are not required.

Notes to Physician — Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media — All standard firefighting media.

Special Exposure Hazards — Not applicable.

Special Protective Equipment for Fire-Fighters — Not applicable.

NFPA Ratings: Health 1, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures — Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures — None known.

Procedure for Cleaning / Absorption — Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

Storage Information

Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.

Respiratory Protection

Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.

Hand Protection

Normal work gloves.

Skin Protection

Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

Eye Protection

Wear safety glasses or goggles to protect against exposure.

Other Precautions

None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Powder
Color:	Tan
Odor:	Mild
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.6
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	35- 57
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Miscible in hydrocarbons
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A). Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	Irritation of the mouth, throat, and stomach.
Aggravated Medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity:	LD50: > 5000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.

MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **LE SUPERMUL**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: LE SUPERMUL
Synonyms: None
Chemical Family: Blend
Application: Emulsifier

Manufacturer/Supplier

Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Diethylene glycol monobutyl ether	112-34-5	1 - 5%	Not applicable	Not applicable
Ethylene glycol monobutyl ether	111-76-2	1 - 5%	20 ppm	50 ppm

3. HAZARDS IDENTIFICATION

Hazard Overview

May cause eye and skin irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation

If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes

In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion

Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

Notes to Physician

Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	> 200**Min:** > 200
Flash Point/Range (C):	> 100**Min:** > 93
Flash Point Method:	PMCC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Use water spray to cool fire exposed surfaces. Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 2, Flammability 1, Reactivity 0
HMIS Ratings:	Flammability 1, Reactivity 0, Health 2

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.
Storage Information	Store away from oxidizers. Keep container closed when not in use. Product has a shelf life of 36 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	Organic vapor respirator. In high concentrations, supplied air respirator or a self-contained breathing apparatus.
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	Amber
Odor:	Mild
pH:	2.6
Specific Gravity @ 20 C (Water=1):	0.924
Density @ 20 C (lbs./gallon):	7.7
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	20
Freezing Point/Range (C):	-6.6
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	280-300
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	May cause abdominal pain, vomiting, nausea, and diarrhea. May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression.
Aggravated Medical Conditions	Lung disorders. Skin disorders.
Chronic Effects/Carcinogenicity	Prolonged or repeated exposure may cause reproductive system damage. Repeated overexposure may cause liver and kidney effects.

Other Information None known.

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect: Not determined

Carcinogenicity Not determined

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BAROID® OIL ABSORBENT**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BAROID® OIL ABSORBENT
Synonyms: None
Chemical Family: Mineral
Application: Suspending Agent

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Magnesium silicate	1343-90-4	60 - 100%	Not applicable	Not applicable
Crystalline silica, quartz	14808-60-7	2-6	0.025 mg/m^3	10 mg/m^3 %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Granules
Color:	Gray to tan
Odor:	Odorless
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	2.6
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	32-38
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact None known.

Eye Contact May cause eye irritation.

Ingestion May be harmful if swallowed.

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not applicable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	Product contains one or more components not listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **RHEMOD L**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: RHEMOD L
Synonyms: None
Chemical Family: Tall oil fatty acid
Application: Viscosifier

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Fatty acids, C18-unsatd., trimers	68937-90-6	10 - 30%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and skin irritation. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	518
Flash Point/Range (C):	270
Flash Point Method:	COC
Autoignition Temperature (F):	> 425
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 1, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Wash hands after use.
Storage Information	Store in a cool, dry location. Product has a shelf life of 36 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Not normally needed. But if significant exposures are possible then the following respirator is recommended: Organic vapor respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Dark
Odor:	Fatty acid
pH:	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity @ 20 C (Water=1):	0.96
Density @ 20 C (lbs./gallon):	8
Bulk Density @ 20 C (lbs/ft3):	57.30
Boiling Point/Range (F):	> 572
Boiling Point/Range (C):	> 300
Freezing Point/Range (F):	< -4
Freezing Point/Range (C):	< 25
Vapor Pressure @ 20 C (mmHg):	< 0.001
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate=1):	0
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	1849 @ 25C
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye and skin contact.
Inhalation	May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause skin irritation.
Eye Contact	May cause mild eye irritation.
Ingestion	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	Not determined

Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BAROID® RIG WASH**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BAROID® RIG WASH
Synonyms: None
Chemical Family: Blend
Application: Surfactant

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Isopropanol	67-63-0	1 - 5%	200 ppm	400 ppm

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin Wash with soap and water. Get medical attention if irritation persists. Remove contaminated clothing and launder before reuse.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion If swallowed dilute with 1-2 glasses of milk or water and then induce vomiting.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined**Min:** > 220
Flash Point/Range (C):	Not Determined**Min:** > 104
Flash Point Method:	COC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.
Storage Information	Store away from oxidizers. Keep container closed when not in use. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	Organic vapor respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Clear blue
Odor:	Slight Alcohol
pH:	9.5

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity @ 20 C (Water=1):	1.025
Density @ 20 C (lbs./gallon):	8.5
Bulk Density @ 20 C (lbs/ft3):	63.6
Boiling Point/Range (F):	> 212
Boiling Point/Range (C):	> 100
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid None known.

Incompatibility (Materials to Avoid) Strong oxidizers.

Hazardous Decomposition Products Oxides of sulfur. Carbon monoxide and carbon dioxide.

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

Skin Contact May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression.

Aggravated Medical Conditions Skin disorders.

Chronic Effects/Carcinogenicity No data available to indicate product or components present at greater than 1% are chronic health hazards.

Other Information None known.

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product contains toxic chemical(s) listed below which is(are) subject to the reporting requirements of Section 313 of Title III of SARA and 40 CFR Part 372: Glycol Ethers//34398-01-1 Isopropanol//67-63-0
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **FWCA CEMENT ADDITIVE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: FWCA CEMENT ADDITIVE
Synonyms: None
Chemical Family: Polysaccharide
Application: Free Water Control Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Cellulose derivative		60 - 100%	10 mg/m^3	15 mg/m^3

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation. Airborne dust may be explosive.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	770
Autoignition Temperature (C):	410
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Health 0, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust.

Storage Information Store away from oxidizers. Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White
Odor:	Characteristic

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	6.5
Specific Gravity @ 20 C (Water=1):	1.39
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	32
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	<5
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Forms gel
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	>600

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Aldehydes. Carboxylic acids. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mild eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined

Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HALAD® 322 CEMENT ADDITIVE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HALAD® 322 CEMENT ADDITIVE
Synonyms: None
Chemical Family: Blend
Application: Cement Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Sodium formate	141-53-7	1 - 5%	Not applicable	Not applicable
Cellulose derivative		10 - 30%	10 mg/m^3	15 mg/m^3

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation. Airborne dust may be explosive.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Health 0, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust.

Storage Information Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Red
Odor:	Odorless

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.28
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	35.2
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Partially soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	>600

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of sulfur. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined

Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HALAD® 344 CEMENT ADDITIVE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HALAD® 344 CEMENT ADDITIVE
Synonyms: None
Chemical Family: Polymer
Application: Fluid Loss Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Modified acrylamide copolymer		60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water spray, dry chemical, or foam.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 1, Reactivity 0
HMIS Ratings: Health 1, Flammability 1, Physical Hazard 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust. Do not swallow. Avoid contact with eyes, skin, or clothing.

Storage Information Store in a cool, dry location. Store away from oxidizers. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Dust/mist respirator. (95%)

Hand Protection Nitrile gloves. Polyvinylchloride gloves. Neoprene gloves. Rubber gloves. Butyl rubber gloves. Cloth gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Powder

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	White to off white
Odor:	Odorless
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.37
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	25-35
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	18
Freezing Point/Range (C):	-8
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	<5
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	>600

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide. Oxides of sulfur.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	Prolonged or repeated contact may cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	No adverse health effects are expected from swallowing.
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined

Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	BOD(28 Day): 3% of COD
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM48: 2000 mg/l (Arcatia tonsa)
Acute Crustaceans Toxicity:	TLM48: > 1000 mg/l (Daphnia magna)
Acute Algae Toxicity:	EC50: 3300 mg/l (Skeletonema costatum)
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HR-5**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HR-5
Synonyms: None
Chemical Family: Lignosulfonate
Application: Cement Retarder

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Modifed lignosulfonate		60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Health 1, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.
Storage Information	Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Not normally needed. But if significant exposures are possible then the following respirator is recommended: Dust/mist respirator. (95%)
Hand Protection	Normal work gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Black
Odor:	Molasses
pH:	9.5-10.3
Specific Gravity @ 20 C (Water=1):	1.32

9. PHYSICAL AND CHEMICAL PROPERTIES

Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	29.8
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	25
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of sulfur.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mechanical irritation to eye.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM96: > 1000 ppm (Crangon crangon)
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HR-601**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HR-601
Synonyms: None
Chemical Family: Lignosulfonate
Application: Cement Retarder

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Modifed lignosulfonate		60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Lower (oz./ft3):	0.2
Flammability Limits in Air - Upper (%):	Not Determined
Flammability Limits in Air - Upper (oz./ft3):	3.5

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 1, Reactivity 0
HMIS Ratings: Health 1, Flammability 1, Physical Hazard 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.

Storage Information Store away from oxidizers. Store in a cool, dry location. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Brown
Odor:	Woody
pH:	7.8
Specific Gravity @ 20 C (Water=1):	1.08
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	30.5
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of sulfur. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mechanical irritation to eye.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: > 5000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM48: > 1000 mg/l (Daphnia magna)
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **KCL POTASSIUM CHLORIDE**

Revision Date: 04-Jan-2010

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: KCL POTASSIUM CHLORIDE
Synonyms: None
Chemical Family: Inorganic Salt
Application: Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Potassium chloride	7447-40-7	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Health 1, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Avoid breathing vapors.
Storage Information	Store in a cool, dry location. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Dust/mist respirator. (95%)
Hand Protection	Normal work gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Dust proof goggles.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White to gray
Odor:	Odorless
pH:	9.2
Specific Gravity @ 20 C (Water=1):	1.99
Density @ 20 C (lbs./gallon):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Bulk Density @ 20 C (lbs/ft3):	72.8
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	25.5
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	74.55

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	May cause moderate skin irritation.
Eye Contact	May cause severe eye irritation.
Ingestion	Irritation of the mouth, throat, and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: > 5000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM96: 100-330 ppm (Crangon crangon)
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **POZ STANDARD CEMENT 50/50**

Revision Date: 05-Jan-2009

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: POZ STANDARD CEMENT 50/50
Synonyms: None
Chemical Family: Cement
Application: Cement

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Fly ash	68131-74-8	30 - 60%	Not applicable	Not applicable
Bentonite	1302-78-9	1 - 5%	Not applicable	Not applicable
Portland cement	65997-15-1	30 - 60%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	1 - 5%	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	None - does not burn.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Health 1*, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Gray
Odor:	Odorless
pH:	12.4
Specific Gravity @ 20 C (Water=1):	Not Determined
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Not Determined
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure

Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact

Can dry skin. May cause an allergic skin reaction. May cause alkali burns with confined contact.

Eye Contact

May cause severe eye irritation.

Ingestion

None known

Aggravated Medical Conditions

Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not applicable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	E Corrosive Material D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **CEMENT - CLASS H - PREMIUM**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: CEMENT - CLASS H - PREMIUM
Synonyms: None
Chemical Family: Cement
Application: Cement

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Portland cement	65997-15-1	60 - 100%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	<3	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	None - does not burn.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Gray
Odor:	Odorless
pH:	12.4
Specific Gravity @ 20 C (Water=1):	3.15
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	94
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	0.5
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Keep away from any contact with water.
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure

Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact

Can dry skin. May cause an allergic skin reaction. May cause alkali burns with confined contact.

Eye Contact

May cause severe eye irritation.

Ingestion

None known

Aggravated Medical Conditions

Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not applicable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	E Corrosive Material D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BARACARB® 25**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BARACARB® 25
Synonyms: None
Chemical Family: Mineral
Application: Bridging Agent

Manufacturer/Supplier

Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Crystalline silica, quartz	14808-60-7	0 - 1%	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2
Limestone	1317-65-3	60 - 100%	10 mg/m^3	15 mg/m^3

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 0, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store away from acids. Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid Powder
Color:	White
Odor:	Odorless
pH:	8-9
Specific Gravity @ 20 C (Water=1):	2.7
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	168
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong acids.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion None known

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: LD50: > 5000 mg/kg (Rat)

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM96: >1,000,000 ppm (Mysidopsis bahia) SPP @ 178.5 ppb
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BARACARB® 50**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BARACARB® 50
Synonyms: None
Chemical Family: Mineral
Application: Bridging Agent

Manufacturer/Supplier

Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Limestone	1317-65-3	60 - 100%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	0 - 1%	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 0, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store away from acids. Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid Powder
Color:	White
Odor:	Odorless
pH:	8-9
Specific Gravity @ 20 C (Water=1):	2.7
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	72-112
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong acids.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion None known

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: LD50: > 5000 mg/kg (Rat)

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM96: >1,000,000 ppm (Mysidopsis bahia) SPP @ 178.5 ppb
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BAROID®**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BAROID®
Synonyms: None
Chemical Family: Mineral
Application: Weight Additive

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Barium sulfate	7727-43-7	60 - 100%	10 mg/m^3	15 mg/m^3
Crystalline silica, quartz	14808-60-7	1 - 5%	0.025 mg/m^3	10 mg/m^3 / %SiO2 + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation. May be harmful if swallowed.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Pink to tan to gray
Odor:	Odorless
pH:	8-9-
Specific Gravity @ 20 C (Water=1):	4.2
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	100- 155
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	233.4

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure

Eye or skin contact, inhalation.

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact

None known.

Eye Contact

May cause mild eye irritation.

Ingestion

May produce nervous system effects such as feeling of weakness, unsteady walk, and dilation of blood vessels. May affect the heart and cardiovascular system.

Aggravated Medical Conditions

Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not applicable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM96: 7500 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity:	TLM96: > 1,000,000 ppm (Mysidopsis bahia) SPP @ 132.6 ppb
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **LIME**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: LIME
Synonyms: None
Chemical Family: Inorganic
Application: pH Control

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Calcium hydroxide	1305-62-0	60 - 100%	5 mg/m^3	15 mg/m^3

3. HAZARDS IDENTIFICATION

Hazard Overview
May cause eye and skin burns. May cause respiratory irritation. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation
If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin
Wash with soap and water. Get medical attention if irritation persists. Remove contaminated clothing and launder before reuse.

Eyes
In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion
Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician
Not Applicable

5. FIRE FIGHTING MEASURES

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media All standard firefighting media.

Special Exposure Hazards Not applicable.

Special Protective Equipment for Fire-Fighters Not Determined

NFPA Ratings: Health 1, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.

Storage Information Store away from acids. Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Dust/mist respirator. (95%)

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White
Odor:	Odorless
pH:	12.2
Specific Gravity @ 20 C (Water=1):	2.24
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	75
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	0.2
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	74.1

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong acids.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	Causes severe skin irritation. May cause skin burns on prolonged contact.
Eye Contact	Causes severe eye irritation May cause eye burns.
Ingestion	Irritation of the mouth, throat, and stomach.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 7340 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: TLM96: 100-500 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity: TLM96: 478,520 ppm (Mysidopsis bahia) SPP @ 8 ppb
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Empty container completely. Transport with all closures in place. Return for reuse or dispose in a sanitary landfill according to national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **WALNUT HULLS**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: WALNUT HULLS
Synonyms: None
Chemical Family: Nut Hulls
Application: Loss Circulation Material

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Walnut hulls	Mixture	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye irritation.

4. FIRST AID MEASURES

Inhalation Under normal conditions, first aid procedures are not required.

Skin Under normal conditions, first aid procedures are not required.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Lower (oz./ft3):	0.07
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid creating or inhaling dust.

Storage Information Store away from oxidizers. Store in a dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Safety glasses.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Brown
Odor:	Characteristic

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.1
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	None known.
Eye Contact	May cause mild eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined

Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	TLM96: > 1,000,000 ppm (Mysidopsis bahia) SPP @ 10 ppb
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

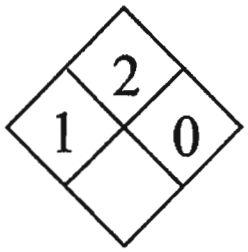
16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

INTEGRITY INDUSTRIES INC.



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MATERIAL SAFETY DATA SHEET

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SECTION I - MANUFACTURER

Integrity Industries, Inc.
2710 E. Corral St.
Kingsville, Texas 78363
Emergency Phone: (361) 595-5561

Revised Date: 06/05/2008
Supercedes: new

THIS DOCUMENT IS PREPARED PURSUANT TO THE OSHA HAZARDOUS COMMUNICATION STANDARD (29 CFR 1910.1200). ALSO, OTHER SUBSTANCE NOT DEEMED "HAZARDOUS" PER THIS MSDS MAY BE LISTED.

SECTION II - MATERIAL IDENTIFICATION

Trade Name: **SYNVERT Base Oil**
Synonyms/Other Designations: Synthetic Drilling Fluid / Polymer Suspension Base
Placard: Not Applicable
Hazard(s): non-hazardous

Component	CAS Number	Weight
Paraffin/Olefin blend	Mixture	100%

SECTION III - PHYSICAL & CHEMICAL DATA

Boiling Point: IBP > 300 °F
Specific Gravity (H2O=1): 0.766
Vapor Density (Air=1): n/a
Appearance: Clear, oily liquid

Pour Point: ND
Vapor Pressure (mm Hg @ 68 °F): 0.135
Solubility in H2O: Insoluble
Viscosity (cSt @104 °F): 1.4

SECTION IV - REACTIVITY

Stability: Stable
Incompatibility: Heat, sparks, open flame. May react with strong acids/strong oxidizing agents, chlorates, nitrates, peroxides.
Hazardous Decomposition Products: Oxides of carbon. Hazardous Polymerizations: will not occur

SECTION V - FIRE & EXPLOSION DATA

Flash Point (ASTM D-93): > 200 °F
Autoignition: n/a
Extinguishing Media: Water spray, Dry Chemical, Foam, CO2
Special Fire Fighting Procedures: Respirators/eye protection and full firefighting protective gear.
Unusual Fire Hazards: Remove containers from source of heat.

SECTION VI - EMERGENCY & FIRST AID DATA

Inhalation: Move to well ventilated area; if breathing difficulties persist after 15 minutes seek medical assistance.
Eye Contact: Wash eye thoroughly for 15 minutes; if irritation persists seek medical assistance.
Skin Contact: Wash affected area with soap & water for 15 minutes; if irritation persists seek medical assistance.
Ingestion: Do not induce vomiting and seek medical advice.

SECTION VII - HEALTH HAZARDS DATA

Acute: May irritate eyes, skin, respiratory, & gastrointestinal tract. Chronic: Repeated/prolonged skin contact may irritate/redden skin, progressing to dermatitis.

SECTION VIII - SPILL & DISPOSAL DATA

Accidental Spill Procedures: Absorb in inert material and dispose of according to local, state & federal regulations. Spill into water should be contained to avoid runoff into waterways.
Handling & Storage: Keep container closed and store in cool dry place. Emptied container still contains material which may ignite with explosive violence if exposed to open flame.

SECTION IX - SPECIAL PROTECTION DATA

Respiratory Protection: Respirator in confined areas.
Ventilation: Desired Exhaust: Mechanical
Protective Gloves: Solvent/chemical resistant gloves
Eye Protection: Safety glasses, goggles.
Other Protection: As required to avoid skin contact.

SECTION X - TRANSPORT INFORMATION

The following may not apply to all shipping situations. Consult 49 CFR for more mode-specific or quantity-specific data.
DOT Proper Shipping Name: Not regulated
DOT Hazard Class or Division: Not regulated
DOT Identification Number: N/A
DOT Packaging Group: III
Type Label(s) Required. none
Placard: Not applicable
*For Limited Quantity requirements see DOT regulation 49 CFR.

SECTION XI - DISCLAIMERS

* SOME INFORMATION PROVIDED HEREIN WAS DRAWN FROM SOURCES OTHER THAN INTEGRITY INDUSTRIES.
THE INFORMATION PROVIDED HEREIN IS BELIEVED BY INTEGRITY INDUSTRIES, INC. TO BE CORRECT & RELIABLE; NO EXPRESSED OR IMPLIED WARRANTY IS PROVIDED HOWEVER.
* INTEGRITY INDUSTRIES, INC. ASSUMES NO RESPONSIBILITY AND DENIES ALL LIABILITY FOR ANY LOSS, DAMAGE, OR EXPENSE CONNECTED WITH CUSTOMERS' METHOD OF HANDLING, STORAGE, USE, AND DISPOSAL OF THIS PRODUCT.
* THE MSDS INFORMATION PROVIDED HEREIN IS APPLICABLE ONLY TO THIS PRODUCT.

Exhibit 7

Subject:
From: "Randis, Thomas" <trandis@state.pa.us>
Date: Fri, 05 Feb 2010 07:57:37 -0500
To: "'David.Kovach@drbc.state.nj.us'" <David.Kovach@drbc.state.nj.us>
CC: "Hawley, Robert" <rhawley@state.pa.us>, "Miller, Chad (DEP)" <chadmiller@state.pa.us>, "Engle, David" <daengle@state.pa.us>

Good Morning Dave,

Valley Joint SA was contacted regarding the acceptance of this top-hole water. The Authority is adamant that they have not taken any further drilling water/wastewater/fluids since DEP sent them a letter in April 2009 requesting a permit amendment if they want to continue accepting these types of wastewaters. It is possible that they accepted this material prior to this date. If Stone Energy is insistent that the top-hole water was disposed of at this facility, either it was prior to April 2009 or there is a disconnect in disposal sites. Thanks Tom

Thomas Randis | Environmental Group Manager
Department of Environmental Protection
208 West Third Street, Suite 101, Williamsport, PA 17701
Phone: (570) 327-3781 | Fax: (570) 327-3565
www.depweb.state.pa.us

----Original Message-----
From: David Kovach [mailto:David.Kovach@drbc.state.nj.us]
Sent: Thursday, February 04, 2010 10:16 AM
To: Miller, Chad (DEP)
Subject: Valley Joint Sewer Authority in Athens, PA

Hi Chad,
Are you aware that the Valley Joint Sewer Authority in Athens, PA apparently accepted water produced during the drilling of the Stone Energy, Matoushek 1 natural gas well. Most of the water was fresh tophole water with potassium chloride as a drilling additive totalling approximately 270,000 gallons. Was the authority approved to take this water? Is there any concerns with accepting these types of wastes. Any help would be appreciated.
Thanks,
Dave

--
David Kovach, P.G.
Geologist, Project Review Section
Delaware River Basin Commission
(p) 609-883-9500 ext 264
(f) 609-883-9522
(e) david.kovach@drbc.state.nj.us

Subject: DRBC Data request
From: "Stiles, Kevin" <StilesEK@StoneEnergy.com>
Date: Mon, 25 Jan 2010 14:07:44 +0000
To: "'david.kovach@drbc.state.nj.us'" <David.Kovach@drbc.state.nj.us>

David:

My technical staff has assembled the information below to answer your questions of last Thursday 1.21. Please let us know if you require any additional information. Looking forward to seeing you at our hearing in February.

Best Regards/Kevin

Kevin Stiles
Appalachia Manager
Stone Energy
6000 Hampton Center Suite E
Morgantown WV 26505
337-291-7783
304-216-1083 Cell
StilesEK@StoneEnergy.com

Matoushek #1 top hole drilling summary:

- Drilled 24" hole from surface to 60'
- 0 – 50', till/gravel/pebbles, drilled on air, hole damp
- 50' – 60', bedrock, drilled on air, hole dry
- 24" conductor pipe set at 60'
- Drilled 17-1/2" hole from 60' to 710'
- 60' – 650', gray shale/siltstone, drilled on air/mist, hole damp
- **650' – 665', significant FW zone**, ~3000 bbls FW to surface (aka 3000 bbls of tophole water)
- 665' – 710', gray shale/siltstone, drilled on air/mist, hole wet from above FW zone
- 13-3/8" conductor casing set at 710' (cemented to surface)
- Drilled 12-1/4" hole from 710' to 1964'
- 710' – 1964', gray shale/siltstone, drilled on air/mist, hole damp, gained 1 to 1.5 bbl/hr water while drilling (~50 bbls FW to surface / tophole water)
- Note: since the hole was damp and "making water" just below the 13-3/8" shoe, the ~50 bbls of water came from near the shoe
- **Note: no significant FW or salt water zones were encountered while drilling the 12-1/4" hole**
- 9-5/8" surface casing set at 1964' (cemented to surface)
- Drilled 8-3/4" hole below 1964', drilled on air/dusted, hole dry, no water zones encountered

1) Depth of all fresh water horizons:
   - 0 – 50', till/gravel/pebbles, hole damp
   - 50' – 650', gray shale/siltstone, hole damp
   - **650' – 665', significant FW zone (~3000 bbls of tophole water)**
   - 665' – approximately 750', gray shale/siltstone, hole wet (~50 bbls of tophole water)
2) Depth of all salt water horizons:
   - No significant salt water horizons were encountered
3) Disposal of salt water in 2) above:

- No significant salt water horizons were encountered