STATE OF NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 12033

APPLICATION OF PUBLIC SERVICE COMPANY OF NEW MEXICO FOR REVIEW OF OIL CONSERVATION DIVISION DIRECTIVE DATED MARCH 13, 1998, DIRECTING APPLICANT TO PERFORM ADDITIONAL REMEDIATION FOR HYDROCARBON CONTAMINATION, SAN JUAN COUNTY, NEW MEXICO.

VOLUME 3

PREPARED DIRECT TESTIMONY AND EXHIBITS

OF

PAUL V. ROSASCO, P.E.

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		PREPARED DIRECT TESTIMONY OF PAUL V. ROSASCO
1	I.	INTRODUCTION AND QUALIFICATIONS.
2	Q.	STATE YOUR FULL NAME FOR THE RECORD.
3	A.	Paul V. Rosasco
4	Q.	WHERE DO YOU RESIDE?
5	A.	Golden, Colorado
6	Q.	BY WHOM ARE YOU EMPLOYED, AND IN WHAT CAPACITY?
7	A.	I am employed by Engineering Management Support, Inc. as Principal Engineer and
8		President.
9	Q.	WHAT IS YOUR EDUCATIONAL BACKGROUND?
10	A.	I have a Bachelor of Science degree in Geology from the University of Oregon, and a Master
		of Engineering Degree in Engineering and Geology from the Colorado School of Mines.
12	Q.	WHAT IS YOUR AREA OF EXPERTISE?
13	A.	I am a Geologist-Hydrologist-Civil Engineer The focus of my work is on the investigation
14		and remediation of soil and water contamination.
15	Q.	DESCRIBE YOUR PROFESSIONAL BACKGROUND.
16	A.	I have over twenty years experience with site investigations and engineering evaluations for
17		waste disposal sites and other soil and groundwater contamination sites involving solvents
18		and hydrocarbons. My work has included large sites such as the Rocky Mountain Arsenal,
19		the South Valley of Albuquerque, the San Juan Basin of Colorado and New Mexico, the San
20		Gabriel Valley, California, the Redlands California and Sand Creek-Commerce City,
21		Colorado. I have also worked on complex sites such as the Lowery Landfill in Colorado,

1 the Denver Radium Site, and the Rocky Flats Industrial Park in Colorado. The petroleum facilities on which I have worked include Conoco/ Total Refineries in commerce City 2 Colorado, Amoco's Casper Refinery in Wyoming, the Paramount Refinery in California, the 3 Pasco bulk storage facility in the State of Washington, the Fruitland formation in the San 4 Juan Basin, the Little America Refinery in Casper, Wyoming and various smaller storage, 5 6 retail or industrial facilities. 7 **Q**. **ARE YOU A REGISTERED ENGINEER?** 8 I am a registered professional (civil) engineer in the states of Colorado and Illinois. A. 9 Q. HAVE YOU PREVIOUSLY TESTIFIED AS AN EXPERT WITNESS IN GEOLOGY, 10 **HYDROLOGY AND CIVIL ENGINEERING?** A. I have previously testified as an expert witness at depositions and/or at trial in approximately 25 state or federal court cases over the last 16 years. I have also testified at numerous local 12 13 and state hearings including the Oil Conservation Division Examiner Hearing in this case. 14 15 II. EMPLOYMENT BY BURLINGTON RESOURCES OIL & GAS COMPANY WHEN WHERE YOU FIRST CONTACTED BY BURLINGTON RESOURCES OIL 16 **Q**. & GAS COMPANY CONCERNING THE CONTAMINATION AT THE HAMPTON 17 18 **4M WELL SITE?** 19 A. I was first contacted by Burlington in June 1998 and began work on this matter in September

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Q. WHAT DID BURLINGTON ASK YOU TO DO?

A. Burlington asked me to evaluate the soil and groundwater data obtained form the Hampton
4M well site and to consult on the site remediation activities.

4 Q. WHAT DOCUMENTS HAVE YOU REVIEWED IN CONNECTION WITH YOUR

WORK ON THE HAMPTON 4M WELL SITE?

- 6 A. I have reviewed the following documents:
- 7 Groundwater monitoring data
- 8 Soil sampling and analytical results
- 9 Soil excavation reports and information
- 10 Free product recovery data
 - Hampton 4M chronology, operation history
- 12 Histories and summaries of discovery, evaluation and remediation of

contamination at the Hampton 4M well site

- 14 Soil boring logs and monitoring well construction records
- 15 Hampton 4M production information
- 16 NMOCD file information regarding the Hampton 4M well
- Surface impoundment closure requirements and PNM and Burlington surface
 impoundment closure plans
- 19 Hampton 4M contamination work plans
- 20 NMOCD correspondence regarding contamination at the Hampton 4M
- 21 Transcript of the NMOCD Examiner hearing regarding the Hampton 4M

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- Q. HAVE YOU VISITED THE WELL SITE? 2 3 A. I visited the well site in September and November 1998 and in May of 1999. 4 5 III. SOURCES OF CONTAMINATION AT THE HAMPTON 4M WELL SITE Q. BASED ON YOUR EVALUATION OF THE SOIL AND GROUNDWATER 6 7 **INFORMATION AVAILABLE AND YOUR INSPECTIONS OF THE SITE, HAVE** YOU BEEN ABLE TO FORM AN OPINION AS TO THE SOURCES OF 8 **GROUNDWATER CONTAMINATION AT THE HAMPTON 4M WELL SITE?** 9 10 A. It is my opinion that the operations of both PNM and Burlington, specifically discharges to former unlined surface impoundments, have contributed to the soil and groundwater 12 contamination and free product occurrences at the Hampton 4M site. 13 **Q**. **UPON WHAT DO YOU BASE THIS CONCLUSION?** 14 A. High levels of hydrocarbon contamination were present in the soil materials immediately 15 beneath both of the impoundments extending continuously throughout the vertical column 16 of soil beneath the base of each impoundment down to the saturated zone. Furthermore, the 17 highest levels of soil and groundwater contamination were detected in the immediate vicinity 18 of the two surface impoundments with the greatest accumulation of free product being 19 detected immediately beneath the former PNM surface impoundment. COULD THE HYDROCARBON RELEASES FROM THE BURLINGTON FORMER 20 **Q**. 21 UNLINED SURFACE PIT HAVE BEEN THE SOURCE OF CONTAMINATION
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FOUND IN THE UNSATURATED SOILS LOCATED BENEATH THE FORMER

what a bout

PNM SURFACE PIT?

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A. Absolutely not. Based on the results of soil borings and site excavations, a continuous zone of hydrocarbon or contaminant occurrences in the unsaturated zone was not present and never existed between the locations of the former Burlington and PNM surface impoundments.

Q. COULD THE CONTAMINATION BENEATH THE FORMER PNM
DEHYDRATION PIT HAVE MIGRATED UPWARD FROM AREAS OF
UNDERLYING GROUNDWATER CONTAMINATION?

No. Although minor amounts of the most volatile contaminants could migrate upward from 10 A. the areas of underlying groundwater contamination or free product occurrences, such upward 12 volatilization would only result in trace levels of volatile contaminants. Furthermore, upward migration of this nature would not contribute to total petroleum hydrocarbon type 13 contaminants which includes hydrocarbons of low volatility nor would it result in the stained -14 soils or soils heavily contaminated with hydrocarbons as were observed in the unsaturated. 15 16 zone beneath the PNM impoundment. The contaminants found beneath the PNM impoundment tend to occur nearest the source of the hydrocarbon contamination and would 17 not "skip" the area immediately downgradient of the Burlington impoundment only to "rise 18 19 up" beneath the PNM impoundment.

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Q. WAS THE FORMER PNM PIT A SOURCE OF CONTAMINATION?

A. All of the site data clearly shows that the PNM impoundment was a source of hydrocarbon

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1 releases and that hydrocarbons released to the PNM impoundment migrated downward through the soil column resulting in extensive soil contamination at high levels. The 2 3 hydrocarbons released from the PNM surface impoundment that migrated down through the 4 soil column reached the underlying water table resulting in contamination of saturated zone 5 soil, accumulations of free product and dissolved phase groundwater contamination. DID PNM'S PRIOR EFFORT TO REMEDIATE THE SOIL AT THE LOCATION Q. 6 OF THEIR FORMER PIT ELIMINATE THEIR PIT AS A SOURCE OF 7 **CONTAMINATION AT THE HAMPTON 4M WELL SITE?** 8 9 Α. PNM's prior soil removal effort was incomplete and left significant amounts of contaminated 10 soils in place at depths ranging from approximately 12 to 25 feet below ground surface beneath their former impoundment.

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13 IV. **BURLINGTON'S 1998-1999 REMEDIATION EFFORTS**

14 **Q**. WERE BURLINGTON'S RECENT REMEDIATION EFFORTS A REASONABLE 15 AND COST EFFECTIVE METHOD OF ADDRESSING CONTAMINATION **REMAINING AT THE HAMPTON 4M WELL SITE?** 16

17 A. Yes. The intent of Burlington's remediation was to remove, to the maximum extent possible, 18 the sources of ongoing groundwater contamination and to quickly recover as much free 19 product as possible. These sources included heavily contaminated soil in the unsaturated 20 zone and the upper part of the saturated zone.

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Burlington's efforts were based on accepted technology for remediation of sources of contamination. Source removal by excavation was used to remove the contamination present in the unsaturated (vadosc) zone soil, saturated zone soil, and free product. Excavation is a more comprehensive and complete method for removal of contamination than other indirect and partial methods such as soil vapor extraction, bioventing, and free product recovery.

Excavation of contamination soils was within and consistent with the scope of both the PNM and Burlington approved plans for addressing contamination associated with unlined surface impoundments. In addition, excavation was an appropriate technique given the nature and extent if the contamination and the associated existing and potential impacts associated with the actual and projected future groundwater contamination particularly potential impacts to downgradient water supply wells and users.

Q. DID BURLINGTON'S RECENT EXCAVATION RESULT IN ADVERSE GROUNDWATER IMPACTS?

A. The recent excavation of contaminated soil at the Hampton 4M well site by Burlington did not result in adverse groundwater impacts. Review of the available groundwater monitoring results (Burlington Exhibit No. 33) obtained subsequent to the remediation activities does not indicate that a marked increase in contaminant levels has occurred in any of the monitoring wells or locations. No free product has been observed in the area where extensive free product accumulations were observed prior to the remediation activities and



		PREPARED DIRECT TESTIMONY OF PAUL V. ROSASCO
1		more specifically in the area of the former wells MW-2 and MW-6 and the new well MW-12.
2		Furthermore, groundwater monitoring results obtained from the well MW-7, located in the
3		wash downgradient of the Hampton 4M well site have displayed significant reductions in
4		contaminant concentrations subsequent to recent remediation activities conducted by
5		Burlington.
6	Q.	DOES THAT CONCLUDE YOUR DIRECT TESTIMONY?
7	A.	Yes.
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VERIFICATION

STATE OF COLORADO)

ss:

COUNTY OF JEFFERSON

Paul V. Rosasco, being first duly sworn upon oath, deposes and states that I am a Principal Engineer and President for Engineering Management Support, Inc., that I have read the foregoing Prepared Direct Testimony and the same is true and correct to the best of my information, knowledge and belief.

Paul V. Rosasco Principal Engineer and President Engineering Management Support, Inc.

SUBSCRIBED AND SWORN to before me this $\frac{3th}{2}$ day of July, 1999 by Paul V. Rosasco.

Chery L. Walters Notary Public

My commission expires:

11/30/99

CHERYL L. WALTERS NOTARY PUBLIC, STATE OF COLORADO

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